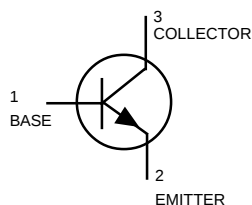


High Voltage Transistors

NPN Silicon



MMBT6517LT1



CASE 318-08, STYLE 6
SOT-23 (TO-236AB)

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, (1) $T_A = 25^\circ\text{C}$	P_D	225	mW
Derate above 25°C		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	P_D	300	mW
Derate above 25°C		2.4	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	$^\circ\text{C}$

DEVICE MARKING

MMBT6517LT1 = 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

1. FR-5 = $1.0 \times 0.75 \times 0.062 \text{ in.}$

2. Alumina = $0.4 \times 0.3 \times 0.024 \text{ in.}$ 99.5% alumina.

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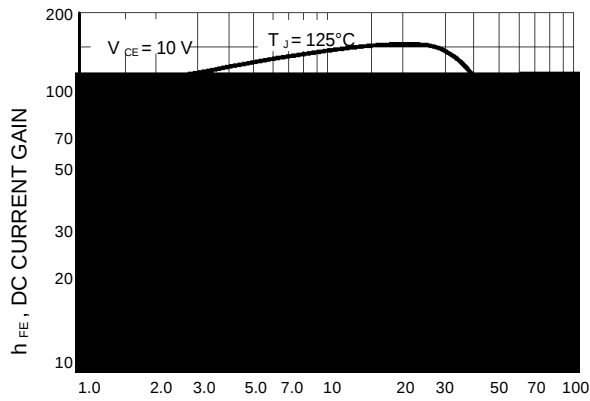
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
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

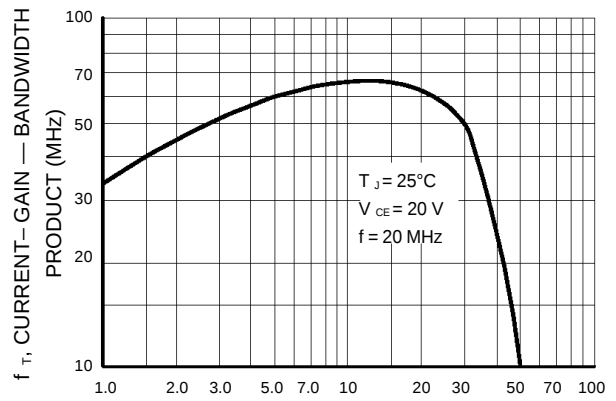
SMALL–SIGNAL CHARACTERISTICS

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

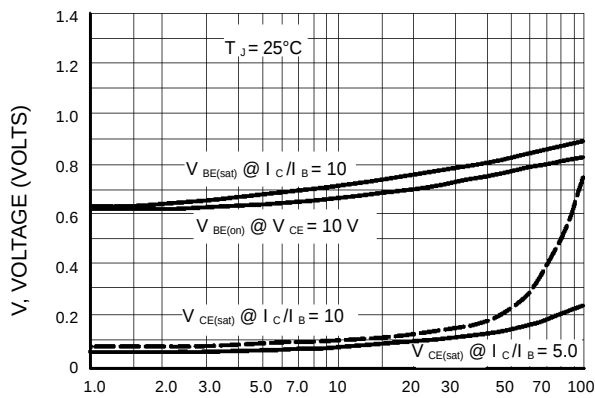
3. Pulse Test: Pulse Width = 300 μs , Duty Cycle = 2.0%.



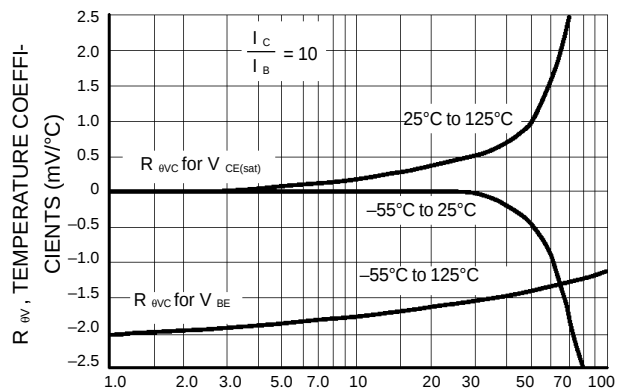
I_C , COLLECTOR CURRENT (mA)
Figure 1. DC Current Gain



I_C , COLLECTOR CURRENT (mA)
Figure 2. Current-Gain — Bandwidth Product



I_C , COLLECTOR CURRENT (mA)
Figure 3. "On" Voltages



I_C , COLLECTOR CURRENT (mA)
Figure 4. Temperature Coefficients

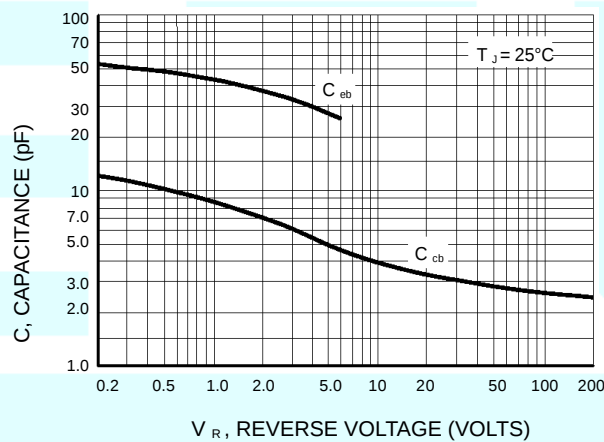
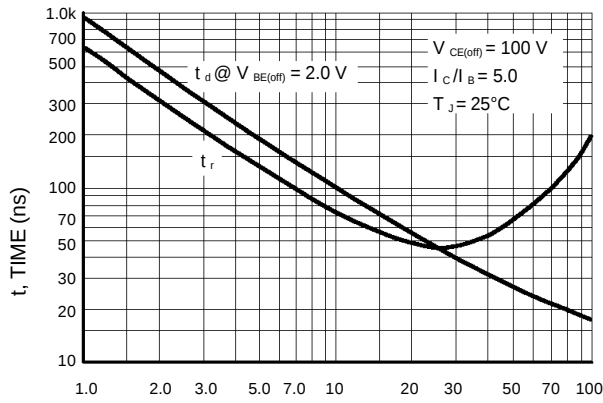
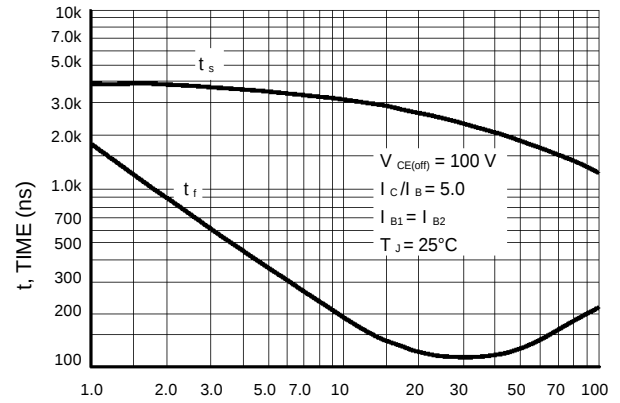


Figure 5. Capacitance

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I_C , COLLECTOR CURRENT (mA)
Figure 6. Turn-On Time



I_C , COLLECTOR CURRENT (mA)
Figure 7. Turn-Off Time

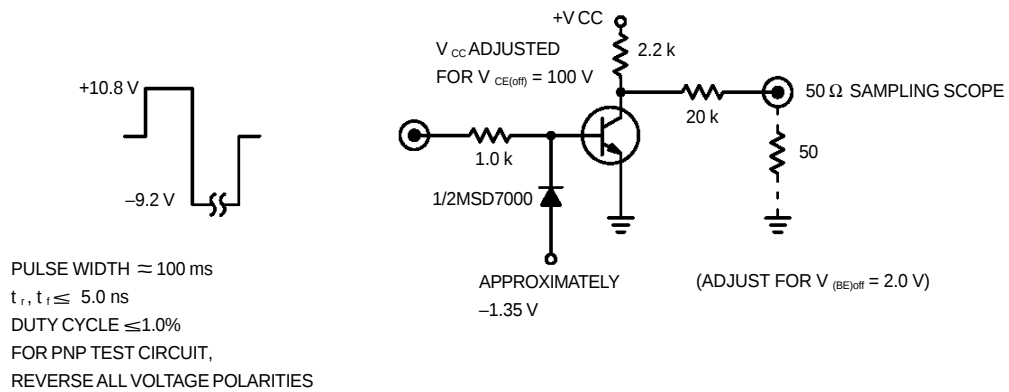


Figure 8. Switching Time Test Circuit

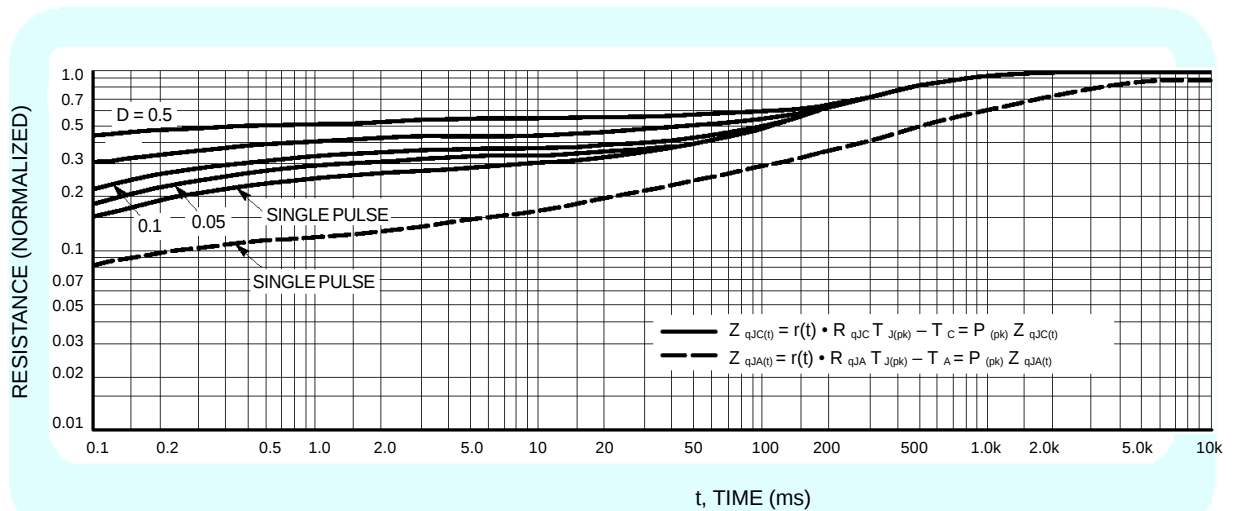
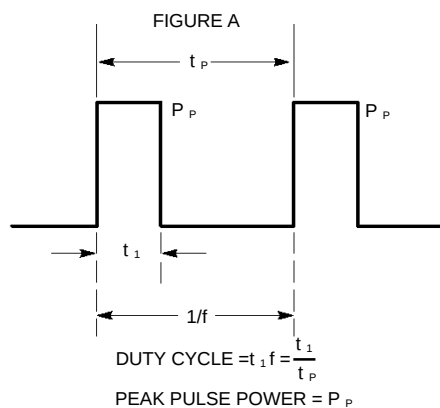


Figure 9. Thermal Response



Design Note: Use of Transient Thermal Resistance Data