



Micro Commercial Components



Micro Commercial Components  
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# MMBT2222A

## NPN General Purpose Amplifier

### Features

- Halogen free available upon request by adding suffix "-HF"
- Surface Mount SOT-23 Package
- Capable of 350mWatts of Power Dissipation,  $I_C=600mA$
- Operating and Storage Junction Temperature:  $-55^{\circ}C$  to  $+150^{\circ}C$
- Thermal resistance, Junction to Ambient:  $357^{\circ}C/W$
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking: 1P
- Lead Free Finish/RoHS Compliant("P" Suffix designates

### Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
<b>OFF CHARACTERISTICS</b>				
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage* ( $I_C=10mA$ , $I_B=0$ )	40		Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=10\mu A$ , $I_E=0$ )	75		Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_E=10\mu A$ , $I_C=0$ )	6.0		Vdc
$I_{CEX}$	Collector Cutoff Current ( $V_{CE}=60Vdc$ , $V_{BE}=3.0Vdc$ )		10	nAdc

### ON CHARACTERISTICS

$\beta_{FE}$	DC Current Gain* ( $I_C=0.1mA$ , $V_{CE}=10Vdc$ ) ( $I_C=1.0mA$ , $V_{CE}=10Vdc$ ) ( $I_C=10mA$ , $V_{CE}=10Vdc$ ) ( $I_C=150mA$ , $V_{CE}=10Vdc$ ) ( $I_C=150mA$ , $V_{CE}=1.0Vdc$ ) ( $I_C=500mA$ , $V_{CE}=10Vdc$ )	35	300	Vdc	
		50			
		75			
		100			
		50			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=150mA$ , $I_B=15mA$ ) ( $I_C=500mA$ , $I_B=50mA$ )		0.3	1.0	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=150mA$ , $I_B=15mA$ ) ( $I_C=500mA$ , $I_B=50mA$ )	0.6	1.2	2.0	Vdc

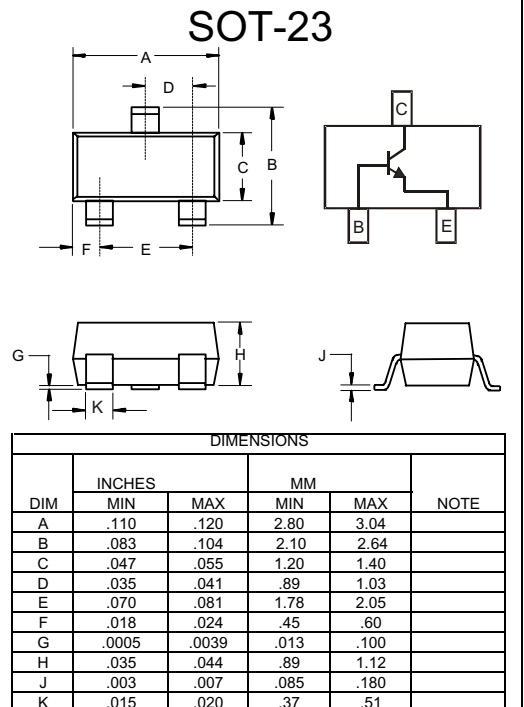
### SMALL-SIGNAL CHARACTERISTICS

$f_T$	Current Gain-Bandwidth Product ( $I_C=20mA$ , $V_{CE}=20Vdc$ , $f=100MHz$ )	300		MHz
$C_{obo}$	Output Capacitance ( $V_{CB}=10Vdc$ , $I_E=0$ , $f=1.0MHz$ )		8.0	pF
$C_{ibo}$	Input Capacitance ( $V_{BE}=0.5Vdc$ , $I_C=0$ , $f=1.0MHz$ )		25	pF
NF	Noise Figure ( $I_C=100\mu A$ , $V_{CE}=10Vdc$ , $R_S=1.0k\Omega$ , $f=1.0kHz$ )		4.0	dB

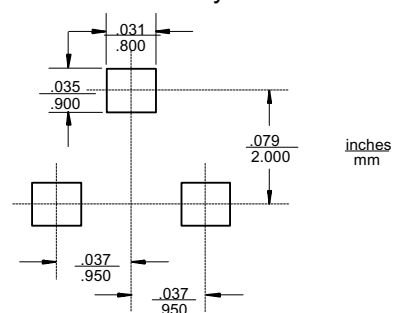
### SWITCHING CHARACTERISTICS

$t_d$	Delay Time	( $V_{CC}=30Vdc$ , $V_{BE}=0.5Vdc$ )	10	ns
$t_r$	Rise Time	( $I_C=150mA$ , $I_{B1}=15mA$ )	25	ns
$t_s$	Storage Time	( $V_{CC}=30Vdc$ , $I_C=150mA$ )	225	ns
$t_f$	Fall Time	( $I_{B1}=I_{B2}=15mA$ )	60	ns

\*Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$



### Suggested Solder Pad Layout



[www.mccsemi.com](http://www.mccsemi.com)

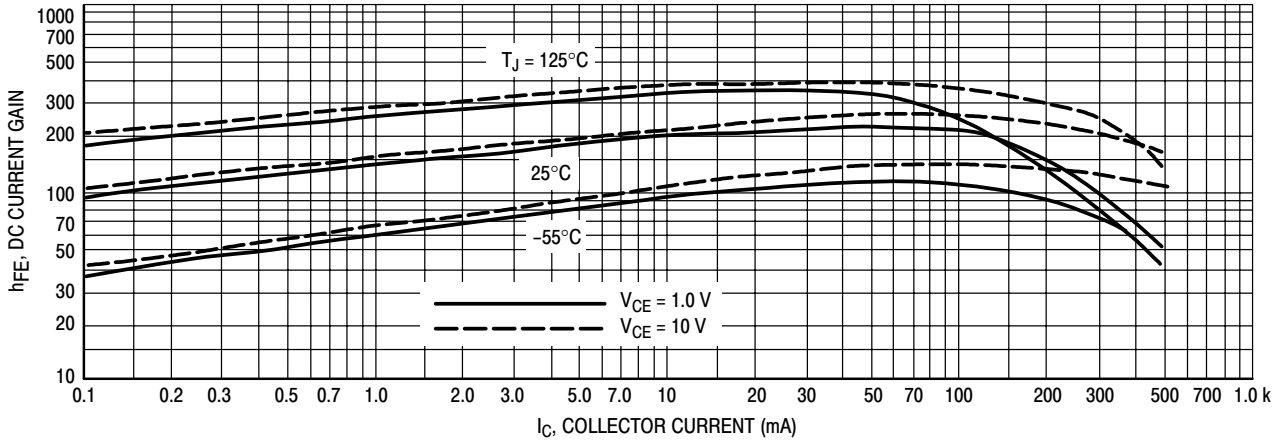


Figure 1. DC Current Gain

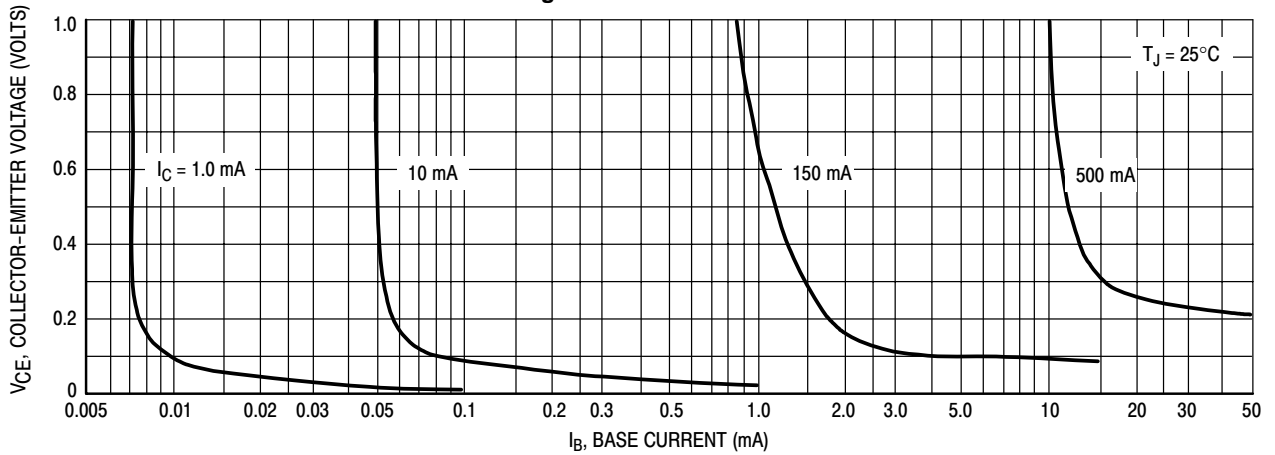


Figure 2. Collector Saturation Region

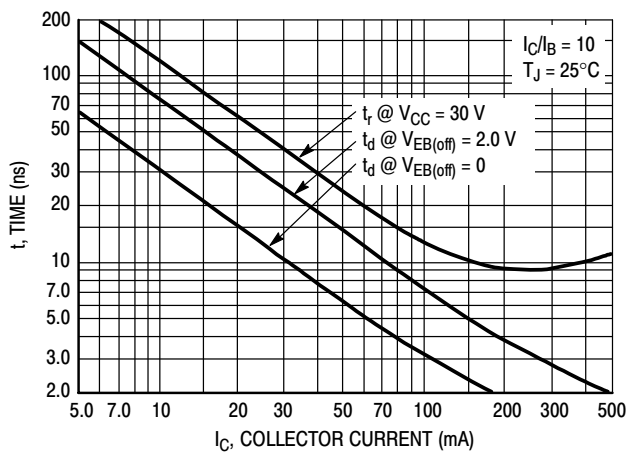


Figure 3. Turn-On Time

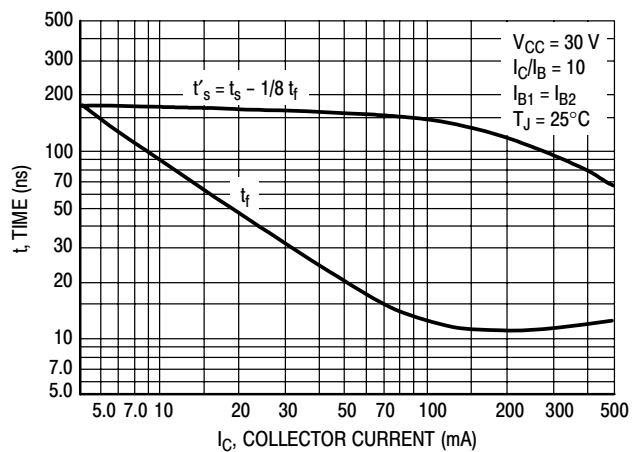


Figure 4. Turn-Off Time

# MMBT2222A

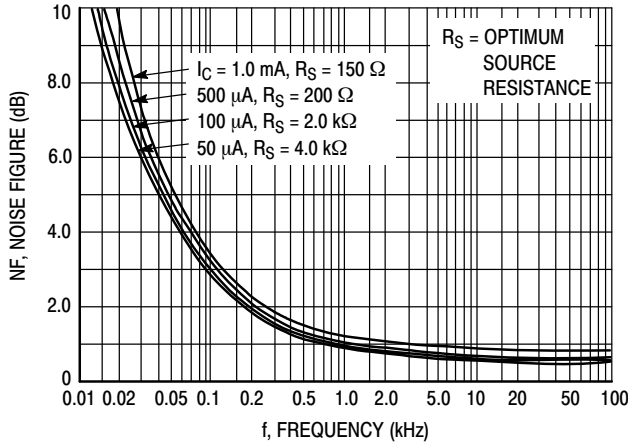


Figure 5. Frequency Effects

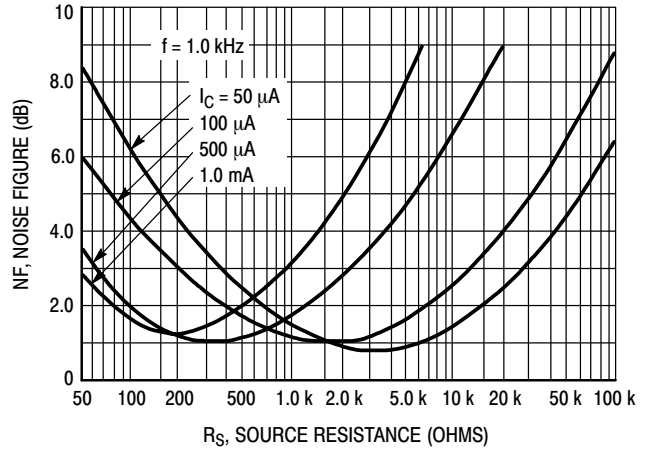


Figure 6. Source Resistance Effects

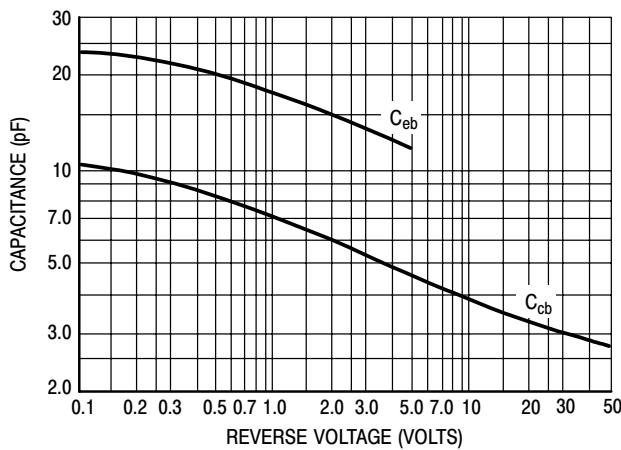


Figure 7. Capacitances

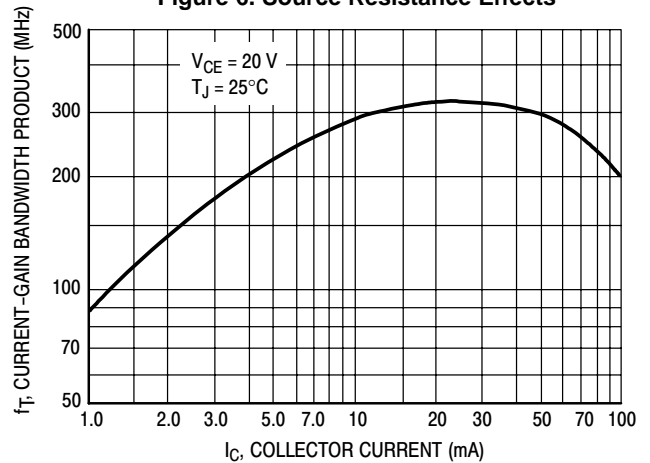


Figure 8. Current-Gain Bandwidth Product

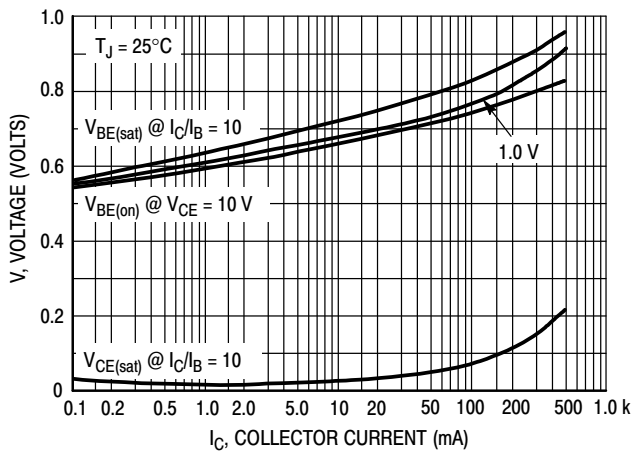


Figure 9. "On" Voltages

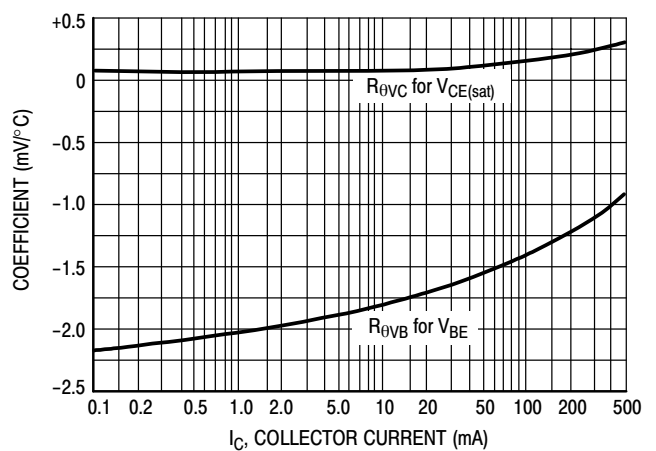


Figure 10. Temperature Coefficients



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### Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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