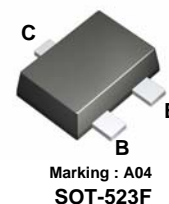


MMBT3904T

NPN Epitaxial Silicon Transistor

Features

- General purpose amplifier transistor.
- Ultra-Small Surface Mount Package for all types.
- Suitable for general switching & amplification
- Well suited for portable application
- As complementary type, PNP MMBT3906T is recommended



Absolute Maximum Ratings T_a = 25°C unless otherwise noted

Symbol	Parameter	Value	Unit
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	200	mA
T _J	Junction Temperature	150	°C
T _{STG}	Storage Temperature Range	-55 ~ 150	°C

* 1. These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics* T_a = 25°C unless otherwise noted

Symbol	Parameter	Max	Unit
P _C	Collector Power Dissipation, by R _{θJA}	250	mW
R _{θJA}	Thermal Resistance, Junction to Ambient	500	°C/W

* Minimum land pad.

Electrical Characteristics* T_a = 25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Unit
BV _{CBO}	Collector-Base Breakdown Voltage	I _C = 10μA, I _E = 0	60		V
BV _{CEO}	Collector-Emitter Breakdown Voltage	I _C = 1mA, I _B = 0	40		V
BV _{EBO}	Emitter-Base Breakdown Voltage	I _E = 10μA, I _C = 0	6		V
I _{CEX}	Collector Cut-off Current	V _{CE} = 60V, V _{EB(OFF)} = 3V		50	nA
h _{FE}	DC Current Gain	V _{CE} = 1V, I _C = 0.1mA V _{CE} = 1V, I _C = 1mA V _{CE} = 1V, I _C = 10mA V _{CE} = 1V, I _C = 50mA V _{CE} = 1V, I _C = 100mA	40 70 100 60 30	300	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 10mA, I _B = 1mA I _C = 50mA, I _B = 5mA		0.2 0.3	V V
V _{BE(sat)}	Base-Emitter Saturation Voltage	I _C = 10mA, I _B = 1mA I _C = 50mA, I _B = 5mA	0.65	0.85 0.95	V V
f _T	Current Gain Bandwidth Product	V _{CE} = 20V, I _C = 10mA, f = 100MHz	300		MHz
C _{ob}	Output Capacitance	V _{CB} = 5V, I _E = 0, f = 1MHz		6	pF
C _{ib}	Input Capacitance	V _{EB} = 0.5V, I _C = 0, f = 1MHz		15	pF
t _d	Delay Time	V _{CC} = 3V, I _C = 10mA		35	ns
t _r	Rise Time	I _{B1} = I _{B2} = 1mA		35	ns
t _s	Storage Time			200	ns
t _f	Fall Time			50	ns

* DC Item are tested by Pulse Test : Pulse Width≤300us, Duty Cycle≤2%

Typical Performance Characteristics

Figure 1. DC Current Gain

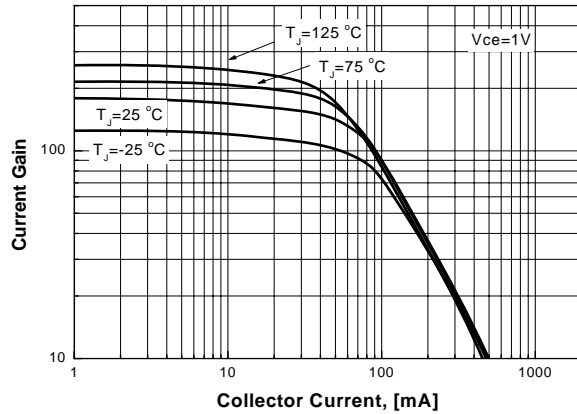


Figure 2. Collector-Emitter Saturation Voltage

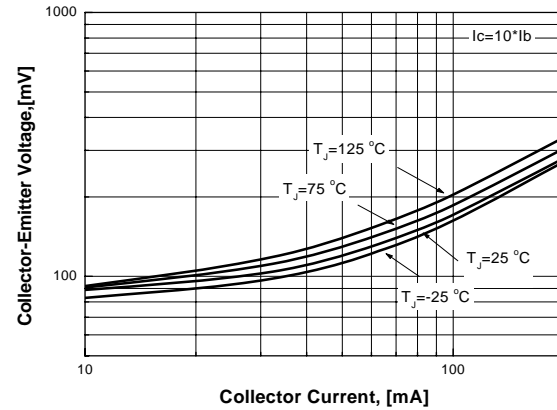


Figure 3. Base- Emitter Saturation Voltage

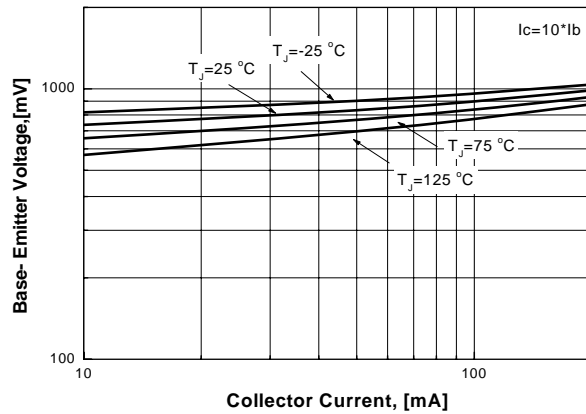


Figure 4. Collector- Base Leakage Current

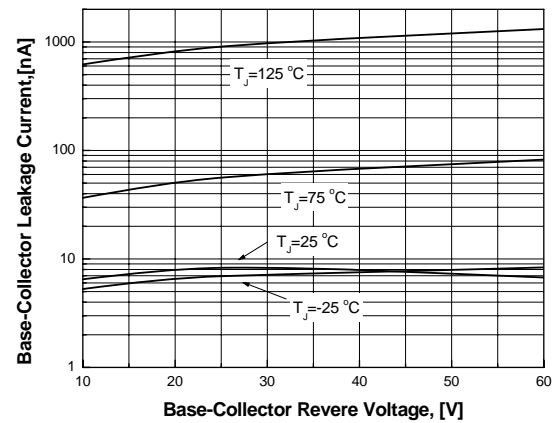


Figure 5. Collector- Base Capacitance

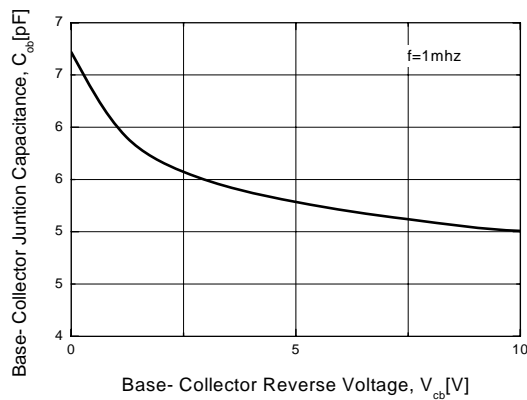
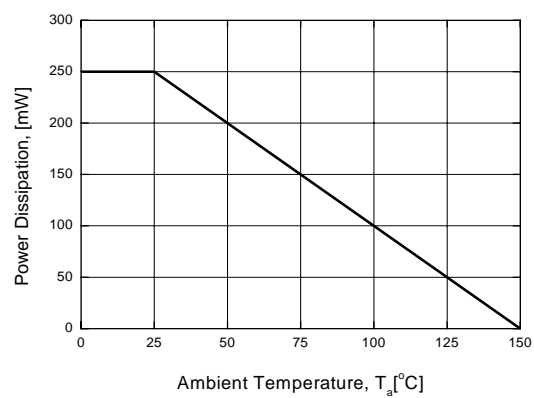


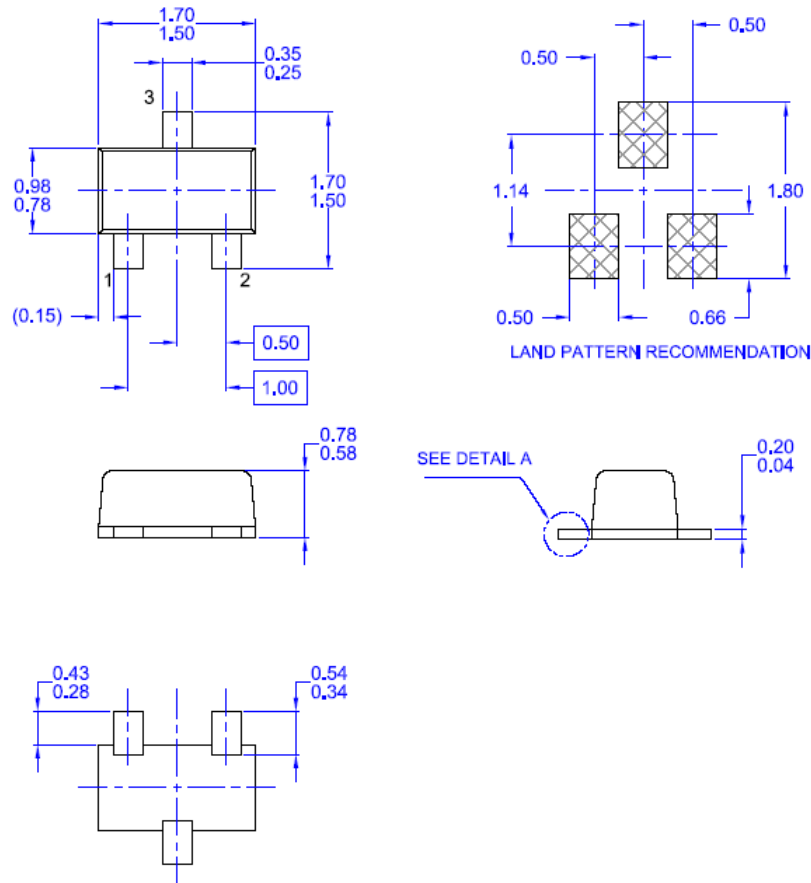
Figure 6. Power Derating



Package Dimensions

SOT-523F

- Case : SOT-523F
- Case Material(Molded Plastic): KTMC1060SC
- UL Flammability classification rating : "V0"
- Moisture Sensitivity level per JESD22-A1113B : MSL 1
- Lead terminals solderable per MIL-STD7502026 /JESD22A121
- Lead Free Plating : Pure Tin(Matte)



Dimensions in Millimeters



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