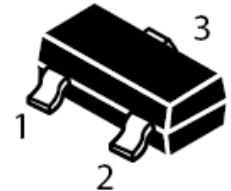
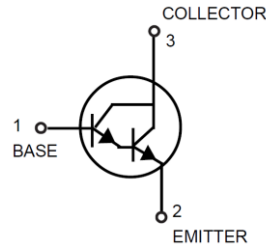


NPN MULTI-CHIP TRANSISTOR
REVERSE VOLTAGE – 30 Volts
FORWARD CURRENT – 0.3 Amperes
FEATURES

- Surface mount device
- Simplifies circuit design
- Reduces board space
- Reduces component count

MECHANICAL DATA

- Case: SOT-23 plastic
- Lead Free in RoHS 2002/95/EC Compliant
- Case material: "Green" molding compound, UL flammability classification 94V-0, (No Br. Sb. Cl)

SOT-23

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

ABSOLUTE RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Collector-emitter voltage	V_{CEO}	30	Vdc
Collector-base voltage	V_{CBO}	30	Vdc
Emitter-base voltage	V_{EBO}	10	Vdc
Collector current-continuous	I_C	300	mAdc

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	MAX.	UNIT
Total device dissipation FR-5 board (Note 1) @ $T_A = 25^\circ\text{C}$	P_D	225	mW
Thermal resistance junction to ambient	R_{thJA}	556	$^\circ\text{C/W}$
Total device dissipation alumina substrate (Note 2) @ $T_A = 25^\circ\text{C}$	P_D	300	mW
Thermal resistance junction to ambient	R_{thJA}	417	$^\circ\text{C/W}$
Junction and storage temperature rang	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Note:

1. FR-5 = 1.0 * 0.75 * 0.062 in.
2. Alumina = 0.4 * 0.3 * 0.024 in 99.5% alumina.

REV-0, MAY.-2015, KSMR01
ORDERING INFORMATION

DEVICE	MARKING	SHIPPING
MMBTA13	1M	3000/ Tape & Reel
MMBTA14	1N	3000/ Tape & Reel

ELECTRICAL CHARACTERISTIC

MMBTA13 thru MMBTA14



OFF CHARACTERISTICS

PARAMETER	TEST CONDITION		SYMBOL	MIN.	MAX	UNIT
Collector-emitter breakdown voltage (Note 3)	$I_C = 100 \mu A$ dc, $V_{BE} = 0$	MMBTA13	$V_{(BR)CEO}$	30	--	Vdc
		MMBTA14				
Collector cutoff current	$V_{CB} = 30$ Vdc, $I_E = 0$	MMBTA13	I_{CBO}	--	100	nAdc
		MMBTA14				
Emitter cutoff current	$V_{EB} = 10$ Vdc, $I_C = 0$	MMBTA13	I_{EBO}	--	100	nAdc
		MMBTA14				

ON CHARACTERISTICS

PARAMETER	TEST CONDITION		SYMBOL	MIN.	MAX	UNIT
DC current gain	$I_C = 10\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$	MMBTA13	h_{FE}	5,000	--	--
	$I_C = 100\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$			10,000		
	$I_C = 10\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$	MMBTA14		10,000	--	
	$I_C = 100\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$			20,000		
Collector-emitter saturation voltage	$I_C = 100\text{ mAdc}$, $I_B = 0.1\text{ mAdc}$	MMBTA13	$V_{CE(SAT)}$	--	1.5	Vdc
		MMBTA14				
Base-emitter on voltage	$I_C = 100\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$	MMBTA13	$V_{BE(SAT)}$	--	2.0	Vdc
		MMBTA14				

SMALL – SIGNAL CHARACTERISTICS

PARAMETER	TEST CONDITION		SYMBOL	MIN.	MAX	UNIT
Current-gain-bandwidth product (Note 4)	$I_C = 10$ mAdc, $V_{CE} = 5.0$ Vdc, $f = 100$ MHz	MMBTA13	f_T	125	--	MHz
		MMBTA14				

Note:

3. Pulse Test: pulse width $\leq 300 \mu s$, duty cycle $\leq 2.0\%$

4. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity..

FIG.1 - Transistor noise model

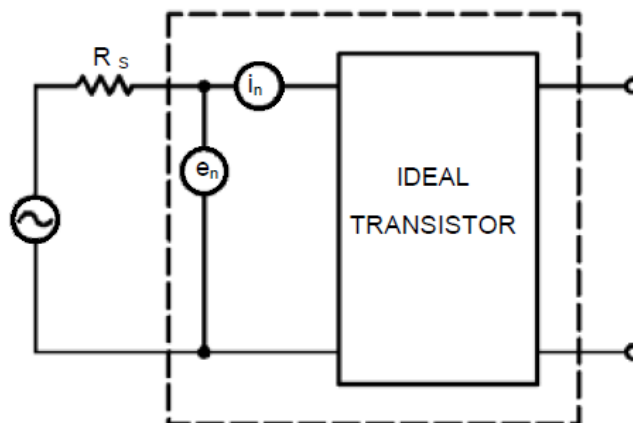


FIG.2 - Noise voltage

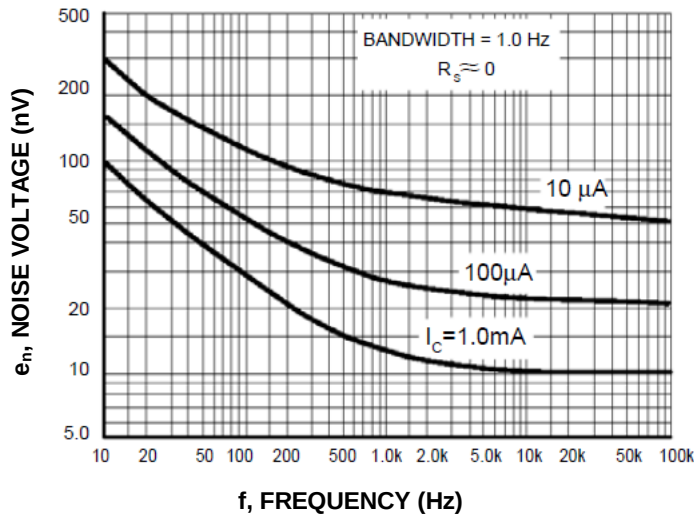


FIG.3 - Noise current

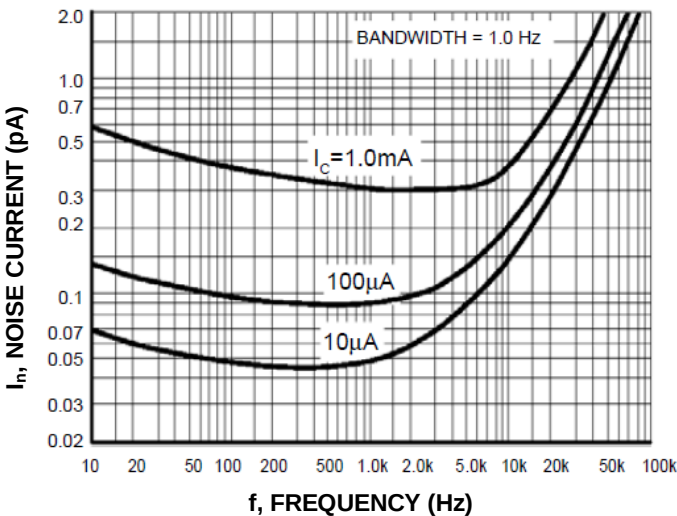


FIG.4 - Total wideband noise voltage

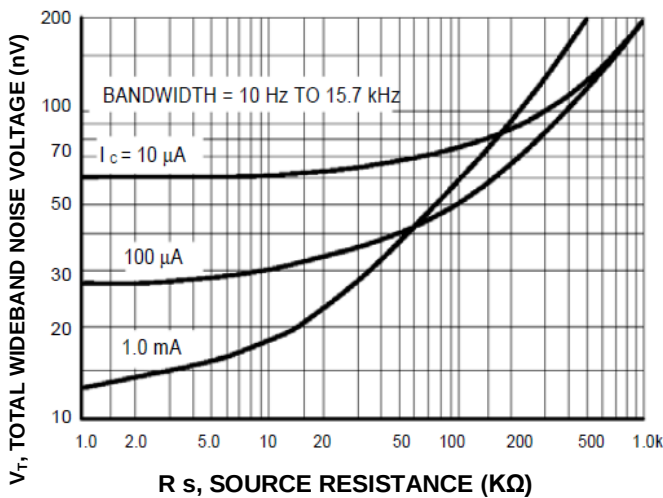


FIG.5 - Wideband noise figure

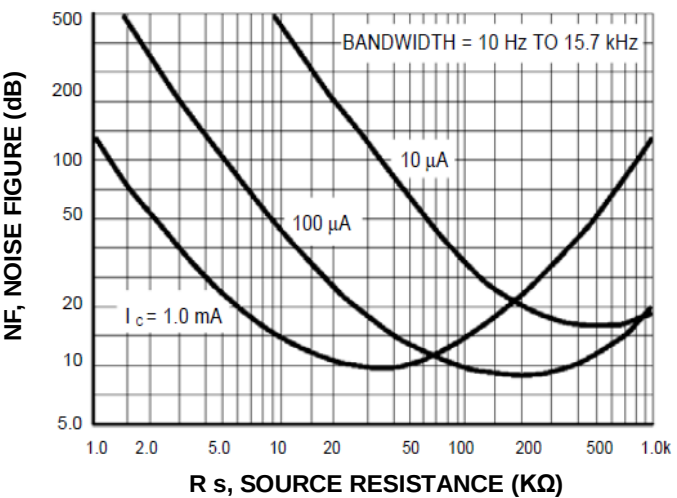


FIG.6 - Capacitance

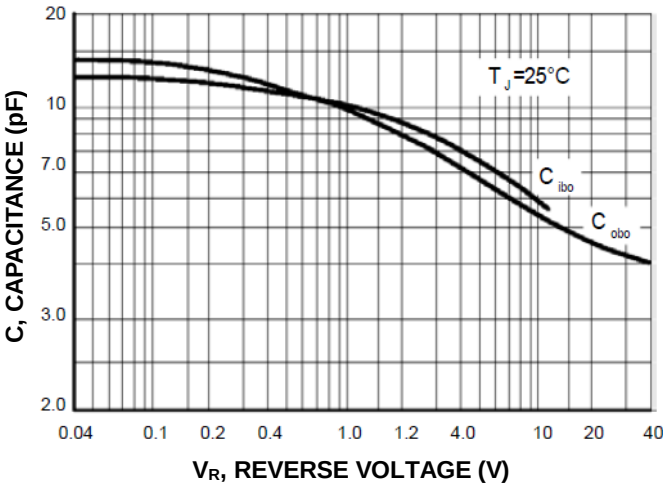


FIG.7 - High frequency current gain

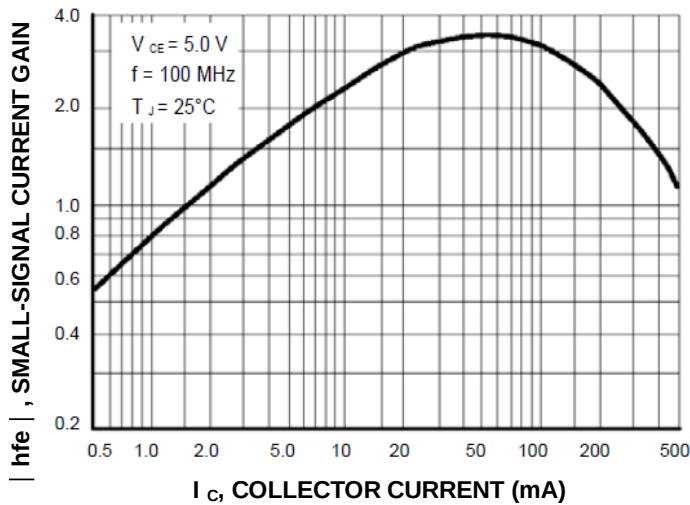


FIG.8 - DC current gain

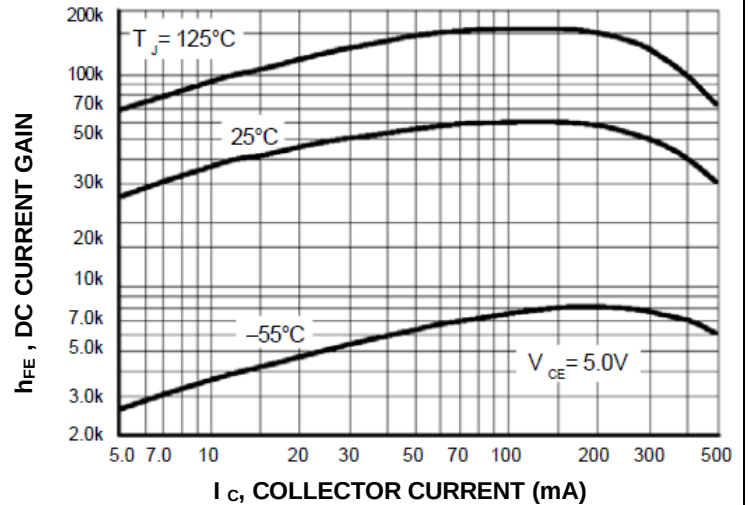


FIG.9 - Collector saturation region

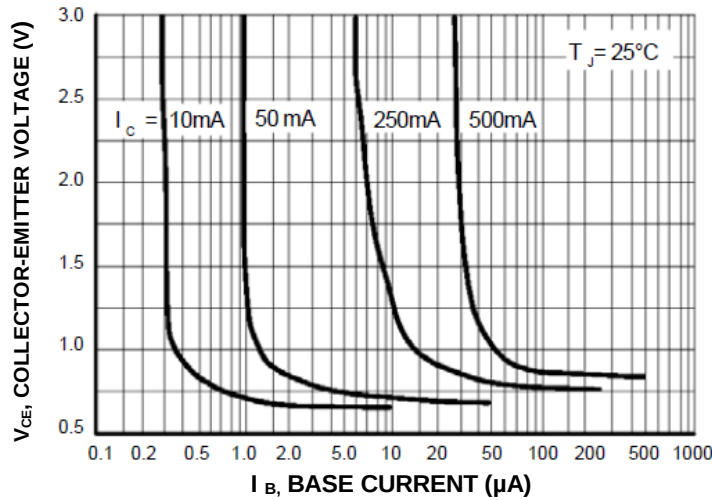


FIG.10 - On voltages

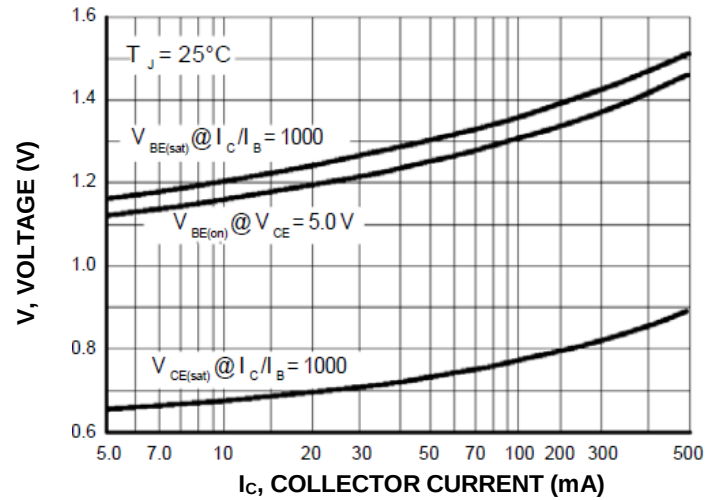


FIG.11 - Temperature coefficients

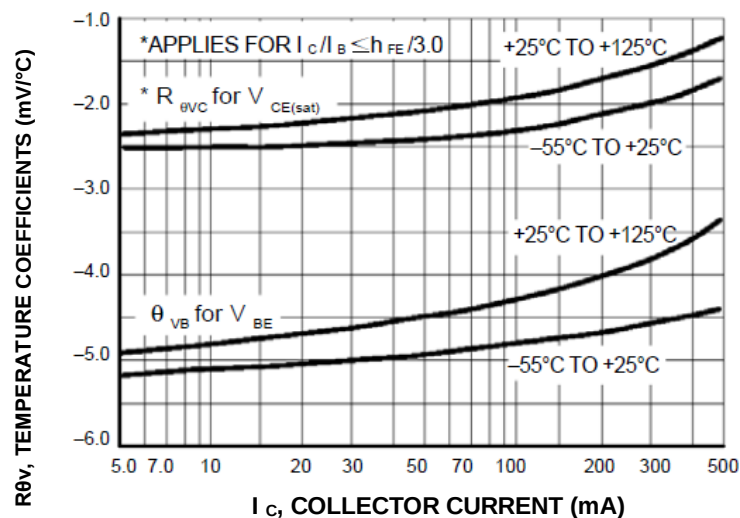


FIG.12 - Thermal response

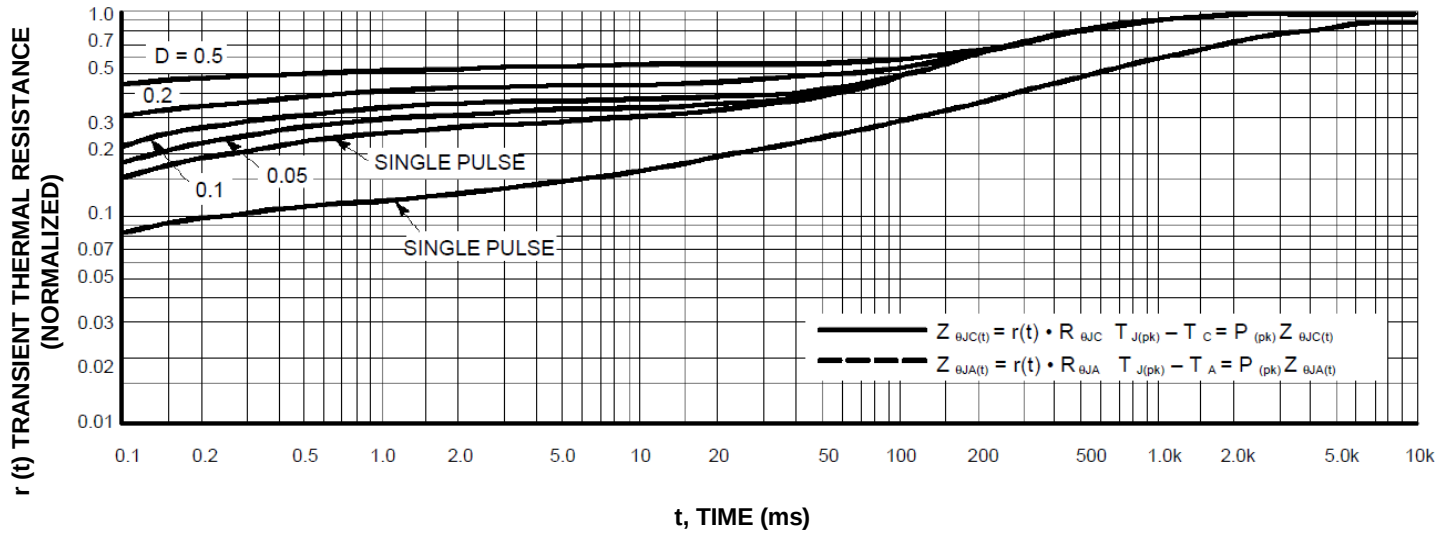
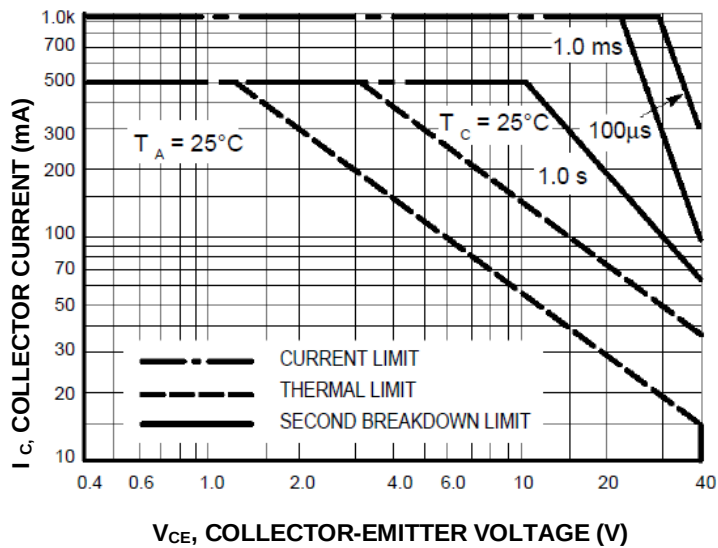
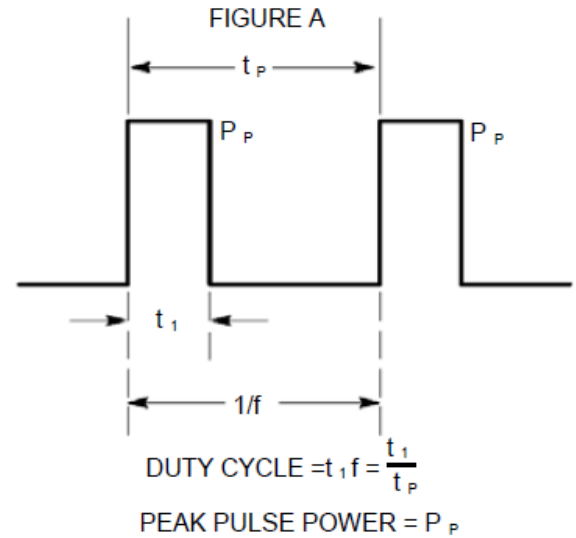


FIG.13 - Active region safe operating area

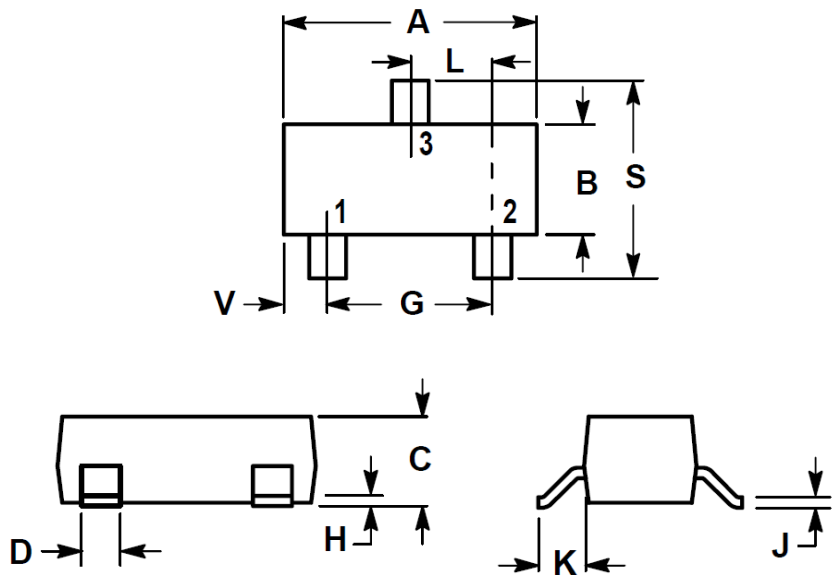


Design note : use of transient thermal resistance data



Package Dimensions :

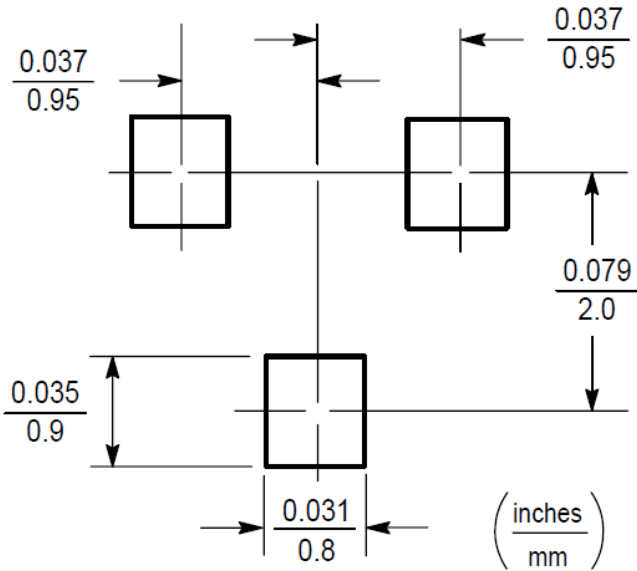
SOT-23



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	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN:
1. BASE
2. EMITTER
3. COLLECTOR

Recommended Footprint :



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