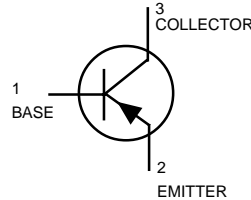


Switching Transistor

PNP Silicon



MMBT3640LT1



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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	-12	Vdc
Collector–Base Voltage	V_{CBO}	-12	Vdc
Emitter–Base Voltage	V_{EBO}	-4.0	Vdc
Collector Current — Continuous	I_C	-80	mAdc

THERMAL CHARACTERISTICS

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

DEVICE MARKING

MMBT3640LT1 = 2J

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 ($I_C = -100 \mu\text{Adc}, V_{BE} = 0$)	$V_{(BR)CES}$	-12	—	Vdc
Collector–Emitter Sustaining Voltage(1) ($I_C = -10 \text{ mAdc}, I_B = 0$)	$V_{CEO(sus)}$	-12	—	Vdc
Collector–Base Breakdown Voltage ($I_C = -100 \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	-12	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = -100 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	-4.0	—	Vdc
Collector Cutoff Current ($V_{CE} = -6.0\text{Vdc}, V_{BE} = 0$) ($V_{CE} = -6.0\text{Vdc}, V_{BE} = 0, T_A = 65^\circ\text{C}$)	I_{CES}	—	-0.01 -1.0	μAdc
Base Current Current ($V_{CE} = -6.0\text{Vdc}, V_{EB} = 0$)	I_B	—	-10	nAdc

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.

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain (I _C = -10mA, V _{CE} = -0.3 Vdc) (I _C = -50mA, V _{CE} = -1.0 Vdc)	h _{FE}	30 20	120 —	—
Collector–Emitter Saturation Voltage (I _C = -10mA, I _B = -1.0 mA) (I _C = -50 mA, I _B = -5.0 mA) (I _C = -10 mA, I _B = -1.0 mA, T _A = 65°C)	V _{CE(sat)}	— — —	-0.2 -0.6 -0.25	Vdc
Base–Emitter Saturation Voltage (I _C = -10mA, I _B = -0.5 mA) (I _C = -10mA, I _B = -1.0 mA) (I _C = -50mA, I _B = -5.0 mA)	V _{BE(sat)}	-0.75 -0.8 —	-0.95 -1.0 -1.5	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product(3),(4) (I _C = -10mA, V _{CE} = -5.0Vdc, f = 100MHz)	f _T	500	—	MHz
Output Capacitance (V _{CB} = -5.0Vdc, I _E = 0, f = 1.0 MHz)	C _{obo}	—	3.5	pF
Input Capacitance (V _{EB} = -0.5Vdc, I _C = 0, f = 1.0 MHz)	C _{ibo}	—	3.5	pF

SWITCHING CHARACTERISTICS

Delay Time (V _{CC} = -6.0 Vdc, V _{EB(off)} = -1.9Vdc, I _C = -50 mA, I _{B1} = -5.0 mA)	t _d	—	10	ns
Rise Time (V _{CC} = -6.0 Vdc, I _C = -50 mA, I _{B1} = -5.0 mA)	t _r	—	30	ns
Storage Time (V _{CC} = -6.0 Vdc, I _C = -50 mA, I _{B1} = -5.0 mA)	t _s	—	20	ns
Fall Time (I _C = -50 mA, I _{B1} = I _{B2} = -5.0 mA)	t _f	—	12	ns
Turn–On Time (V _{CC} = -6.0 Vdc, I _C = -50 mA, V _{EB(off)} = -1.9Vdc, I _{B1} = -5.0 mA) (V _{CC} = -1.5 Vdc, I _C = -10 mA, I _{B1} = -5.0 mA)	t _{on}	— —	25 60	ns
Turn–Off Time (V _{CC} = -6.0 Vdc, I _C = -50 mA, V _{EB(off)} = -1.9Vdc, I _{B1} = I _{B2} = -5.0 mA) (V _{CC} = -1.5 Vdc, I _C = -10 mA, I _{B1} = I _{B2} = -0.5 mA)	t _{off}	— —	35 75	ns

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

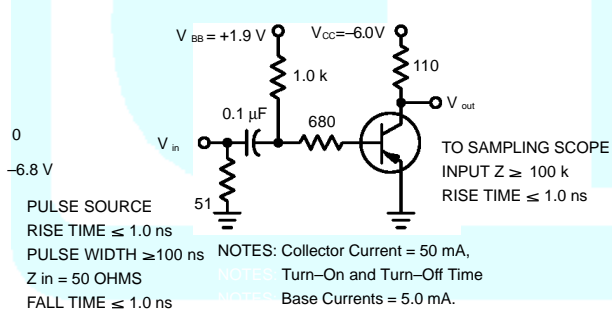


Figure 1.

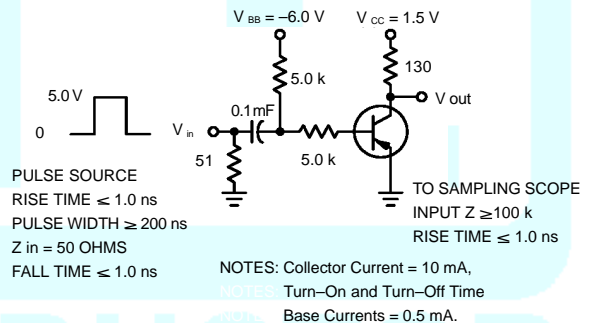


Figure 2.

MMBT3640LT1

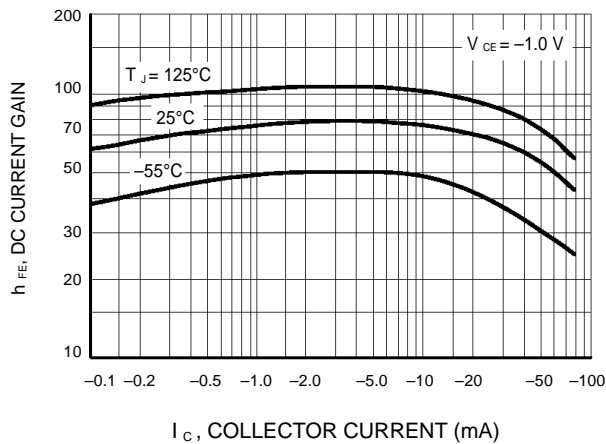


Figure 3. DC Current Gain

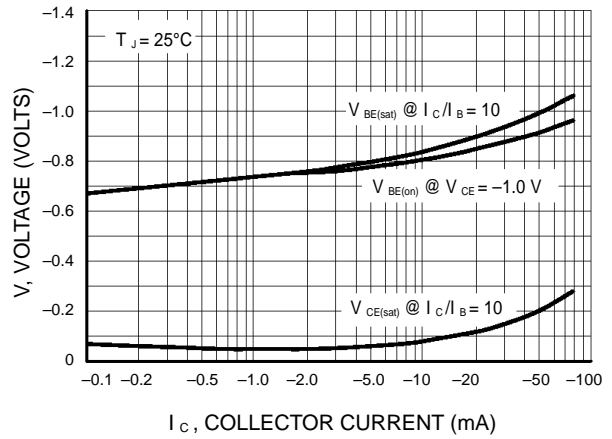


Figure 4. "On" Voltages

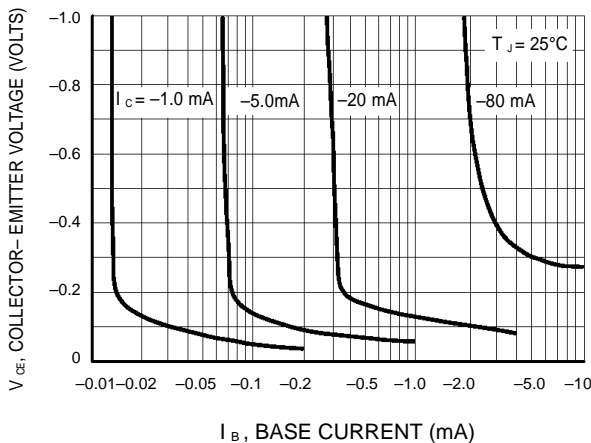


Figure 5. Collector Saturation Region

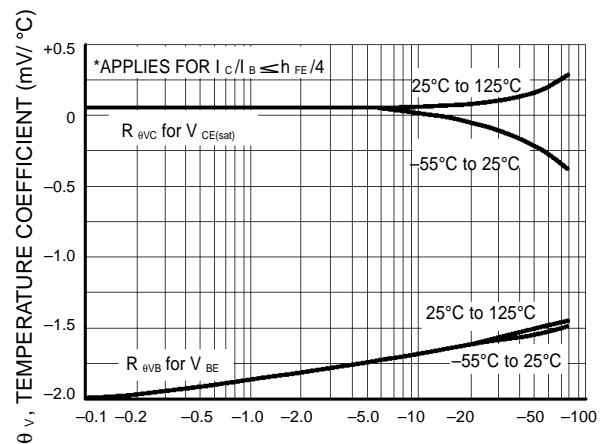


Figure 6. Temperature Coefficients

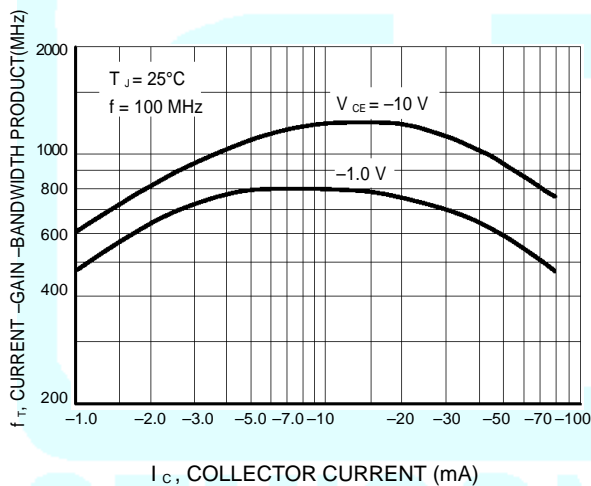


Figure 7. Current-Gain — Bandwidth Product

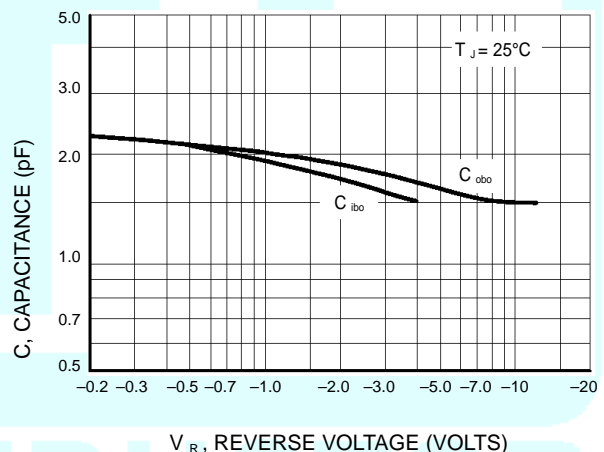


Figure 8. Capacitance