



**THE DATASHEET OF
MMBTA56Q-7-F**



Features

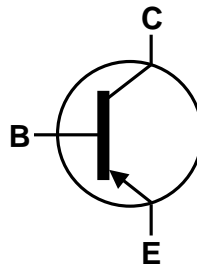
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Complementary NPN Type: MMBTA05 / MMBTA06
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([MMBTA55Q / MMBTA56Q](#))**

Mechanical Data

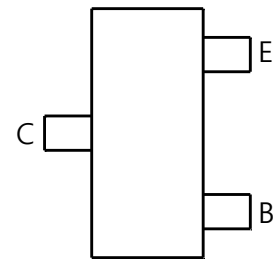
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



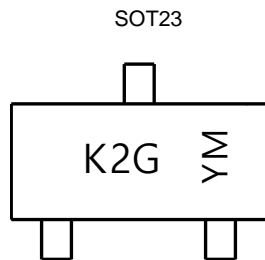
Top View Pin-Out

Ordering Information (Note 4)

Part Number	Package	Marking Code	Reel Size (Inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
MMBTA55-7-F	SOT23	K2G	7	8	3,000	Reel
MMBTA56-7-F	SOT23	K2G	7	8	3,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K2G = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: K = 2023)
 M = Month (ex: 9 = September)

Date Code Key

Year	2007	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	U	-	K	L	M	N	O	P	R	S	T	U
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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	MMBTA55	MMBTA56	Unit
Collector-Base Voltage	V _{CBO}	-60	-80	V
Collector-Emitter Voltage	V _{CEO}	-60	-80	V
Emitter-Base Voltage	V _{EBO}	-4.0		V
Collector Current - Continuous	I _C	-500		mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	(Note 5)	310
		(Note 6)	350
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 5)	403
		(Note 6)	357
Thermal Resistance, Junction to Leads	R _{θJL}	350	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

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:
- 5. 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.
 - 6. Same as Note 5, except the device is mounted on 15 mm x 15mm 1oz copper.
 - 7. Thermal resistance from junction to solder-point (at the end of the leads).
 - 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

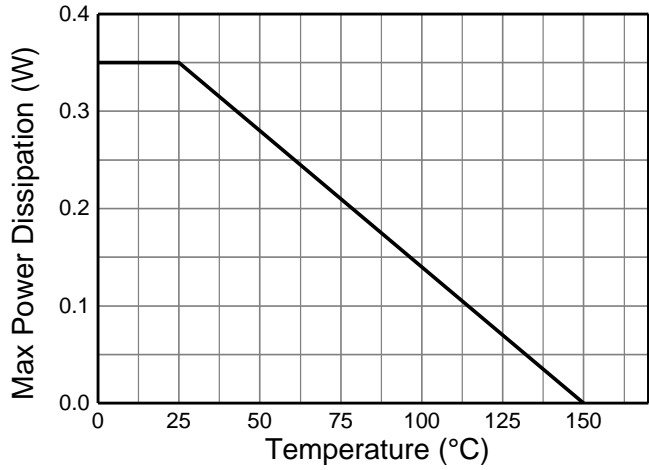


Figure 1. Derating Curve

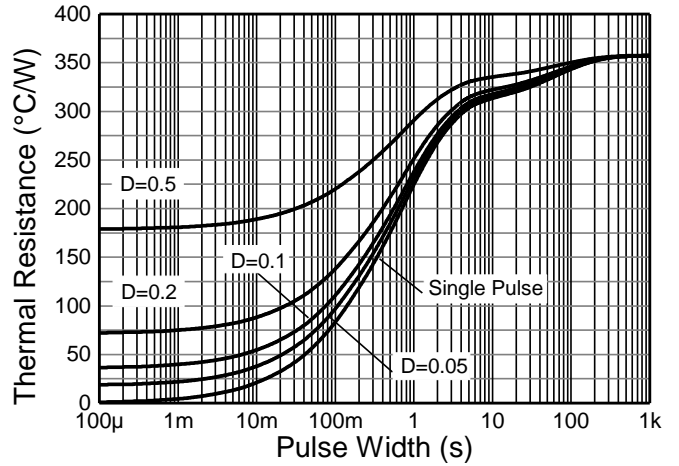


Figure 2. Transient Thermal Impedance

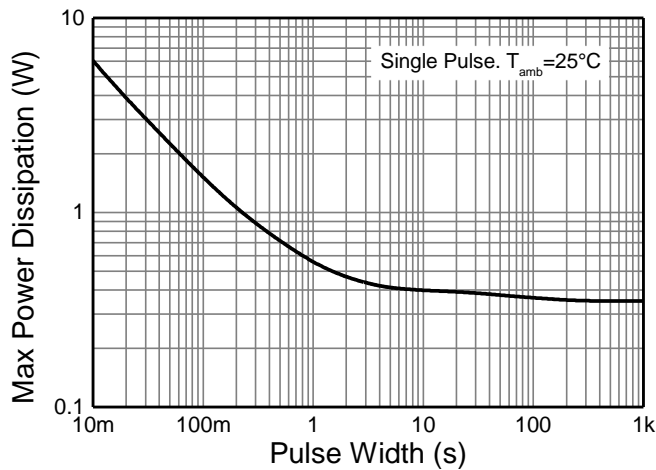


Figure 3. Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)						
Collector-Base Breakdown Voltage	MMBTA55 MMBTA56	BV _{CBO}	-60 -80	—	V	I _C = -100μA, I _E = 0
Collector-Emitter Breakdown Voltage	MMBTA55 MMBTA56	BV _{CEO}	-60 -80	—	V	I _C = -1.0mA, I _B = 0
Emitter-Base Breakdown Voltage		BV _{EBO}	-5.0	-4.0	—	I _E = -100μA, I _C = 0
Collector Cut-Off Current	MMBTA55 MMBTA56	I _{CBO}	—	-100	nA	V _{CB} = -60V, I _E = 0 V _{CB} = -80V, I _E = 0
Collector Cut-Off Current	MMBTA55 MMBTA56	I _{CEX}	—	-100	nA	V _{CE} = -60V, I _{BO} = 0V V _{CE} = -80V, I _{BO} = 0V
ON CHARACTERISTICS (Note 9)						
DC Current Gain		h _{FE}	100	—	—	I _C = -10mA, V _{CE} = -1.0V I _C = -100mA, V _{CE} = -1.0V
Collector-Emitter Saturation Voltage		V _{CE(sat)}	—	-0.25	V	I _C = -100mA, I _B = -10mA
Base-Emitter Saturation Voltage		V _{BE(sat)}	—	-1.2	V	I _C = -100mA, V _{CE} = -1.0V
SMALL SIGNAL CHARACTERISTICS						
Current Gain-Bandwidth Product		f _r	50	—	MHz	V _{CE} = -1.0V, I _C = -100mA, f = 100MHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

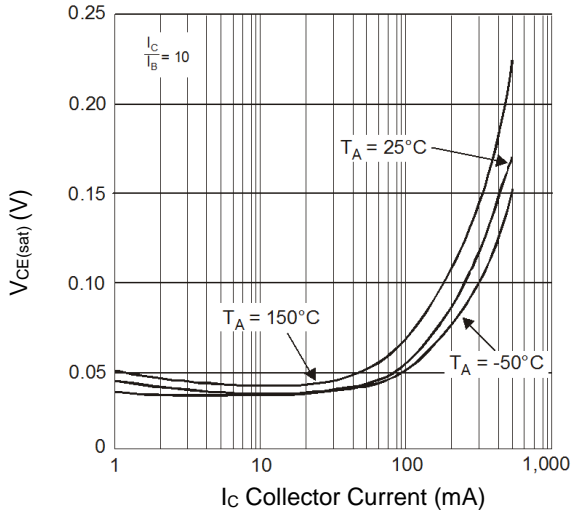


Figure 4. $V_{CE} \text{ v } I_C$

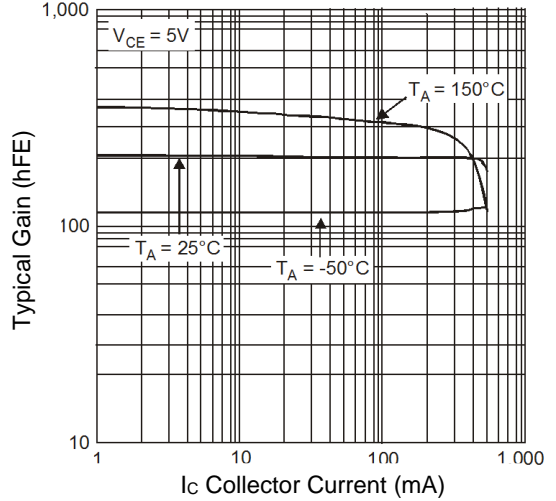


Figure 5. $h_{FE} \text{ v } I_C$

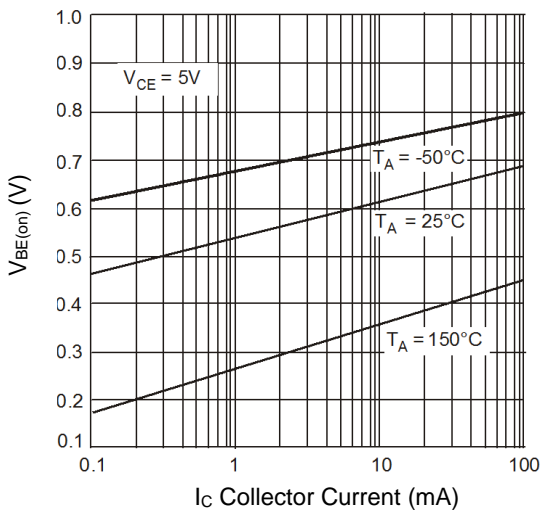


Figure 6. $V_{BE(on)} \text{ v } I_C$

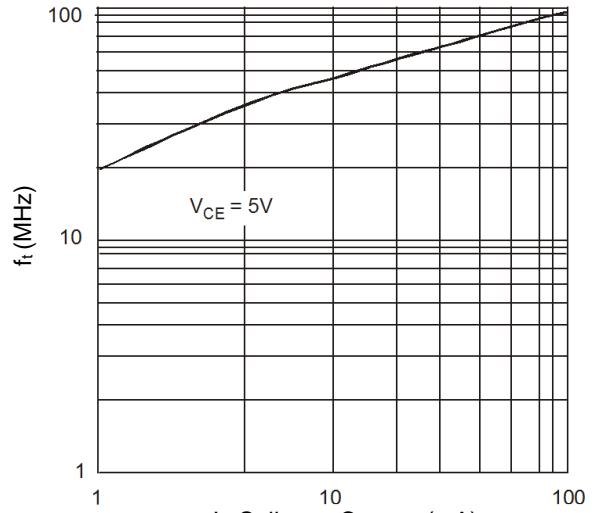
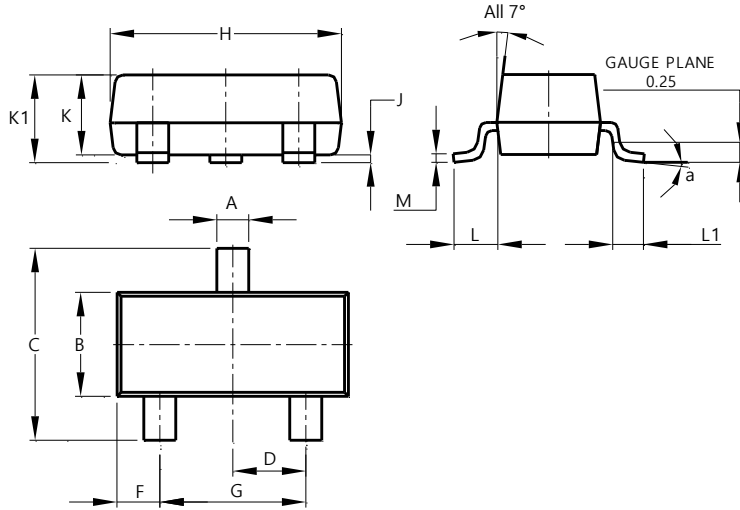


Figure 7. $f_t \text{ v } I_C$

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23

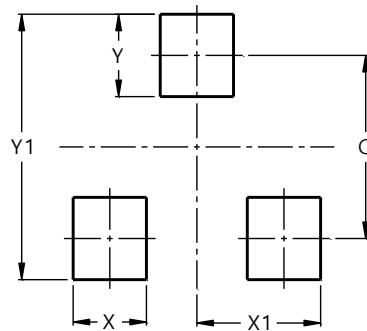


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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