

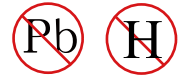


YEA SHIN TECHNOLOGY CO., LTD

9013P/Q/R/S

General Purpose Transistors

NPN Silicon



Pb-Free package is available

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-continuoun	I_C	500	mAdc

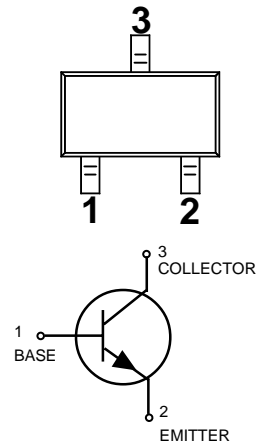
THERMAL CHARATEERISTICS

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

DEVICE MARKING

9013P=13P 9013Q=13Q 9013R=13R 9013S=13S

SOT-23 (TO-236AB)



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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

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

PACKAGE OUTLINE & DIMENSIONS

9013P/Q/R/S

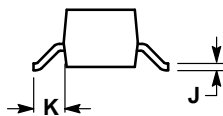
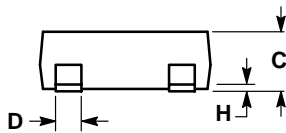
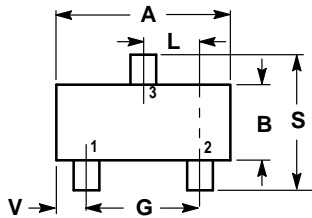
ON CHARACTERISTICS

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

NOTE:

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

SOT-23 (TO-236AB)



NOTES:

- CONTROLLING DIMENSION: MILLIMETERS
- 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
E	0.0701	0.0807	1.78	2.04
F	0.0005	0.0040	0.013	0.100
G	0.0034	0.0070	0.085	0.177
H	0.0180	0.0236	0.45	0.60
I	0.0350	0.0401	0.89	1.02
J	0.0830	0.0984	2.10	2.50
K	0.0177	0.0236	0.45	0.60

- PIN 1. BASE
2. EMITTER
3. COLLECTOR

