

## SOT-523 General Purpose Transistor

### PNP Silicon

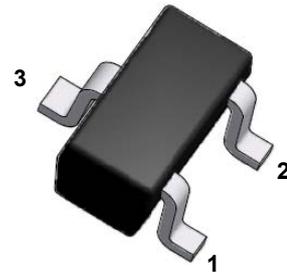
### Surface Mount Plastic Package

Green Product

#### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Symbol          | Parameter                                       | Value       | Units                     |
|-----------------|---|-------------|---------------------------|
| $V_{CBO}$       | Collector-Base Voltage                          | -40         | V                         |
| $V_{CEO}$       | Collector-Emitter Voltage                       | -40         | V                         |
| $V_{EBO}$       | Emitter-Base Voltage                            | -5          | V                         |
| $I_C$           | Collector Current                               | -200        | mA                        |
| $P_D$           | Power Dissipation<br>(FR-4 Board – minimum pad) | 200         | mW                        |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient     | 600         | $^\circ\text{C}/\text{W}$ |
| $T_J$ $T_{STG}$ | Junction & Storage Temperature Range            | -55 to +150 | $^\circ\text{C}$          |

These ratings are limiting values above which the serviceability of the device may be impaired.

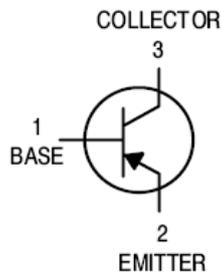


SOT-523 (SC-75A)

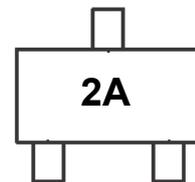
#### Specification Features:

- Simplifies Circuit Design
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Weight: approx. 0.002g

#### Electrical Symbol:



#### Device Marking Code:



#### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

#### Off Characteristics

| Symbol        | Parameter                                       | Test Condition                                 | Limits |     | Unit  |
|---------------|---|--|--------|-----|-------|
|               |   |  | Min    | Max |       |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage<br>(Note 1) | $I_C = -1\text{mA}$ , $I_B = 0\text{A}$        | -40    | -   | Volts |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage                | $I_C = -10\mu\text{A}$ , $I_E = 0\text{A}$     | -40    | -   | Volts |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage                  | $I_E = -10\mu\text{A}$ , $I_B = 0\text{A}$     | -5     | -   | Volts |
| $I_{BL}$      | Base Cutoff Current                             | $V_{CE} = -30\text{V}$ , $V_{EB} = -3\text{V}$ | -      | -50 | nA    |
| $I_{CEX}$     | Collector Cutoff Current                        | $V_{CE} = -30\text{V}$ , $V_{EB} = -3\text{V}$ | -      | -50 | nA    |

Note 1: Pulse Test. Pulse width <300us, Duty cycle < 2.0%.

**On Characteristics (Note 1)**

| Symbol                     | Parameter                            | Test Condition                                 | Limits |      | Unit  |
|----------------------------|--------------------------------------|--|--------|------|-------|
|                            |                                      |  | Min    | Max  |       |
| <b>H<sub>FE</sub></b>      | DC Current Gain                      | I <sub>C</sub> = -0.1mA, V <sub>CE</sub> = -1V | 60     | -    | -     |
|                            |                                      | I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -1V | 80     | -    |       |
|                            |                                      | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V  | 100    | 300  |       |
|                            |                                      | I <sub>C</sub> = -50mA, V <sub>CE</sub> = -1V  | 60     | -    |       |
|                            |                                      | I <sub>C</sub> = -100mA, V <sub>CE</sub> = -1V | 30     | -    |       |
| <b>V<sub>CE(sat)</sub></b> | Collector-Emitter Saturation Voltage | I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA  | -      | 0.25 | Volts |
|                            |                                      | I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA  | -      | 0.4  |       |
| <b>V<sub>BE(sat)</sub></b> | Base-Emitter Saturation Voltage      | I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA  | 0.65   | 0.85 | Volts |
|                            |                                      | I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA  | -      | 0.95 |       |

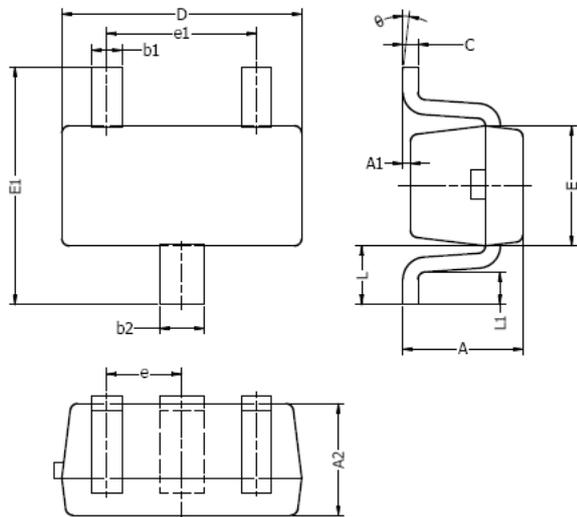
**Small-signal Characteristics**

| Symbol                 | Parameter                      | Test Condition  | Limits |     | Unit              |
|------------------------|--------------------------------|---|--------|-----|-------------------|
|                        |                                |   | Min    | Max |                   |
| <b>f<sub>T</sub></b>   | Current-Gain-Bandwidth Product | I <sub>C</sub> = -10mA, V <sub>CE</sub> = -20V, f = 100MHz                          | 250    | -   | MHz               |
| <b>C<sub>obo</sub></b> | Output Capacitance             | V <sub>CB</sub> = -5V, I <sub>E</sub> = 0A, f = 1.0MHz                              | -      | 4.5 | pF                |
| <b>C<sub>ibo</sub></b> | Input Capacitance              | V <sub>BE</sub> = -0.5V, I <sub>C</sub> = 0A, f = 1.0MHz                            | -      | 10  | pF                |
| <b>h<sub>ie</sub></b>  | Input Impedance                | V <sub>CE</sub> = -10V, I <sub>C</sub> = -1mA, f = 1.0kHz                           | 2      | 12  | pF                |
| <b>h<sub>re</sub></b>  | Voltage Feedback Ratio         | V <sub>CE</sub> = -10V, I <sub>C</sub> = -1mA, f = 1.0kHz                           | 0.1    | 10  | X10 <sup>-4</sup> |
| <b>h<sub>fe</sub></b>  | Small-signal Current Gain      | V <sub>CE</sub> = -10V, I <sub>C</sub> = -1mA, f = 1.0kHz                           | 100    | 400 | -                 |
| <b>h<sub>oe</sub></b>  | Output Admittance              | V <sub>CE</sub> = -10V, I <sub>C</sub> = -1mA, f = 1.0kHz                           | 3      | 60  | ∅ mhos            |
| <b>NF</b>              | Noise Figure                   | V <sub>CE</sub> = -5V, I <sub>C</sub> = -100uA<br>R <sub>S</sub> = 1.0kΩ f = 1.0kHz |        | 4   | dB                |

**Switching Characteristics**

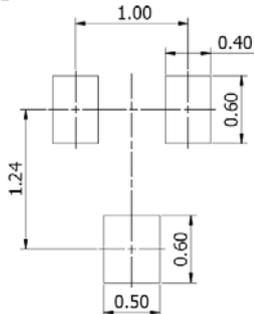
| Symbol               | Parameter    | Test Condition                                  | Limits |     | Unit |
|----------------------|--------------|---|--------|-----|------|
|                      |              |   | Min    | Max |      |
| <b>t<sub>d</sub></b> | Delay Time   | V <sub>CC</sub> = -3V, V <sub>BE</sub> = -0.5V, | -      | 35  | nS   |
| <b>t<sub>r</sub></b> | Rise Time    | I <sub>C</sub> = -10mA, I <sub>B1</sub> = -1mA  | -      | 35  |      |
| <b>t<sub>s</sub></b> | Storage Time | V <sub>CC</sub> = -3V, I <sub>C</sub> = -10mA,  | -      | 225 | nS   |
| <b>t<sub>f</sub></b> | Fall Time    | I <sub>B1</sub> = I <sub>B2</sub> = -1mA        | -      | 75  |      |

SOT-523 Package Outline



| DIM | MILLIMETERS |      | INCHES     |       |
|-----|-------------|------|------------|-------|
|     | MIN         | MAX  | MIN        | MAX   |
| A   | 0.70        | 0.90 | 0.028      | 0.035 |
| A1  | 0.00        | 0.10 | 0.000      | 0.004 |
| A2  | 0.70        | 0.80 | 0.028      | 0.031 |
| b1  | 0.15        | 0.25 | 0.006      | 0.010 |
| b2  | 0.25        | 0.35 | 0.010      | 0.014 |
| c   | 0.10        | 0.20 | 0.004      | 0.008 |
| D   | 1.50        | 1.70 | 0.059      | 0.067 |
| E   | 0.70        | 0.90 | 0.028      | 0.035 |
| E1  | 1.45        | 1.75 | 0.057      | 0.069 |
| e   | 0.50 TYP.   |      | 0.020 TYP. |       |
| e1  | 0.90        | 1.10 | 0.035      | 0.043 |
| L   | 0.40 REF.   |      | 0.016 REF. |       |
| L1  | 0.10        | 0.30 | 0.004      | 0.012 |
| θ   | 0°          | 8°   | 0°         | 8°    |

Typical Soldering Pattern:



NOTES:

1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

## **NOTICE**

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