



# MMSTA05/MMSTA06

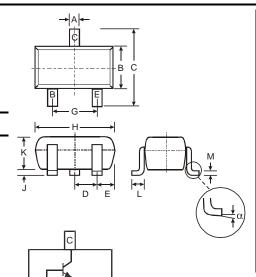
#### NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### **Features**

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMSTA55/MMSTA56)
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 2)
- "Green" Device (Notes 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).
- MMSTA05 Marking K1H, K1G (See Page 3)
- MMSTA06 Marking K1G (See Page 3)
- Order & Date Code Information: See Page 3
- Weight: 0.006 grams (approximate)



SOT-323								
Dim	Min	Max						
Α	0.25	0.40						
В	1.15	1.35						
С	2.00	2.20						
D	0.65 Nominal							
Е	0.30	0.40						
G	1.20	1.40						
Н	1.80	2.20						
J	0.0	0.10						
K	0.90	1.00						
L	0.25	0.40						
М	0.10	0.18						
α	0°	8°						
All Dimensions in mm								

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

Characteristic	Symbol	MMSTA05 MMSTA06		Unit	
Collector-Base Voltage	$V_{CBO}$	60	80	V	
Collector-Emitter Voltage	V <sub>CEO</sub>	60	80	V	
Emitter-Base Voltage	V <sub>EBO</sub>	4	V		
Collector Current - Continuous (Note 1)	Ic	50	mA		
Power Dissipation (Note 1)	P <sub>d</sub>	20	200		
Thermal Resistance, Junction to Ambient (Note 1)	$R_{ heta JA}$	62	°C/W		
Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to	°C		

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

Characteristic	Symbol	Min	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 5)	•				2	
Collector-Base Breakdown Voltage	MMSTA05 MMSTA06	$V_{(BR)CBO}$	60 80		V	$I_C = 100 \mu A, I_E = 0$
Collector-Emitter Breakdown Voltage	MMSTA05 MMSTA06	V <sub>(BR)CEO</sub>	60 80		V	$I_C = 1.0 \text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage		$V_{(BR)EBO}$	4.0		V	$I_E = 100 \mu A, I_C = 0$
Collector Cutoff Current	MMSTA05 MMSTA06	I <sub>CBO</sub>	_	100	nA	$V_{CB} = 60V, I_{E} = 0$ $V_{CB} = 80V, I_{E} = 0$
Collector Cutoff Current	MMSTA05 MMSTA06	I <sub>CES</sub>	_	100	nA	$V_{CE} = 60V, I_{BO} = 0V$ $V_{CE} = 80V, I_{BO} = 0V$
ON CHARACTERISTICS (Note 5)					•	
DC Current Gain		h <sub>FE</sub>	100	_	_	$I_C = 10\text{mA}, V_{CE} = 1.0\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1.0\text{V}$
Collector-Emitter Saturation Voltage		V <sub>CE(SAT)</sub>	_	0.25	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 10mA
Base-Emitter Saturation Voltage		V <sub>BE(SAT)</sub>	_	1.2	V	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 1.0V
SMALL SIGNAL CHARACTERISTICS		•				
Current Gain-Bandwidth Product		$f_T$	100		MHz	$V_{CE} = 2.0V, I_{C} = 10mA, f = 100MHz$

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. 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 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 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.



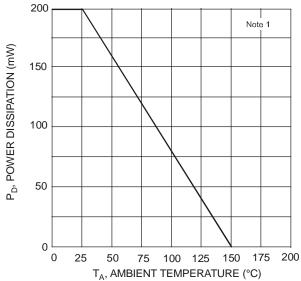


Fig. 1, Max Power Dissipation vs. Ambient Temperature

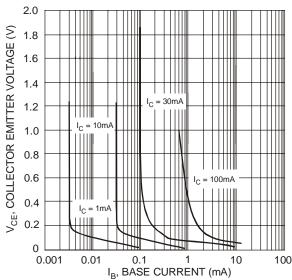


Fig. 3 Typical Collector Saturation Region

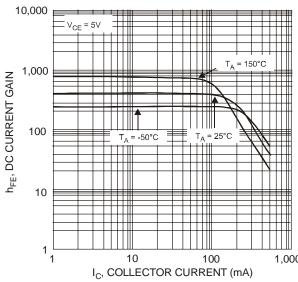


Fig. 5, DC Current Gain vs. Collector Current

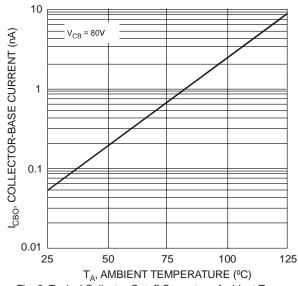


Fig. 2 Typical Collector-Cutoff Current vs. Ambient Temperature

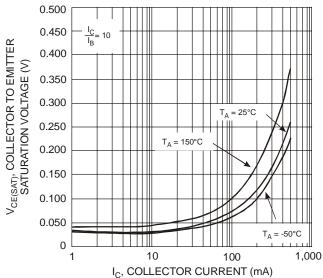


Fig. 4 Collector Emitter Saturation Voltage vs. Collector Current

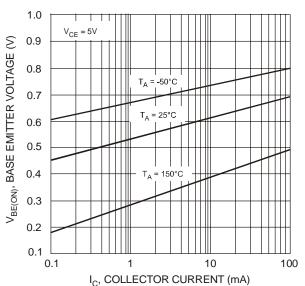


Fig. 6, Base Emitter Voltage vs. Collector Current



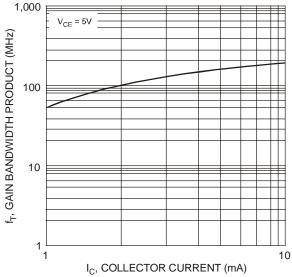


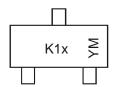
Fig. 7, Gain Bandwidth Product vs Collector Current

# Ordering Information (Note 4 and 6)

Device	Packaging	Shipping				
MMSTA05-7-F	SOT-323	3000/Tape & Reel				
MMSTA06-7-F	SOT-323	3000/Tape & Reel				

Notes: 6. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

### **Marking Information**



K1x = Product Type Marking Code, ex: K1H = MMSTA05

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	М	N	Р	R	S	Т	U	V	W	X	Υ	Z
Month	Jan	Fe	b	Mar	Apr	May	Jui	n	Jul	Aug	Sep	Oc	t	Nov	Dec
Code	1	2		3	4	5	6		7	8	9	0		Ν	D

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