



# Mini size of Discrete semiconductor elements



## Diode Rectifier

|   |                                      |       |    |
|---|--------------------------------------|-------|----|
| → | Schottky SOD-723 / SOD-523 / SOD-323 | ----- | P1 |
| → | TO-252 / TO263                       |       |    |
| → | SOT-23-6 / TSSOP-8 / SOP-8           |       |    |
| → | mini-MELF / MELF                     |       |    |
| → | SMA / SMB / SMC                      |       |    |
| → | Switching SOT-523 / SOT-323 / SOT-23 | ----- | P2 |
| → | Bridge (Single phase / Three phase)  | ----- | P3 |
| → | RF ( low capacitance ) & Varactor    | ----- | P4 |



## MOSFET

|   |                                  |       |    |
|---|----------------------------------|-------|----|
| → | SOT-323                          | ----- | P5 |
| → | SOT-23                           |       |    |
| → | TO-252 / TO-263 / TO-220 / TO-3P | ----- | P6 |
| → | TSSOP-8 / SOP-8                  |       |    |



## Regulator

|   |                                    |       |     |
|---|------------------------------------|-------|-----|
| → | Switching Regulator / Charger pump | ----- | P7  |
| → | DC-DC converter / PWM IC           | ----- | P8  |
| → | Step-up/down (Boost / Buck)        |       |     |
| → | LDO Regulator                      | ----- | P9~ |
| → | Ultra LDO Regulator                | ----- | P11 |



## Transistor (Digital)

|   |   |       |      |
|---|---|-------|------|
| → | SOT-323 / SOT-363 (Dual N , Dual P , P+N) | ----- | P12  |
| → | SOT-23 / SOT-89                           | ----- | P13  |
| → | TO-252 / TO-263                           | ----- | P14  |
| → | TO-92 / TO-220 / TO-3P                    | ----- | P15  |
| → | Triac / SCR / RF (1GHz ~ )                |       |      |
| → | Digital                                   | ----- | P16~ |
|   |   |       | P18  |



## Reset IC

|   |                   |       |     |
|---|-------------------|-------|-----|
| → | SOT-23 / SOT-23-5 | ----- | P19 |
| → | SOT-89 / TO-92    |       |     |

## Logic IC

|   |                      |       |     |
|---|----------------------|-------|-----|
| → | SOT-23-5 / SOT-323-5 | ----- | P20 |
| → | Standard             |       |     |

## EEPROM IC



## Protection Device

|   |  |       |     |
|---|--|-------|-----|
| → | Sidac / Thyristor / EMI Filter                   | ----- | P21 |
| → | TVS / ESD Arrays / Varistor (chip)               | ----- | P22 |
| → | Gastube arrester / 5~6 pin arrester              | ----- | P23 |
| → | Polymer resetable fuse / Thermal switch & sensor | ----- | P24 |

## Film Capacitor

|   |  |       |     |
|---|--|-------|-----|
| → | Class X1 / X2 Safety license (300Vac)          | ----- | P25 |
| → | MPP / MPE / DMP (High current)                 |       |     |
| → | Minibox DC film cap. / <u>X+Y</u> combint cap. | ----- | P26 |
| → | Lighting film / AC starting film cap.          |       |     |



## Ceramic Cap.

|   |                                     |       |     |
|---|-------------------------------------|-------|-----|
| → | Class Y1 / Y2 Safety license        | ----- | P27 |
| → | High voltage (1KV ~ 6KV)            |       |     |
| → | Chip Capacitors & Multilayer (MLCC) |       |     |
| → | Tantalum Capacitors                 |       |     |



## Package Outline Dimensions

----- P28 ~ P34

**\*Other Industrial specification ( -20°C / -30°C / - 40°C ~ 85°C )**

# Transistors

| Part Number           | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |      |            |            |            |            |            | fT<br>MHz | PIN  |
|-----------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|------|------------|------------|------------|------------|------------|-----------|------|
|                       |            | BVCBO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |      |            |            | VCE(sat)   |            |            |           |      |
|                       |            |                 |              |            |                       | Min                                  | Max  | IC<br>(mA) | VCE<br>(V) | Max<br>(V) | IC<br>(mA) | IB<br>(mA) |           |      |
| <b>SOT-323 (P.28)</b> |            |                 |              |            |                       |                                      |      |            |            |            |            |            |           |      |
| BC846W                | NPN        | 80              | 65           | 100        | 225                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | BCE  |
| BC847W                | NPN        | 50              | 45           | 100        | 225                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | BCE  |
| MMBT2222AW            | NPN        | 75              | 40           | 600        | 225                   | 100                                  | 300  | 150        | 10         | 0.5        | 380        | 10         | 300       | BCE  |
| MMBT2907AW            | PNP        | -60             | -60          | -600       | 225                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | BCE  |
| MMBT3904W             | NPN        | 60              | 40           | 200        | 225                   | 100                                  | 300  | 10         | 1          | 0.2        | 10         | 1          | 300       | BCE  |
| MMBT3906W             | PNP        | -40             | -40          | -200       | 225                   | 120                                  | 360  | -10        | -1         | 0.25       | -10        | -1         | 250       | BCE  |
| *MMBT5401W            | PNP        | -160            | -150         | -600       | 225                   | 60                                   | 240  | -10        | -5         | -0.2       | -10        | -1         | 100       | BCE  |
| *MMBT5551W            | NPN        | 180             | 160          | 600        | 225                   | 80                                   | 250  | 10         | 5          | 0.15       | 10         | 1          | 100       | BCE  |
| <b>SOT-363 (P.29)</b> |            |                 |              |            |                       |                                      |      |            |            |            |            |            |           |      |
| MMDT2412              | N*2        | 50              | 40           | 150        | 200                   | 120                                  | 820  | 1          | 6          | 0.4        | 1          | 5          | 180       | DAUL |
| MMDT3904              | N*2        | 60              | 40           | 200        | 200                   | 100                                  | 300  | 10         | 1          | 0.2        | 10         | 1          | 300       | DAUL |
| MMDT2222              | N*2        | 75              | 40           | 600        | 200                   | 100                                  | 300  | 150        | 10         | 0.5        | 150        | 10         | 300       | DAUL |
| MMDT2411              | N*2        | 40              | 40           | 600        | 200                   | 82                                   | 560  | 100        | 3          | 0.4        | 100        | 10         | 300       | DAUL |
| MMDT1036              | P*2        | -40             | -32          | 500        | 200                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | DAUL |
| MMDT1037              | P*2        | -60             | -50          | 150        | 200                   | 120                                  | 820  | -1         | -6         | -0.5       | -1         | -5         | 140       | DAUL |
| MMDT3906              | P*2        | -40             | -40          | 200        | 200                   | 100                                  | 300  | -10        | -1         | -0.25      | -10        | -1         | 250       | DAUL |
| MMDT2907              | P*2        | -60             | -60          | 600        | 200                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | DAUL |
| MMDT2227              | N+P        | 75              | 40           | 600        | 200                   | 100                                  | 300  | 150        | 10         | 0.3        | 150        | 15         | 300       | N+P  |
|                       |            | -60             | -60          | 600        | 200                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       |      |
| MMDT3946              | N+P        | 60              | 40           | 200        | 200                   | 100                                  | 300  | 10         | 1          | 0.2        | 10         | 1          | 300       | N+P  |
|                       |            | -40             | -40          | 200        | 200                   | 100                                  | 300  | -10        | -1         | -0.25      | -10        | -1         | 250       |      |
| <b>SOT-23 (P.28)</b>  |            |                 |              |            |                       |                                      |      |            |            |            |            |            |           |      |
| BC807                 | PNP        | -50             | -45          | -800       | 225                   | 100                                  | 630  | -100       | -1         | -0.7       | -500       | -50        | 100       | BCE  |
| BC817                 | NPN        | 50              | 45           | 800        | 225                   | 100                                  | 630  | 100        | 1          | 0.7        | 500        | 50         | 100       | BCE  |
| BC846                 | NPN        | 80              | 65           | 100        | 225                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | BCE  |
| BC847                 | NPN        | 50              | 45           | 100        | 225                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | BCE  |
| BC848                 | NPN        | 30              | 30           | 100        | 225                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | BCE  |
| BC856                 | PNP        | -80             | -65          | -100       | 225                   | 115                                  | 800  | -2         | -5         | -0.3       | -10        | -0.5       | 150       | BCE  |
| BC857                 | PNP        | -50             | -45          | -100       | 225                   | 110                                  | 800  | -2         | -5         | -0.3       | -10        | -0.5       | 150       | BCE  |
| BC858                 | PNP        | -30             | -30          | -100       | 225                   | 110                                  | 800  | -2         | -5         | -0.3       | -10        | -0.5       | 150       | BCE  |
| BCW65C                | NPN        | 60              | 32           | 800        | 225                   | 250                                  | 630  | 100        | 1          | 0.3        | 100        | 10         | 170       | BCE  |
| MMBT1015              | PNP        | -50             | -50          | -150       | 225                   | 120                                  | 700  | -2         | -6         | -0.3       | -100       | -10        | 80        | BCE  |
| MMBT1815              | NPN        | 60              | 50           | 150        | 225                   | 120                                  | 700  | 2          | 6          | 0.25       | 100        | 10         | 80        | BCE  |
| MMBT2222A             | NPN        | 75              | 40           | 600        | 225                   | 100                                  | 300  | 150        | 10         | 0.5        | 380        | 10         | 300       | BCE  |
| MMBT2369              | NPN        | 40              | 40           | 500        | 225                   | 40                                   | 120  | 10         | 1          | 0.25       | 10         | 1          | 500       | BCE  |
| MMBT2484              | NPN        | 60              | 60           | 50         | 225                   | 250                                  | -    | 1          | 5          | 0.35       | 1          | 0.1        |           | BCE  |
| MMBT2907A             | PNP        | -60             | -60          | -600       | 225                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | BCE  |
| MMBT3904              | NPN        | 60              | 40           | 200        | 225                   | 100                                  | 300  | 10         | 1          | 0.2        | 10         | 1          | 300       | BCE  |
| MMBT3906              | PNP        | -40             | -40          | -200       | 225                   | 120                                  | 360  | -10        | -1         | 0.25       | -10        | -1         | 250       | BCE  |
| MMBT4124              | NPN        | 30              | 25           | 200        | 225                   | 120                                  | 360  | 2          | 1          | 0.3        | 50         | 5          | 300       | BCE  |
| MMBT4125              | PNP        | -30             | -30          | -200       | 225                   | 50                                   | 150  | -2         | -1         | -0.4       | -50        | -5         | 200       | BCE  |
| MMBT4401              | NPN        | 60              | 40           | 600        | 225                   | 100                                  | 300  | 150        | 1          | 0.4        | 150        | 15         | 250       | BCE  |
| MMBT4403              | PNP        | -40             | -40          | -600       | 225                   | 100                                  | 300  | -150       | -2         | -0.4       | -150       | -15        | 200       | BCE  |
| MMBT5086              | PNP        | -50             | -50          | -50        | 225                   | 150                                  | 500  | -0.1       | -5         | -0.3       | -10        | -1         | 40        | BCE  |
| MMBT5087              | PNP        | -50             | -50          | -50        | 225                   | 250                                  | 800  | -0.1       | -5         | -0.3       | -10        | -1         | 40        | BCE  |
| MMBT5088              | NPN        | 35              | 30           | 50         | 225                   | 300                                  | 900  | 0.1        | 5          | 0.5        | 10         | 1          | 50        | BCE  |
| MMBT5089              | NPN        | 30              | 25           | 50         | 225                   | 400                                  | 1200 | 0.1        | 5          | 0.5        | 10         | 1          | 50        | BCE  |
| MMBT5401              | PNP        | -160            | -150         | -600       | 225                   | 60                                   | 240  | -10        | -5         | -0.2       | -10        | -1         | 100       | BCE  |
| MMBT5550              | NPN        | 160             | 140          | 600        | 225                   | 60                                   | 250  | 10         | 5          | 0.25       | 50         | 5          | 100       | BCE  |
| MMBT5551              | NPN        | 180             | 160          | 600        | 225                   | 80                                   | 250  | 10         | 5          | 0.15       | 10         | 1          | 100       | BCE  |
| MMBT6427              | NPN        | 40              | 40           | 500        | 225                   | 20K                                  | 200K | 100        | 5          | 1.2        | 50         | 0.5        |           | BCE  |
| MMBT6429              | NPN        | 55              | 45           | 200        | 225                   | 500                                  | 1250 | 0.1        | 5          | 0.2        | 10         | 0.5        | 100       | BCE  |
| MMBT6517              | NPN        | 350             | 350          | 500        | 225                   | 30                                   | 200  | 30         | 10         | 0.5        | 30         | 3          | 40        | BCE  |
| MMBT6520              | PNP        | -350            | -350         | -500       | 225                   | 30                                   | 200  | -30        | -10        | -0.5       | -30        | -3         | 40        | BCE  |
| MMBT8050              | NPN        | 25              | 20           | 700        | 225                   | 150                                  | 500  | 150        | 1          | 0.5        | 500        | 50         | 150       | BCE  |
| MMBT8099              | NPN        | 80              | 80           | 500        | 225                   | 100                                  | 300  | 1          | 5          | 0.4        | 100        | 5          | 150       | BCE  |
| MMBT8550              | PNP        | -25             | -20          | -700       | 225                   | 150                                  | 400  | -150       | -1         | -0.5       | -500       | -50        | 150       | BCE  |
| MMBT8599              | PNP        | -80             | -80          | -500       | 225                   | 100                                  | 300  | -1         | -5         | -0.4       | -100       | -5         | 150       | BCE  |
| MMBT9018              | NPN        | 20              | 15           | 50         | 225                   | 30                                   | 400  | 1          | 6          | 0.5        | 5          | 0.5        | 500       | BCE  |
| MMBTA06               | NPN        | 80              | 80           | 500        | 225                   | 50                                   | -    | 10         | 1          | 0.25       | 100        | 10         | 100       | BCE  |
| MMBTA13               | NPN        | 30              | 30           | 300        | 225                   | 10K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        | 125       | BCE  |
| MMBTA14               | NPN        | 30              | 30           | 300        | 225                   | 20K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        | 125       | BCE  |

| Part Number          | NPN or PNP | Maximum Ratings |       |       |               | Electrical Characteristics (Ta=25°C) |      |            |            |            |            |            | fT<br>MHz | PIN |
|----------------------|------------|-----------------|-------|-------|---------------|--------------------------------------|------|------------|------------|------------|------------|------------|-----------|-----|
|                      |            | BVCBO           | BVCEO | IC    | PD<br>Ta=25°C | hFE                                  |      |            |            | VCE(sat)   |            |            |           |     |
|                      |            | (V)             | (V)   | (mA)  | (mW)          | Min                                  | Max  | IC<br>(mA) | VCE<br>(V) | Max<br>(V) | IC<br>(mA) | IB<br>(mA) |           |     |
| <b>SOT-23 (P.28)</b> |            |                 |       |       |               |                                      |      |            |            |            |            |            |           |     |
| MMBTA42              | NPN        | 300             | 300   | 500   | 225           | 40                                   | -    | 10         | 10         | 0.5        | 20         | 2          | 50        | BCE |
| MMBTA44              | NPN        | 450             | 400   | 300   | 350           | 50                                   | 300  | 10         | 10         | 0.4        | 1          | 0.1        |           | BCE |
| MMBTA56              | PNP        | -80             | -80   | -500  | 225           | 50                                   | -    | -100       | -1         | -0.25      | -100       | -10        | 100       | BCE |
| MMBTA64              | PNP        | -30             | -30   | -500  | 225           | 20K                                  | -    | -100       | -5         | -1.5       | -100       | -0.1       | 125       | BCE |
| MMBTA92              | PNP        | -300            | -300  | -500  | 225           | 40                                   | -    | -10        | -10        | -0.5       | -20        | -2         | 50        | BCE |
| MMBTA94              | PNP        | -400            | -400  | -150  | 350           | 75                                   | 200  | -10        | -10        | -0.2       | -1         | -0.1       |           | BCE |
| MMBTH10              | NPN        | 20              | 15    | 50    | 225           | 60                                   | -    | 4          | 10         | 0.5        | 4          | 0.4        | 650       | BCE |
| GT85C                | NPN        | 50              | 45    | 800   | 225           | 100                                  | 630  | 100        | 1          | 0.7        | 500        | 50         | 100       | BCE |
| GTD82NS              | NPN        | 40              | 30    | 3000  | 1000          | 30                                   | 400  | 1          | 2          | 0.5        | 2          | 0.2        | 80        | BCE |
| GTB72PS              | PNP        | -40             | -30   | -3000 | 1000          | 30                                   | 400  | -1         | -2         | -0.5       | -2         | -0.2       | 80        | BCE |
| SC5094               | NPN        | 18              | 10    | 20    | 150           | 50                                   | 200  | 1          | 2          | -          | -          | -          | 9000      | BCE |
| <b>SOT-89 (P.32)</b> |            |                 |       |       |               |                                      |      |            |            |            |            |            |           |     |
| M1300                | PNP        | -20             | -10   | -2000 | 1             | 140                                  | 1000 | -500       | -1         | -0.5       | -2000      | -50        | 140       | BCE |
| M14                  | NPN        | 30              | 30    | 300   | 1             | 20K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        | 125       | BCE |
| M1426                | PNP        | -20             | -20   | -3000 | 1.2           | 160                                  | 390  | -100       | -2         | -0.5       | -2000      | -100       | 240       | BCE |
| M2222A               | NPN        | 75              | 40    | 600   | 1.2           | 100                                  | 300  | 150        | 10         | 0.3        | 150        | 15         | 300       | BCE |
| M27                  | NPN        | 60              | 60    | 500   | 1             | 10K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        |           | BCE |
| M2907A               | PNP        | -60             | -60   | -600  | 1.2           | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | BCE |
| M3019                | NPN        | 140             | 80    | 1000  | 1.2           | 100                                  | 300  | 150        | 10         | 0.2        | 150        | 15         | 100       | BCE |
| M3669                | NPN        | 80              | 80    | 2000  | 1             | 300                                  | -    | 500        | 2          | 0.5        | 1000       | 50         | 100       | BCE |
| M3904                | NPN        | 60              | 40    | 200   | 1             | 100                                  | 300  | 10         | 1          | 0.3        | 50         | 5          | 300       | BCE |
| M3906                | PNP        | -40             | -40   | -200  | 1             | 100                                  | 300  | -10        | -1         | -0.4       | -50        | -5         | 250       | BCE |
| M4033                | PNP        | -80             | -80   | -1000 | 1.2           | 100                                  | -    | -100       | -5         | -0.5       | -500       | -50        | 100       | BCE |
| M42                  | NPN        | 300             | 300   | 500   | 1             | 40                                   | -    | 10         | 10         | 0.5        | 20         | 2          | 50        | BCE |
| M44                  | NPN        | 400             | 400   | 300   | 1             | 50                                   | 300  | 10         | 10         | 0.38       | 20         | 2          |           | BCE |
| M5401                | PNP        | -160            | -150  | -600  | 1             | 60                                   | 240  | -10        | -5         | -0.5       | -50        | -5         | 100       | BCE |
| M5551                | NPN        | 180             | 160   | 600   | 1.2           | 80                                   | 250  | 10         | 5          | 0.2        | 50         | 5          | 100       | BCE |
| M64                  | PNP        | -30             | -30   | -500  | 1             | 10K                                  | -    | -10        | -5         | -1.5       | -100       | -0.1       | 125       | BCE |
| M6718                | NPN        | 100             | 100   | 1000  | 1             | 100                                  | 250  | 250        | 1          | 0.35       | 350        | 35         | 50        | BCE |
| M772                 | PNP        | -40             | -30   | -3000 | 1.5           | 100                                  | 500  | -1000      | -2         | -0.5       | -2000      | -200       | 80        | BCE |
| M772A                | PNP        | -60             | -50   | -3000 | 1.5           | 100                                  | 500  | -1000      | -2         | 0.5        | -2000      | -200       | 80        | BCE |
| M879                 | NPN        | 30              | 10    | 3000  | 1             | 140                                  | 400  | 3000       | 2          | 0.4        | 3000       | 60         | 200       | BCE |
| M882                 | NPN        | 40              | 30    | 3000  | 1.5           | 100                                  | 500  | 1000       | 2          | 0.5        | 2000       | 200        | 90        | BCE |
| M92                  | PNP        | -300            | -300  | -500  | 1             | 40                                   | -    | -10        | -10        | -0.5       | -20        | -2         | 50        | BCE |
| M92M                 | PNP        | -300            | -300  | -800  | 1             | 80                                   | -    | -10        | -10        | -0.7       | -100       | -10        | 50        | BCE |
| M94                  | PNP        | -400            | -400  | -500  | 1             | 50                                   | 300  | -10        | -10        | -0.5       | -10        | -1         |           | BCE |
| M965                 | NPN        | 40              | 20    | 5000  | 1.2           | 340                                  | 800  | 500        | 2          | 0.35       | 3000       | 100        | 150       | BCE |
| <b>TO-92 (P.31)</b>  |            |                 |       |       |               |                                      |      |            |            |            |            |            |           |     |
| 2N3417               | NPN        | 50              | 50    | 500   | 625           | 180                                  | 540  | 2          | 4.5        | 0.3        | 50         | 3          |           | EBC |
| 2N3904               | NPN        | 60              | 40    | 200   | 625           | 100                                  | 300  | 10         | 1          | 0.2        | 10         | 1          | 300       | EBC |
| 2N3906               | PNP        | -40             | -40   | -200  | 625           | 100                                  | 300  | -10        | -1         | -0.25      | -10        | -1         | 250       | EBC |
| 2N4124               | NPN        | 30              | 25    | 200   | 350           | 120                                  | 360  | 2          | 1          | 0.3        | 50         | 5          | 300       | EBC |
| 2N4126               | PNP        | -25             | -25   | -200  | 625           | 120                                  | 360  | -2         | -1         | -0.4       | -50        | -5         | 250       | EBC |
| 2N4401               | NPN        | 60              | 40    | 600   | 625           | 100                                  | 300  | 150        | 1          | 0.4        | 150        | 15         | 250       | EBC |
| 2N4403               | PNP        | -40             | -40   | -600  | 625           | 100                                  | 300  | -150       | -2         | -0.4       | -150       | -15        | 200       | EBC |
| 2N5086               | PNP        | -50             | -50   | -50   | 350           | 150                                  | 500  | -0.1       | -5         | -0.3       | -10        | -1         | 40        | EBC |
| 2N5087               | PNP        | -50             | -50   | -50   | 625           | 250                                  | 800  | -0.1       | -5         | -0.3       | -10        | -1         | 40        | EBC |
| 2N5088               | NPN        | 35              | 30    | 50    | 350           | 300                                  | 900  | 0.1        | 5          | 0.5        | 10         | 1          | 50        | EBC |
| 2N5089               | NPN        | 30              | 25    | 50    | 350           | 400                                  | 1200 | 0.1        | 5          | 0.5        | 10         | 1          | 50        | EBC |
| 2N5366               | PNP        | -40             | -40   | -500  | 400           | 100                                  | -    | -50        | -1         | -0.25      | -50        | -5         |           | ECB |
| 2N5401               | PNP        | -160            | -150  | -600  | 625           | 80                                   | 400  | -10        | -5         | -0.2       | -10        | -1         | 100       | EBC |
| 2N5551               | NPN        | 180             | 160   | 600   | 625           | 80                                   | 400  | 10         | 5          | 0.2        | 50         | 5          | 100       | ECB |
| 2N6426               | NPN        | 40              | 40    | 500   | 625           | 20K                                  | 200K | 500        | 5          | 1.5        | 500        | 0.5        |           | EBC |
| 2N6427               | NPN        | 40              | 40    | 500   | 625           | 10K                                  | 100K | 10         | 5          | 1.2        | 50         | 0.5        |           | EBC |
| 2N6517               | NPN        | 350             | 350   | 500   | 625           | 30                                   | 200  | 30         | 10         | 0.3        | 10         | 1          | 40        | EBC |
| 2N6520               | PNP        | -350            | -350  | -500  | 625           | 30                                   | 200  | -30        | -10        | -0.3       | -10        | -1         | 40        | EBC |
| 2N6718L              | NPN        | 100             | 100   | 1000  | 850           | 50                                   | 300  | 250        | 1          | 0.35       | 350        | 35         | 50        | ECB |
| A3669                | NPN        | 80              | 80    | 2000  | 750           | 240                                  | -    | 500        | 2          | 0.5        | 1000       | 50         | 100       | ECB |
| A8050                | NPN        | 40              | 25    | 1500  | 1000          | 85                                   | 500  | 100        | 1          | 0.5        | 800        | 80         | 100       | EBC |
| A8050S               | NPN        | 25              | 20    | 700   | 625           | 100                                  | 500  | 150        | 1          | 0.5        | 500        | 50         | 150       | EBC |
| A8550                | PNP        | -40             | -25   | -1500 | 1000          | 85                                   | 500  | -100       | -1         | -0.5       | -800       | -80        | 100       | EBC |
| A8550S               | PNP        | -25             | -20   | -700  | 625           | 100                                  | 500  | -150       | -1         | -0.5       | -500       | -50        | 150       | EBC |
| AD825                | NPN        | 80              | 55    | 600   | 625           | 10K                                  | 100K | 100        | 5          | 1.5        | 100        | 0.1        | 125       | BCE |
| AD826                | NPN        | 75              | 60    | 600   | 625           | 100                                  | 300  | 150        | 10         | 1          | 500        | 50         | 300       | BCE |

| Part Number         | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |      |            |            |            |            |            | fT<br>MHz | PIN |
|---------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|------|------------|------------|------------|------------|------------|-----------|-----|
|                     |            | BVCEO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |      |            |            | VCE(sat)   |            |            |           |     |
|                     |            |                 |              |            |                       | Min                                  | Max  | IC<br>(mA) | VCE<br>(V) | Max<br>(V) | IC<br>(mA) | IB<br>(mA) |           |     |
| <b>TO-92 (P.31)</b> |            |                 |              |            |                       |                                      |      |            |            |            |            |            |           |     |
| BC237               | NPN        | 50              | 45           | 100        | 400                   | 120                                  | 800  | 2          | 5          | 0.2        | 10         | 0.5        | 150       | CBE |
| BC327               | PNP        | -50             | -45          | -500       | 625                   | 100                                  | 600  | -100       | -1         | -0.7       | -500       | -50        | 100       | CBE |
| BC337               | NPN        | 50              | 45           | 800        | 625                   | 100                                  | 600  | 100        | 1          | 0.7        | 500        | 50         | 210       | CBE |
| BC546               | NPN        | 80              | 65           | 100        | 625                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | CBE |
| BC547               | NPN        | 50              | 45           | 100        | 625                   | 110                                  | 800  | 2          | 5          | 0.25       | 10         | 0.5        | 300       | CBE |
| BC548               | NPN        | 30              | 30           | 100        | 400                   | 110                                  | 800  | 2          | 5          | 0.6        | 100        | 5          |           | CBE |
| BC556               | PNP        | -80             | -65          | -100       | 500                   | 75                                   | 475  | -2         | -5         | -0.3       | -10        | -0.5       | 300       | CBE |
| BC557               | PNP        | -50             | -45          | -100       | 500                   | 75                                   | 800  | -2         | -5         | -0.3       | -10        | -1         | 300       | CBE |
| BC558               | PNP        | -30             | -25          | -100       | 500                   | 75                                   | 885  | -2         | -5         | -0.3       | -10        | -1         | 300       | CBE |
| BF422               | NPN        | 250             | 250          | 50         | 830                   | 50                                   | -    | 25         | 20         | 0.6        | 30         | 3          | 60        | ECB |
| BF423               | PNP        | -250            | -250         | -50        | 830                   | 50                                   | -    | -25        | -20        | -0.6       | -30        | -3         | 60        | ECB |
| DY227               | NPN        | 30              | 25           | 300        | 400                   | 70                                   | 400  | 50         | 1          | 0.4        | 300        | 30         |           | EBC |
| E8050               | NPN        | 40              | 25           | 1500       | 1000                  | 85                                   | 500  | 100        | 1          | 0.5        | 800        | 80         | 100       | ECB |
| E8050S              | NPN        | 25              | 20           | 700        | 625                   | 100                                  | 500  | 150        | 1          | 0.5        | 500        | 50         | 150       | ECB |
| E8051               | NPN        | 40              | 25           | 1500       | 1000                  | 85                                   | 500  | 100        | 1          | 0.5        | 800        | 80         | 100       | EBC |
| E8051S              | NPN        | 25              | 20           | 700        | 625                   | 100                                  | 500  | 150        | 1          | 0.5        | 500        | 50         | 150       | EBC |
| E8550               | PNP        | -40             | -25          | -1500      | 1000                  | 85                                   | 500  | -100       | -1         | -0.5       | -800       | -80        | 100       | ECB |
| E8550S              | PNP        | -25             | -20          | -700       | 625                   | 100                                  | 500  | -150       | -1         | -0.5       | -500       | -50        | 150       | ECB |
| E8551               | PNP        | -40             | -25          | -1500      | 1000                  | 85                                   | 500  | -100       | -1         | -0.5       | -800       | -80        | 100       | EBC |
| E8551S              | PNP        | -25             | -20          | -700       | 625                   | 100                                  | 500  | -150       | -1         | -0.5       | -500       | -50        | 150       | EBC |
| E9012               | PNP        | -40             | -20          | -500       | 625                   | 112                                  | 300  | -50        | -1         | -0.6       | -500       | -50        | 100       | EBC |
| E9013               | NPN        | 40              | 20           | 500        | 625                   | 112                                  | 300  | 50         | 1          | 0.6        | 500        | 50         | 100       | EBC |
| E9014               | NPN        | 50              | 45           | 100        | 450                   | 100                                  | 1000 | 1          | 5          | 0.14       | 100        | 5          | 150       | EBC |
| E9015               | PNP        | -50             | -45          | -100       | 450                   | 100                                  | 600  | -1         | -5         | -0.2       | -100       | -5         | 100       | EBC |
| E9018               | NPN        | 30              | 15           | 50         | -                     | 39                                   | 198  | 1          | 5          | 0.5        | 10         | 1          | 700       | EBC |
| LB120A              | NPN        | 600             | 400          | 100        | 625                   | 10                                   | 36   | 50         | 10         | 0.4        | 50         | 10         |           | ECB |
| M28S                | NPN        | 40              | 20           | 1250       | 850                   | 300                                  | 1000 | 100        | 1          | 0.55       | 600        | 20         |           | ECB |
| MPS650              | NPN        | 60              | 40           | 2000       | 625                   | 75                                   | -    | 500        | 2          | 0.5        | 2000       | 200        | 75        | EBC |
| MPS651              | NPN        | 80              | 60           | 2000       | 625                   | 75                                   | -    | 500        | 2          | 0.5        | 2000       | 200        | 75        | EBC |
| MPS6562             | PNP        | -25             | -25          | -500       | 625                   | 50                                   | 200  | -500       | -1         | -0.5       | -500       | -50        | 60        | EBC |
| MPS751              | PNP        | -80             | -60          | -2000      | 625                   | 75                                   | -    | -500       | -2         | -0.5       | -2000      | -200       | 75        | EBC |
| MPS8099             | NPN        | 80              | 80           | 500        | 625                   | 100                                  | 300  | 1          | 5          | 0.4        | 100        | 5          |           | EBC |
| MPS8599             | PNP        | -80             | -80          | -500       | 625                   | 100                                  | 300  | -1         | -5         | -0.4       | -100       | -5         | 150       | EBC |
| MPSA05              | NPN        | 60              | 60           | 500        | 625                   | 50                                   | -    | 100        | 1          | 0.25       | 100        | 10         | 100       | EBC |
| MPSA06              | NPN        | 80              | 80           | 500        | 625                   | 50                                   | -    | 100        | 1          | 0.25       | 100        | 10         | 100       | EBC |
| MPSA13              | NPN        | 30              | 30           | 500        | 600                   | 10K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        | 125       | EBC |
| MPSA14              | NPN        | 30              | 30           | 500        | 625                   | 20K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        | 125       | EBC |
| MPSA18              | NPN        | 45              | 45           | 200        | 625                   | 500                                  | 1500 | 10         | 5          | 0.3        | 50         | 5          | 100       | EBC |
| MPSA26              | NPN        | 50              | 50           | 500        | 625                   | 10K                                  | -    | 10         | 5          | 1.5        | 100        | 0.1        |           | EBC |
| MPSA27              | NPN        | 60              | 60           | 500        | 625                   | 10K                                  | -    | 100        | 5          | 1.5        | 100        | 0.1        |           | EBC |
| MPSA42              | NPN        | 300             | 300          | 500        | 625                   | 40                                   | -    | 10         | 10         | 0.35       | 20         | 2          |           | EBC |
| MPSA42M             | NPN        | 300             | 300          | 800        | 625                   | 80                                   | -    | 10         | 10         | 0.2        | 20         | 2          | 50        | EBC |
| MPSA43              | NPN        | 200             | 200          | 500        | 625                   | 40                                   | -    | 10         | 10         | 0.35       | 20         | 2          | 50        | EBC |
| MPSA44              | NPN        | 400             | 400          | 300        | 625                   | 50                                   | 300  | 10         | 10         | 0.35       | 1          | 0.1        |           | EBC |
| MPSA55              | PNP        | -60             | -60          | -500       | 625                   | 50                                   | -    | -100       | -1         | -0.25      | -100       | -10        | 50        | EBC |
| MPSA56              | PNP        | -80             | -80          | -500       | 625                   | 50                                   | -    | -100       | -1         | -0.25      | -100       | -10        | 50        | EBC |
| MPSA64              | PNP        | -30             | -30          | -500       | 625                   | 10K                                  | -    | -10        | -5         | -1.5       | -100       | -0.1       | 125       | EBC |
| MPSA92              | PNP        | -300            | -300         | -500       | 625                   | 40                                   | -    | -10        | -10        | -0.35      | -20        | -2         | 50        | EBC |
| MPSA92M             | PNP        | -300            | -300         | -800       | 625                   | 80                                   | -    | -10        | -10        | -0.15      | -30        | -1         | 50        | EBC |
| MPSA93              | PNP        | -200            | -200         | -500       | 625                   | 40                                   | -    | -10        | -10        | -0.35      | -20        | -2         | 50        | EBC |
| MPSA94              | PNP        | -400            | -400         | -500       | 625                   | 50                                   | 300  | -10        | -10        | -0.5       | -10        | -1         |           | EBC |
| MPSH10              | NPN        | 20              | 15           | 50         | 625                   | 60                                   | -    | 4          | 10         | 0.5        | 4          | 0.4        | 650       | BEC |
| PH2369              | NPN        | 40              | 15           | 500        | 625                   | 40                                   | 120  | 10         | 1          | 0.25       | 10         | 1          | 500       | CBE |
| PN2222A             | NPN        | 75              | 40           | 600        | 625                   | 100                                  | 300  | 150        | 10         | 0.3        | 150        | 15         | 300       | EBC |
| PN2369A             | NPN        | 40              | 40           | 200        | 625                   | 40                                   | 120  | 10         | 0.35       | 0.2        | 10         | 1          | 500       | EBC |
| PN2907A             | PNP        | -60             | -60          | -600       | 625                   | 100                                  | 300  | -150       | -10        | -0.4       | -150       | -15        | 200       | EBC |
| SA1015              | PNP        | -50             | -50          | -150       | 400                   | 120                                  | 700  | -2         | -6         | -0.3       | -100       | -10        | 270       | ECB |
| SA1300              | PNP        | -20             | -10          | -2000      | 750                   | 140                                  | 1000 | -500       | -1         | -0.5       | -2000      | -50        | 140       | ECB |
| SA1538S             | PNP        | -120            | -120         | -200       | 900                   | 60                                   | 320  | -10        | -10        | -1         | -30        | -3         | 400       | ECB |
| SA733               | PNP        | -60             | -50          | -100       | 250                   | 90                                   | 600  | -1         | -6         | -0.18      | -100       | -10        | 100       | ECB |
| SB1109S             | PNP        | -160            | -160         | -100       | 900                   | 60                                   | 320  | -10        | -5         | -2         | -30        | -3         | 140       | ECB |
| SB1426              | PNP        | -20             | -20          | -3000      | 750                   | 82                                   | 390  | -100       | -2         | -0.5       | -2000      | -100       | 240       | ECB |
| SB562               | PNP        | -25             | -20          | -1000      | 900                   | 85                                   | 240  | -500       | -2         | -0.5       | -800       | -80        | 350       | ECB |
| SB564A              | PNP        | -30             | -25          | -1000      | 800                   | 70                                   | 400  | -100       | -1         | -0.5       | -1000      | -100       | 110       | ECB |

| Part Number          | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |     |            |            |            |            |            | fT<br>MHz | PIN |
|----------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|-----|------------|------------|------------|------------|------------|-----------|-----|
|                      |            | BVCBO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |     |            |            | VCE(sat)   |            |            |           |     |
|                      |            |                 |              |            |                       | Min                                  | Max | IC<br>(mA) | VCE<br>(V) | Max<br>(V) | IC<br>(mA) | IB<br>(mA) |           |     |
| <b>TO-92 (P.31)</b>  |            |                 |              |            |                       |                                      |     |            |            |            |            |            |           |     |
| SB764                | PNP        | -60             | -50          | -1000      | 900                   | 60                                   | 320 | -50        | -2         | -0.7       | -500       | -50        | 150       | ECB |
| SB772S               | PNP        | -40             | -30          | -3000      | 750                   | 100                                  | 400 | -1000      | -2         | -0.3       | -2000      | -200       | 80        | ECB |
| SC1815               | NPN        | 60              | 50           | 150        | 400                   | 120                                  | 700 | 2          | 6          | 0.25       | 100        | 10         | 80        | ECB |
| SC1959               | NPN        | 35              | 30           | 500        | 500                   | 120                                  | 240 | 100        | 1          | 0.25       | 100        | 10         | 300       | ECB |
| SC2228Y              | NPN        | 160             | 160          | 50         | 900                   | 60                                   | 320 | 10         | 10         | 0.6        | 20         | 2          | 50        | ECB |
| SC2240               | NPN        | 150             | 150          | 100        | 625                   | 120                                  | 400 | 2          | 6          | 0.3        | 10         | 1          | 100       | ECB |
| SC3953S              | NPN        | 120             | 120          | 200        | 900                   | 60                                   | 320 | 10         | 10         | 1          | 30         | 3          | 400       | ECB |
| SC945                | NPN        | 60              | 50           | 100        | 250                   | 135                                  | 600 | 1          | 6          | 0.1        | 100        | 10         | 150       | ECB |
| SD1609S              | NPN        | 160             | 160          | 100        | 900                   | 60                                   | 320 | 10         | 5          | 2          | 30         | 3          | 140       | ECB |
| SD1616A              | NPN        | 120             | 60           | 1000       | 750                   | 135                                  | 600 | 100        | 2          | 0.3        | 1000       | 50         | 100       | ECB |
| SD468                | NPN        | 25              | 20           | 1000       | 900                   | 85                                   | 240 | 500        | 2          | 0.5        | 800        | 80         | 190       | ECB |
| SD471A               | NPN        | 40              | 30           | 1000       | 800                   | 70                                   | 400 | 100        | 1          | 0.5        | 1000       | 100        | 130       | ECB |
| SD667A               | NPN        | 120             | 100          | 1000       | 900                   | 60                                   | 200 | 150        | 5          | 1          | 500        | 50         | 140       | ECB |
| SD879                | NPN        | 30              | 10           | 3000       | 750                   | 140                                  | 400 | 3000       | 2          | 0.3        | 3000       | 60         | 200       | ECB |
| SD882S               | NPN        | 40              | 30           | 3000       | 750                   | 100                                  | 500 | 1000       | 2          | 0.5        | 2000       | 200        | 90        | ECB |
| SD965                | NPN        | 40              | 20           | 5000       | 750                   | 230                                  | 800 | 500        | 2          | 0.35       | 3000       | 100        | 150       | ECB |
| T666                 | NPN        | 75              | 40           | 600        | 625                   | 100                                  | 300 | 150        | 10         | 0.3        | 150        | 15         | 300       | ECB |
| TL145                | NPN        | 500             | 500          | 300        | 1000                  | 50                                   | 300 | 20         | 10         | 0.5        | 20         | 2          | 10        | EBC |
| TL194                | PNP        | -400            | -400         | -300       | 1000                  | 50                                   | 300 | -20        | -10        | -0.2       | -20        | -2         | 10        | ECB |
| TL195                | PNP        | -500            | -500         | -300       | 1000                  | 50                                   | 300 | -20        | -10        | -0.5       | -20        | -2         | 10        | ECB |
| <b>TO-220 (P.30)</b> |            |                 |              |            |                       |                                      |     |            |            |            |            |            |           |     |
| H2584                | PNP        | -20             | -15          | -10        | 65                    | 1K                                   | 60K | -10        | -1.7       | -1.5       | -10        | -10        |           | BCE |
| H2585                | PNP        | -20             | -15          | -5         | 40                    | 1K                                   | 60K | -5         | -1.7       | -1.5       | -5         | -5         |           | BCE |
| 2N6388               | NPN        | 80              | 80           | 10         | 65                    | 1K                                   | 20K | 5          | 3          | 2          | 5          | 10         |           | BCE |
| 2N6668               | PNP        | -80             | -80          | -10        | 65                    | 1K                                   | 20K | -5         | -3         | -2         | -5         | -10        |           | BCE |
| BU406                | NPN        | 400             | 200          | 7          | 60                    | 30                                   | 125 | 2          | 5          | 1          | 5          | 500        |           | BCE |
| BU407                | NPN        | 330             | 150          | 7          | 60                    | 35                                   | 200 | 2          | 5          | 1          | 5          | 500        | 10        | BCE |
| D44H11               | NPN        | 80              | 80           | 10         | 50                    | 60                                   | -   | 2          | 1          | 1          | 8          | 400        | 50        | BCE |
| D45H11               | PNP        | -80             | -80          | -10        | 50                    | 60                                   | -   | -2         | -1         | -1         | -8         | -800       | 40        | BCE |
| LB124E               | NPN        | 600             | 400          | 2          | 35                    | 10                                   | 40  | 0.3        | 5          | 0.3        | 0.1        | 10         | 15        | BCE |
| LB125E               | NPN        | 600             | 400          | 5          | 40                    | 10                                   | -   | 0.01       | 5          | 0.5        | 1          | 200        |           | BCE |
| MJE13005             | NPN        | 700             | 400          | 4          | 75                    | 10                                   | 60  | 1          | 5          | 0.5        | 1          | 200        |           | BCE |
| MJE13007             | NPN        | 700             | 400          | 8          | 80                    | 10                                   | 40  | 2          | 5          | 1          | 2          | 400        |           | BCE |
| MJE13009             | NPN        | 700             | 400          | 12         | 100                   | 10                                   | 30  | 0.5        | 5          | 1          | 5          | 1000       | 4         | BCE |
| MJE2955T             | PNP        | -70             | -60          | -10        | 75                    | 20                                   | 100 | -4         | -4         | -1.1       | -4         | -400       | 2         | BCE |
| MJE3055T             | NPN        | 70              | 60           | 10         | 75                    | 20                                   | 100 | 4          | 4          | 1.1        | 4          | 400        | 2         | BCE |
| SB507                | PNP        | -60             | -60          | -3         | 30                    | 40                                   | 320 | -1         | -2         | -1         | -2         | -200       | 8         | BCE |
| SB857                | PNP        | -70             | -50          | -4         | 40                    | 60                                   | 320 | -1         | -4         | -1         | -2         | -200       | 15        | BCE |
| SC4242               | NPN        | 450             | 400          | 7          | 40                    | 10                                   | -   | 4          | 5          | 0.8        | 4          | 800        |           | BCE |
| SD1159               | NPN        | 200             | 60           | 4.5        | 40                    | 30                                   | 160 | 1          | 5          | 1          | 4          | 400        | 10        | BCE |
| SD313                | NPN        | 60              | 60           | 3          | 30                    | 40                                   | 320 | 1          | 2          | 1          | 2          | 200        | 8         | BCE |
| SD880                | NPN        | 60              | 60           | 3          | 30                    | 60                                   | 300 | 0.5        | 5          | 1          | 3          | 300        | 3         | BCE |
| TIP102               | NPN        | 100             | 100          | 8          | 80                    | 1K                                   | 20K | 3          | 4          | 2          | 3          | 6          |           | BCE |
| TIP105               | PNP        | -60             | -60          | -8         | 80                    | 1K                                   | 20K | -3         | -4         | -2         | -3         | -6         |           | BCE |
| TIP107               | PNP        | -100            | -100         | -8         | 80                    | 1K                                   | 20K | -3         | -4         | -2         | -3         | -6         |           | BCE |
| TIP112               | NPN        | 100             | 100          | 4          | 50                    | 1K                                   | -   | 1          | 4          | 2.5        | 2          | 8          |           | BCE |
| TIP117               | PNP        | -100            | -100         | -4         | 50                    | 1K                                   | -   | -1         | -4         | -2.5       | -2         | -8         |           | BCE |
| TIP122               | NPN        | 100             | 100          | 5          | 65                    | 1K                                   | -   | 0.5        | 3          | 2          | 3          | 12         |           | BCE |
| TIP125               | PNP        | -60             | -60          | -5         | 65                    | 1K                                   | -   | -0.5       | -3         | -2         | -3         | -12        |           | BCE |
| TIP127               | PNP        | -100            | -100         | -5         | 65                    | 1K                                   | -   | -0.5       | -3         | -2         | -3         | -12        |           | BCE |
| TIP29C               | NPN        | 100             | 100          | 1          | 30                    | 15                                   | 75  | 1          | 4          | 0.7        | 1          | 125        | 3         | BCE |
| TIP31C               | NPN        | 100             | 100          | 3          | 40                    | 10                                   | 50  | 3          | 4          | 1.2        | 3          | 375        | 3         | BCE |
| TIP32C               | PNP        | -100            | -100         | -3         | 40                    | 10                                   | 50  | -3         | -4         | -1.2       | -3         | -375       | 3         | BCE |
| TIP41C               | NPN        | 100             | 100          | 6          | 65                    | 15                                   | 75  | 3          | 4          | 1.5        | 6          | 600        | 3         | BCE |
| TIP42C               | PNP        | -100            | -100         | -6         | 65                    | 15                                   | 75  | -3         | -4         | -1.5       | -6         | -600       | 3         | BCE |
| TIP47                | NPN        | 350             | 250          | 1          | 40                    | 30                                   | 150 | 0.3        | 10         | 1          | 1          | 200        | 10        | BCE |
| TIP49                | NPN        | 450             | 350          | 1          | 40                    | 30                                   | 150 | 0.3        | 10         | 1          | 1          | 200        | 10        | BCE |
| TIP50                | NPN        | 500             | 400          | 1          | 40                    | 30                                   | 150 | 0.3        | 10         | 1          | 1          | 200        | 10        | BCE |
| SC4234               | NPN        | 1200            | 800          | 3          | 45                    | 8                                    | -   | 1          | 5          | 1          | 1.5        | 300        | 8         | BCE |
| <b>TO-3P (P.30)</b>  |            |                 |              |            |                       |                                      |     |            |            |            |            |            |           |     |
| MJE13007R            | NPN        | 700             | 400          | 8          | 130                   | 10                                   | 30  | 0.5        | 5          | 1          | 2          | 400        |           | BCE |
| MJE13009R            | NPN        | 700             | 400          | 12         | 130                   | 8                                    | 40  | 5          | 5          | 1          | 5          | 1000       |           | BCE |
| KTC5242              | NPN        | 230             | 230          | 15         | 130                   | 55                                   | 160 | 7          | 5          | 0.4        | 8          | 1000       | 30        | BCE |

| Part Number          | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |     |            |            |            |            |            | ft<br>MHz | PIN |
|----------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|-----|------------|------------|------------|------------|------------|-----------|-----|
|                      |            | BVCEO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |     |            |            | VCE(sat)   |            |            |           |     |
|                      |            |                 |              |            |                       | Min                                  | Max | IC<br>(mA) | VCE<br>(V) | Max<br>(V) | IC<br>(mA) | IB<br>(mA) |           |     |
| <b>T0-252 (P.30)</b> |            |                 |              |            |                       |                                      |     |            |            |            |            |            |           |     |
| J10387               | NPN        | 80              | 80           | 10         | 20                    | 2K                                   | 20K | 5          | 3          | 2          | 5          | 10         |           | BCE |
| J1109                | PNP        | -160            | -160         | -0.1       | #1.25                 | 60                                   | 320 | -0.01      | -5         | -2         | -0.03      | -3         |           | BCE |
| J112                 | NPN        | 100             | 100          | 4          | 20                    | 1K                                   | 12K | 2          | 3          | 2.5        | 2          | 8          |           | BCE |
| J117                 | PNP        | -100            | -100         | -4         | 20                    | 1K                                   | 12K | -2         | -3         | -2         | -2         | -8         |           | BCE |
| J122                 | NPN        | 100             | 100          | 5          | 20                    | 1K                                   | 12K | 4          | 4          | 2          | 4          | 16         |           | BCE |
| J127                 | PNP        | -100            | -100         | -5         | 20                    | 1K                                   | 12K | -4         | -4         | -2         | -4         | -16        |           | BCE |
| J13003               | NPN        | 700             | 400          | 1.5        | 15                    | 8                                    | 40  | 0.5        | 2          | 1          | 1          | 250        |           | BCE |
| J1538                | PNP        | -120            | -120         | -0.2       | #1.3                  | 60                                   | 320 | -0.01      | -10        | -1         | -0.03      | -3         |           | BCE |
| J1609                | NPN        | 160             | 160          | 0.1        | #1.25                 | 60                                   | 320 | 0.01       | 5          | 2          | 0.03       | 3          |           | BCE |
| J200                 | NPN        | 40              | 25           | 5          | 10                    | 45                                   | 180 | 2          | 1          | 0.75       | 2          | 200        |           | BCE |
| J210                 | PNP        | -40             | -25          | -5         | 12.5                  | 45                                   | 180 | -2         | -1         | -0.75      | -2         | -200       |           | BCE |
| J2584                | PNP        | -35             | -35          | -10        | 20                    | 2K                                   | 60K | -0.5       | -1.7       | -1.5       | -10        | -10        |           | BCE |
| J2955                | PNP        | -70             | -60          | -10        | 20                    | 20                                   | 100 | -4         | -4         | -1.1       | -4         | -400       |           | BCE |
| J3055                | NPN        | 70              | 60           | 10         | 20                    | 20                                   | 100 | 4          | 4          | 1.1        | 4          | 400        |           | BCE |
| J31C                 | NPN        | 100             | 100          | 3          | 15                    | 10                                   | 50  | 3          | 4          | 1.2        | 3          | 375        |           | BCE |
| J32C                 | PNP        | -100            | -100         | -3         | 15                    | 10                                   | 50  | -3         | -4         | -1.2       | -3         | -375       |           | BCE |
| J340                 | NPN        | 300             | 300          | 0.5        | 15                    | 30                                   | 240 | 0.05       | 10         | -          | -          | -          |           | BCE |
| J350                 | PNP        | -300            | -300         | -0.5       | 15                    | 30                                   | 240 | -0.05      | -10        | -          | -          | -          |           | BCE |
| J3669                | NPN        | 80              | 80           | 2          | #1.25                 | 300                                  | -   | 0.5        | 2          | 0.5        | 1          | 50         |           | BCE |
| J3953                | NPN        | 120             | 120          | 0.2        | #1.3                  | 60                                   | 320 | 0.01       | 10         | 1          | 0.03       | 3          |           | BCE |
| J41C                 | NPN        | 100             | 100          | 6          | 20                    | 15                                   | 75  | 3          | 4          | 1.5        | 6          | 600        |           | BCE |
| J42C                 | PNP        | -100            | -100         | -6         | 20                    | 15                                   | 75  | -3         | -4         | -1.5       | -6         | -600       |           | BCE |
| J44H11               | NPN        | 80              | 80           | 8          | 20                    | 60                                   | -   | 2          | 1          | 1          | 8          | 400        |           | BCE |
| J45H11               | PNP        | -80             | -80          | -10        | 20                    | 60                                   | -   | -2         | -1         | -1         | -8         | -800       |           | BCE |
| J47                  | NPN        | 350             | 250          | 1          | 20                    | 30                                   | 150 | 0.3        | 10         | 1          | 1          | 200        |           | BCE |
| J50                  | NPN        | 500             | 400          | 1          | 15                    | 30                                   | 150 | 0.3        | 10         | 1          | 1          | 200        |           | BCE |
| J649A                | PNP        | -180            | -160         | -1.5       | 20                    | 60                                   | 200 | -0.15      | -5         | 1          | -0.5       | -50        |           | BCE |
| J6668                | PNP        | -80             | -80          | -10        | 20                    | 1K                                   | 20K | -5         | -3         | -2         | -5         | -10        |           | BCE |
| J667A                | PNP        | -120            | -100         | -1         | 20                    | 60                                   | 200 | -0.15      | -5         | -1         | -0.5       | -50        |           | BCE |
| J669A                | NPN        | 180             | 160          | 1.5        | #1                    | 60                                   | 200 | 0.15       | 5          | 1          | 0.5        | 50         |           | BCE |
| J6718                | NPN        | 100             | 100          | 1          | 20                    | 50                                   | 250 | 0.25       | 1          | 0.35       | 0.35       | 35         |           | BCE |
| J772                 | PNP        | -40             | -30          | -3         | 20                    | 100                                  | 500 | -1         | -2         | -0.5       | -2         | -200       |           | BCE |
| J882                 | NPN        | 40              | 30           | 3          | 10                    | 160                                  | 400 | 1          | 2          | 0.5        | 2          | 200        |           | BCE |

## RF transistors

| Part Number    | Voltage<br>VCBO (V) | Current<br>Ic (mA) | Frequency<br>(GHz) | Performances<br>stable power<br>gain (type) | Application                            | Package                    |
|----------------|---------------------|--------------------|--------------------|---|--|----------------------------|
| <b>SiGe</b>    |                     |                    |                    |   |  |                            |
| GTRFG761       | 8                   | 35                 | 60                 | 20dB  | W-CDMA, LNA, SiGeHBT                   | SOT-343 (3K/reel) (P.30)   |
| GTRFG843       | 8                   | 35                 | 60                 | 20dB  | Mobile Comm., VCO, SiGeHBT             | SOT-763 (3K/reel) (P.29)   |
| GTRFG2105      | 13                  | 35                 | 25                 | 22.5dB                                      | 2.4GHz Wireless LAN, ITS, LNA, SiGeHBT | SOT-343 (3K/reel) (P.30)   |
| GTRFG2105      | 13                  | 35                 | 25                 | 22.5dB                                      | 2.4GHz Wireless LAN, ITS, LNA, SiGeHBT | SOT-763 (3K/reel) (P.29)   |
| GTRFG0105      | 13                  | 100                | 17                 | 17dB  | W-CDMA, 2.4GHz Wireless LAN, SiGeHBT   | SOT-343 (3K/reel) (P.30)   |
| GTRFG0116      | 13                  | 100                | 17                 | 17dB  | W-CDMA, 2.4GHz Wireless LAN, SiGeHBT   | SOT-763 (3K/reel) (P.29)   |
| <b>Silicon</b> |                     |                    |                    |   |  |                            |
| GTRFS355       | 20                  | 100                | 6.5                | 9.5dB                                       | High-Freq low-noise amplification      | TO-92 (P.31)               |
| GTRFS536       | 30                  | 250                | 5.3                | 7.2dB                                       | High-Freq low-noise amplification      | SOT-89 (1K/reel) (P.32)    |
| GTRFS356       | 20                  | 100                | 7                  | 11.5dB                                      | Microwave                              | SOT-23 (3K/reel) (P.28)    |
| GTRFS585       | 20                  | 35                 | 10                 | 10dB  | VHF , UHF band                         | SOT-23 (3K/reel) (P.28)    |
| GTRFS191       | 9                   | 100                | 10                 | 3.5dB                                       | Microwave                              | SOT-23 (3K/reel) (P.28)    |
| GTRFS226       | 20                  | 100                | 4.5                | 9dB   | VHF , UHF band                         | SOT-323 (3K/reel) (P.28)   |
| GTRFS571       | 20                  | 60                 | 5                  | 5dB   | UHF high-Freq                          | SOT-323 (3K/reel) (P.28)   |
| GTRFS228       | 20                  | 35                 | 8                  | 7.5dB                                       | VHF , UHF band                         | SOT-323 (3K/reel) (P.28)   |
| GTRFS193       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | SOT-323 (3K/reel) (P.28)   |
| GTRFS004       | 20                  | 60                 | 5                  | 5dB   | UHF high-Freq                          | SOT-523 (3K/reel) (P.28)   |
| GTRFS006       | 20                  | 100                | 4.5                | 9dB   | VHF , UHF band                         | SOT-523 (3K/reel) (P.28)   |
| GTRFS008       | 20                  | 35                 | 8                  | 7.5dB                                       | VHF , UHF band                         | SOT-523 (3K/reel) (P.28)   |
| GTRFS195       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | SOT-523 (3K/reel) (P.28)   |
| GTRFS431       | 20                  | 60                 | 4.3                | 5dB   | UHF high-Freq                          | MiniSOT-523 (3K/reel)      |
| GTRFS432       | 20                  | 100                | 4.5                | 10dB  | High-Freq low-noise amplification      | MiniSOT-523 (3K/reel)      |
| GTRFS434       | 20                  | 35                 | 8                  | 7.5dB                                       | VHF , UHF band                         | MiniSOT-523 (3K/reel)      |
| GTRFS437       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | MiniSOT-523 (3K/reel)      |
| GTRFS614       | 20                  | 100                | 4.5                | 10dB  | High-Freq low-noise amplification      | SOT-723 ( 10K/reel) (P.28) |
| GTRFS801       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | SOT-723 ( 10K/reel) (P.28) |
| GTRFS192       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | SOT-143 (3K/reel) (P.30)   |
| GTRFS975       | 9                   | 30                 | 12                 | 11dB  | High-Freq low-noise amplification      | SOT-143 (3K/reel) (P.30)   |
| GTRFS194       | 9                   | 100                | 4.5                | 3.5dB                                       | High-Freq low-noise amplification      | SOT-343 (3K/reel) (P.30)   |

# Digital Transistors

| Part Number           | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |     |            |            | INPUT                  |                         |                         | fT<br>MHz | PIN |
|-----------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|-----|------------|------------|------------------------|-------------------------|-------------------------|-----------|-----|
|                       |            | BVCBO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |     |            |            | Current<br>Max<br>(mA) | R1<br>resistance<br>(Ω) | R2<br>resistance<br>(Ω) |           |     |
|                       |            |                 |              |            |                       | Min                                  | Max | IC<br>(mA) | VCE<br>(V) |                        |                         |                         |           |     |
| <b>SOT-323 (P.28)</b> |            |                 |              |            |                       |                                      |     |            |            |                        |                         |                         |           |     |
| DTA114ES3             | PNP        | -50             | -50          | -100       | 200                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       | BCE |
| DTA114TS3             | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -0.88                  | 10K                     | NONE                    | 250       | BCE |
| DTA114YS3             | PNP        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.88                  | 10K                     | 47K                     | 250       | BCE |
| DTA115ES3             | PNP        | -50             | -50          | -100       | 200                   | 82                                   | -   | -5         | -5         | -0.15                  | 100K                    | 100K                    | 250       | BCE |
| DTA123JS3             | PNP        | -50             | -50          | -100       | 200                   | 80                                   | -   | -10        | -5         | -3.6                   | 2.2K                    | 47K                     | 250       | BCE |
| DTA123TS3             | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -3.6                   | 2.2K                    | NONE                    | 250       | BCE |
| DTA123YS3             | PNP        | -50             | -50          | -100       | 200                   | 33                                   | -   | -10        | -5         | -3.6                   | 2.2K                    | 10K                     | 250       | BCE |
| DTA124ES3             | PNP        | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       | BCE |
| DTA143ES3             | PNP        | -50             | -50          | -100       | 200                   | 20                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 4.7K                    | 250       | BCE |
| DTA143TS3             | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -1.8                   | 4.7K                    | NONE                    | 250       | BCE |
| DTA143XS3             | PNP        | -50             | -50          | -100       | 200                   | 30                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 10K                     | 250       | BCE |
| DTA143ZS3             | PNP        | -50             | -50          | -100       | 200                   | 80                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 47K                     | 250       | BCE |
| DTA144ES3             | PNP        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.18                  | 47K                     | 47K                     | 250       | BCE |
| DTA144TS3             | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -0.18                  | 47K                     | NONE                    | 250       | BCE |
| DTA144WS3             | PNP        | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.18                  | 47K                     | 22K                     | 250       | BCE |
| DTB114ES3             | PNP        | -50             | -50          | -500       | 200                   | 56                                   | -   | -50        | -5         | 0.88                   | 10K                     | 10K                     | 250       | BCE |
| DTC113ZS3             | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 5          | 5          | 7.2                    | 1K                      | 10K                     | 250       | BCE |
| DTC114ES3             | NPN        | 50              | 50           | 100        | 200                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | BCE |
| DTC114TS3             | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 0.88                   | 10K                     | NONE                    | 250       | BCE |
| DTC114WS3             | NPN        | 50              | 50           | 100        | 200                   | 24                                   | -   | 10         | 5          | 0.88                   | 10K                     | 4.7K                    | 250       | BCE |
| DTC114YS3             | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.88                   | 10K                     | 47K                     | 250       | BCE |
| DTC115ES3             | NPN        | 50              | 50           | 100        | 200                   | 82                                   | -   | 5          | 5          | 0.15                   | 100K                    | 100K                    | 250       | BCE |
| DTC115GS3             | NPN        | 50              | 50           | 100        | 200                   | 82                                   | -   | 5          | 5          | 0.15                   | NONE                    | 100K                    | 250       | BCE |
| DTC123TS3             | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 3.8                    | 2.2K                    | NONE                    | 250       | BCE |
| DTC123YS3             | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 10         | 5          | 3.8                    | 2.2K                    | 10K                     | 250       | BCE |
| DTC124ES3             | NPN        | 50              | 50           | 100        | 200                   | 56                                   | -   | 5          | 5          | 0.36                   | 22K                     | 22K                     | 250       | BCE |
| DTC124XS3             | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.36                   | 22K                     | 47K                     | 250       | BCE |
| DTC143ES3             | NPN        | 50              | 50           | 100        | 200                   | 20                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | BCE |
| DTC143TS3             | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 1.8                    | 4.7K                    | NONE                    | 250       | BCE |
| DTC143XS3             | NPN        | 50              | 50           | 100        | 200                   | 30                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 10K                     | 250       | BCE |
| DTC143YS3             | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 22K                     | 250       | BCE |
| DTC143ZS3             | NPN        | 50              | 50           | 100        | 200                   | 80                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 47K                     | 250       | BCE |
| DTC144ES3             | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.18                   | 47K                     | 47K                     | 250       | BCE |
| DTC144TS3             | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 0.18                   | 47K                     | NONE                    | 250       | BCE |
| DTC144VS3             | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 5          | 5          | 0.18                   | 47K                     | 10K                     | 250       | BCE |
| DTC144WS3             | NPN        | 50              | 50           | 100        | 200                   | 56                                   | -   | 5          | 5          | 0.18                   | 47K                     | 22K                     | 250       | BCE |
| DTD113ZS3             | NPN        | 50              | 50           | 500        | 200                   | 56                                   | -   | 50         | 5          | 7.2                    | 1K                      | 10K                     | 250       | BCE |
| DTD114ES3             | NPN        | 50              | 50           | 500        | 200                   | 56                                   | -   | 50         | 5          | 0.88                   | 10K                     | 10K                     | 250       | BCE |
| DTD143ES3             | NPN        | 50              | 50           | 500        | 200                   | 47                                   | -   | 50         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | BCE |
| <b>SOT-523 (P.28)</b> |            |                 |              |            |                       |                                      |     |            |            |                        |                         |                         |           |     |
| DTA114EUS3            | PNP        | -50             | -50          | -100       | 200                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       | BCE |
| DTA114TUS3            | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -0.88                  | 10K                     | NONE                    | 250       | BCE |
| DTA114YUS3            | PNP        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.88                  | 10K                     | 47K                     | 250       | BCE |
| DTA115EUS3            | PNP        | -50             | -50          | -100       | 200                   | 82                                   | -   | -5         | -5         |                        | 100K                    | 100K                    | 250       | BCE |
| DTA123JUS3            | PNP        | -50             | -50          | -100       | 200                   | 80                                   | -   | -10        | -5         | -3.6                   | 2.2K                    | 47K                     | 250       | BCE |
| DTA123TUS3            | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -3.6                   | 2.2K                    | NONE                    | 250       | BCE |
| DTA123YUS3            | PNP        | -50             | -50          | -100       | 200                   | 33                                   | -   | -10        | -5         | -3.6                   | 2.2K                    | 10K                     | 250       | BCE |
| DTA124EUS3            | PNP        | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       | BCE |
| DTA143EUS3            | PNP        | -50             | -50          | -100       | 200                   | 20                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 4.7K                    | 250       | BCE |
| DTA143TUS3            | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -1.8                   | 4.7K                    | NONE                    | 250       | BCE |
| DTA143XUS3            | PNP        | -50             | -50          | -100       | 200                   | 30                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 10K                     | 250       | BCE |
| DTA143ZUS3            | PNP        | -50             | -50          | -100       | 200                   | 80                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 47K                     | 250       | BCE |
| DTA144EUS3            | PNP        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.18                  | 47K                     | 47K                     | 250       | BCE |
| DTA144TUS3            | PNP        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -0.18                  | 47K                     | NONE                    | 250       | BCE |
| DTA144WUS3            | PNP        | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.18                  | 47K                     | 22K                     | 250       | BCE |
| DTB114EUS3            | PNP        | -50             | -50          | -500       | 200                   | 56                                   | -   | -50        | -5         | 0.88                   | 10K                     | 10K                     | 250       | BCE |
| DTC113ZUS3            | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 5          | 5          | 7.2                    | 1K                      | 10K                     | 250       | BCE |
| DTC114EUS3            | NPN        | 50              | 50           | 100        | 200                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | BCE |
| DTC114TUS3            | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 0.88                   | 10K                     | NONE                    | 250       | BCE |
| DTC114WUS3            | NPN        | 50              | 50           | 100        | 200                   | 24                                   | -   | 10         | 5          | 0.88                   | 10K                     | 4.7K                    | 250       | BCE |
| DTC114YUS3            | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.88                   | 10K                     | 47K                     | 250       | BCE |
| DTC115EUS3            | NPN        | 50              | 50           | 100        | 200                   | 82                                   | -   | 5          | 5          | 0.15                   | 100K                    | 100K                    | 250       | BCE |
| DTC115GUS3            | NPN        | 50              | 50           | 100        | 200                   | 82                                   | -   | 5          | 5          | 0.15                   | NONE                    | 100K                    | 250       | BCE |

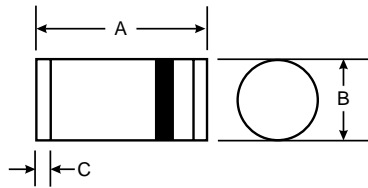
| Part Number           | NPN or PNP | Maximum Ratings |              |            |                       | Electrical Characteristics (Ta=25°C) |     |            |            | INPUT                  |                         |                         | fT<br>MHz | PIN  |
|-----------------------|------------|-----------------|--------------|------------|-----------------------|--------------------------------------|-----|------------|------------|------------------------|-------------------------|-------------------------|-----------|------|
|                       |            | BVCEO<br>(V)    | BVCEO<br>(V) | IC<br>(mA) | PD<br>Ta=25°C<br>(mW) | hFE                                  |     |            |            | Current<br>Max<br>(mA) | R1<br>resistance<br>(Ω) | R2<br>resistance<br>(Ω) |           |      |
|                       |            |                 |              |            |                       | Min                                  | Max | IC<br>(mA) | VCE<br>(V) |                        |                         |                         |           |      |
| <b>SOT-523 (P.28)</b> |            |                 |              |            |                       |                                      |     |            |            |                        |                         |                         |           |      |
| DTC124XUS3            | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.36                   | 22K                     | 47K                     | 250       | BCE  |
| DTC143EUS3            | NPN        | 50              | 50           | 100        | 200                   | 20                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | BCE  |
| DTC143TUS3            | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 1.8                    | 4.7K                    | NONE                    | 250       | BCE  |
| DTC143XUS3            | NPN        | 50              | 50           | 100        | 200                   | 30                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 10K                     | 250       | BCE  |
| DTC143YUS3            | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 22K                     | 250       | BCE  |
| DTC143ZUS3            | NPN        | 50              | 50           | 100        | 200                   | 80                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 47K                     | 250       | BCE  |
| DTC144EUS3            | NPN        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.18                   | 47K                     | 47K                     | 250       | BCE  |
| DTC144TUS3            | NPN        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 0.18                   | 47K                     | NONE                    | 250       | BCE  |
| DTC144VUS3            | NPN        | 50              | 50           | 100        | 200                   | 33                                   | -   | 5          | 5          | 0.18                   | 47K                     | 10K                     | 250       | BCE  |
| DTC144WUS3            | NPN        | 50              | 50           | 100        | 200                   | 56                                   | -   | 5          | 5          | 0.18                   | 47K                     | 22K                     | 250       | BCE  |
| DTD113ZUS3            | NPN        | 50              | 50           | 500        | 200                   | 56                                   | -   | 50         | 5          | 7.2                    | 1K                      | 10K                     | 250       | BCE  |
| DTD114EUS3            | NPN        | 50              | 50           | 500        | 200                   | 56                                   | -   | 50         | 5          | 0.88                   | 10K                     | 10K                     | 250       | BCE  |
| DTD143EUS3            | NPN        | 50              | 50           | 500        | 200                   | 47                                   | -   | 50         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | BCE  |
| <b>SOT-363 (P.29)</b> |            |                 |              |            |                       |                                      |     |            |            |                        |                         |                         |           |      |
| BA114ES6R             | P*2        | -50             | -50          | -100       | 200                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       | Daul |
| BA114TS6R             | P*2        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -0.88                  | 10K                     | NONE                    | 250       | Daul |
| BA114YS6R             | P*2        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.88                  | 10K                     | 47K                     | 250       | Daul |
| BA124ES6R             | P*2        | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       | Daul |
| BA143TS6R             | P*2        | -50             | -50          | -100       | 200                   | 100                                  | 600 | -1         | -5         | -1.8                   | 4.7K                    | NONE                    | 250       | Daul |
| BA143ZS6R             | P*2        | -50             | -50          | -100       | 200                   | 80                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 47K                     | 250       | Daul |
| BA144ES6R             | P*2        | -50             | -50          | -100       | 200                   | 68                                   | -   | -5         | -5         | -0.18                  | 47K                     | 47K                     | 250       | Daul |
| BC114ES6R             | N*2        | 50              | 50           | 100        | 200                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | Daul |
| BC114TS6R             | N*2        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 0.88                   | 10K                     | NONE                    | 250       | Daul |
| BC114YS6R             | N*2        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.88                   | 10K                     | 47K                     | 250       | Daul |
| BC124ES6R             | N*2        | 50              | 50           | 100        | 200                   | 56                                   | -   | 5          | 5          | 0.36                   | 22K                     | 22K                     | 250       | Daul |
| BC124XS6R             | N*2        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.36                   | 22K                     | 47K                     | 250       | Daul |
| BC143ES6R             | N*2        | 50              | 50           | 100        | 200                   | 20                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | Daul |
| BC143TS6R             | N*2        | 50              | 50           | 100        | 200                   | 100                                  | 600 | 1          | 5          | 1.8                    | 4.7K                    | NONE                    | 250       | Daul |
| BC143XS6R             | N*2        | 50              | 50           | 100        | 200                   | 30                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 10K                     | 250       | Daul |
| BC143ZS6R             | N*2        | 50              | 50           | 100        | 200                   | 80                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 47K                     | 250       | Daul |
| BC144ES6R             | N*2        | 50              | 50           | 100        | 200                   | 68                                   | -   | 5          | 5          | 0.18                   | 47K                     | 47K                     | 250       | Daul |
| BCA114ES6R            | N+P        | 50              | 50           | 100        | 200                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | N+P  |
|                       |            | -50             | -50          | -100       | 200                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       |      |
| BCA124ES6R            | N+P        | 50              | 50           | 100        | 200                   | 56                                   | -   | 5          | 5          | 0.36                   | 22K                     | 22K                     | 250       | N+P  |
|                       |            | -50             | -50          | -100       | 200                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       |      |
| <b>SOT-563 (P.29)</b> |            |                 |              |            |                       |                                      |     |            |            |                        |                         |                         |           |      |
| BA114EUS6R            | P*2        | -50             | -50          | -100       | 150                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       | Daul |
| BA114TUS6R            | P*2        | -50             | -50          | -100       | 150                   | 100                                  | 600 | -1         | -5         | -0.88                  | 10K                     | NONE                    | 250       | Daul |
| BA114YUS6R            | P*2        | -50             | -50          | -100       | 150                   | 68                                   | -   | -5         | -5         | -0.88                  | 10K                     | 47K                     | 250       | Daul |
| BA124EUS6R            | P*2        | -50             | -50          | -100       | 150                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       | Daul |
| BA143TUS6R            | P*2        | -50             | -50          | -100       | 150                   | 100                                  | 600 | -1         | -5         | -1.8                   | 4.7K                    | NONE                    | 250       | Daul |
| BA143ZUS6R            | P*2        | -50             | -50          | -100       | 150                   | 80                                   | -   | -10        | -5         | -1.8                   | 4.7K                    | 47K                     | 250       | Daul |
| BA144EUS6R            | P*2        | -50             | -50          | -100       | 150                   | 68                                   | -   | -5         | -5         | -0.18                  | 47K                     | 47K                     | 250       | Daul |
| BC114EUS6R            | N*2        | 50              | 50           | 100        | 150                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | Daul |
| BC114TUS6R            | N*2        | 50              | 50           | 100        | 150                   | 100                                  | 600 | 1          | 5          | 0.88                   | 10K                     | NONE                    | 250       | Daul |
| BC114YUS6R            | N*2        | 50              | 50           | 100        | 150                   | 68                                   | -   | 5          | 5          | 0.88                   | 10K                     | 47K                     | 250       | Daul |
| BC124EUS6R            | N*2        | 50              | 50           | 100        | 150                   | 56                                   | -   | 5          | 5          | 0.36                   | 22K                     | 22K                     | 250       | Daul |
| BC124XUS6R            | N*2        | 50              | 50           | 100        | 150                   | 68                                   | -   | 5          | 5          | 0.36                   | 22K                     | 47K                     | 250       | Daul |
| BC143EUS6R            | N*2        | 50              | 50           | 100        | 150                   | 20                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 4.7K                    | 250       | Daul |
| BC143TUS6R            | N*2        | 50              | 50           | 100        | 150                   | 100                                  | 600 | 1          | 5          | 1.8                    | 4.7K                    | NONE                    | 250       | Daul |
| BC143XUS6R            | N*2        | 50              | 50           | 100        | 150                   | 30                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 10K                     | 250       | Daul |
| BC143ZUS6R            | N*2        | 50              | 50           | 100        | 150                   | 80                                   | -   | 10         | 5          | 1.8                    | 4.7K                    | 47K                     | 250       | Daul |
| BC144EUS6R            | N*2        | 50              | 50           | 100        | 150                   | 68                                   | -   | 5          | 5          | 0.18                   | 47K                     | 47K                     | 250       | Daul |
| BCA114EUS6R           | N+P        | 50              | 50           | 100        | 150                   | 30                                   | -   | 5          | 5          | 0.88                   | 10K                     | 10K                     | 250       | N+P  |
|                       |            | -50             | -50          | -100       | 150                   | 30                                   | -   | -5         | -5         | -0.88                  | 10K                     | 10K                     | 250       |      |
| BCA124EUS6R           | N+P        | 50              | 50           | 100        | 150                   | 56                                   | -   | 5          | 5          | 0.36                   | 22K                     | 22K                     | 250       | N+P  |
|                       |            | -50             | -50          | -100       | 150                   | 56                                   | -   | -5         | -5         | -0.36                  | 22K                     | 22K                     | 250       |      |



# Other Package Outline Dimensions

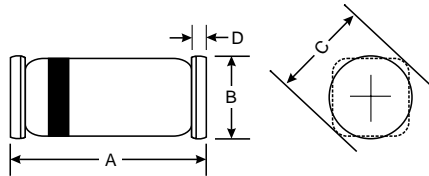
All Dimensions in mm

MiniMELF / MELF



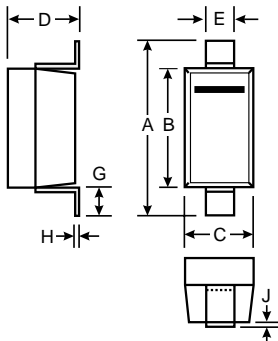
| Dim | MiniMELF |      | MELF         |      |
|-----|----------|------|--------------|------|
|     | Min      | Max  | Min          | Max  |
| A   | 3.30     | 3.70 | 4.80         | 5.20 |
| B   | 1.30     | 1.60 | 2.40         | 2.60 |
| C   | 0.28     | 0.50 | 0.55 Nominal |      |

QuadroMELF / MicroMELF



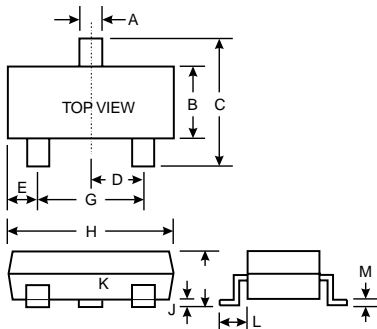
| Dim | QuadroMELF                |     | MicroMELF                  |      |
|-----|---------------------------|-----|----------------------------|------|
|     | Min                       | Max | Min                        | Max  |
| A   | 3.3                       | 3.7 | 1.8                        | 2.0  |
| B   | 1.4                       | 1.6 | 1.20                       | 1.25 |
| C   | 1.7 $\varnothing$ Typical |     | 1.35 $\varnothing$ Typical |      |
| D   | 0.3 Typical               |     | —                          |      |

SOD-123 / SOD-323 / SOD-523 / SOD-723



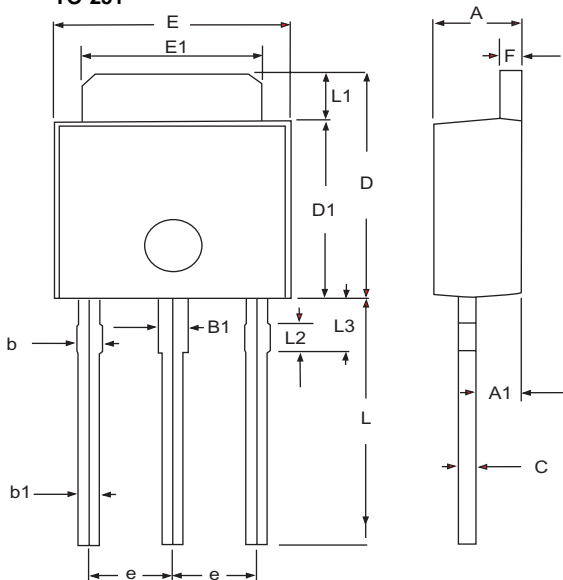
| Dim | SOD-123      |      | SOD-323 |      | SOD-523              |      |
|-----|--------------|------|---------|------|----------------------|------|
|     | Min          | Max  | Min     | Max  | Min                  | Max  |
| A   | 3.55         | 3.85 | 2.30    | 2.70 | 1.50                 | 1.70 |
| B   | 2.55         | 2.85 | 1.60    | 1.80 | 1.10                 | 1.30 |
| C   | 1.40         | 1.70 | 1.15    | 1.35 | 0.25                 | 0.35 |
| D   | —            | 1.35 | 0.80    | 1.10 | 0.70                 | 0.90 |
| E   | 0.55 Typical |      | 0.25    | 0.40 | 0.10                 | 0.20 |
| G   | 0.25         | —    | 0.15    | 0.45 | 0.50                 | 0.70 |
| H   | 0.15 Typical |      | 0.10    | 0.25 | All Dimensions in mm |      |
| J   | —            | 0.10 | —       | 0.10 |                      |      |

SOT-23 / SC-59 / SOT-323 / SOT-523

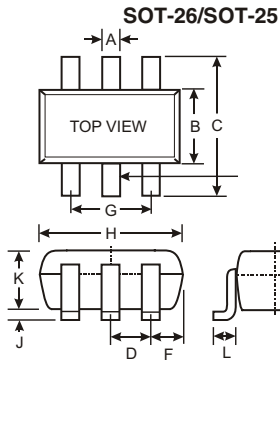


| Dim | SOT-23 |       | SC-59 |      | SOT-323 / SOT-523 |             |
|-----|--------|-------|-------|------|-------------------|-------------|
|     | Min    | Max   | Min   | Max  | Min               | Max         |
| A   | 0.37   | 0.51  | 0.30  | 0.50 | 0.30 / 0.15       | 0.40 / 0.22 |
| B   | 1.19   | 1.40  | 1.40  | 1.80 | 1.15 / 0.75       | 1.35 / 0.85 |
| C   | 2.10   | 2.50  | 2.50  | 3.00 | 2.00 / 1.45       | 2.20 / 1.75 |
| D   | 0.89   | 1.05  | 0.85  | 1.05 | 0.65 / 0.5        |             |
| E   | 0.45   | 0.61  | 0.30  | 0.70 | 0.30 / -          | 0.40 / -    |
| G   | 1.78   | 2.05  | 1.70  | 2.10 | 1.20 / 0.9        | 1.40 / 1.1  |
| H   | 2.65   | 3.05  | 2.70  | 3.10 | 1.80 / 1.5        | 2.20 / 1.7  |
| J   | 0.013  | 0.15  | —     | 0.10 | -                 | 0.10        |
| K   | 0.89   | 1.10  | 1.00  | 1.40 | 0.90 / 0.6        | 1.00 / 0.8  |
| L   | 0.45   | 0.61  | 0.55  | 0.70 | 0.25 / 0.1        | 0.40 / 0.3  |
| M   | 0.076  | 0.178 | 0.10  | 0.35 | 0.10 / 0.1        | 0.25 / 0.2  |

TO-251



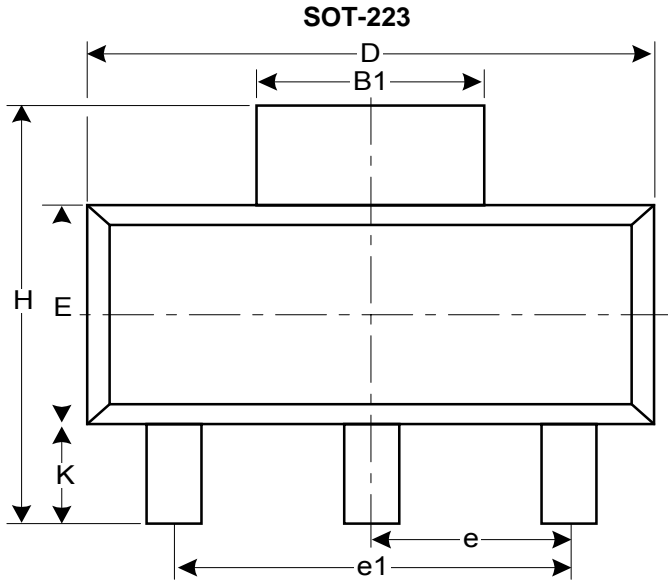
| SYMBOLS | MILLIMETERS |       | INCHES |       |
|---------|-------------|-------|--------|-------|
|         | MIN         | MAX   | MIN    | MAX   |
| A       | 2.20        | 2.40  | 0.087  | 0.095 |
| A1      | 1.100       | 1.300 | 0.043  | 0.051 |
| B1      | 0.650       | 1.050 | 0.026  | 0.041 |
| b       | 0.500       | 0.900 | 0.020  | 0.035 |
| b1      | 0.400       | 0.800 | 0.016  | 0.32  |
| C       | 0.400       | 0.600 | 0.016  | 0.024 |
| D       | 6.700       | 7.300 | 0.264  | 0.287 |
| D1      | 5.400       | 5.650 | 0.213  | 0.222 |
| E       | 6.40        | 6.650 | 0.252  | 0.262 |
| e       | 2.100       | 2.500 | 0.083  | 0.098 |
| F       | 0.400       | 0.600 | 0.016  | 0.024 |
| L       | 7.000       | 8.000 | 0.276  | 0.315 |
| L1      | 1.300       | 1.700 | 0.051  | 0.067 |
| L2      | 0.700       | 0.900 | 0.028  | 0.035 |
| L3      | 1.400       | 1.800 | 0.055  | 0.071 |



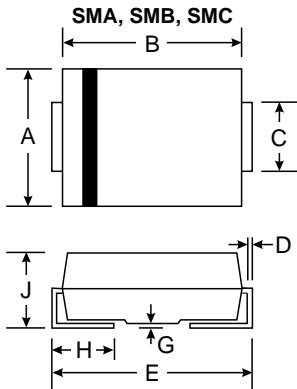
| SOT-363/353 |              |      |
|-------------|--------------|------|
| Dim         | Min          | Max  |
| A           | 0.10         | 0.30 |
| B           | 1.15         | 1.35 |
| C           | 2.00         | 2.20 |
| D           | 0.65 Nominal |      |
| F           | 0.30         | 0.40 |
| H           | 1.80         | 2.20 |
| J           | —            | 0.10 |
| K           | 0.90         | 1.00 |
| L           | 0.25         | 0.40 |
| M           | 0.10         | 0.25 |
| $\alpha$    | 0°           | 8°   |

| SOT-26/25 |       |      |      |
|-----------|-------|------|------|
| Dim       | Min   | Max  | Typ  |
| A         | 0.35  | 0.50 | 0.38 |
| B         | 1.50  | 1.70 | 1.60 |
| C         | 2.70  | 3.00 | 2.80 |
| D         | —     | —    | 0.95 |
| F         | —     | —    | 0.55 |
| H         | 2.90  | 3.10 | 3.00 |
| J         | 0.013 | 0.10 | 0.05 |
| K         | 1.00  | 1.30 | 1.10 |
| L         | 0.35  | 0.55 | 0.40 |
| M         | 0.10  | 0.20 | 0.15 |
| $\alpha$  | 0°    | 8°   | —    |

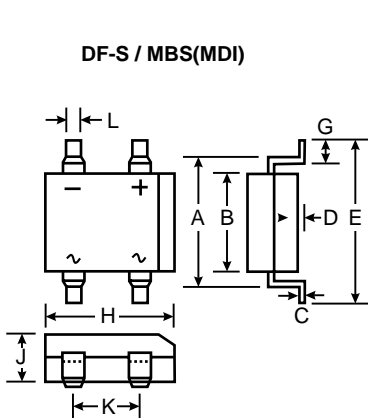
| SOT-563              |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.25 |
| B                    | 1.10 | 1.25 | 1.20 |
| C                    | 1.55 | 1.70 | 1.60 |
| D                    | 0.50 |      |      |
| G                    | 0.90 | 1.10 | 1.00 |
| H                    | 1.50 | 1.70 | 1.60 |
| K                    | 0.56 | 0.60 | 0.60 |
| L                    | 0.15 | 0.25 | 0.20 |
| M                    | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm |      |      |      |



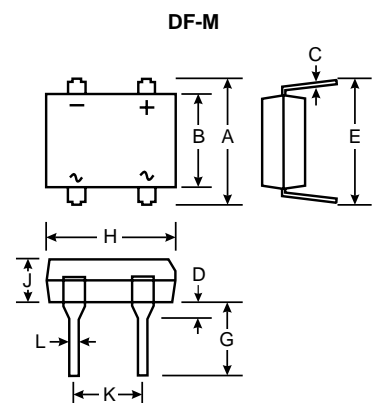
| Symbol   | Dimensions In Millimeters |      |            |
|----------|---------------------------|------|------------|
|          | Min.                      | Nom. | Max.       |
| A(Thin)  | 1.50                      | 1.65 | 1.80       |
| A1       | 0.02                      | 0.05 | 0.08       |
| B        | 0.60                      | 0.70 | 0.80       |
| B1       | 2.90                      | -    | 3.15(Ref.) |
| c        | 0.28                      | 0.30 | 0.32       |
| D        | 6.30                      | 6.50 | 6.70       |
| E        | 3.30                      | 3.50 | 3.70       |
| e        | 2.3 Basic                 |      |            |
| e1       | 4.6 Basic                 |      |            |
| H        | 6.70                      | 7.00 | 7.30       |
| L        | 0.91                      | 1.00 | 1.10       |
| K        | 1.50                      | 1.75 | 2.00       |
| $\alpha$ | 0°                        | 5°   | 10°        |
| $\beta$  | -                         | 13°  | -          |

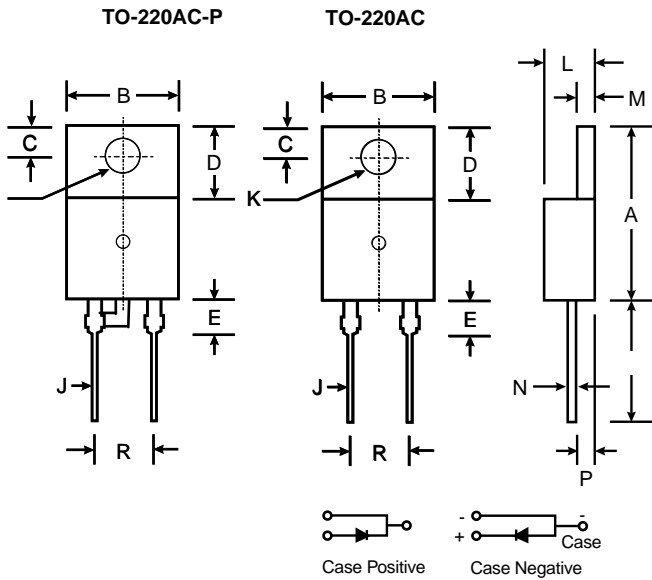


| Dim | SMA  |      | SMB  |      | SMC  |      |
|-----|------|------|------|------|------|------|
|     | Min  | Max  | Min  | Max  | Min  | Max  |
| A   | 2.29 | 2.92 | 3.30 | 3.94 | 5.59 | 6.22 |
| B   | 4.00 | 4.60 | 4.06 | 4.57 | 6.60 | 7.11 |
| C   | 1.27 | 1.63 | 1.96 | 2.21 | 2.75 | 3.18 |
| D   | 0.15 | 0.31 | 0.15 | 0.31 | 0.15 | 0.31 |
| E   | 4.80 | 5.59 | 5.00 | 5.59 | 7.75 | 8.13 |
| G   | 0.10 | 0.20 | 0.10 | 0.20 | 0.10 | 0.20 |
| H   | 0.76 | 1.52 | 0.76 | 1.52 | 0.76 | 1.52 |
| J   | 2.01 | 2.62 | 2.00 | 2.62 | 2.00 | 2.62 |

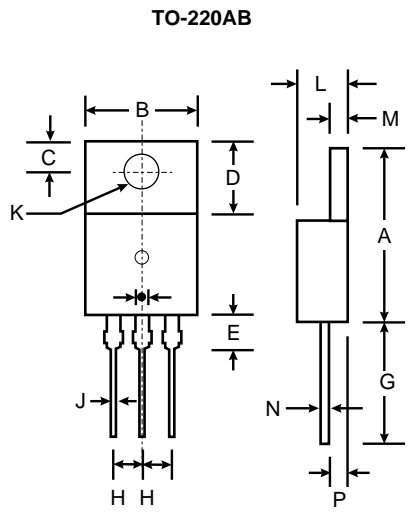


| Dim | DF-S  |       | MBS (MDI) |      | DF-M |      |
|-----|-------|-------|-----------|------|------|------|
|     | Min   | Max   | Min       | Max  | Min  | Max  |
| A   | 7.40  | 7.90  | 5.43      | 5.75 | 7.40 | 7.90 |
| B   | 6.20  | 6.50  | 3.6       | 4.0  | 6.20 | 6.50 |
| C   | 0.22  | 0.30  | 0.15      | 0.35 | 0.22 | 0.30 |
| D   | 0.076 | 0.33  | 0.05      | 0.20 | 1.27 | 2.03 |
| E   | —     | 10.40 | —         | 7.0  | 7.60 | 8.90 |
| G   | 1.02  | 1.53  | 0.70      | 1.10 | 3.81 | 4.69 |
| H   | 8.13  | 8.51  | 4.5       | 4.9  | 8.13 | 8.51 |
| J   | 2.40  | 3.40  | 2.8       | 2.9  | 2.40 | 3.40 |
| K   | 5.00  | 5.20  | 2.5       | 2.7  | 5.00 | 5.20 |
| L   | 1.00  | 1.20  | 0.50      | 0.80 | 0.46 | 0.58 |

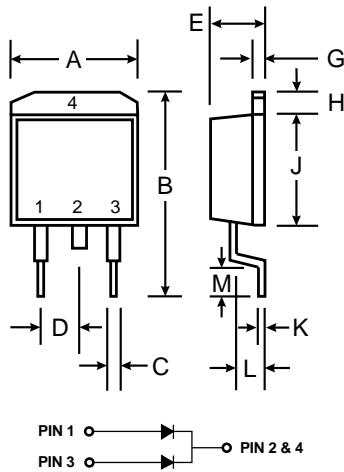




| Dim | Min                | Max                |
|-----|--------------------|--------------------|
| A   | 14.22              | 15.88              |
| B   | 9.65               | 10.67              |
| C   | 2.54               | 3.43               |
| D   | 5.84               | 6.86               |
| E   | —                  | 6.35               |
| G   | 12.70              | 14.73              |
| H   | 2.29               | 2.79               |
| J   | 0.51               | 1.14               |
| K   | 3.53 $\varnothing$ | 4.09 $\varnothing$ |
| L   | 3.56               | 4.83               |
| M   | 1.14               | 1.40               |
| N   | 0.30               | 0.64               |
| P   | 2.03               | 2.92               |
| R   | 4.83               | 5.33               |

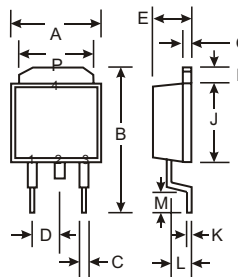


TO-263 / D<sup>2</sup>PAK



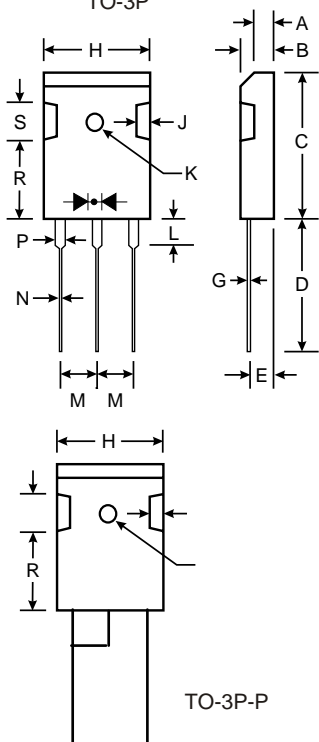
| Dim | Min   | Max   |
|-----|-------|-------|
| A   | 9.65  | 10.69 |
| B   | 14.60 | 15.88 |
| C   | 0.51  | 1.14  |
| D   | 2.29  | 2.79  |
| E   | 4.37  | 4.83  |
| G   | 1.14  | 1.40  |
| H   | 1.14  | 1.40  |
| J   | 8.25  | 9.25  |
| K   | 0.30  | 0.64  |
| L   | 2.03  | 2.92  |
| M   | 2.29  | 2.79  |

TO-252 / DPAK



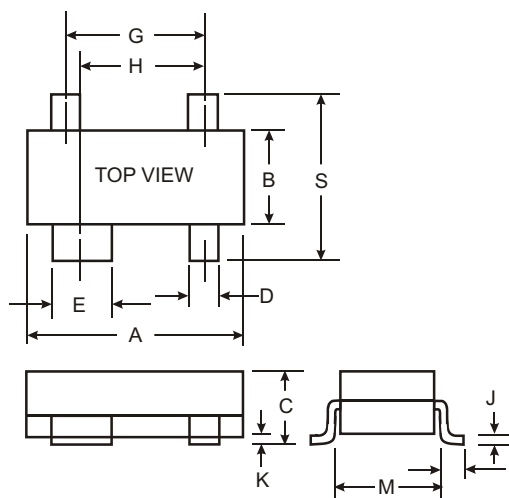
| Dim | Min         | Max |
|-----|-------------|-----|
| A   | 6.3         | 6.7 |
| B   | —           | 10  |
| C   | 0.3         | 0.8 |
| D   | 2.3 Nominal |     |
| E   | 2.1         | 2.5 |
| G   | 0.4         | 0.6 |
| H   | 1.2         | 1.6 |
| J   | 5.3         | 5.7 |
| K   | 0.5 Nominal |     |
| L   | 1.3         | 1.8 |
| M   | 1.0         | —   |
| P   | 5.1         | 5.5 |

TO-3P



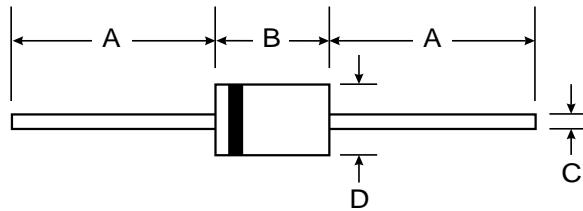
| Dim | Min                | Max                |
|-----|--------------------|--------------------|
| A   | 3.20               | 3.50               |
| B   | 4.59               | 5.16               |
| C   | 20.80              | 21.30              |
| D   | 19.70              | 20.20              |
| E   | 2.10               | 2.40               |
| G   | 0.51               | 0.76               |
| H   | 15.90              | 16.40              |
| J   | 1.70               | 2.70               |
| K   | 3.10 $\varnothing$ | 3.30 $\varnothing$ |
| L   | 3.50               | 4.51               |
| M   | 5.20               | 5.70               |
| N   | 1.12               | 1.22               |
| P   | 2.90               | 3.30               |
| R   | 11.70              | 12.80              |
| S   | 4.30 Typical       |                    |

SOT-343 / SOT-143



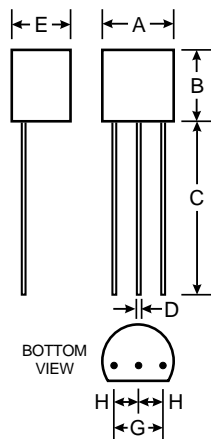
| SOT-143              |          |       |
|----------------------|----------|-------|
| Dim                  | Min      | Max   |
| A                    | 2.80     | 3.04  |
| B                    | 1.20     | 1.40  |
| C                    | 0.80     | 1.20  |
| D                    | 0.37     | 0.46  |
| E                    | 0.76     | 0.89  |
| G                    | 1.92 BSC |       |
| H                    | 1.72 BSC |       |
| J                    | 0.085    | 0.130 |
| K                    | 0.051    | 0.127 |
| L                    | 0.25     | 0.55  |
| M                    | 1.00     | 1.69  |
| S                    | 2.10     | 2.64  |
| All Dimensions in mm |          |       |

### Axial Devices (Through-Hole)



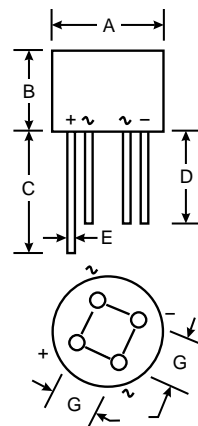
| Dim           | A     |     | B    |      | C     |       | D    |      |
|---------------|-------|-----|------|------|-------|-------|------|------|
|               | Min   | Max | Min  | Max  | Min   | Max   | Min  | Max  |
| A-405         | 25.40 | —   | 4.10 | 5.20 | 0.53  | 0.64  | 2.00 | 2.70 |
| DO-35         | 25.40 | —   | —    | 4.00 | —     | 0.60  | —    | 2.00 |
| DO-41 Plastic | 25.40 | —   | 4.06 | 5.21 | 0.71  | 0.864 | 2.00 | 2.72 |
| DO-41 Glass   | 25.40 | —   | —    | 4.70 | —     | 0.863 | —    | 2.71 |
| DO-15         | 25.40 | —   | 5.50 | 7.62 | 0.686 | 0.889 | 2.60 | 3.60 |
| DO-201        | 25.40 | —   | 8.50 | 9.53 | 0.96  | 1.06  | 4.80 | 5.21 |
| DO-201AD      | 25.40 | —   | 7.20 | 9.50 | 1.20  | 1.30  | 4.80 | 5.30 |
| R-6           | 25.40 | —   | 8.60 | 9.10 | 1.20  | 1.30  | 8.60 | 9.10 |
| T-1           | 25.40 | —   | 2.60 | 3.20 | 0.53  | 0.64  | 2.20 | 2.60 |
| 5W            | 25.40 | —   | 8.38 | 8.89 | 0.94  | 1.09  | 3.30 | 3.68 |
| 5KP           | 25.40 | —   | —    | 8.60 | 0.95  | 1.07  | —    | 9.53 |
| 5KW           | 25.40 | —   | —    | 9.00 | 1.20  | 1.30  | —    | 8.00 |

### TO-92



| Dim | Min   | Max   |
|-----|-------|-------|
| A   | 4.32  | 4.83  |
| B   | 4.32  | 4.78  |
| C   | 12.50 | 15.62 |
| D   | 0.36  | 0.56  |
| E   | 3.15  | 3.94  |
| G   | 2.29  | 2.79  |
| H   | 1.14  | 1.40  |

### WOG / AM

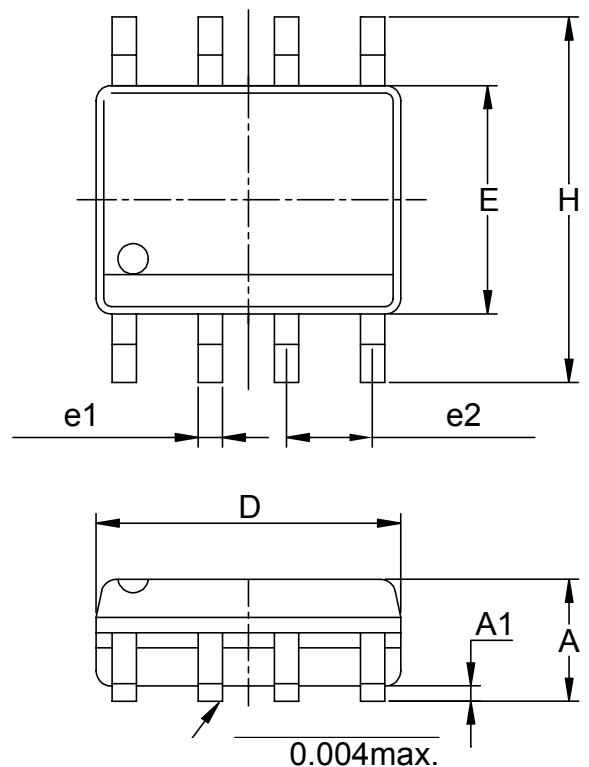


| Dim | Min   | Max  |
|-----|-------|------|
| A   | 8.84  | 9.86 |
| B   | 4.00  | 4.60 |
| C   | 27.90 | —    |
| D   | 25.40 | —    |
| E   | 0.71  | 0.81 |
| G   | 4.60  | 5.60 |

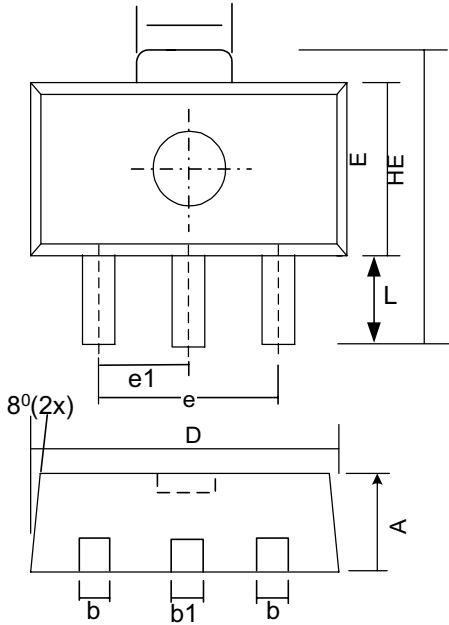
Lead configuration shown is for bulk product packaging only.  
See ANSI/EIA-486 for Radial Tape specifications.

### SOP-8 / TSSOP-8

| Dim | Millimeters SOP-8 / TSSOP-8 |             |
|-----|-----------------------------|-------------|
|     | Min.                        | Max.        |
| A   | 1.35 / 1.0                  | 1.75 / 1.2  |
| A1  | 0.10 / 0.1                  | 0.25 / 0.15 |
| D   | 4.80 / 2.9                  | 5.00 / 3.1  |
| E   | 3.80 / 4.3                  | 4.00 / 4.5  |
| H   | 5.80 / 6.2                  | 6.20 / 6.6  |
| L   | 0.40 / -                    | 1.27 / -    |
| e1  | 0.33 / -                    | 0.51 / -    |
| e2  | 1.27BSC / 0.65BSC           |             |

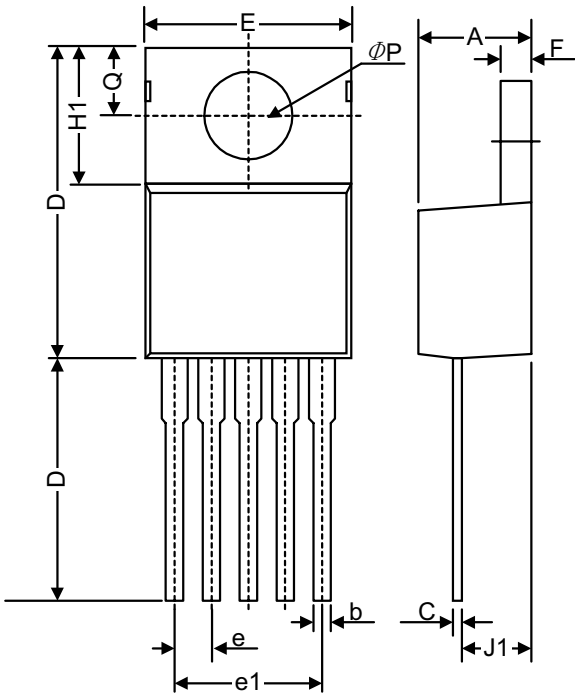


**SOT89**



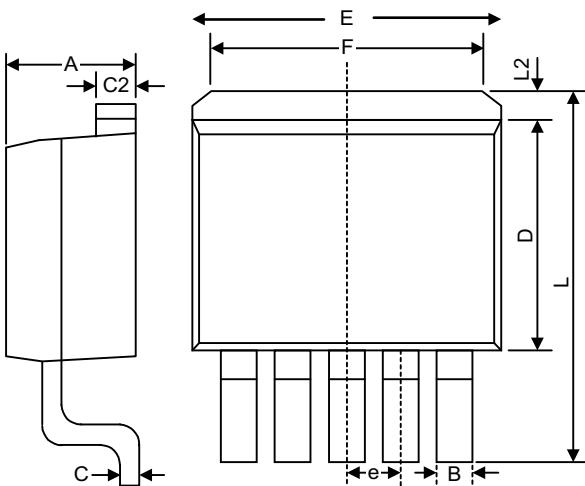
| Symbol | Dimensions In Millimeters |      |      |
|--------|---------------------------|------|------|
|        | Min.                      | Nom. | Max. |
| A      | 1.40                      | 1.50 | 1.60 |
| B      | 0.36                      | 0.42 | 0.48 |
| b1     | 0.41                      | 0.47 | 0.53 |
| C      | 0.38                      | 0.40 | 0.43 |
| D      | 4.40                      | 4.50 | 4.60 |
| D1     | 1.40                      | 1.60 | 1.75 |
| E      | 2.90                      | 3.00 | 3.10 |
| e1     | 1.45                      | 1.50 | 1.55 |
| E      | 2.40                      | 2.50 | 2.60 |
| HE     | 3.94                      | -    | 4.25 |
| L      | 0.80                      | -    | 1.20 |

**TO-220-5**

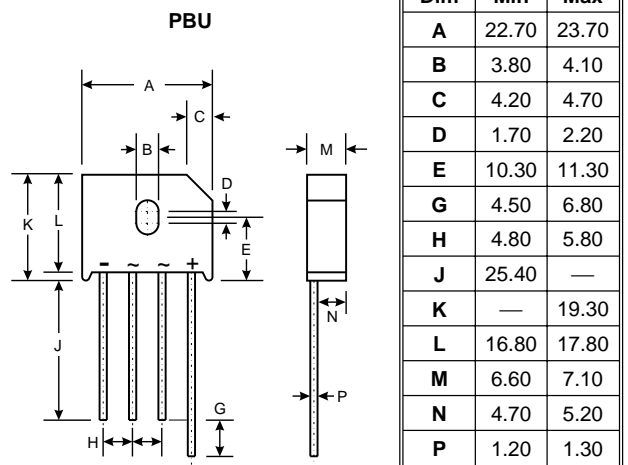
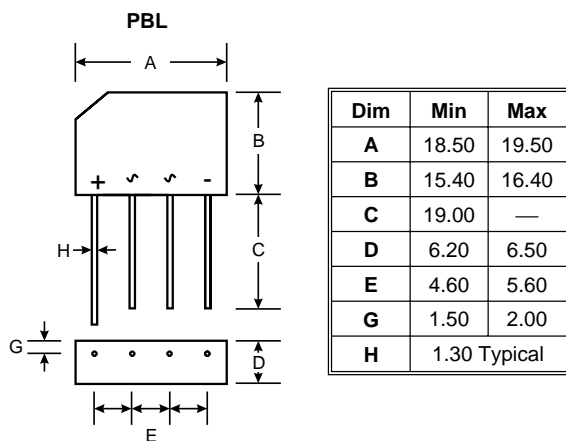
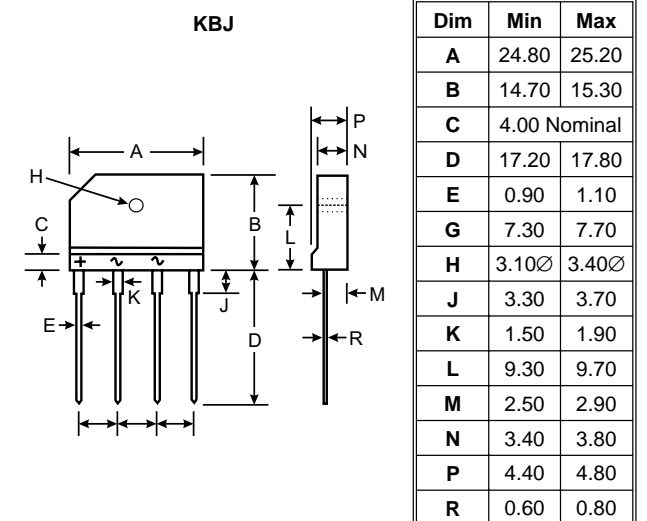
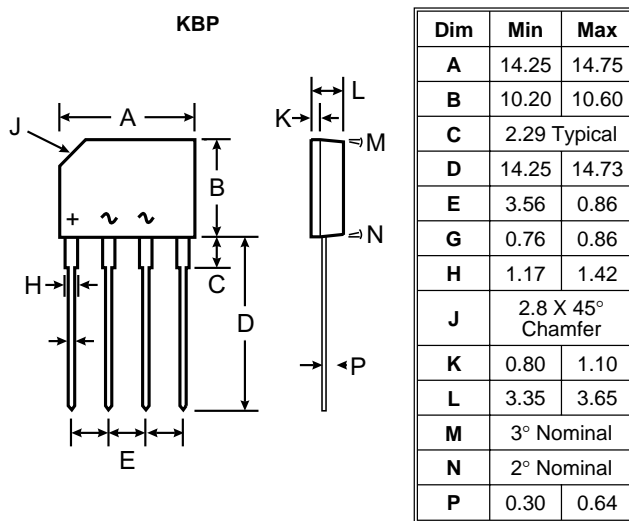
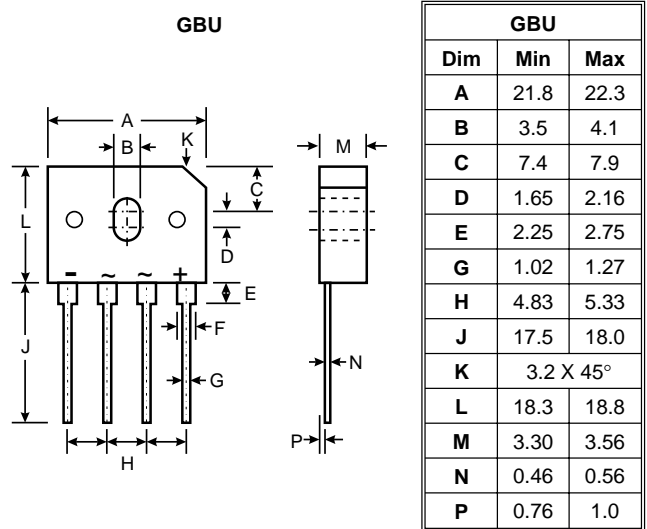
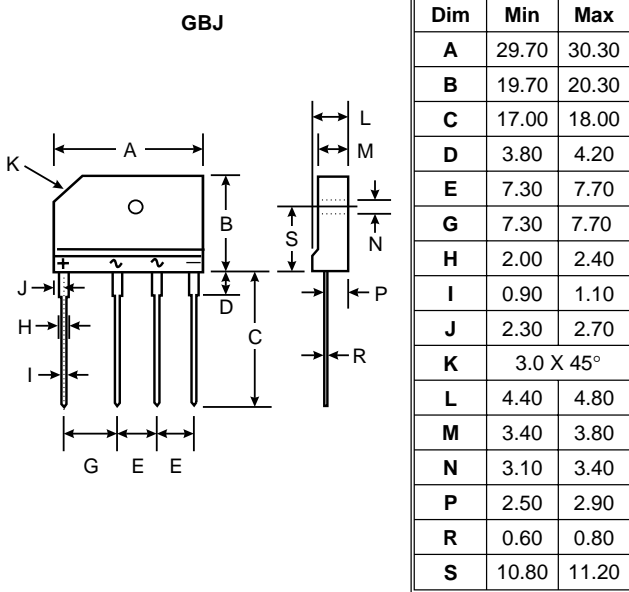


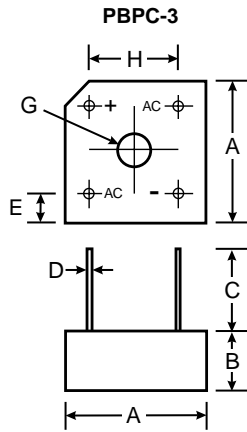
| Symbol   | Dimensions In Millimeters |       |
|----------|---------------------------|-------|
|          | Min.                      | Max.  |
| A        | 4.06                      | 4.8   |
| b        | 0.76                      | 1.02  |
| C        | 0.36                      | 0.64  |
| D        | 14.22                     | 15.49 |
| E        | 9.78                      | 10.54 |
| e        | 1.57                      | 1.85  |
| e(1)     | 6.68                      | 6.93  |
| F        | 1.14                      | 1.40  |
| H(1)     | 5.46                      | 6.86  |
| J(1)     | 2.29                      | 3.18  |
| L        | 13.21                     | 14.73 |
| $\Phi P$ | 3.68                      | 3.94  |
| Q        | 2.54                      | 2.92  |

**TO-263-5**

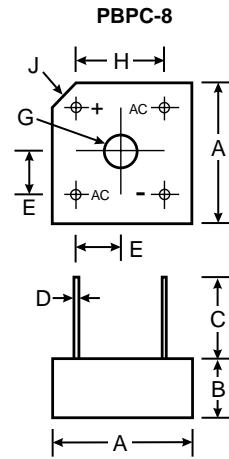


| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | Min.                      | Max.  |
| A      | 4.06                      | 4.83  |
| B      | 0.76                      | 1.02  |
| C      | 0.36                      | 0.64  |
| C2     | 1.14                      | 1.40  |
| D      | 8.64                      | 9.65  |
| E      | 9.78                      | 10.54 |
| e      | 1.57                      | 1.85  |
| F      | 6.60                      | 7.11  |
| L      | 15.11                     | 15.37 |
| L2     | -                         | 1.40  |

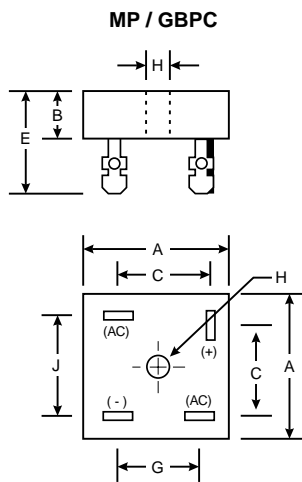




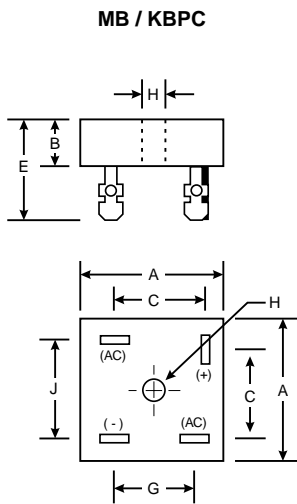
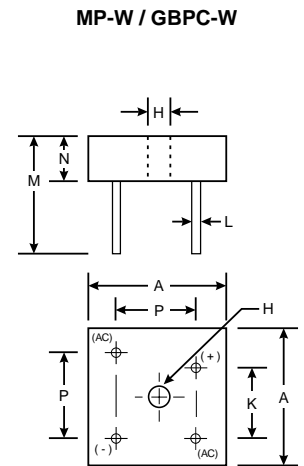
| Dim | Min               | Max   |
|-----|-------------------|-------|
| A   | 14.73             | 15.75 |
| B   | 5.84              | 6.86  |
| C   | 19.00             | —     |
| D   | 0.76Ø Typical     |       |
| E   | 1.70              | 2.70  |
| G   | Hole for #6 screw |       |
|     | 3.60              | 4.00  |
| H   | 10.30             | 11.30 |



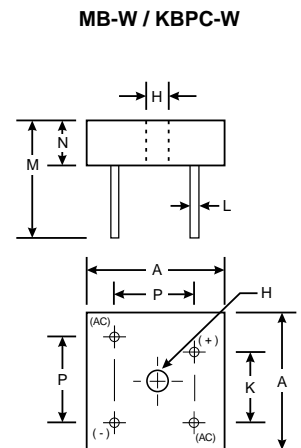
| Dim | Min                | Max   |
|-----|--------------------|-------|
| A   | 18.54              | 19.56 |
| B   | 6.35               | 7.60  |
| C   | 22.20              | —     |
| D   | 1.27Ø Typical      |       |
| E   | 5.33               | 7.37  |
| G   | 3.60Ø              | 4.00Ø |
| H   | 12.70 Typical      |       |
| J   | 2.38 X 45° Typical |       |



| Dim | Min                | Max   |
|-----|--------------------|-------|
| A   | 28.30              | 28.80 |
| B   | 7.40               | 8.00  |
| C   | 16.10              | 17.10 |
| E   | 18.80              | 21.30 |
| G   | 13.80              | 14.80 |
| H   | Hole for #10 screw |       |
|     | 4.85Ø              | 5.59Ø |
| J   | 17.60              | 18.60 |
| K   | 10.90              | 11.90 |
| L   | 0.97Ø              | 1.07Ø |
| M   | 26.4               | —     |
| N   | 7.40               | 8.00  |
| P   | 17.60              | 18.60 |



| Dim | Min                | Max   |
|-----|--------------------|-------|
| A   | 28.40              | 28.70 |
| B   | 10.97              | 11.23 |
| C   | 15.50              | 17.60 |
| E   | 22.86              | 25.40 |
| G   | 13.30              | 15.30 |
| H   | Hole for #10 screw |       |
|     | 4.85Ø              | 5.59Ø |
| J   | 17.10              | 19.10 |
| K   | 10.40              | 12.40 |
| L   | 0.97Ø Nominal      | 1.07Ø |
| M   | 30.50              | —     |
| N   | 10.97              | 11.23 |
| P   | 17.10              | 19.10 |



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