



JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO.,LTD

SOT-523 Plastic-Encapsulate Transistors

MMBT4401T

TRANSISTOR (NPN)

FEATURES

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBT4403T)
- Ultra-Small Surface Mount Package
- Also Available in Lead Free Version

MARKING: 2X

MAXIMUM RATINGS* $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current -Continuous	600	mA
P_C	Collector Power dissipation	0.15	W
T_J, T_{stg}	Junction and Storage Temperature	-55to +150	$^{\circ}\text{C}$
$R_{\theta JA}$	Thermal Resistance, junction to Ambient	357	$^{\circ}\text{C}/\text{mW}$

SOT-523



1. BASE
2. EMITTER
3. COLLECTOR

ELECTRICAL CHARACTERISTICS ($T_{amb}=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=100\mu\text{A}$, $I_E=0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}$, $I_B=0$	40			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=100\mu\text{A}$, $I_C=0$	6			V
Collector cut-off current	I_{CEX}	$V_{CE}=35\text{V}$, $V_{EB(OFF)}=0.4\text{V}$			0.1	μA
Base cut-off current	I_{BL}	$V_{CE}=35\text{V}$, $V_{EB(OFF)}=0.4\text{V}$			0.1	μA
DC current gain	$h_{FE(1)}$	$V_{CE}=1\text{V}$, $I_C=0.1\text{mA}$	20			
	$h_{FE(2)}$	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$	40			
	$h_{FE(3)}$	$V_{CE}=1\text{V}$, $I_C=10\text{mA}$	80			
	$h_{FE(4)}$	$V_{CE}=1\text{V}$, $I_C=150\text{mA}$	100		300	
	$h_{FE(5)}$	$V_{CE}=2\text{V}$, $I_C=500\text{mA}$	40			
Collector-emitter saturation voltage	$V_{CE(sat)1}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$			0.4	V
	$V_{CE(sat)2}$	$I_C=500\text{mA}$, $I_B=50\text{mA}$			0.75	V
Base-emitter saturation voltage	$V_{BE(sat)1}$	$I_C=150\text{mA}$, $I_B=15\text{mA}$	0.75		0.95	V
	$V_{BE(sat)2}$	$I_C=500\text{mA}$, $I_B=50\text{mA}$			1.2	V
Transition frequency	f_T	$V_{CE}=10\text{V}$, $I_C=20\text{mA}$ $f=100\text{MHz}$	250			MHz
Output Capacitance	C_{ob}	$V_{CB}=5\text{V}$, $I_E=0$ $f=1\text{MHz}$			6.5	pF

SWITCHING CHARACTERISTICS

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Delay time	t_d	$V_{CC}=30V, V_{BE}=2V$			15	nS
Rise time	t_r	$I_C=150mA, I_{B1}=15mA$			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

Typical Characteristics

MMBT4401T

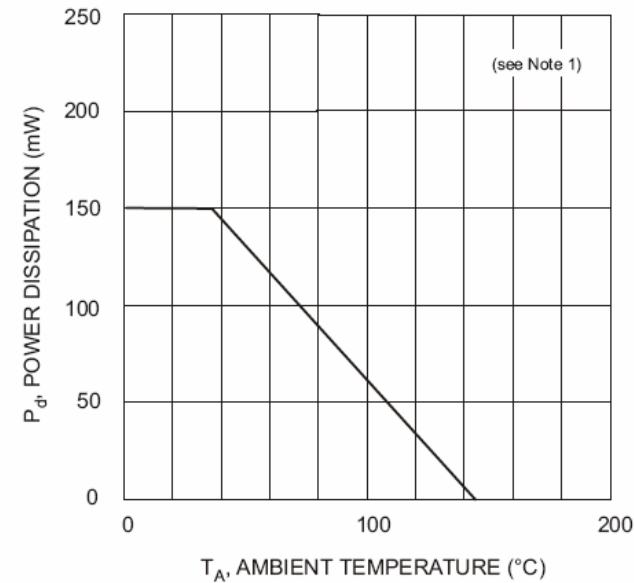


Fig. 1, Power Derating Curve

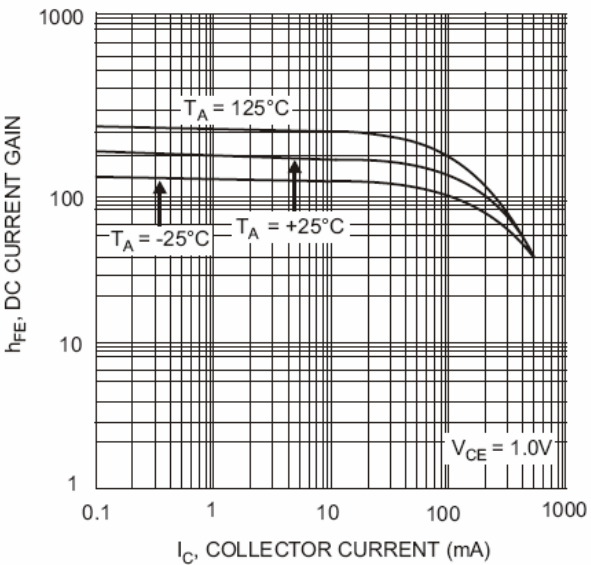


Fig. 2 Typical DC Current Gain vs Collector Current

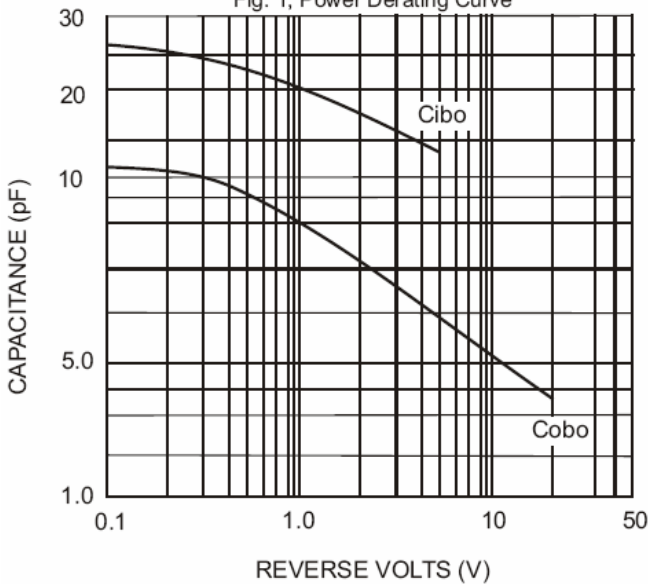


Fig. 3 Typical Capacitance

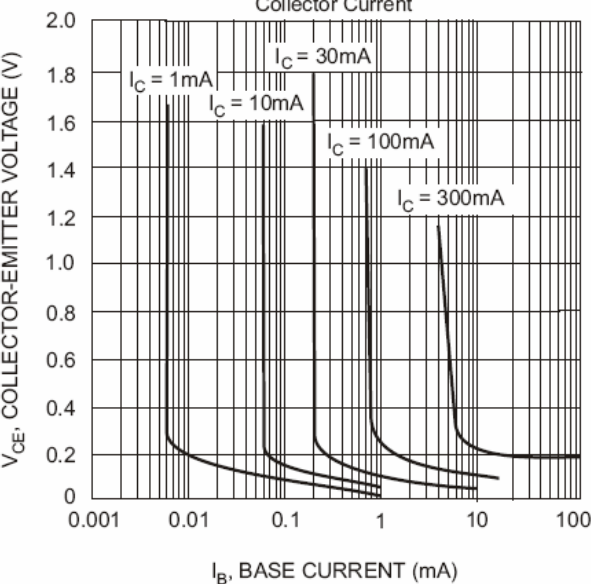


Fig. 4 Typical Collector Saturation Region

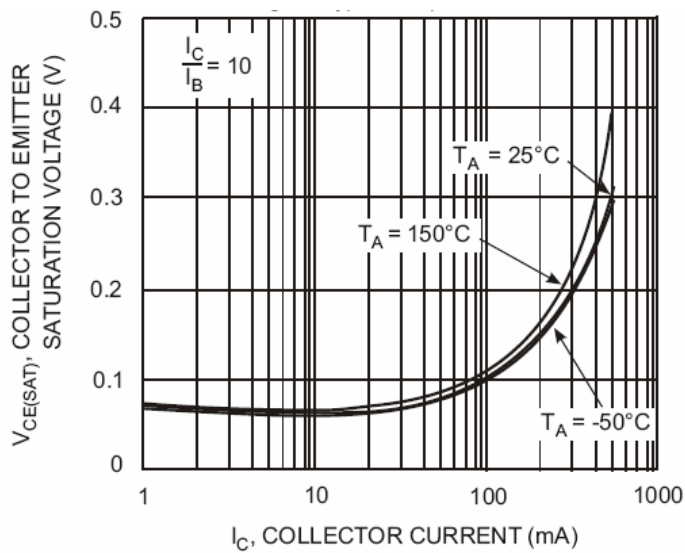


Fig. 5 Collector Emitter Saturation Voltage vs. Collector Current

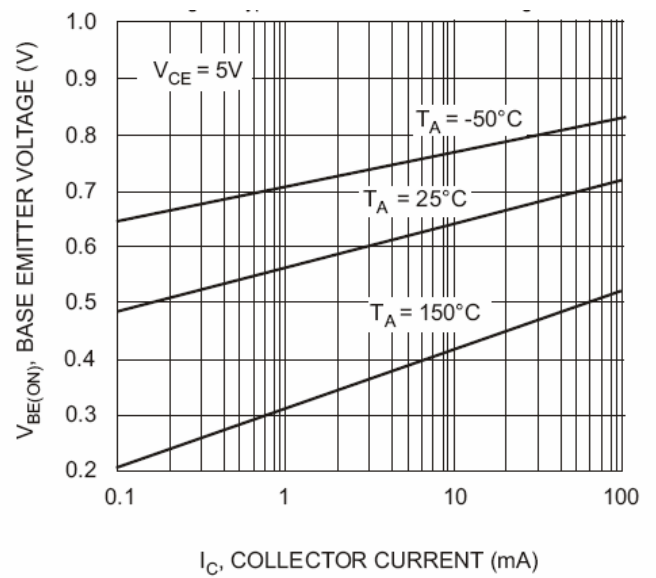


Fig. 6 Base Emitter Voltage vs. Collector Current

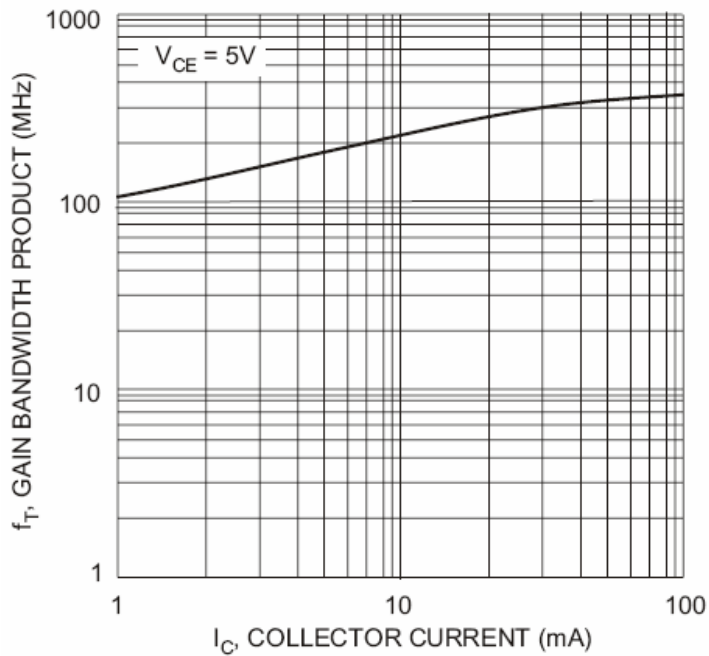


Fig. 7 Gain Bandwidth Product vs. Collector Current