

## Features

- 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

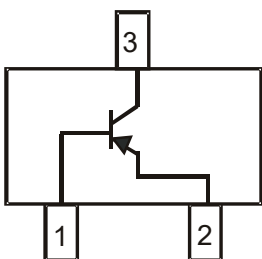
| Parameter                 | Symbol    | Rating | Unit |
|---------------------------|-----------|--------|------|
| Collector-Base Voltage    | $V_{CBO}$ | -40    | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | -40    | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | -5     | V    |
| Collector Current         | $I_C$     | -200   | mA   |
| Power Dissipation         | $P_D$     | 300    | mW   |

## Thermal characteristics

| Parameter                                   | Symbol        | Rating   | Unit |
|---|---------------|----------|------|
| Operating Junction Temperature Range        | $T_{OPR}$     | -55~+150 | °C   |
| Storage Temperature Range                   | $T_{STR}$     | -55~+150 | °C   |
| Thermal Resistance from Junction to Ambient | $R_{th(j-a)}$ | 417      | °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.

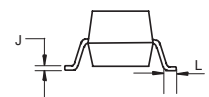
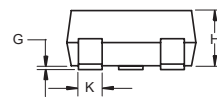
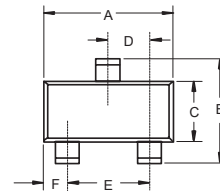
## Internal Structure



- 1.BASE
- 2.EMITTER
- 3.COLLECTOR

# PNP General Purpose Amplifier

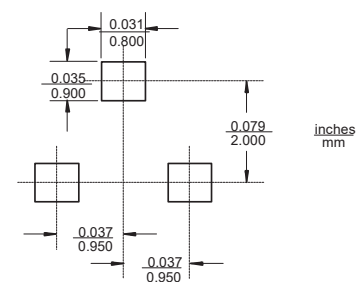
## SOT-23



### 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

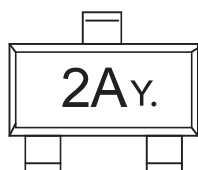


Electrical Characteristics @ 25°C Unless Otherwise Specified

| Parameter  | Symbol        | Min   | Typ | Max   | Units | Conditions                                 |
|--|---------------|-------|-----|-------|-------|--|
| Collector-Base Breakdown Voltage                   | $V_{(BR)CBO}$ | -40   |     |       | V     | $I_C=-10\mu A, I_E=0$                      |
| Collector-Emitter Breakdown Voltage <sup>(2)</sup> | $V_{(BR)CEO}$ | -40   |     |       | V     | $I_C=-1mA, I_B=0$                          |
| Emitter-Base Breakdown Voltage                     | $V_{(BR)EBO}$ | -5    |     |       | V     | $I_E=-10\mu A, I_C=0$                      |
| Collector-Base Cutoff Current                      | $I_{CBO}$     |       |     | -100  | nA    | $V_{CB}=-40V, I_E=0$                       |
| Collector Cutoff Current                           | $I_{CEX}$     |       |     | -50   | nA    | $V_{CE}=-30V, V_{BE}=-3V$                  |
| Emitter-Base Cutoff Current                        | $I_{EBO}$     |       |     | -100  | nA    | $V_{EB}=-5V, I_C=0$                        |
| DC Current Gain <sup>(2)</sup>                     | $h_{FE(1)}$   | 100   |     | 300   |       | $V_{CE}=-1V, I_C=-10mA$                    |
|  | $h_{FE(2)}$   | 60    |     |       |       | $V_{CE}=-1V, I_C=-50mA$                    |
|  | $h_{FE(3)}$   | 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                                 | $C_{cbo}$     |       |     | 4.5   | pF    | $V_{CB}=-5V, I_E=0, f=1MHz$                |
| Input Capacitance                                  | $C_{ibo}$     |       |     | 10    | pF    | $V_{BE}=-0.5V, I_C=0, f=1MHz$              |
| Noise Figure                                       | NF            |       |     | 4     | dB    | $V_{CE}=-5V, I_C=100\mu A, R_S=1K, f=1KHz$ |
| Delay Time   | $t_d$         |       |     | 35    | ns    | $V_{CC}=-3V, I_C=-10mA$                    |
| Rise Time  | $t_r$         |       |     | 35    | ns    | $V_{BE}=-0.5V, I_{B1}=I_{B2}=-1mA$         |
| Storage Time                                       | $t_s$         |       |     | 225   | ns    | $V_{CC}=-3V, I_C=-10mA$                    |
| Fall Time  | $t_f$         |       |     | 75    | ns    | $I_{B1}=I_{B2}=-1mA$                       |

Note: 2. Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$

Marking Information



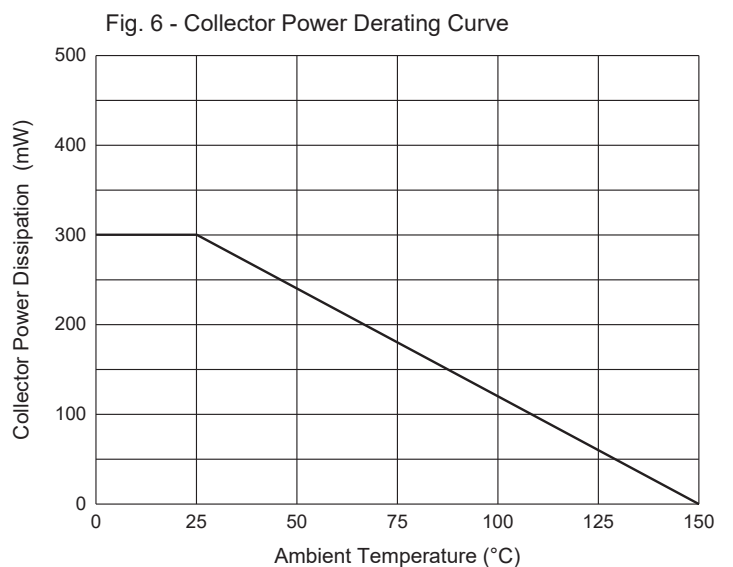
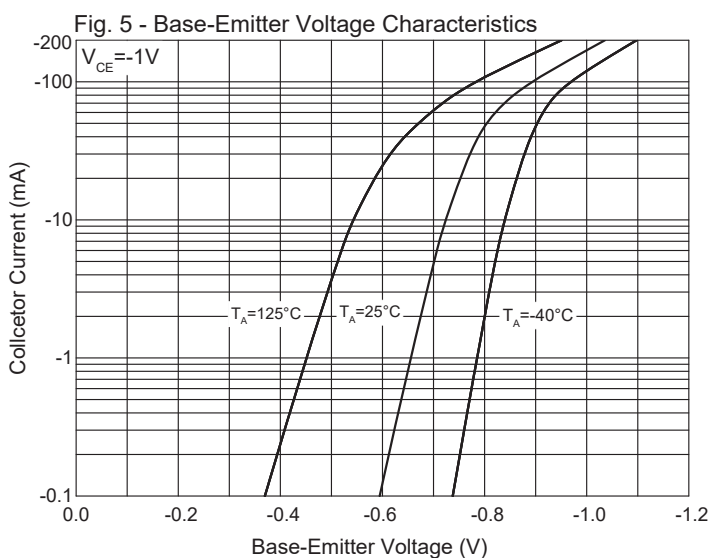
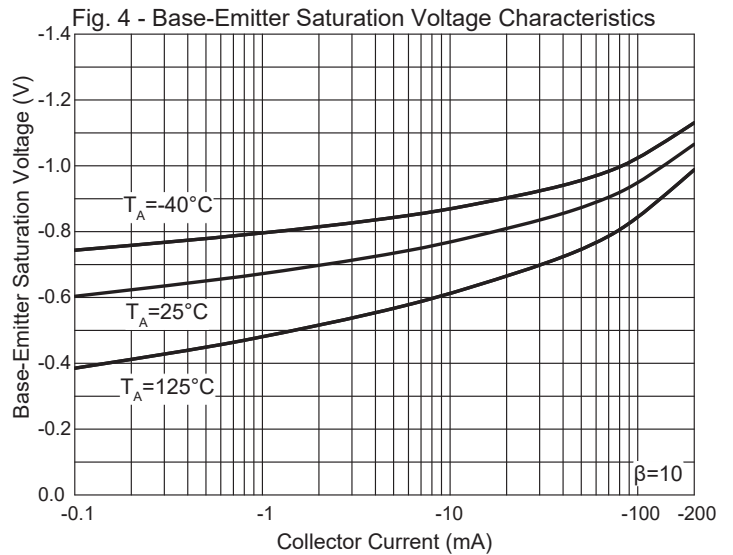
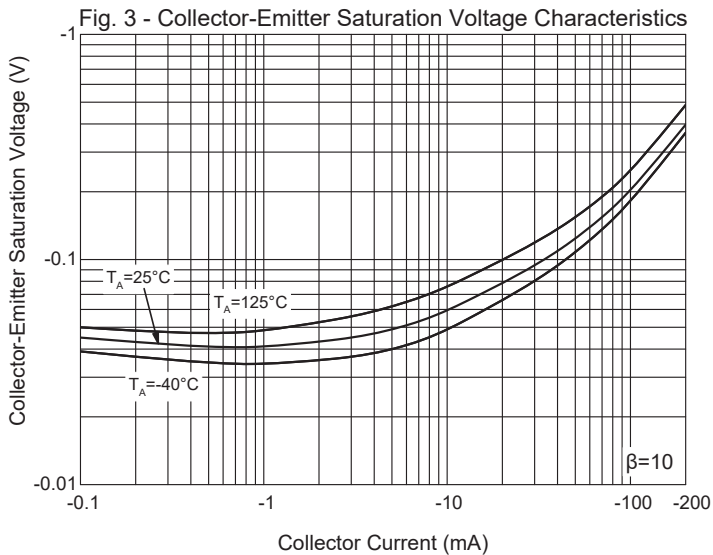
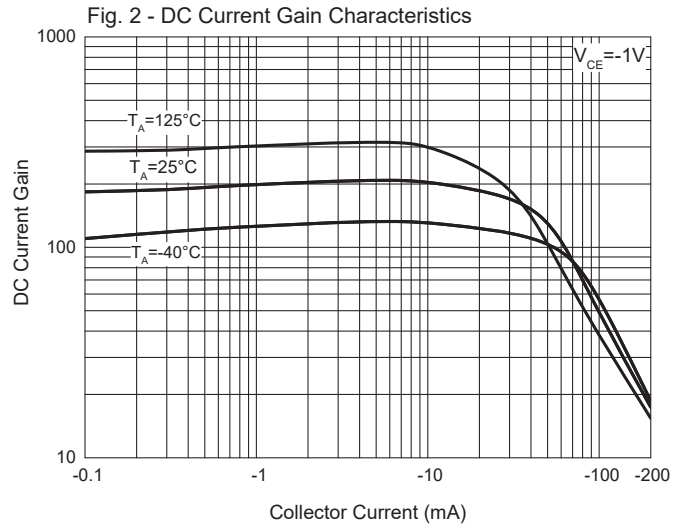
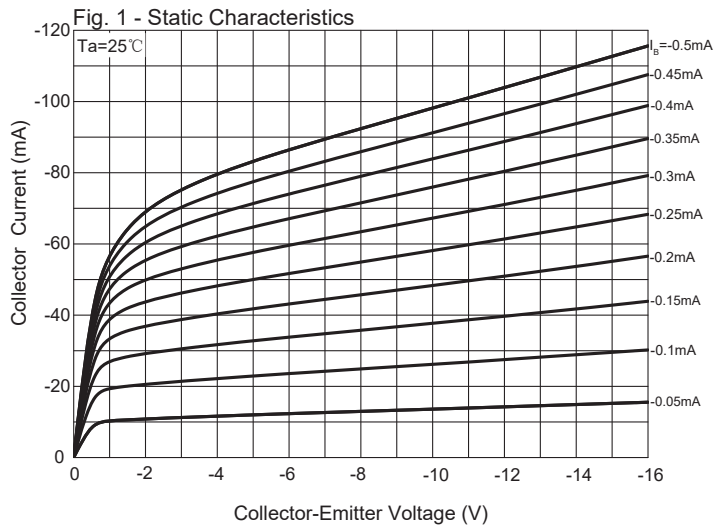
2A = Product Type Marking Code  
Y = Date Code Marking

Date code Key (2 years a cycle)

| Year  | 2011 |     |     |     |     |     |     |     |     |     |     |     |
|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Month | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Code  | J    | O   | L   | C   | K   | B   | P   | D   | M   | E   | G   | F   |

| Year  | 2012 |     |     |     |     |     |     |     |     |     |     |     |
|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Month | Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Code  | W    | N   | Y   | T   | R   | H   | A   | I   | U   | X   | Z   | S   |

**Curve Characteristics**



## Ordering Information

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

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