



# MMBTH10

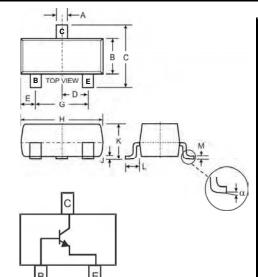
## NPN SURFACE MOUNT VHF/UHF TRANSISTOR

## **Features**

- Designed for VHF/UHF Amplifier Applications and High Output VHF Oscillators
- High Current Gain Bandwidth Product
- Ideal for Mixer and RF Amplifier Applications with collector currents in the 100µA - 30 mA Range
- Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 3 and 4)
- Qualified to AEC-Q101 Standards for High Reliability

## **Mechanical Data**

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking Information: K3H, K3Y; See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)



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SOT-23										
Dim	Min	Max								
Α	0.37	0.51								
В	1.20	1.40								
C	2.30	2.50								
D	0.89	1.03								
E	0.45	0.60								
G	1.78	2.05								
Н	2.80	3.00								
J	0.013	0.10								
K	0.903	1.10								
L	0.45	0.61								
М	0.085	0.180								
α	0°	8°								
All Dimensions in mm										

# Maximum Ratings @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	30	V
Collector-Emitter Voltage	$V_{CEO}$	25	V
Emitter-Base Voltage	$V_{EBO}$	3.0	V
Collector Current - Continuous (Note 1)	Ι <sub>C</sub>	50	mA
Power Dissipation (Note 1)	$P_{D}$	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{ heta JA}$	417	°C/W
Operating and Storage Temperature Range	$T_J$ , $T_{STG}$	-55 to +150	°C

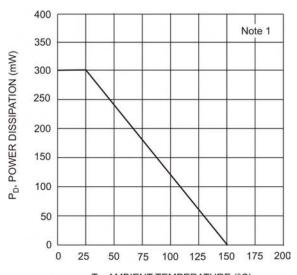
# **Electrical Characteristics** @TA = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition				
OFF CHARACTERISTICS (Note 2)									
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	25	_	V	$I_{C} = 1 \text{mA}, I_{B} = 0$				
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	30	_	V	$I_C = 100 \mu A, I_E = 0$				
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	3.0	_	V	$I_E = 10 \mu A, I_C = 0$				
Collector Cutoff Current	I <sub>CBO</sub>		100	nA	$V_{CB} = 25V, I_E = 0$				
Emitter Cutoff Current	I <sub>EBO</sub>		100	nA	$V_{EB} = 2V$ , $I_C = 0$				
ON CHARACTERISTICS (Note 2)									
DC Current Gain	h <sub>FE</sub>	60	_	_	$I_C = 4mA, V_{CE} = 10.0V$				
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	_	0.5	V	$I_C = 4mA$ , $I_B = 400 \mu A$				
Base-Emitter On Voltage	V <sub>BE(SAT)</sub>		0.95	V	$I_C = 4mA, V_{CE} = 10.0V$				
SMALL SIGNAL CHARACTERISTICS	·		•	3					
Current Gain-Bandwidth Product	f <sub>T</sub>	650	_	MHz	$V_{CE} = 10V$ , $f = 100MHz$ , $I_{C} = 4mA$				
Collector-Base Capacitance	C <sub>CB</sub>	_	0.7	pF	$V_{CB} = 10V$ , $f = 1.0MHz$ , $I_E = 0$				
Collector-Base Feedback Capacitance	C <sub>RB</sub>	_	0.65	pF	$V_{CB} = 10V$ , $f = 1.0MHz$ , $I_E = 0$				
Collector-Base Time Constant	Rb'Cc	_	9	ps	V <sub>CB</sub> = 10V, f = 31.8MHz, I <sub>C</sub> = 4mA				

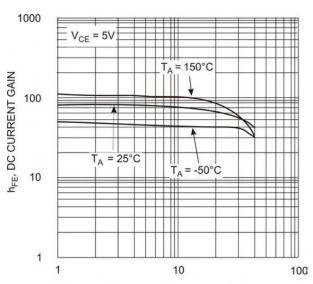
Notes:

- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch, pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
- Short duration pulse test used to minimize self-heating effect.
- No purposefully added lead. Halogen and Antimony Free.
- Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

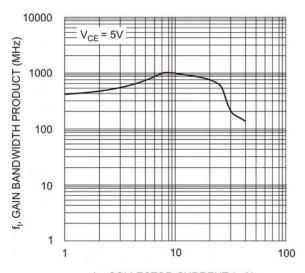




T<sub>A</sub>, AMBIENT TEMPERATURE (°C) Fig. 1, Max Power Dissipation vs Ambient Temperature



 $I_{C}$ , COLLECTOR CURRENT (mA) Fig. 3, DC Current Gain vs. Collector Current



I<sub>C</sub>, COLLECTOR CURRENT (mA) Fig. 5, Gain Bandwidth Product vs Collector Current

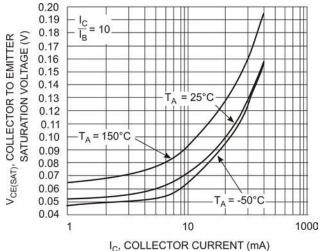


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

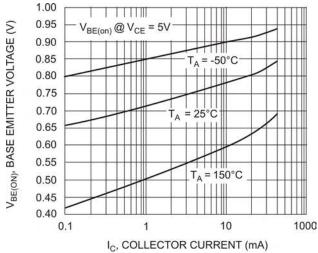


Fig. 4 Base Emitter Voltage vs. Collector Current

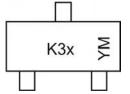


## **Ordering Information** (Note 5)

Device	Packaging	Shipping			
MMBTH10-7-F	SOT-23	3000/Tape & Reel			

5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

# **Marking Information**



K3x = Product Type Marking Code, e.g. K3H

YM = Date Code Marking

Y = Year ex: N = 2002

M = Month ex: 9 = September

#### Date Code Key

Date Code N	ey														
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	М	N	Р	R	S	Т	U	V	W	Χ	Υ	Z
Month	Jan	Fe	b I	Mar	Apr	May	Ju	n	Jul	Aug	Sep	Oc	t I	Nov	Dec
Code	1	2		3	4	5	6		7	8	9	0		N	D

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