

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	-500		mAdc

DEVICE MARKING

MMBTA92LT1 = 2D; MMBTA93LT1 = 2E

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$

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.

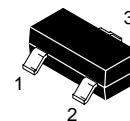
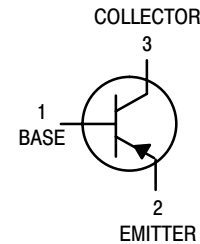
1. FR-5 = 1.0 x 0.75 x 0.062 in.

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



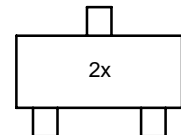
ON Semiconductor®

<http://onsemi.com>



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.

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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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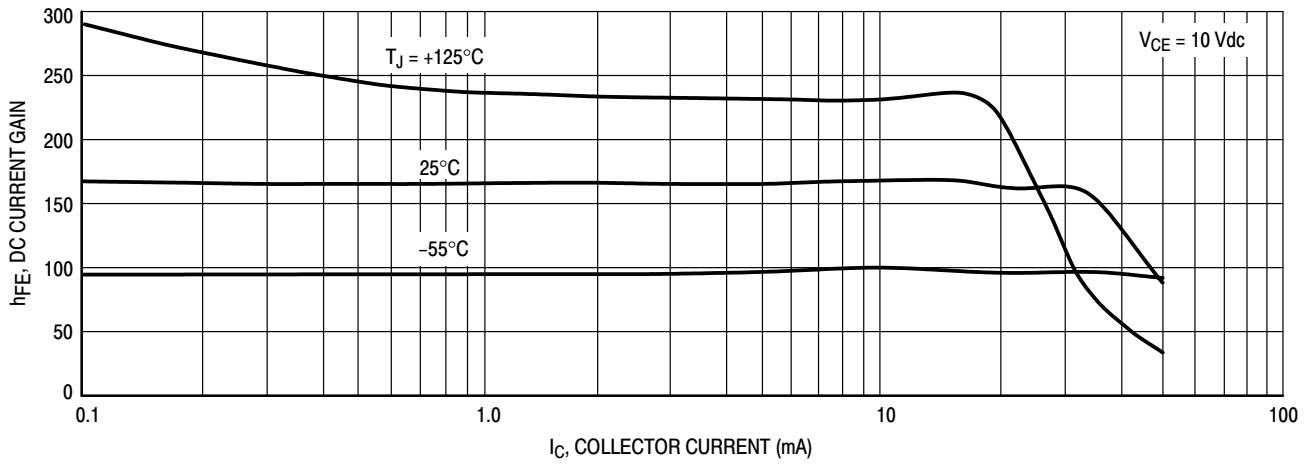


Figure 1. DC Current Gain

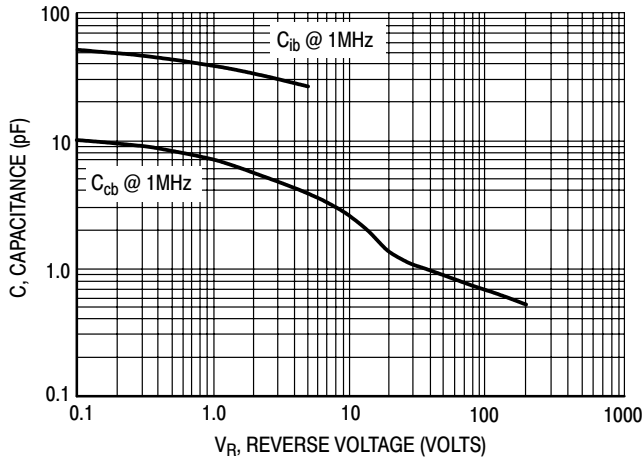


Figure 2. Capacitance

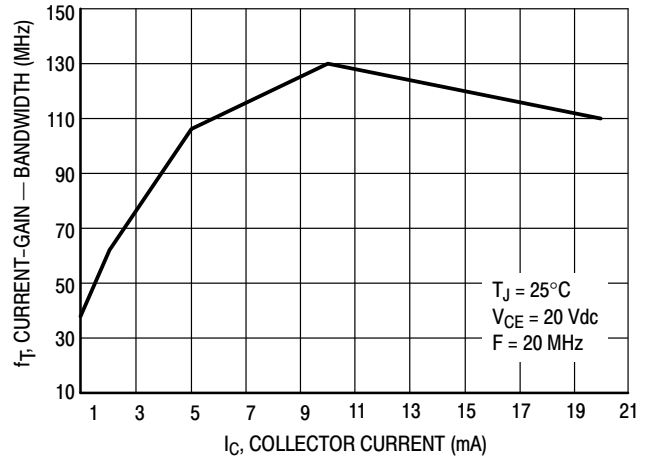


Figure 3. Current-Gain - Bandwidth

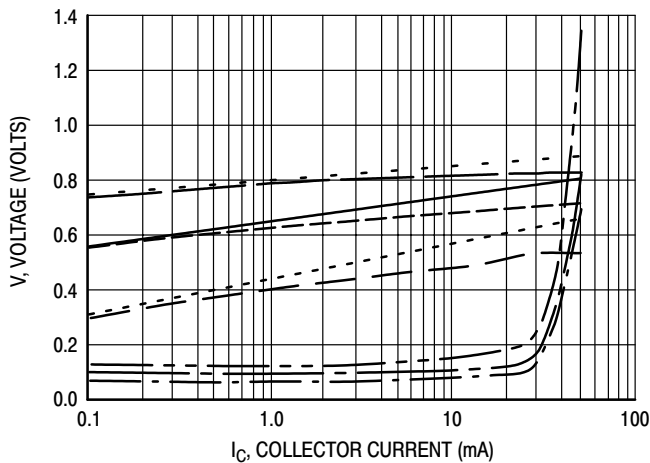


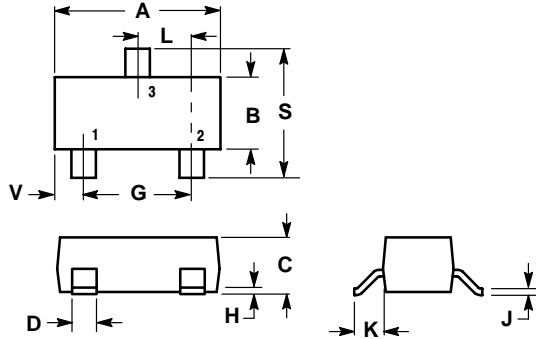
Figure 4. "ON" Voltages

- $V_{CE(sat)}$ @ 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 AK

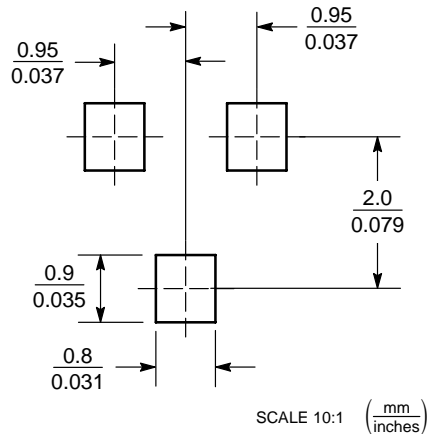


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

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

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

SOLDERING FOOTPRINT*



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

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