

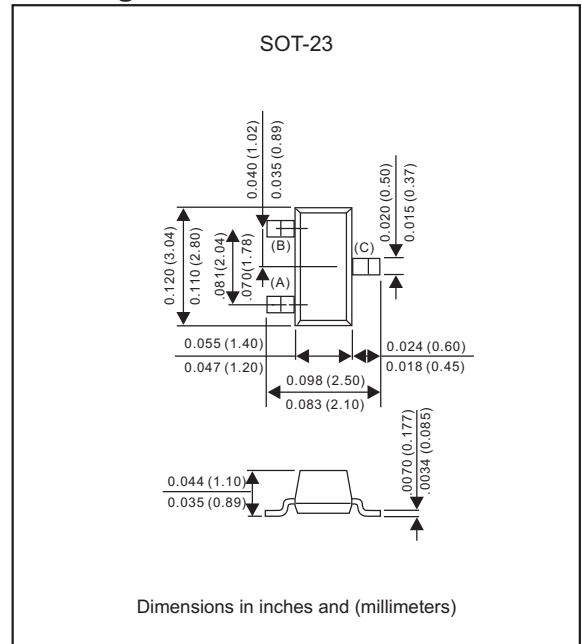
Features

- High collector current. (500mA)
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex. S9013-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Maximum ratings (AT $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	25	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	5	V
Collector current — continuous	I_C	500	mA

Thermal characteristics

PARAMETER	Symbol	MIN.	TYP.	MAX.	UNIT
Total device dissipation FR-5 board (1)	$T_A=25^{\circ}\text{C}$			225	mW
	Derate above 25°C			1.8	mW/ $^{\circ}\text{C}$
Thermal resistance	Junction to ambient			556	$^{\circ}\text{C}/\text{W}$
Total device dissipation alumina substrate(2)	$T_A=25^{\circ}\text{C}$			300	mW
	Derate above 25°C			2.4	mW/ $^{\circ}\text{C}$
Thermal resistance	Junction to ambient			417	$^{\circ}\text{C}/\text{W}$
Operating junction temperature range	T_J	-55		+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55		+150	$^{\circ}\text{C}$

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

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
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Off characteristics

Collector-emitter breakdown voltage	$I_C=1\text{mA}$	$V_{(BR)CEO}$	25			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

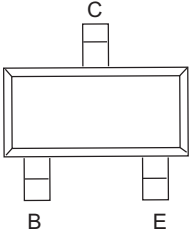
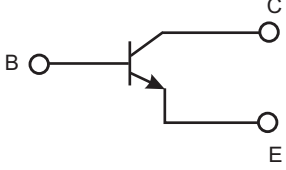
On characteristics

Collector-emitter saturation voltage	$I_C=500\text{mA}$ $I_B=50\text{mA}$	$V_{CE(sat)}$			0.6	V
Base-emitter saturation voltage	$I_C=500\text{mA}$ $I_B=50\text{mA}$	$V_{BE(sat)}$			1.2	V
Base-emitter saturation voltage	$I_C=10\text{mA}$ $V_{CB}=1\text{V}$	$V_{BE(sat)}$			0.7	V
DC current gain *	$I_C=100\text{mA}$ $V_{CE}=1\text{V}$	h_{FE}	70		400	-

h_{FE} values are classified as follows:

*	L	H	J
h_{FE}	70~200	200~350	300~400

Pinning information

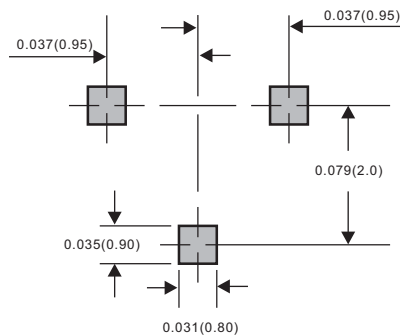
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
S9013	J3

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA. (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6