

MMBTA92LT1, MMBTA93LT1

Preferred Device

High Voltage Transistors

PNP Silicon

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	-50		mAdc

DEVICE MARKING

MMBTA92LT1 = 2D; MMBTA93LT1 = 2E

THERMAL CHARACTERISTICS

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

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.

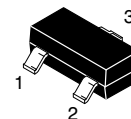
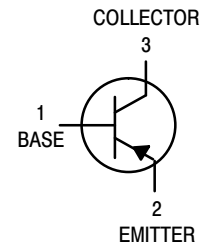
1. FR-5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



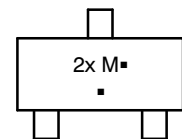
ON Semiconductor®

<http://onsemi.com>



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)

ORDERING INFORMATION

Device	Package	Shipping†
MMBTA92LT1	SOT-23	3000 / Tape & Reel
MMBTA92LT1G	SOT-23 (Pb-Free)	3000 / Tape & Reel
MMBTA92LT3G	SOT-23 (Pb-Free)	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.

MMBTA92LT1, MMBTA93LT1

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector - Emitter Breakdown Voltage (Note 3) (I _C = -1.0 mA _{dc} , I _B = 0)	MMBTA92 MMBTA93	V _{(BR)CEO}	-300 -200	- -	V _{dc}
Collector - Base Breakdown Voltage (I _C = -100 μA _{dc} , I _E = 0)	MMBTA92 MMBTA93	V _{(BR)CBO}	-300 -200	- -	V _{dc}
Emitter - Base Breakdown Voltage (I _E = -100 μA _{dc} , I _C = 0)		V _{(BR)EBO}	-5.0	-	V _{dc}
Collector Cutoff Current (V _{CB} = -200 V _{dc} , I _E = 0) (V _{CB} = -160 V _{dc} , I _E = 0)	MMBTA92 MMBTA93	I _{CBO}	- -	-0.25 -0.25	μA _{dc}
Emitter Cutoff Current (V _{EB} = -3.0 V _{dc} , I _C = 0)		I _{EBO}	-	-0.1	μA _{dc}

ON CHARACTERISTICS (Note 3)

DC Current Gain (I _C = -1.0 mA _{dc} , V _{CE} = -10 V _{dc}) (I _C = -10 mA _{dc} , V _{CE} = -10 V _{dc}) (I _C = -30 mA _{dc} , V _{CE} = -10 V _{dc})	Both Types Both Types MMBTA92 MMBTA93	h _{FE}	25 40 25 25	- - - -	-
Collector - Emitter Saturation Voltage (I _C = -20 mA _{dc} , I _B = -2.0 mA _{dc})	MMBTA92 MMBTA93	V _{CE(sat)}	- -	-0.5 -0.5	V _{dc}
Base - Emitter Saturation Voltage (I _C = -20 mA _{dc} , I _B = -2.0 mA _{dc})		V _{BE(sat)}	-	-0.9	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

Current - Gain — Bandwidth Product (I _C = -10 mA _{dc} , V _{CE} = -20 V _{dc} , f = 100 MHz)		f _T	50	-	MHz
Collector - Base Capacitance (V _{CB} = -20 V _{dc} , I _E = 0, f = 1.0 MHz)	MMBTA92 MMBTA93	C _{cb}	- -	6.0 8.0	pF

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

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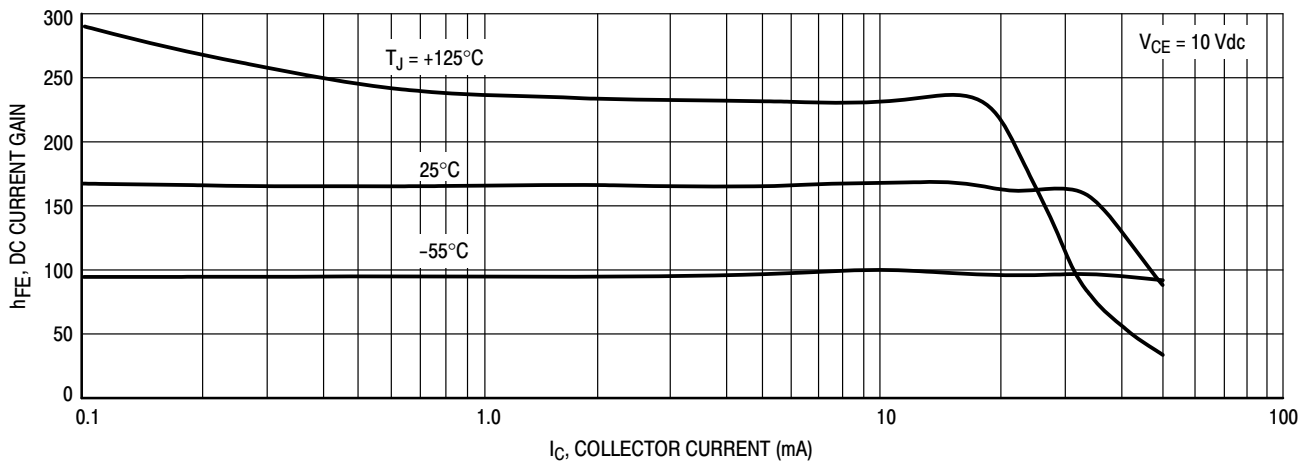


Figure 1. DC Current Gain

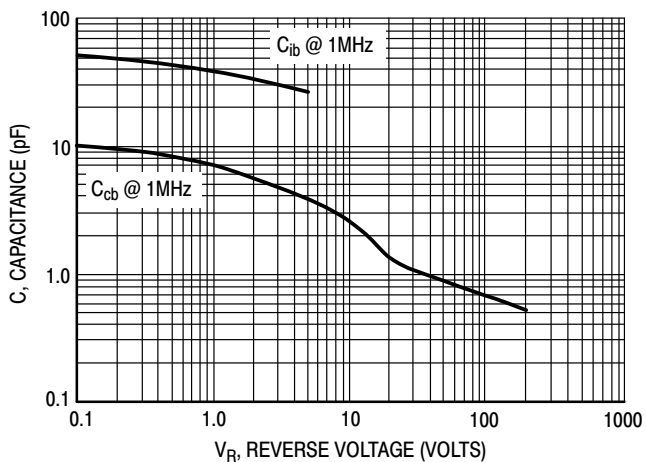


Figure 2. Capacitance

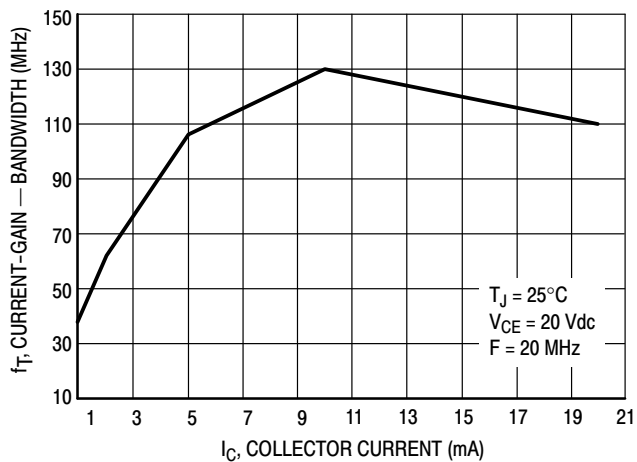


Figure 3. Current-Gain - Bandwidth

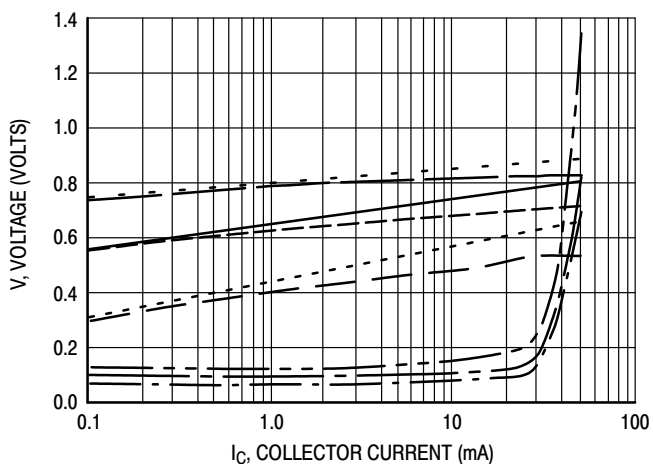


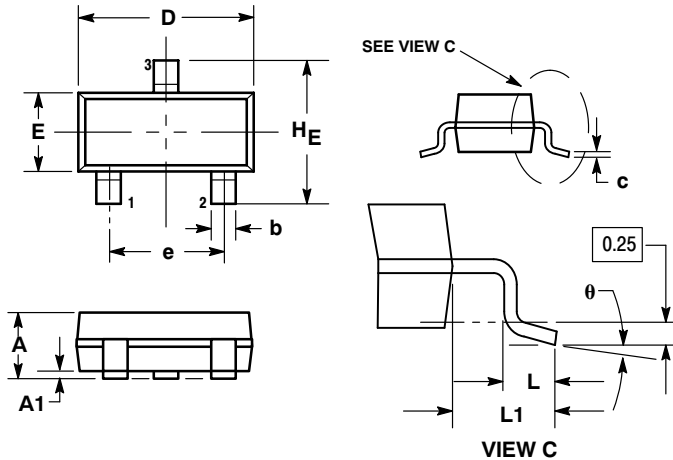
Figure 4. "ON" Voltages

- $V_{CE(sat)}$ @ 25°C , $I_C/I_B = 10$
- $V_{CE(sat)}$ @ 125°C , $I_C/I_B = 10$
- $V_{CE(sat)}$ @ -55°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ 25°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ 125°C , $I_C/I_B = 10$
- $V_{BE(sat)}$ @ -55°C , $I_C/I_B = 10$
- $V_{BE(on)}$ @ 25°C , $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$ @ 125°C , $V_{CE} = 10 \text{ V}$
- $V_{BE(on)}$ @ -55°C , $V_{CE} = 10 \text{ V}$

MMBTA92LT1, MMBTA93LT1

PACKAGE DIMENSIONS

SOT-23 (TO-236)
CASE 318-08
ISSUE AN

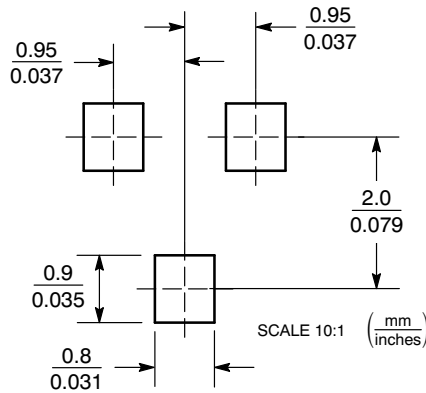


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	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
HE	2.10	2.40	2.64	0.083	0.094	0.104

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

SOLDERING FOOTPRINT



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