



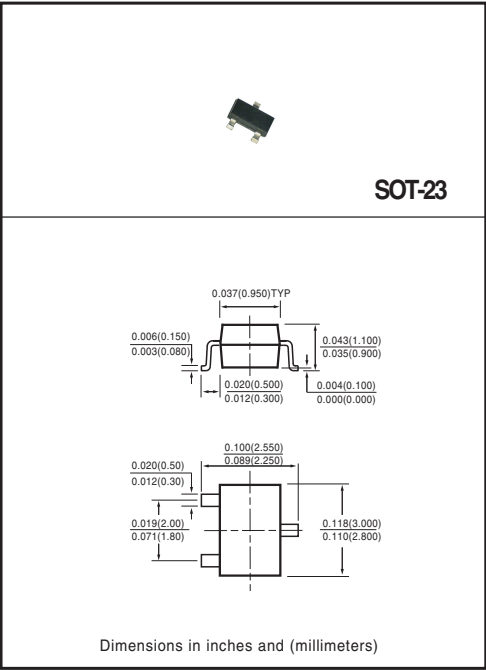
**SOT-23 BIPOLAR TRANSISTORS
TRANSISTOR(NPN)**

FEATURES

- * Power dissipation
 $P_{CM} 0.3 W(T_{amb}=25^{\circ}C)$
- * Collector current
 $I_{CM} 0.6 A$
- * Collector-base voltage
 $V_{(BR)CBO} 60 V$
- * Operating and storage junction temperature range
 $T_J, T_{stg}: -55^{\circ}C \text{ to } +150^{\circ}C$

MECHANICAL DATA

- * Case: Molded plastic
- * Epoxy: UL 94V-O rate flame retardant
- * Lead: MIL-STD-202E method 208C guaranteed
- * Mounting position: Any
- * Weight: 0.008 gram



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS
Ratings at 25°C ambient temperature unless otherwise specified.

RATINGS	SYMBOL	VALUE	UNITS
Zener Current (see Table "Characteristics")	-	-	-
Max. Steady State Power Dissipation ⁽¹⁾ @ T _A =25°C Derate above 25°C	P _D	300	mW
Max. Operating Temperature Range	T _J	-55 to +150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS (At T_A = 25°C unless otherwise noted)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance Junction to Ambient	R _{θJA}	-	-	417	°C/W
Max. Instantaneous Forward Voltage at I _F = 10mA	V _F	-	-	-	Volts

NOTES : 1. Alumina=0.4*0.3*0.024in. 99.5% alumina. 2006-3

ELECTRICAL CHARACTERISTICS (@TA=25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 10\text{mA}$, $I_B = 0$)	$V_{(BR)CEO}$	30	-	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	60	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	-	Vdc
Collector Cutoff Current ($V_{CE} = 60\text{Vdc}$, $V_{EB(off)} = 3.0\text{Vdc}$)	I_{CEX}	-	0.1	μA
Collector Cutoff Current ($V_{CB} = 60\text{Vdc}$, $I_E = 0$) ($V_{CB} = 60\text{Vdc}$, $I_E = 0$, $T_A = 125^\circ\text{C}$)	I_{CBO}	-	0.01 10	μA

ON CHARACTERISTICS

DC Current Gain ($I_C = 0.1\text{mA}$, $V_{CE} = 10\text{Vdc}$) ($I_C = 1.0\text{mA}$, $V_{CE} = 10\text{Vdc}$) ($I_C = 10\text{mA}$, $V_{CE} = 10\text{Vdc}$) ($I_C = 150\text{mA}$, $V_{CE} = 10\text{Vdc}$) (2) ($I_C = 500\text{mA}$, $V_{CE} = 10\text{Vdc}$) (2)	h_{FE}	35 50 75 100 30	- - - - -	-
Collector-Emitter Saturation Voltage (2) ($I_C = 150\text{mA}$, $I_B = 15\text{mA}$) ($I_C = 500\text{mA}$, $I_B = 50\text{mA}$)	$V_{CE(sat)}$	- -	0.4 1.6	Vdc
Base-Emitter Saturation Voltage (2) ($I_C = 150\text{mA}$, $I_B = 15\text{mA}$) ($I_C = 500\text{mA}$, $I_B = 50\text{mA}$)	$V_{BE(sat)}$	- -	1.3 2.6	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain-Bandwidth Product (3) ($I_C = 20\text{mA}$, $V_{CE} = 20\text{Vdc}$, $f = 100\text{MHz}$)	f_T	250	-	MHz
Input Capacitance ($V_{EB} = 0.5\text{Vdc}$, $I_C = 0$, $f = 1.0\text{MHz}$)	C_{ibo}	-	30	pF

NOTES : 2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

3. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity

RATING AND CHARACTERISTICS CURVES (MMBT2222LT1)

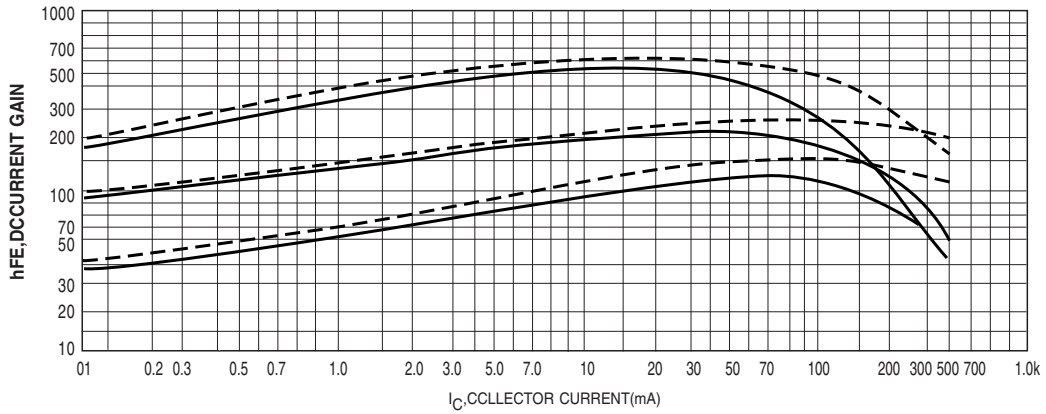


Figure 1. DC Current Gain

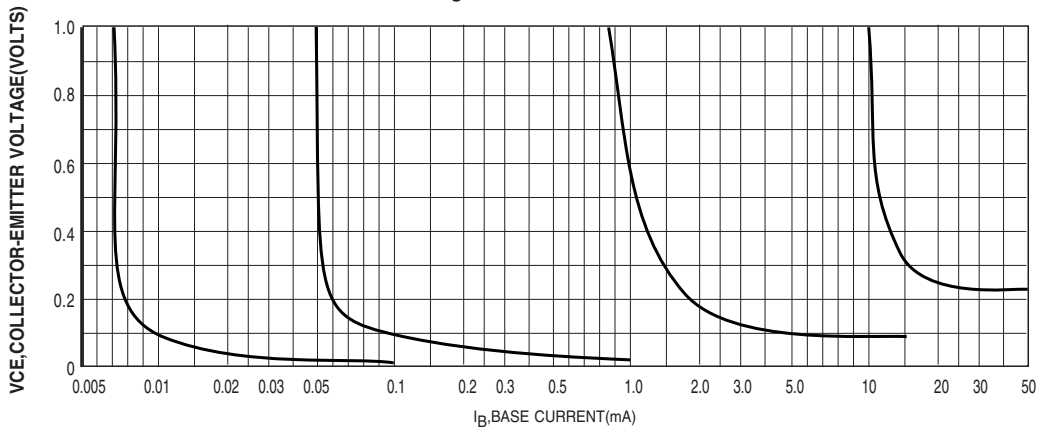


Figure 2. Collector Saturation Region

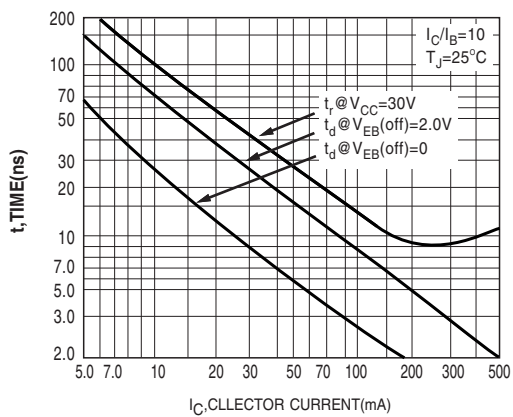


Figure 3. Turn-On Time

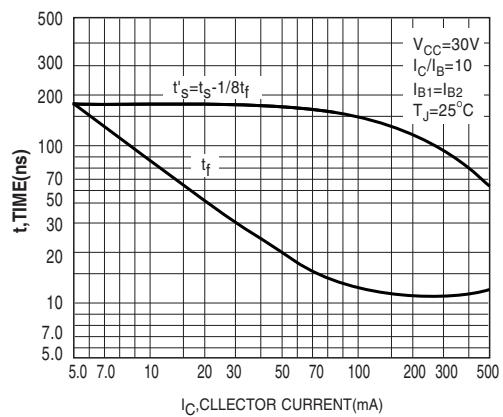


Figure 4. Turn-Off Time

RATING AND CHARACTERISTICS CURVES (MMBT2222LT1)

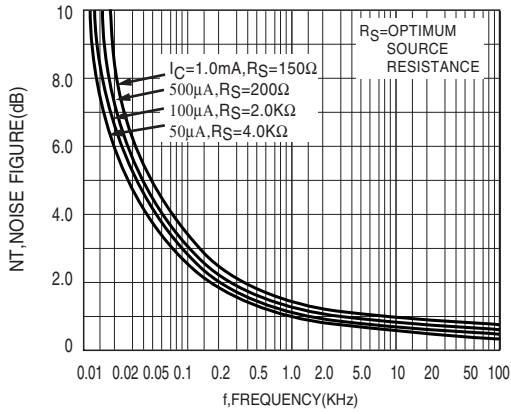


Figure 5. Frequency Effects

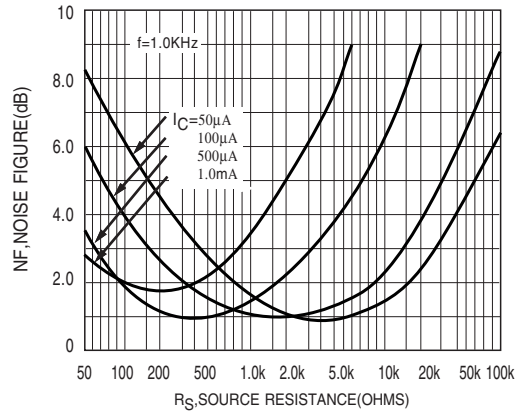


Figure 6. Source Resistance Effects

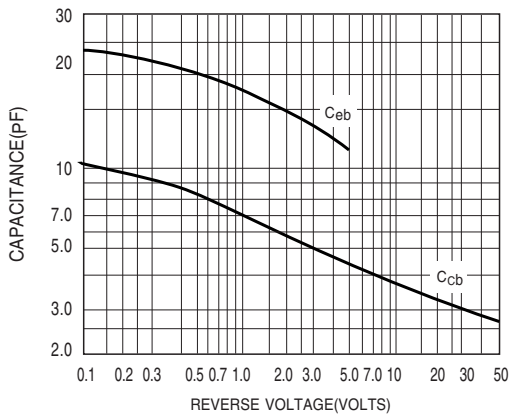


Figure 7. Capacitances

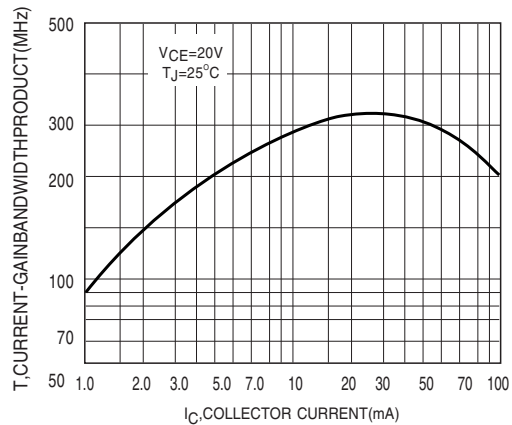


Figure 8. Current-Gain Bandwidth Product

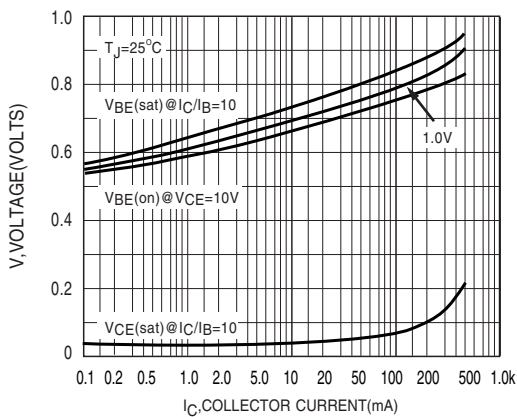


Figure 9. "On" Voltages

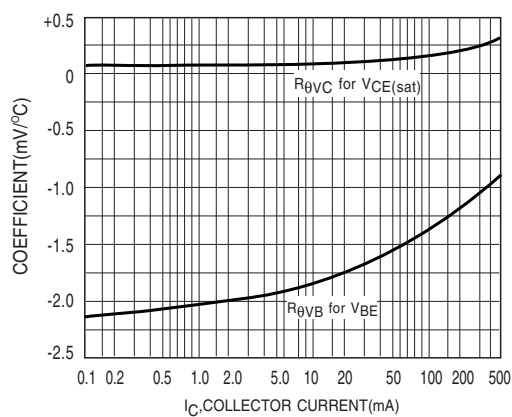


Figure 10. Temperature Coefficients