



# MMBTA13 / MMBTA14

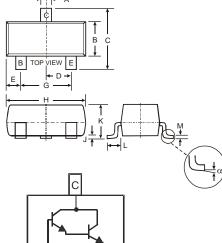
NPN SURFACE MOUNT DARLINGTON TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (MMBTA63 /MMBTA64)
- Ideal for Medium Power Amplification and Switching
- High Current Gain
- 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
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- MMBTA13 Marking (See Page 3): K2D, K3D
- MMBTA14 Marking (See Page 3): K3D
- Ordering & Date Code Information: See Page 3
- Weight: 0.008 grams (approximate)



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

## **Maximum Ratings** $@T_A = 25^{\circ}C$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	30	V
Collector-Emitter Voltage	V <sub>CEO</sub>	30	V
Emitter-Base Voltage	V <sub>EBO</sub>	10	V
Collector Current - Continuous	Ic	300	mA
Power Dissipation (Note 1)	PD	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>0JA</sub>	417	°CW
Operating and Storage and Temperature Range	TJ, TSTG	-55 to +150	°C

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

Characteristic			Min	Max	Unit	Test Condition			
OFF CHARACTERISTICS (Note 2)									
Collector-Emitter Breakdown Voltage		V <sub>(BR)CEO</sub>	30	_	V	$I_{C} = 100 \mu A V_{BE} = 0 V$			
Collector Cutoff Current		I <sub>CBO</sub>	_	100	nA	$V_{CB} = 30V, I_E = 0$			
Emitter Cutoff Current		I <sub>EBO</sub>	_	100	nA	$V_{EB} = 10V, I_{C} = 0$			
ON CHARACTERISTICS (Note 2)		•				-			
DC Current Gain	MMBTA13 MMBTA14 MMBTA13 MMBTA14	h <sub>FE</sub>	5,000 10,000 10,000 20,000	_	—	$\begin{split} I_{C} &= 10 \text{mA}, \ V_{CE} &= 5.0 \text{V} \\ I_{C} &= 10 \text{mA}, \ V_{CE} &= 5.0 \text{V} \\ I_{C} &= 100 \text{mA}, \ V_{CE} &= 5.0 \text{V} \\ I_{C} &= 100 \text{mA}, \ V_{CE} &= 5.0 \text{V} \end{split}$			
Collector-Emitter Saturation Voltage		VCE(SAT)	_	1.5	V	$I_C = 100 \text{mA}, I_B = 100 \mu \text{A}$			
Base-Emitter Saturation Voltage		VBE(SAT)	_	2.0	V	$I_{C} = 100 \text{mA}, V_{CE} = 5.0 \text{V}$			
SMALL SIGNAL CHARACTERISTICS									
Output Capacitance		Cobo	8.0 Ty	pical	pF	$V_{CB} = 10V, f = 1.0MHz, I_E = 0$			
Input Capacitance		C <sub>ibo</sub>	15 Typical		pF	$V_{EB} = 0.5V, f = 1.0MHz, I_{C} = 0$			
Current Gain-Bandwidth Product		f⊤	125		MHz	$V_{CE} = 5.0V, I_{C} = 10mA, f = 100MHz$			

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.

2: Short duration pulse test used to minimize self-heating effect.

3. 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 Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.



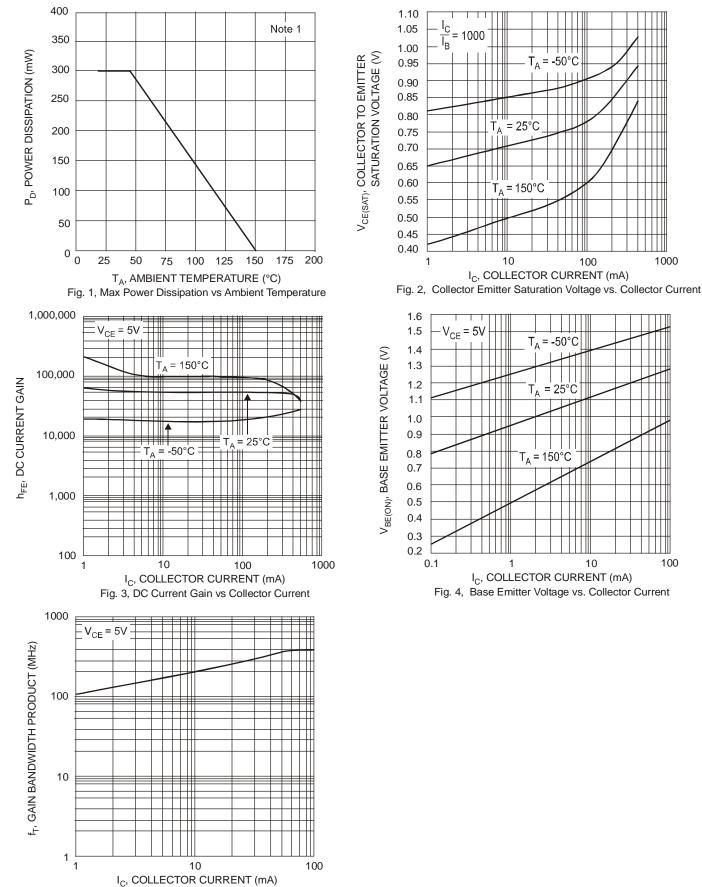


Fig. 5, Gain Bandwidth Product vs Collector Current

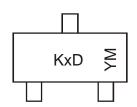


## Ordering Information (Note 5)

Device	Packaging	Shipping			
MMBTA13-7-F	SOT-23	3000/Tape & Reel			
MMBTA14-7-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



KxD = Product Type Marking Code, ex: K2D = MMBTA13 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	К	L	М	Ν	Р	R	s	Т	U	V	W	Х	Y	Z
Month	Jan	Fe	b I	Mar	Apr	May	Ju	n	Jul	Aug	Sep	Oct	t	Nov	Dec
Code	1	2		3	4	5	6		7	8	9	0		Ν	D

#### IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.