

# MMBTA63LT1G, MMBTA64LT1G, SMMBTA64LT1G



**ON Semiconductor®**

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## Darlington Transistors

### PNP Silicon

#### Features

- AEC-Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CES}$	-30	Vdc
Collector - Base Voltage	$V_{CBO}$	-30	Vdc
Emitter - Base Voltage	$V_{EBO}$	-10	Vdc
Collector Current - Continuous	$I_C$	-500	mAdc

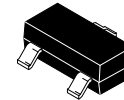
#### THERMAL CHARACTERISTICS

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

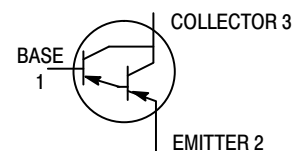
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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.

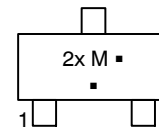
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



SOT-23 (TO-236)  
CASE 318  
STYLE 6



#### MARKING DIAGRAM



2x = Device Code  
 x = U for MMBTA63LT1G  
 x = V for MMBTA64LT1G  
 SMMBTA64LT1G  
 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†
MMBTA63LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBTA64LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
SMMBTA64LT1G	SOT-23 (Pb-Free)	3,000 / 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.

# MMBTA63LT1G, MMBTA64LT1G, SMMBTA64LT1G

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector - Emitter Breakdown Voltage ( $I_C = -100 \mu\text{Adc}$ )	$V_{(BR)CEO}$	-30	-	Vdc
Collector Cutoff Current ( $V_{CB} = -30 \text{Vdc}$ )	$I_{CBO}$	-	-100	nAdc
Emitter Cutoff Current ( $V_{EB} = -10 \text{Vdc}$ )	$I_{EBO}$	-	-100	nAdc
<b>ON CHARACTERISTICS</b>				
DC Current Gain (Note 3) ( $I_C = -10 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ ) MMBTA63 ( $I_C = -10 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ ) MMBTA64, SMMBTA64 ( $I_C = -100 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ ) MMBTA63 ( $I_C = -100 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ ) MMBTA64, SMMBTA64	$h_{FE}$	5,000 10,000 10,000 20,000	- - - -	-
Collector - Emitter Saturation Voltage ( $I_C = -100 \text{mAdc}$ , $I_B = -0.1 \text{mAdc}$ )	$V_{CE(sat)}$	-	-1.5	Vdc
Base - Emitter On Voltage ( $I_C = -100 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ )	$V_{BE(on)}$	-	-2.0	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current - Gain - Bandwidth Product ( $I_C = -10 \text{mAdc}$ , $V_{CE} = -5.0 \text{Vdc}$ , $f = 100 \text{MHz}$ )	$f_T$	125	-	MHz

3. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MMBTA63LT1G, MMBTA64LT1G, SMMBTA64LT1G

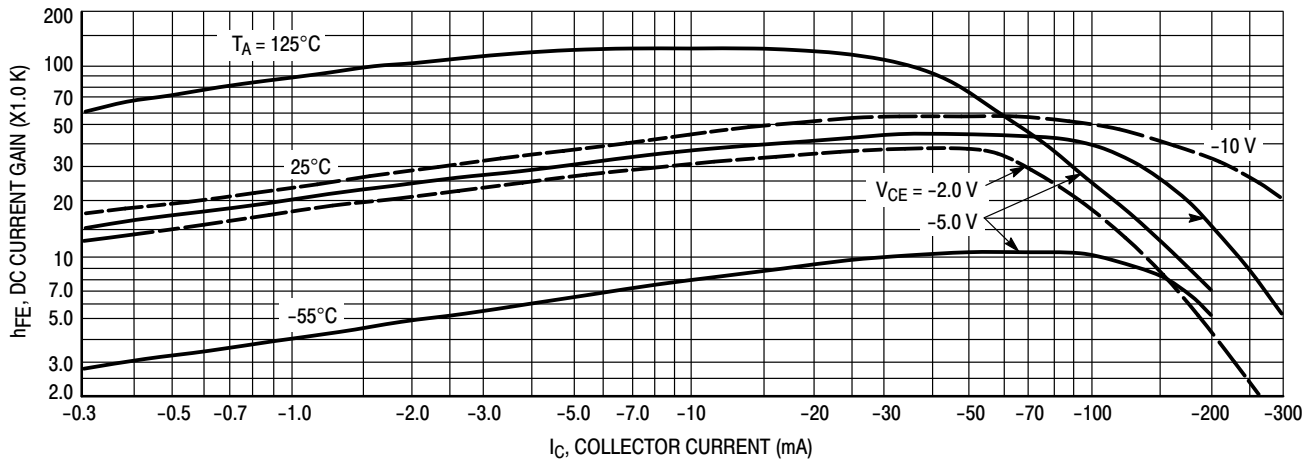


Figure 1. DC Current Gain

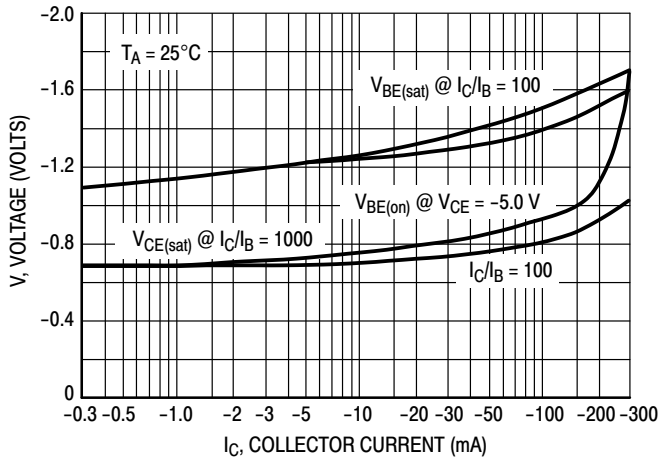


Figure 3. "On" Voltage

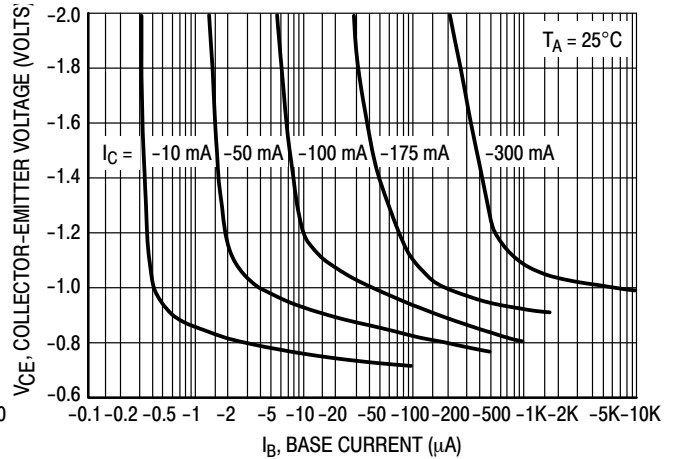


Figure 2. Collector Saturation Region

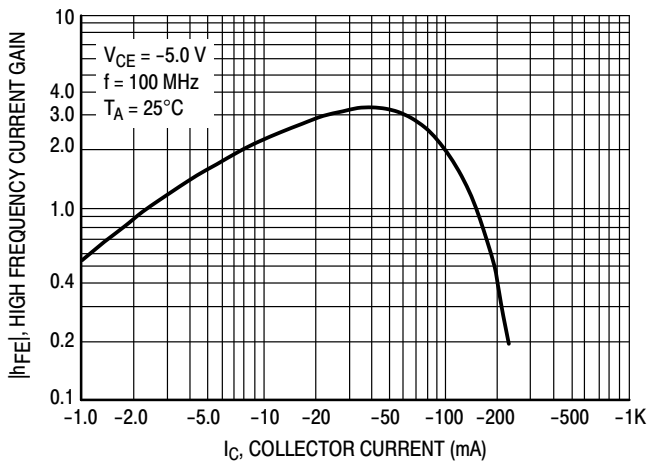


Figure 4. High Frequency Current Gain

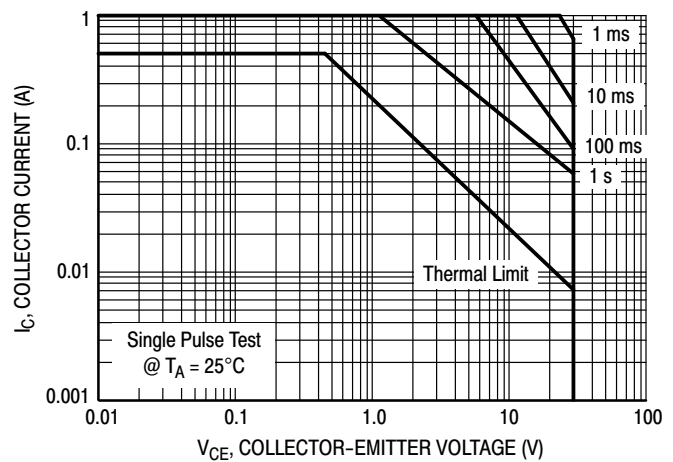
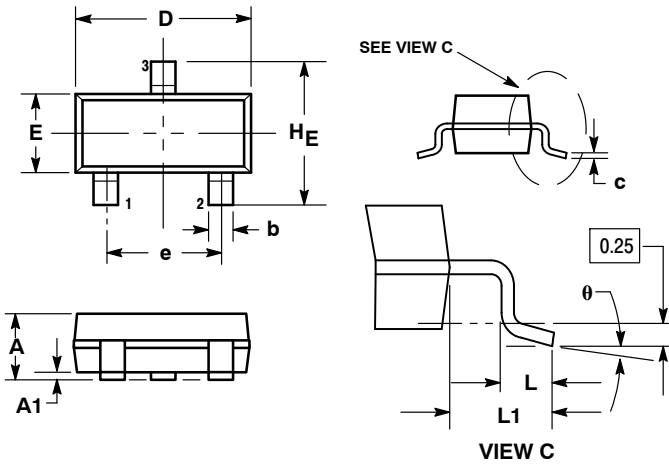


Figure 5. Safe Operating Area

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## PACKAGE DIMENSIONS

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



NOTES:

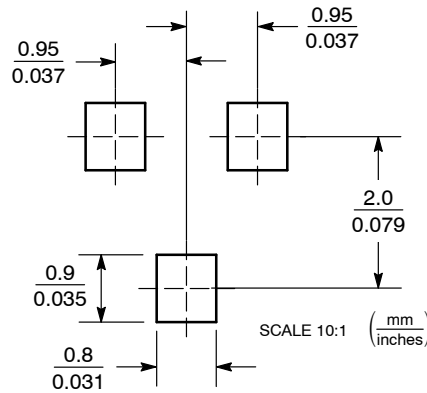
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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
θ	0°	---	10°	0°	---	10°

STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

### SOLDERING FOOTPRINT



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