

MMBTA56W, SMMBTA56W

Driver Transistor

PNP Silicon

Features

- Moisture Sensitivity Level: 1
- ESD Rating:
 - Human Body Model – 4 kV
 - Machine Model – 400 V
- 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_{CEO}	-80	Vdc
Collector-Base Voltage	V_{CBO}	-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 $T_A = 25^\circ\text{C}$	P_D	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	°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.

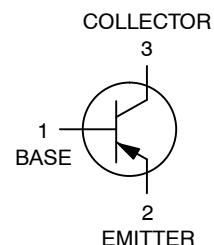


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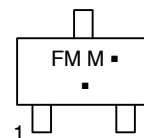
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SC-70 (SOT-323)
CASE 419
STYLE 3



MARKING DIAGRAM



FM = Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping [†]
MMBTA56WT1G	SC-70 (Pb-Free)	3,000 / Tape & Reel
SMMBTA56WT1G	SC-70 (Pb-Free)	3,000 / Tape & Reel
SMMBTA56WT3G	SC-70 (Pb-Free)	10,000 / Tape & Reel

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

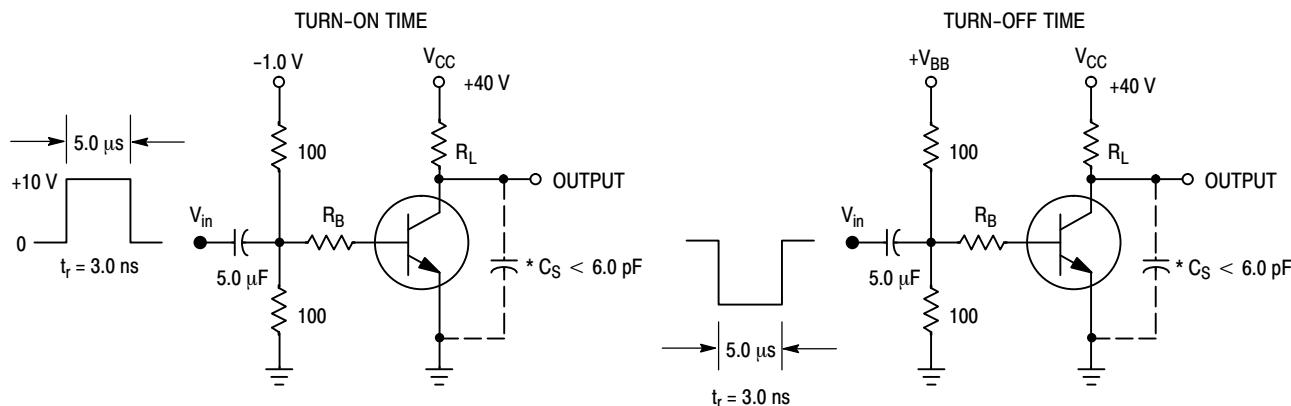
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (Note 1) ($I_C = -1.0 \text{ mA}_\text{dc}$, $I_B = 0$)	$V_{(\text{BR})\text{CEO}}$	-80	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = -100 \mu\text{A}_\text{dc}$, $I_C = 0$)	$V_{(\text{BR})\text{EBO}}$	-4.0	-	Vdc
Collector Cutoff Current ($V_{CE} = -60 \text{ Vdc}$, $I_B = 0$)	I_{CES}	-	-0.1	μA_dc
Collector Cutoff Current ($V_{CB} = -60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = -80 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	-	-0.1	μA_dc
ON CHARACTERISTICS				
DC Current Gain ($I_C = -10 \text{ mA}_\text{dc}$, $V_{CE} = -1.0 \text{ Vdc}$) ($I_C = -100 \text{ mA}_\text{dc}$, $V_{CE} = -1.0 \text{ Vdc}$)	h_{FE}	100 100	-	-
Collector-Emitter Saturation Voltage ($I_C = -100 \text{ mA}_\text{dc}$, $I_B = -10 \text{ mA}_\text{dc}$)	$V_{CE(\text{sat})}$	-	-0.25	Vdc
Base-Emitter On Voltage ($I_C = -100 \text{ mA}_\text{dc}$, $V_{CE} = -1.0 \text{ Vdc}$)	$V_{BE(\text{on})}$	-	-1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain - Bandwidth Product (Note 2) ($I_C = -100 \text{ mA}_\text{dc}$, $V_{CE} = -1.0 \text{ Vdc}$, $f = 100 \text{ MHz}$)	f_T	50	-	MHz

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
2. f_T is defined as the frequency at which $|h_{\text{fe}}|$ 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

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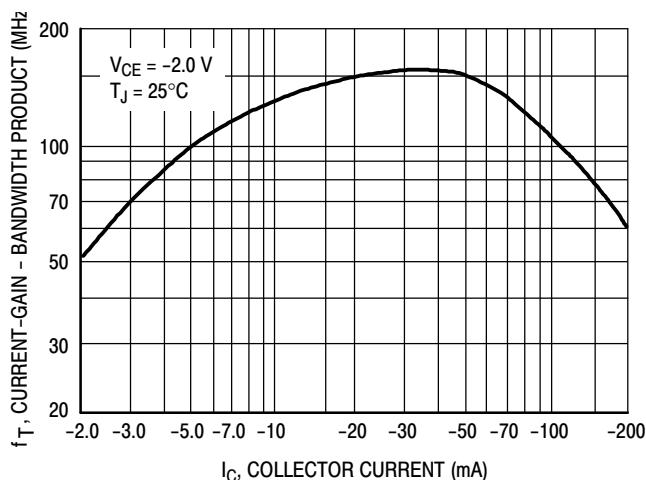


Figure 2. Current-Gain — Bandwidth Product

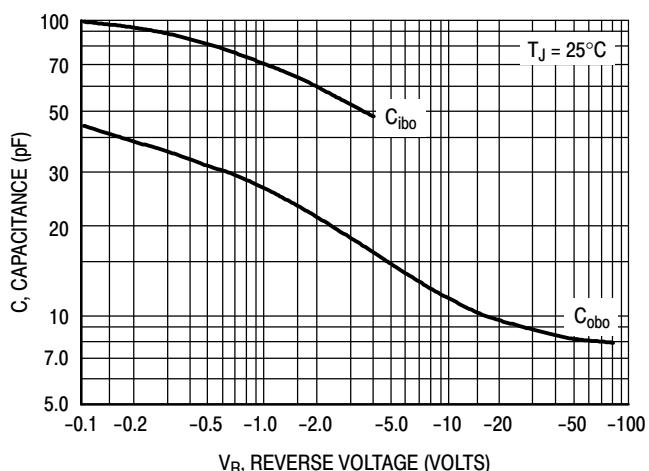


Figure 3. Capacitance

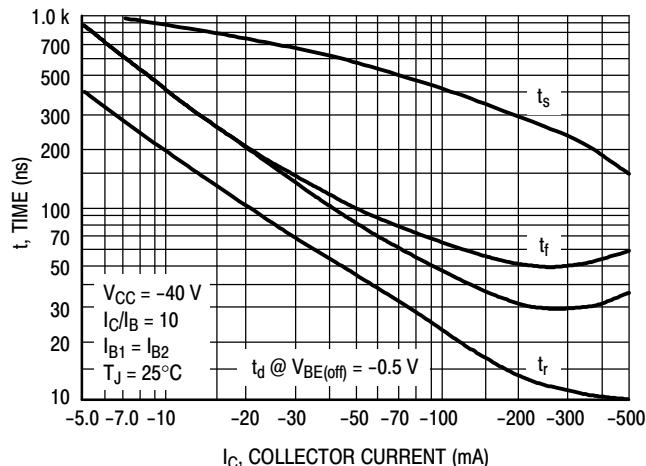


Figure 4. Switching Time

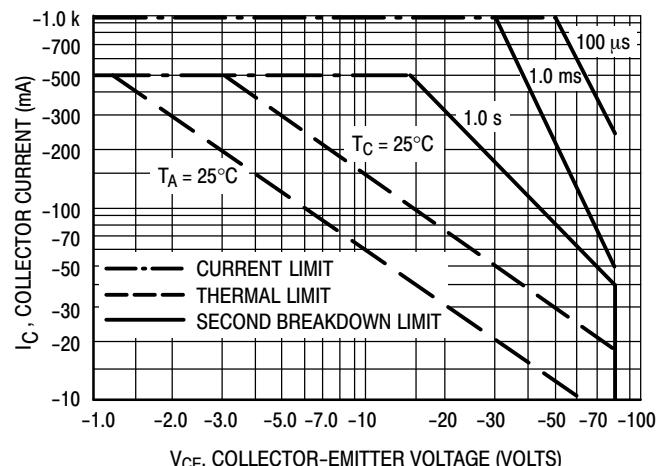


Figure 5. Active-Region Safe Operating Area

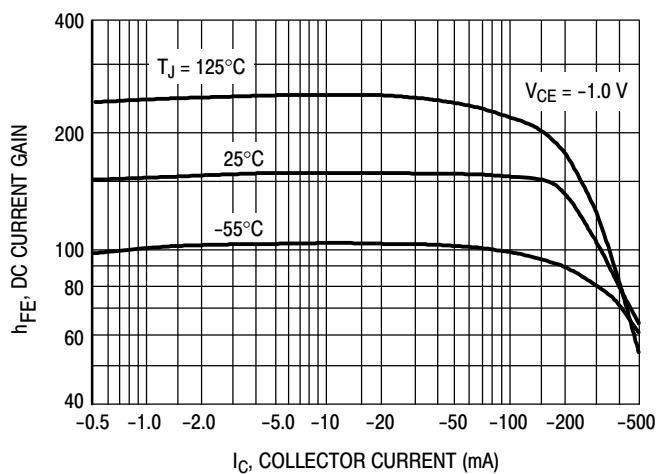


Figure 6. DC Current Gain

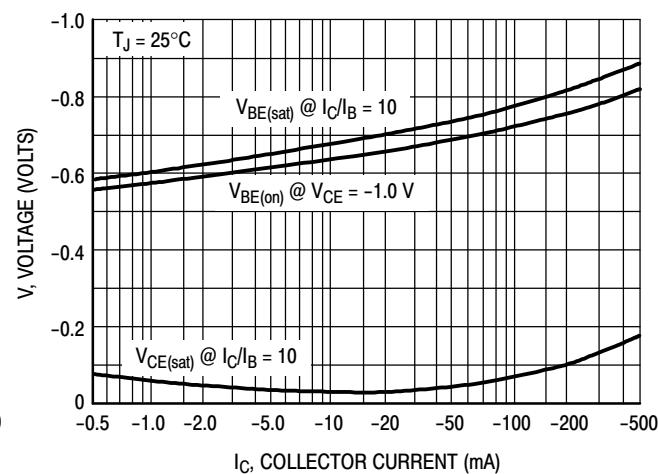


Figure 7. "ON" Voltages

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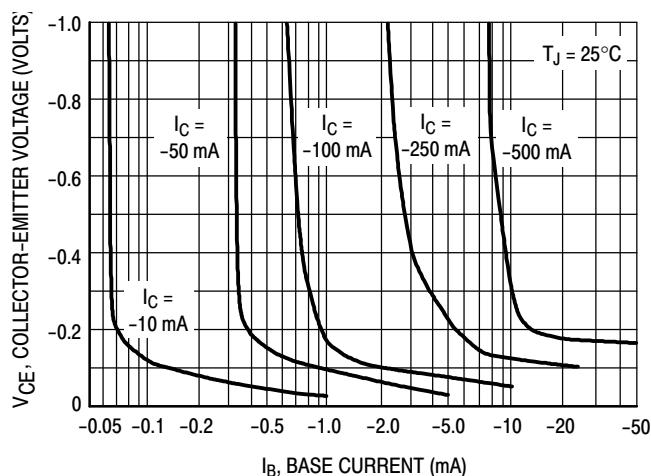


Figure 8. Collector Saturation Region

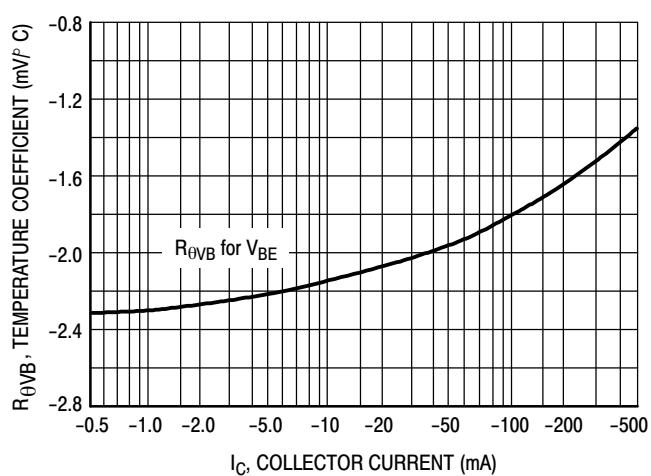
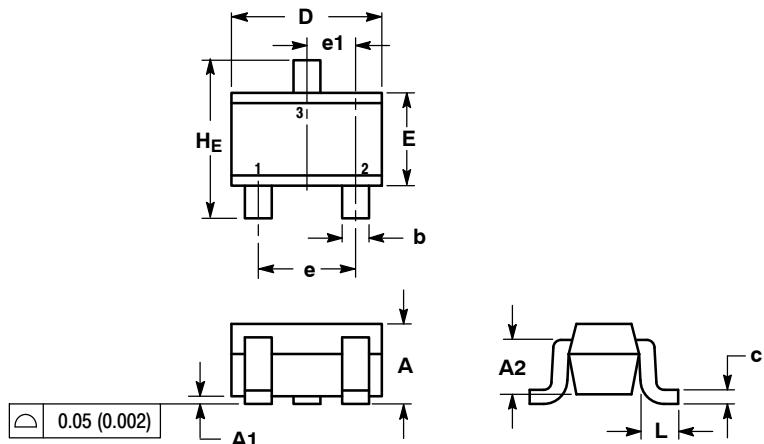


Figure 9. Base-Emitter Temperature Coefficient

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PACKAGE DIMENSIONS

SC-70 (SOT-323) CASE 419-04 ISSUE N



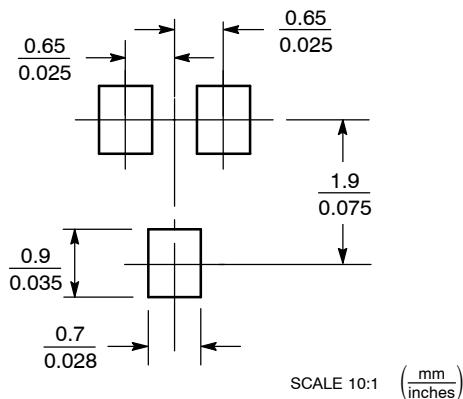
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2		0.70 REF			0.028 REF	
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1		0.65 BSC			0.026 BSC	
L	0.20	0.38	0.56	0.008	0.015	0.022
H_E	2.00	2.10	2.40	0.079	0.083	0.095

STYLE 3:
PIN 1. BASE
2. Emitter
3. Collector

SOLDERING FOOTPRINT*



SCALE 10:1 (mm/inches)

*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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