## Features

- Epitaxial Planar Die Construction
- Halogen Free. “Green” Device (Note 1)
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

# PNP General Purpose Amplifier

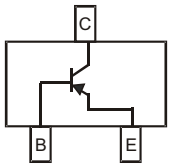
## Maximum Ratings @ 25°C Unless Otherwise Specified

- Operating Junction Temperature Range: -55℃ to +150℃
- Storage Temperature Range: -55℃ to +150℃
- Typical Thermal Resistance: 833℃/W Junction to Ambient

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -40 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -40 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -5 | V |
| Collector Current | $I_C$ | -200 | mA |
| Collector Power Dissipation | $P_C$ | 150 | mW |

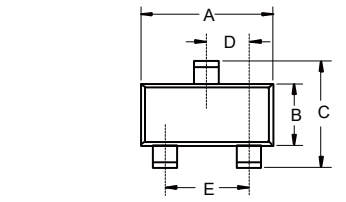
Note: 1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

### Internal Structure



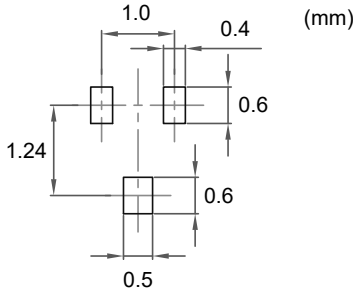

**Marking: 3N**

## SOT-523




| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| DIM | INCHES | | MM | | NOTE |
| | MIN | MAX | MIN | MAX | |
| A | 0.059 | 0.067 | 1.50 | 1.70 | |
| B | 0.030 | 0.033 | 0.75 | 0.85 | |
| C | 0.057 | 0.069 | 1.45 | 1.75 | |
| D | 0.020 | | 0.50 | | TYP. |
| E | 0.035 | 0.043 | 0.90 | 1.10 | |
| G | 0.000 | 0.004 | 0.00 | 0.10 | |
| H | 0.024 | 0.031 | 0.60 | 0.80 | |
| J | 0.004 | 0.008 | 0.10 | 0.20 | |
| K | 0.006 | 0.014 | 0.15 | 0.35 | |

**Suggested Solder Pad Layout**



## Electrical Characteristics @ 25°C Unless Otherwise Specified

| Parameter | Symbol | Min | Typ | Max | Units | Conditions |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -40 | | | V | $I_C$=-10μA, $I_E$=0 |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -40 | | | V | $I_C$=-1mA, $I_B$=0 |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -5 | | | V | $I_E$=-10μA, $I_C$=0 |
| Collector-Base Cutoff Current | $I_{CBO}$ | | | -50 | nA | $V_{CB}$=-30V, $I_E$=0 |
| Emitter-Base Cutoff Current | $I_{EBO}$ | | | -50 | nA | $V_{EB}$=-5V, $I_C$=0 |
| DC Current Gain | $h_{FE(1)}$ | 60 | | | | $V_{CE}$=-1V, $I_C$=-0.1mA |
| | $h_{FE(2)}$ | 80 | | | | $V_{CE}$=-1V, $I_C$=-1mA |
| | $h_{FE(3)}$ | 100 | | 300 | | $V_{CE}$=-1V, $I_C$=-10mA |
| | $h_{FE(4)}$ | 60 | | | | $V_{CE}$=-1V, $I_C$=-50mA |
| | $h_{FE(5)}$ | 30 | | | | $V_{CE}$=-1V, $I_C$=-100mA |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | | -0.25 | V | $I_C$=-10mA, $I_B$=-1mA |
| | | | | -0.4 | V | $I_C$=-50mA, $I_B$=-5mA |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | -0.65 | | -0.85 | V | $I_C$=-10mA, $I_B$=-1mA |
| | | | | -0.95 | V | $I_C$=-50mA, $I_B$=-5mA |
| Transition Frequency | $f_T$ | 250 | | | MHz | $V_{CE}$=-20V, $I_C$=-10mA, f=100MHz |
| Output Capacitance | $C_{obo}$ | | | 4.5 | pF | $V_{CB}$=-5V, $I_E$=0, f=1MHz |
| Input Capacitance | $C_{ibo}$ | | | 10 | pF | $V_{BE}$=-0.5V, $I_C$=0, f=1KHz |
| Noise Figure | NF | | | 4 | dB | $V_{CE}$=-5V, $I_C$=-100μA<br>RS=1KΩ, f=1MHz |
| Delay Time | $t_d$ | | | 35 | ns | $V_{CC}$=-3V, $V_{BE}$=-0.5V |
| Rise Time | $t_r$ | | | 35 | ns | $I_C$=-10mA, $I_{B1}$=-1mA |
| Storage Time | $t_s$ | | | 225 | ns | $V_{CC}$=-3V, $I_C$=-10mA |
| Fall Time | $t_f$ | | | 75 | ns | $I_{B1}$=$I_{B2}$=-1mA |

## Curve Characteristics

Fig. 1 - Static Characteristics

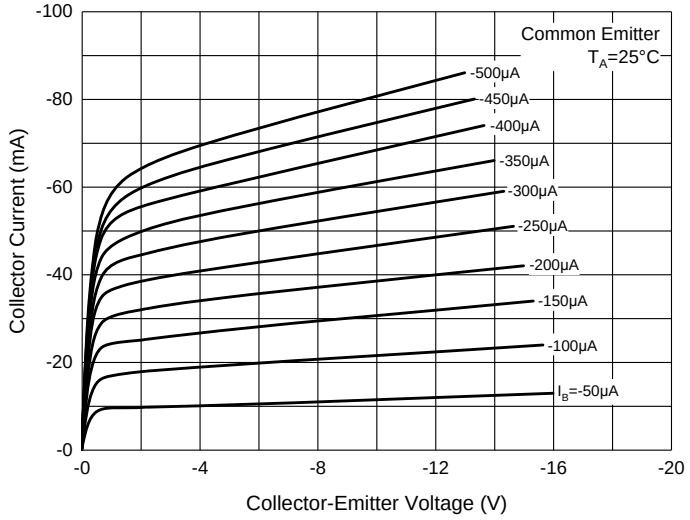



Fig. 2 - DC Current Gain Characteristics

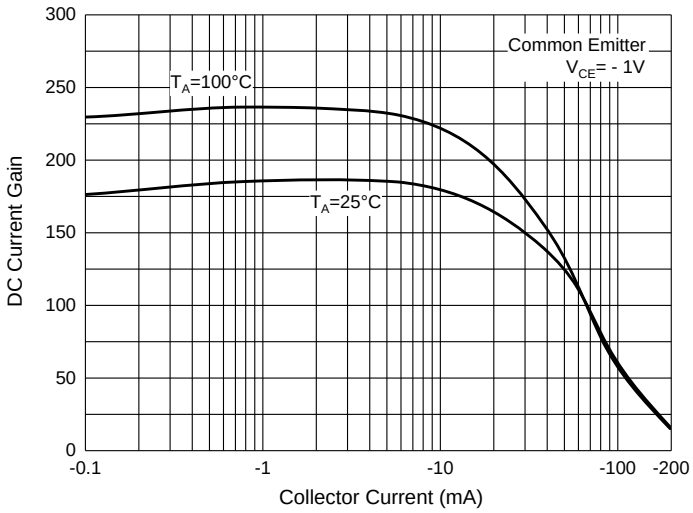



Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

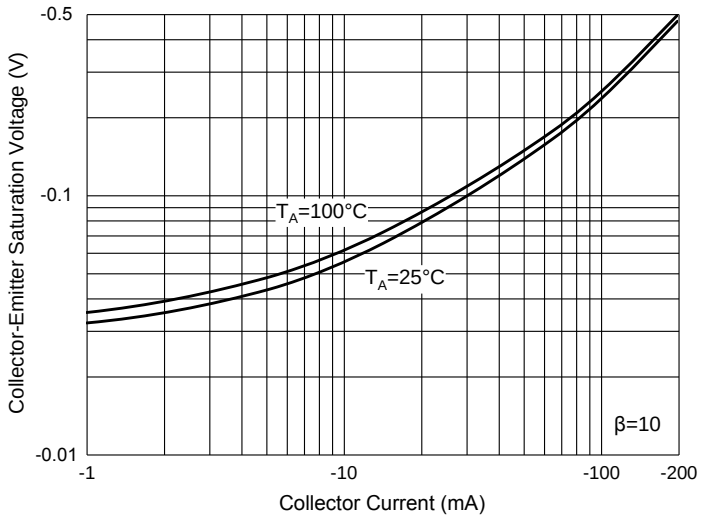



Fig. 4 - Base-Emitter Saturation Voltage Characteristics

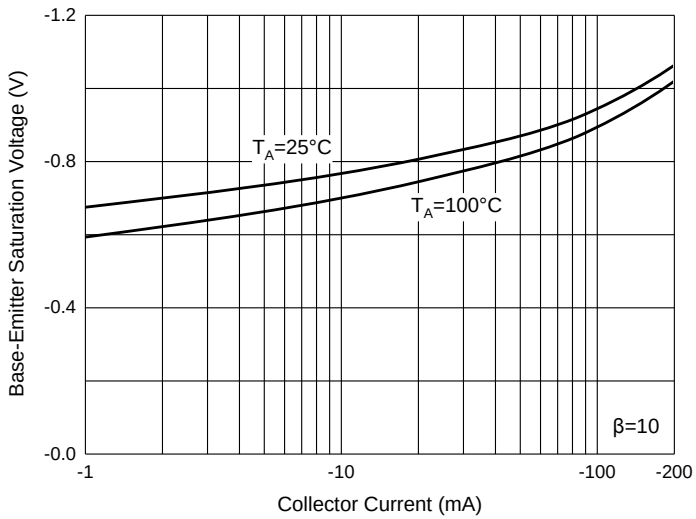



Fig. 5 - Base-Emitter Voltage Characteristics

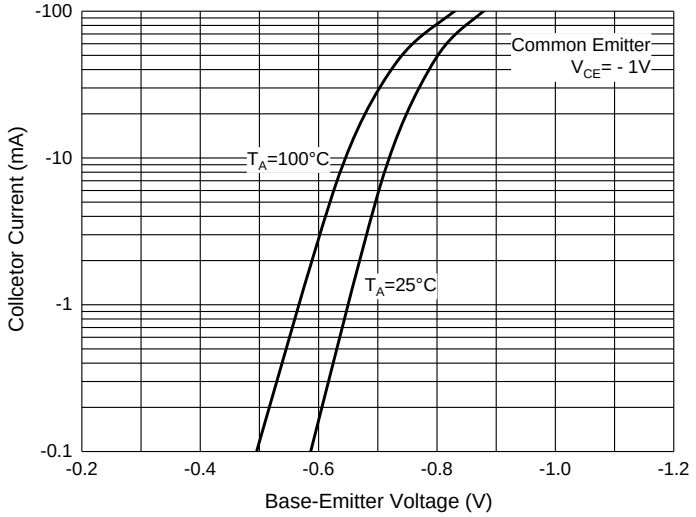
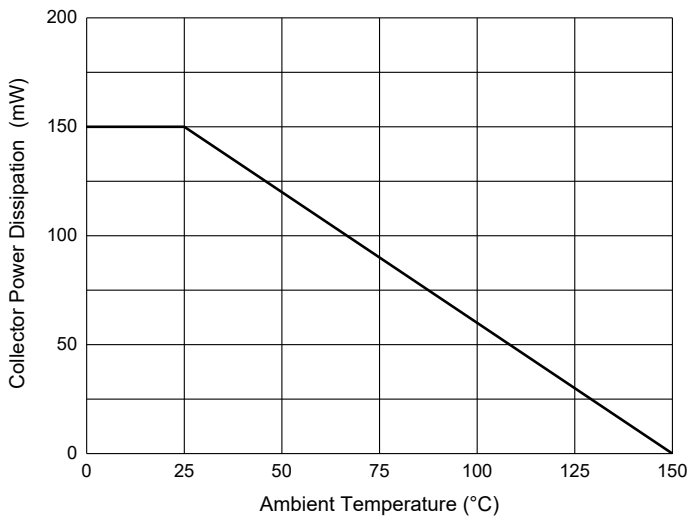



Fig. 6 - Collector Power Derating Curve



## Ordering Information

| Device | Packing |
|---|---|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

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