MMBT6520L, NSVMMBT6520L

High Voltage Transistor

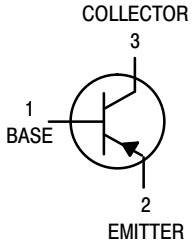
PNP Silicon

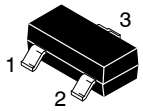
ON Semiconductor®

http://onsemi.com

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





SOT−23 (TO−236)
CASE 318
STYLE 6

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CEO}	−350	Vdc
Collector − Base Voltage	V_{CBO}	−350	Vdc
Emitter − Base Voltage	V_{EBO}	−5.0	Vdc
Base Current	I_B	−250	mA
Collector Current − Continuous	I_C	−500	mAdc

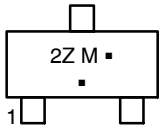
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board, (Note 1) T_A = 25°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2) T_A = 25°C Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	417	°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.

1. FR−5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

MARKING DIAGRAM



2Z = 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†
MMBT6520LT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
MMBT6520LT3G	SOT−23 (Pb−Free)	10,000 / Tape & Reel
NSVMMBT6520LT1G	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.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage (I_C = −1.0 mA)	$V_{(BR)CEO}$	−350	−	Vdc
Collector−Base Breakdown Voltage (I_C = −100 μA)	$V_{(BR)CBO}$	−350	−	Vdc
Emitter−Base Breakdown Voltage (I_E = −10 μA)	$V_{(BR)EBO}$	−5.0	−	Vdc
Collector Cutoff Current (V_{CB} = −250 V)	I_{CBO}	−	−50	nA
Emitter Cutoff Current (V_{EB} = −4.0 V)	I_{EBO}	−	−50	nA
ON CHARACTERISTICS				
DC Current Gain	h_{FE}			−
(I_C = −1.0 mA, V_{CE} = −10 V)		20	−	
(I_C = −10 mA, V_{CE} = −10 V)		30	−	
(I_C = −30 mA, V_{CE} = −10 V)		30	200	
(I_C = −50 mA, V_{CE} = −10 V)		20	200	
(I_C = −100 mA, V_{CE} = −10 V)		15	−	
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
(I_C = −10 mA, I_B = −1.0 mA)		−	−0.30	
(I_C = −20 mA, I_B = −2.0 mA)		−	−0.35	
(I_C = −30 mA, I_B = −3.0 mA)		−	−0.50	
(I_C = −50 mA, I_B = −5.0 mA)		−	−1.0	
Base−Emitter Saturation Voltage	$V_{BE(sat)}$			Vdc
(I_C = −10 mA, I_B = −1.0 mA)		−	−0.75	
(I_C = −20 mA, I_B = −2.0 mA)		−	−0.85	
(I_C = −30 mA, I_B = −3.0 mA)		−	−0.90	
Base−Emitter On Voltage (I_C = −100 mA, V_{CE} = −10 V)	$V_{BE(on)}$	−	−2.0	Vdc
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}	−	100	pF

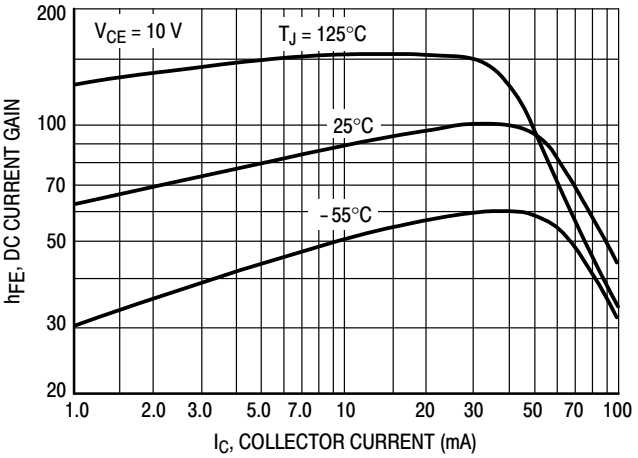


Figure 1. DC Current Gain

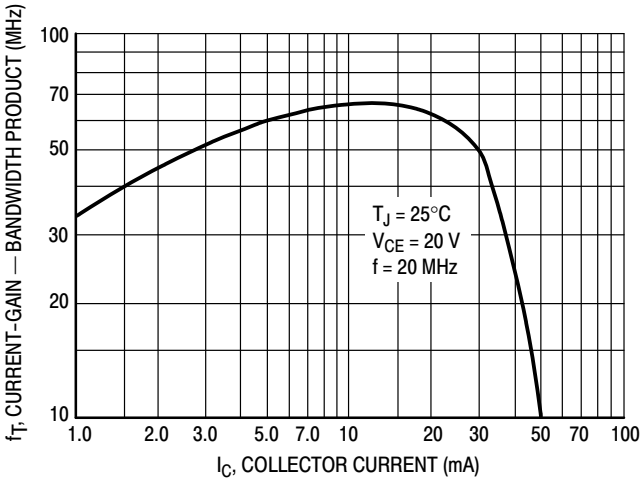


Figure 2. Current−Gain — Bandwidth Product

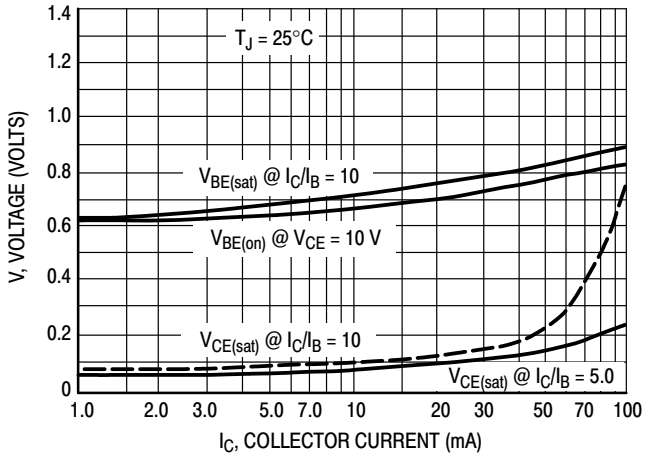


Figure 3. “On” Voltages

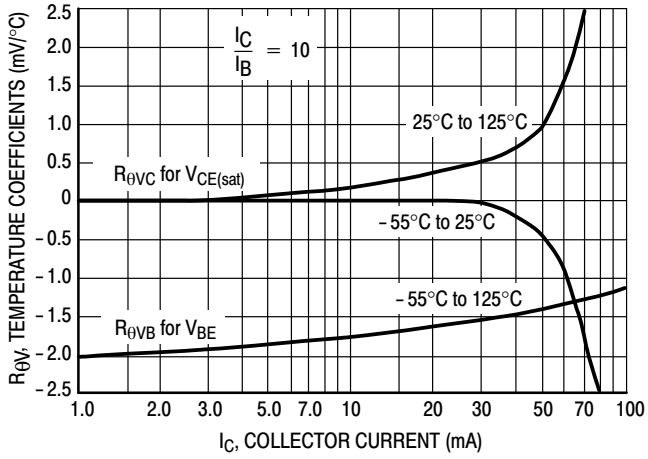


Figure 4. Temperature Coefficients

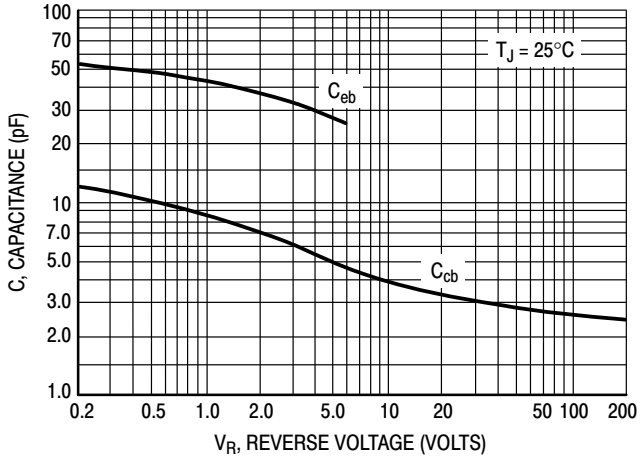


Figure 5. Capacitance

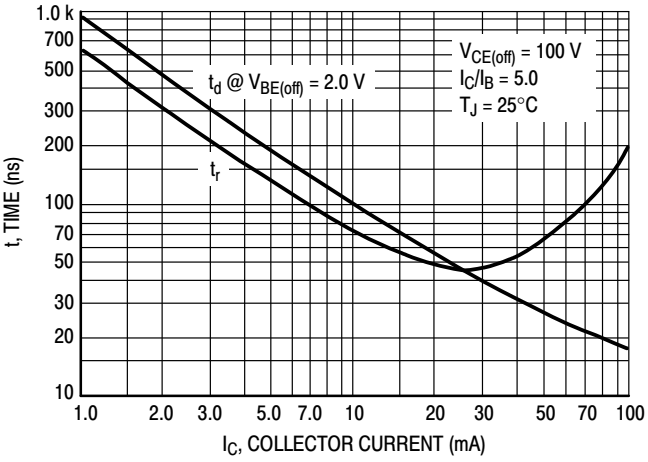


Figure 6. Turn−On Time

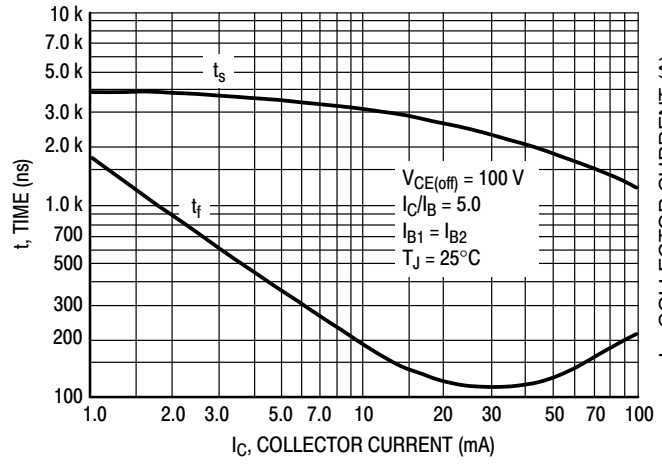


Figure 7. Turn−Off Time

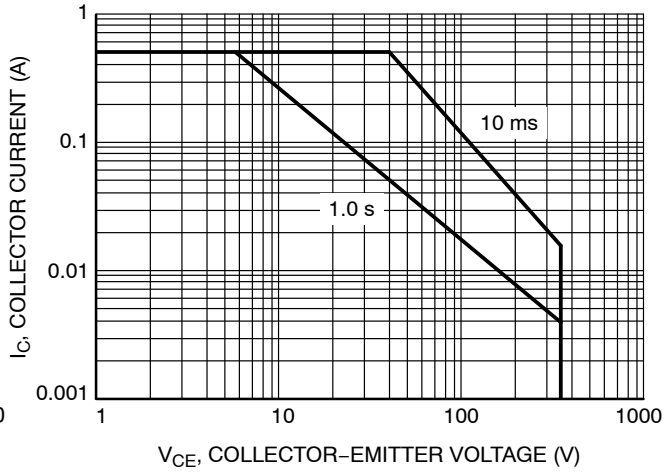


Figure 8. Safe Operating Area

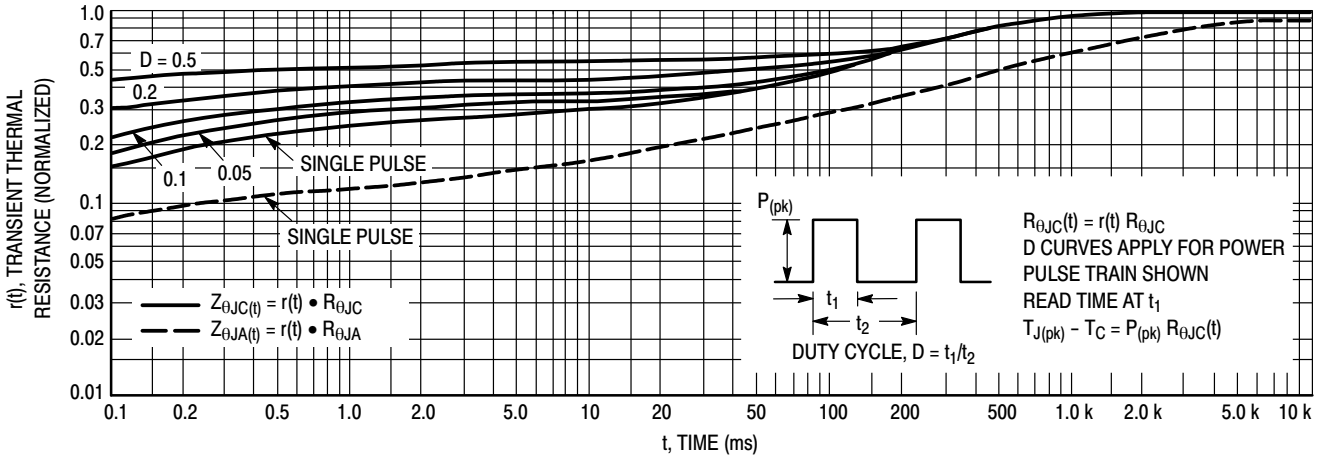


Figure 9. Thermal Response

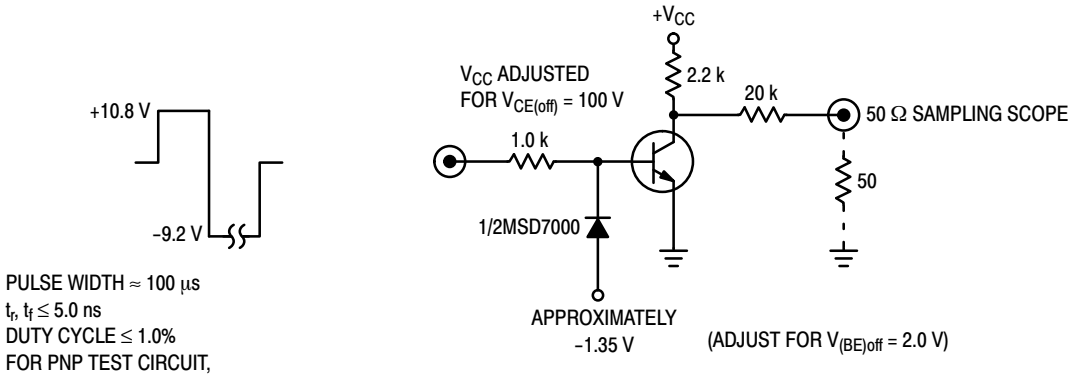
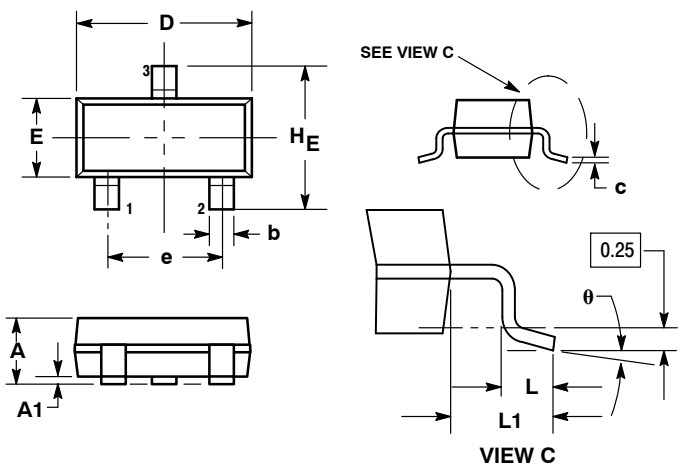


Figure 10. Switching Time Test Circuit

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

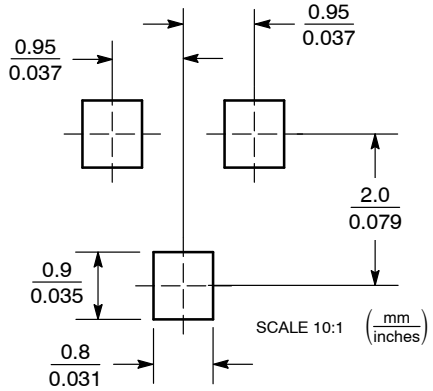


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	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
H_E	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	---	10°	0°	---	10°

STYLE 6:
PIN 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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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