

**Features**

- Complementary to 2SA1162
- 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)

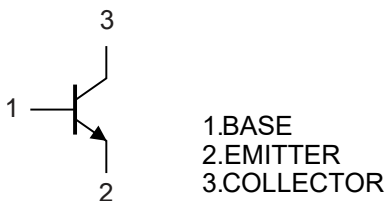
**Maximum Ratings @ 25°C Unless Otherwise Specified**

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

| Parameter                    | Symbol    | Rating | Unit |
|------------------------------|-----------|--------|------|
| Collector-Base Voltage       | $V_{CBO}$ | 60     | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 50     | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 5      | V    |
| Continuous Collector Current | $I_C$     | 150    | mA   |
| Power Dissipation            | $P_D$     | 150    | mW   |

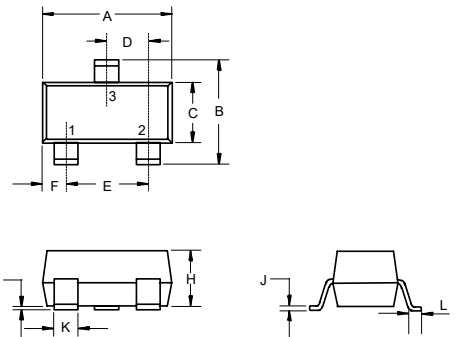
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

**Internal Structure**



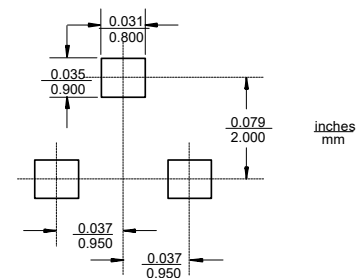
**NPN  
Plastic-Encapsulate  
Transistors**

**SOT-23**



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | MIN    | MAX   | MIN  | MAX  |      |
| A   | 0.110  | 0.120 | 2.80 | 3.04 |      |
| B   | 0.083  | 0.104 | 2.10 | 2.64 |      |
| C   | 0.047  | 0.055 | 1.20 | 1.40 |      |
| D   | 0.034  | 0.041 | 0.85 | 1.05 |      |
| E   | 0.067  | 0.083 | 1.70 | 2.10 |      |
| F   | 0.018  | 0.024 | 0.45 | 0.60 |      |
| G   | 0.0004 | 0.006 | 0.01 | 0.15 |      |
| H   | 0.035  | 0.043 | 0.90 | 1.10 |      |
| J   | 0.003  | 0.007 | 0.08 | 0.18 |      |
| K   | 0.012  | 0.020 | 0.30 | 0.51 |      |
| L   | 0.007  | 0.020 | 0.20 | 0.50 |      |

**Suggested Solder Pad Layout**



**Electrical Characteristics @  $T_A=25^\circ\text{C}$  Unless Otherwise Specified**

| Parameter                            | Symbol        | Min | Typ | Max  | Units         | Conditions  |
|--------------------------------------|---------------|-----|-----|------|---------------|---|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 60  |     |      | V             | $I_C=100\mu\text{A}, I_E=0$   |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 50  |     |      | V             | $I_C=1\text{mA}, I_B=0$   |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 5   |     |      | V             | $I_E=100\mu\text{A}, I_C=0$   |
| Collector-Base Cutoff Current        | $I_{CBO}$     |     |     | 0.1  | $\mu\text{A}$ | $V_{CB}=60\text{V}, I_E=0$  |
| Emitter-Base Cutoff Current          | $I_{EBO}$     |     |     | 0.1  | $\mu\text{A}$ | $V_{EB}=5\text{V}, I_C=0$   |
| DC Current Gain                      | $h_{FE}$      | 70  |     | 700  |               | $V_{CE}=6\text{V}, I_C=2\text{mA}$  |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |     | 0.1 | 0.25 | V             | $I_C=100\text{mA}, I_B=10\text{mA}$                                       |
| Transition Frequency                 | $f_T$         | 80  |     |      | MHz           | $V_{CE}=10\text{V}, I_C=1\text{mA}$                                       |
| Collector Output Capacitance         | $C_{ob}$      |     | 2   | 3.5  | pF            | $V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$                                 |
| Noise Figure                         | $N_F$         |     | 1   | 10   | dB            | $V_{CE}=6\text{V}, I_C=0.1\text{mA}, f=1\text{KHz}, R_g=10\text{K}\Omega$ |

**Classification of  $h_{FE}$** 

|         |        |         |         |         |
|---------|--------|---------|---------|---------|
| Rank    | O      | Y       | GR      | BL      |
| Range   | 70-140 | 120-240 | 200-400 | 350-700 |
| Marking | LO     | LY      | LG      | LL      |

**Curve Characteristics**

Fig. 1 - Static Characteristics

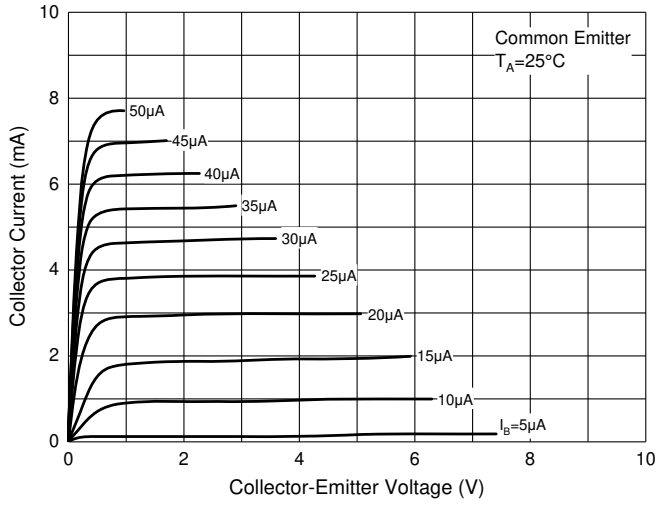


Fig. 2 - DC Current Gain Characteristics

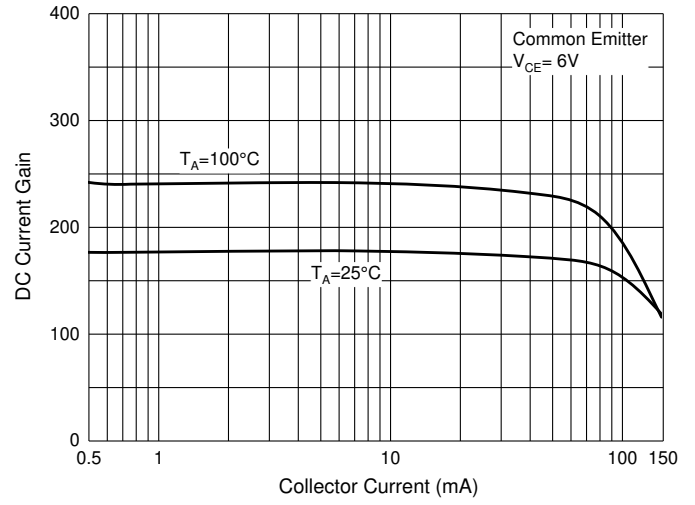


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

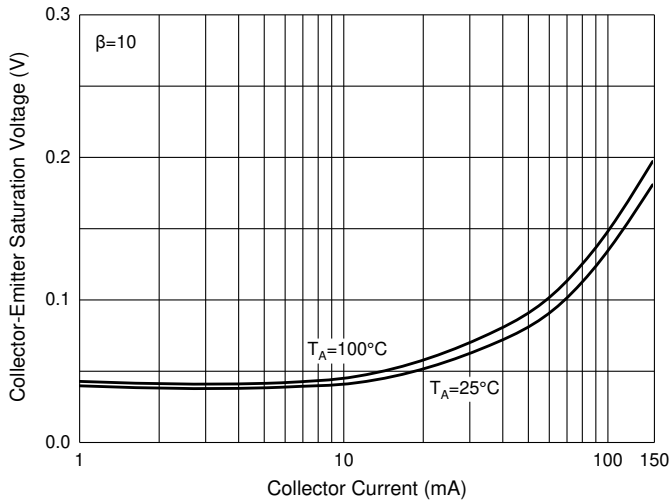


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

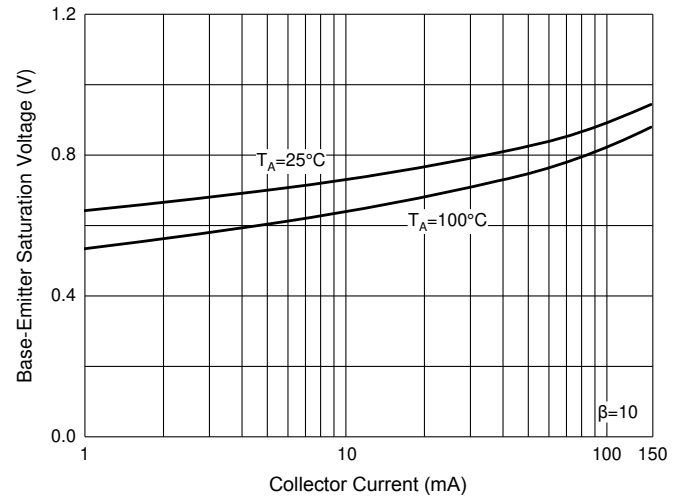


Fig. 5 - Base-Emitter Voltage Characteristics

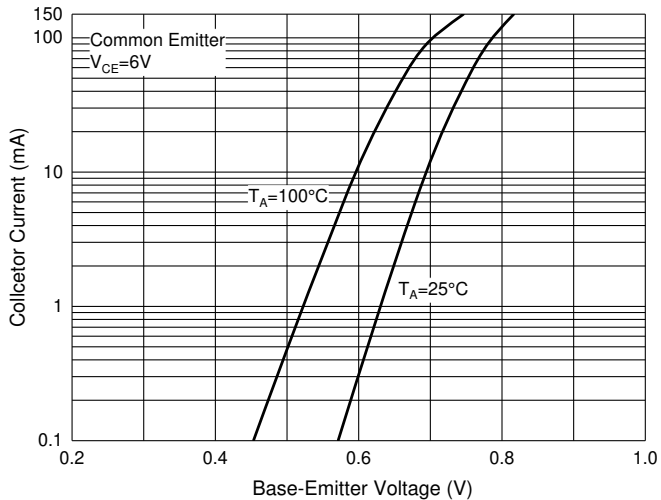
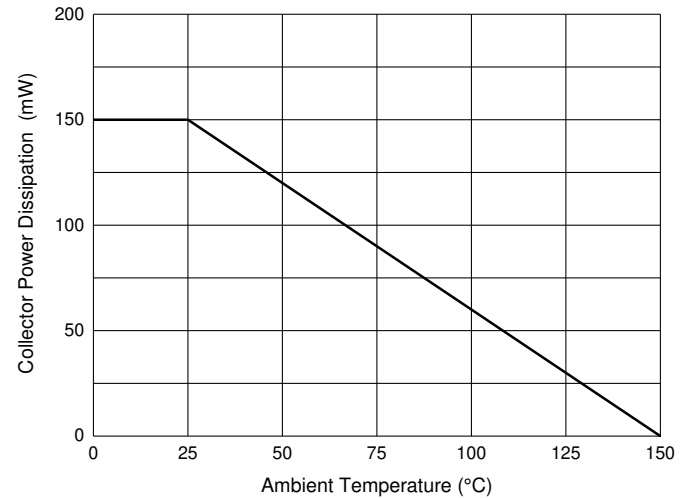


Fig. 6 - Collector Power Derating Curve



## Ordering Information

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

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