MMBTA56Q-7-F Datasheet

https://www.DiGi-Electronics.com

DiGi Electronics Part Number	MMBTA56Q-7-F-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	MMBTA56Q-7-F
Description	TRANS PNP 80V 0.5A SOT23-3
Detailed Description	Bipolar (BJT) Transistor PNP 80 V 500 mA 50MHz 350 mW Surface Mount SOT-23-3

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MMBTA56Q-7-F	Diodes Incorporated
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	500 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
80 V	250mV @ 10mA, 100mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100nA (ICBO)	100 @ 100mA, 1V
Power - Max:	Frequency - Transition:
350 mW	50MHz
Operating Temperature:	Grade:
-55°C ~ 150°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Surface Mount
Package / Case:	Supplier Device Package:
TO-236-3, SC-59, SOT-23-3	SOT-23-3
Base Product Number:	
MMBTA56	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0095	

Lead-free Green

MMBTA55 / MMBTA56

60V PNP MEDIUM POWER TRANSISTOR IN SOT23

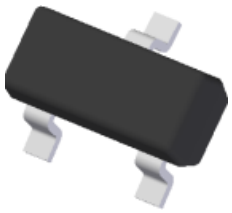
Features

- 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)**

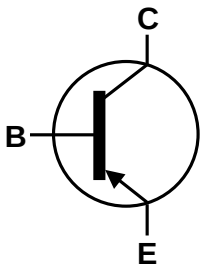
Mechanical Data

- 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)

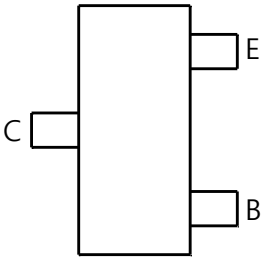
SOT23



Top View



Device Symbol



Top View
Pin-Out

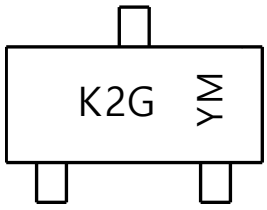
Ordering Information (Note 4)

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

SOT23



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	(Note 5)	P_D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	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

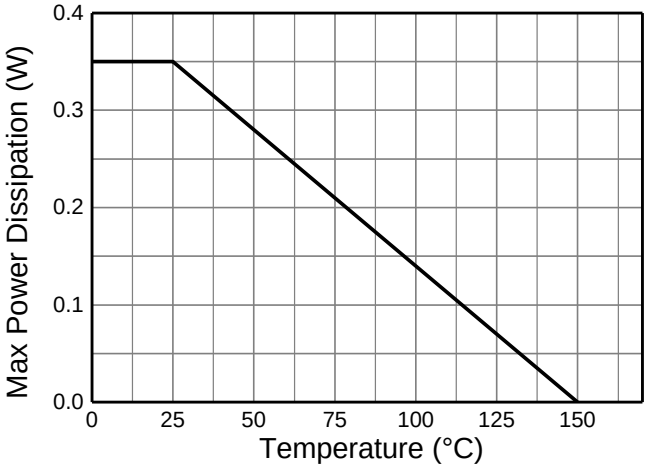


Figure 1. Derating Curve

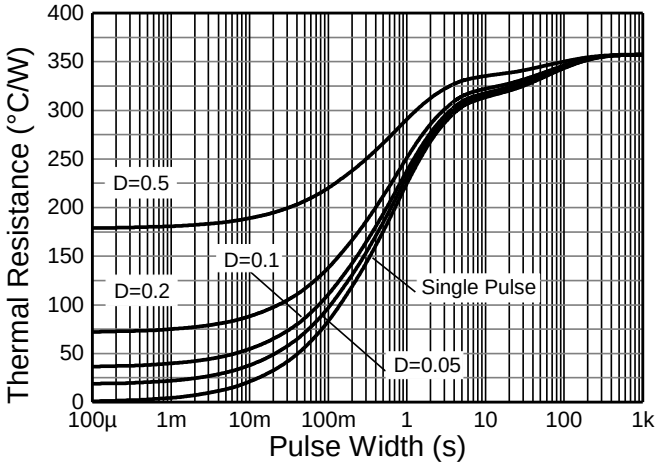


Figure 2. Transient Thermal Impedance

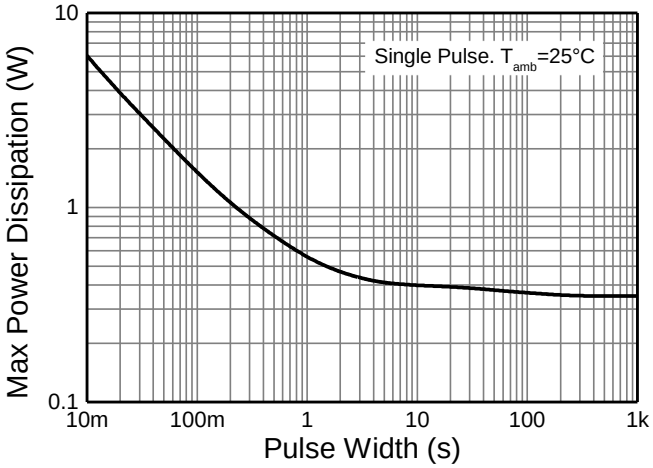


Figure 3. Pulse Power Dissipation

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_T	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°C, unless otherwise specified.)

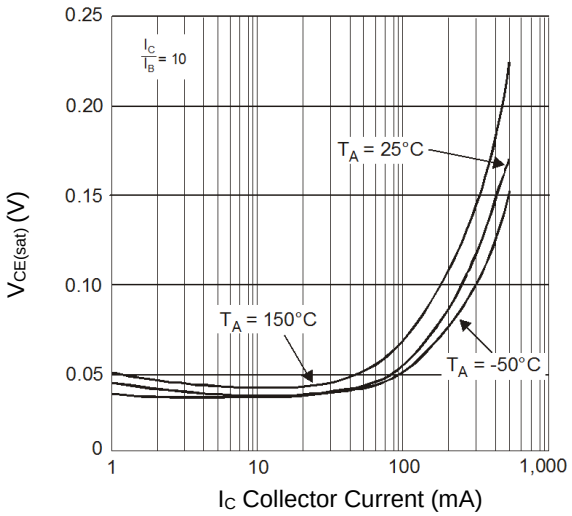


Figure 4. V_{CE} v I_C

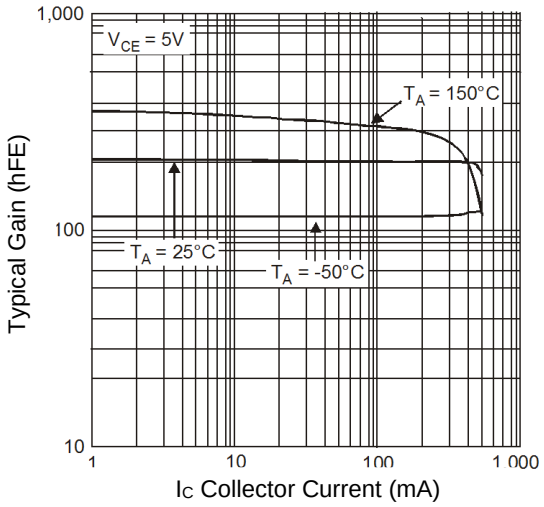


Figure 5. h_{FE} v I_C

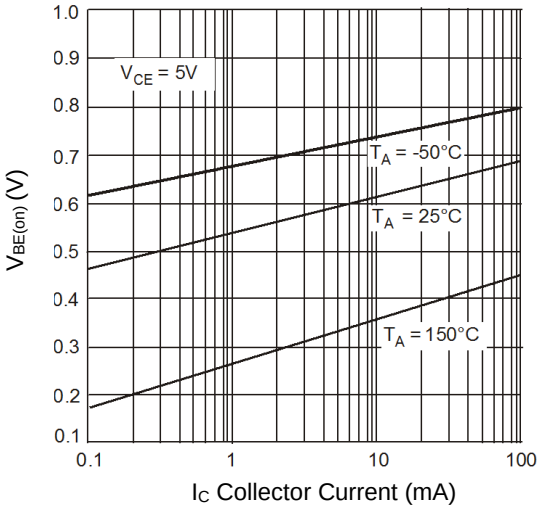


Figure 6. $V_{BE(on)}$ v I_C

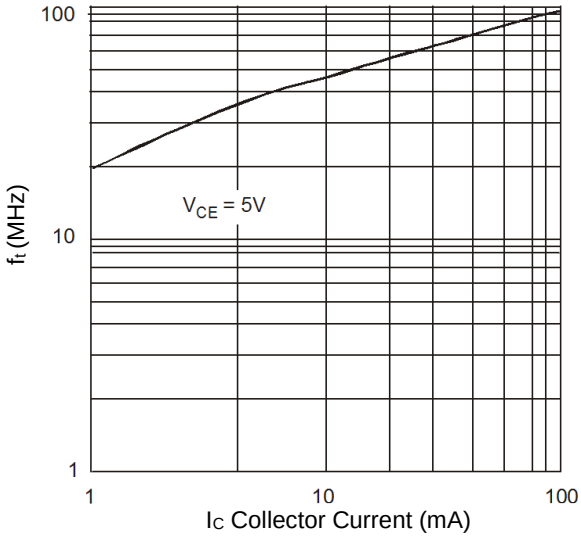
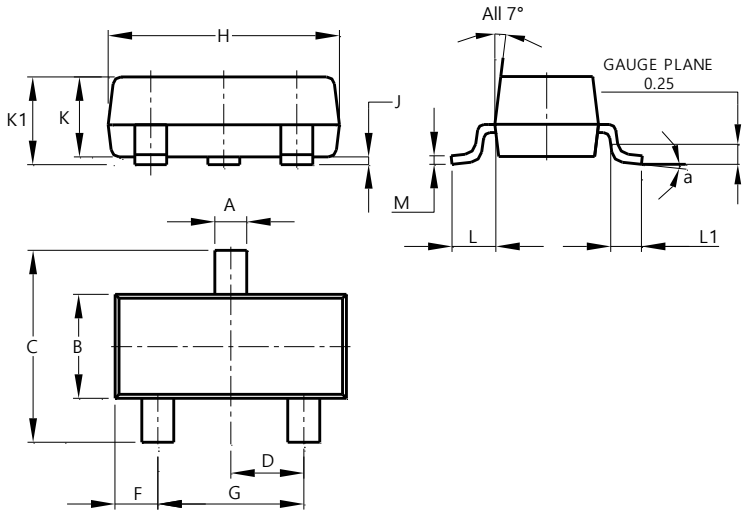


Figure 7. f_t v I_C

Package Outline Dimensions

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

SOT23

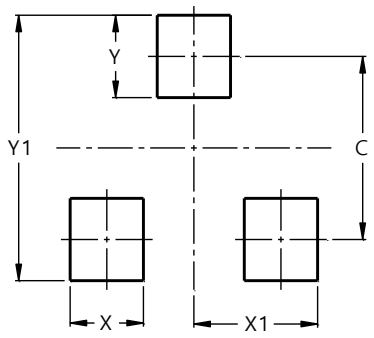


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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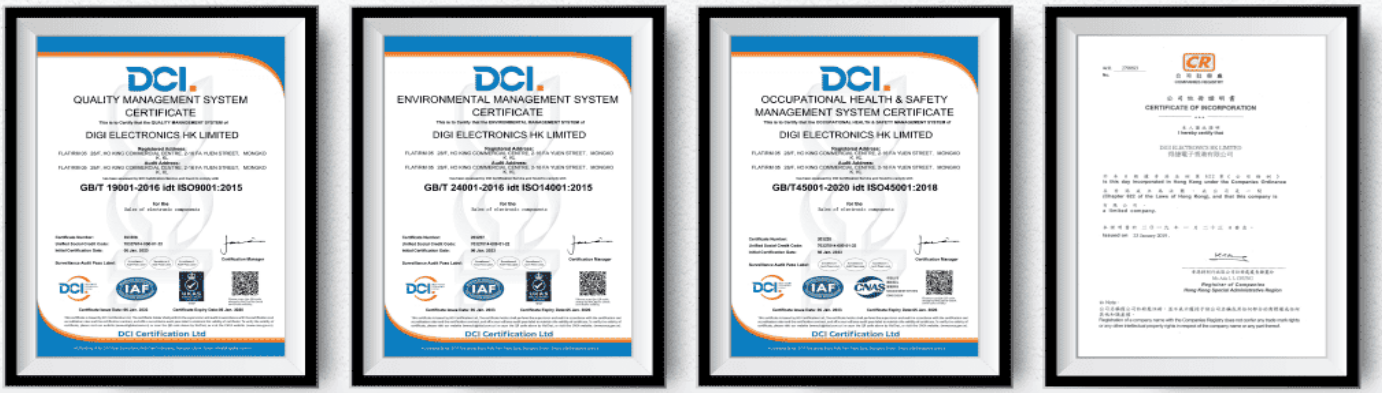

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