

# MMBTH10

## NPN VHF/UHF Transistors

### Features

- Halogen free available upon request by adding suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Designed for VHF/UHF Amplifier applications and high output VHF Oscillators
- High current gain bandwidth product
- Marking Code: 3EM
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1

### Maximum Ratings

Symbol	Rating	Rating	Unit
$V_{CEO}$	Collector-Emitter Voltage	25	V
$V_{CBO}$	Collector-Base Voltage	30	V
$V_{EBO}$	Emitter-Base Voltage	3.0	V
$I_C$	Collector Current-Continuous <sup>(1)</sup>	50	mA
$P_C$	Power dissipation <sup>(2)</sup>	225	mW
$T_J$	Junction Temperature	-55 to +150	°C
$T_{STG}$	Storage Temperature	-55 to +150	°C

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

Symbol	Parameter	Min	Max	Units
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#### OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ( $I_C=1.0mA, I_B=0$ )	25	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ( $I_C=100\mu A, I_E=0$ )	30	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage ( $I_C=10\mu A, I_C=0$ )	3.0	---	Vdc
$I_{CBO}$	Collector-Base Cutoff Current ( $V_{CB}=25Vdc, I_E=0$ )	---	100	nAdc
$I_{EBO}$	Emitter-Base Cutoff Current ( $V_{EB}=2.0Vdc, I_C=0$ )	---	100	nAdc

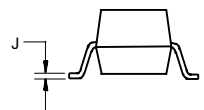
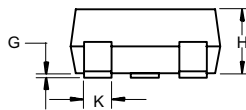
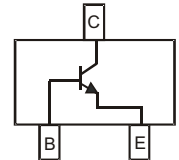
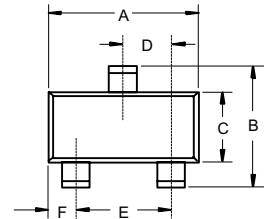
#### ON CHARACTERISTICS

$h_{FE}$	DC Current Gain ( $I_C=4.0mA, V_{CE}=10Vdc$ )	60	---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ( $I_C=4.0mA, I_B=400\mu A$ )	---	0.5	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ( $I_C=4.0mA, V_{CE}=10Vdc$ )	---	0.95	Vdc

#### SMALL SIGNAL CHARACTERISTICS

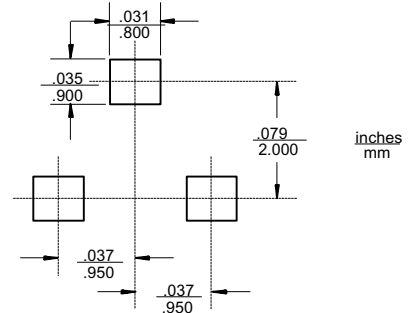
$f_T$	Current-Gain-Bandwidth Product ( $V_{CE}=10V, f=100MHz, I_C=4.0mA$ )	650	---	MHz
$C_{CB}$	Collector-Base Capacitance ( $V_{CB}=10V, f=1.0MHz, I_E=0$ )	---	0.7	pF
$C_{RB}$	Collector-Base Feedback Capacitance ( $V_{CB}=10V, f=1.0MHz, I_E=0$ )	---	0.65	pF

Note: 1. Valid provided that terminals are kept at ambient temperature.  
 2. Pulse test: Pulse width<300us, duty cycle<2%



DIM	DIMENSIONS				NOTE
	INCHES		MM		
A	.110	.120	2.80	3.04	
B	.083	.104f	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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