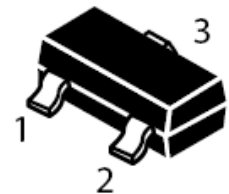
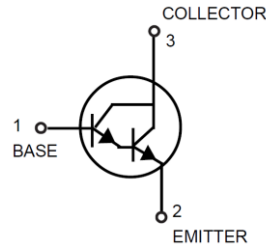


NPN MULTI-CHIP TRANSISTOR
REVERSE VOLTAGE – 30 Volts
FORWARD CURRENT – 0.3 Amperes
FEATURES

- 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)	$I_C = 100 \mu A$, $V_{BE} = 0$	MMBTA13	$V_{(BR)CEO}$	30	--	Vdc
		MMBTA14				
Collector cutoff current	$V_{CB} = 30 V$, $I_E = 0$	MMBTA13	I_{CBO}	--	100	nAdc
		MMBTA14				
Emitter cutoff current	$V_{EB} = 10 V$, $I_C = 0$	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)	$I_C = 10 mA$, $V_{CE} = 5.0 V$, $f = 100 MHz$	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

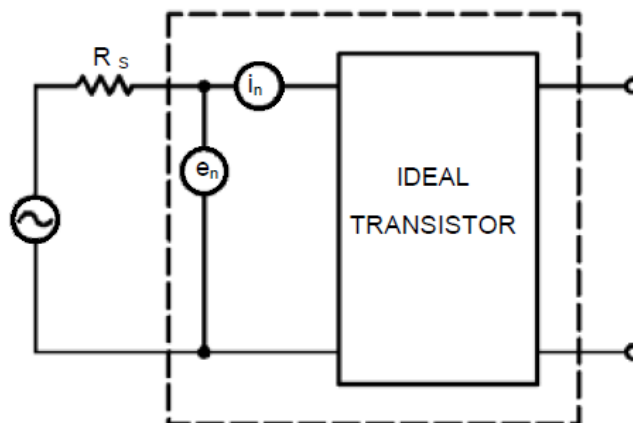


FIG.2 - Noise voltage

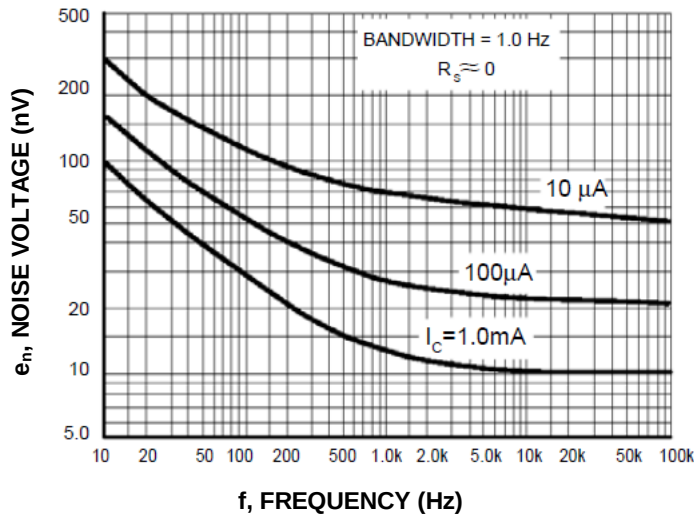


FIG.3 - Noise current

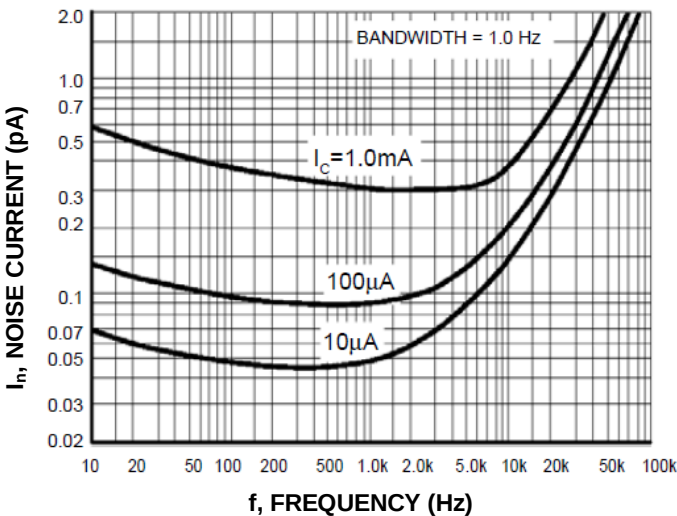


FIG.4 - Total wideband noise voltage

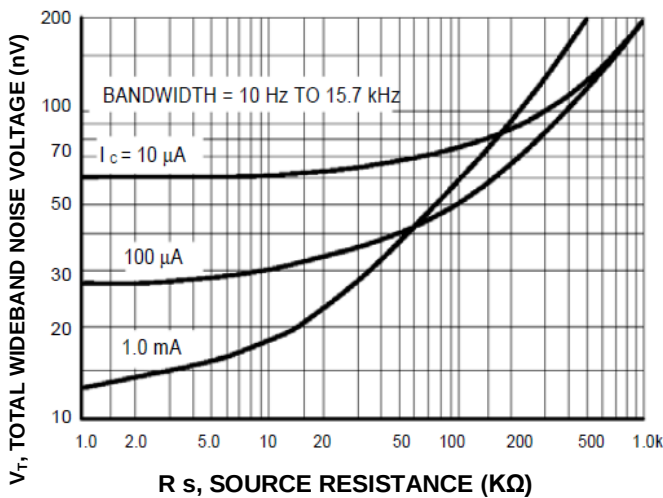


FIG.5 - Wideband noise figure

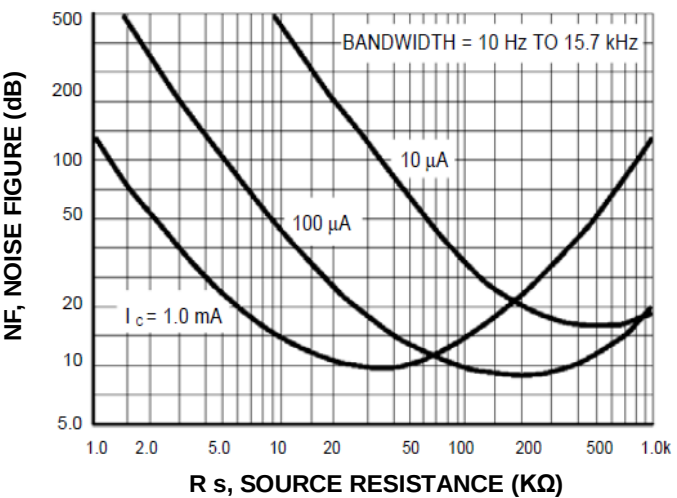


FIG.6 - Capacitance

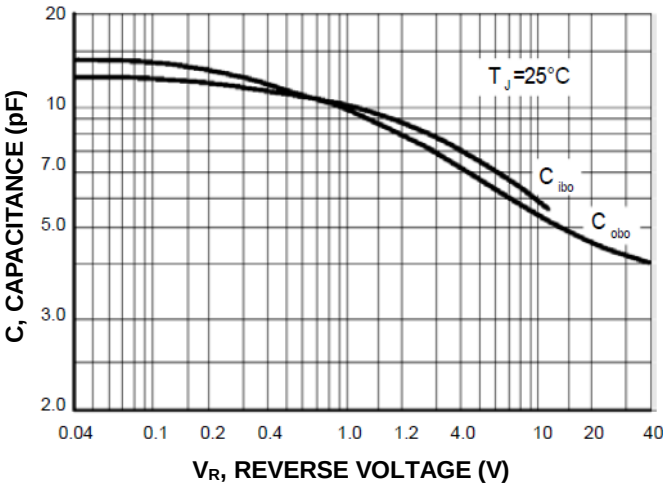


FIG.7 - High frequency current gain

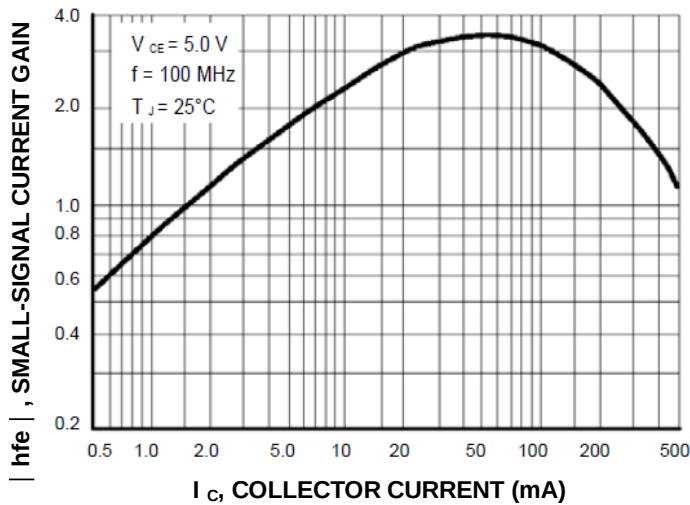


FIG.8 - DC current gain

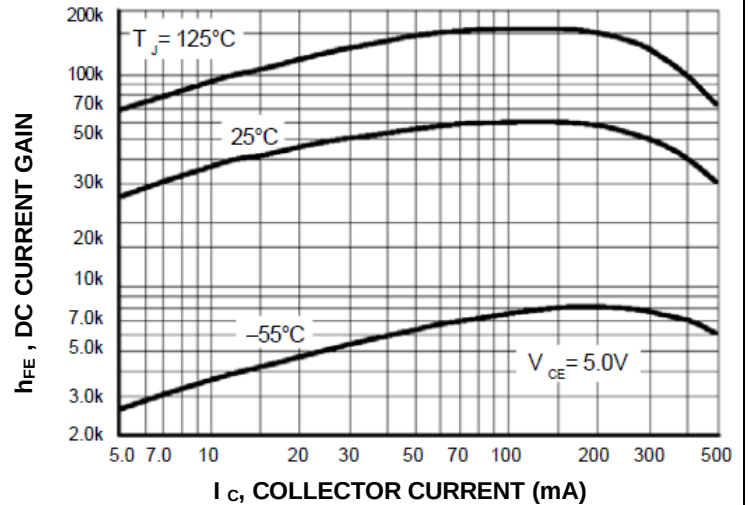


FIG.9 - Collector saturation region

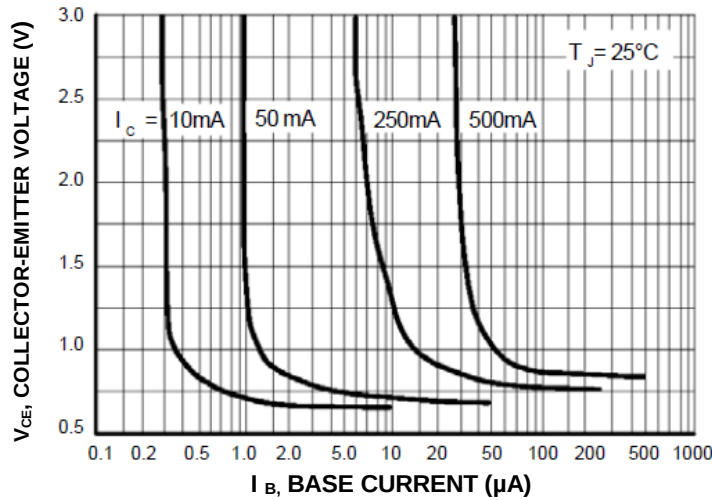


FIG.10 - On voltages

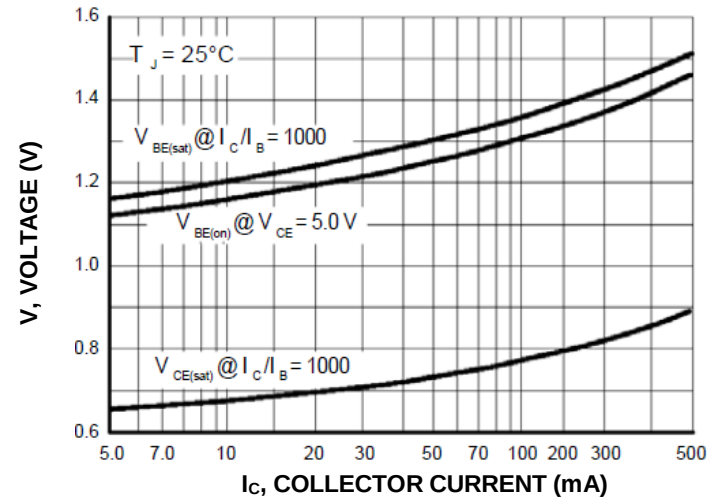


FIG.11 - Temperature coefficients

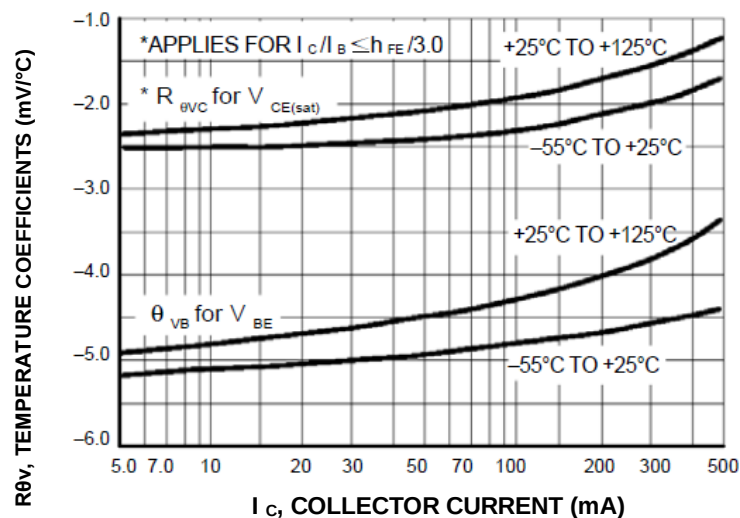


FIG.12 - Thermal response

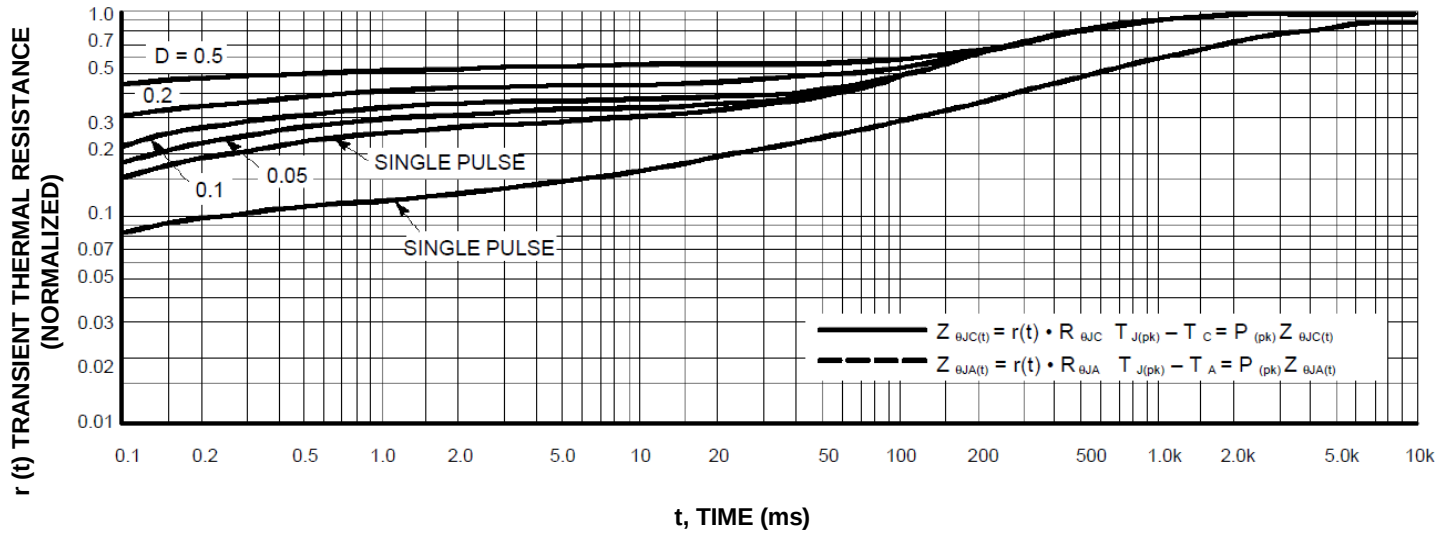
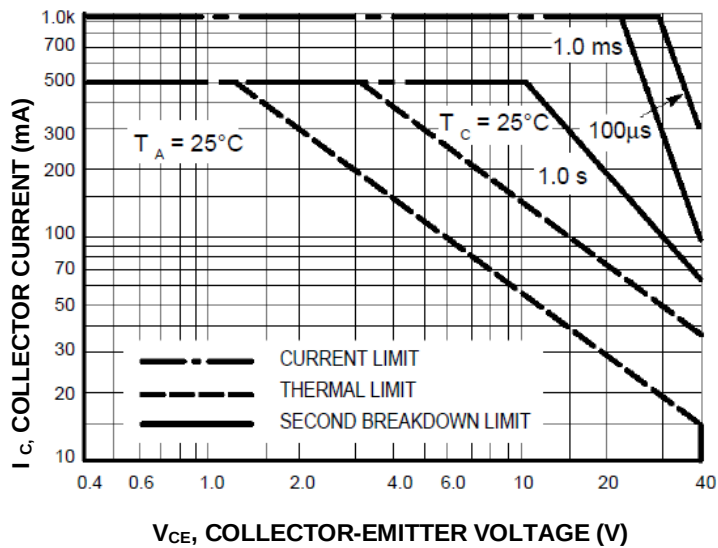
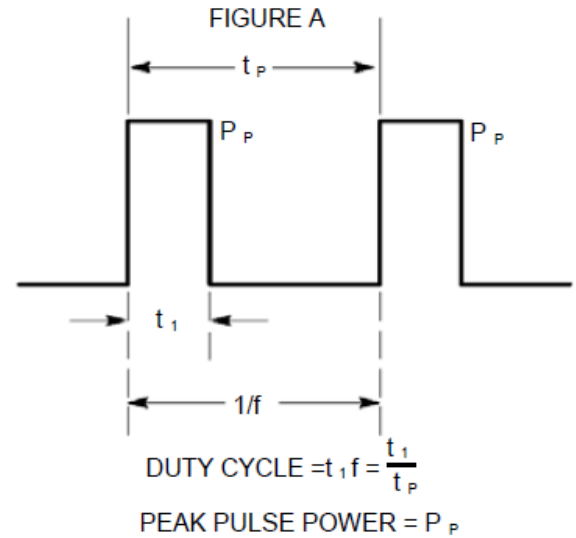


FIG.13 - Active region safe operating area

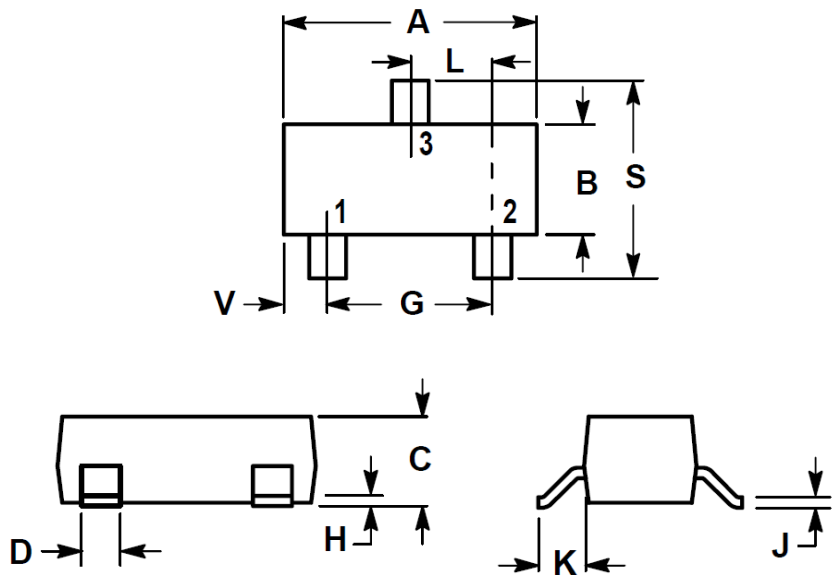


Design note : use of transient thermal resistance data



Package Dimensions :

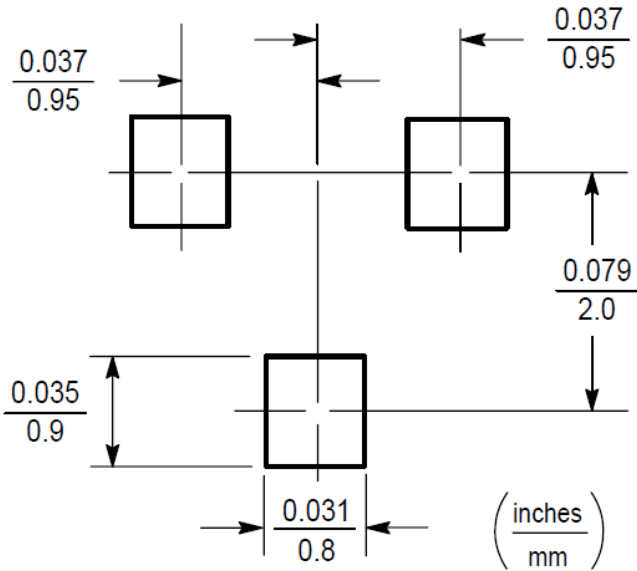
SOT-23



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 :



Important Notice and Disclaimer

LSC reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

LSC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does LSC assume any liability for application assistance or customer product design. LSC does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of LSC.

LSC products are not authorized for use as critical components in life support devices or systems without express written approval of LSC.