



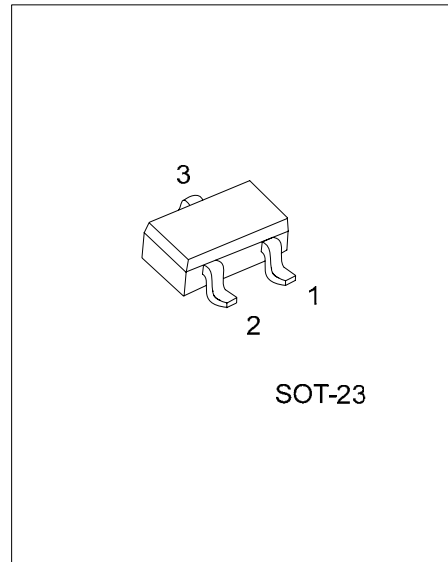
MMBT4403

PNP SILICON TRANSISTOR

PNP GENERAL PURPOSE AMPLIFIER

DESCRIPTION

The UTC **MMBT4403** is designed for use as a general purpose amplifier and switch requiring collector currents up to 500mA.



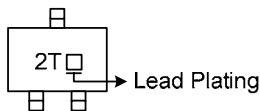
*Pb-free plating product number: MMBT4403L

ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
MMBT4403-AE3-R	MMBT4403L-AE3-R	SOT-23	E	B	C	Tape Reel

<p>MMBT4403L-AE3-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel (2) AE3: SOT-23 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
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MARKING



MMBT4403

PNP SILICON TRANSISTOR

■ ABSOLUTE MAXIMUM RATINGS (Ta=25 , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-40	V
Emitter-Base Voltage	V _{EBO}	-5	V
Collector Current-Continuous	I _C	-600	mA
Total Device Dissipation Derate above 25	P _C	350 2.8	mW mW/
Junction Temperature	T _J	+150	
Storage Temperature	T _{STG}	-55 ~ +150	

Note 1. 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.

2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

■ THERMAL DATA (Ta=25 , unless otherwise specified)

CHARACTERISTIC	SYMBOL	RATINGS	UNIT
Thermal Resistance, Junction to Ambient	θ _{JA}	357	/W

■ ELECTRICAL CHARACTERISTICS (Ta=25 , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (Note)	BV _{CEO}	I _C =-1mA, I _B =0	-40			V
Collector-Base Breakdown Voltage	BV _{CB0}	I _C =-0.1mA, I _E =0	-40			V
Emitter-Base Breakdown Voltage	BV _{EBO}	I _E =-0.1mA, I _C =0	-5			V
Collector Cut-off Current	I _{CEX}	V _{CE} =-35V, V _{EB} =-0.4V			-0.1	μA
Base Cut-off Current	I _{BEX}	V _{CE} =-35V, V _{BE} =-0.4V			-0.1	μA
ON CHARACTERISTICS*						
DC Current Gain	h _{FE1}	V _{CE} =-1V, I _C =-0.1mA	30			
	h _{FE2}	V _{CE} =-1V, I _C =-1mA	60			
	h _{FE3}	V _{CE} =-1V, I _C =-10mA	100			
	h _{FE4}	V _{CE} =-2V, I _C =-150mA (Note)	100		300	
	h _{FE5}	V _{CE} =-2V, I _C =-500mA (Note)	20			
Collector-Emitter Saturation Voltage	V _{CE(SAT1)}	I _C =-150mA, I _B =-15mA			-0.4	V
	V _{CE(SAT2)}	I _C =-500mA, I _B =-50mA			-0.75	V
Base-Emitter Saturation Voltage	V _{BE(SAT1)}	I _C =-150mA, I _B =-15mA (Note)	-0.75		-0.95	V
	V _{BE(SAT2)}	I _C =-500mA, I _B =-50mA			-1.3	V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	V _{CE} =-10V, I _C =-20mA, f=100MHz	200			MHz
Collector-Base Capacitance	C _{cb}	V _{CB} =-10V, I _E =0, f=140kHz			8.5	pF
Emitter-Base Capacitance	C _{eb}	V _{BE} =-0.5V, I _C =0, f=140kHz			30	pF
Input Impedance	h _{IE}	V _{CE} =-10V, I _C =-1mA, f=1kHz	1.5		15	kΩ
Voltage Feedback Ratio	h _{RE}	V _{CE} =-10V, I _C =-1mA, f=1kHz	0.1		8	×10 ⁻⁴
Small-Signal Current Gain	h _{FE}	V _{CE} =-10V, I _C =-1mA, f=1kHz	60		500	
Output Admittance	h _{OE}	V _{CE} =-10V, I _C =-1mA, f=1kHz	1.0		100	μmhos
SWITCHING CHARACTERISTICS						
Delay Time	t _D	V _{CC} =-30V, I _C =-150mA, I _{B1} =-15mA			15	ns
Rise Time	t _R				20	ns
Storage Time	t _S	V _{CC} =-30V, I _C =-150mA			225	ns
Fall Time	t _F	I _{B1} =I _{B2} =-15mA			30	ns

Note: Pulse test: Pulse Width≤300μs, Duty Cycle≤2%

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■ TEST CIRCUIT

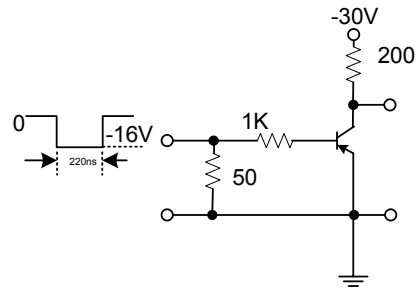


Figure 1. Saturated Turn-On Switching Timer

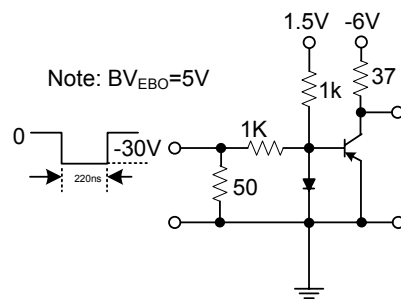
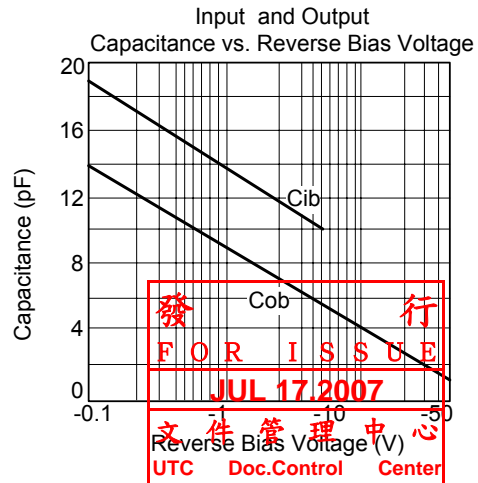
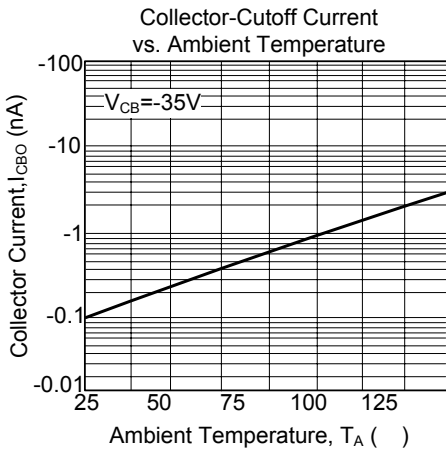
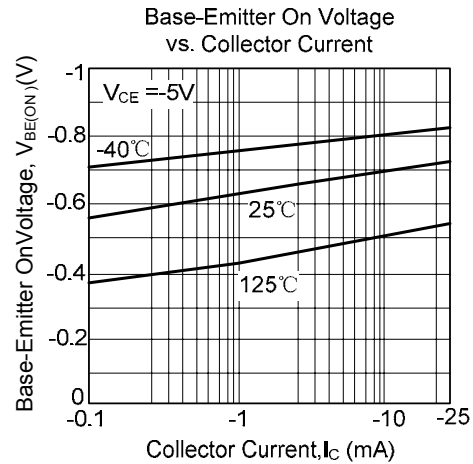
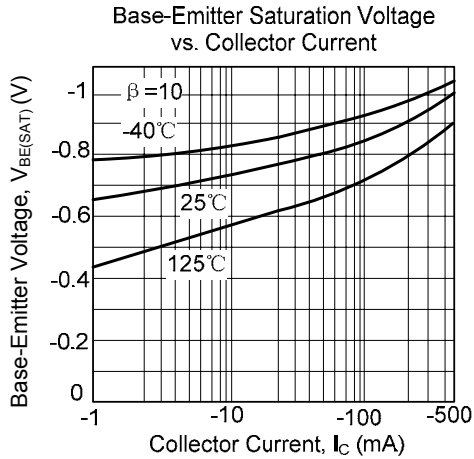
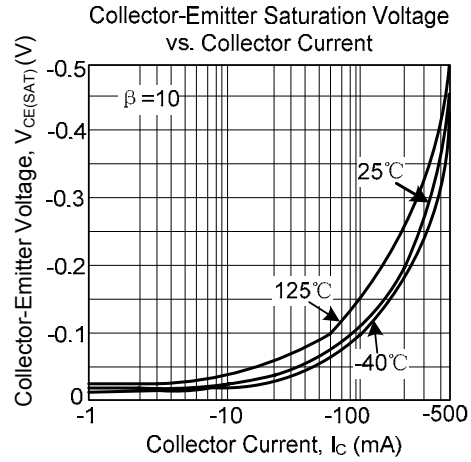
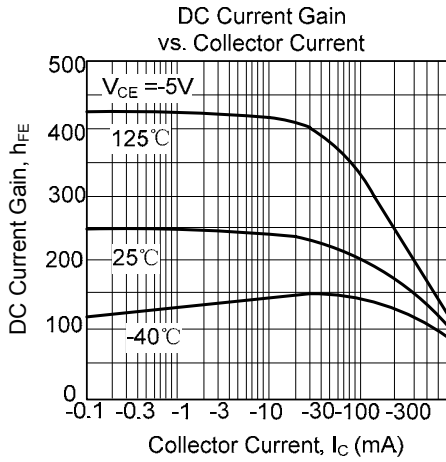


Figure 2. Saturated Turn-Off Switching Timer

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TYPICAL CHARACTERISTICS



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