

MMBT6517L, NSVMMBT6517L

High Voltage Transistor

NPN Silicon

Features

- NSV 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}	350	V
Collector – Base Voltage	V_{CBO}	350	V
Emitter – Base Voltage	V_{EBO}	5.0	V
Base Current	I_B	25	mA
Collector Current – Continuous	I_C	100	mA

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

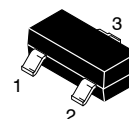
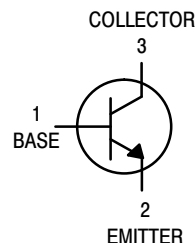
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



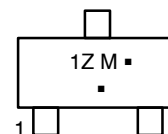
ON Semiconductor®

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SOT-23 (TO-236AB)
CASE 318
STYLE 6

MARKING DIAGRAM



1Z = Device Code
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

Device	Package	Shipping†
MMBT6517LT1G	SOT-23 (Pb-Free)	3000 / Tape & Reel
MMBT6517LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
NSVMMBT6517LT1G	SOT-23 (Pb-Free)	3,000 / 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.

MMBT6517L, NSVMMBT6517L

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I _C = 1.0 mA)	V _{(BR)CEO}	350	–	V
Collector–Base Breakdown Voltage (I _C = 100 µA)	V _{(BR)CBO}	350	–	V
Emitter–Base Breakdown Voltage (I _E = 10 µA)	V _{(BR)EBO}	6.0	–	V
Collector Cutoff Current (V _{CB} = 250 V)	I _{CBO}	–	50	nA
Emitter Cutoff Current (V _{EB} = 5.0 V)	I _{EBO}	–	50	nA

ON CHARACTERISTICS

DC Current Gain (I _C = 1.0 mA, V _{CE} = 10 V) (I _C = 10 mA, V _{CE} = 10 V) (I _C = 30 mA, V _{CE} = 10 V) (I _C = 50 mA, V _{CE} = 10 V) (I _C = 100 mA, V _{CE} = 10 V)	h _{FE}	20 30 30 20 15	– – 200 200 –	–
Collector–Emitter Saturation Voltage (Note 3) (I _C = 10 mA, I _B = 1.0 mA) (I _C = 20 mA, I _B = 2.0 mA) (I _C = 30 mA, I _B = 3.0 mA) (I _C = 50 mA, I _B = 5.0 mA)	V _{CE(sat)}	– – – –	0.30 0.35 0.50 1.0	V
Base–Emitter Saturation Voltage (I _C = 10 mA, I _B = 1.0 mA) (I _C = 20 mA, I _B = 2.0 mA) (I _C = 30 mA, I _B = 3.0 mA)	V _{BE(sat)}	– – –	0.75 0.85 0.90	V
Base–Emitter On Voltage (I _C = 100 mA, V _{CE} = 10 V)	V _{BE(on)}	–	2.0	V

SMALL–SIGNAL CHARACTERISTICS

Current Gain – Bandwidth Product (I _C = 10 mA, V _{CE} = 20 V, f = 20 MHz)	f _T	40	200	MHz
Collector–Base Capacitance (V _{CB} = 20 V, f = 1.0 MHz)	C _{cb}	–	6.0	pF
Emitter–Base Capacitance (V _{EB} = 0.5 V, f = 1.0 MHz)	C _{eb}	–	80	pF

3. Pulse Test: Pulse Width = 300 µs, Duty Cycle = 2.0%.

MMBT6517L, NSVMMBT6517L

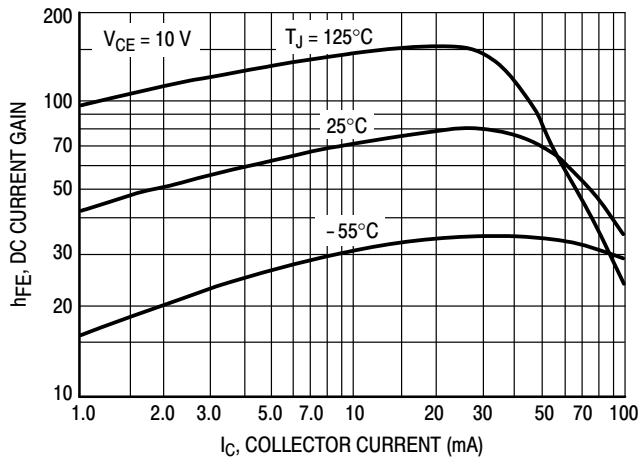


Figure 1. DC Current Gain

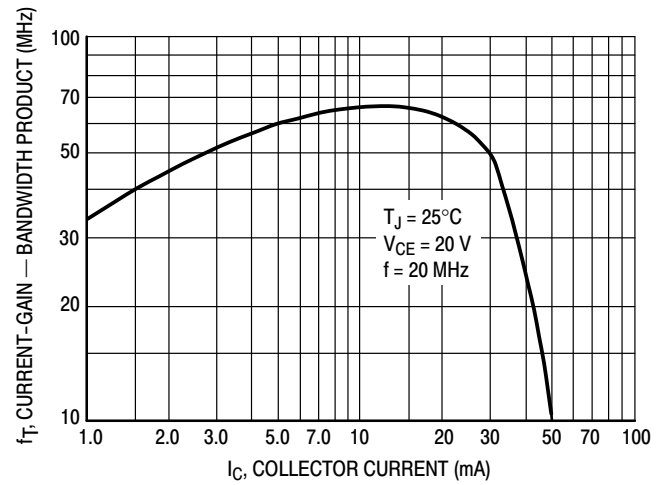


Figure 2. Current-Gain — Bandwidth Product

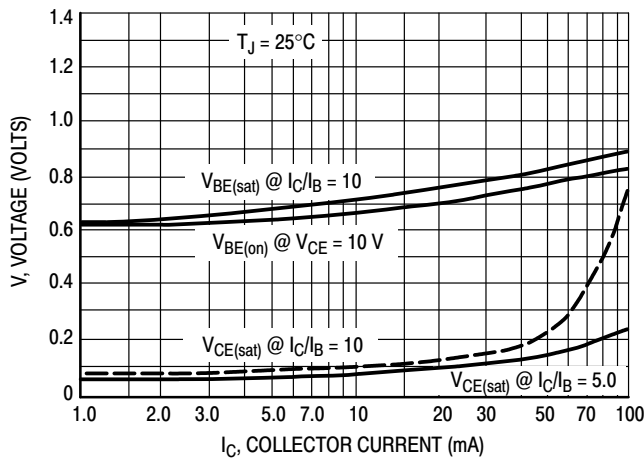


Figure 3. "On" Voltages

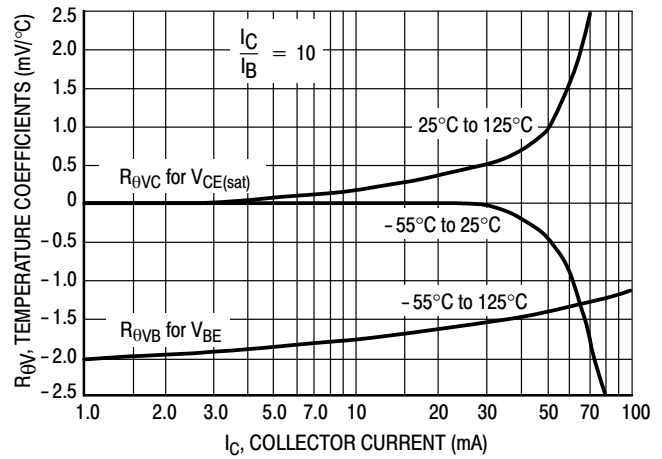


Figure 4. Temperature Coefficients

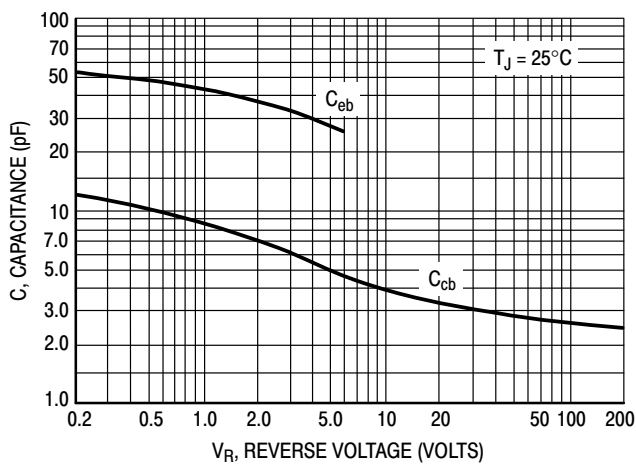


Figure 5. Capacitance

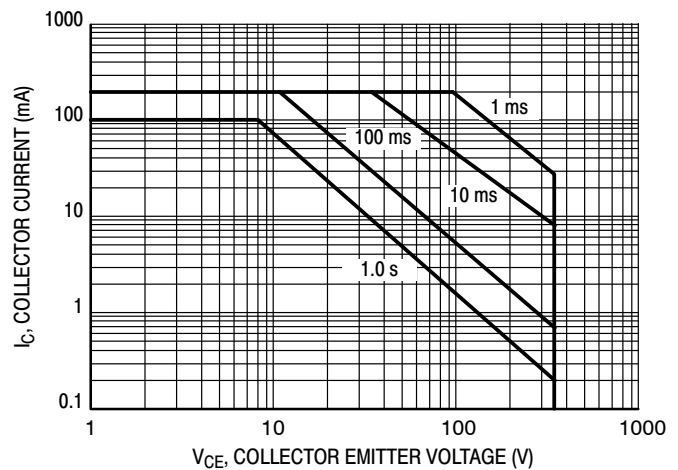


Figure 6. Safe Operating Area

MMBT6517L, NSVMMBT6517L

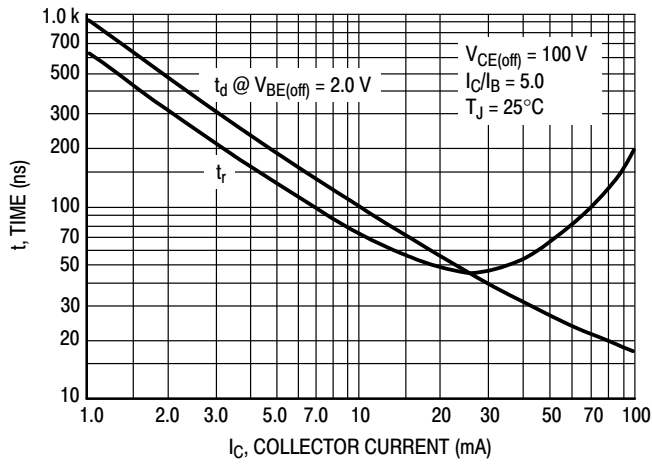


Figure 7. Turn-On Time

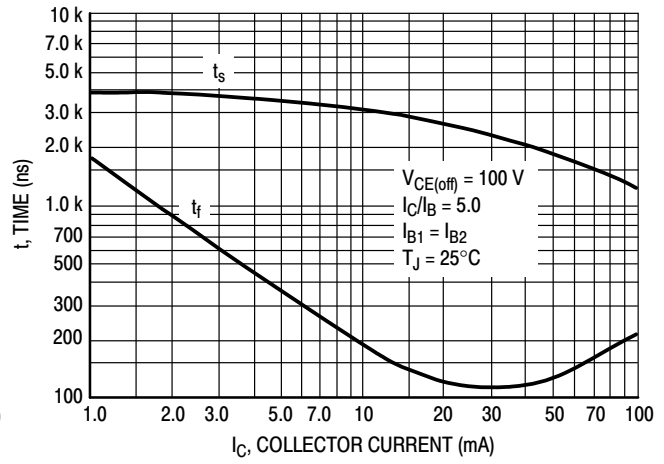


Figure 8. Turn-Off Time

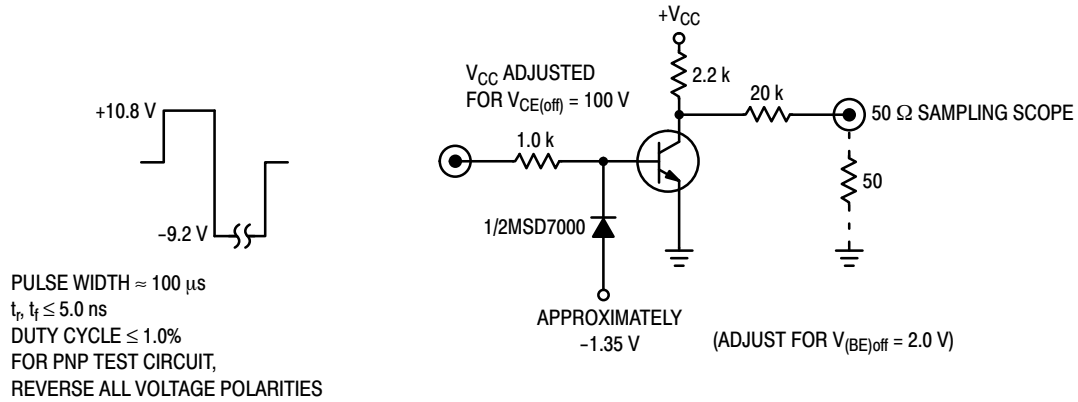


Figure 9. Switching Time Test Circuit

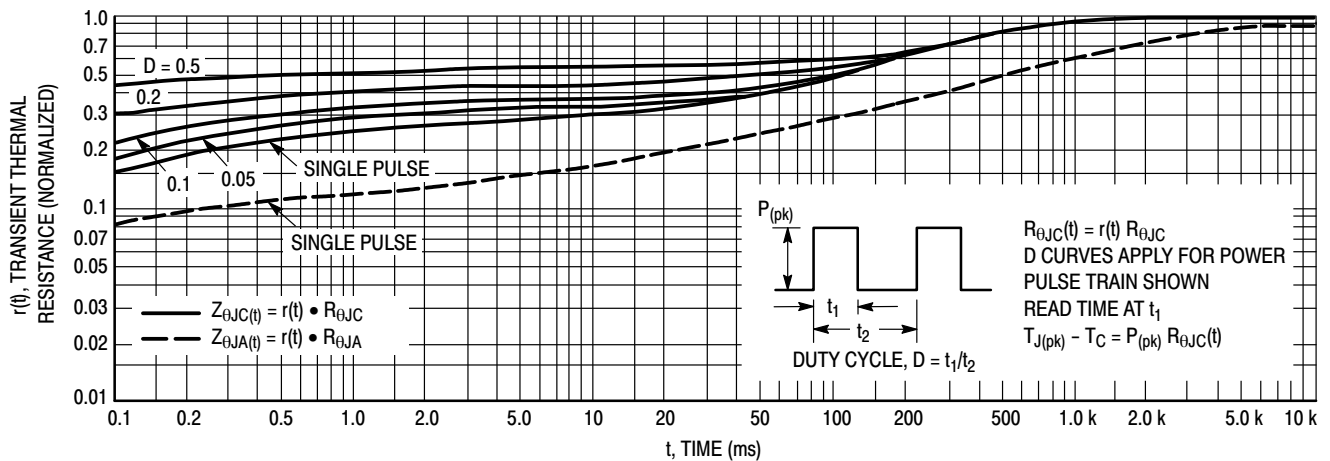


Figure 10. Thermal Response

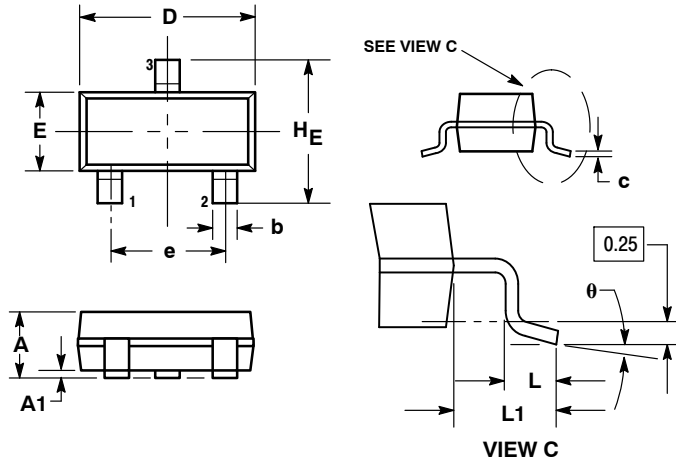
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PACKAGE DIMENSIONS

SOT-23 (TO-236)

CASE 318-08

ISSUE AP



NOTES:

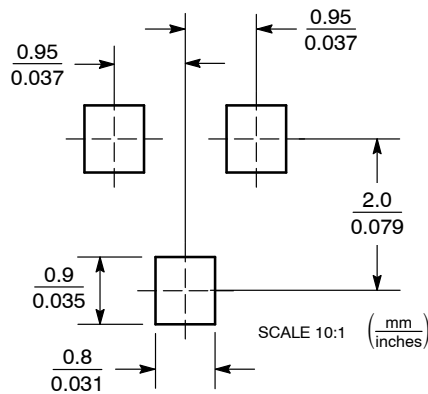
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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
θ	0°	---	10°	0°	---	10°


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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