MMBTH10

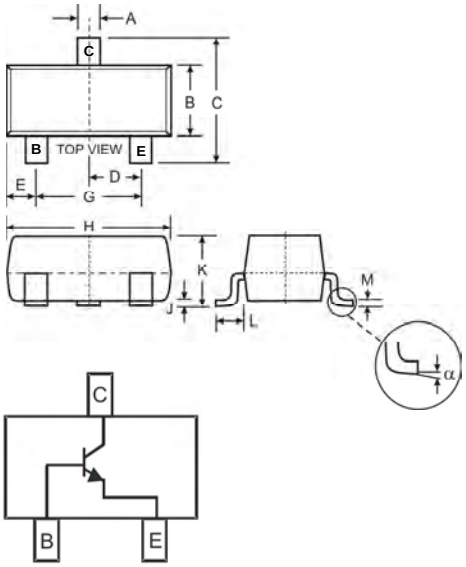
NPN SURFACE MOUNT VHF/UHF TRANSISTOR

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)



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

Maximum Ratings @T_A = 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)	I_C	50	mA
Power Dissipation (Note 1)	P_D	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 2)					
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	25	—	V	I_C = 1mA, I_B = 0
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	30	—	V	I_C = 100μA, I_E = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	3.0	—	V	I_E = 10μA, I_C = 0
Collector Cutoff Current	I_{CBO}	—	100	nA	V_{CB} = 25V, I_E = 0
Emitter Cutoff Current	I_{EBO}	—	100	nA	V_{EB} = 2V, I_C = 0
ON CHARACTERISTICS (Note 2)					
DC Current Gain	h_{FE}	60	—	—	I_C = 4mA, V_{CE} = 10.0V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.5	V	I_C = 4mA, I_B = 400μA
Base-Emitter On Voltage	$V_{BE(SAT)}$	—	0.95	V	I_C = 4mA, V_{CE} = 10.0V
SMALL SIGNAL CHARACTERISTICS					
Current Gain-Bandwidth Product	f_T	650	—	MHz	V_{CE} = 10V, f = 100MHz, I_C = 4mA
Collector-Base Capacitance	C_{CB}	—	0.7	pF	V_{CB} = 10V, f = 1.0MHz, I_E = 0
Collector-Base Feedback Capacitance	C_{RB}	—	0.65	pF	V_{CB} = 10V, f = 1.0MHz, I_E = 0
Collector-Base Time Constant	Rb'Cc	—	9	ps	V_{CB} = 10V, f = 31.8MHz, I_C = 4mA

Notes:
1. 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.
2. Short duration pulse test used to minimize self-heating effect.
3. No purposefully added lead. Halogen and Antimony Free.
4. 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_2O_3 Fire Retardants.

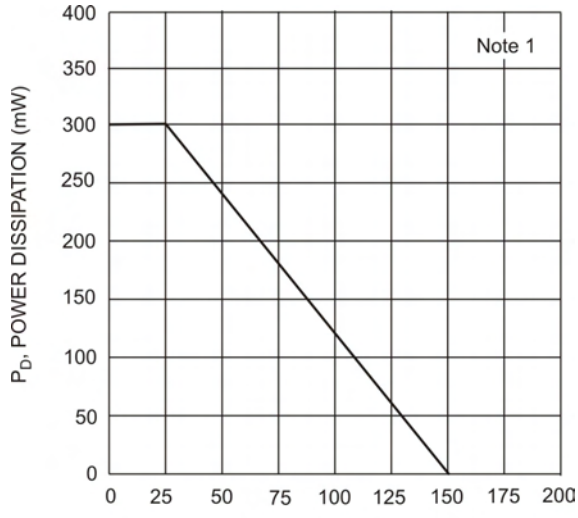


Fig. 1, Max Power Dissipation vs Ambient Temperature

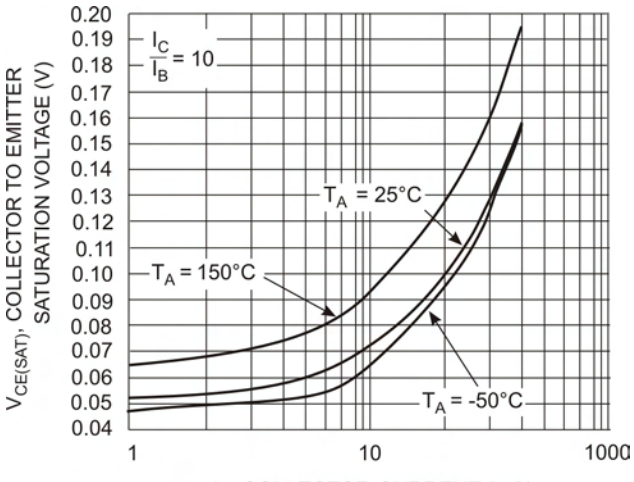


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

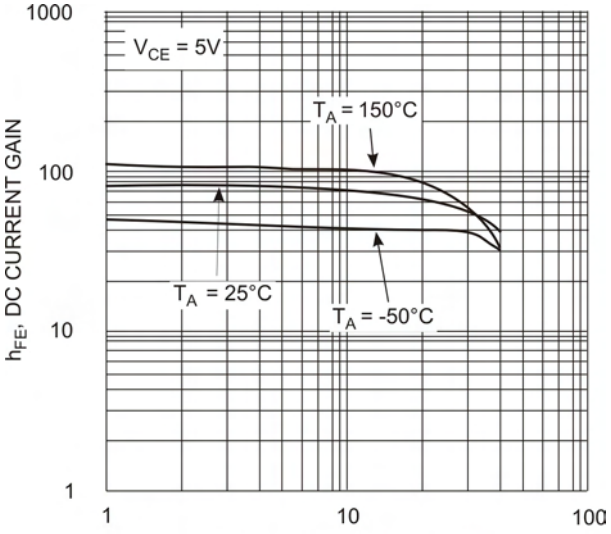


Fig. 3, DC Current Gain vs. Collector Current

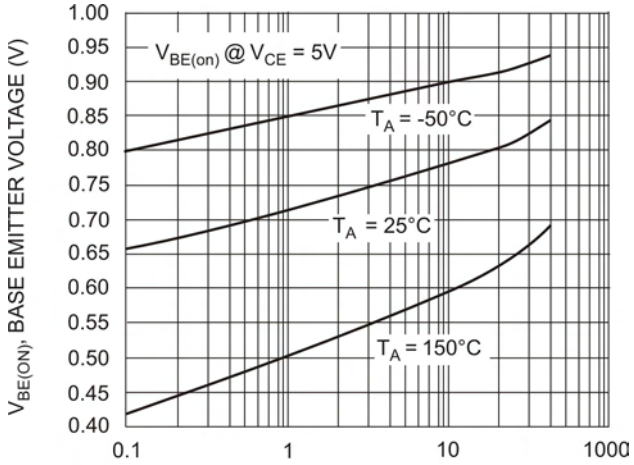


Fig. 4 Base Emitter Voltage vs. Collector Current

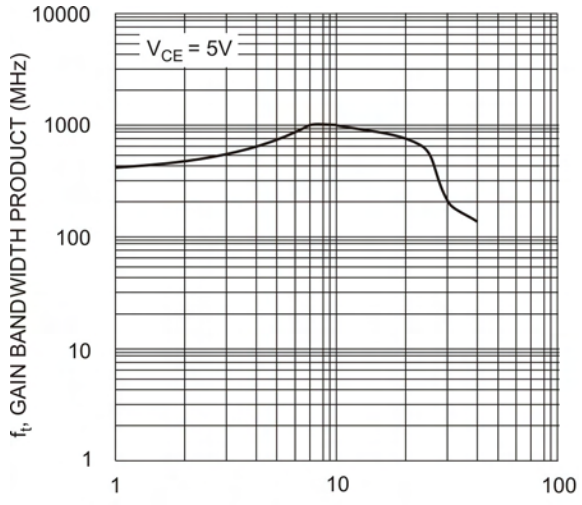


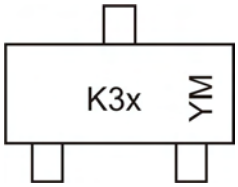
Fig. 5, Gain Bandwidth Product vs Collector Current

Ordering Information (Note 5)

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

Notes: 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

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D