



# MMBT4403

## Features

- Operating and Storage Junction Temperatures: -55°C to 150°C
- Capable of 350mWatts of Power Dissipation
- Surface Mount SOT-23 Package
- $I_C = -600\text{mA}$
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Marking: 2T/M3A
- Halogen free available upon request by adding suffix "-HF"

## PNP General Purpose Amplifier

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

Symbol	Parameter	Min	Max	Units
<b>OFF CHARACTERISTICS</b>				
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(NOTE 1)</sup> ( $I_C = 1.0\text{mA}$ , $I_B = 0$ )	40		Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C = 100\mu\text{A}$ , $I_E = 0$ )	40		Vdc
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_E = 100\mu\text{A}$ , $I_C = 0$ )	5.0		Vdc
$I_{BL}$	Base Cutoff Current ( $V_{CE} = 30\text{Vdc}$ , $V_{BE} = 3.0\text{Vdc}$ )		0.1	$\mu\text{A}$
$I_{CEX}$	Collector Cutoff Current ( $V_{CE} = 30\text{Vdc}$ , $V_{BE} = 3.0\text{Vdc}$ )		0.1	$\mu\text{A}$

### ON CHARACTERISTICS

$\beta_{FE}$	DC Current Gain <sup>(NOTE 1)</sup> ( $I_C = 0.1\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ ) ( $I_C = 1.0\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ ) ( $I_C = 10\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ ) ( $I_C = 150\text{mA}$ , $V_{CE} = 2.0\text{Vdc}$ ) ( $I_C = 500\text{mA}$ , $V_{CE} = 2.0\text{Vdc}$ )	30		
		60		
		100		
		100	300	
		20		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$ ) ( $I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ )		0.4 0.75	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$ ) ( $I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ )	0.75	0.95 1.30	Vdc

### SMALL-SIGNAL CHARACTERISTICS

$f_T$	Current Gain-Bandwidth Product ( $I_C = 20\text{mA}$ , $V_{CE} = 10\text{Vdc}$ , $f = 100\text{MHz}$ )	200		MHz
$C_{cb}$	Output Capacitance ( $V_{CB} = 10\text{Vdc}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )		8.5	pF
$C_{eb}$	Input Capacitance ( $V_{EB} = 0.5\text{Vdc}$ , $I_C = 0$ , $f = 1.0\text{MHz}$ )		30.0	pF

### SWITCHING CHARACTERISTICS

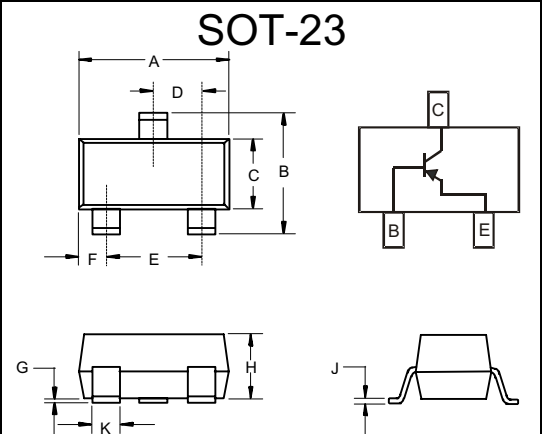
$t_d$	Delay Time	( $V_{CC} = 3.0\text{Vdc}$ , $V_{BE} = 2.0\text{Vdc}$ )	15	ns
$t_r$	Rise Time	( $I_C = 150\text{mA}$ , $I_{B1} = 15\text{mA}$ )	20	ns
$t_s$	Storage Time	( $V_{CC} = 3.0\text{Vdc}$ , $I_C = 150\text{mA}$ )	225	ns
$t_f$	Fall Time	( $I_{B1} = I_{B2} = 15\text{mA}$ )	30	ns

### THERMAL CHARACTERISTICS

$R_{thJA}$	Thermal Resistance, Junction to Ambient <sup>(NOTE 2)</sup>	357	°C/W
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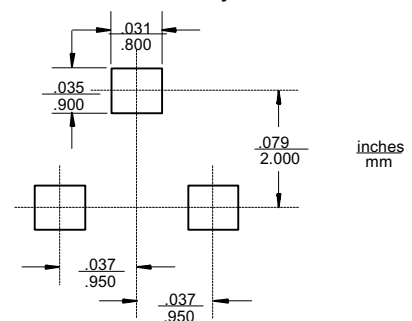
NOTE: 1. Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

2. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

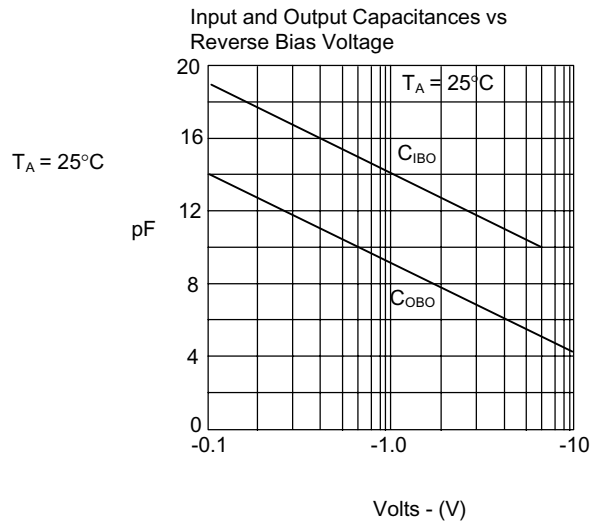
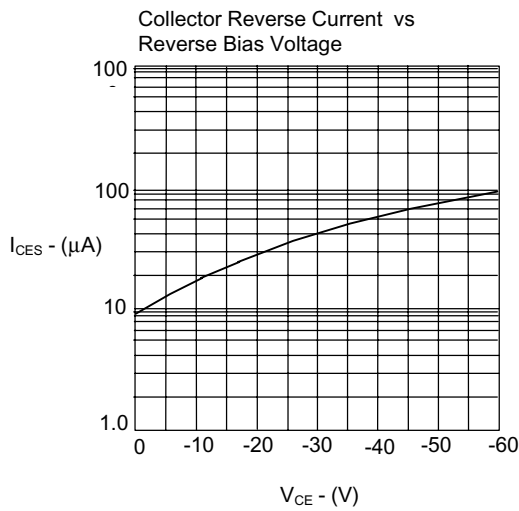
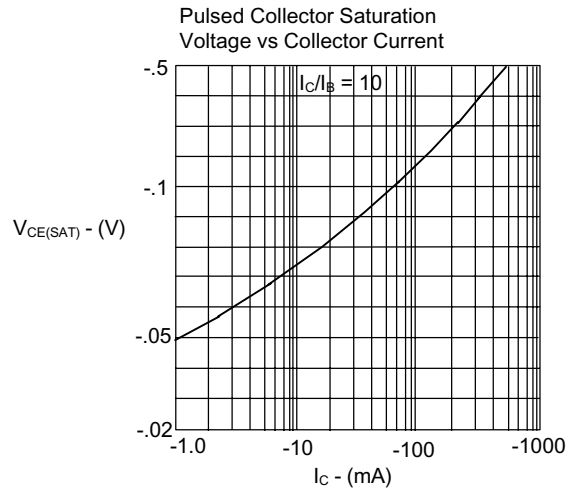
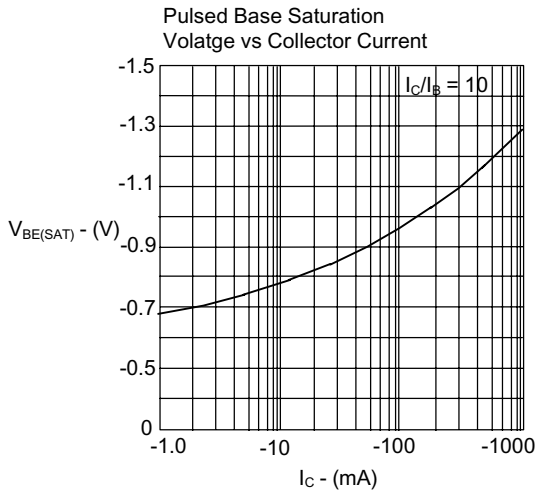
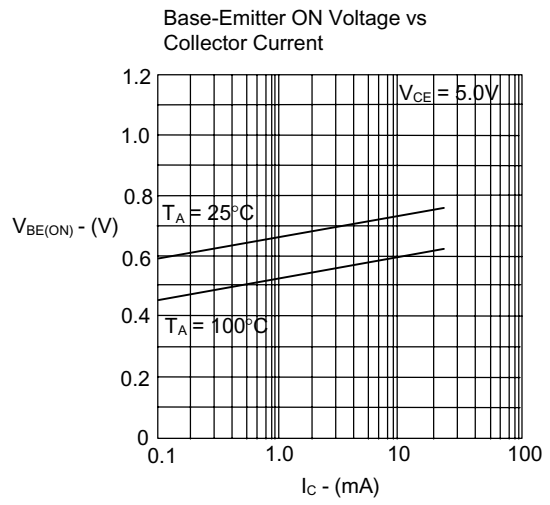
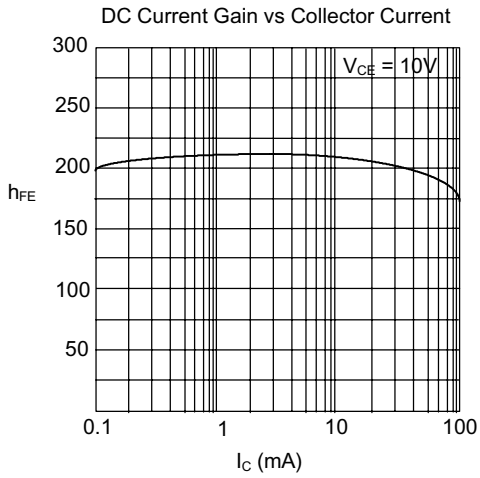


DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.104	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

### Suggested Solder Pad Layout



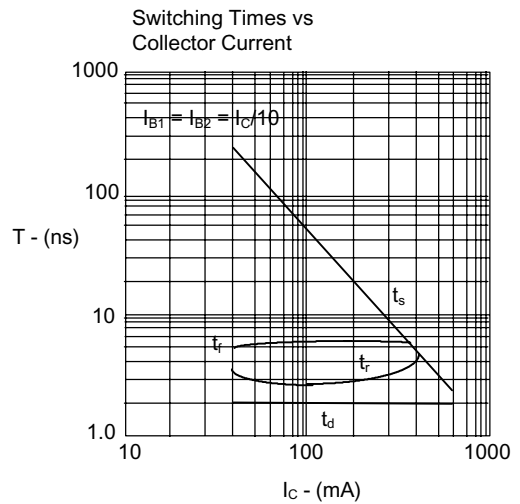
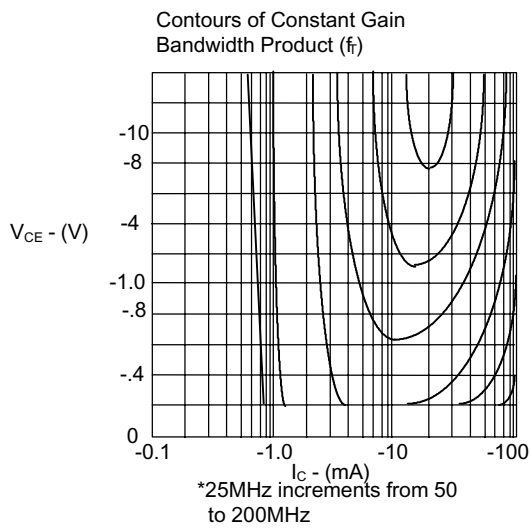
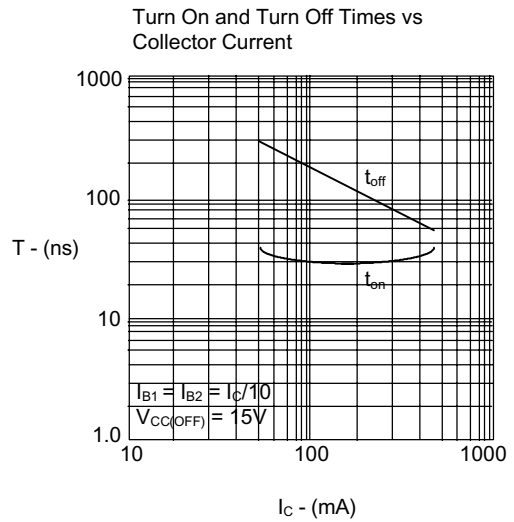
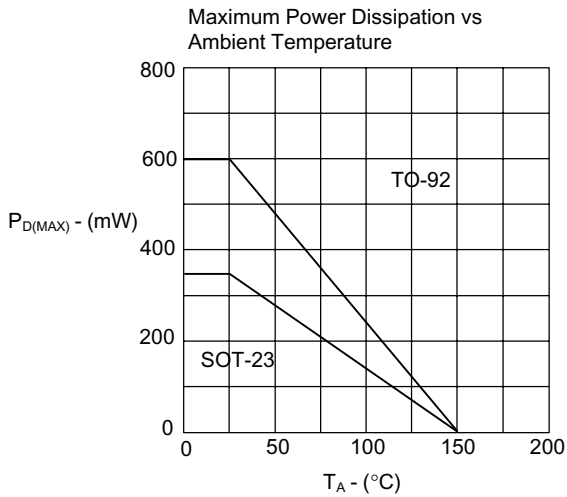
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### Ordering Information :

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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