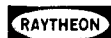


General Purpose Amplifiers

| Type | Polarity | Maximum Ratings | | | | Electrical Characteristics @ 25° C | | | | | | Package |
|---------|----------|---------------------|--------------|--------------|--------------|------------------------------------|-----|------------------|--------|------------------|------------------|---------|
| | | PD Ambient mW | VCB Volts | VCE Volts | VEB Volts | HFE @ IC | | VCE(Sat) @ IC/IB | | ft MHz Min | Cob pF Max | |
| | | | | | | Min/Max | mA | Volts | mA/mA | | | |
| 2N497 | NPN | 800 | 60 | 60 | 8 | 12/36 | 200 | 5.0 | 200/40 | 40† | 20† | TO-39 |
| 2N498 | NPN | 800 | 100 | 100 | 8 | 12/36 | 200 | 5.0 | 200/40 | 40† | 20† | TO-39 |
| 2N656 | NPN | 800 | 60 | 60 | 8 | 30/90 | 200 | 5.0 | 200/40 | 40† | 20† | TO-39 |
| 2N657 | NPN | 800 | 100 | 100 | 8 | 30/90 | 200 | 5.0 | 200/40 | 40† | 20† | TO-39 |
| 2N696 | NPN | 600 | 60 | 40* | 5 | 20/60 | 150 | 1.5 | 150/15 | 40 | 35 | TO-39 |
| 2N697 | NPN | 600 | 60 | 40* | 5 | 40/120 | 150 | 1.5 | 150/15 | 50 | 35 | TO-39 |
| 2N697A | NPN | 800 | 60 | 35 | 5 | 40/120 | 150 | 1.5 | 150/15 | 50 | 35 | TO-39 |
| 2N698 | NPN | 600 | 120 | 60 | 7 | 20/60 | 150 | 5.0 | 150/15 | 40 | 15 | TO-39 |
| 2N699 | NPN | 800 | 120 | 80* | 5 | 40/120 | 150 | 5.0 | 150/15 | 50 | 20 | TO-39 |
| 2N699A | NPN | 800 | 120 | 80* | 5 | 40/120 | 150 | 5.0 | 150/15 | 50 | 20 | TO-39 |
| 2N699B | NPN | 800 | 120 | 80 | 7 | 40/120 | 150 | 5.0 | 150/15 | 60 | 15 | TO-39 |
| 2N717 | NPN | 400 | 60 | 40* | 5 | 20/60 | 150 | 1.5 | 150/15 | 40 | 35 | TO-18 |
| 2N718 | NPN | 400 | 60 | 40* | 5 | 40/120 | 150 | 1.5 | 150/15 | 50 | 35 | TO-18 |
| 2N718A | NPN | 500 | 75 | 50* | 7 | 40/120 | 150 | 1.5 | 150/15 | 60 | 25 | TO-18 |
| 2N719 | NPN | 400 | 120 | 80* | 5 | 20/60 | 150 | 5.0 | 150/15 | 40 | 20 | TO-18 |
| 2N720 | NPN | 400 | 120 | 80* | 5 | 40/120 | 150 | 5.0 | 150/15 | 50 | 20 | TO-18 |
| 2N720A | NPN | 500 | 120 | 80* | 7 | 40/120 | 150 | 5.0 | 150/15 | 50 | 15 | TO-18 |
| 2N721 | PNP | 400 | 50 | 35 | 5 | 20/45 | 150 | 1.5 | 150/15 | 50 | 45 | TO-18 |
| 2N722 | PNP | 400 | 50 | 35 | 5 | 30/90 | 150 | 1.5 | 150/15 | 50 | 45 | TO-18 |
| 2N730 | NPN | 500 | 60 | 40* | 5 | 20/60 | 150 | 1.5 | 150/15 | 40 | 35 | TO-18 |
| 2N731 | NPN | 500 | 60 | 40* | 5 | 40/120 | 150 | 1.5 | 150/15 | 50 | 35 | TO-18 |
| 2N870 | NPN | 500 | 100 | 60 | 7 | 40/120 | 150 | 5.0 | 150/15 | 50 | 15 | TO-18 |
| 2N871 | NPN | 500 | 100 | 60 | 7 | 100/300 | 150 | 5.0 | 150/15 | 60 | 15 | TO-18 |
| 2N910 | NPN | 500 | 100 | 60 | 7 | 75/- | 10 | 1.2 | 50/5 | 60 | 15 | TO-18 |
| 2N911 | NPN | 500 | 100 | 60 | 7 | 35/- | 10 | 1.2 | 50/5 | 50 | 15 | TO-18 |
| 2N912 | NPN | 500 | 100 | 60 | 7 | 15/- | 10 | 1.2 | 50/5 | 40 | 15 | TO-18 |
| 2N956 | NPN | 500 | 75 | 50* | 7 | 100/300 | 150 | 1.5 | 150/15 | 70 | 25 | TO-18 |
| 2N1131 | PNP | 600 | 50 | 35 | 5 | 20/45 | 150 | 1.5 | 150/15 | 50 | 45 | TO-39 |
| 2N1132 | PNP | 600 | 50 | 35 | 5 | 30/90 | 150 | 1.5 | 150/15 | 50 | 45 | TO-39 |
| 2N1420 | NPN | 600 | 60 | 30* | 5 | 100/300 | 150 | 1.5 | 150/15 | 50 | 35 | TO-39 |
| 2N1507 | NPN | 600 | 60 | 30* | 5 | 100/300 | 150 | 1.5 | 150/15 | 50 | 35 | TO-39 |
| 2N1613 | NPN | 800 | 75 | 50* | 7 | 40/120 | 150 | 1.5 | 150/15 | 60 | 25 | TO-39 |
| 2N1613A | NPN | 1000 | 75 | 50* | 7 | 40/120 | 150 | 1.0 | 150/15 | 60 | 25 | TO-39 |
| 2N1613B | NPN | 1000 | 120 | 50 | 7 | 40/120 | 150 | 0.2 | 150/15 | 60 | 10 | TO-39 |
| 2N1711 | NPN | 800 | 75 | 50* | 7 | 100/300 | 150 | 1.5 | 150/15 | 70 | 25 | TO-39 |
| 2N1711A | NPN | 1000 | 75 | 50* | 7 | 100/300 | 150 | 1.0 | 150/15 | 70 | 25 | TO-39 |
| 2N1711B | NPN | 1000 | 120 | 50 | 7 | 100/300 | 150 | 0.2 | 150/15 | 70 | 10 | TO-39 |
| 2N1889 | NPN | 800 | 100 | 60 | 7 | 40/120 | 150 | 5.0 | 150/15 | 50 | 15 | TO-39 |
| 2N1890 | NPN | 800 | 100 | 60 | 7 | 100/300 | 150 | 5.0 | 150/15 | 60 | 15 | TO-39 |
| 2N1893 | NPN | 800 | 120 | 80 | 7 | 40/120 | 150 | 5.0 | 150/15 | 50 | 15 | TO-39 |
| 2N1893A | NPN | 800 | 140 | 80 | 7 | 40/120 | 150 | 2.0 | 150/15 | 100 | 8 | TO-39 |
| 2N1973 | NPN | 800 | 100 | 60 | 7 | 75/- | 10 | 0.4 | 10/1 | 60 | 15 | TO-39 |
| 2N1975 | NPN | 800 | 100 | 60 | 7 | 15/- | 10 | 0.4 | 10/1 | 60 | 15 | TO-39 |
| 2N1986 | NPN | 600 | 50 | 25 | 5 | 60/240 | 150 | 1.5 | 150/15 | 40 | 35 | TO-39 |
| 2N1988 | NPN | 600 | 100 | 45 | 5 | 35/120 | 30 | 2.0 | 30/3 | 40 | 20 | TO-39 |

*BV_{CE}R < 10Ω

†Typical Values



Transistors (Cont.)

Discrete Devices

European "Pro Electron" Types (Cont.)

| Type | Near Equivalent | Polarity | Pkg. |
|---------|-----------------|----------|-------|
| BFX30 | 2N2904A | PNP | TO-39 |
| BFX37 | 2N2605* | PNP | TO-18 |
| BFX65 | 2N2605* | PNP | TO-18 |
| BFX84 | 2N1711 | NPN | TO-39 |
| BFX85 | 2N1711 | NPN | TO-39 |
| BFX86 | 2N1711 | NPN | TO-39 |
| BFX87 | 2N2904A | PNP | TO-39 |
| BFX88 | 2N2904A | PNP | TO-39 |
| BFY39 | 2N916 | NPN | TO-18 |
| BFY39-1 | 2N916 | NPN | TO-18 |
| BFY39-2 | 2N916 | NPN | TO-18 |
| BFY50 | 2N697 | NPN | TO-39 |
| BFY51 | 2N697 | NPN | TO-39 |
| BFY52 | 2N1711 | NPN | TO-39 |
| BFY56 | 2N697 | NPN | TO-39 |
| BFY72 | 2N2218 | NPN | TO-39 |
| BFY76 | 2N929 | NPN | TO-18 |
| BSX45-6 | 2N697 | NPN | TO-39 |

| Type | Near Equivalent | Polarity | Pkg. |
|----------|-----------------|----------|-------|
| BSX45-10 | 2N1711 | NPN | TO-39 |
| BSX45-16 | 2N1711 | NPN | TO-39 |
| BSX46-6 | 2N2102 | NPN | TO-39 |
| BSX46-10 | 2N2102 | NPN | TO-39 |
| BSX4616 | 2N1711 | NPN | TO-39 |
| BSX48 | 2N2221 | NPN | TO-18 |
| BSX88 | 2N2369A | NPN | TO-18 |
| BSY38 | 2N706 | NPN | TO-18 |
| BSY39 | 2N2369A | NPN | TO-18 |
| BSY51 | 2N2218 | NPN | TO-39 |
| BSY52 | 2N2219 | NPN | TO-39 |
| BSY53 | 2N2218A | NPN | TO-39 |
| BSY54 | 2N2219A | NPN | TO-39 |
| BSY95A | 2N2369A | NPN | TO-18 |
| TCH98 | 2N3914 | PNP | TO-18 |
| TCH98B | 2N3343 | PNP | TO-39 |
| TCH99 | 2N3914 | PNP | TO-18 |
| TCH99B | 2N3344 | PNP | TO-39 |

* Electrical Equivalent Only

Dual and Quad Cross-reference

| Raytheon | Motorola | TI | National |
|-----------|----------|----|----------|
| SP918F | MD918F | | |
| SP918QD | | | |
| SP918QF | MQ918 | | |
| SP930F | | | |
| SP930QD | | | |
| SP930QF | | | |
| SP2218AF | MD2218AF | | |
| SP2218AQD | | | |
| SP2218AQF | MQ2218A | | |
| SP2219AF | MD2219AF | | |
| SP2219AQD | | | |
| SP2219AQF | MQ2219A | | |
| SP2369AF | MD2369AF | | |
| SP2369AQD | | | |
| SP2369AQF | MQ2369A | | |
| SP2484F | MD2484F | | |
| SP2484QD | | | |
| SP2484QF | MQ2484 | | |
| SP2904AF | MD2904AF | | |
| SP2904AQD | | | |

| Raytheon | Motorola | TI | National |
|-----------|----------|---------|----------|
| SP2904AQF | MQ2904A | | |
| SP2905AF | MD2905AF | | |
| SP2905AQD | | | |
| SP2905AQF | MQ2905A | | |
| SP3250AF | MD3250AF | | |
| SP3250AQD | | | |
| SP3250AQF | MQ3250A | | |
| SP3251AF | MD3251AF | | |
| SP3251AQD | | | |
| SP3251AQF | MQ3251A | | |
| SP3467F | MD3467F | | |
| SP3467QD | | | DH3467CD |
| SP3467QF | MQ3467 | | |
| SP3725F | MD3725F | | |
| SP3725QD | | | DH3725CD |
| SP3725QDB | MPQ3725 | Q2T3725 | DH3725CN |
| SP3725QF | MQ3725 | | |
| SP3762F | MD3762F | | |
| SP3762QD | | | |
| SP3762QF | MQ3762 | | |

Suffix Meanings F — Dual TO-89 Flat Pack
 QD — Quad TO-116 Ceramic Dual-in-line
 QDB — Quad TO-116 Plastic Dual-in-line
 QF — Quad TO-86 Flat Pack

