

MMBTA06W, SMMBTA06W,

Driver Transistor

NPN Silicon

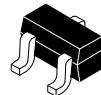
Features

- 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*

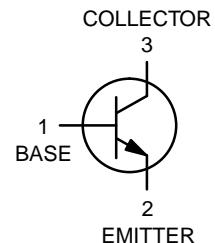


ON Semiconductor®

www.onsemi.com



SC-70
CASE 419
STYLE 3



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

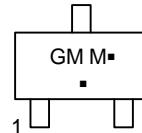
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board $T_A = 25^\circ\text{C}$	P_D	460	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	272	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°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-4 Board, 1 oz. Cu, 100 mm².

MARKING DIAGRAM



GM = Specific 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 [†]
MMBTA06WT1G	SC-70 (Pb-Free)	3,000 / Tape & Reel
SMMBTA06WT1G	SC-70 (Pb-Free)	3,000 / Tape & Reel
SMMBTA06WT3G	SC-70 (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.

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

MMBTA06W, SMMBTA06W,

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	—	V_dc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{A}_\text{dc}$, $I_C = 0$)	$V_{(\text{BR})\text{EBO}}$	4.0	—	V_dc
Collector Cutoff Current ($V_{CE} = 60 \text{ V}_\text{dc}$, $I_B = 0$)	I_{CES}	—	0.1	μA_dc
Collector Cutoff Current ($V_{CB} = 80 \text{ V}_\text{dc}$, $I_E = 0$)	I_{CBO}	—	0.1	μA_dc

ON CHARACTERISTICS

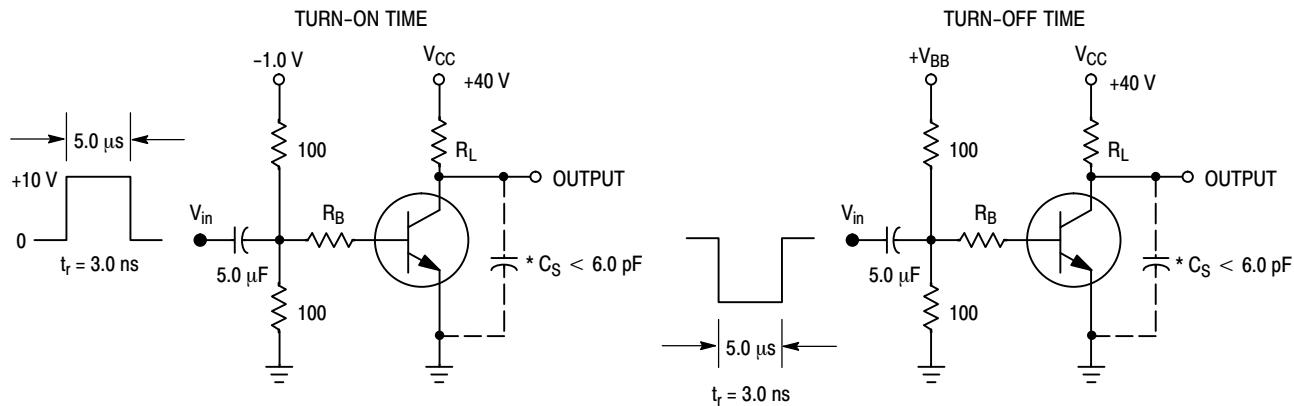
DC Current Gain ($I_C = 10 \text{ mA}_\text{dc}$, $V_{CE} = 1.0 \text{ V}_\text{dc}$) ($I_C = 100 \text{ mA}_\text{dc}$, $V_{CE} = 1.0 \text{ V}_\text{dc}$)	h_{FE}	100 100	— —	—
Collector-Emitter Saturation Voltage ($I_C = 100 \text{ mA}_\text{dc}$, $I_B = 10 \text{ mA}_\text{dc}$)	$V_{CE(\text{sat})}$	—	0.25	V_dc
Base-Emitter On Voltage ($I_C = 100 \text{ mA}_\text{dc}$, $V_{CE} = 1.0 \text{ V}_\text{dc}$)	$V_{BE(\text{on})}$	—	1.2	V_dc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain – Bandwidth Product (Note 2) ($I_C = 10 \text{ mA}$, $V_{CE} = 2.0 \text{ V}$, $f = 100 \text{ MHz}$)	f_T	100	—	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.

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

MMBTA06W, SMMBTA06W,

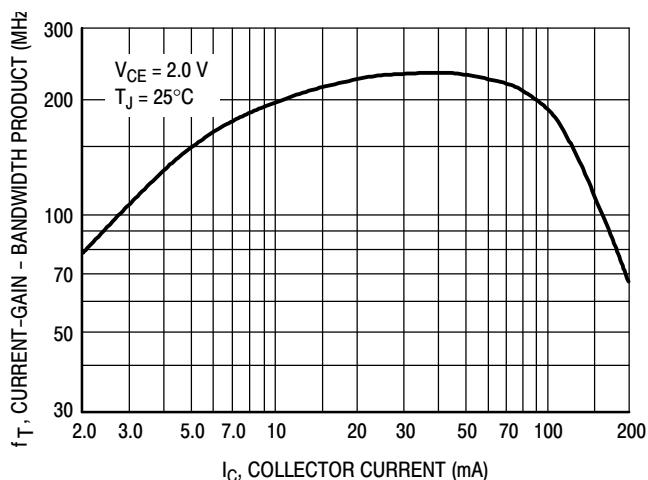


Figure 2. Current-Gain — Bandwidth Product

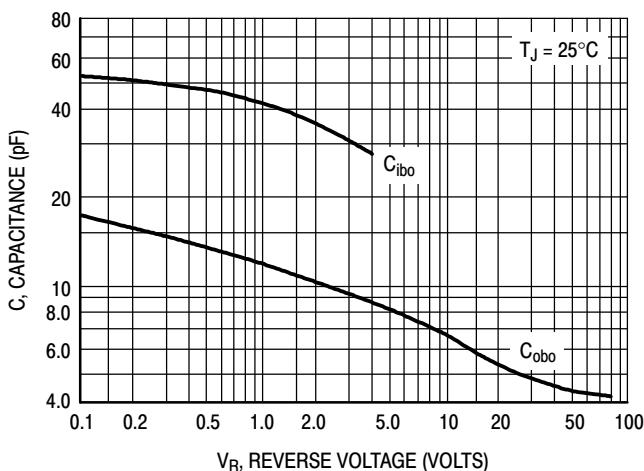


Figure 3. Capacitance

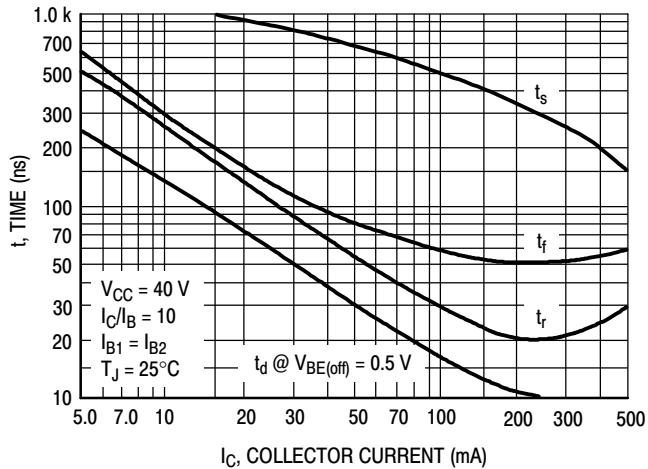


Figure 4. Switching Time

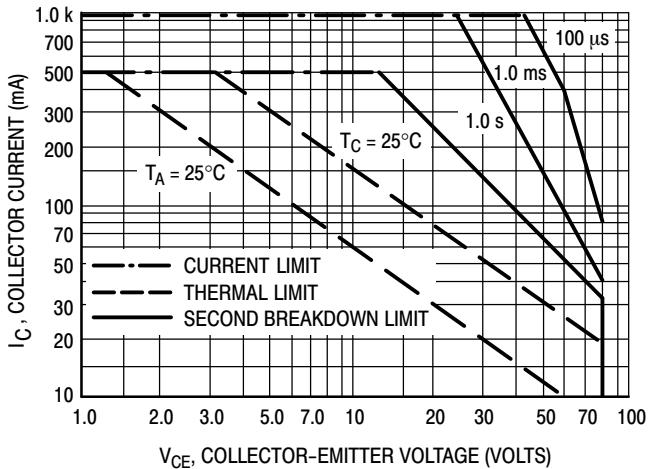


Figure 5. Active-Region Safe Operating Area

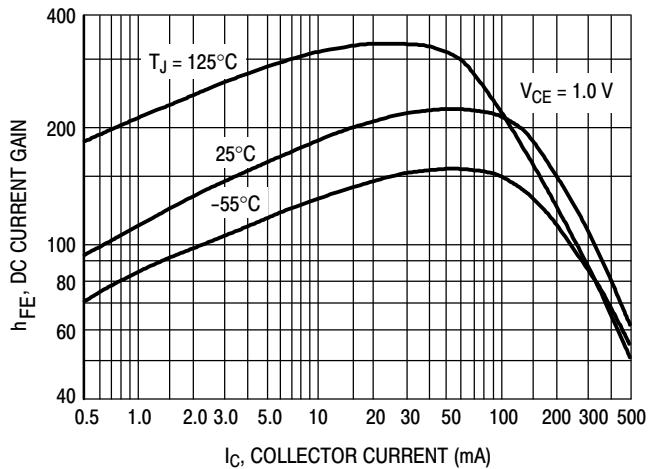


Figure 6. DC Current Gain

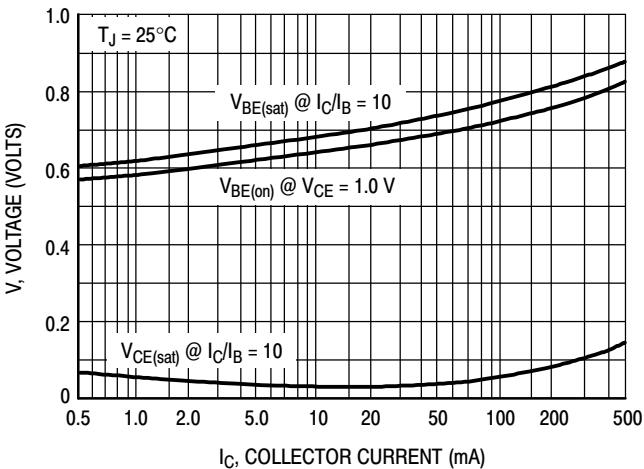


Figure 7. "ON" Voltages

MMBTA06W, SMMBTA06W,

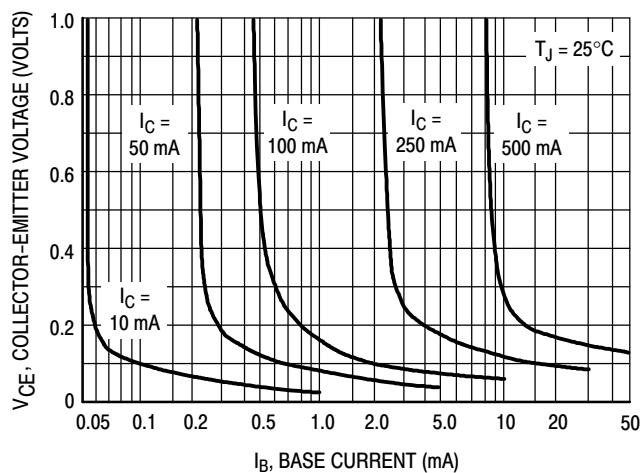


Figure 8. Collector Saturation Region

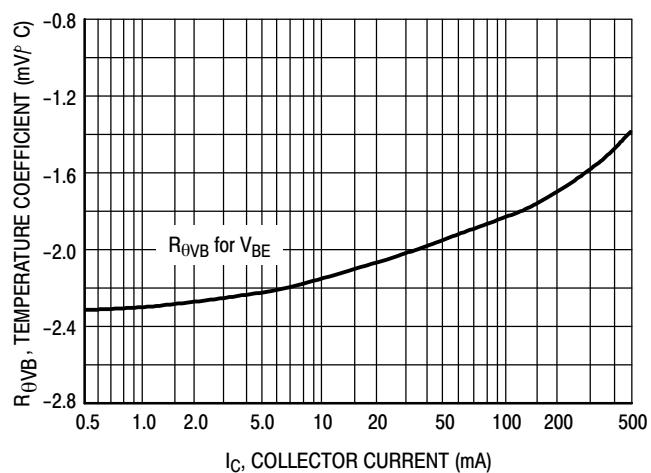
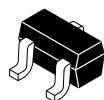


Figure 9. Base-Emitter Temperature Coefficient

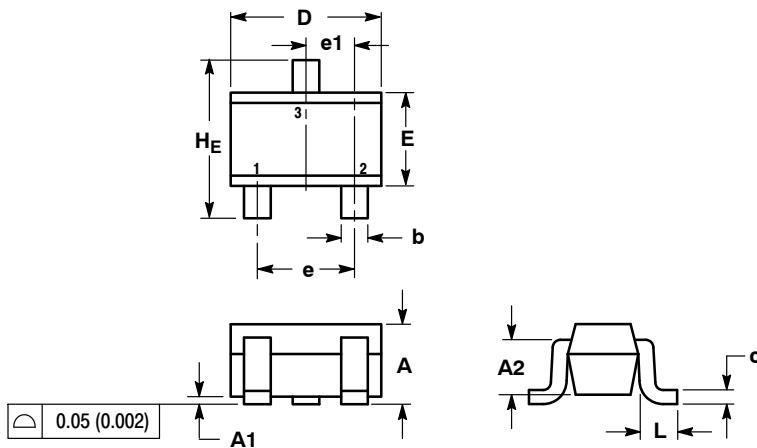
MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 4:1



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

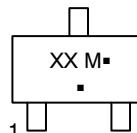
DATE 11 NOV 2008

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

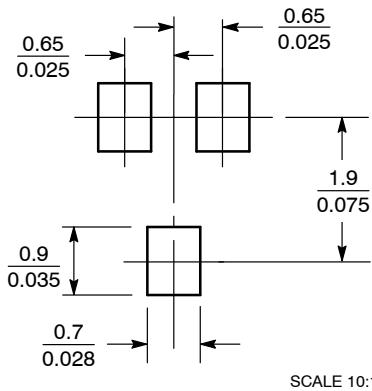
GENERIC MARKING DIAGRAM



XX = 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.

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.

STYLE 1:
CANCELLED

STYLE 2:
PIN 1. ANODE
2. N.C.
3. CATHODE

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

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. CATHODE

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

STYLE 7:
PIN 1. BASE
2. Emitter
3. COLLECTOR

STYLE 8:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. CATHODE-ANODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. ANODE-CATHODE

STYLE 11:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

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