High Voltage Transistor

Lead free product

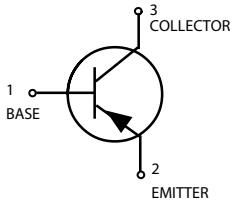
Halogen-free type

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 °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
Operating Junction and Storage Temperature	T J, Tstg	–55 to +150	°C

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.

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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	

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Figure 1. DC Current Gain

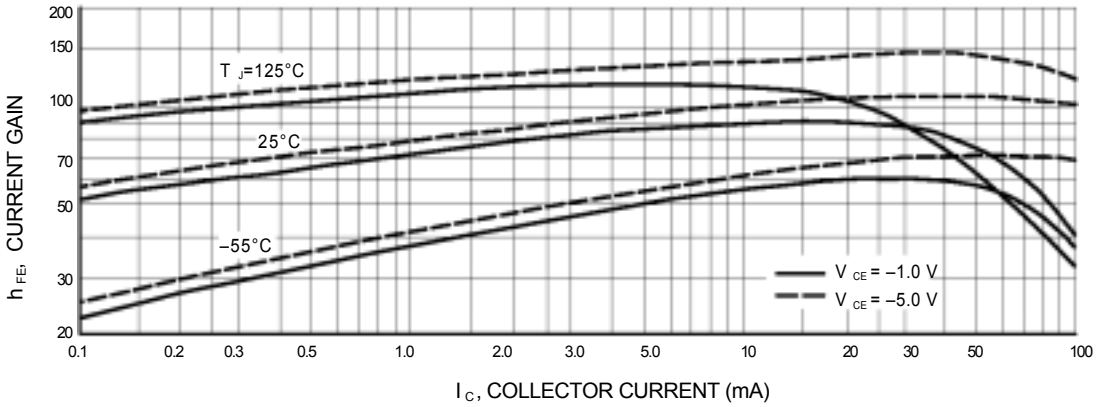

Figure 2. Collector Saturation Region

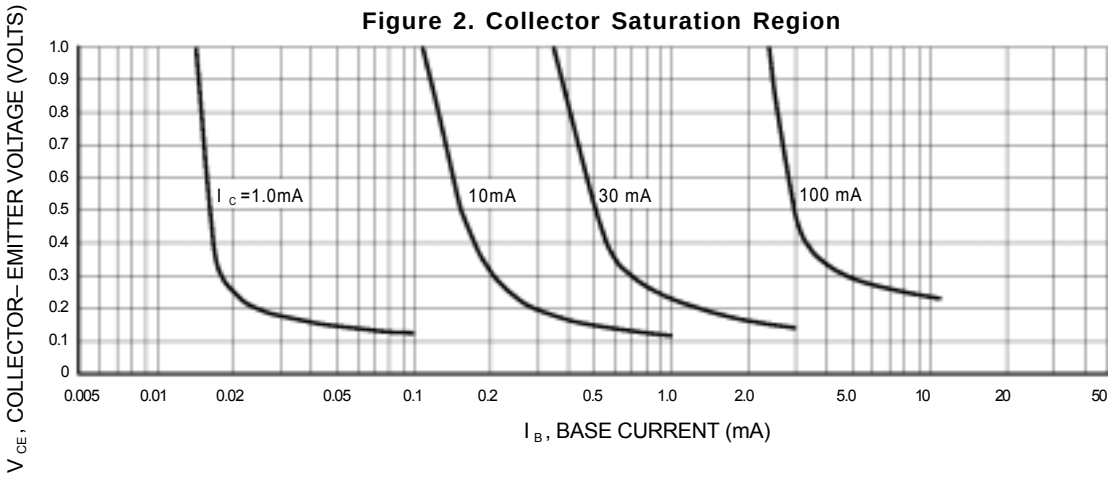

Figure 3. Collector Cut–Off Region

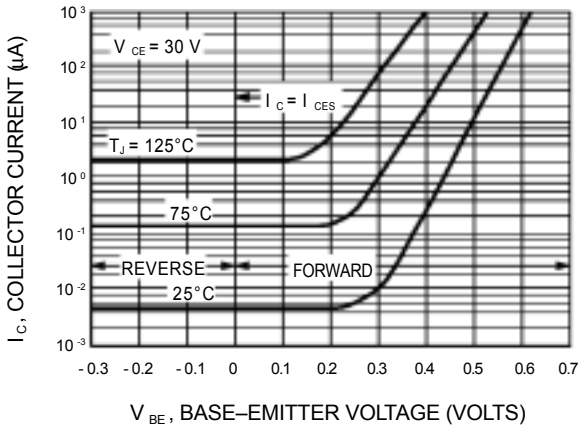

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Figure 4. "On" Voltages

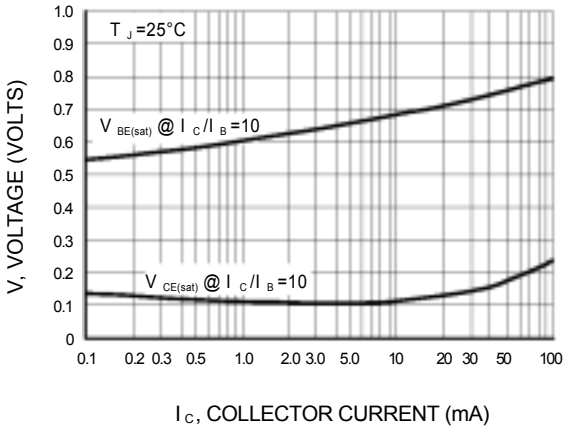


Figure 5. Temperature Coefficients

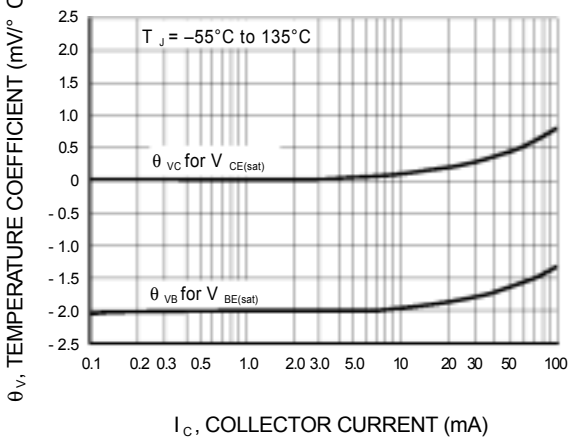
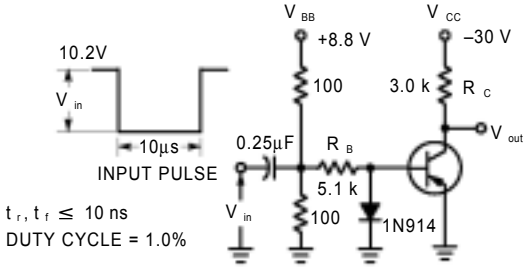


Figure 6. Switching Time Test Circuit



Values Shown are for I C @ 10 mA

Figure 7. Capacitances

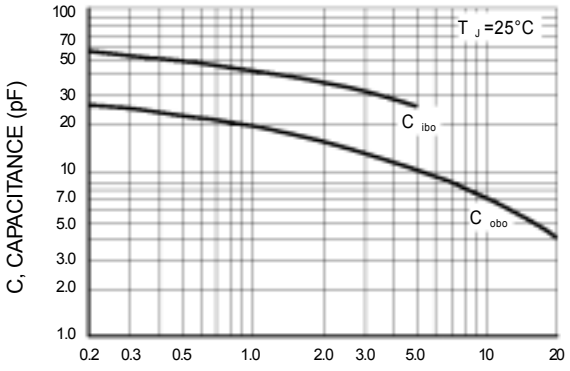


Figure 8. Turn–On Time

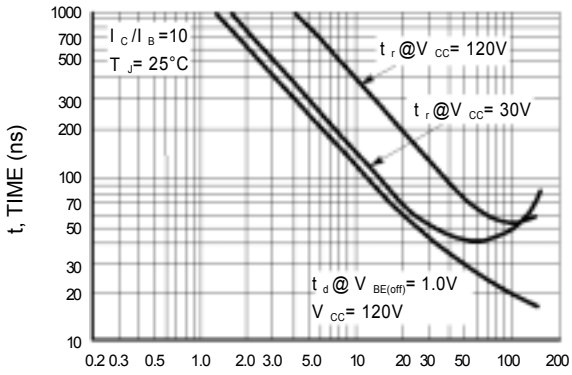
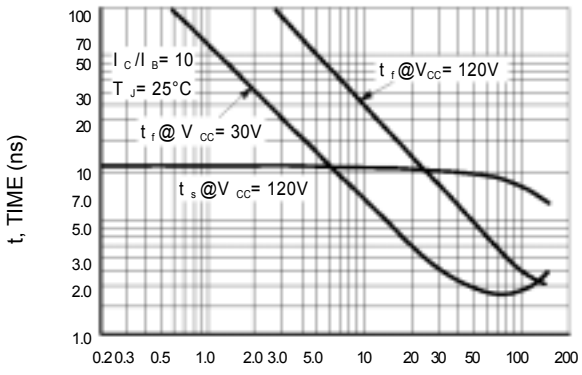


Figure 9. Turn–Off Time



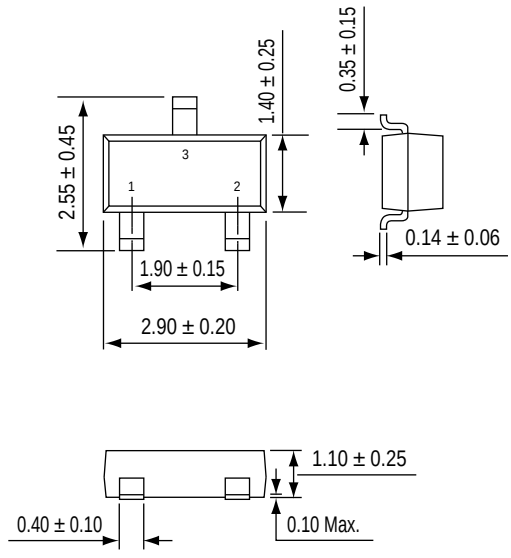
DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Reel	Reel (pcs)	Carton (pcs)	Packaging
MMBT5401GH	**RK**	7"	3,000	60,000 120,000	SOT-23

PACKAGE DIMENSIONS

SOT-23

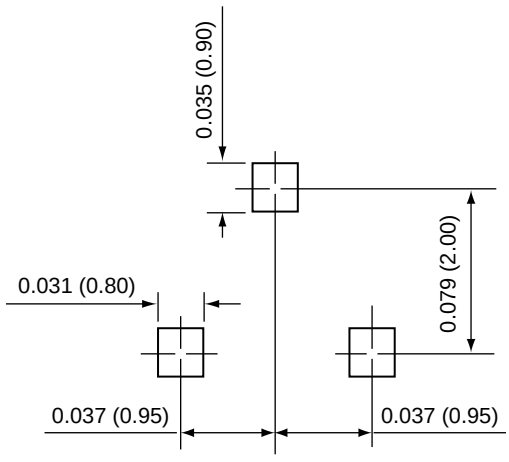
Unit : mm



SOLDERING FOOTPRINT

SOT-23

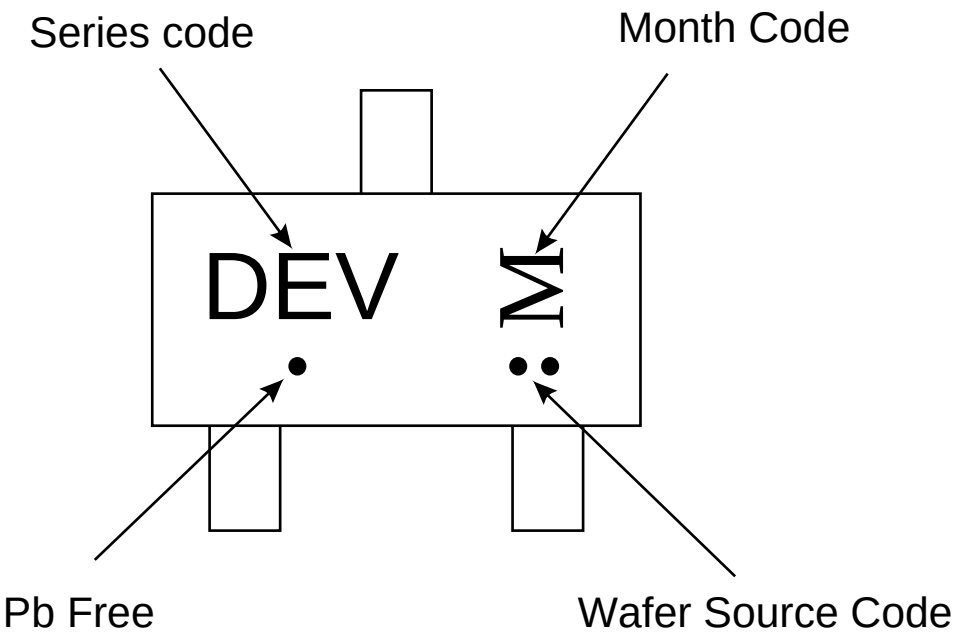
*Dimensions in inches and (millimeters)



MARKING DIAGRAM

SOT-23

DEV = Series Code
M = Month Code



Month Code :

	ODD YEARS (2009/1/3)		EVEN YEARS (2010/1/3)
Jan	1	Jan	E
Feb	2	Feb	F
Mar	3	Mar	H
Apr	4	Apr	J
May	5	May	K
Jun	6	Jun	L
Jul	7	Jul	N
Aug	8	Aug	P
Sep	9	Sep	U
Oct	T	Oct	X
Nov	V	Nov	Y
Dec	C	Dec	Z