MMBT5401

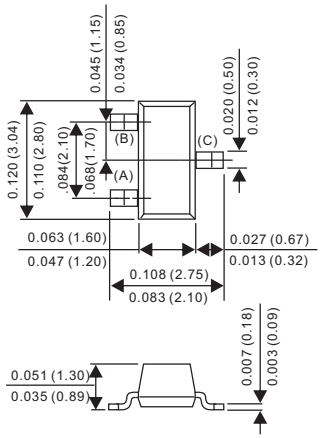
High Voltage PNP Transistor

Features

- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Compliant to Halogen-free

Package outline

SOT-23



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

Maximum ratings (AT T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	Value	UNIT
Collector −Base Voltage		V_{CBO}	-160	Vdc
Collector −Emitter Voltage		V_{CEO}	-150	Vdc
Emitter −Base Voltage		V_{EBO}	-5.0	Vdc
Collector Current − Continuous		I_C	-500	mAdc

Thermal Characteristics

Characteristics	CONDITIONS	Symbol	Max	UNIT
Total device dissipation FR-5 board (1)	T_A = 25°C	P_D	225	mW
	Derate above 25°C	P_D	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	P_D	2.4	mW/°C
Thermal resistance	Junction to ambient	$R_{\theta JA}$	417	°C/W
Operating temperature		T_J	-55 ~ +150	°C
Storage temperature		T_{STG}	-55 ~ +150	

1.FR-5 = 1.0 X 0.75 X0.062 in.
2.Alumina = 0.4 X 0.3 X 0.024 in. 99.5% alumina.

Electrical Characteristics (AT T_A=25°C unless otherwise noted)

OFF characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Collector−Base Breakdown Voltage	I_C=−100uAdc,I_E=0	$V_{(BR)CBO}$	-160		Vdc
Collector−Emitter Breakdown Voltage	I_C=−1.0mAdc,I_B=0	$V_{(BR)CEO}$	-150		Vdc
Emitter−Base Breakdown Voltage	I_E = -10uAdc, I_C = 0	$V_{(BR)EBO}$	-5.0		Vdc
Collector Cutoff Current	V_{CB} = -120Vdc, I_E = 0 V_{CB} = -120Vdc, I_E = 0,T_A=100°C	I_{CES}		-100 -100	nAdc uAdc

ON characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
DC Current Gain	I_C =- 1.0mAdc, V_{CE} = -5.0Vdc I_C =- 10mAdc, V_{CE} = -5.0Vdc I_C =- 50mAdc, V_{CE} = -5.0Vdc	h_{FE}	50 60 50	300	-
Collector−Emitter Saturation Voltage	I_C = -10mAdc, I_B = -1.0mAdc I_C = -50mAdc, I_B = -5.0mAdc	$V_{CE(sat)}$		-0.2 -0.5	Vdc
Base−Emitter Saturation Voltage	I_C = -10mAdc, I_B = -1.0mAdc I_C = -50mAdc, I_B = -5.0mAdc	$V_{BE(sat)}$		-1.0 -1.0	Vdc

Small−Siglal characteristics

PARAMETER	CONDITIONS	Symbol	Min.	Max.	UNIT
Current-Gain-Bandwidth Product	I_C =- 10mAdc, V_{CE} = -10Vdc, f=100MHz	f_T	100	300	MHZ
Output Capacitance	V_{CB}=-10Vdc,I_E =0, f=1.0MHz	C_{obo}		6.0	pF
Small Signal Current Gain	I_C =- 1.0mAdc, V_{CE} = -10Vdc, f=1.0KHz	h_{fe}	40	200	-
Noise Figure	I_C =- 200uAdc, V_{CE} = -5.0Vdc, R_S=10Ω,f=1.0KHz	NF		8.0	dB

FIG.1 DC Current Gain

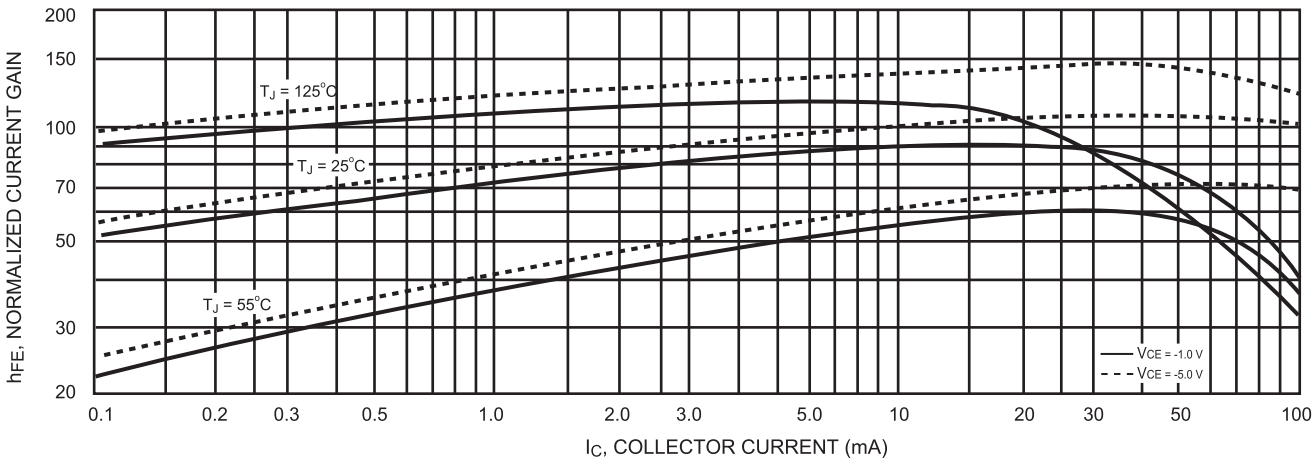


FIG.2 Collector Saturation Region

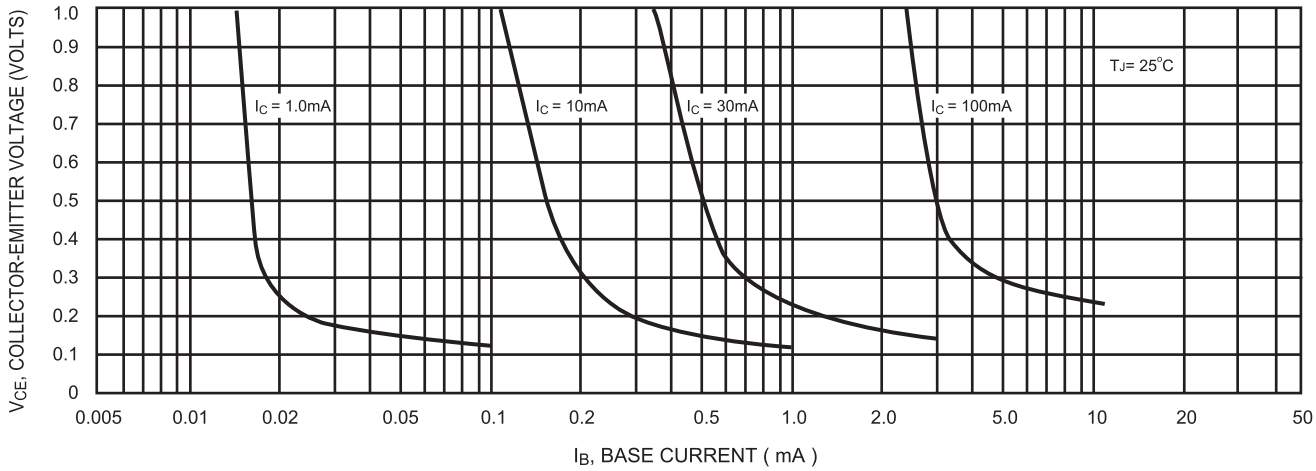


FIG.3 Temperature Coefficients

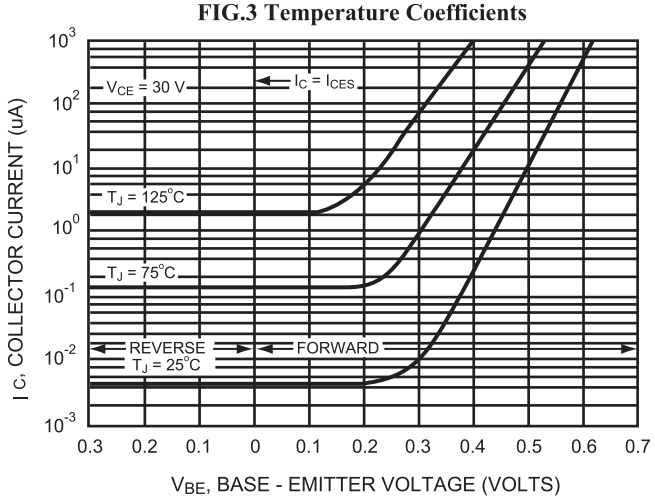


FIG.4 " On " Voltages

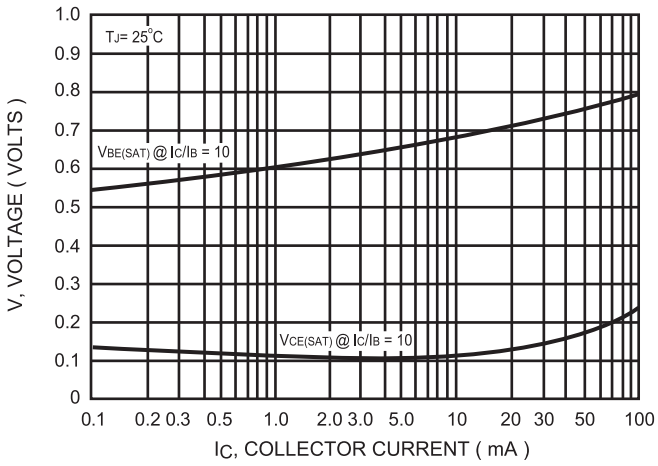


FIG.5 Temperature Coefficients

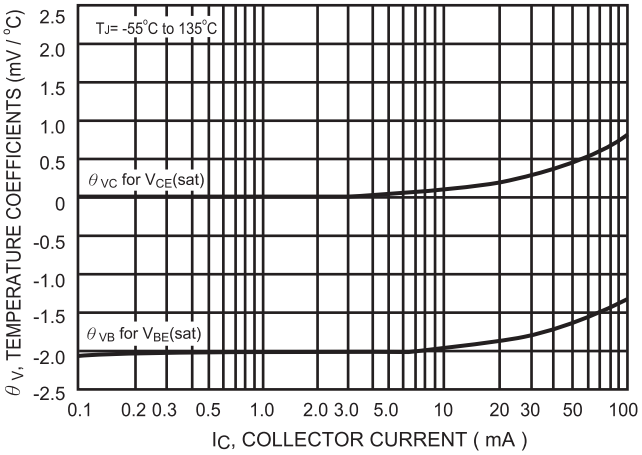
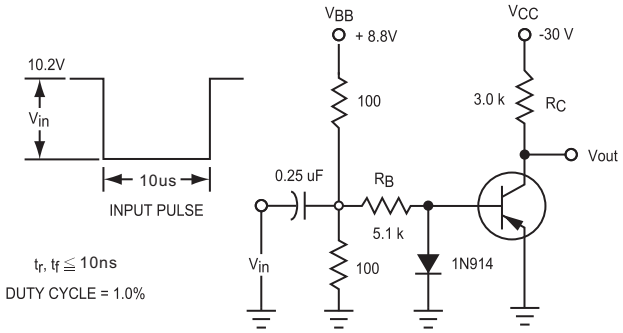


FIG.6 Switching Time Test Circuit



VALUES SHOWN ARE FOR IC @ 10 mA

FIG.7 Capacitances

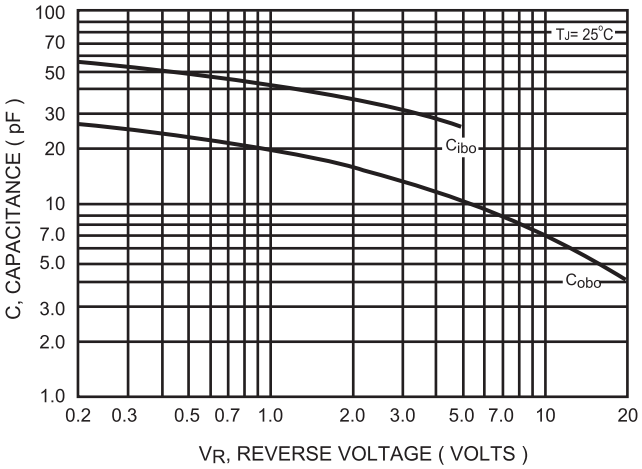


FIG.8 Turn - On Time

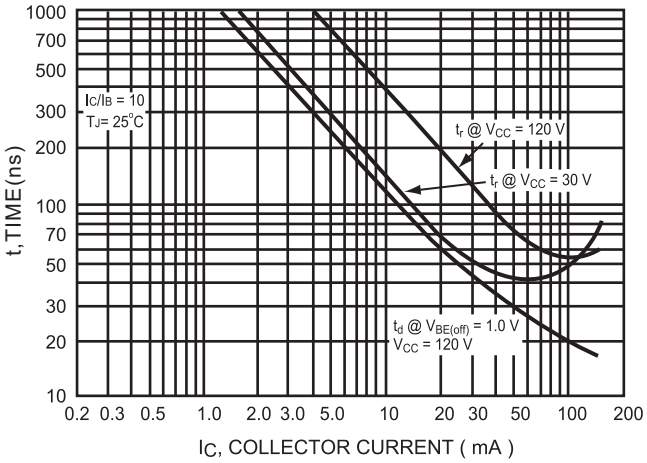
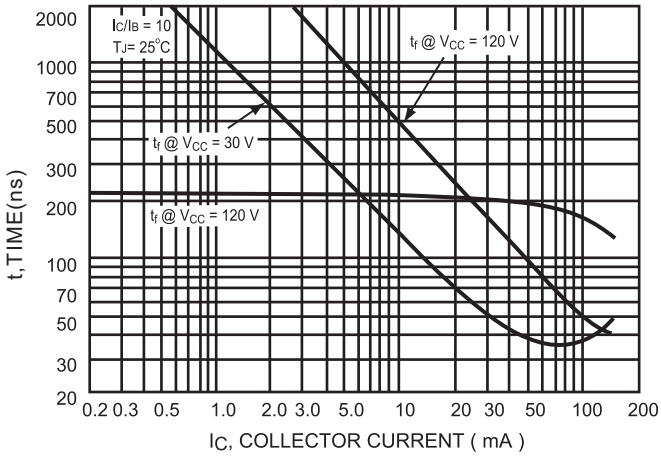
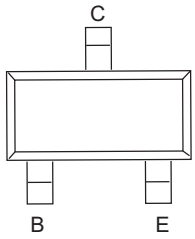
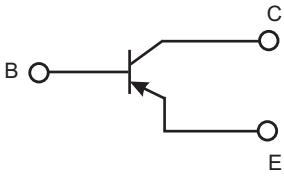


FIG.9 Turn - Off Time



Pinning information

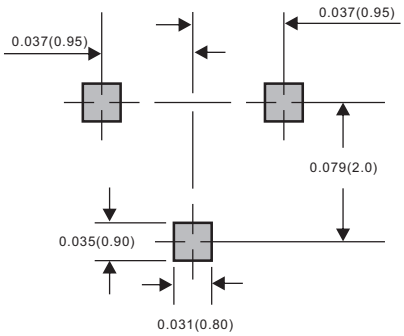
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
MMBT5401	2L

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)