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# MMBT2222AT

## NPN Epitaxial Silicon Transistor

### Features

- General purpose amplifier transistor.
- Ultra-Small Surface Mount Package for all types.
- General purpose switching & amplification application



### Absolute Maximum Ratings $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage	75	V
$V_{CEO}$	Collector-Emitter Voltage	40	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current	600	mA
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 ~ 150	$^\circ\text{C}$

- \* 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\* $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max	Unit
$P_C$	Collector Power Dissipation, by $R_{\theta JA}$	250	mW
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	500	$^\circ\text{C}/\text{W}$

\* Minimum land pad.

### Electrical Characteristics\* $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Unit
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	75		V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 1\text{mA}, I_B = 0$	40		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	6		V
$I_{CEX}$	Collector Cut-off Current	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3\text{V}$		10	nA
$h_{FE}$	DC Current Gain	$V_{CE} = 1\text{V}, I_C = 0.1\text{mA}$ $V_{CE} = 1\text{V}, I_C = 1\text{mA}$ $V_{CE} = 1\text{V}, I_C = 10\text{mA}$ $V_{CE} = 1\text{V}, I_C = 150\text{mA}$	35 50 75 100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$		0.3 1.0	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$	0.6	1.2 2.0	V V
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$	300		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$		8	pF
$C_{ib}$	Input Capacitance	$V_{EB} = 0.5\text{V}, I_C = 0, f = 1\text{MHz}$		30	pF
$t_d$	Delay Time	$V_{CC} = 30\text{V}, I_C = 150\text{mA}$		10	ns
$t_r$	Rise Time	$I_{B1} = I_{B2} = 15\text{mA}$		25	ns
$t_s$	Storage Time			225	ns
$t_f$	Fall Time			60	ns

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

Typical Performance Characteristics

Figure 1. DC Current Gain

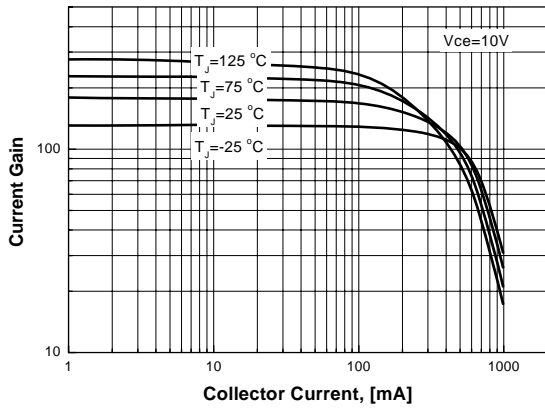


Figure 2. DC Current Gain

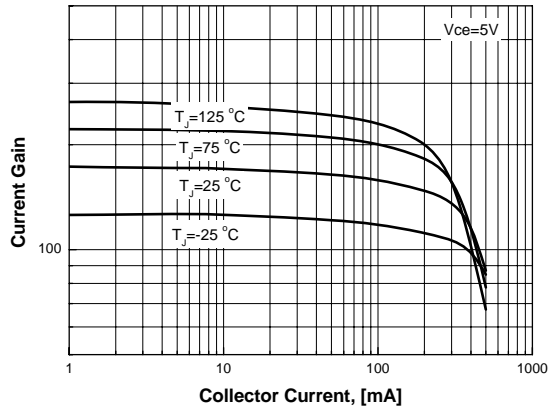


Figure 3. Collector-Emitter Saturation Voltage

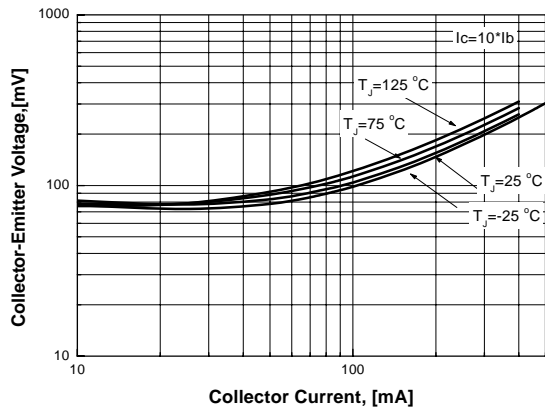


Figure 4. Base-Emitter Saturation voltage

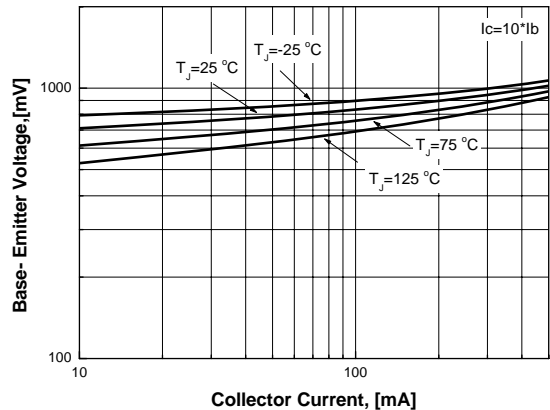


Figure 5. Collector-Base Leakage Current

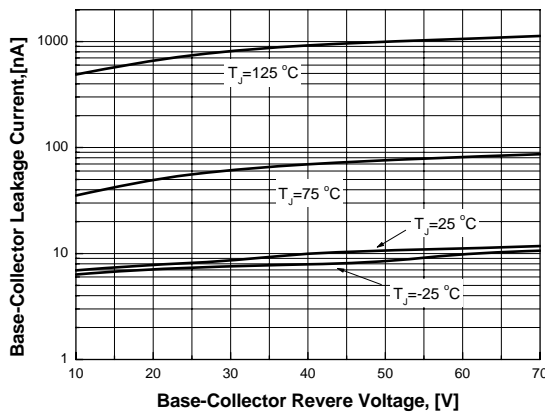
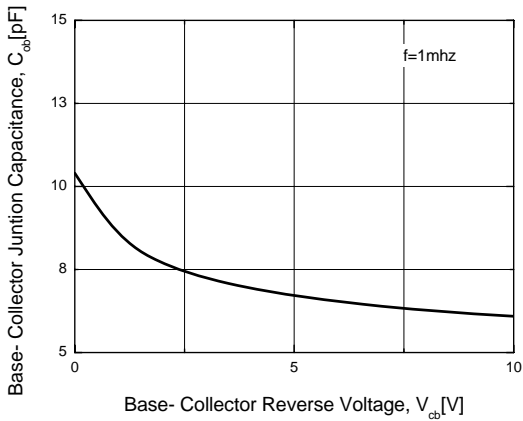
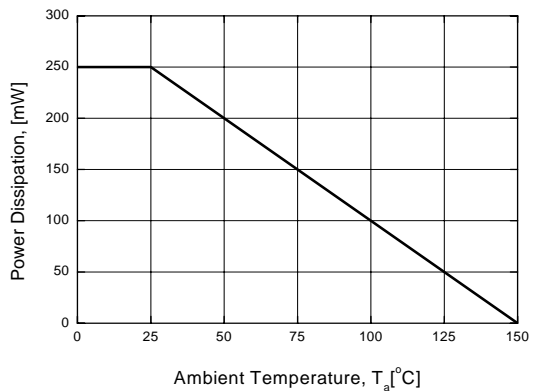


Figure 6. Collector-Base Capacitance



## Typical Performance Characteristics

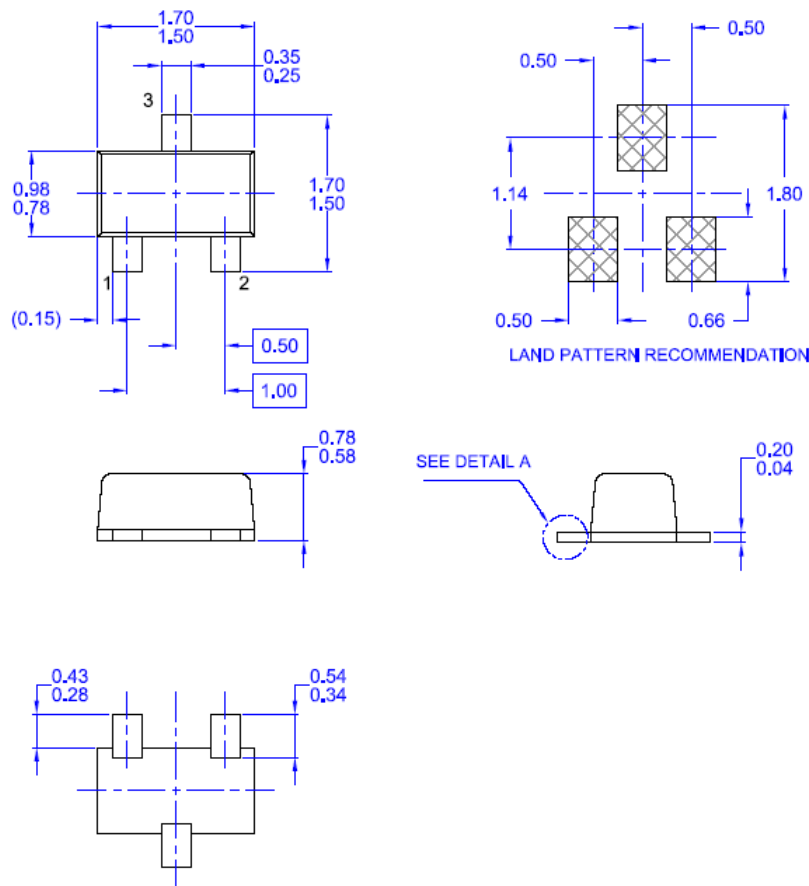
Figure 7. Power Derating



# 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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