

### General Purpose Transistors

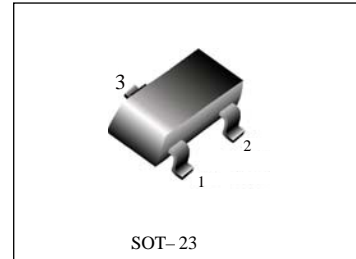
#### NPN Silicon

#### FEATURE

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

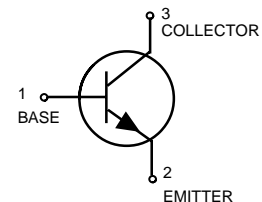
#### ORDERING INFORMATION

Device	Package	Shipping
FTC9013SX	SOT-23	3000/Tape&Reel
FTC9013SX	SOT-23	10000/Tape&Reel



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

#### DEVICE MARKING

FTC9013SQ=13Q FTC9013SR=13R FTC9013SS=13S

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

#### 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 ( $V_{BE}=4\text{V}$ )	$I_{EBO}$	-	-	150	nA



# FTC9013S

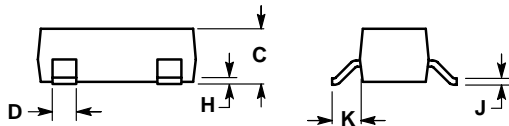
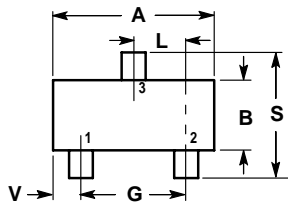
## ON CHARACTERISTICS

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
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  
2. EMITTER  
3. COLLECTOR

