MMBTA13 / MMBTA14

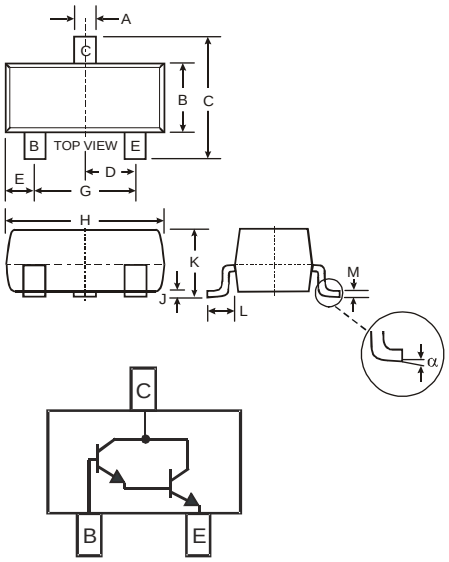
NPN SURFACE MOUNT DARLINGTON TRANSISTOR

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**
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}	30	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current - Continuous	I_C	300	mA
Power Dissipation (Note 1)	P_D	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	417	°CW
Operating and Storage and 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		$V_{(BR)CEO}$	30	—	V	I_C = 100μA V_{BE} = 0V
Collector Cutoff Current		I_{CBO}	—	100	nA	V_{CB} = 30V, I_E = 0
Emitter Cutoff Current		I_{EBO}	—	100	nA	V_{EB} = 10V, I_C = 0
ON CHARACTERISTICS (Note 2)						
DC Current Gain	MMBTA13	h_{FE}	5,000	—	—	I_C = 10mA, V_{CE} = 5.0V
	MMBTA14		10,000			I_C = 10mA, V_{CE} = 5.0V
	MMBTA13		10,000			I_C = 100mA, V_{CE} = 5.0V
	MMBTA14		20,000			I_C = 100mA, V_{CE} = 5.0V
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	1.5	V	I_C = 100mA, I_B = 100μA
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	—	2.0	V	I_C = 100mA, V_{CE} = 5.0V
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance		C_{obo}	8.0 Typical		pF	V_{CB} = 10V, f = 1.0MHz, I_E = 0
Input Capacitance		C_{ibo}	15 Typical		pF	V_{EB} = 0.5V, f = 1.0MHz, I_C = 0
Current Gain-Bandwidth Product		f_T	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.
4. 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_2O_3 Fire Retardants.

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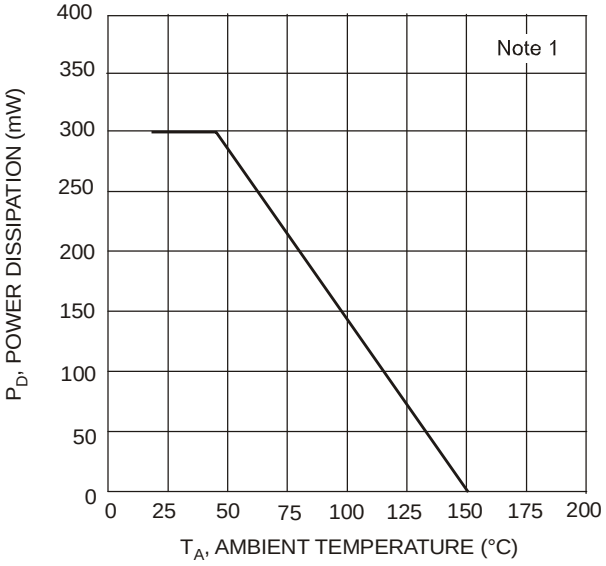


Fig. 1, Max Power Dissipation vs Ambient Temperature

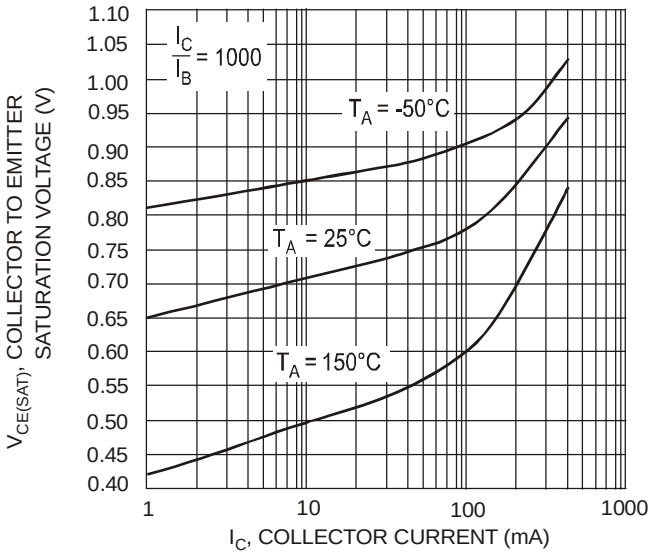


Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current

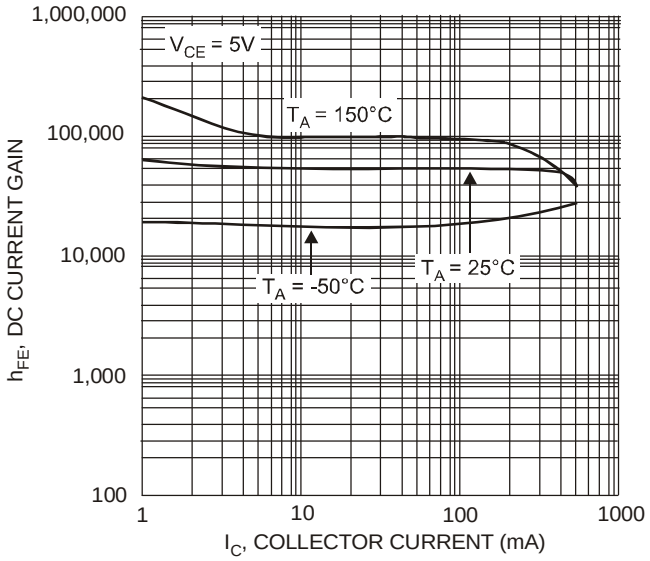


Fig. 3, DC Current Gain vs Collector Current

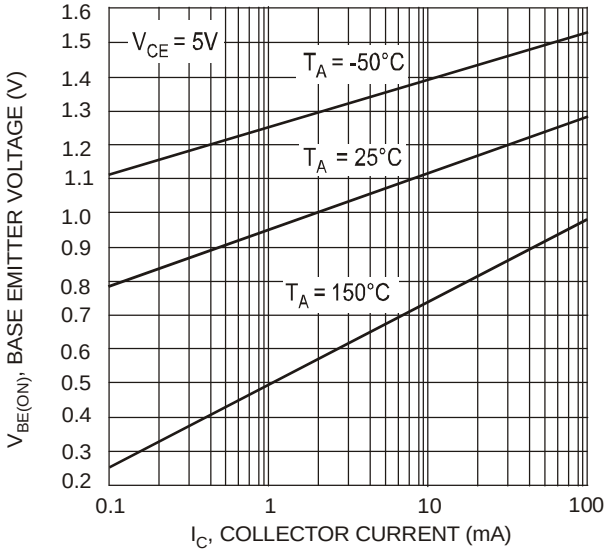


Fig. 4, Base Emitter Voltage vs. Collector Current

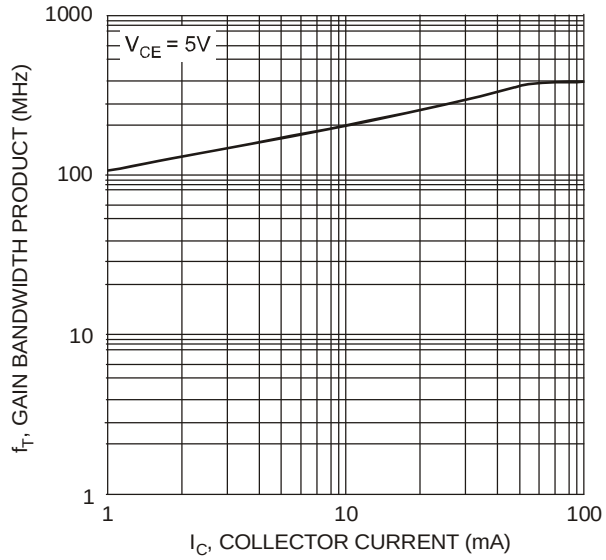


Fig. 5, Gain Bandwidth Product vs Collector Current

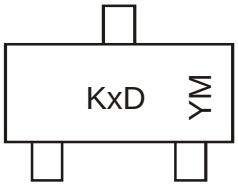
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Ordering Information (Note 5)

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	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

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