

# SOT-523 General Purpose Transistor

## NPN Silicon

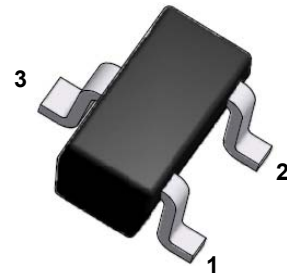
### Surface Mount Plastic Package

Green Product

#### Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V <sub>CBO</sub>	Collector-Base Voltage	60	V
V <sub>CEO</sub>	Collector-Emitter Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	6	V
I <sub>C</sub>	Collector Current	200	mA
P <sub>D</sub>	Power Dissipation (FR-4 Board – minimum pad)	200	mW
R <sub>θJA</sub>	Thermal Resistance from Junction to Ambient	600	°C /W
T <sub>J</sub> T <sub>STG</sub>	Junction & Storage Temperature Range	-55 to +150	°C

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

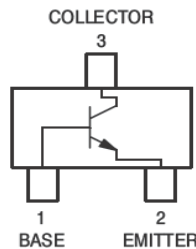


SOT-523 (SC-75A)

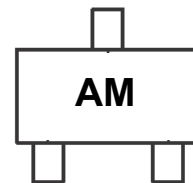
#### Specification Features:

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

#### Electrical Symbol:



#### Device Marking Code:



#### Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

#### Off Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage (Note 1)	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0A	40	-	Volts
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage	I <sub>C</sub> = 10uA, I <sub>E</sub> = 0A	60	-	Volts
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage	I <sub>E</sub> = 10uA, I <sub>B</sub> = 0A	6	-	Volts
I <sub>BL</sub>	Base Cutoff Current	V <sub>CE</sub> = 30V, V <sub>EB</sub> = 3V	-	50	nA
I <sub>CEx</sub>	Collector Cutoff Current	V <sub>CE</sub> = 30V, V <sub>EB</sub> = 3V	-	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	40	-	-
		I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 1V	70	-	
		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	-	0.2	Volts
		I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA	-	0.3	
<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	

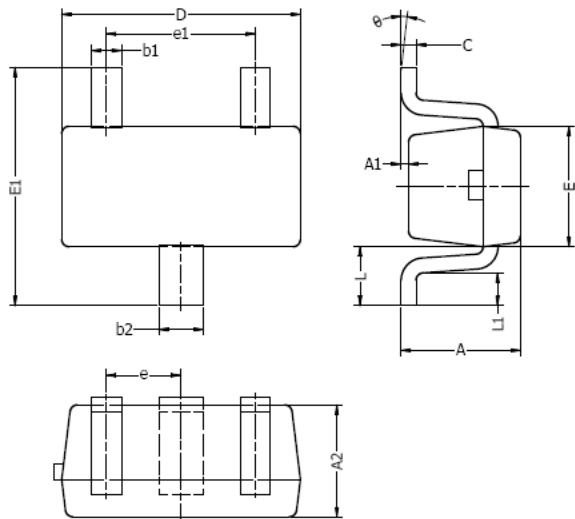
**Small-signal Characteristics**

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	200	-	MHz
<b>C<sub>obo</sub></b>	Output Capacitance	V <sub>CB</sub> = 5V, I <sub>E</sub> = 0A, f = 1.0MHz	-	4	pF
<b>C<sub>ibo</sub></b>	Input Capacitance	V <sub>BE</sub> = 0.5V, I <sub>C</sub> = 0A, f = 1.0MHz	-	8	pF
<b>h<sub>ie</sub></b>	Input Impedance	V <sub>CE</sub> = 10V, I <sub>C</sub> = 1mA, f = 1.0kHz	1	10	pF
<b>h<sub>re</sub></b>	Voltage Feedback Ratio	V <sub>CE</sub> = 10V, I <sub>C</sub> = 1mA, f = 1.0kHz	0.5	8	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	1	40	∅ mhos
<b>NF</b>	Noise Figure	V <sub>CE</sub> = 5V, I <sub>C</sub> = 100uA R <sub>S</sub> = 1.0kΩ f = 1.0kHz		5	dB

**Switching Characteristics**

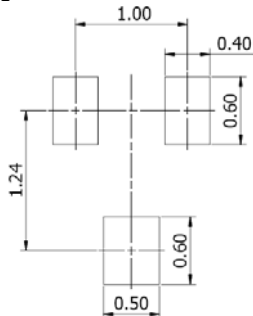
Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
<b>t<sub>d</sub></b>	Delay Time	V <sub>CC</sub> = 3V, V <sub>BE</sub> = 0.5V,	-	35	nS
<b>t<sub>r</sub></b>	Rise Time	I <sub>C</sub> = 10mA, I <sub>B1</sub> = 1mA	-	35	
<b>t<sub>s</sub></b>	Storage Time	V <sub>CC</sub> = 3V, I <sub>C</sub> = 10mA,	-	200	nS
<b>t<sub>f</sub></b>	Fall Time	I <sub>B1</sub> = I <sub>B2</sub> = 1mA	-	50	

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.

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