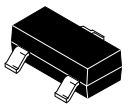
MMBTA55L Series, MMBTA56L Series, SMMBTA56L Series

Driver Transistors

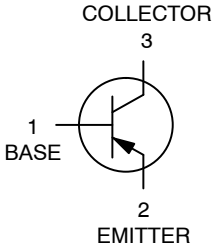
PNP Silicon

ON Semiconductor®

http://onsemi.com



SOT−23
CASE 318
STYLE 6



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 MMBTA55 MMBTA56, SMMBTA56	V_{CEO}	 −60 −80	Vdc
Collector − Base Voltage MMBTA55 MMBTA56, SMMBTA56	V_{CBO}	 −60 −80	Vdc
Emitter − Base Voltage	V_{EBO}	−4.0	Vdc
Collector Current − Continuous	I_C	−500	mAdc

THERMAL CHARACTERISTICS

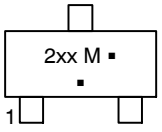
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board (Note 1) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2) T_A = 25°C Derate above 25°C	P_D	 300 2.4	 mW mW/°C
Thermal 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 × 0.75 × 0.062 in.
2. Alumina = 0.4 × 0.3 × 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.

MARKING DIAGRAM



2xx = Device Code
x = H for MMBTA55LT1G
xx = GM for MMBTA56LT1G, SMMBTA56LT1G
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.

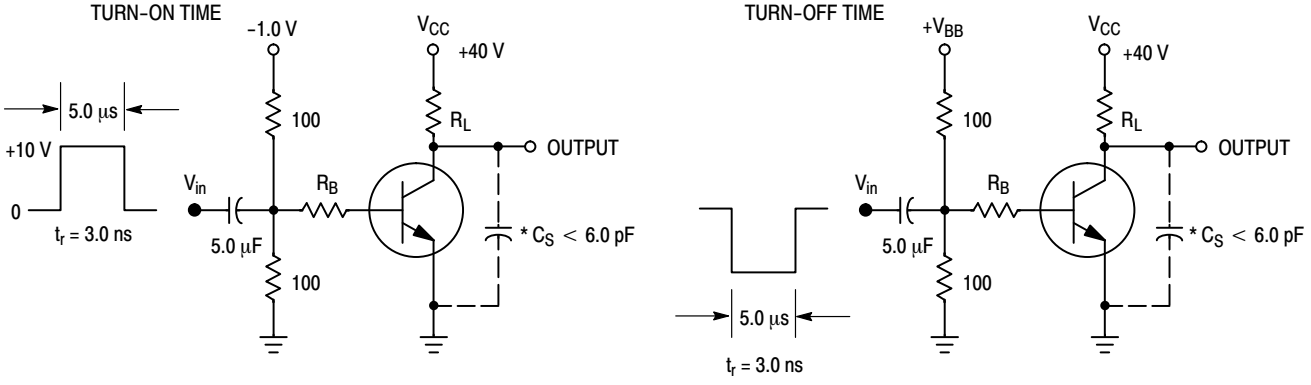
ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector – Emitter Breakdown Voltage (Note 3) (I_C = −1.0 mAdc, I_B = 0) MMBTA55 MMBTA56, SMMBTA56	$V_{(BR)CEO}$	 −60 −80	 – –	Vdc
Emitter – Base Breakdown Voltage (I_E = −100 μAdc, I_C = 0)	$V_{(BR)EBO}$	 −4.0	 –	Vdc
Collector Cutoff Current (V_{CE} = −60 Vdc, I_B = 0)	I_{CES}	 –	 −0.1	μAdc
Collector Cutoff Current (V_{CB} = −60 Vdc, I_E = 0) MMBTA55 (V_{CB} = −80 Vdc, I_E = 0) MMBTA56, SMMBTA56	I_{CBO}	 – –	 −0.1 −0.1	μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = −10 mAdc, V_{CE} = −1.0 Vdc) (I_C = −100 mAdc, V_{CE} = −1.0 Vdc)	h_{FE}	 100 100	 – –	–
Collector – Emitter Saturation Voltage (I_C = −100 mAdc, I_B = −10 mAdc)	$V_{CE(sat)}$	 –	 −0.25	Vdc
Base – Emitter On Voltage (I_C = −100 mAdc, V_{CE} = −1.0 Vdc)	$V_{BE(on)}$	 –	 −1.2	Vdc
SMALL−SIGNAL CHARACTERISTICS				
Current – Gain – Bandwidth Product (Note 4) (I_C = −100 mAdc, V_{CE} = −1.0 Vdc, f = 100 MHz)	f_T	 50	 –	MHz

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
4. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.



*Total Shunt Capacitance of Test Jig and Connectors For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

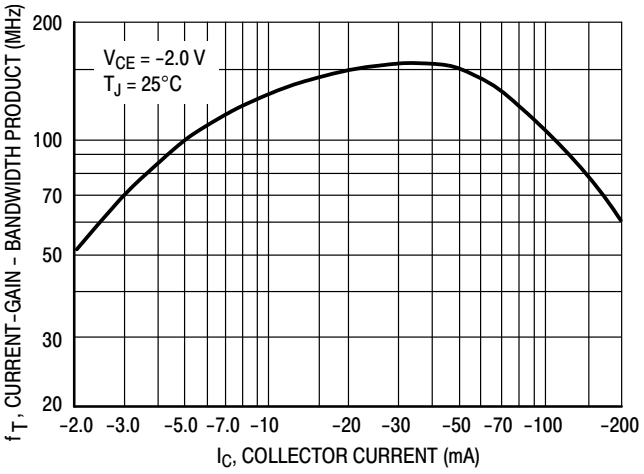


Figure 2. Current−Gain — Bandwidth Product

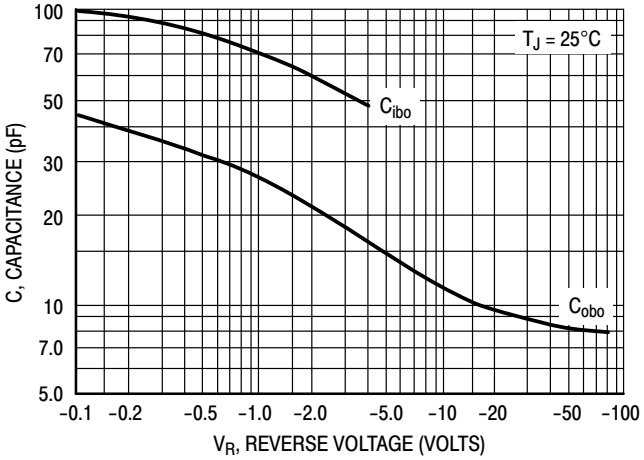


Figure 3. Capacitance

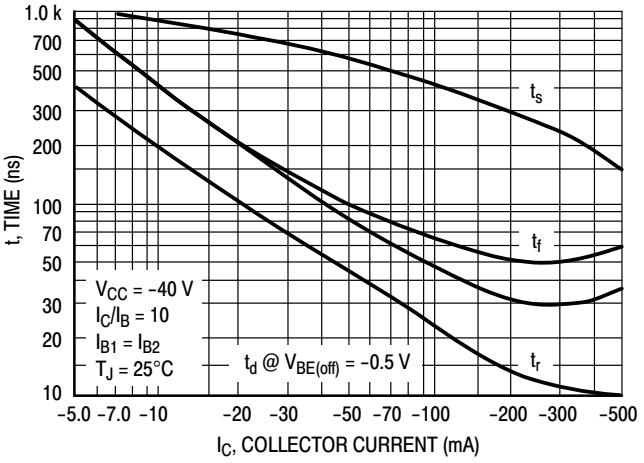


Figure 4. Switching Time

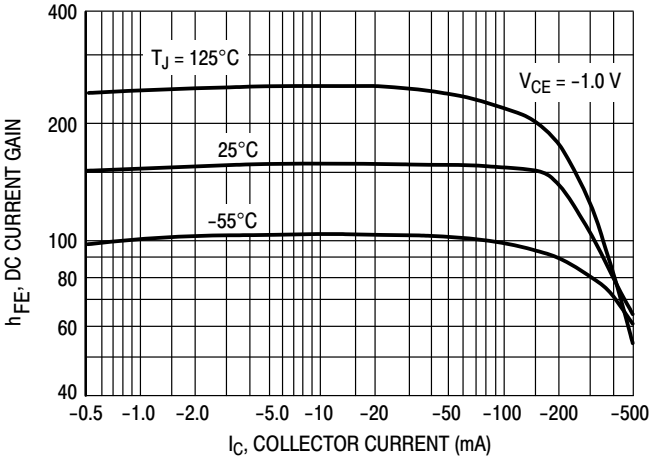


Figure 5. DC Current Gain

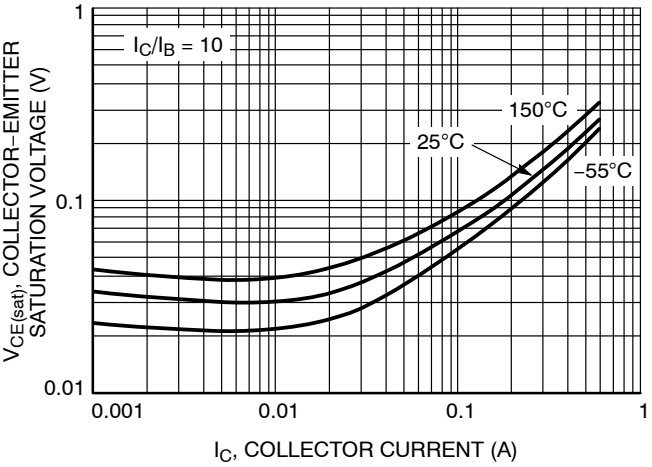


Figure 6. Collector Emitter Saturation Voltage vs. Collector Current

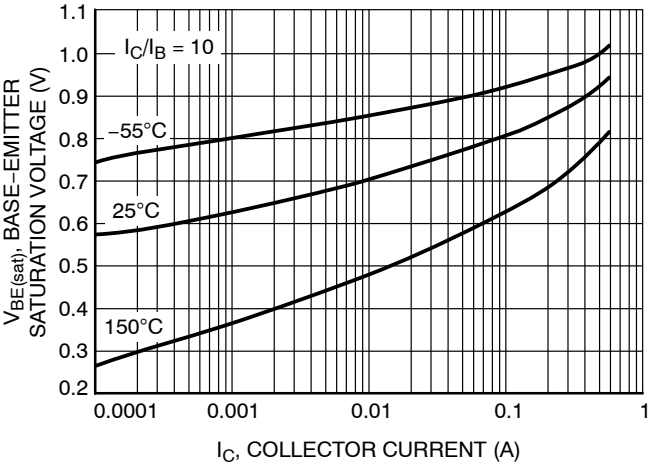


Figure 7. Base Emitter Saturation Voltage vs. Collector Current

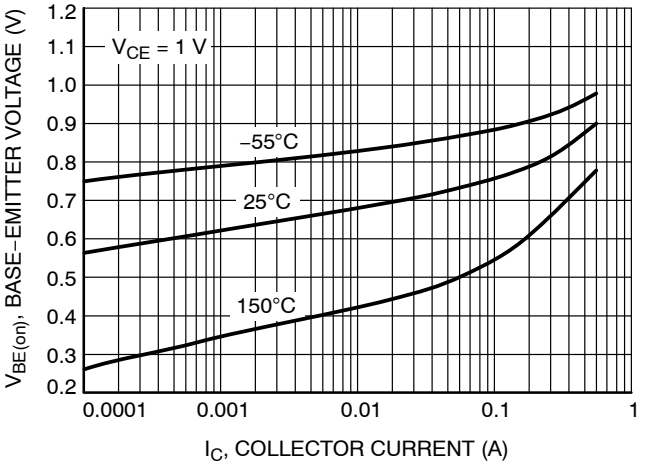


Figure 8. Base Emitter Voltage vs. Collector Current

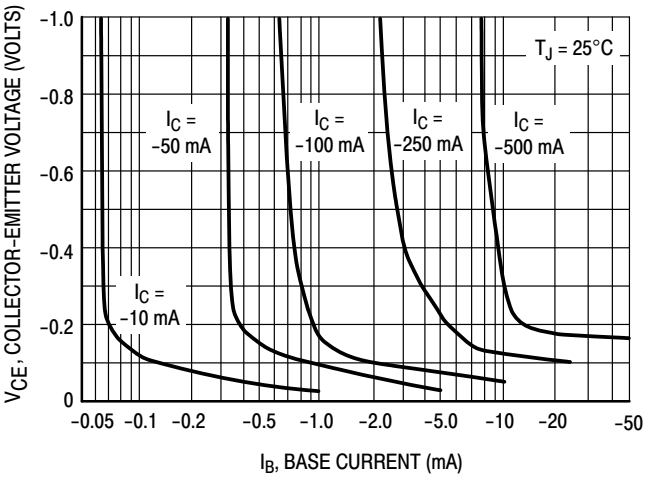


Figure 9. Collector Saturation Region

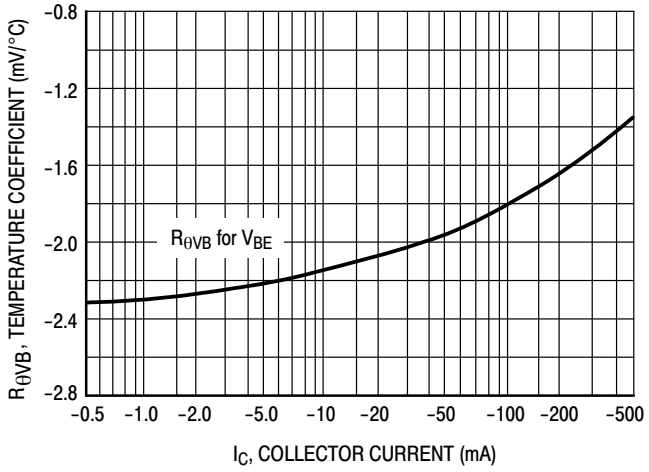


Figure 10. Base−Emitter Temperature Coefficient

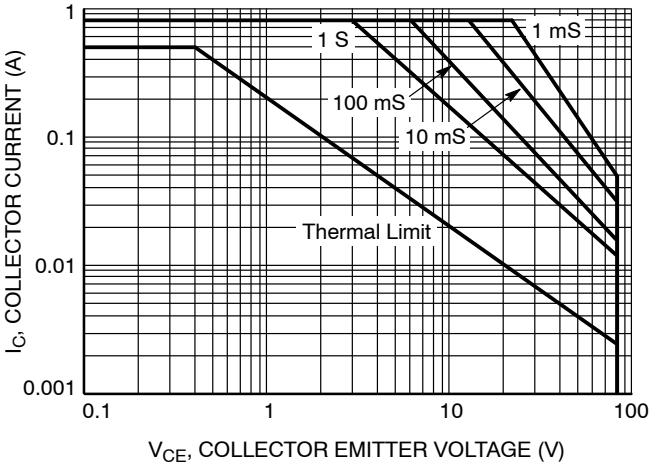


Figure 11. Safe Operating Area

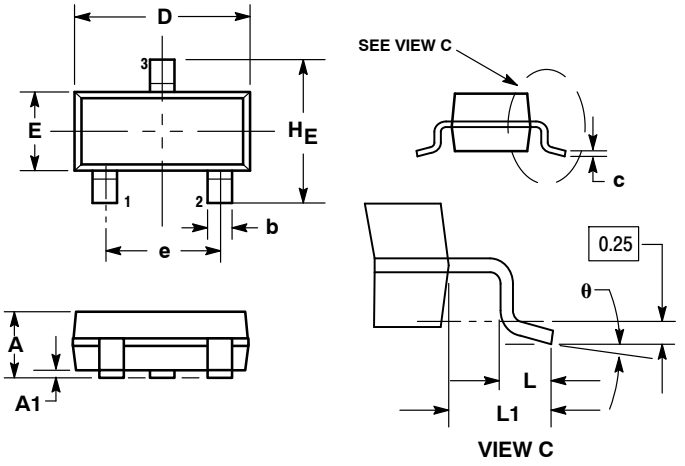
ORDERING INFORMATION

Device Order Number	Package Type	Shipping†
MMBTA55LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
MMBTA55LT3G	SOT−23 (Pb−Free)	10,000 / Tape & Reel
MMBTA56LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SMMBTA56LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
MMBTA56LT3G	SOT−23 (Pb−Free)	10,000 / Tape & Reel
SMMBTA56LT3G	SOT−23 (Pb−Free)	10,000 / 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.

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

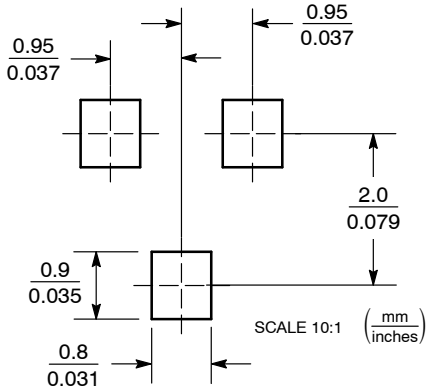


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	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
θ	0°	−−−	10°	0°	−−−	10°

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

SOLDERING FOOTPRINT



PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

MMBTA55LT1/D