

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

FEATURES

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBT2907FW)
- Ideal for Medium Power Amplification and Switching

MARKING

1P

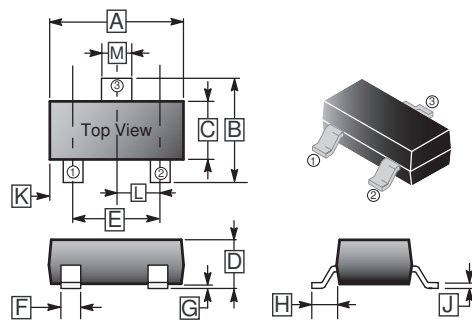
PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-523	3K	7 inch

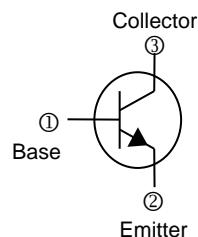
ORDER INFORMATION

Part Number	Type
MMBT2222AT-C	Lead (Pb)-free and Halogen-free

SOT-523



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.50	1.70	G	-	0.10
B	1.45	1.75	H	0.55 REF.	
C	0.70	0.90	J	0.08	0.20
D	0.60	0.90	K	-	
E	0.90	1.10	L	0.50 TYP.	
F	0.15	0.35	M	0.25	0.40



MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Collector-Base Voltage	V _{CBO}	75	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EBO}	6	V
Continuous Collector Current	I _C	600	mA
Total Device Dissipation FR-4 Board ¹	P _D	150	mW
Thermal Resistance, Junction-Ambient	R _{θJA}	833	°C/W
Junction & Storage Temperature Range	T _J , T _{STG}	-55~150	°C

Note:

1. Device mounted on FR-4 glass epoxy printed circuit board using the minimum recommended footprint.

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

Characteristic	Symbol	Min.	Max.	Unit	Test Conditions
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	75	-	V	$I_C=10\mu\text{A}, I_E=0$
Collector-Emitter Breakdown Voltage ¹	$V_{(BR)CEO}$	40	-	V	$I_C=10\text{mA}, I_B=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	-	V	$I_E=-10\mu\text{A}, I_C=0$
Collector Cut-off Current	I_{BL}	-	20	nA	$V_{CE}=60\text{V}, V_{EB}=3\text{V}$
Emitter Cut-off Current	I_{CEX}	-	100	nA	$V_{CE}=60\text{V}, V_{BE}=3\text{V}$
DC Current Gain ¹	h_{FE}	35	-		$I_C=0.1\text{mA}, V_{CE}=10\text{V}$
		50	-		$I_C=1\text{mA}, V_{CE}=10\text{V}$
		75	-		$I_C=10\text{mA}, V_{CE}=10\text{V}$
		100	-		$I_C=150\text{mA}, V_{CE}=10\text{V}$
		40	-		$I_C=500\text{mA}, V_{CE}=10\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.3	V	$I_C=150\text{mA}, I_B=15\text{mA}$
		-	1		$I_C=500\text{mA}, I_B=50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.6	1.2	V	$I_C=150\text{mA}, I_B=15\text{mA}$
		-	2		$I_C=500\text{mA}, I_B=50\text{mA}$
Current-Gain-Bandwidth Product	f_T	250	-	MHz	$V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$
Output Capacitance	C_{obo}	-	8	pF	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$
Input Capacitance	C_{ibo}	-	30	pF	$V_{BE}=0.5\text{V}, I_E=0, f=1\text{MHz}$
Input Impedance	h_{ie}	0.25	1.25	K Ω	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1\text{kHz}$
Voltage Feedback Ratio	h_{re}	-	4	$\times 10^{-4}$	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1\text{kHz}$
Small-Signal Current Gain	h_{fe}	75	375		$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1\text{kHz}$
Output Admittance	h_{oe}	25	200	μmhos	$V_{CE}=10\text{V}, I_C=10\text{mA}, f=1\text{kHz}$
Noise Figure	NF	-	4.0	dB	$V_{CE}=10\text{V}, I_C=100\mu\text{A}, R_S=1\text{k}\Omega, f=1\text{kHz}$
Delay Time	T_d	-	10	nS	$V_{CC}=3\text{V}, V_{BE}=-0.5\text{V}, I_C=150\text{mA}, I_{B1}=15\text{mA}$
Rise Time	T_r	-	25		
Storage Time	T_s	-	225	nS	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$
Fall Time	T_f	-	60		

Note:

1. Pulse Test: Pulse Width \leq 300s, Duty Cycles \leq 2%.

CHARACTERISTIC CURVES

SWITCHING TIME EQUIVALENT TEST CIRCUITS

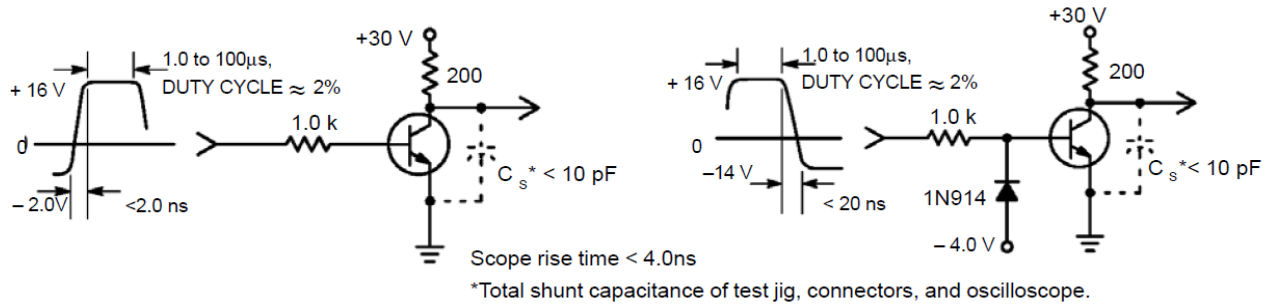


Figure 1. Turn-On Time

Figure 2. Turn-Off Time

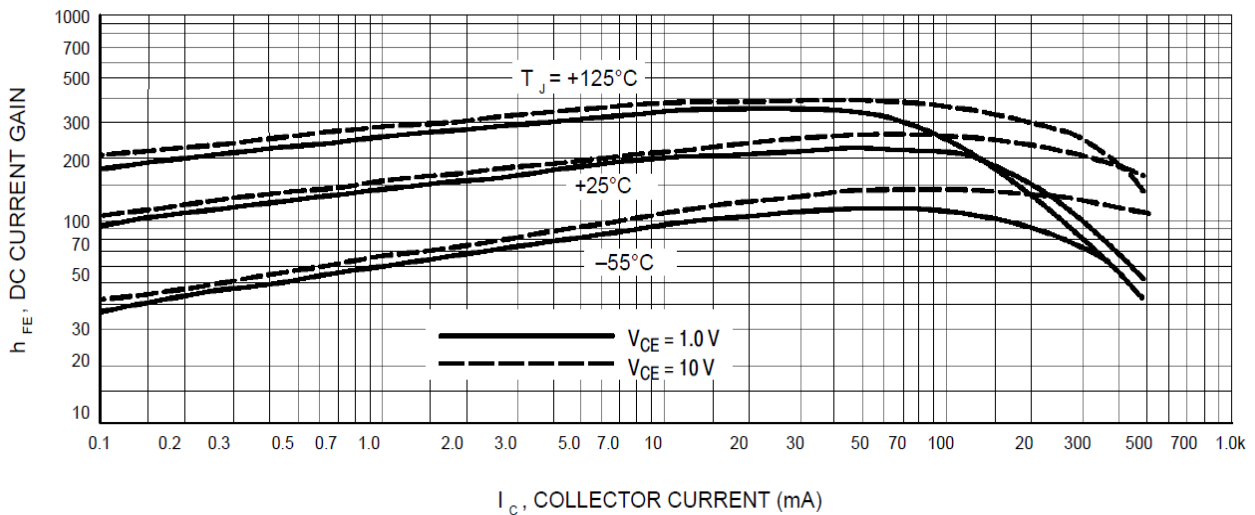


Figure 3. DC Current Gain

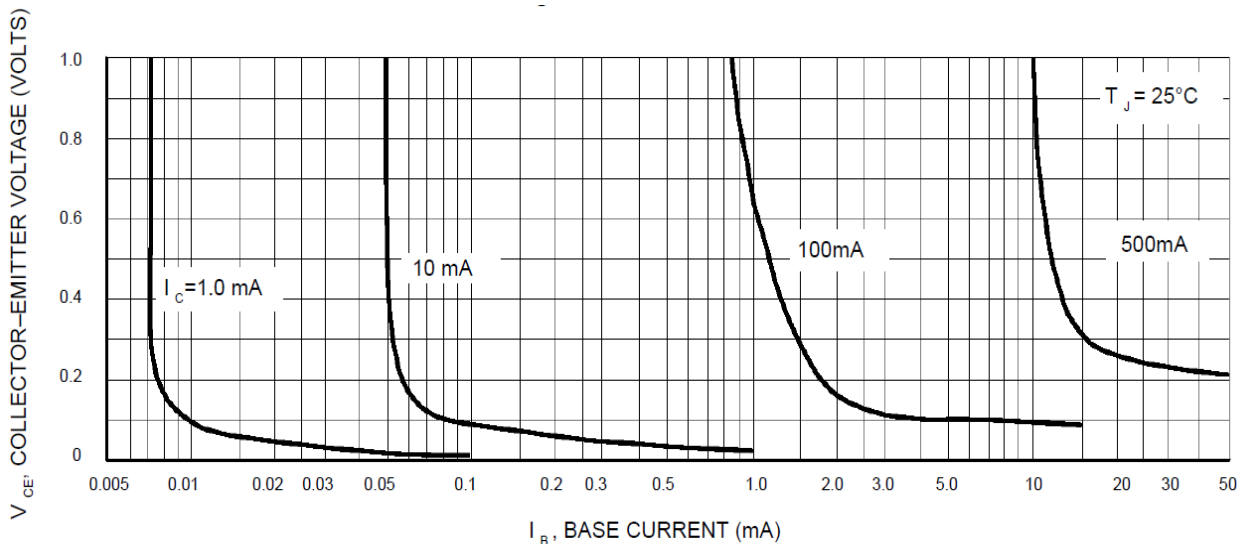


Figure 4. Collector Saturation Region

CHARACTERISTIC CURVES

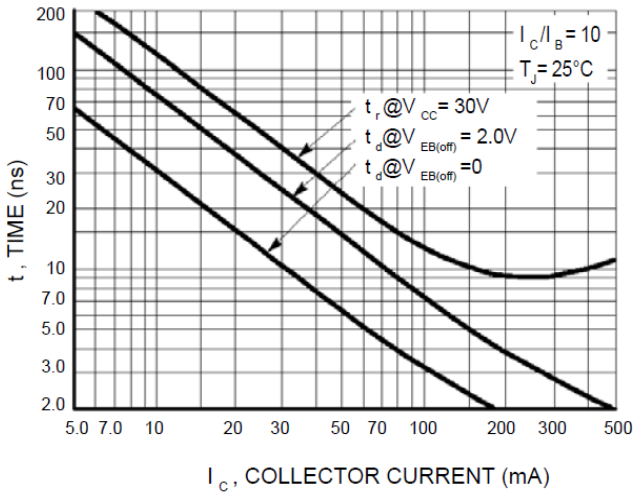


Figure 5. Turn-On Time

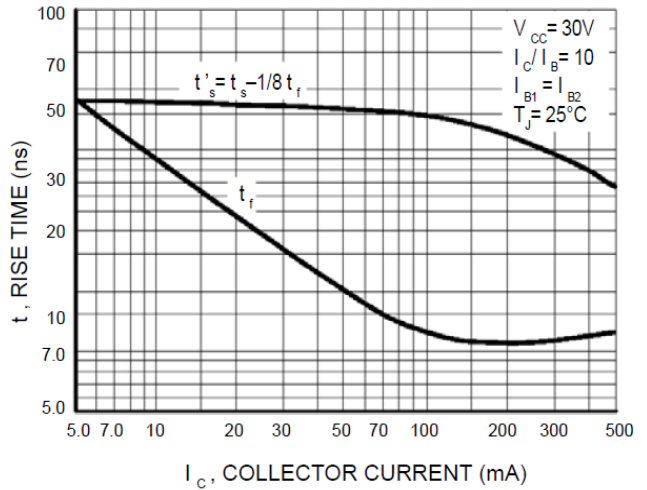


Figure 6. Turn - Off Time

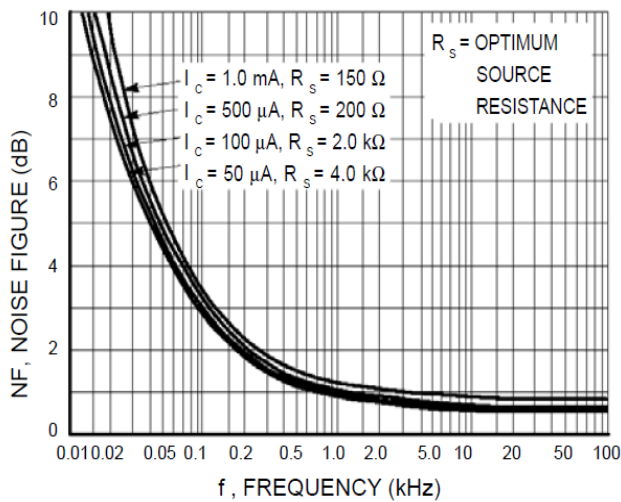


Figure 7. Frequency Effects

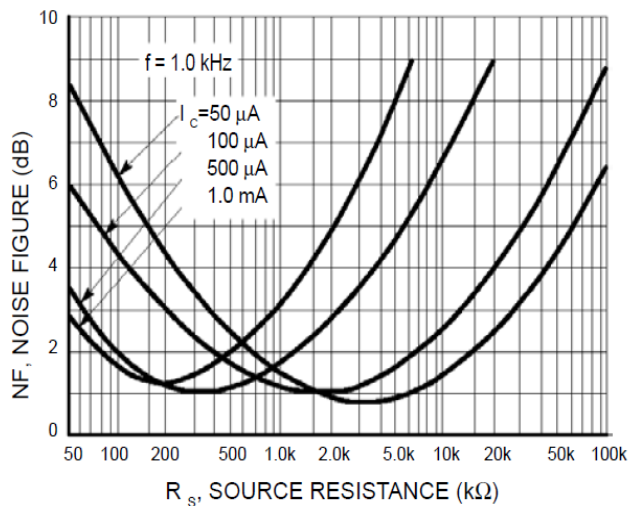


Figure 8. Source Resistance Effects

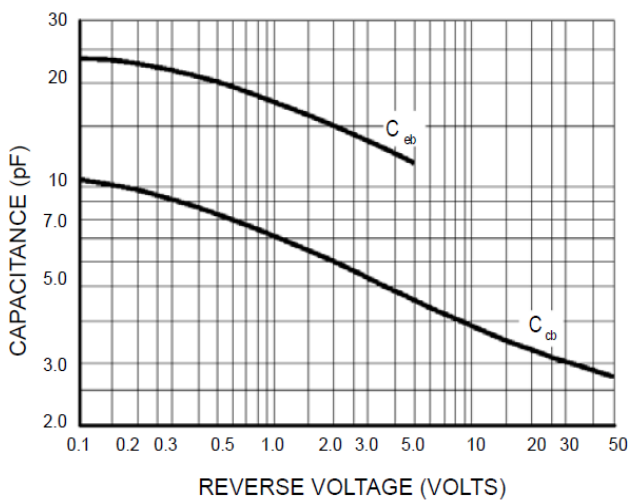


Figure 9. Capacitance

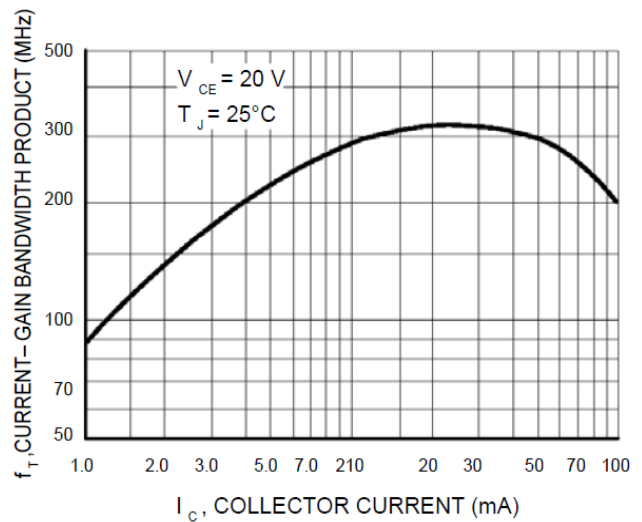
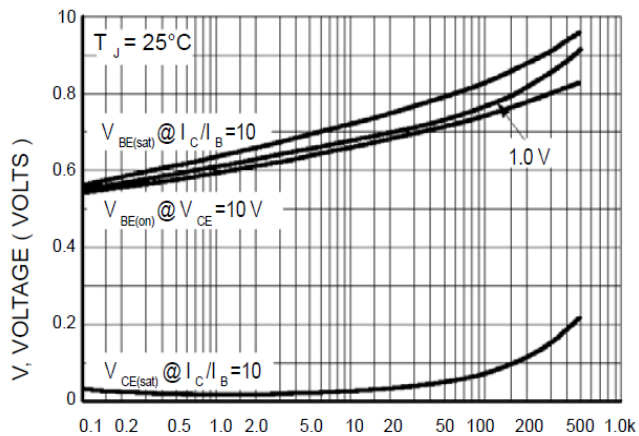
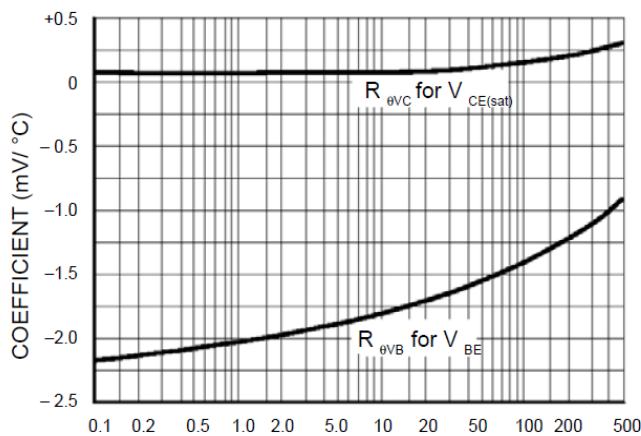


Figure 10. Current-Gain Bandwidth Product

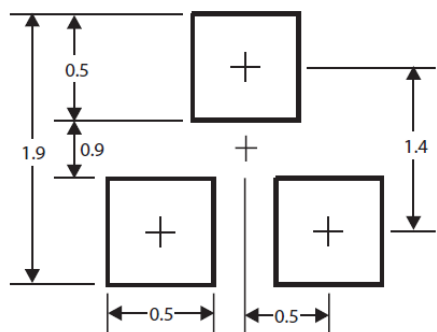
CHARACTERISTIC CURVES



I_C , COLLECTOR CURRENT (mA)
Figure 11. "On" Voltages



I_C , COLLECTOR CURRENT (mA)
Figure 12. Temperature Coefficients



*Dimensions in millimeters

Figure 13. Mounting Pad Layout