

Darlington Transistors

PNP Silicon

MMBTA63LT1G, MMBTA64LT1G, SMMBTA64LT1G,

Features

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

MAXIMUM RATINGS

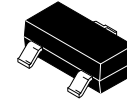
Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V_{CES}	–30	Vdc
Collector – Base Voltage	V_{CBO}	–30	Vdc
Emitter – Base Voltage	V_{EBO}	–10	Vdc
Collector Current – Continuous	I_C	–500	mAdc

THERMAL CHARACTERISTICS

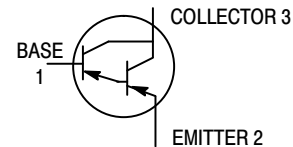
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board, (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

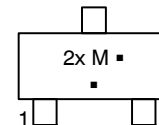
1. FR–5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.



SOT-23 (TO-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
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OFF CHARACTERISTICS

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

ON CHARACTERISTICS

DC Current Gain (Note 3) ($I_C = -10\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$) MMBTA63	h_{FE}	5,000	–	–
($I_C = -10\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$) MMBTA64, SMMBTA64		10,000	–	
($I_C = -100\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$) MMBTA63		10,000	–	
($I_C = -100\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$) MMBTA64, SMMBTA64		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

SMALL – SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product ($I_C = -10\ \text{mAdc}$, $V_{CE} = -5.0\ \text{Vdc}$, $f = 100\ \text{MHz}$)	f_T	125	–	MHz
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Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

MMBTA63LT1G, MMBTA64LT1G, SMMBTA64LT1G,

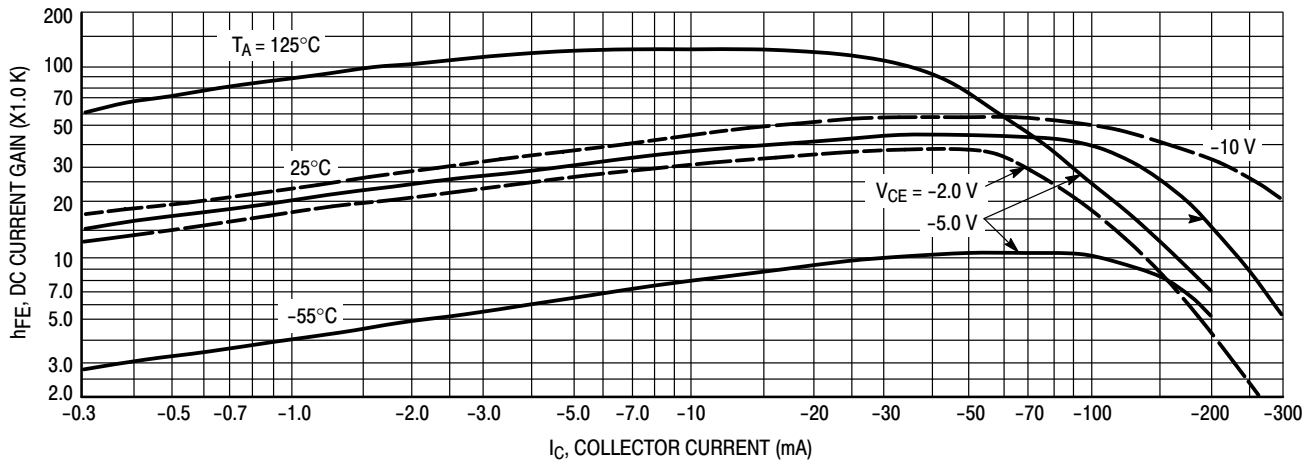


Figure 1. DC Current Gain

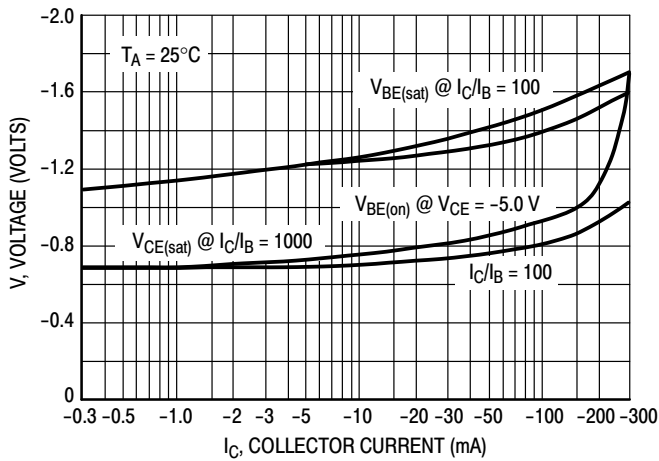


Figure 3. "On" Voltage

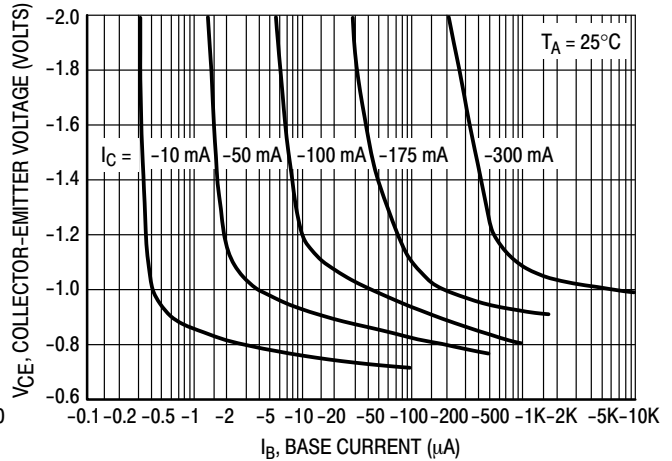


Figure 2. Collector Saturation Region

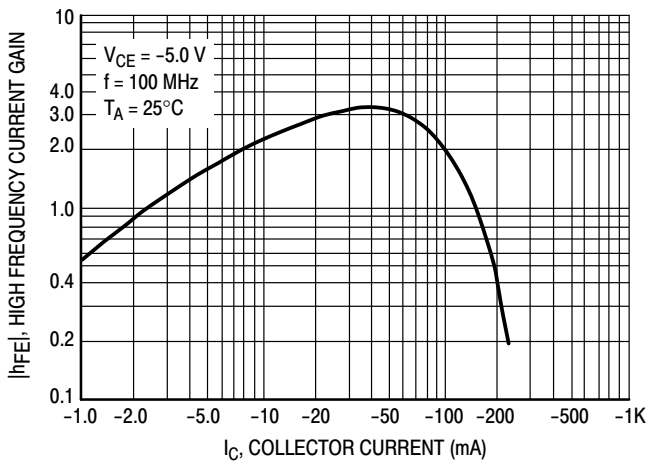


Figure 4. High Frequency Current Gain

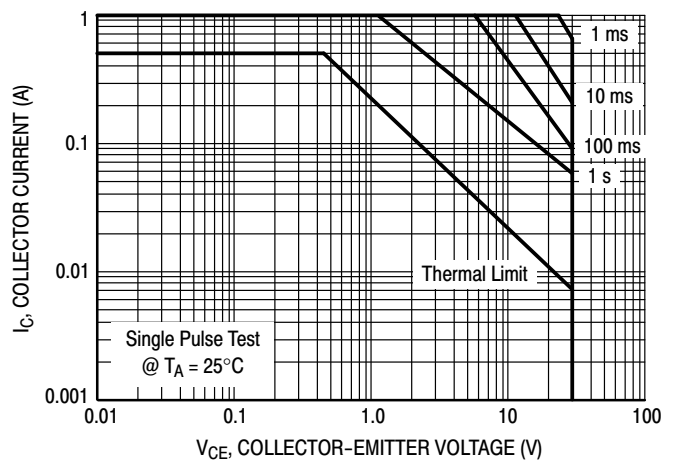
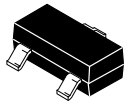


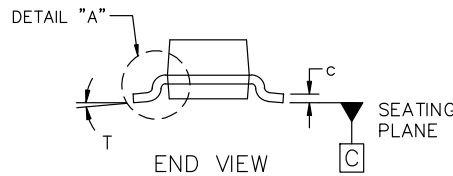
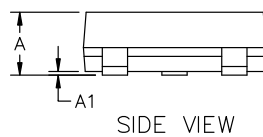
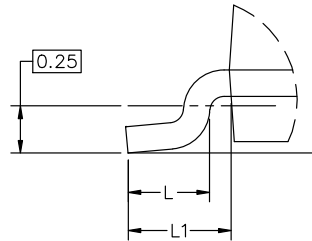
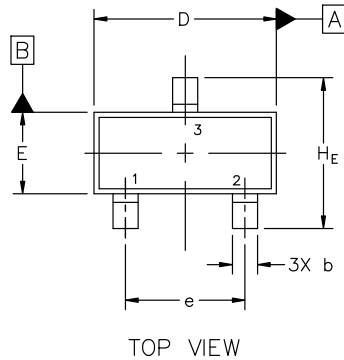
Figure 5. Safe Operating Area



SCALE 4:1

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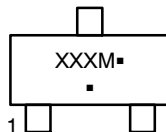


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

NOTES:

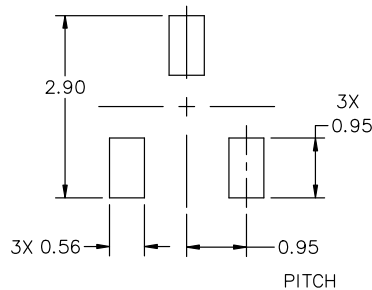
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

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

STYLES ON PAGE 2

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STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE	STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE	STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE	STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE	STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE	STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE	STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE
STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE	STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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