

# High Voltage Transistors

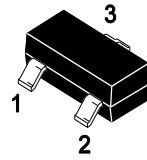
## NPN Silicon

We declare that the material of product compliance with RoHS requirements.

### Ordering Information

Device	Marking	Shipping
MBT6517 S-MBT6517	1Z	3000/Tape&Reel

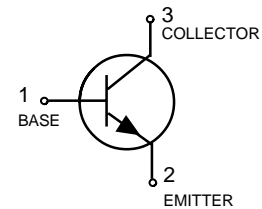
**MBT6517**  
**S-MBT6517**



SOT23

### 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	mAdc
Collector Current — Continuous	$I_C$	500	mAdc



### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Derate above $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above $25^\circ\text{C}$		2.4	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	$^\circ\text{C}$

### DEVICE MARKING

(S-)MBT6517 G= 1Z

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 1.0 \text{ mAdc}$ )	$V_{(BR)CEO}$	350	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}$ )	$V_{(BR)CBO}$	350	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}$ )	$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = 250\text{Vdc}$ )	$I_{CBO}$	—	50	nAdc
Emitter Cutoff Current ( $V_{EB} = 5.0\text{Vdc}$ )	$I_{EBO}$	—	50	nAdc



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

Characteristic	Symbol	Min	Max	Unit
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**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 30\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 50\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 100\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	20 30 30 20 15	— — 200 200 —	—
Collector–Emitter Saturation Voltage(3) ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ ) ( $I_C = 20\text{ mAdc}$ , $I_B = 2.0\text{ mAdc}$ ) ( $I_C = 30\text{ mAdc}$ , $I_B = 3.0\text{ mAdc}$ ) ( $I_C = 50\text{ mAdc}$ , $I_B = 5.0\text{ mAdc}$ )	$V_{CE(sat)}$	— — — —	0.30 0.35 0.50 1.0	Vdc
Base – Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ ,) ( $I_C = 20\text{ mAdc}$ , $I_B = 2.0\text{ mAdc}$ ,) ( $I_C = 30\text{ mAdc}$ , $I_B = 3.0\text{ mAdc}$ ,)	$V_{BE(sat)}$	— — —	0.75 0.85 0.90	Vdc
Base–Emitter On Voltage ( $I_C = 100\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$V_{BE(on)}$	—	2.0	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

Current Gain–Bandwidth Product ( $V_{CE} = 20\text{ Vdc}$ , $I_C = 10\text{ mAdc}$ , $f = 20\text{ MHz}$ )	$f_T$	40	200	MHz
Collector –Base Capacitance ( $V_{CB} = 20\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )	$C_{cb}$	—	6.0	pF
Emitter –Base Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )	$C_{eb}$	—	80	pF

3. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.



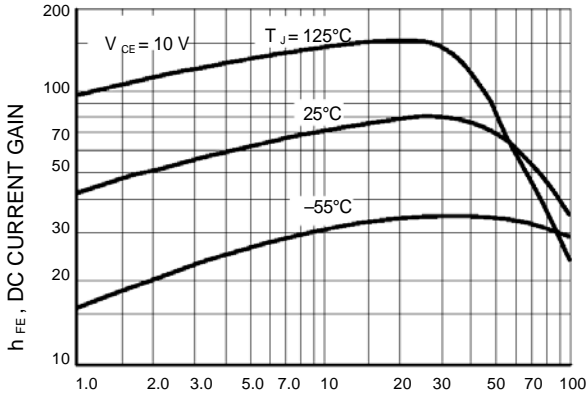


Figure 1. DC Current Gain

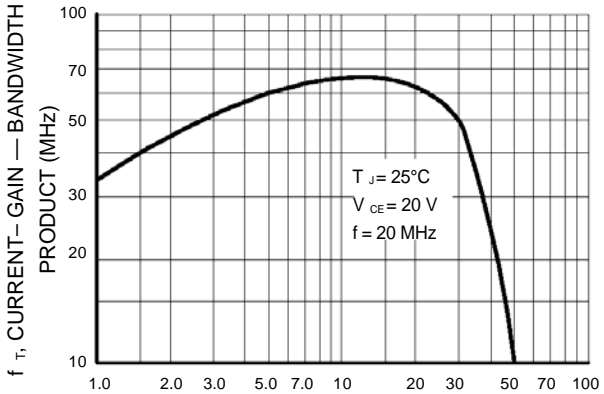


Figure 2. Current-Gain — Bandwidth Product

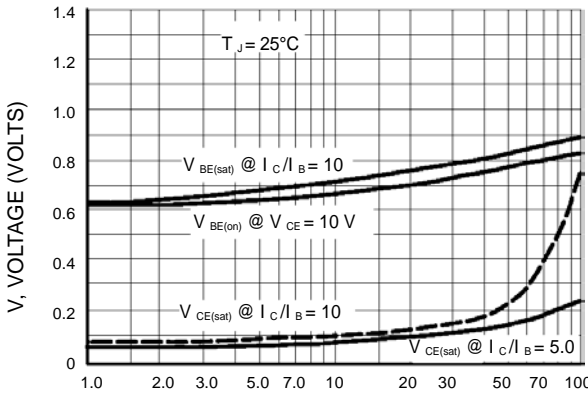


Figure 3. "On" Voltages

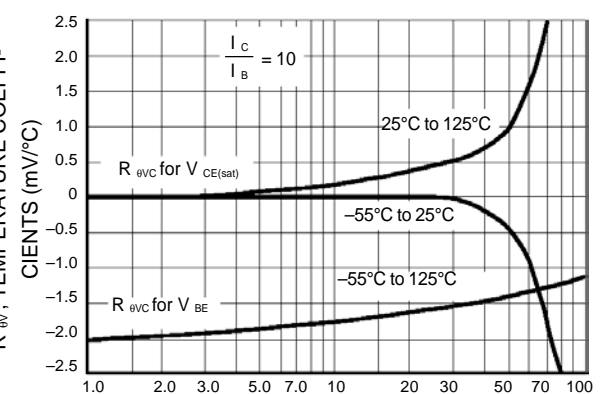


Figure 4. Temperature Coefficients

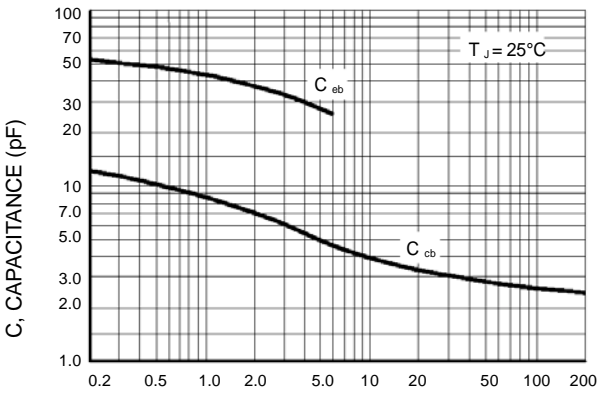
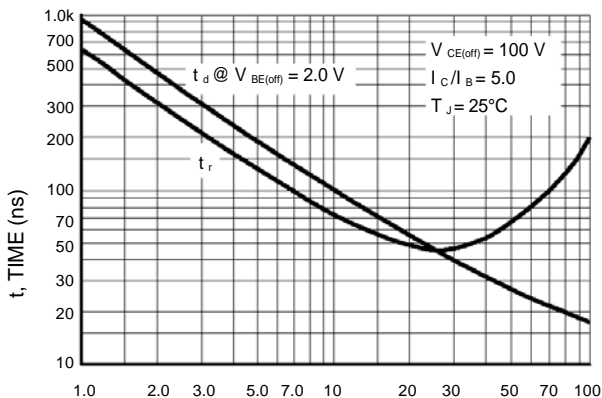


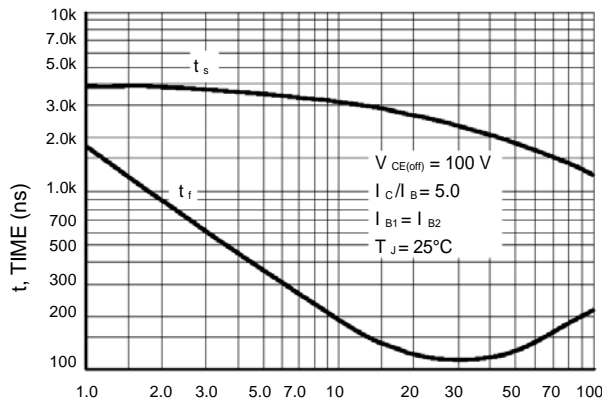
Figure 5. Capacitance





$I_C$ , COLLECTOR CURRENT (mA)

Figure 6. Turn-On Time



$I_C$ , COLLECTOR CURRENT (mA)

Figure 7. Turn-Off Time

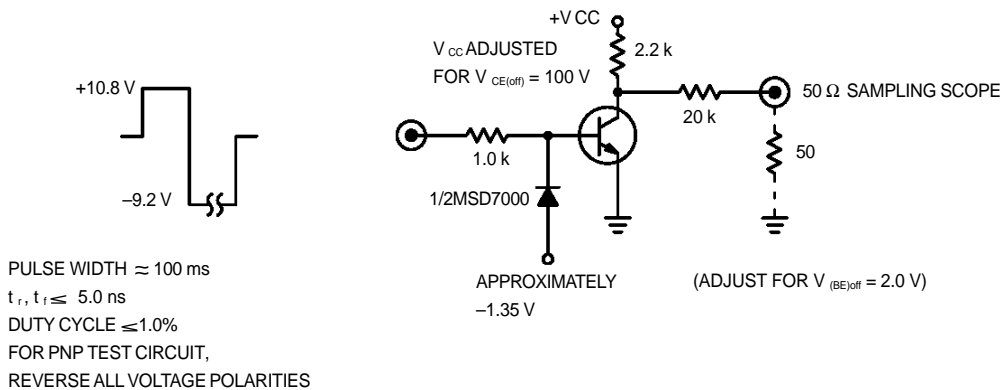


Figure 8. Switching Time Test Circuit

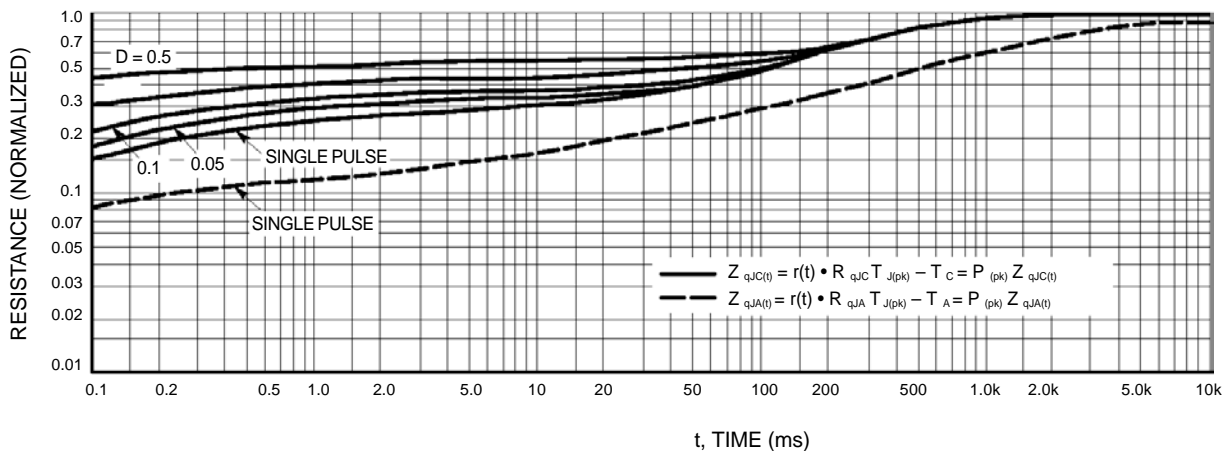
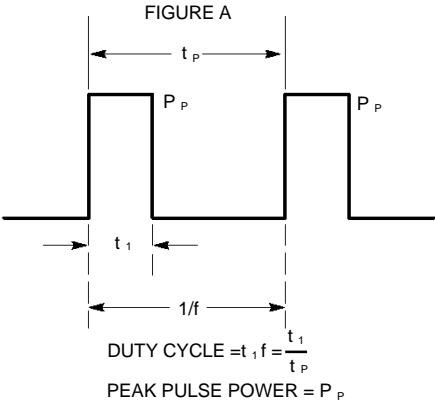


Figure 9. Thermal Response

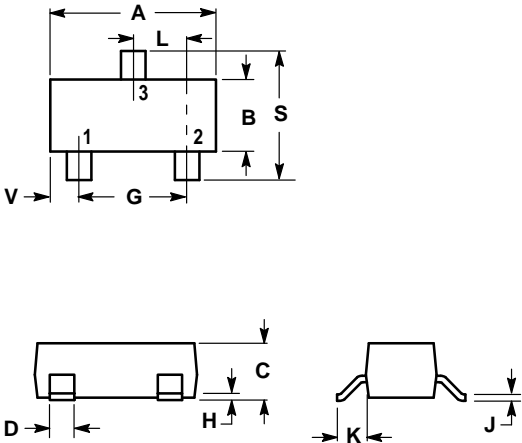




**Design Note: Use of Transient Thermal Resistance Data**



**SOT-23**



**NOTES:**

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE
- 2. EMITTER
- 3. COLLECTOR

