



# MMBTA28

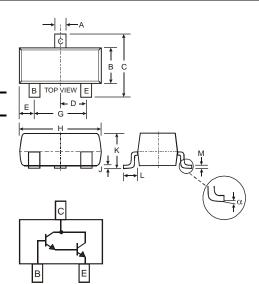
### NPN SURFACE MOUNT DARLINGTON TRANSISTOR

### **Features**

- **Epitaxial Planar Die Construction**
- Ideal for Low Power Amplification and Switching
- High Current Gain
- Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 3 and 4)

### **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).
- Marking Information: See Page 3 Ordering 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						
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						
M	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	$V_{CBO}$	80	V
Collector-Emitter Voltage	$V_{CEO}$	80	V
Emitter-Base Voltage	$V_{EBO}$	12	V
Collector Current - Continuous	lc	500	mA
Power Dissipation (Note 1)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	417	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

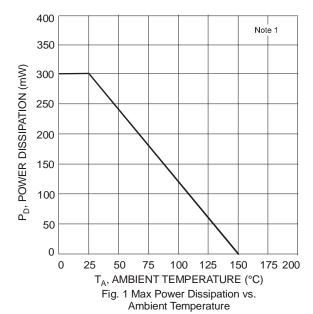
# **Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

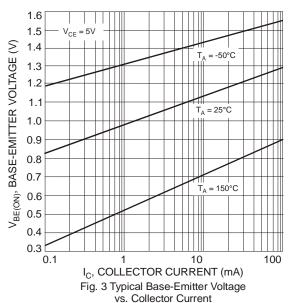
Characteristic	Symbol	Min	Max	Unit	Test Condition				
OFF CHARACTERISTICS (Note 2)									
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	80	_	V	$I_C = 100 \mu A I_E = 0$				
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	12	_	V	$I_E = 100 \mu A I_C = 0$				
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	80	_	V	$I_C = 100 \mu A I_B = 0$				
Collector Cutoff Current	I <sub>CBO</sub>		100	nA	$V_{CB} = 60V, I_E = 0$				
Collector Cutoff Current	ICES		500	nA	V <sub>CE</sub> = 10V				
Emitter Cutoff Current	I <sub>EBO</sub>		100	nA	$V_{EB} = 10V, I_C = 0$				
ON CHARACTERISTICS (Note 2)									
DC Current Gain	h	10,000			$I_C = 10 \text{mA}, V_{CE} = 5.0 \text{V}$				
DC Current Gain	h <sub>FE</sub>	10,000			$I_C = 100 \text{mA}, V_{CE} = 5.0 \text{V}$				
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>		1.5	V	$I_C = 100 \text{mA}, I_B = 100 \mu \text{A}$				
Base-Emitter Saturation Voltage	V <sub>BE(SAT)</sub>		2.0	V	$I_C = 100 \text{mA}, V_{CE} = 5.0 \text{V}$				
SMALL SIGNAL CHARACTERISTICS									
Output Capacitance	$C_{obo}$	8.0 Typical		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 <sub>T</sub>	125		MHz	$V_{CE} = 5.0V, I_{C} = 10mA,$ f = 100MHz				

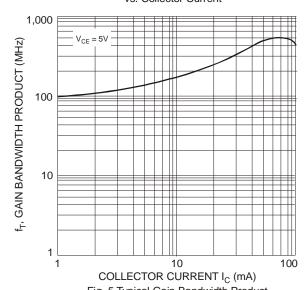
Notes:

- 1. Device mounted on FR-4 PCB, 1.6x1.6x0.06 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 Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.









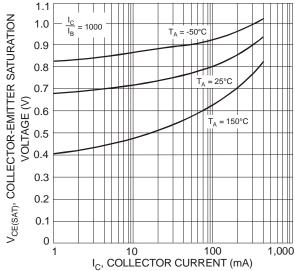


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

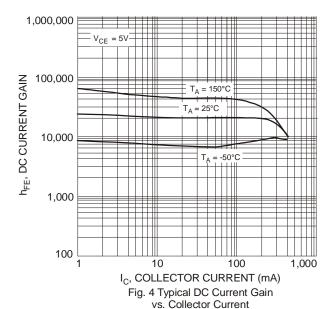


Fig. 5 Typical Gain Bandwidth Product vs. Collector Current

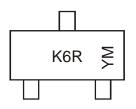


### Ordering Information (Note 5)

Part Number	Packaging	Shipping
MMBTA28-7-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**



K6R = Product Type Marking Code YM = Date Code Marking Y = Year ex: T = 2006 M = Month ex: 9 = September

Date Code Key

Year	200	6	2007		2008	20	09	2010		2011	2	2012	
Code	Т		U		V		V	X		Υ		Z	
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Code	1	2	3	4	5	6	7	8	9	0	N	D	

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