



**THE DATASHEET OF  
MMBTA56-7-F**



## Features

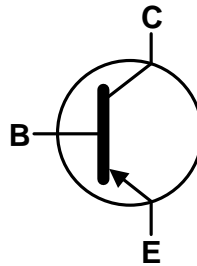
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Complementary NPN Type: MMBTA05 / MMBTA06
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Mechanical Data

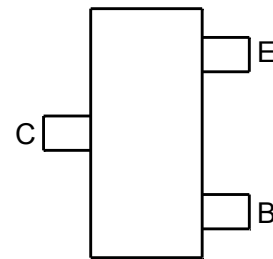
- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



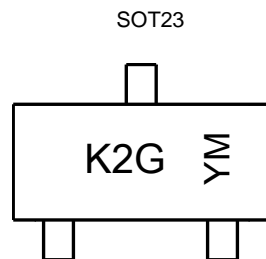
Top View Pin-Out

## Ordering Information (Notes 4 & 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
MMBTA55-7-F	AEC-Q101	K2G	7	8	3,000
MMBTA56-7-F	AEC-Q101	K2G	7	8	3,000
MMBTA56Q-7-F	Automotive	K2G	7	8	3,000
MMBTA56Q-13-F	Automotive	K2G	13	8	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



K2G = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: C = 2015)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	C	D	E	F	G	H	I	J	K	L	M	N

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

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	MMBTA55	MMBTA56	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-60	-80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	-80	V
Emitter-Base Voltage	V <sub>EBO</sub>	-4.0		V
Collector Current - Continuous	I <sub>C</sub>	-500		mA

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

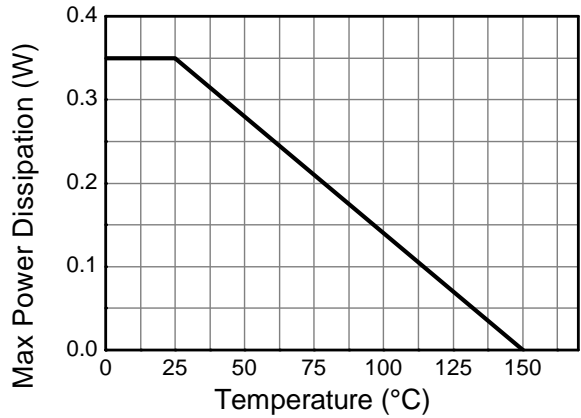
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	310
		(Note 7)	350
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 6)	403
		(Note 7)	357
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	350	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 9)

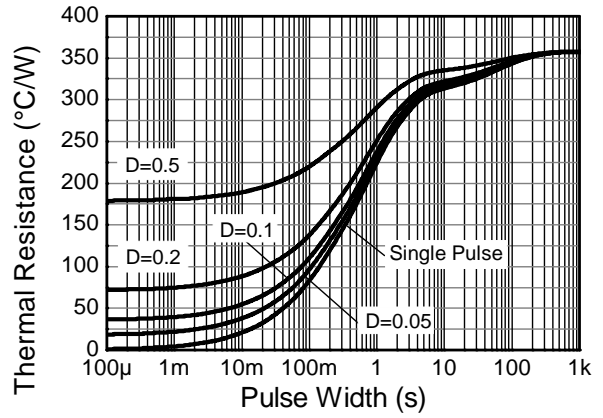
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- 6. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - 7. Same as Note 6, except the device is mounted on 15 mm x 15mm 1oz copper.
  - 8. Thermal resistance from junction to solder-point (at the end of the leads).
  - 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

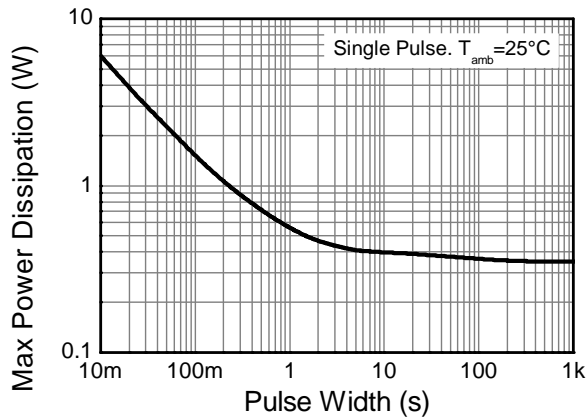
**Thermal Characteristics and Derating Information**



**Derating Curve**



**Transient Thermal Impedance**



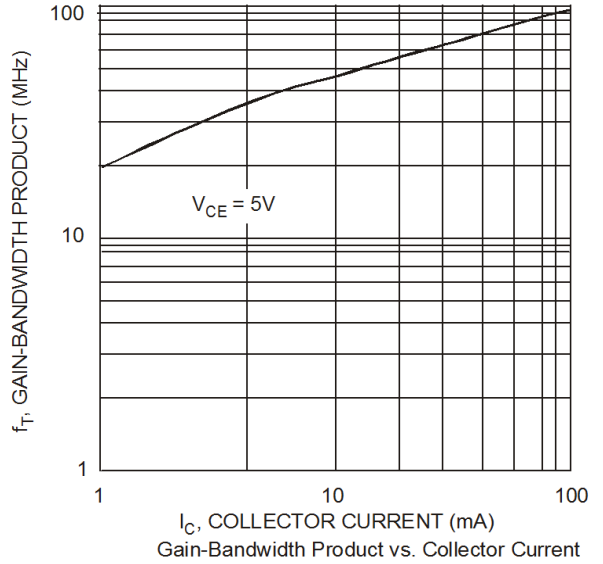
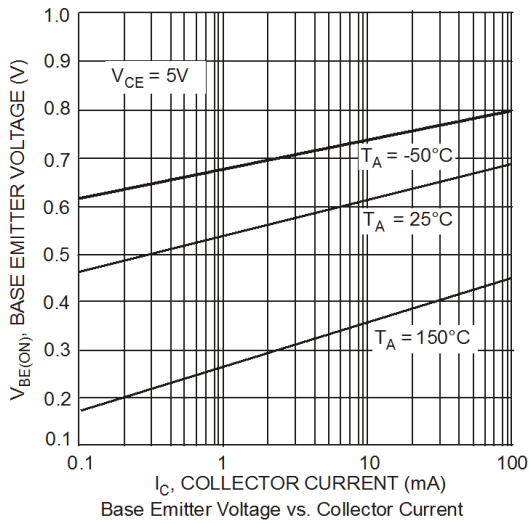
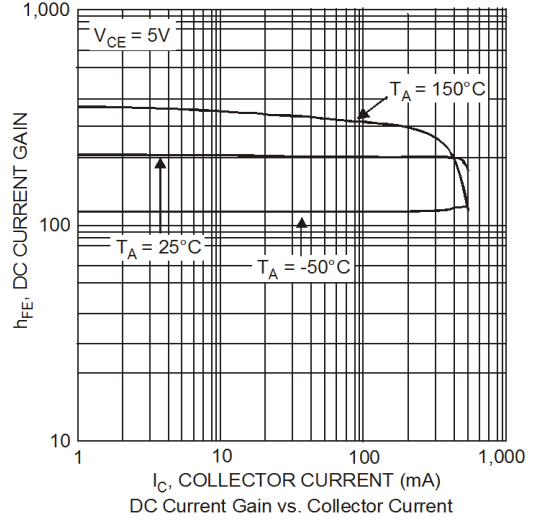
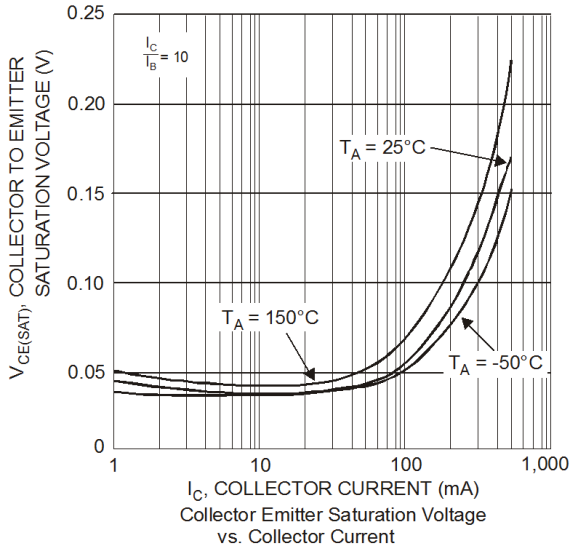
**Pulse Power Dissipation**

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 10)</b>					
Collector-Base Breakdown Voltage	MMBTA55 MMBTA56	BV <sub>CB0</sub>	-60 -80	—	V I <sub>C</sub> = -100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	MMBTA55 MMBTA56	BV <sub>CEO</sub>	-60 -80	—	V I <sub>C</sub> = -1.0mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage		BV <sub>EBO</sub>	-5.0	-4.0	— I <sub>E</sub> = -100μA, I <sub>C</sub> = 0
Collector Cut-Off Current	MMBTA55 MMBTA56	I <sub>CBO</sub>	—	-100	nA V <sub>CB</sub> = -60V, I <sub>E</sub> = 0 V <sub>CB</sub> = -80V, I <sub>E</sub> = 0
Collector Cut-Off Current		I <sub>CEX</sub>	—	-100	nA V <sub>CE</sub> = -60V, I <sub>BO</sub> = 0V V <sub>CE</sub> = -80V, I <sub>BO</sub> = 0V
<b>ON CHARACTERISTICS (Note 10)</b>					
DC Current Gain		h <sub>FE</sub>	100	—	— I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1.0V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -1.0V
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
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Current Gain-Bandwidth Product		f <sub>T</sub>	50	—	MHz V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -100mA, f = 100MHz

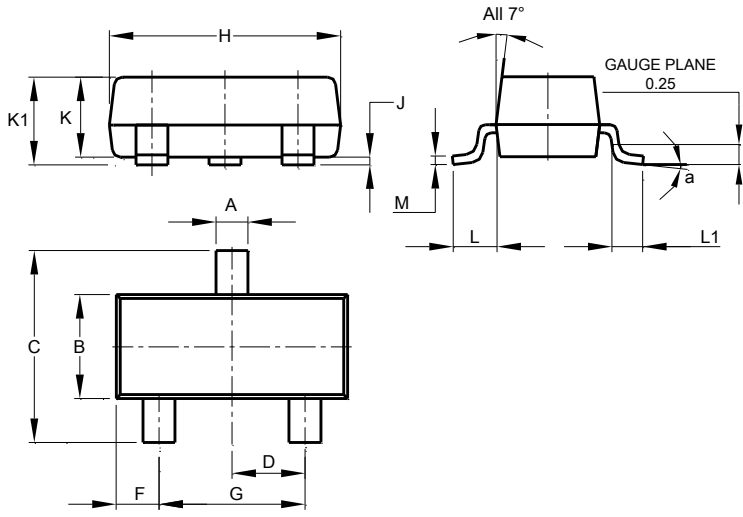
Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

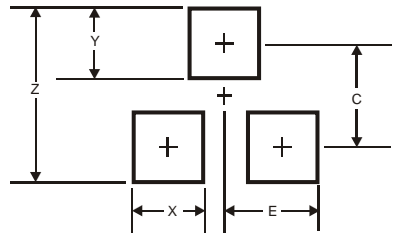
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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