

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

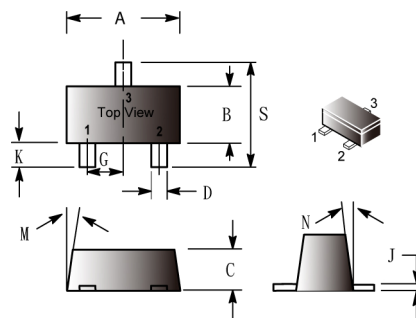
## MARKING CODE

1P

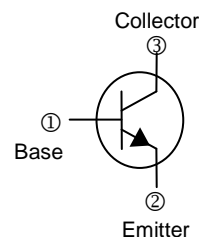
## PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-523	3K	7 inch

## SOT-523



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.50	1.70	K	0.30	0.50
B	0.75	0.95	M	---	10°
C	0.60	0.80	N	---	10°
D	0.23	0.33	S	1.50	1.70
G	0.50BSC				
J	0.10	0.20			



## MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Collector - Emitter Voltage	V <sub>CEO</sub>	40	V
Collector - Base Voltage	V <sub>CBO</sub>	75	V
Emitter - Base Voltage	V <sub>EBO</sub>	6	V
Collector Current - Continuous	I <sub>C</sub>	600	mA
Total Device Dissipation FR-4 Board @ T <sub>A</sub> =25°C <sup>1</sup>	P <sub>D</sub>	150	mW
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	833	°C / W
Junction & Storage Temperature	T <sub>J</sub> , T <sub>STG</sub>	-55~150	°C

Note:

1. Device mounted on FR4 glass epoxy printed circuit board using the minimum recommended footprint.

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

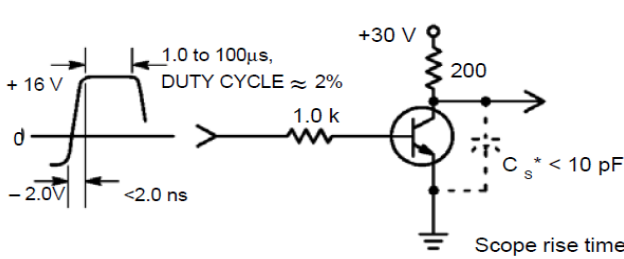
Characteristic	Symbol	Min.	Max.	Unit	Test Conditions
<b>Off Characteristics</b>					
Collector-Emitter Breakdown Voltage <sup>1</sup>	$V_{(BR)CEO}$	40	-	V	$I_C=10\text{ mA}, I_B=0$
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	75	-	V	$I_C=10\mu\text{A}, I_E=0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	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	$V_{CE}=60\text{V}, V_{BE}=3\text{V}$
<b>On Characteristics<sup>1</sup></b>					
DC Current Gain <sup>1</sup>	$h_{FE}$	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		$I_C=500\text{ mA}, I_B=50\text{ mA}$
<b>Small-Signal Characteristics</b>					
Curren-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	$V_{CB}=10\text{V}, I_E=0, f=1.0\text{ MHz}$
Input Capacitance	$C_{ibo}$	-	30	pF	$V_{BE}=0.5\text{V}, I_E=0, f=1.0\text{ MHz}$
Input Impedancen	$h_{ie}$	0.25	1.25	K $\Omega$	$V_{CE}=10\text{V}, I_C=10\text{ mA}, f=1.0\text{ kHz}$
Voltage Feedback Ratio	$h_{re}$	-	4	$\times 10^{-4}$	$V_{CE}=10\text{V}, I_C=10\text{ mA}, f=1.0\text{ kHz}$
Small-Signal Current Gain	$h_{fe}$	75	375		$V_{CE}=10\text{V}, I_C=10\text{ mA dc}, f=1.0\text{ kHz}$
Output Admittance	$h_{oe}$	25	200	$\mu\text{mhos}$	$V_{CE}=10\text{V}, I_C=10\text{ mA dc}, f=1.0\text{ kHz}$
Noise Figure	NF	-	4.0	dB	$V_{CE}=10\text{V}, I_C=100\mu\text{A}, R_S=1\text{ K}\Omega, f=1.0\text{ kHz}$
<b>Switching Characteristics</b>					
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:

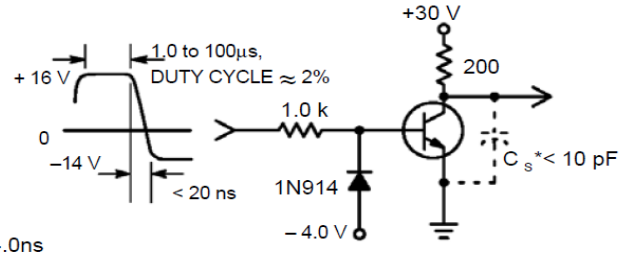
1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

**CHARACTERISTIC CURVES**

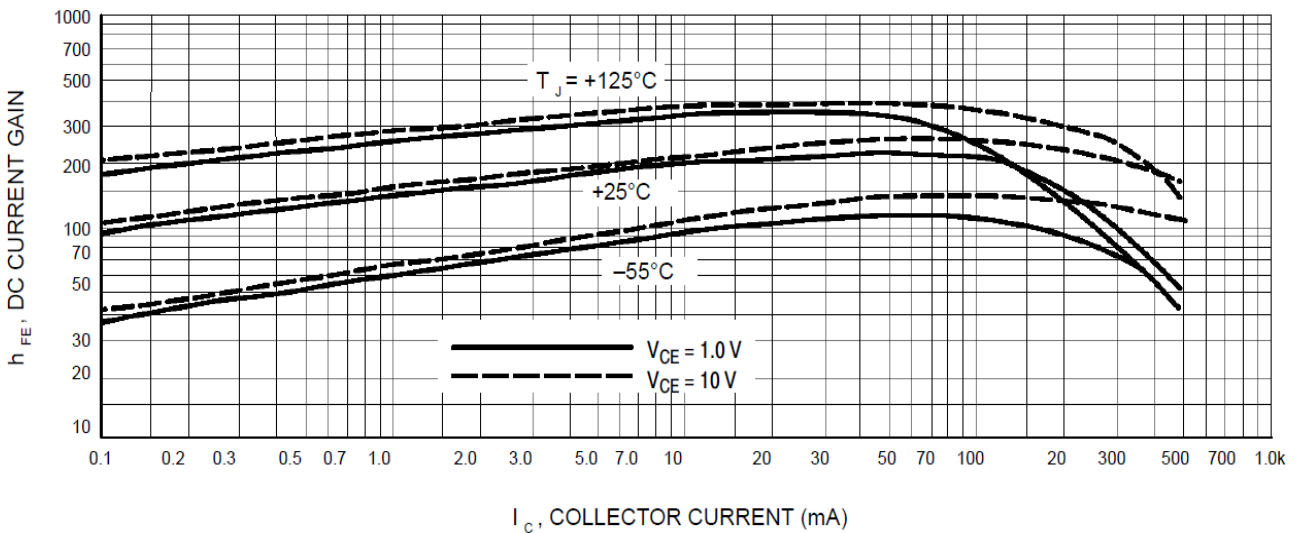
**SWITCHING TIME EQUIVALENT TEST CIRCUITS**



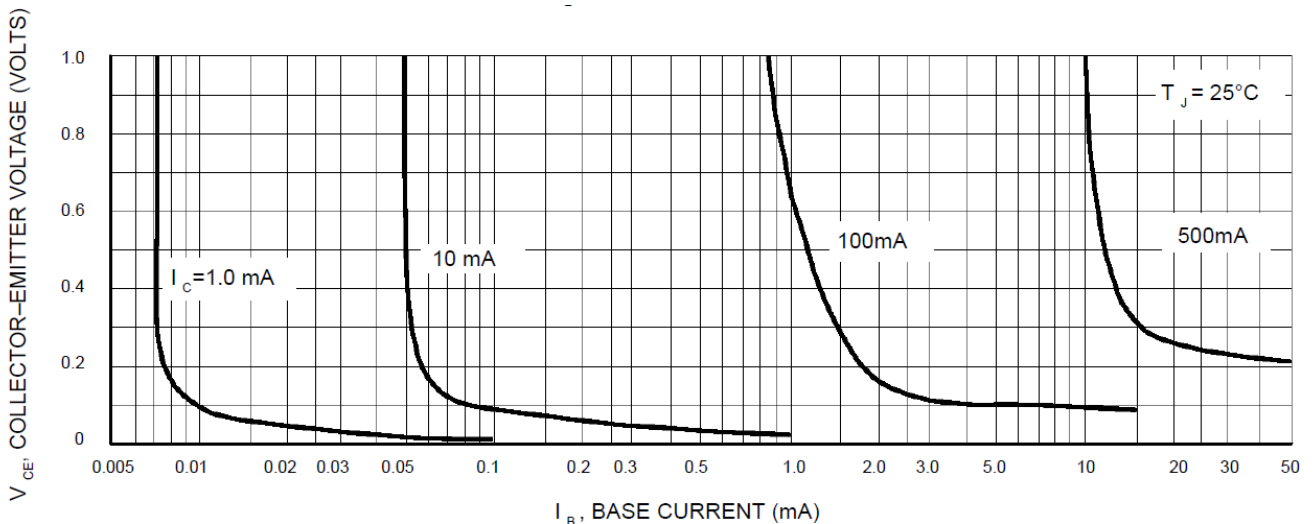
**Figure 1. Turn-On Time**



**Figure 2. Turn-Off Time**

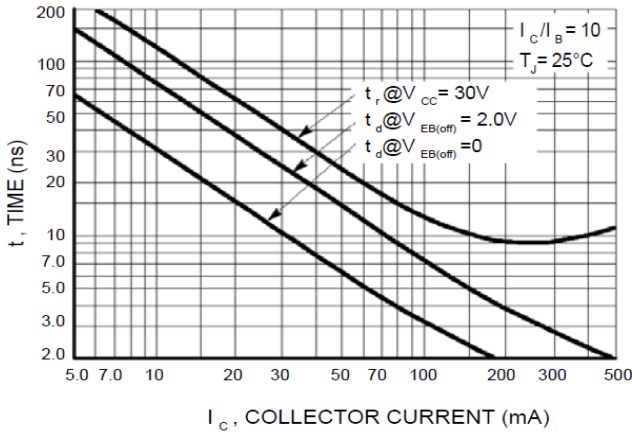


**Figure 3. DC Current Gain**

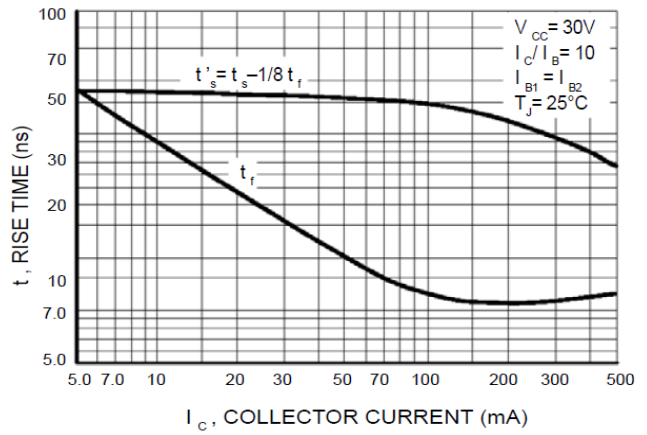


**Figure 4. Collector Saturation Region**

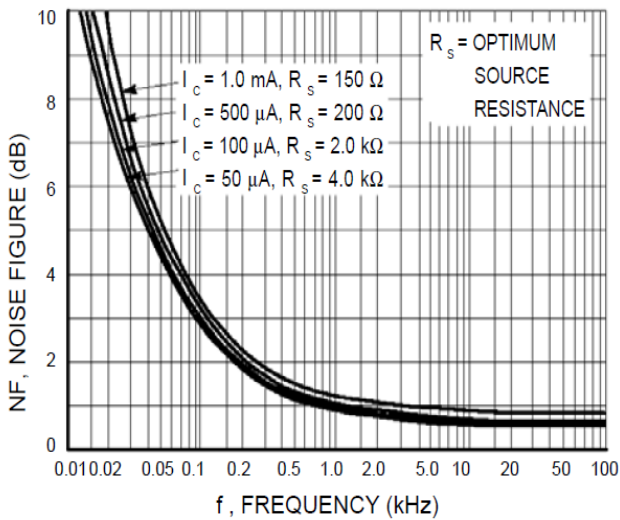
**CHARACTERISTIC CURVES**



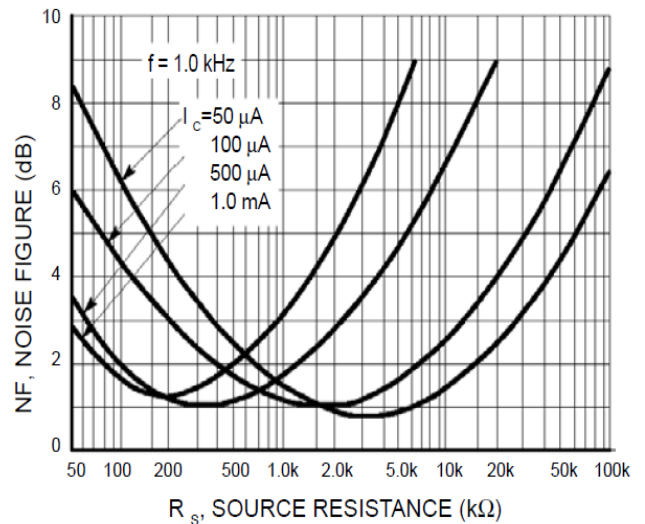
**Figure 5. Turn-On Time**



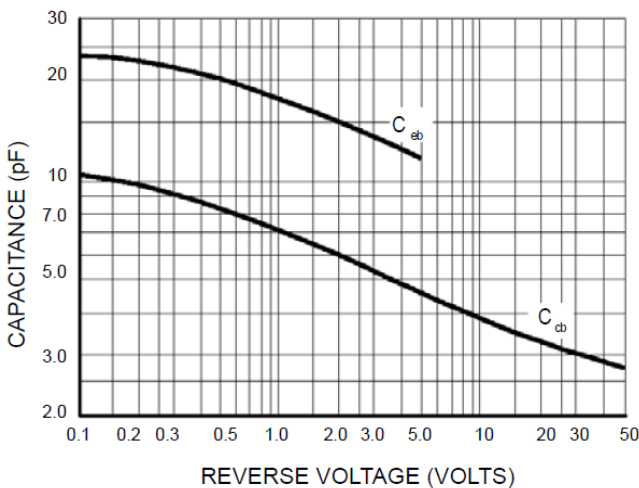
**Figure 6. Turn - Off Time**



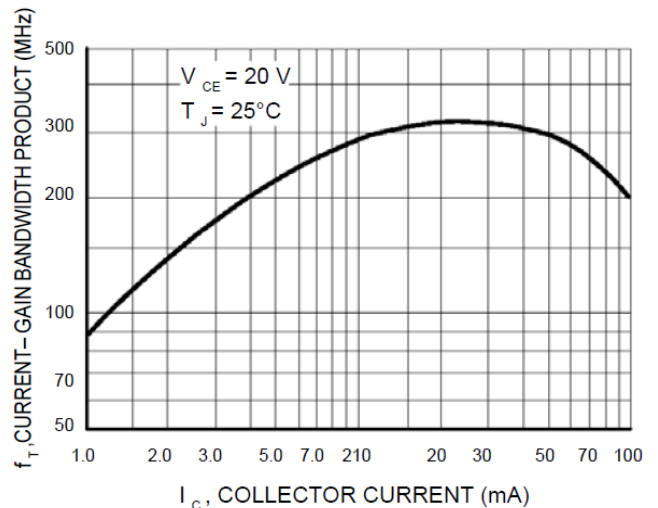
**Figure 7. Frequency Effects**



**Figure 8. Source Resistance Effects**

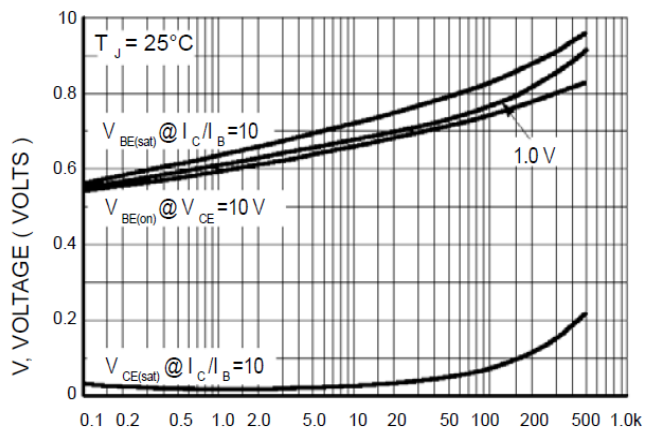


**Figure 9. Capacitance**



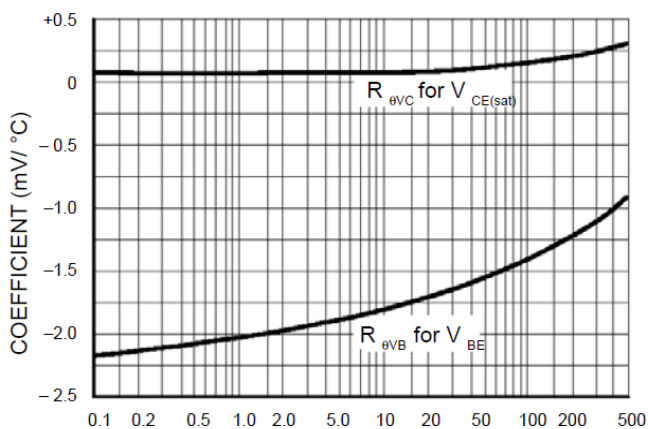
**Figure 10. Current- Gain Bandwidth Product**

**CHARACTERISTIC CURVES**



$I_C$ , COLLECTOR CURRENT (mA)

**Figure 11. "On" Voltages**



$I_C$ , COLLECTOR CURRENT (mA)

**Figure 12. Temperature Coefficients**