MMBTA92LT1G, MMBTA93LT1G

High Voltage Transistors

PNP Silicon

ON Semiconductor®

http://onsemi.com

Features

- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

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	−50		mAdc

DEVICE MARKING

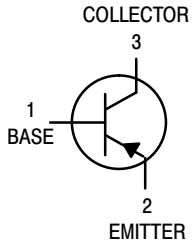
MMBTA92LT1 = 2D; MMBTA93LT1 = 2E

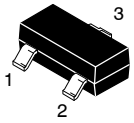
THERMAL CHARACTERISTICS

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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

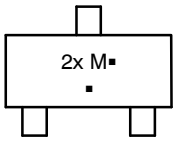
1. FR−5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.





SOT−23 (TO−236AF)
CASE 318
STYLE 6

MARKING DIAGRAM



2x = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MMBTA92LT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
MMBTA92LT3G	SOT−23 (Pb−Free)	10000 / 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.

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%.

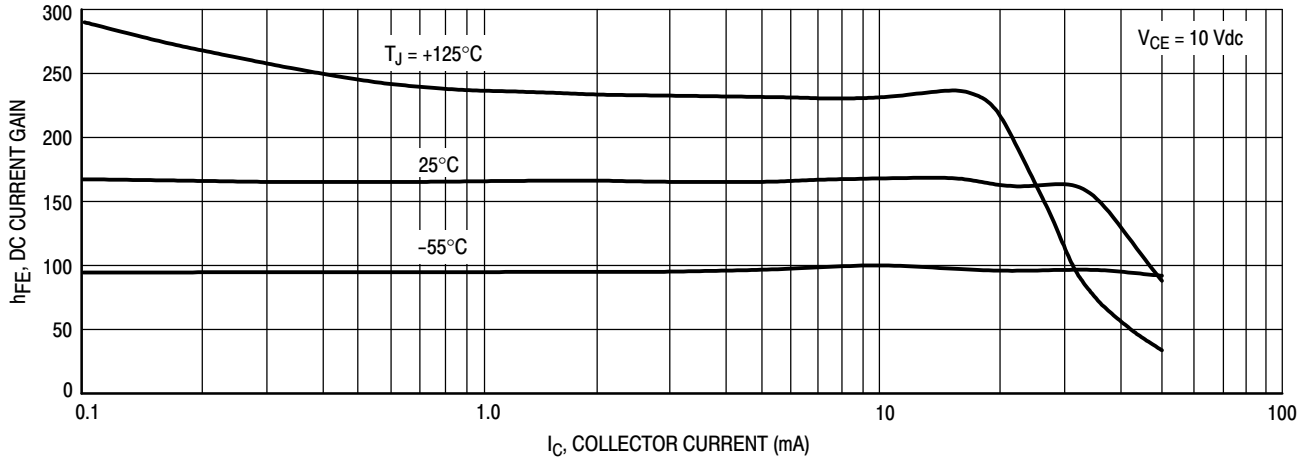


Figure 1. DC Current Gain

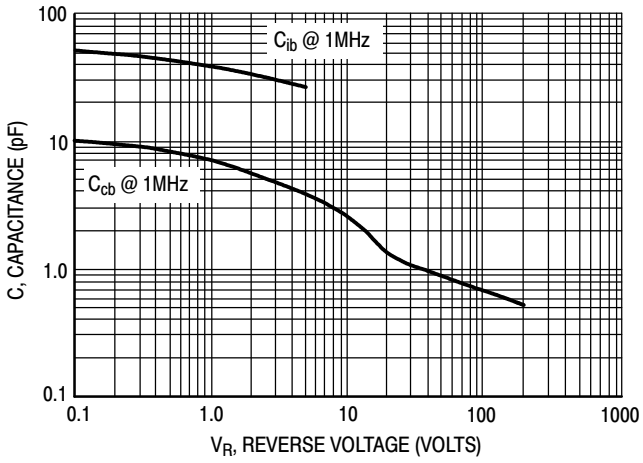


Figure 2. Capacitance

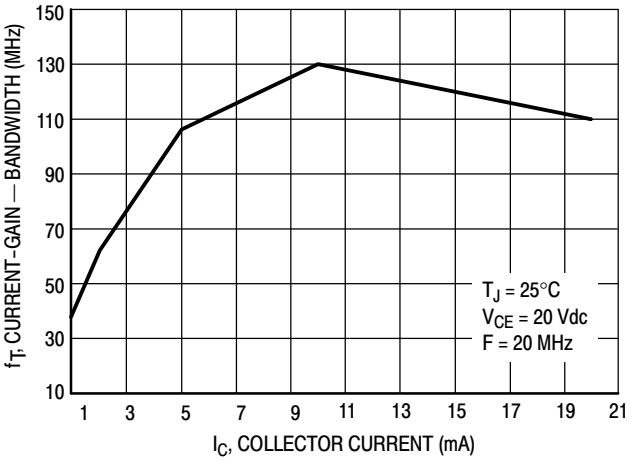
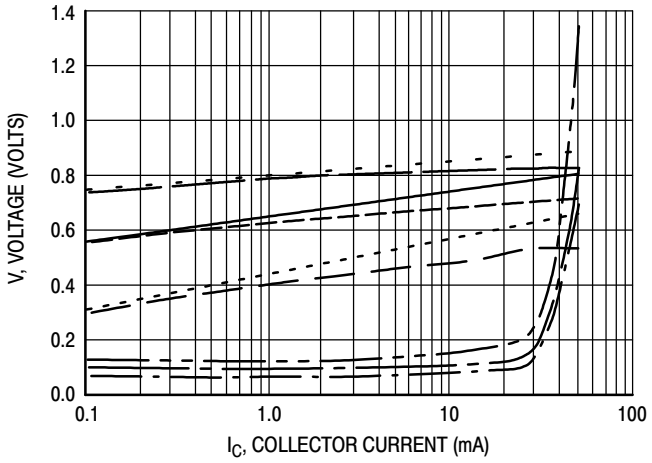


Figure 3. Current−Gain − Bandwidth



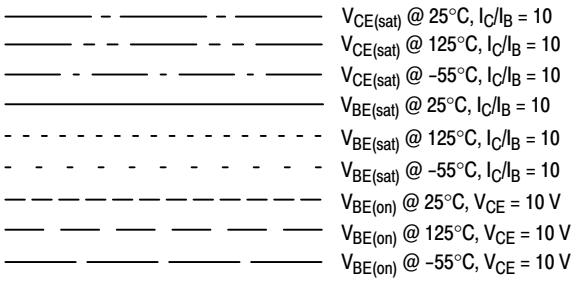
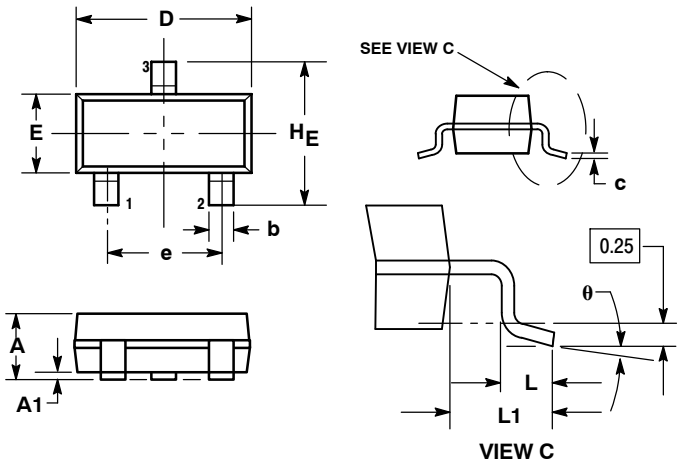


Figure 4. “ON” Voltages

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AN

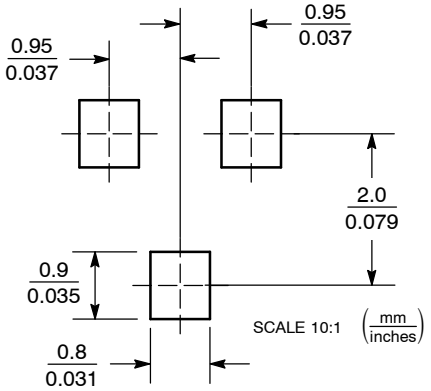


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

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

SOLDERING FOOTPRINT



PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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MMBTA92LT1/D