

High Voltage Transistor

Lead free product

Halogen-free type

FEATURE

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

MMBT5401GH



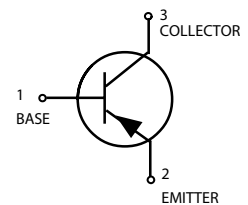
SOT-23

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
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	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	$T_{J, T_{stg}}$	–55to+150	$^\circ\text{C}$



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 ($V_{CB} = -120\text{ Vdc}$, $I_E = 0$) ($V_{CB} = -120\text{ Vdc}$, $I_E = 0$, $T_A = 100^\circ\text{C}$)	I_{CES}	—	– 50	nAdc 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.

MMBT5401GH
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	

Figure 1. DC Current Gain

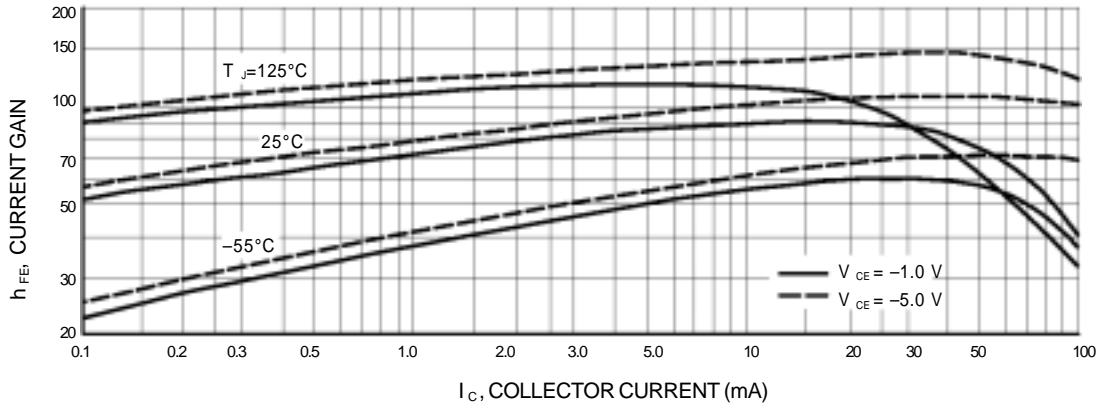


Figure 2. Collector Saturation Region

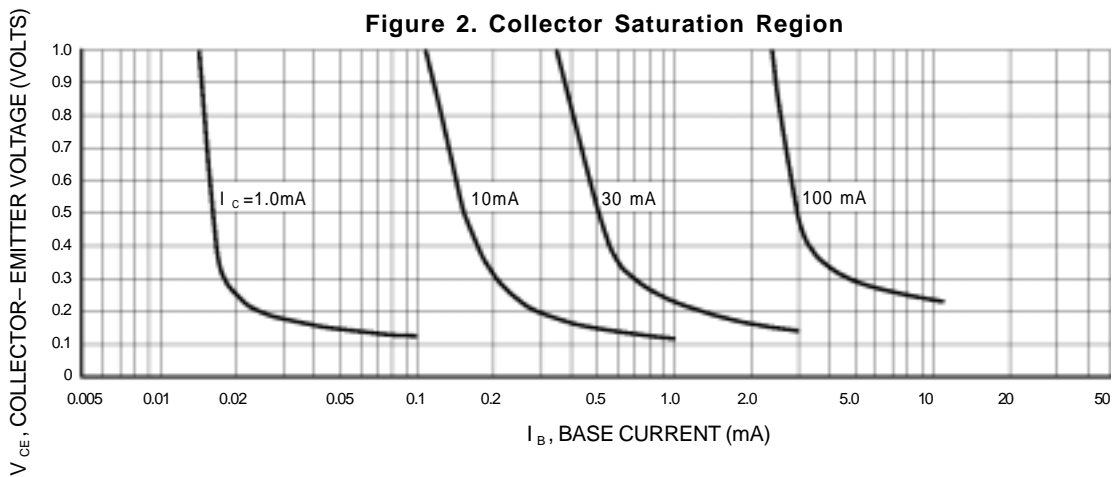
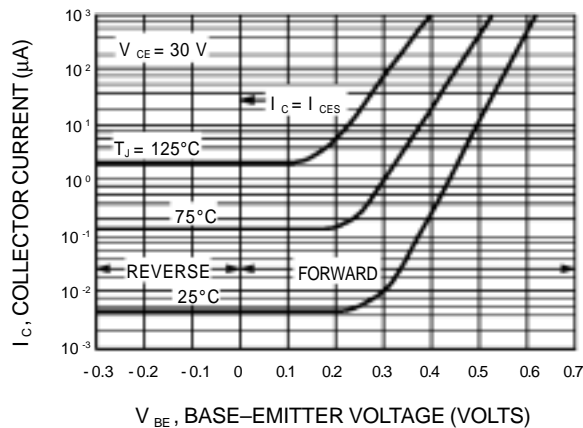


Figure 3. Collector Cut-Off Region



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Figure 4. "On" Voltages

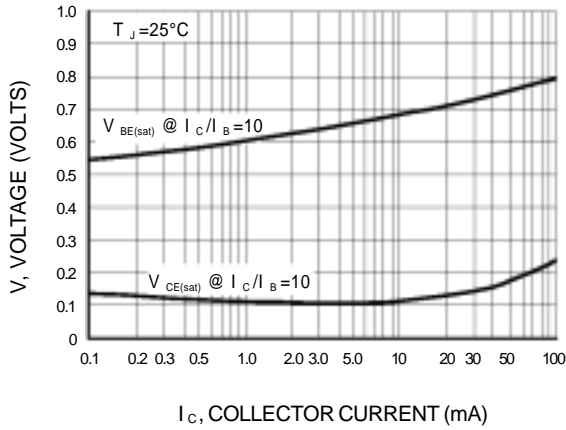


Figure 5. Temperature Coefficients

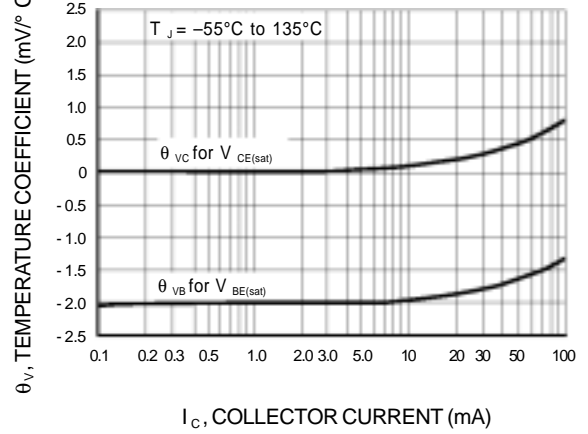


Figure 6. Switching Time Test Circuit

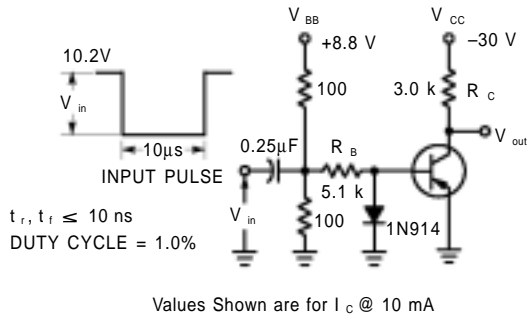


Figure 7. Capacitances

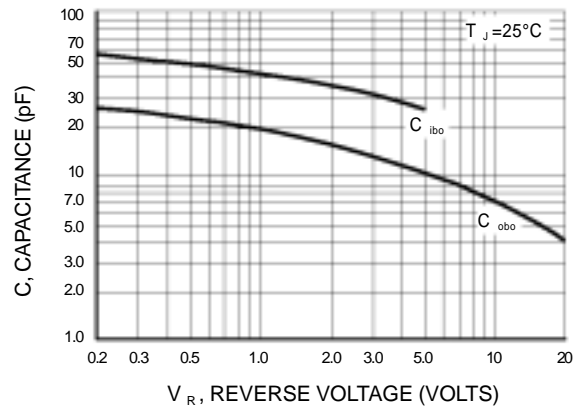


Figure 8. Turn-On Time

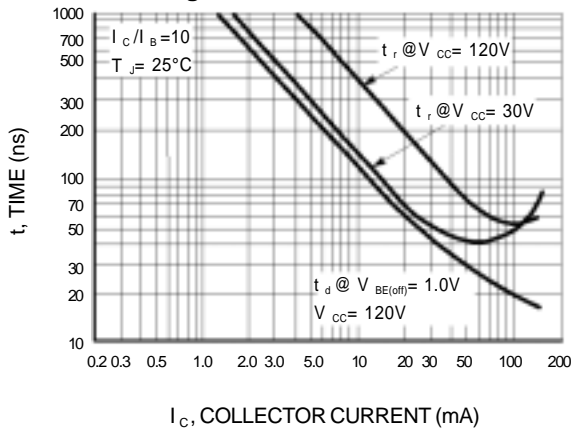


Figure 9. Turn-Off Time

