

General Purpose Transistors

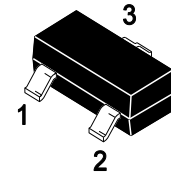
NPN Silicon FEATURE

We declare that the material of product compliance with RoHS requirements.
S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

S9013 Series
S-S9013 Series

DEVICE MARKING AND ORDERING INFORMATION

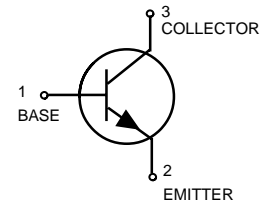
Device	Marking	Shipping
S9013P	S-S9013P	13P 3000/Tape&Reel
S9013Q	S-S9013Q	13Q 3000/Tape&Reel
S9013R	S-S9013R	13R 3000/Tape&Reel
S9013S	S-S9013S	13S 3000/Tape&Reel



SOT-23

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	20	V
Collector-Base Voltage	V_{CBO}	40	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector current-continouun	I_C	500	mAdc



THERMAL CHARATEERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (1) $T_A=25^{\circ}C$	P_D	225	mW
Derate above $25^{\circ}C$		1.8	mW/ $^{\circ}C$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^{\circ}C/W$
Total Device Dissipation Alumina Substrate, (2) $T_A=25^{\circ}C$	P_D	300	mW
Derate above $25^{\circ}C$		2.4	mW/ $^{\circ}C$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^{\circ}C/W$
Junction and Storage Temperature	T_j, T_{stg}	-55 to +150	$^{\circ}C$

1. FR-5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C=1.0mA$)	$V_{(BR)CEO}$	20	-	-	V
Emitter-Base Breakdown Voltage ($I_E=100\mu A$)	$V_{(BR)EBO}$	5	-	-	V
Collector-Base Breakdown Voltage ($I_C=100\mu A$)	$V_{(BR)CBO}$	40	-	-	V
Collector Cutoff Current ($V_{CB}=35V$)	I_{CBO}	-	-	150	nA
Emitter Cutoff Current ($V_{EB}=4V$)	I_{EBO}	-	-	150	nA



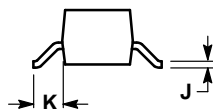
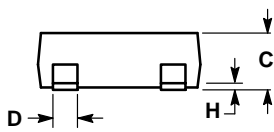
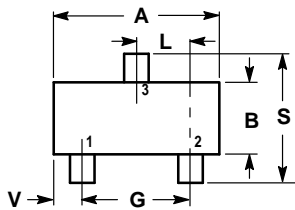
ON CHARACTERISTICS

DC Current Gain ($I_c=50mA, V_{CE}=1V$)	H_{fe}	100	-	600	
Collector-Emitter Saturation Voltage ($I_c=500mA, I_b=50mA$)	$V_{CE(S)}$	-	-	0.6	V

NOTE:

*	P	Q	R	S
H_{FE}	100~200	150~300	200~400	300~600

SOT-23



NOTES:

1. CONTROLLING DIMENSION: MILLIMETERS
2. LEAD THICKNESS SPECIFIED PER L / F DRAWING WITH SOLDER PLATING.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0180	0.0236	0.45	0.60
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.0984	2.10	2.50
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE
- EMITTER
- COLLECTOR

