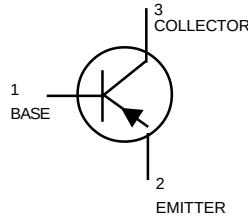


High Voltage Transistor

PNP Silicon



MMBT5401LT1



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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	- 150	Vdc
Collector-Base Voltage	V_{CBO}	- 160	Vdc
Emitter-Base Voltage	V_{EBO}	- 5.0	Vdc
Collector Current — Continuous	I_C	- 500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR- 5 Board (1) $T_A = 25^\circ\text{C}$ 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, (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}	-55to+150	$^\circ\text{C}$

DEVICE MARKING

MMBT5401LT1=2L

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = -1.0\text{ mAdc}, I_E = 0$)	$V_{(BR)CEO}$	- 150	—	Vdc
Collector-Base Breakdown Voltage ($I_C = -100\text{ }\mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	- 160	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = -10\text{ }\mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ($V_{CB} = -120\text{ Vdc}, I_E = 0$) ($V_{CB} = -120\text{ Vdc}, I_E = 0, T_A = 100^\circ\text{C}$)	I_{CES}	— —	- 50 - 50	nAdc μAdc

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.

MMBT5401LT1
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (2)				
DC Current Gain ($I_C = -1.0\text{mA}$, $V_{CE} = -5.0\text{Vdc}$) ($I_C = -10\text{mA}$, $V_{CE} = -5.0\text{Vdc}$) ($I_C = -50\text{mA}$, $V_{CE} = -5.0\text{Vdc}$)	h_{FE}	50 60 50	— 240 —	—
Collector–Emitter Saturation Voltage ($I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$) ($I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$)	$V_{CE(sat)}$	— —	– 0.2 – 0.5	Vdc
Base–Emitter Saturation Voltage ($I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$) ($I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$)	$V_{BE(sat)}$	— —	– 1.0 – 1.0	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ($I_C = -10\text{mA}$, $V_{CE} = -10\text{Vdc}$, $f = 100\text{MHz}$)	f_T	100	300	MHz
Output Capacitance ($V_{CB} = -10\text{Vdc}$, $I_E = 0$, $f = 1.0\text{MHz}$)	C_{obo}	—	6.0	pF
Small–Signal Current Gain ($I_C = -1.0\text{mA}$, $V_{CE} = -10\text{Vdc}$, $f = 1.0\text{kHz}$)	h_{fe}	40	200	—
Noise Figure ($I_C = -200\mu\text{A}$, $V_{CE} = -5.0\text{Vdc}$, $R_S = 10\Omega$, $f = 1.0\text{kHz}$)	NF	—	8.0	dB

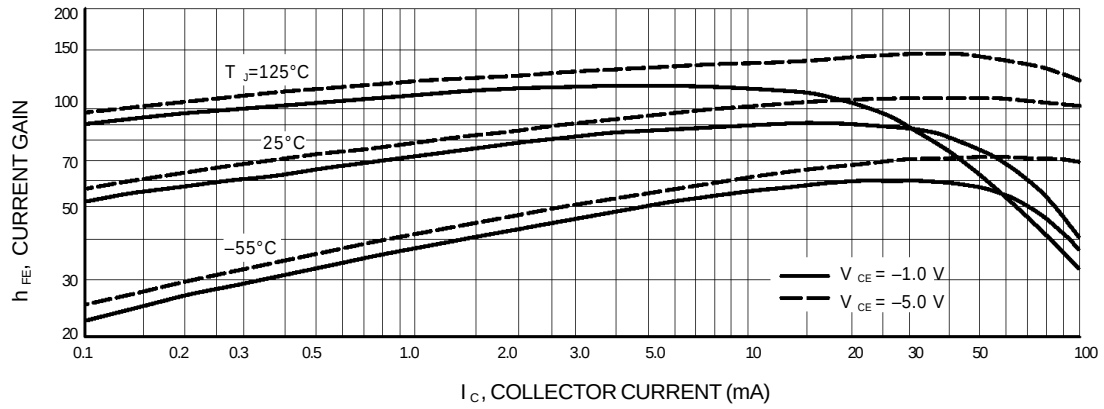


Figure 1. DC Current Gain

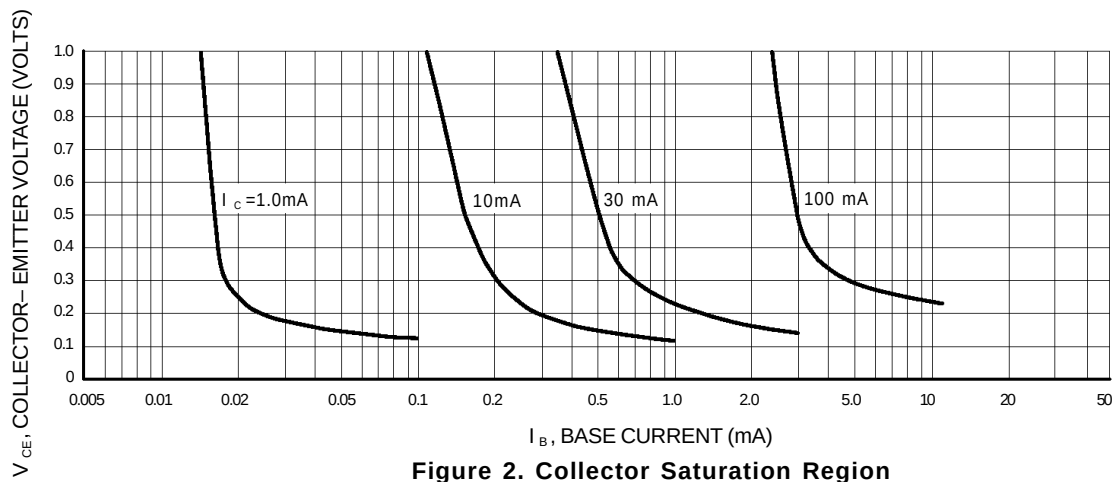


Figure 2. Collector Saturation Region

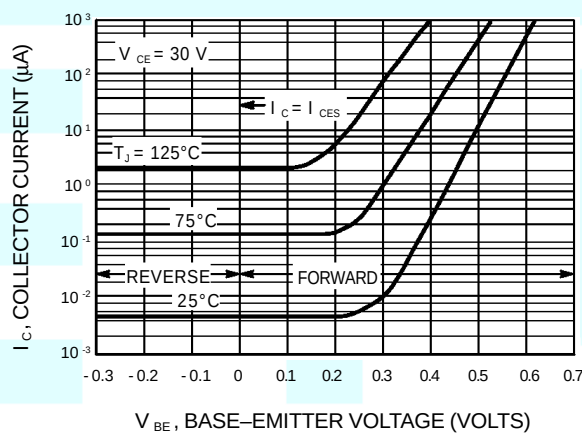


Figure 3. Collector Cut-Off Region

MMBT5401LT1

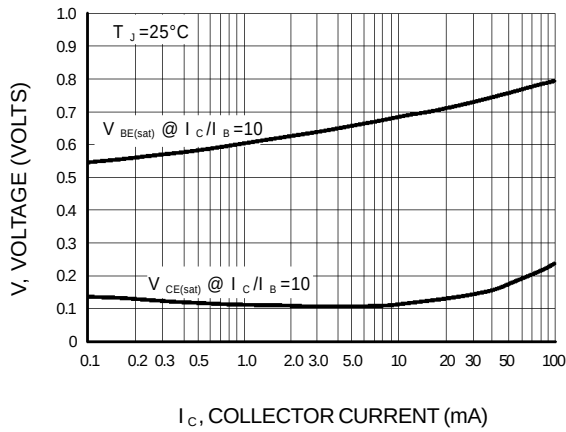


Figure 4. "On" Voltages

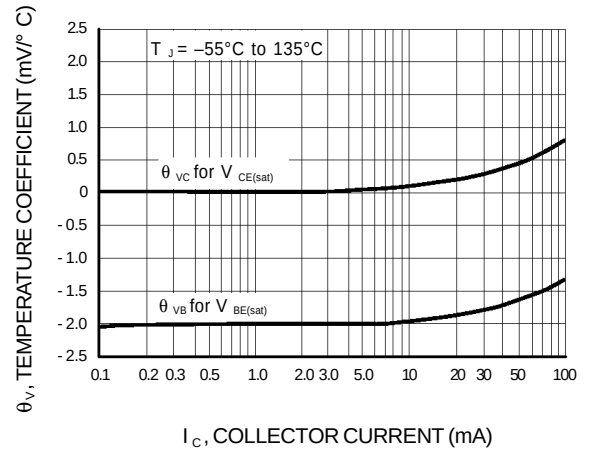


Figure 5. Temperature Coefficients

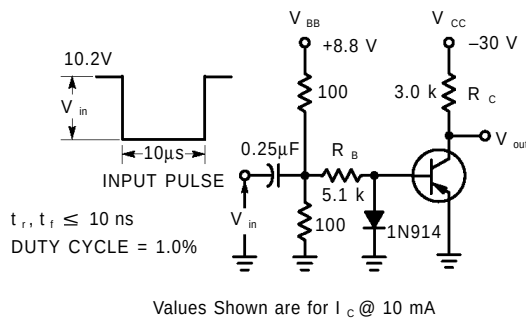


Figure 6. Switching Time Test Circuit

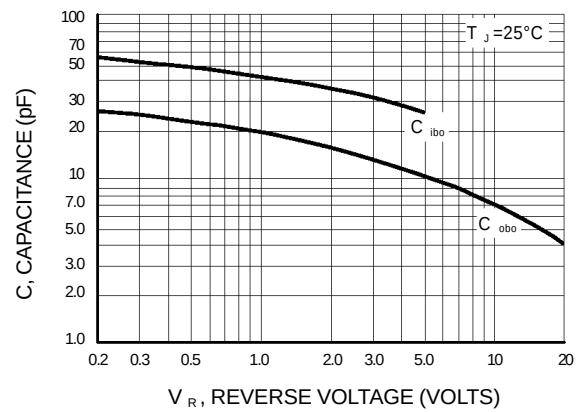


Figure 7. Capacitances

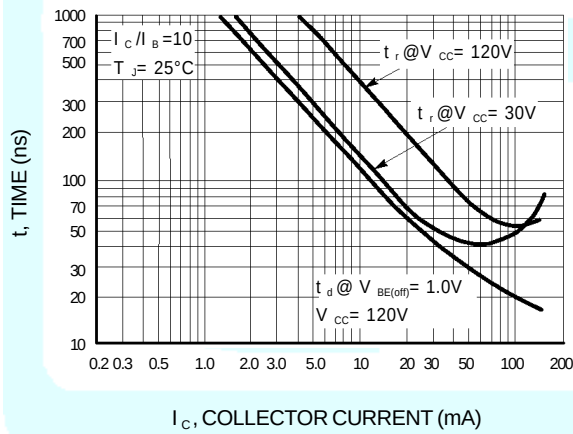


Figure 8. Turn-On Time

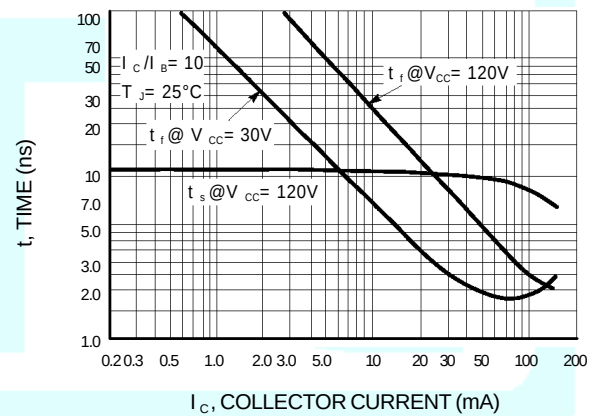


Figure 9. Turn-Off Time