

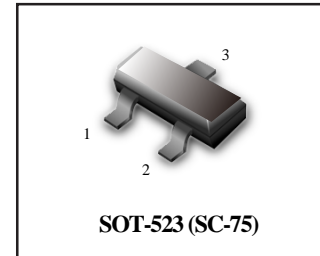
General Purpose Transistor

NPN Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SOT-523 (SC-75) package which is designed for low power surface mount applications.

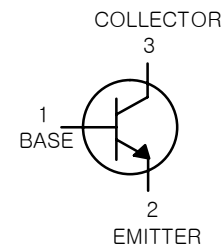
Features

- We declare that the material of product compliance with RoHS requirements.



ORDERING INFORMATION

Device	Maring	Shipping
2N2222AE	1P	3000 / Tape & Reel



MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Rating	Symbol	Max	Unit
Collector–Emitter Voltage	V_{CEO}	40	Vdc
Collector–Base Voltage	V_{CBO}	75	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current – Continuous	I_C	600	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$	P_D	150	mW
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (Note 1) ($I_C = 1.0 \text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	40	–	Vdc
Collector–Base Breakdown Voltage ($I_C = 10 \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	75	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	6.0	–	Vdc
Base Cutoff Current ($V_{CE} = 60 \text{ Vdc}, V_{EB} = 3.0 \text{ Vdc}$)	I_{BL}	–	20	nAdc
Collector Cutoff Current ($V_{CE} = 60 \text{ Vdc}, V_{EB} = 3.0 \text{ Vdc}$)	I_{CEX}	–	100	nAdc



2N2222AE

ON CHARACTERISTICS (Note 2)

DC Current Gain ($I_C = 0.1 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 1.0 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 150 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$) ($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$)	H_{FE}	35 50 75 100 40	- - - - -	-
Collector – Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$)	$V_{CE(sat)}$	- -	0.3 1.0	Vdc
Base – Emitter Saturation Voltage ($I_C = 150 \text{ mAdc}$, $I_B = 15 \text{ mAdc}$) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$)	$V_{BE(sat)}$	0.6 -	1.2 2.0	Vdc

SMALL-SIGNAL CHARACTERISTICS

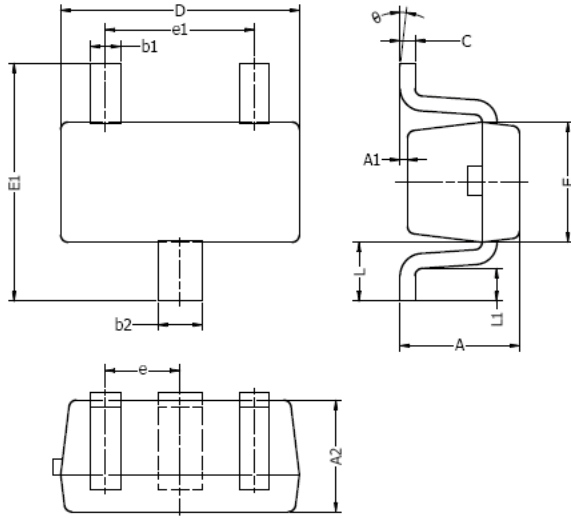
Current – Gain – Bandwidth Product ($I_C = 20 \text{ mAdc}$, $V_{CE} = 20 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	250	-	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{obo}	-	8.0	pF
Input Capacitance ($V_{EB} = 0.5 \text{ Vdc}$, $I_C = 0$, $f = 1.0 \text{ MHz}$)	C_{ibo}	-	30	pF
Input Impedance ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{ie}	0.25	1.25	k Ω
Voltage Feedback Ratio ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{re}	-	4.0	$\times 10^{-4}$
Small – Signal Current Gain ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	75	375	-
Output Admittance ($V_{CE} = 10 \text{ Vdc}$, $I_C = 10 \text{ mAdc}$, $f = 1.0 \text{ kHz}$)	h_{oe}	25	200	μmhos
Noise Figure ($V_{CE} = 10 \text{ Vdc}$, $I_C = 100 \mu\text{Adc}$, $R_S = 1.0 \text{ k ohms}$, $f = 1.0 \text{ kHz}$)	NF	-	4.0	dB

SWITCHING CHARACTERISTICS

Delay Time	($V_{CC} = 30 \text{ Vdc}$, $V_{BE} = -0.5 \text{ Vdc}$, $I_C = 150 \text{ mAdc}$, $I_{B1} = 15 \text{ mAdc}$)	t_d	-	10	ns
Rise Time		t_r	-	25	
Storage Time	($V_{CC} = 30 \text{ Vdc}$, $I_C = 150 \text{ mAdc}$, $I_{B1} = I_{B2} = 15 \text{ mAdc}$)	t_s	-	225	ns
Fall Time		t_f	-	60	

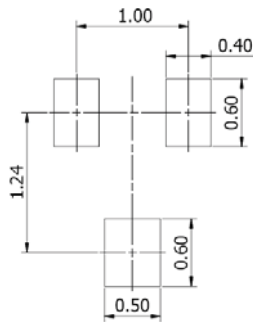
1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.
2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

SOT-523(SC-75) OUTLINE AND DIMENSIONS



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:

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