

High Voltage Transistor

FEATURE

- **Pb-Free package is available**
 RoHS product for packing code suffix "G"
 Halogen free product for packing code suffix "H"

DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
MMBT5401LT1	2L	3000/Tape&Reel

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	mW 1.8 mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300	mW 2.4 mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55to+150	°C

DEVICE MARKING

MMBT5401LT1=2L

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

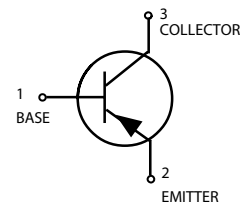
Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

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

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.



High Voltage Transistor

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (2)				
DC Current Gain	h_{FE}			—
($I_C = -1.0\text{mA}$, $V_{CE} = -5.0\text{Vdc}$)		50	—	
($I_C = -10\text{mA}$, $V_{CE} = -5.0\text{Vdc}$)		60	240	
($I_C = -50\text{mA}$, $V_{CE} = -5.0\text{Vdc}$)		50	—	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
($I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$)		—	-0.2	
($I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$)		—	-0.5	
Base–Emitter Saturation Voltage	$V_{BE(sat)}$			Vdc
($I_C = -10\text{mA}$, $I_B = -1.0\text{mA}$)		—	-1.0	
($I_C = -50\text{mA}$, $I_B = -5.0\text{mA}$)		—	-1.0	
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product	f_T			MHz
($I_C = -10\text{mA}$, $V_{CE} = -10\text{Vdc}$, $f = 100\text{MHz}$)		100	300	
Output Capacitance	C_{obo}			pF
($V_{CB} = -10\text{Vdc}$, $I_E = 0$, $f = 1.0\text{MHz}$)		—	6.0	
Small–Signal Current Gain	h_{fe}			—
($I_C = -1.0\text{mA}$, $V_{CE} = -10\text{Vdc}$, $f = 1.0\text{kHz}$)		40	200	
Noise Figure	NF			dB
($I_C = -200\mu\text{A}$, $V_{CE} = -5.0\text{Vdc}$, $R_s = 10\Omega$, $f = 1.0\text{kHz}$)		—	8.0	

High Voltage Transistor

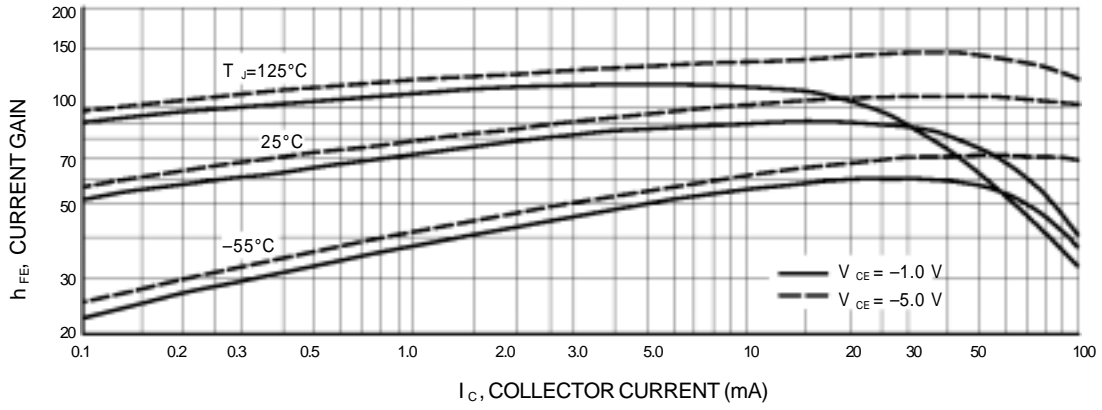


Figure 1. DC Current Gain

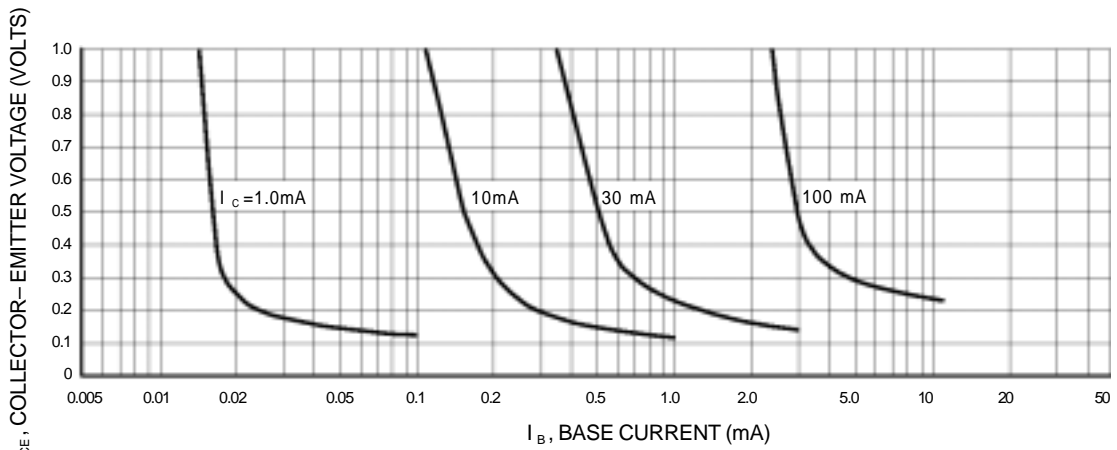


Figure 2. Collector Saturation Region

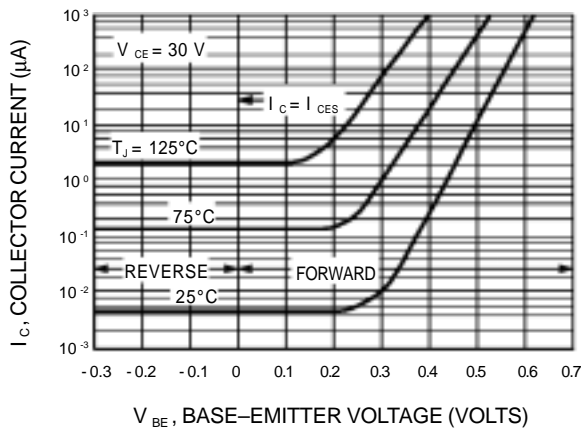


Figure 3. Collector Cut-Off Region

High Voltage Transistor

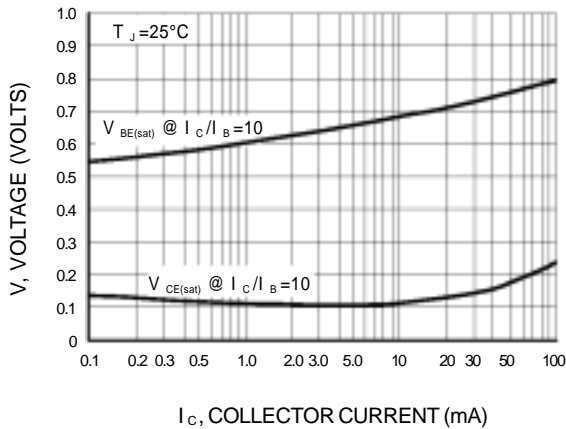


Figure 4. "On" Voltages

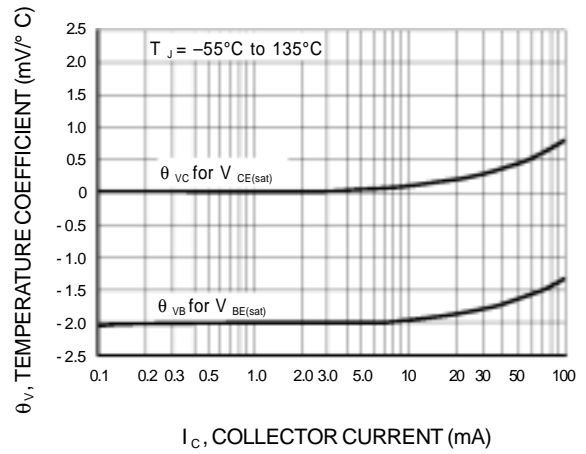


Figure 5. Temperature Coefficients

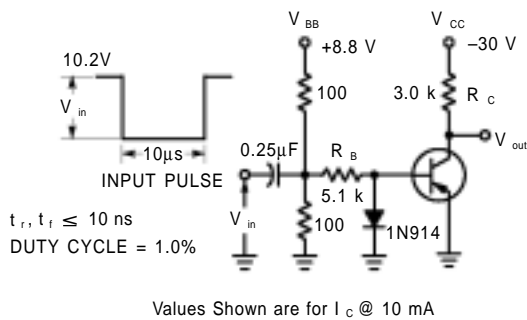


Figure 6. Switching Time Test Circuit

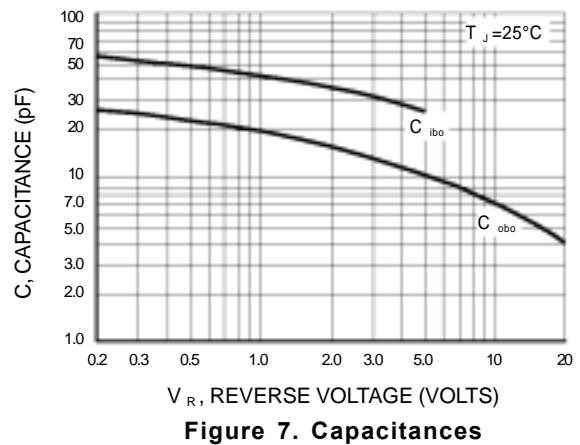


Figure 7. Capacitances

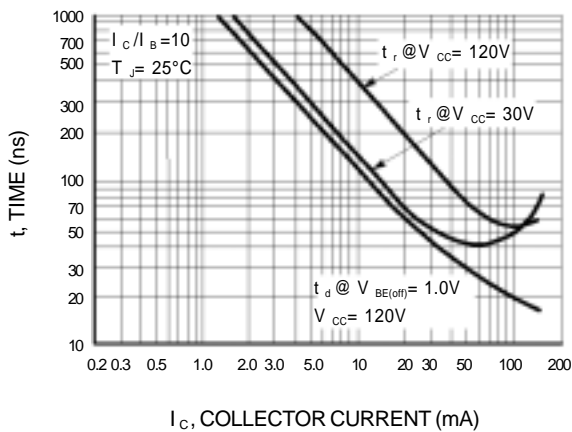


Figure 8. Turn-On Time

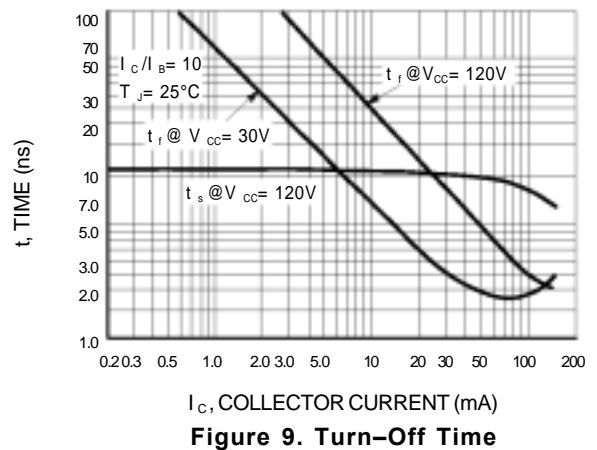
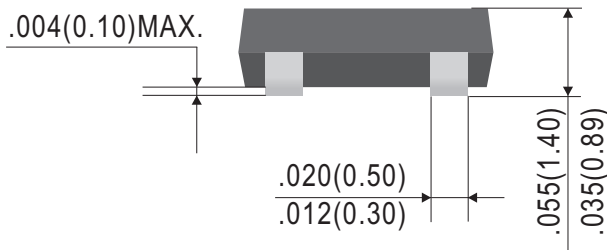
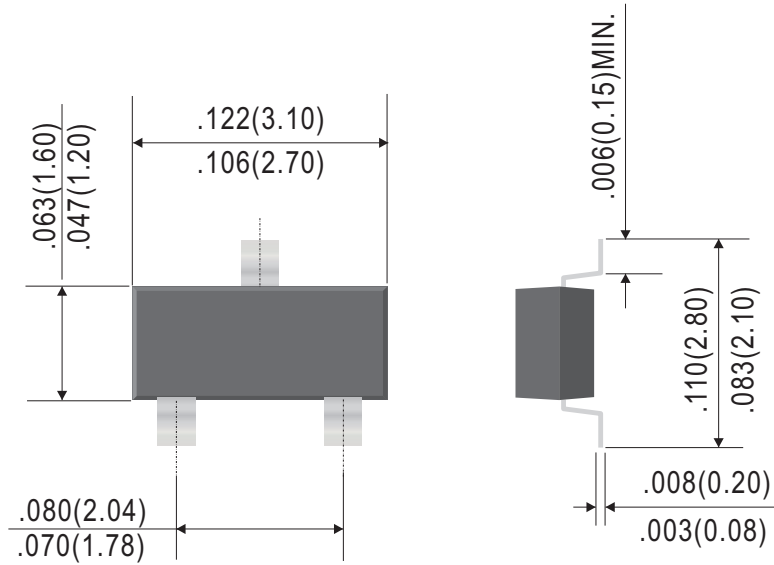


Figure 9. Turn-Off Time

High Voltage Transistor

SOT-23



Dimensions in inches and (millimeters)

