

# MMBTA56WT1

## Driver Transistor

### PNP Silicon

#### Features

- Moisture Sensitivity Level: 1
- ESD Rating: Human Body Model – 4 kV  
Machine Model – 400 V
- Pb-Free Package is Available

#### 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

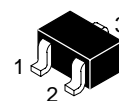
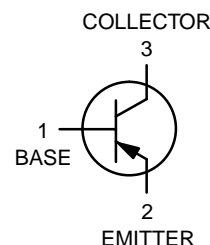
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Junction and Storage Temperature	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

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.



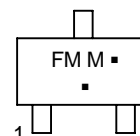
ON Semiconductor®

<http://onsemi.com>



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†
MMBTA56WT1	SC-70	3000/Tape & Reel
MMBTA56WT1G	SC-70 (Pb-Free)	3000/Tape & Reel

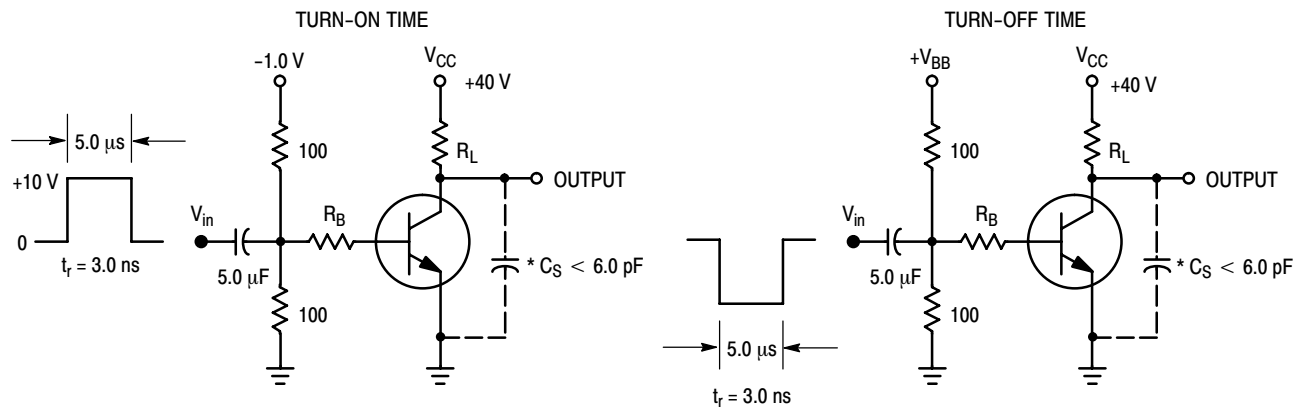
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMBTA56WT1

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

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

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

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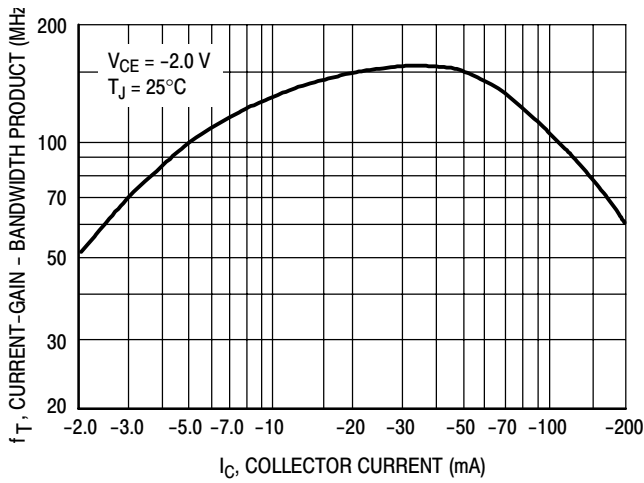


Figure 2. Current-Gain — Bandwidth Product

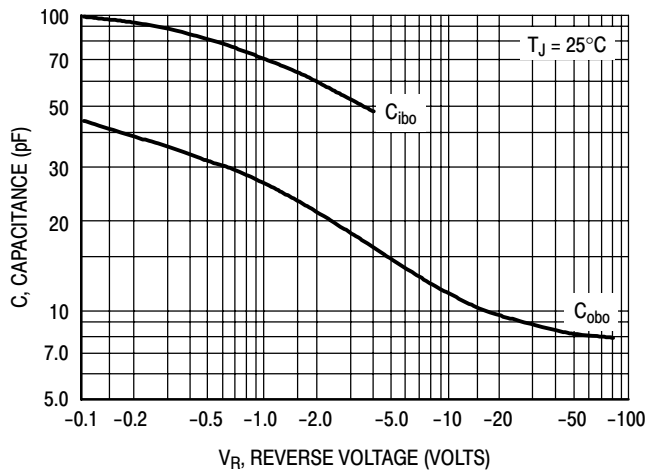


Figure 3. Capacitance

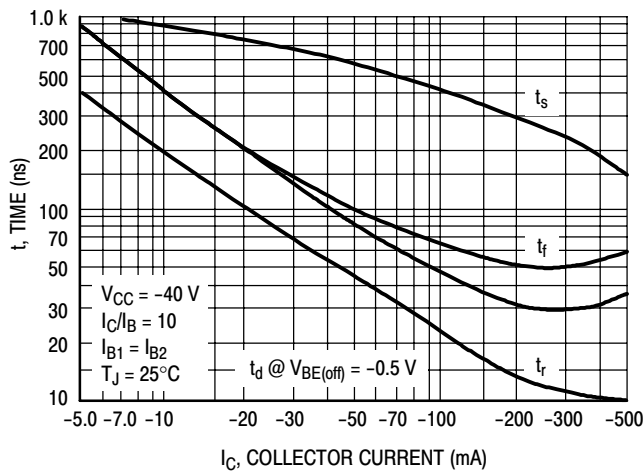


Figure 4. Switching Time

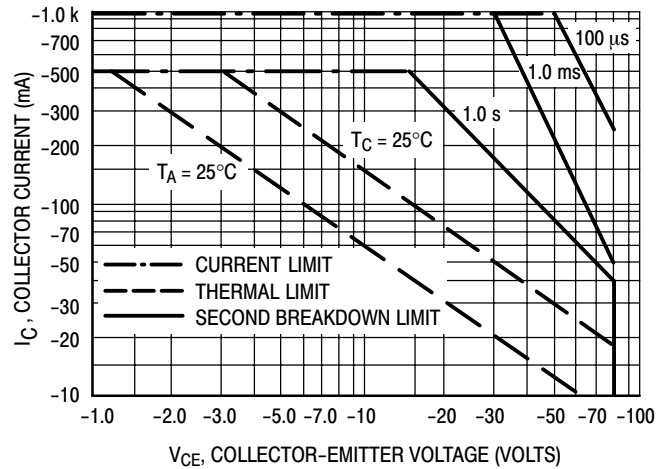


Figure 5. Active-Region Safe Operating Area

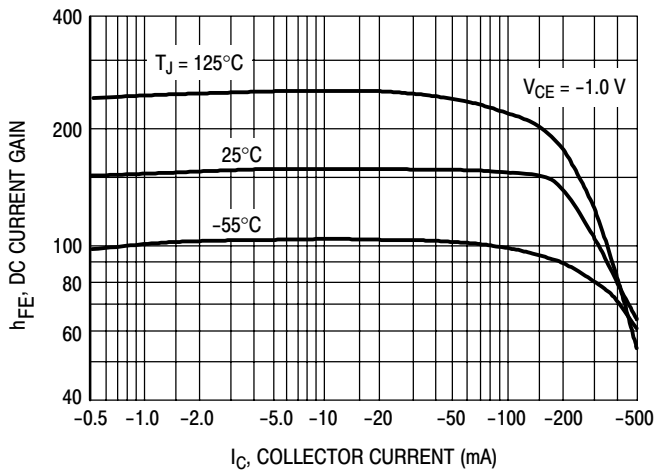


Figure 6. DC Current Gain

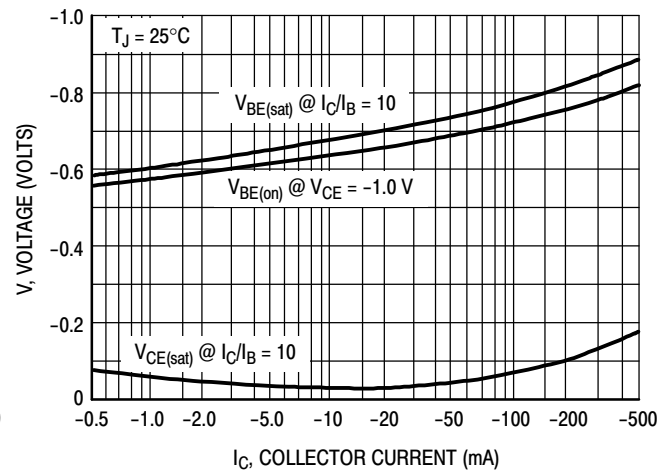


Figure 7. "ON" Voltages

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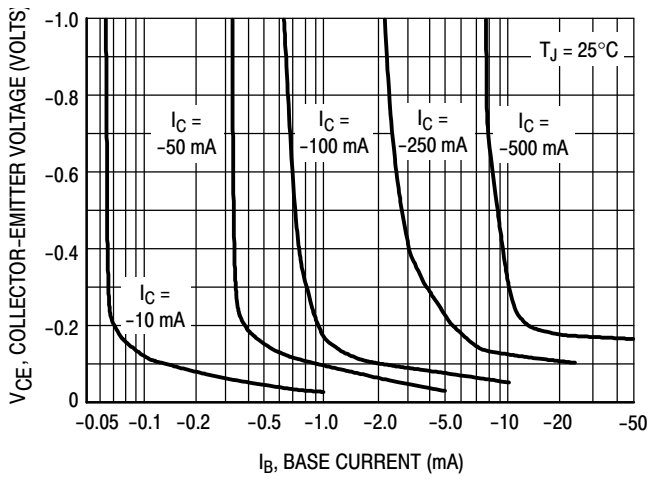


Figure 8. Collector Saturation Region

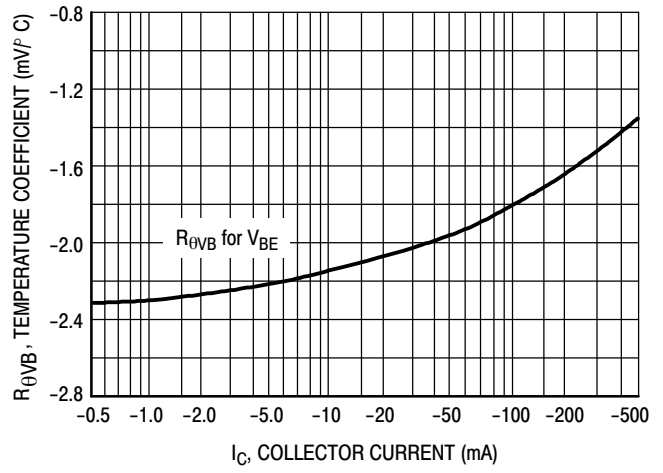
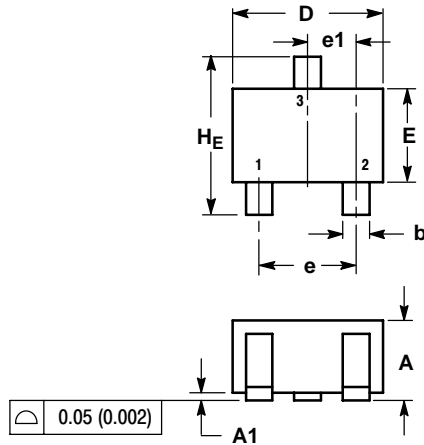


Figure 9. Base-Emitter Temperature Coefficient

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## PACKAGE DIMENSIONS

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



NOTES:

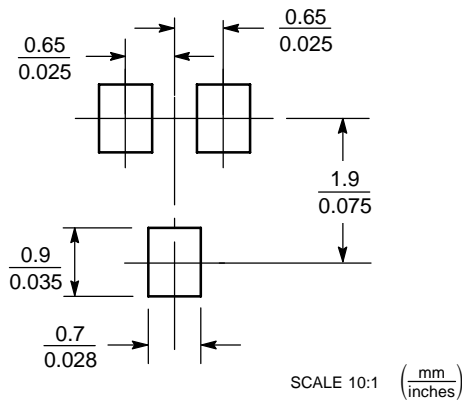
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

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	0.7 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	0.425 REF			0.017 REF		
HE	2.00	2.10	2.40	0.079	0.083	0.095

STYLE 3:

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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