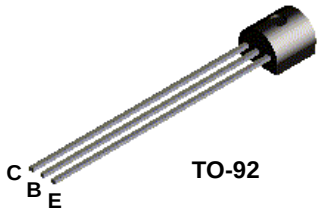
FAIRCHILD SEMICONDUCTOR TM

*Discrete POWER & Signal Technologies*

# PN3643




TO-92

## NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 10. See PN100 for characteristics.

### Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 5.0 | V |
| $I_C$ | Collector Current - Continuous | 500 | mA |
| $T_J$, $T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

**NOTES**:
**1)** These ratings are based on a maximum junction temperature of 150 degrees C.
**2)** These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | Units |
|---|---|---|---|
| | | PN3643 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 625<br>5.0 | mW<br>mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 83.3 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 200 | °C/W |

## NPN General Purpose Amplifier
(continued)

### Electrical Characteristics
TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C$ = 10 mA, $I_B$ = 0 | 30 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 10 µA, $I_E$ = 0 | 60 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 10 µA, $I_C$ = 0 | 5.0 | | V |
| $I_{CES}$ | Collector Cutoff Current | $V_{CE}$ = 50 V, $I_E$ = 0<br>$V_{CE}$ = 50 V, $I_E$ = 0, $T_A$ = +65 °C | | 50<br>1.0 | nA<br>µA |
| **ON CHARACTERISTICS*** | | | | | |
| $h_{FE}$ | DC Current Gain | $V_{CE}$ = 10 V, $I_C$ = 150 mA<br>$V_{CE}$ = 10 V, $I_C$ = 500 mA | 100<br>20 | 300 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$ = 150 mA, $I_B$ = 15 mA | | 0.22 | V |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10 V, f = 140 kHz, | | 8.0 | pF |
| η | Collector Efficiency | $V_{CE}$ = 15 V, f = 30 MHz,<br>Rg = 140 Ω, RL = 260 Ω | 60 | | % |
| $G_{pe}$ | Amplifier Power Gain | $V_{CE}$ = 15 V, f = 30 MHz,<br>Rg = 140 Ω, RL = 260 Ω | 10 | | dB |
| $h_{fe}$ | Small-Signal Current Gain | $I_C$ = 50 mA, $V_{CE}$ = 5.0 V,<br>f = 100 MHz | 2.5 | | |

*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%