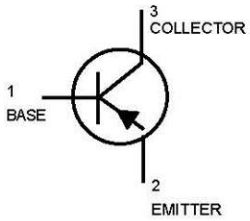
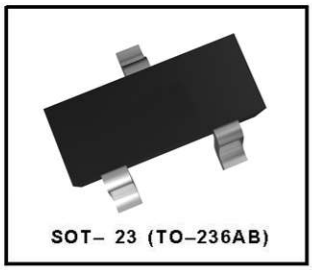
MMBT5401

PNP Silicon




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

MMBT5401=2L

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I_C = –1.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	– 150	—	Vdc
Collector–Base Breakdown Voltage (I_C = –100 µAdc, I_E = 0)	$V_{(BR)CBO}$	– 160	—	Vdc
Emitter-BAse Breakdown Voltage (I_E= –10µAdc,I_C=0)	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current (V_{CB} = –120 Vdc, I_E= 0)	I_{CES}	—	– 50	nAdc
(V_{CB} = –120 Vdc, I_E= 0, T_A=100 °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.

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

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

● **SMALL–SIGNAL CHARACTERISTICS**

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

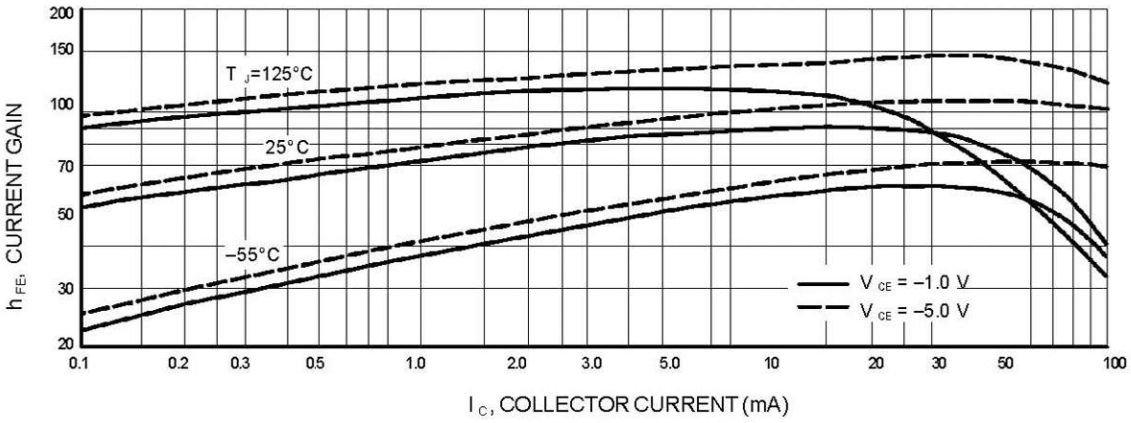


Figure 1. DC Current Gain

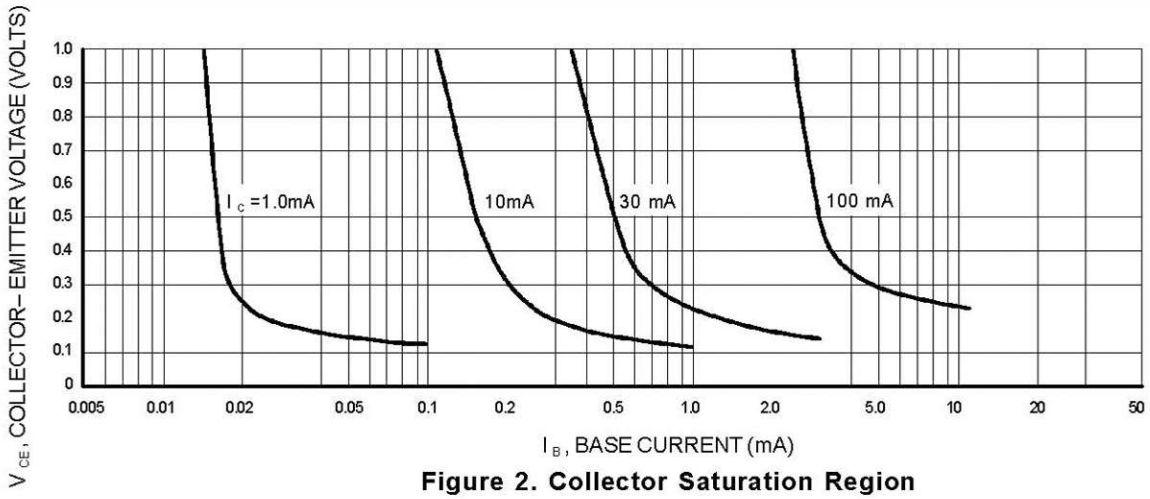


Figure 2. Collector Saturation Region

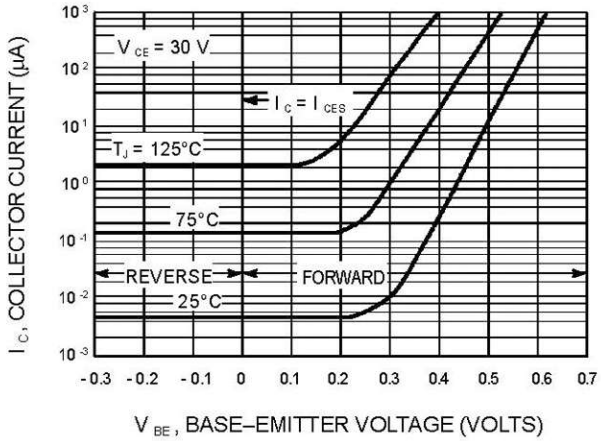


Figure 3. Collector Cut–Off Region

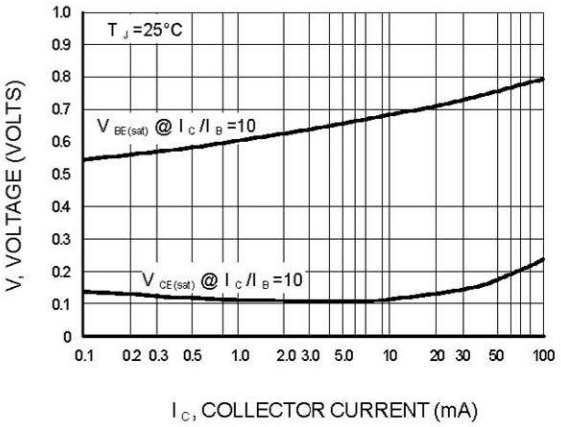


Figure 4. "On" Voltages

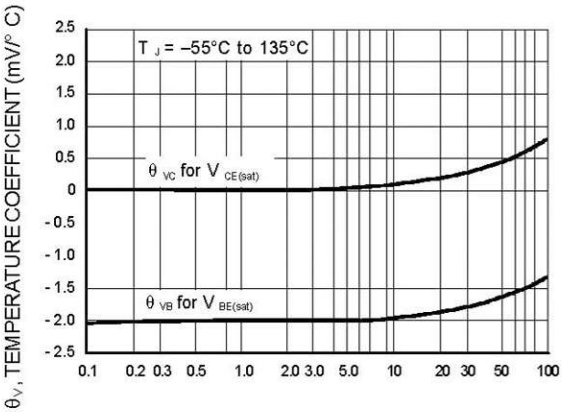


Figure 5. Temperature Coefficients

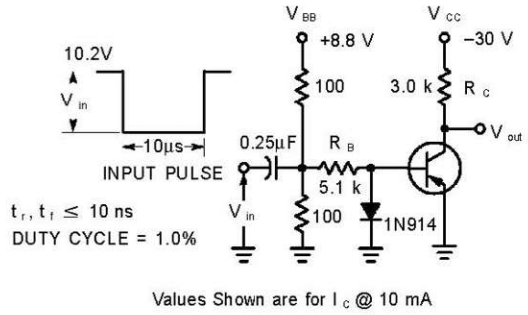


Figure 6. Switching Time Test Circuit

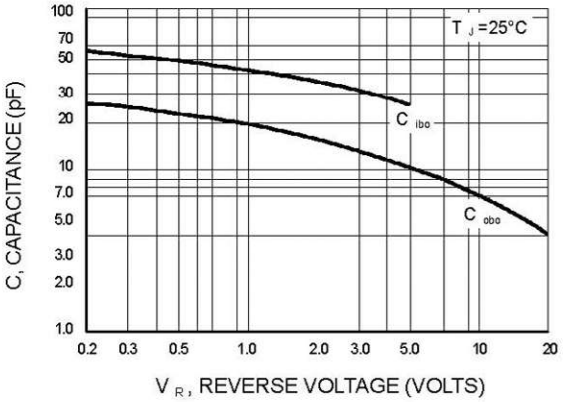


Figure 7. Capacitances

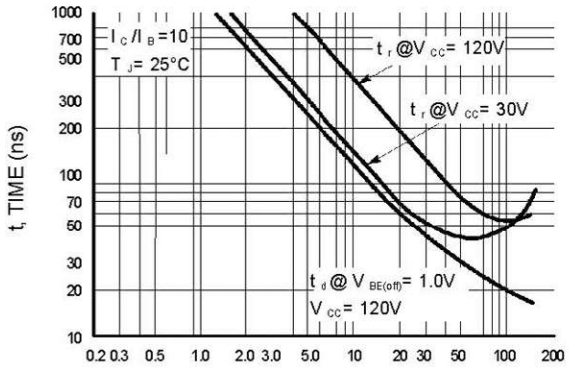


Figure 8. Turn–On Time

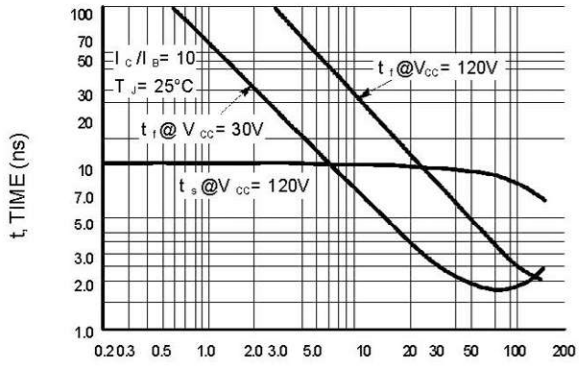


Figure 9. Turn–Off Time

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