



Discrete POWER & Signal Technologies

PN4141



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 |
|------------------|---|--------|-------|
| | | PN4141 | |
| P _D | Total Device Dissipation Derate above 25°C | 625 | mW |
| | | 5.0 | mW/°C |
| R _{θJC} | Thermal Resistance, Junction to Case | 83.3 | °C/W |
| R _{θJA} | Thermal Resistance, Junction to Ambient | 200 | °C/W |



NPN General Purpose Amplifier

(continued)

PN4141

Electrical Characteristics

TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|--------|-----------|-----------------|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-------|

OFF CHARACTERISTICS

| | | | | | |
|---------------|--------------------------------------|---|-----|----|----|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C = 10 \text{ mA}, I_B = 0$ | 30 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C = 10 \text{ } \mu\text{A}, I_E = 0$ | 60 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E = 10 \text{ } \mu\text{A}, I_C = 0$ | 5.0 | | V |
| I_{CEX} | Collector Cutoff Current | $V_{CE} = 40 \text{ V}, V_{OB} = 3.0 \text{ V}$ | | 50 | nA |
| I_{BL} | Base Cutoff Current | $V_{CE} = 40 \text{ V}, V_{OB} = 3.0 \text{ V}$ | | 50 | nA |

ON CHARACTERISTICS*

| | | | | | |
|---------------|--------------------------------------|--|---------------------------------------|------------|--------|
| h_{FE} | DC Current Gain | $V_{CE} = 10 \text{ V}, I_C = 100 \text{ } \mu\text{A}$ $V_{CE} = 10 \text{ V}, I_C = 1.0 \text{ mA}$ $V_{CE} = 10 \text{ V}, I_C = 10 \text{ mA}$ $V_{CE} = 10 \text{ V}, I_C = 150 \text{ mA}$ $V_{CE} = 10 \text{ V}, I_C = 500 \text{ mA}$ $V_{CE} = 1.0 \text{ V}, I_C = 150 \text{ mA}$ | 35 50 75 100 30 50 | 300 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$ | | 0.4 1.6 | V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$ | | 1.3 2.6 | V V |

SMALL SIGNAL CHARACTERISTICS

| | | | | | |
|----------|---------------------------|---|-----|-----|----|
| C_{ob} | Output Capacitance | $V_{CB} = 10 \text{ V}, f = 100 \text{ kHz}$ | | 8.0 | pF |
| h_{fe} | Small-Signal Current Gain | $I_C = 20 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$ | 2.5 | | |

SWITCHING CHARACTERISTICS

| | | | | | |
|-------|--------------|--|--|-----|----|
| t_d | Delay Time | $V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA},$ | | 10 | ns |
| t_r | Rise Time | $I_{B1} = 15 \text{ mA}, V_{OB} \text{ (off)} = 0.5 \text{ V}$ | | 40 | ns |
| t_s | Storage Time | $V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA},$ | | 250 | ns |
| t_f | Fall Time | $I_{B1} = I_{B2} = 15 \text{ mA}$ | | 60 | ns |

*Pulse Test: Pulse Width $\leq 300 \text{ } \mu\text{s}$, Duty Cycle $\leq 2.0\%$