



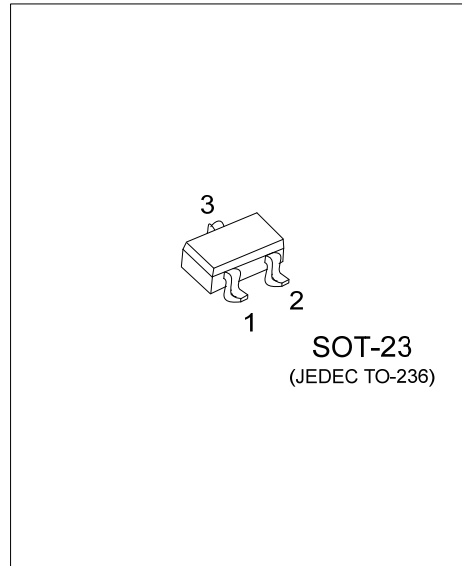
# MMBT5401

## PNP SILICON TRANSISTOR

### HIGH VOLTAGE SWITCHING TRANSISTOR

#### FEATURES

- \*Collector-Emitter Voltage:  $V_{CE0}=-150V$
- \*High Current Gain



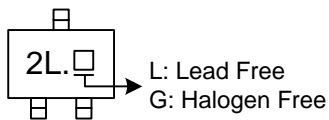
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MMBT5401L-x-AE3-R	MMBT5401G-x-AE3-R	SOT-23	B	E	C	Tape Reel

Note: Pin Assignment: B: Base E: Emitter C: Collector

<p>MMBT5401G-x-AE3-R</p>	<p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) x: refer to Classification of <math>h_{FE}</math></p> <p>(4) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector -Base Voltage	$V_{CBO}$	-160	V
Collector -Emitter Voltage	$V_{CEO}$	-150	V
Emitter -Base Voltage	$V_{EBO}$	-5	V
DC Collector Current	$I_C$	-600	mA
Power Dissipation	$P_D$	350	mW
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector-Base Breakdown Voltage	$BV_{CBO}$	$I_C=-100\mu\text{A}$ , $I_E=0$	-160			V
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=-1\text{mA}$ , $I_B=0$	-150			V
Emitter-Base Breakdown Voltage	$BV_{EBO}$	$I_E=-10\mu\text{A}$ , $I_C=0$	-5			V
Collector Cut-off Current	$I_{CBO}$	$V_{CB}=-120\text{V}$ , $I_E=0$			-50	nA
Emitter Cut-off Current	$I_{EBO}$	$V_{BE}=-3\text{V}$ , $I_C=0$			-50	nA
DC Current Gain(Note)	$h_{FE}$	$V_{CE}=-5\text{V}$ , $I_C=-1\text{mA}$	80			
		$V_{CE}=-5\text{V}$ , $I_C=-10\text{mA}$	80	160	400	
		$V_{CE}=-5\text{V}$ , $I_C=-50\text{mA}$	80			
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_C=-10\text{mA}$ , $I_B=-1\text{mA}$			-0.2	V
		$I_C=-50\text{mA}$ , $I_B=-5\text{mA}$			-0.5	
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	$I_C=-10\text{mA}$ , $I_B=-1\text{mA}$			-1	V
		$I_C=-50\text{mA}$ , $I_B=-5\text{mA}$			-1	
Current Gain Bandwidth Product	$f_T$	$V_{CE}=-10\text{V}$ , $I_C=-10\text{mA}$ , $f=100\text{MHz}$	100		300	MHz
Output Capacitance	$C_{OB}$	$V_{CB}=-10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$			6.0	pF
Noise Figure	NF	$I_C=-0.25\text{mA}$ , $V_{CE}=-5\text{V}$ $R_S=1\text{k}\Omega$ , $f=10\text{Hz} \sim 15.7\text{kHz}$			8	dB

Note: Pulse test:  $P_W < 300\mu\text{s}$ , Duty Cycle  $< 2\%$

■ CLASSIFICATION OF  $h_{FE}$

RANK	A	B	C
RANGE	80-170	150-240	200-400

## ■ TYPICAL CHARACTERISTICS

Fig.1 Collector Output Capacitance

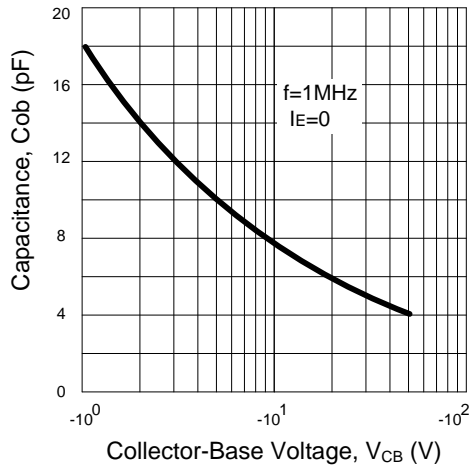


Fig.2 DC Current Gain

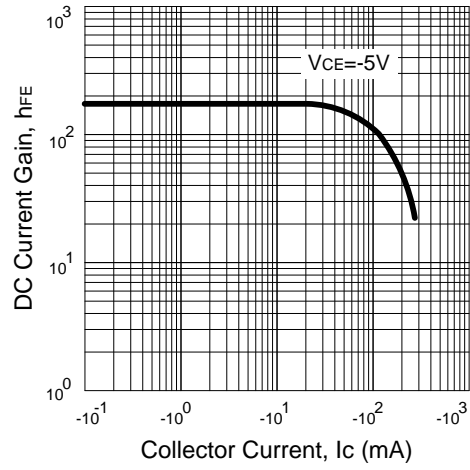


Fig.3 Base-Emitter on Voltage

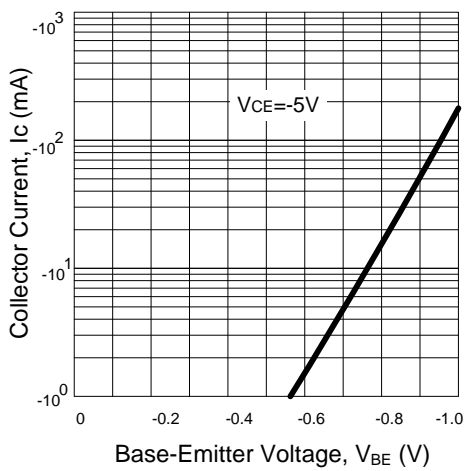


Fig.4 Saturation Voltage

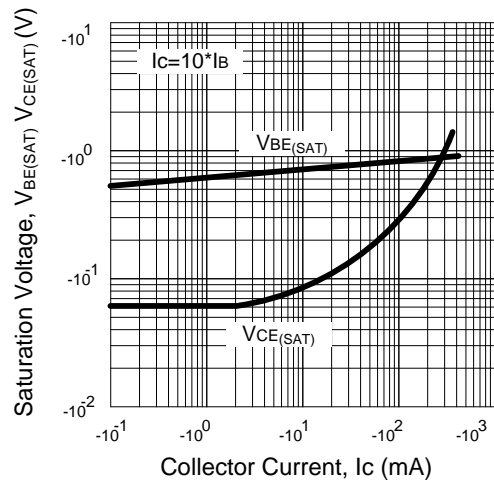
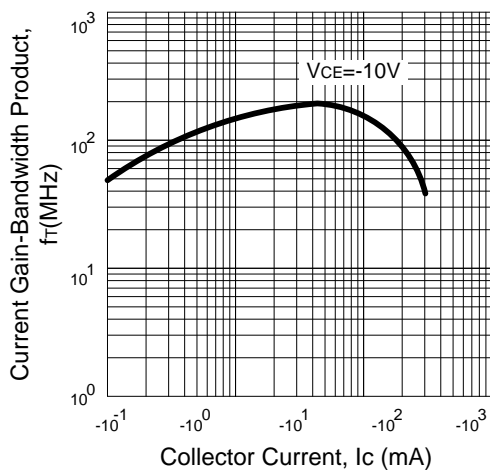


Fig.5 Current Gain-Bandwidth Product



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