

## Features

- Ideally Suited For Automatic Insertion
- 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

| Parameter                             | Symbol    | Rating | Unit |
|---------------------------------------|-----------|--------|------|
| Collector-Base Voltage                | $V_{CBO}$ | 75     | V    |
| Collector-Emitter Voltage             | $V_{CEO}$ | 40     | V    |
| Emitter-Base Voltage                  | $V_{EBO}$ | 6      | V    |
| Collector Current                     | $I_C$     | 0.6    | A    |
| Collector Current-Peak <sup>(2)</sup> | $I_{CM}$  | 1.1    | A    |
| Power Dissipation                     | $P_D$     | 350    | mW   |

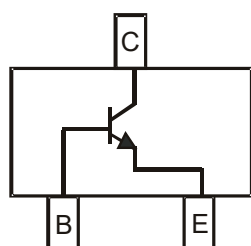
## Thermal characteristics

| Parameter                                   | Symbol        | Rating   | Unit |
|---|---------------|----------|------|
| Junction Temperature Range                  | $T_j$         | -55~+150 | °C   |
| Storage Temperature Range                   | $T_{stg}$     | -55~+150 | °C   |
| Thermal Resistance from Junction to Ambient | $R_{th(J-A)}$ | 357      | °C/W |

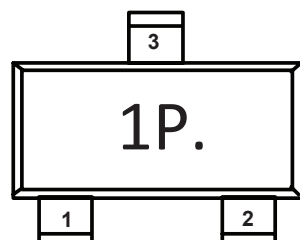
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. pulse width≤40us.

## Internal Structure

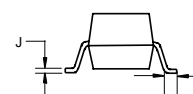
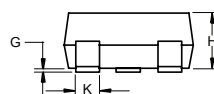
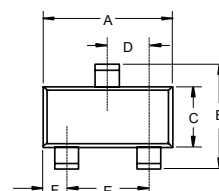


## Device Marking



# NPN General Purpose Amplifier

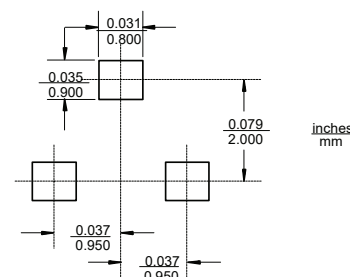
## SOT-23



### DIMENSIONS

| 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   | 0.014  | 0.020 | 0.35 | 0.51 |      |
| L   | 0.007  | 0.020 | 0.20 | 0.50 |      |

### Suggested Solder Pad Layout

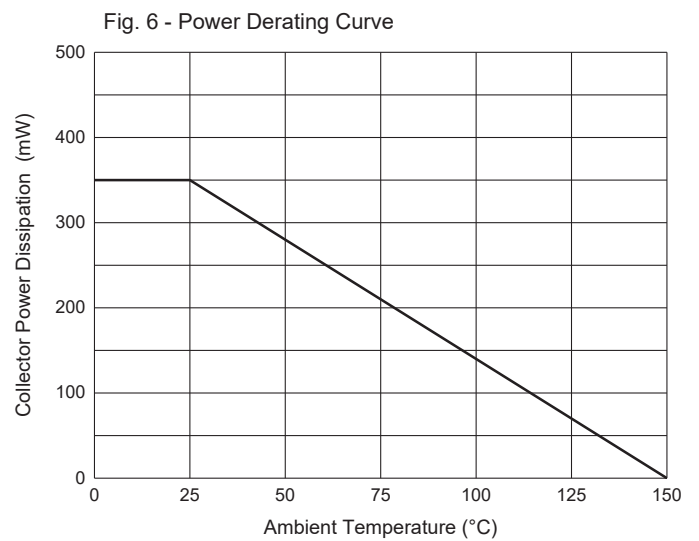
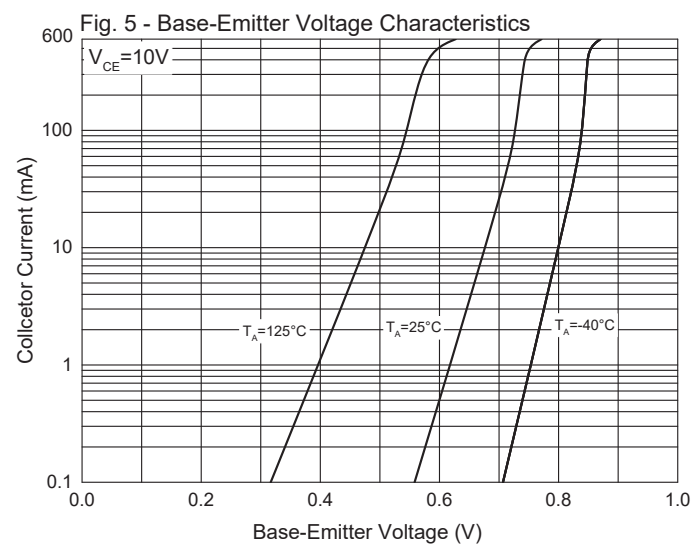
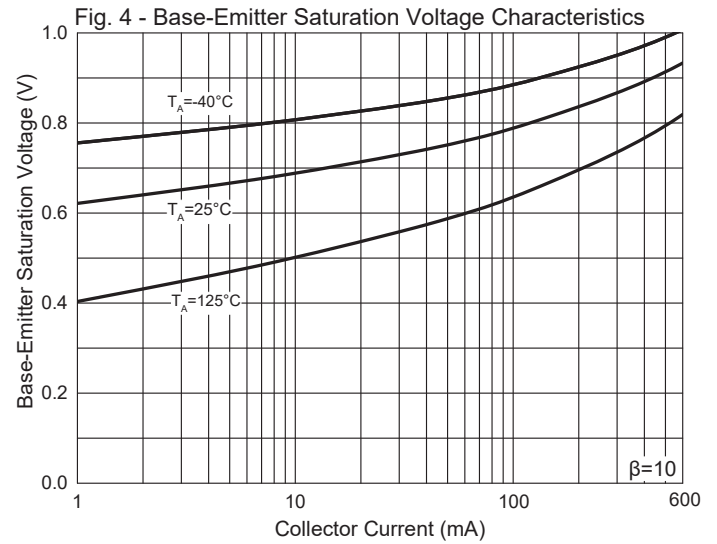
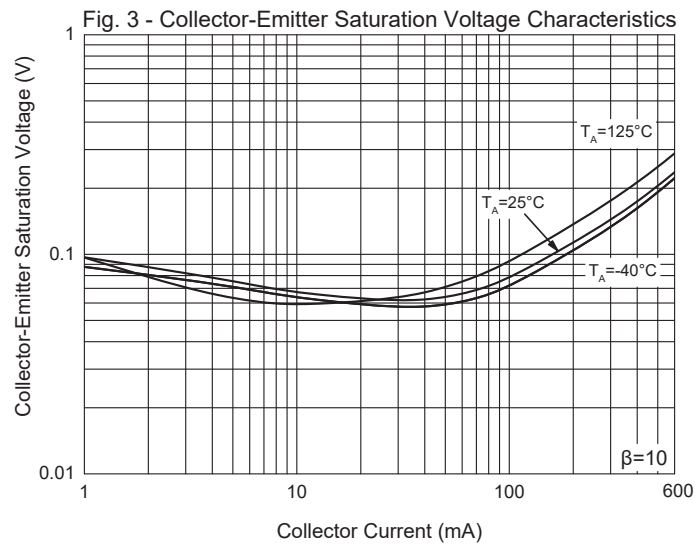
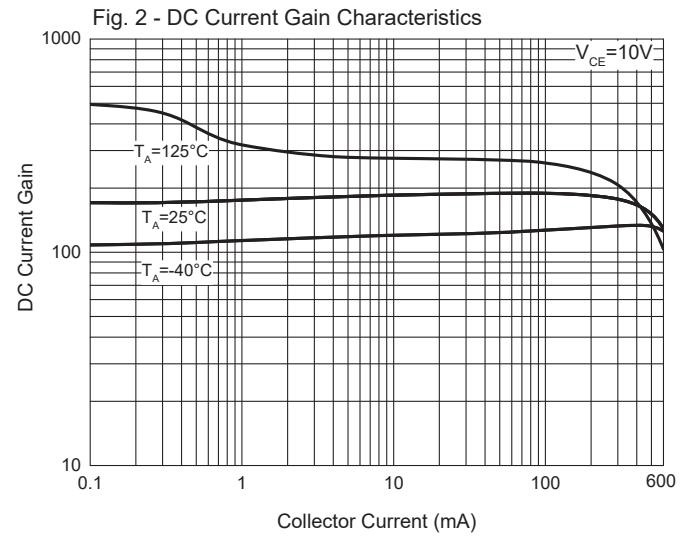
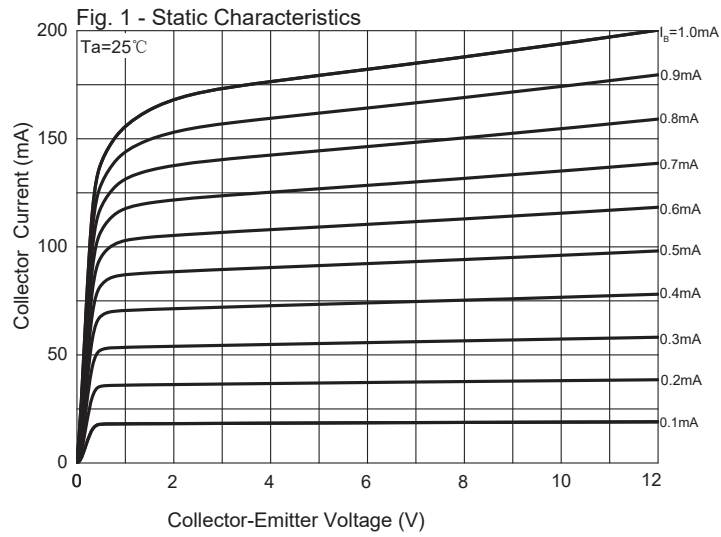


## Electrical Characteristics @ 25°C Unless Otherwise Specified

| Parameter                            | Symbol        | Min | Typ | Max | Units | Conditions                                       |
|--------------------------------------|---------------|-----|-----|-----|-------|--|
| Collector-Base Breakdown Voltage*    | $V_{(BR)CBO}$ | 75  |     |     | V     | $I_C=10\mu A, I_E=0$                             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 40  |     |     | V     | $I_C=10mA, I_B=0$                                |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 6   |     |     | V     | $I_E=10\mu A, I_C=0$                             |
| Collector Cutoff Current             | $I_{CEX}$     |     |     | 10  | nA    | $V_{CE}=60V, V_{BE}=3V$                          |
| DC Current Gain*                     | $h_{FE1}$     | 35  |     |     |       | $V_{CE}=10V, I_C=0.1mA$                          |
|                                      | $h_{FE2}$     | 50  |     |     |       | $V_{CE}=10V, I_C=1mA$                            |
|                                      | $h_{FE3}$     | 75  |     |     |       | $V_{CE}=10V, I_C=10mA$                           |
|                                      | $h_{FE4}$     | 100 |     | 300 |       | $V_{CE}=10V, I_C=150mA$                          |
|                                      | $h_{FE5}$     | 50  |     |     |       | $V_{CE}=1V, I_C=150mA$                           |
|                                      | $h_{FE6}$     | 40  |     |     |       | $V_{CE}=10V, I_C=500mA$                          |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |     |     | 0.3 | V     | $I_C=150mA, I_B=15mA$                            |
|                                      |               |     |     | 1.0 | V     | $I_C=500mA, I_B=50mA$                            |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | 0.6 |     | 1.2 | V     | $I_C=150mA, I_B=15mA$                            |
|                                      |               |     |     | 2.0 | V     | $I_C=500mA, I_B=50mA$                            |
| Transition Frequency                 | $f_T$         | 300 |     |     | MHz   | $V_{CE}=20V, I_C=20mA, f=100MHz$                 |
| Output Capacitance                   | $C_{obo}$     |     |     | 8   | pF    | $V_{CB}=10V, I_E=0, f=1MHz$                      |
| Input Capacitance                    | $C_{ibo}$     |     |     | 45  | pF    | $V_{BE}=0.5V, I_C=0, f=1MHz$                     |
| Noise Figure                         | NF            |     |     | 4   | dB    | $V_{CE}=10V, I_C=100\mu A, f=1kHz, R_S=1k\Omega$ |
| Delay Time                           | $t_d$         |     |     | 10  | ns    | $V_{CC}=30V, V_{BE}=0.5V$                        |
| Rise Time                            | $t_r$         |     |     | 25  | ns    | $I_C=150mA, I_{B1}=15mA$                         |
| Storage Time                         | $t_s$         |     |     | 225 | ns    | $V_{CC}=30V, I_C=150mA$                          |
| Fall Time                            | $t_f$         |     |     | 60  | ns    | $I_{B1}=I_{B2}=15mA$                             |

\*Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

## Curve Characteristics



## Ordering Information

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

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