



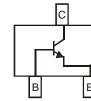
#### NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### **Features**

- **Epitaxial Planar Die Construction**
- Complementary PNP Type Available (MMBT4126)
- Ideal for Medium Power Amplification and Switching
- Lead, Halogen and Antimony Free, RoHS Compliant
- "Green" Device (Notes 2 and 4)

### **Mechanical Data**

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)





**Device Schematic** 

# Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	30	V
Collector-Emitter Voltage	V <sub>CEO</sub>	25	V
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	V
Collector Current - Continuous (Note 1)	Ic	200	mA

#### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	$P_{D}$	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{ hetaJA}$	417	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## **Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 3)							
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	30		V	$I_C = 10\mu A, I_E = 0$		
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	25		V	$I_C = 1.0 \text{mA}, I_B = 0$		
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	5.0	_	V	$I_E = 10\mu A, I_C = 0$		
Collector Cutoff Current	I <sub>CBO</sub>	.		nA	$V_{CB} = 20V, I_{E} = 0V$		
Emitter Cutoff Current	I <sub>EBO</sub>	_	50	nA	$V_{EB} = 3.0V, I_{C} = 0V$		
ON CHARACTERISTICS (Note 3)							
DC Current Gain	h <sub>FE</sub>	120	360		$I_C = 2.0 \text{mA}, V_{CE} = 1.0 \text{V}$		
DC Current Gain		60			$I_C = 50 \text{mA}, V_{CE} = 1.0 \text{V}$		
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>		0.30	V	$I_C = 50 \text{mA}, I_B = 5.0 \text{mA}$		
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>		0.95	V	$I_C = 50 \text{mA}, I_B = 5.0 \text{mA}$		
SMALL SIGNAL CHARACTERISTICS							
Output Capacitance	$C_{obo}$		4.0	pF	$V_{CB} = 5.0V$ , $f = 1.0MHz$ , $I_E = 0$		
Input Capacitance	Cibo		8.0	pF	$V_{EB} = 0.5V$ , $f = 1.0MHz$ , $I_{C} = 0$		
Small Signal Current Gain	h <sub>fe</sub>	120	480		$V_{CE} = 1.0V, I_{C} = 2.0mA,$		
Sinal Signal Guiterit Gain	ı ite	120	400		f = 1.0kHz		
Current Gain-Bandwidth Product	f⊤	300	_	MHz	$V_{CE} = 20V, I_{C} = 10mA,$ f = 100MHz		

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.
- No purposefully added lead. Halogen and Antimony Free.
- 3. Short duration pulse test used to minimize self-heating effect.
- Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb₂O₃ Fire Retardants.



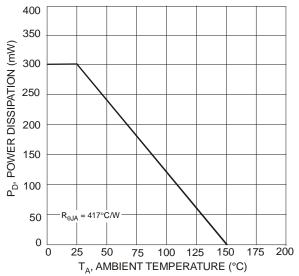


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 1)

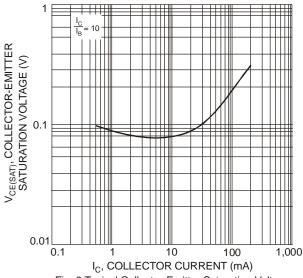
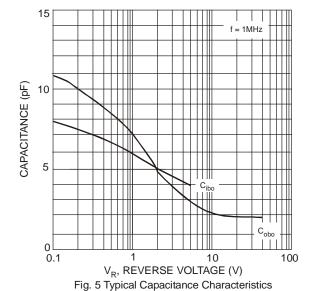


Fig. 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current



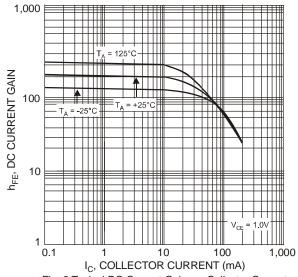


Fig. 2 Typical DC Current Gain vs. Collector Current

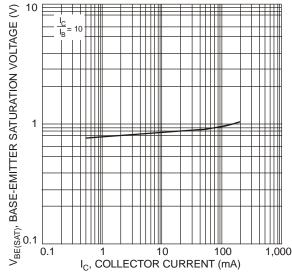


Fig. 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

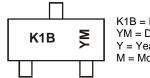


### Ordering Information (Note 5)

Part Number	Case	Packaging
MMBT4124-7-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**



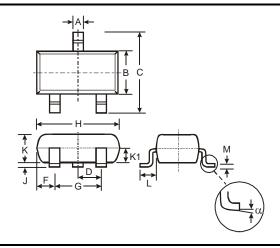
K1B = Product Type Marking Code

YM = Date Code Marking Y = Year (ex: N = 2002) M = Month (ex: 9 = September)

Date Code Kev

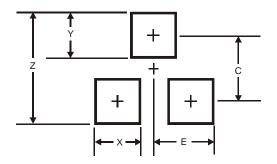
Date Code Ne	у																	
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	J	K	L	М	Ν	Р	R	S	Т	U	٧	W	X	Υ	Z	Α	В	С
Month	Jan	1	Feb	Mar	r	Apr	May	/	Jun	Jul	l   .	Aug	Sep		Oct	Nov	<i>,</i>	Dec
Code	1		2	3		4	5		6	7		8	9		0	N		D

## **Package Outline Dimensions**



SOT-23								
Dim	Min	Max	Тур					
Α	0.37	0.51	0.40					
В	1.20	1.40	1.30					
С	2.30	2.50	2.40					
D	0.89	1.03	0.915					
F	0.45	0.60	0.535					
G	1.78	2.05	1.83					
Н	2.80	3.00	2.90					
J	0.013	0.10	0.05					
K	0.903	1.10	1.00					
<b>K</b> 1	-	-	0.400					
L	0.45	0.61	0.55					
М	0.085	0.18	0.11					
α	0°	8°	-					
All Dimensions in mm								

## **Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.9
Х	0.8
Y	0.9
С	2.0
E	1.35

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