MMBTA92LT1, MMBTA93LT1

Preferred Device

High Voltage Transistors

PNP Silicon

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	92	93	Unit
Collector−Emitter Voltage	V_{CEO}	−300	−200	Vdc
Collector−Base Voltage	V_{CBO}	−300	−200	Vdc
Emitter−Base Voltage	V_{EBO}	−5.0	−5.0	Vdc
Collector Current — Continuous	I_C	−500		mAdc

DEVICE MARKING

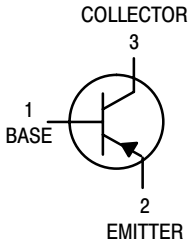
MMBTA92LT1 = 2D; MMBTA93LT1 = 2E

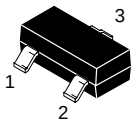
THERMAL CHARACTERISTICS

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

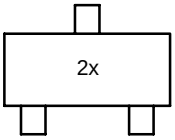
1. FR−5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.





SOT−23 (TO−236AF)
CASE 318
Style 6

MARKING DIAGRAM



2x = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping†
MMBTA92LT1	SOT−23	3000 / Tape & Reel
MMBTA92LT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
MMBTA92LT3	SOT−23	10000 / Tape & Reel
MMBTA93LT1	SOT−23	3000 / Tape & Reel
MMBTA93LT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Breakdown Voltage (Note 3)		$V_{(BR)CEO}$			Vdc
(I_C = −1.0 mAdc, I_B = 0)	MMBTA92		−300	−	
	MMBTA93		−200	−	
Collector−Base Breakdown Voltage		$V_{(BR)CBO}$			Vdc
(I_C = −100 μAdc, I_E = 0)	MMBTA92		−300	−	
	MMBTA93		−200	−	
Emitter−Base Breakdown Voltage		$V_{(BR)EBO}$	−5.0	−	Vdc
(I_E = −100 μAdc, I_C = 0)					
Collector Cutoff Current		I_{CBO}			μAdc
(V_{CB} = −200 Vdc, I_E = 0)	MMBTA92		−	−0.25	
(V_{CB} = −160 Vdc, I_E = 0)	MMBTA93		−	−0.25	
Emitter Cutoff Current		I_{EBO}	−	−0.1	μAdc
(V_{EB} = −3.0 Vdc, I_C = 0)					
ON CHARACTERISTICS (Note 3)					
DC Current Gain		h_{FE}			−
(I_C = −1.0 mAdc, V_{CE} = −10 Vdc)	Both Types		25	−	
(I_C = −10 mAdc, V_{CE} = −10 Vdc)	Both Types		40	−	
(I_C = −30 mAdc, V_{CE} = −10 Vdc)	MMBTA92		25	−	
	MMBTA93		25	−	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = −20 mAdc, I_B = −2.0 mAdc)	MMBTA92		−	−0.5	
	MMBTA93		−	−0.5	
Base−Emitter Saturation Voltage		$V_{BE(sat)}$	−	−0.9	Vdc
(I_C = −20 mAdc, I_B = −2.0 mAdc)					
SMALL−SIGNAL CHARACTERISTICS					
Current−Gain — Bandwidth Product		f_T	50	−	MHz
(I_C = −10 mAdc, V_{CE} = −20 Vdc, f = 100 MHz)					
Collector−Base Capacitance		C_{cb}			pF
(V_{CB} = −20 Vdc, I_E = 0, f = 1.0 MHz)	MMBTA92		−	6.0	
	MMBTA93		−	8.0	

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

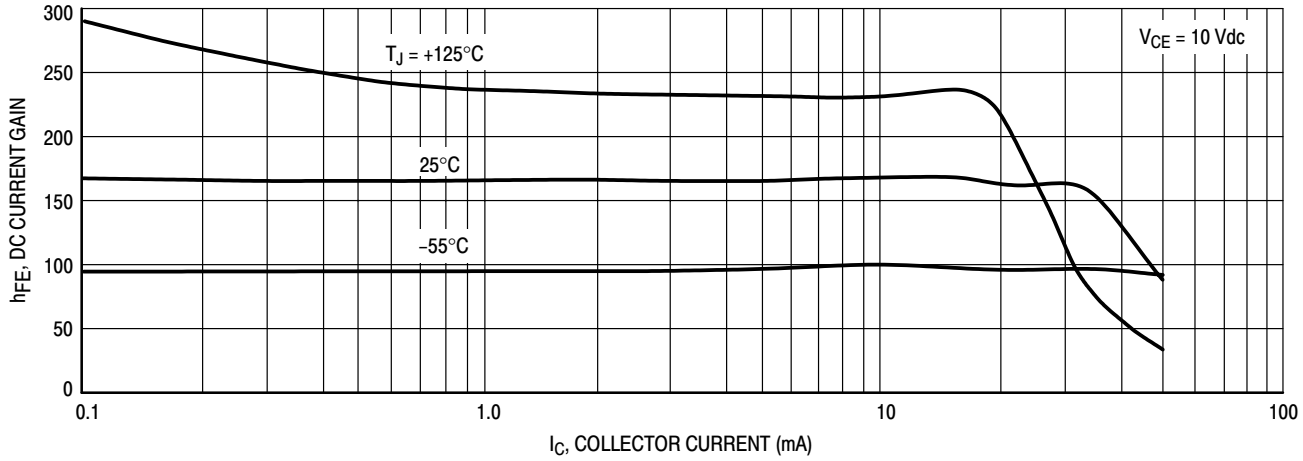


Figure 1. DC Current Gain

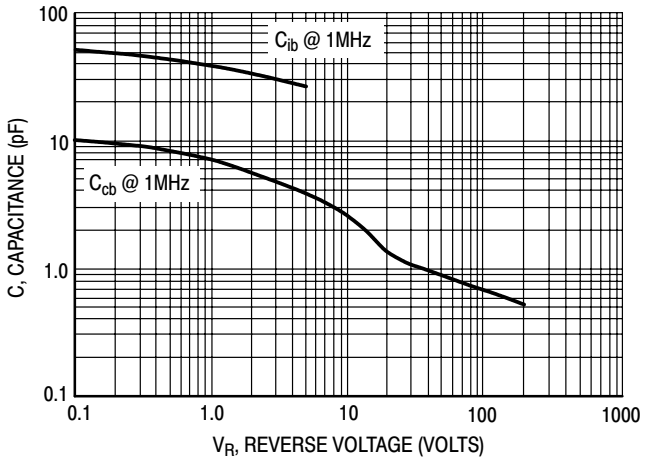


Figure 2. Capacitance

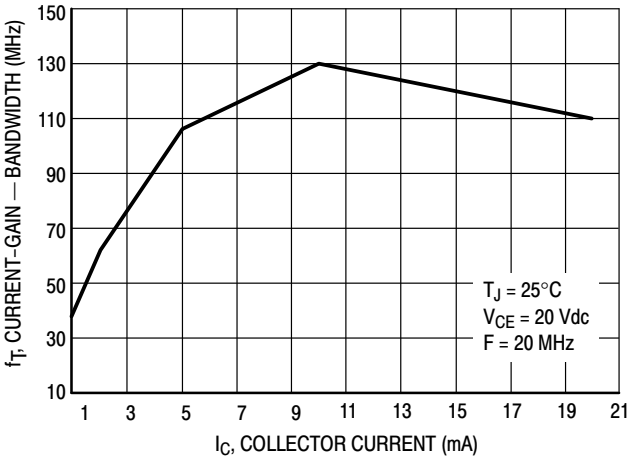
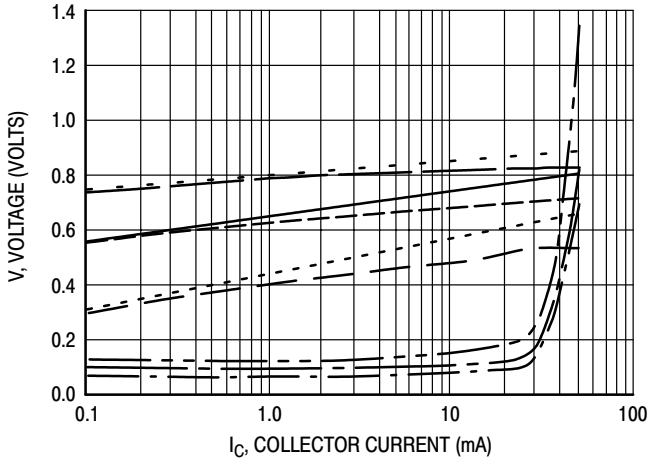


Figure 3. Current−Gain − Bandwidth



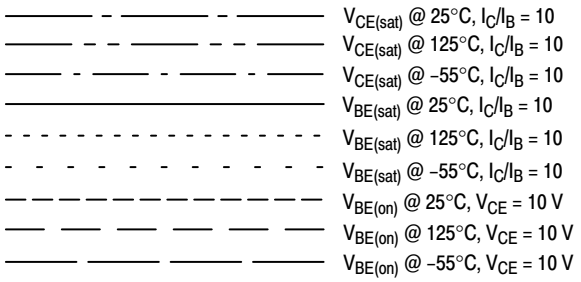
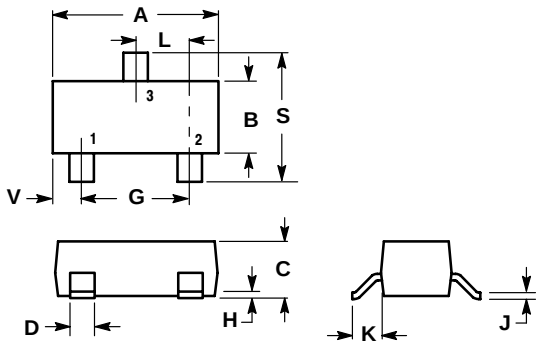


Figure 4. “ON” Voltages

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AK

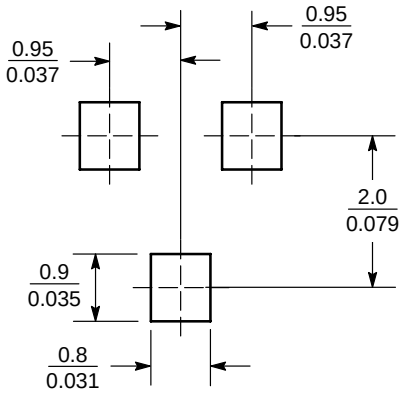


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	INCHES		MILLIMETERS	
DIM	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

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
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ON Semiconductor Website: http://onsemi.com

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