

# MMBTA55LT1, MMBTA56LT1

MMBTA56LT1 is a Preferred Device

## Driver Transistors

### PNP Silicon

#### Features

- Pb-Free Packages are Available

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage MMBTA55 MMBTA56	$V_{CEO}$	-60 -80	Vdc
Collector-Base Voltage MMBTA55 MMBTA56	$V_{CBO}$	-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) $T_A = 25^\circ\text{C}$ 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	$^\circ\text{C}$

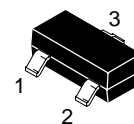
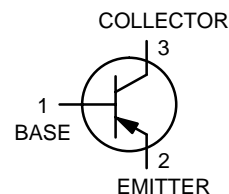
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- FR-5 =  $1.0 \times 0.75 \times 0.062$  in.
- Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.



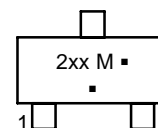
ON Semiconductor®

<http://onsemi.com>



SOT-23  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



2xx = Device Code  
 x = H for MMBTA55LT1  
 xx = GM for MMBTA56LT1  
 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.

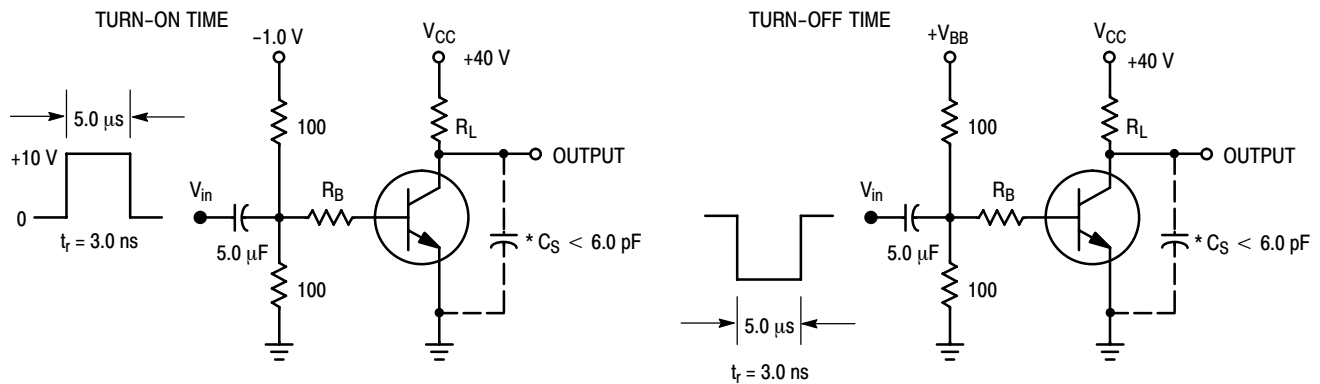
Preferred devices are recommended choices for future use and best overall value.

# MMBTA55LT1, MMBTA56LT1

## 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 3) ( $I_C = -1.0\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$ MMBTA55 MMBTA56	-60 -80	-	Vdc
Emitter-Base Breakdown Voltage ( $I_E = -100\ \mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-4.0	-	Vdc
Collector Cutoff Current ( $V_{CE} = -60\text{ Vdc}$ , $I_B = 0$ )	$I_{CES}$	-	-0.1	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = -60\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -80\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$ MMBTA55 MMBTA56	- -	-0.1 -0.1	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = -10\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ ) ( $I_C = -100\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ )	$h_{FE}$	100 100	- -	-
Collector-Emitter Saturation Voltage ( $I_C = -100\text{ mAdc}$ , $I_B = -10\text{ mAdc}$ )	$V_{CE(sat)}$	-	-0.25	Vdc
Base-Emitter On Voltage ( $I_C = -100\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ )	$V_{BE(on)}$	-	-1.2	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain - Bandwidth Product (Note 4) ( $I_C = -100\text{ mAdc}$ , $V_{CE} = -1.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	50	-	MHz

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

# MMBTA55LT1, MMBTA56LT1

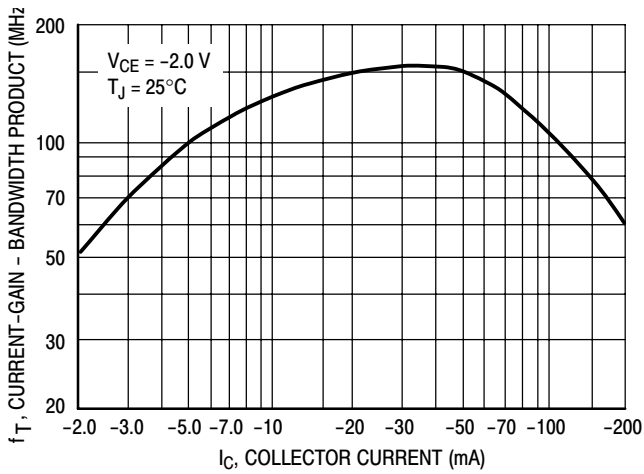


Figure 2. Current-Gain — Bandwidth Product

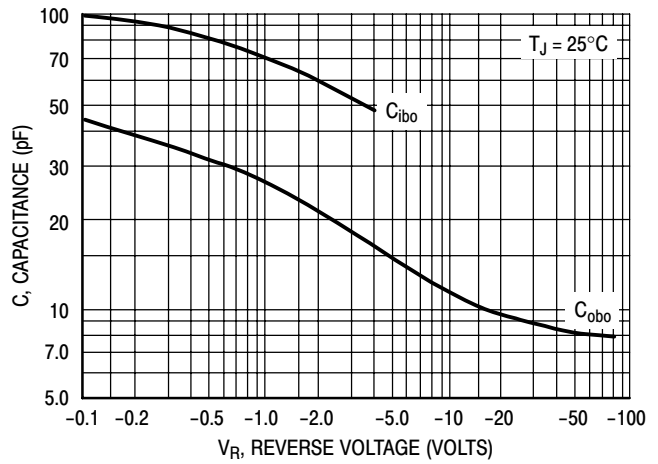


Figure 3. Capacitance

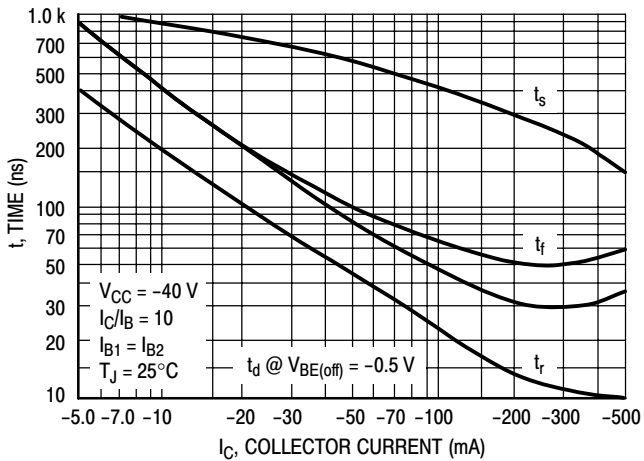


Figure 4. Switching Time

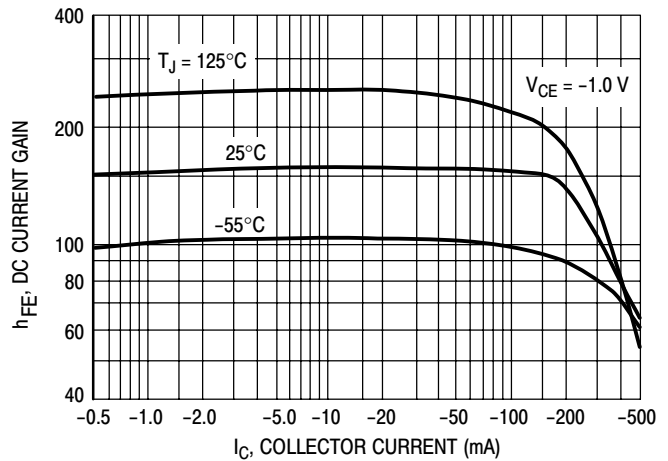


Figure 5. DC Current Gain

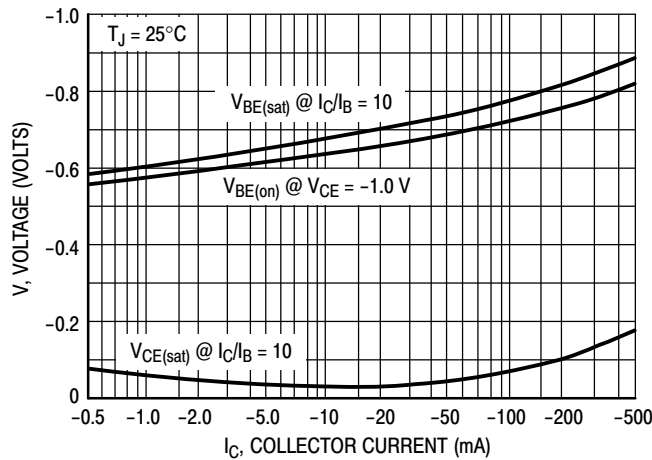


Figure 6. "ON" Voltages

# MMBTA55LT1, MMBTA56LT1

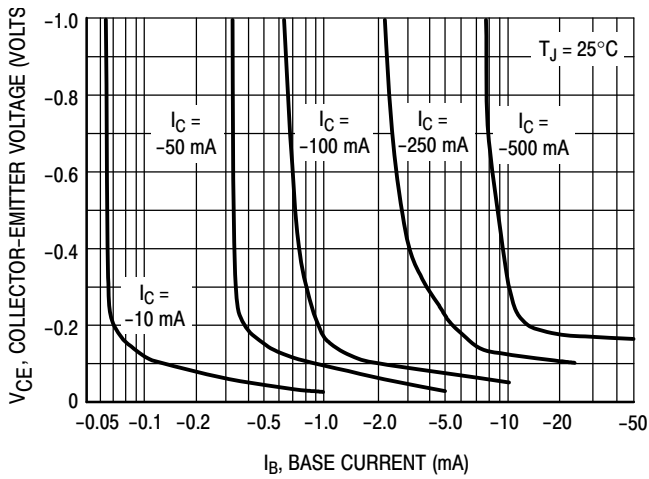


Figure 7. Collector Saturation Region

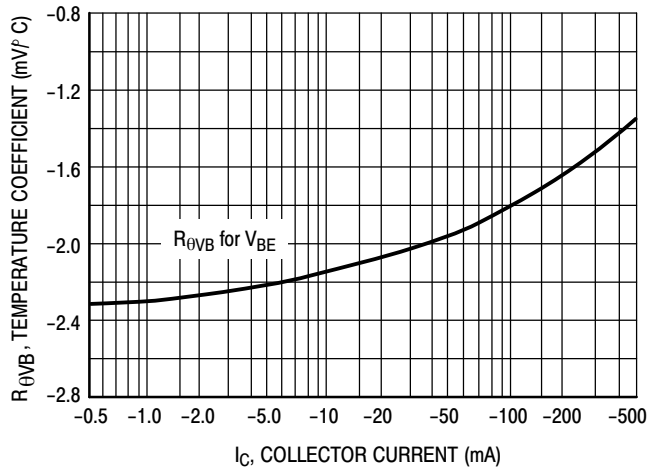


Figure 8. Base-Emitter Temperature Coefficient

## ORDERING INFORMATION

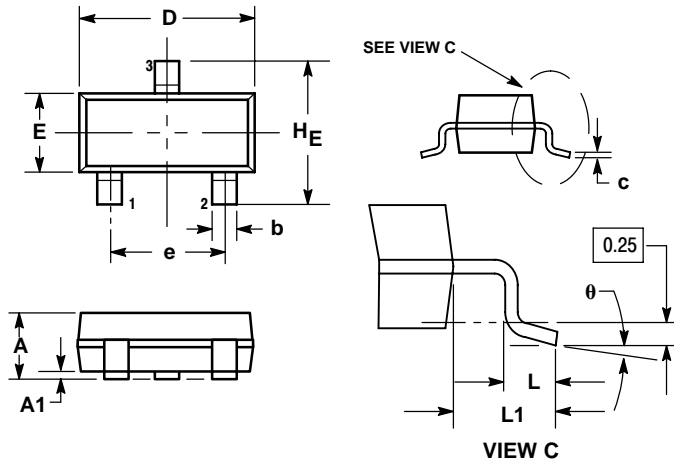
Device Order Number	Package Type	Shipping <sup>†</sup>
MMBTA55LT1	SOT-23	3,000 / Tape & Reel
MMBTA55LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBTA55LT3	SOT-23	10,000 / Tape & Reel
MMBTA55LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
MMBTA56LT1	SOT-23	3,000 / Tape & Reel
MMBTA56LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBTA56LT3	SOT-23	10,000 / Tape & Reel
MMBTA56LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel

<sup>†</sup>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.

# MMBTA55LT1, MMBTA56LT1

## PACKAGE DIMENSIONS

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



### NOTES:

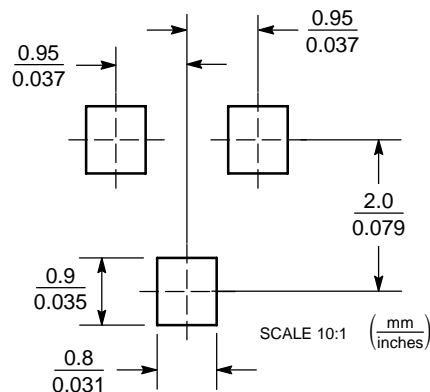
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

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

### STYLE 6:

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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