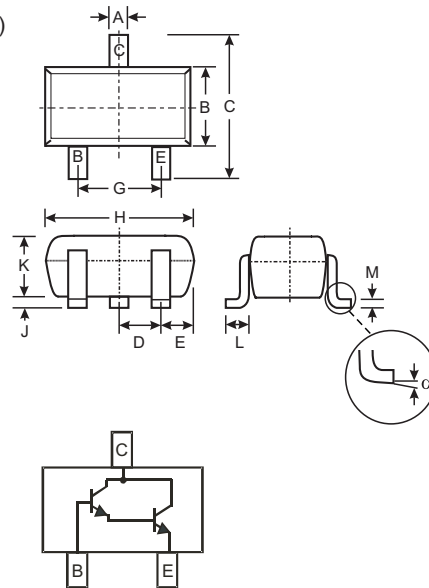


Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMSTA63/MMSTA64)
- Ideal for Medium 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 2)
- MMSTA14 Marking K3D (See Page 2)
- Ordering & Date Code Information: See Page 2
- 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
α	0°	8°
All Dimensions in mm		

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

Characteristic	Symbol	MMSTA13	MMSTA14	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 (Note 1)	I_C	300		mA
Power Dissipation (Note 1)	P_d	200		mW
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	625		K/W
Operating and Storage and Temperature Range	T_j, T_{STG}	-55 to +150		$^\circ\text{C}$

- 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.
 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

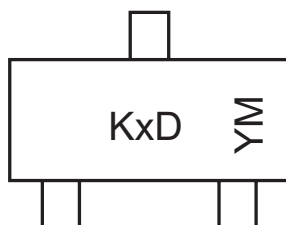
Characteristic	Symbol	Min	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 5)						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	30	—	V	$I_C = 100\mu\text{A}$, $V_{BE} = 0\text{V}$	
Collector Cutoff Current	I_{CBO}	—	100	nA	$V_{CB} = 30\text{V}$, $I_E = 0$	
Emitter Cutoff Current	I_{EBO}	—	100	nA	$V_{EB} = 10\text{V}$, $I_C = 0$	
ON CHARACTERISTICS (Note 5)						
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	$I_C = 100\text{mA}$, $V_{CE} = 5.0\text{V}$	
SMALL SIGNAL CHARACTERISTICS						
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	$V_{CE} = 5.0\text{V}$, $I_C = 10\text{mA}$, $f = 100\text{MHz}$	

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 test pulse used to minimize self-heating effect.
6. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information

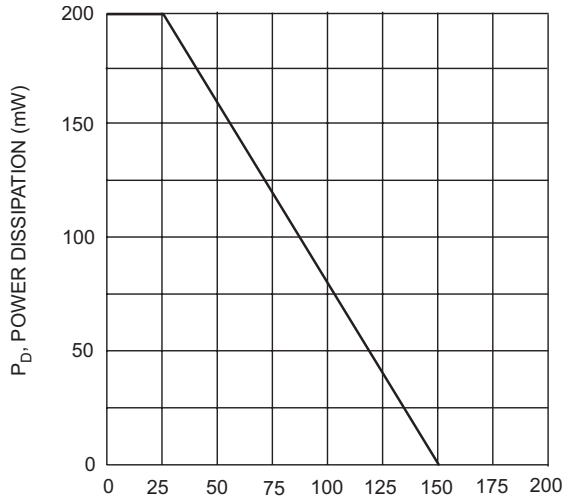


KxD = Product Type Marking Code, e.g., K2D = MMSTA13
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

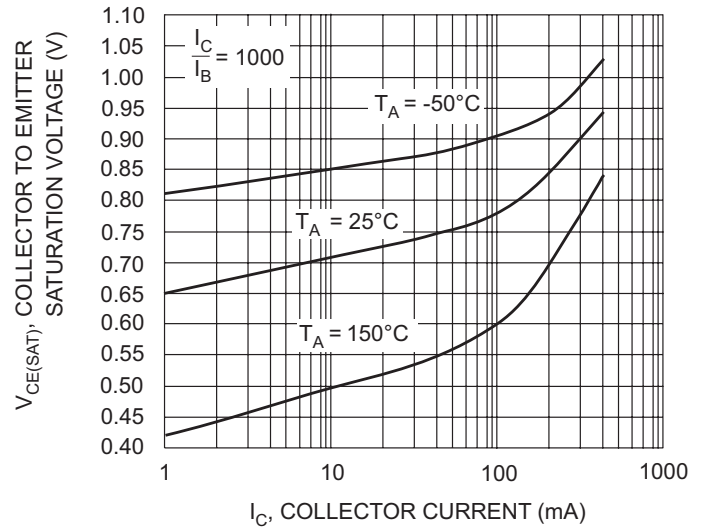
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Code	J	K	L	M	N	P	R	S	T	U	V	W

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



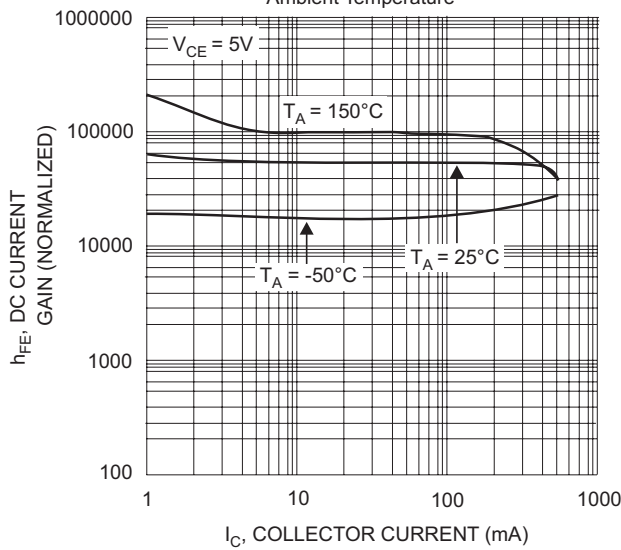
T_A , AMBIENT TEMPERATURE ($^{\circ}C$)

Fig. 1, Max Power Dissipation vs Ambient Temperature



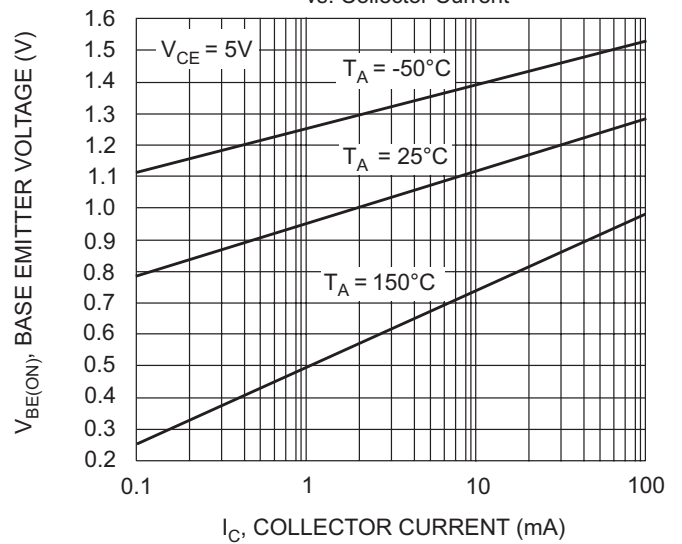
I_C , COLLECTOR CURRENT (mA)

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



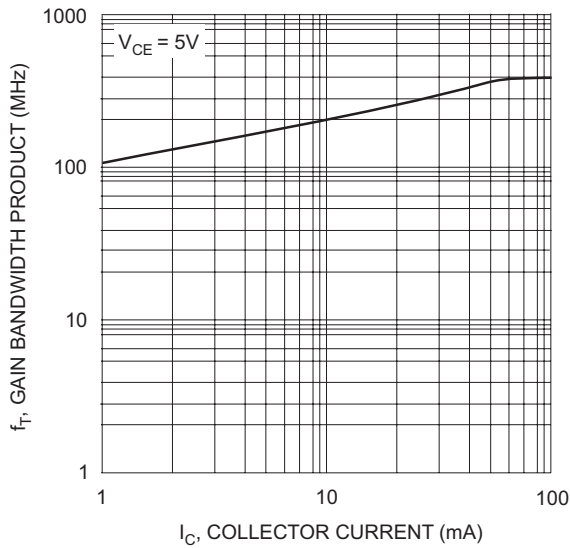
I_C , COLLECTOR CURRENT (mA)

Fig. 3, DC Current Gain vs Collector Current



I_C , COLLECTOR CURRENT (mA)

Fig. 4, Base Emitter Voltage vs. Collector Current



I_C , COLLECTOR CURRENT (mA)

Fig. 5, Gain Bandwidth Product vs Collector Current

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