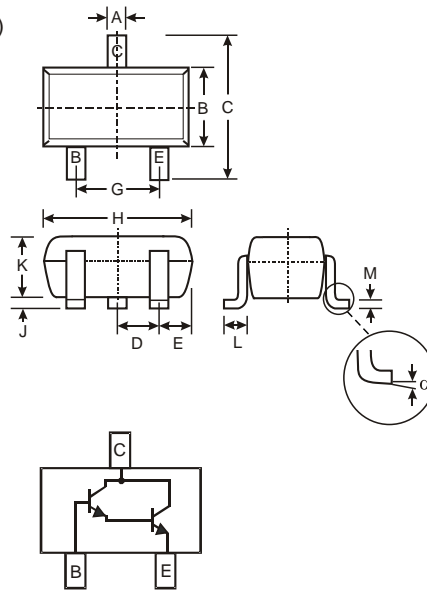


### Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMSTA63/MMSTA64)
- Ideal for Low Power Amplification and Switching
- High Current Gain
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

### Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- MMSTA13 Marking K2D, K3D (See Page 3)
- MMSTA14 Marking K3D (See Page 3)
- Ordering & Date Code Information: See Page 3
- Weight: 0.006 grams (approximate)



SOT-323		
Dim	Min	Max
A	0.25	0.40
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.18
	0°	8°
All Dimensions in mm		

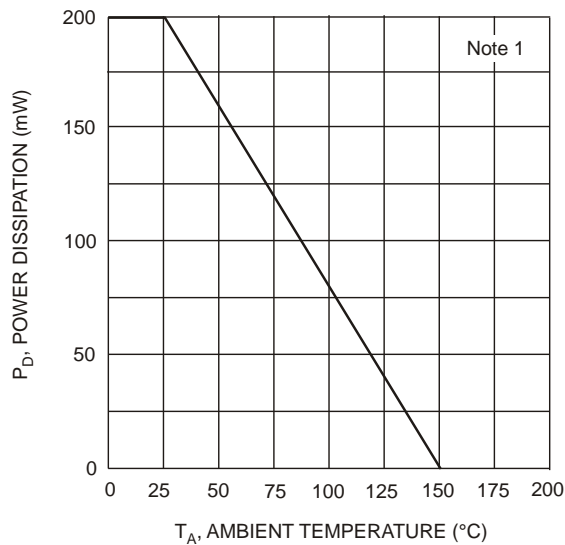
### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

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 (Note 1)	I <sub>C</sub>	300	mA
Power Dissipation (Note 1)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>JA</sub>	625	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

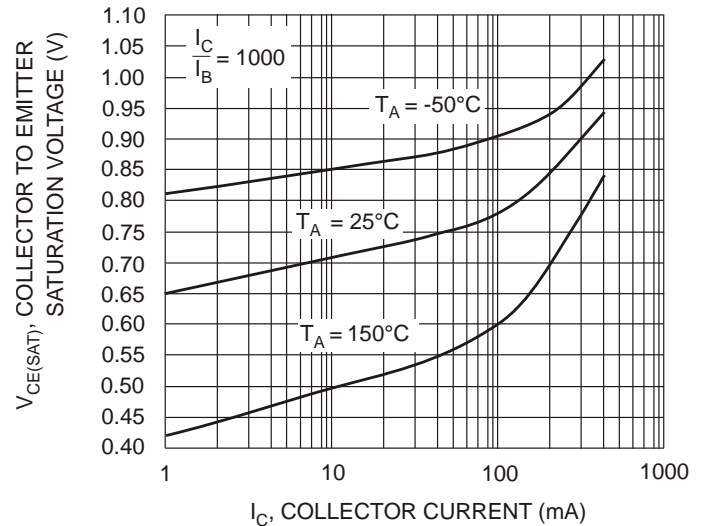
- Note:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. No purposefully added lead.
  3. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  4. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

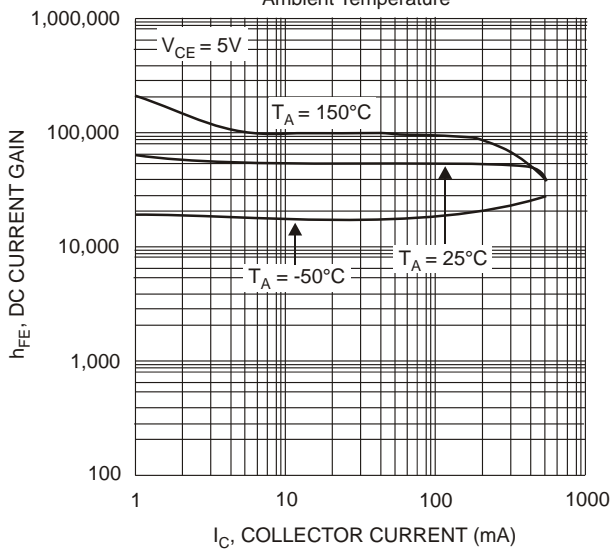
Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>					
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30		V	$I_C = 100\mu\text{A}$ , $V_{BE} = 0\text{V}$
Collector Cutoff Current	$I_{CBO}$		100	nA	$V_{CB} = 30\text{V}$ , $I_E = 0$
Emitter Cutoff Current	$I_{EBO}$		100	nA	$V_{EB} = 10\text{V}$ , $I_C = 0$
<b>ON CHARACTERISTICS (Note 5)</b>					
DC Current Gain	MMSTA13 MMSTA14 MMSTA13 MMSTA14	$h_{FE}$	5,000 10,000 10,000 20,000		$I_C = 10\text{mA}$ , $V_{CE} = 5.0\text{V}$ $I_C = 10\text{mA}$ , $V_{CE} = 5.0\text{V}$ $I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{V}$ $I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		1.5	V	$I_C = 100\text{mA}$ , $I_B = 100\mu\text{A}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$		2.0	V	$I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	8.0 Typical		pF	$V_{CB} = 10\text{V}$ , $f = 1.0\text{MHz}$ , $I_E = 0$
Input Capacitance	$C_{ibo}$	15 Typical		pF	$V_{EB} = 0.5\text{V}$ , $f = 1.0\text{MHz}$ , $I_C = 0$
Current Gain-Bandwidth Product	$f_T$	125		MHz	$V_{CE} = 5.0\text{V}$ , $I_C = 10\text{mA}$ , $f = 100\text{MHz}$



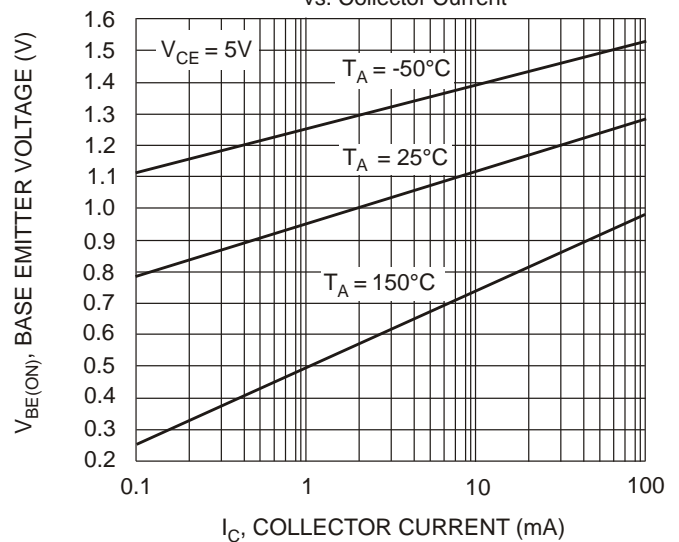
$T_A$ , AMBIENT TEMPERATURE ( $^\circ\text{C}$ )  
Fig. 1, Max Power Dissipation vs Ambient Temperature



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 3, DC Current Gain vs Collector Current



$I_C$ , COLLECTOR CURRENT (mA)  
Fig. 4, Base Emitter Voltage vs. Collector Current

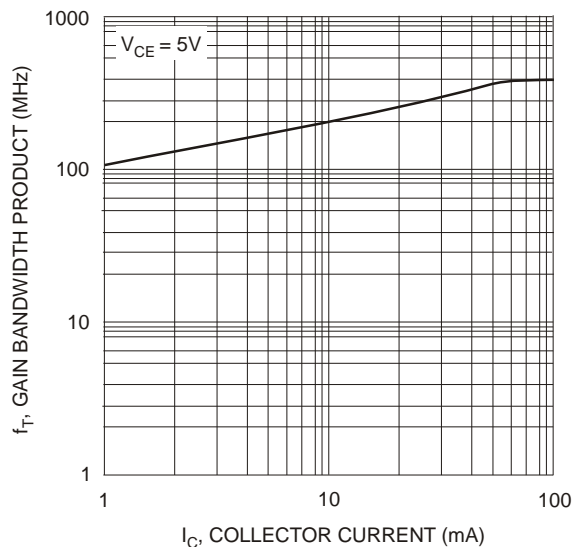


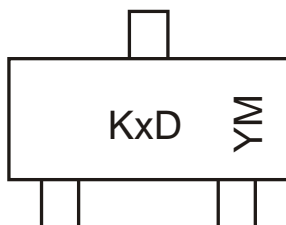
Fig. 5, Gain Bandwidth Product vs Collector Current

### Ordering Information (Note 4 & 6)

Device	Packaging	Shipping
MMSTA13-7-F MMSTA14-7-F	SOT-323	3000/Tape & Reel

- Notes: 4. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.  
 5. Short duration pulse test used to minimize self-heating effect.  
 6. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

### Marking Information



KxD = Product Type Marking Code, e.g., K2D = MMSTA13  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

#### Date Code Key

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

Month	Jan	Feb	March	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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