

Features

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Complementary PNP Type: MMBTA55 and MMBTA56
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The MMBTA05Q and MMBTA06Q are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

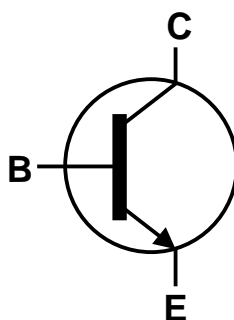
Mechanical Data

- 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 208③
- Weight: 0.008 grams (Approximate)

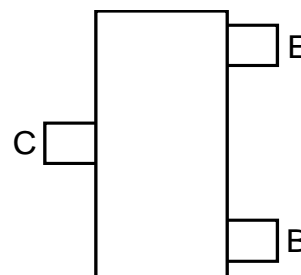


SOT23

Top View



Device Symbol



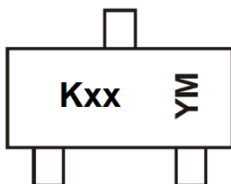
Top View
Pin Configuration

Ordering Information (Note 4)

Orderable Part Number	Marking	Reel size (inches)	Tape width (mm)	Packing	
				Quantity	Carrier
MMBTA05-7-F	K1G / K1H	7	8	3,000	Reel
MMBTA05Q-13-F	K1G / K1H	13	8	10,000	Reel
MMBTA06-7-F	K1G	7	8	3,000	Reel
MMBTA06Q-7-F	K1G	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



Kxx = Product Type Marking Code (See Ordering Information)
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: K = 2023)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2010	...	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	X	...	K	L	M	N	P	R	S	T	U	V

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

Characteristic	Symbol	MMBTA05	MMBTA06	Unit
Collector-Base Voltage	V_{CB0}	60	80	V
Collector-Emitter Voltage	V_{CEO}	60	80	V
Emitter-Base Voltage	V_{EBO}	4.0		V
Collector Current	I_C	500		mA
Peak Collector Current	I_{CM}	1		A

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

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	(Note 5) 310	mW
		(Note 6) 350	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5) 403	$^\circ\text{C/W}$
		(Note 6) 357	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

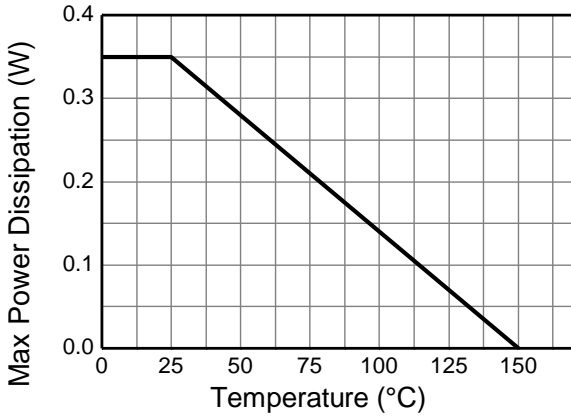


Figure 1 Derating Curve

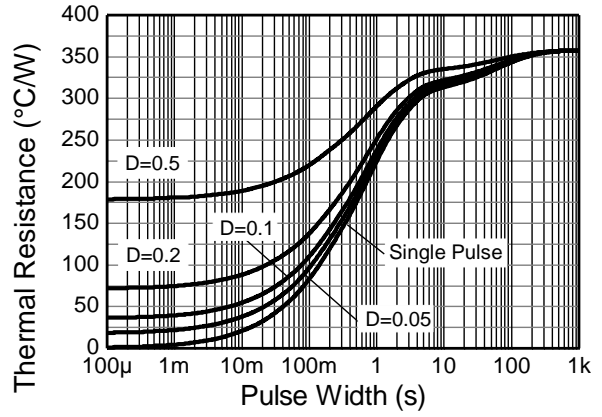


Figure 2 Transient Thermal Impedance

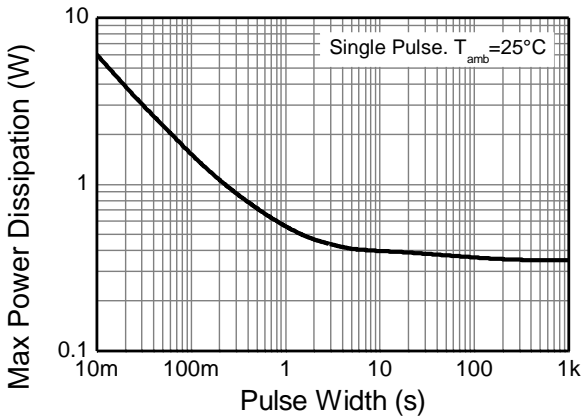


Figure 3 Pulse Power Dissipation

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

Characteristic		Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	MMBTA05 MMBTA06	BV _{CBO}	60 80	—	V	I _C = 100μA, I _E = 0
Collector-Emitter Breakdown Voltage (Note 9)	MMBTA05 MMBTA06	BV _{CEO}	60 80	—	V	I _C = 10.0mA, I _B = 0
Emitter-Base Breakdown Voltage		BV _{EBO}	4.0	—	V	I _E = 100 μA, I _C = 0
Collector Cutoff Current	MMBTA05 MMBTA06	I _{CBO}	—	100	nA	V _{CB} = 60V, I _E = 0 V _{CB} = 80V, I _E = 0
Collector Cutoff Current	MMBTA05 MMBTA06	I _{CES}	—	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 Turn-On Voltage		V _{BE(on)}	—	1.2	V	I _C = 100mA, V _{CE} = 1.0V
SMALL SIGNAL CHARACTERISTICS						
Current Gain-Bandwidth Product		f _T	100	—	MHz	V _{CE} = 2.0V, I _C = 10mA, f = 100MHz

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

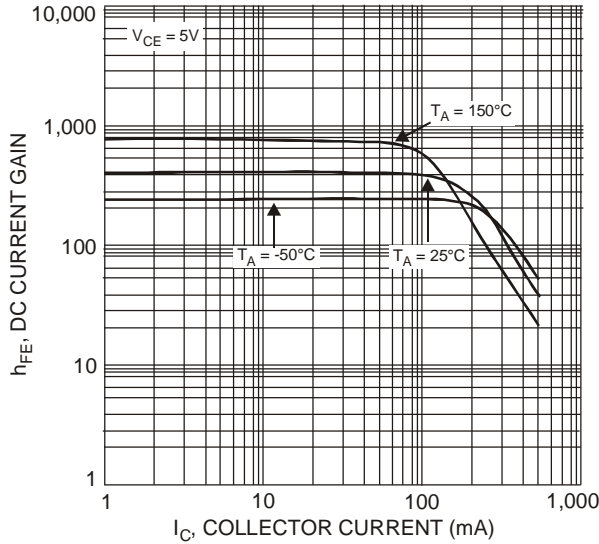


Figure 4 Typical DC Current Gain vs. Collector Current

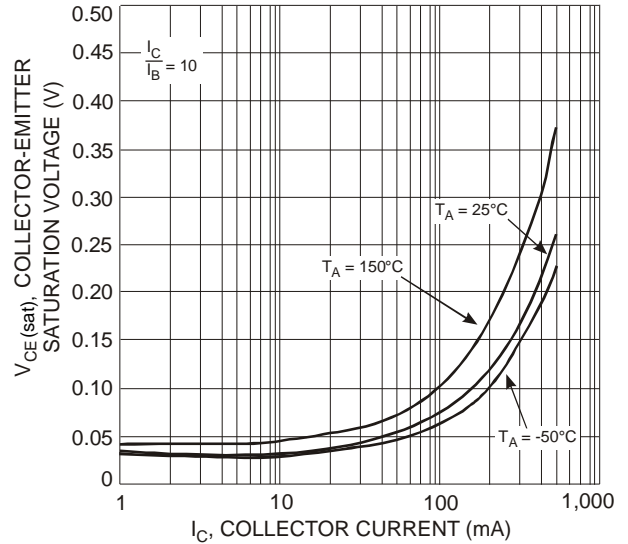


Figure 5 Collector-Emitter Saturation Voltage vs. Collector Current

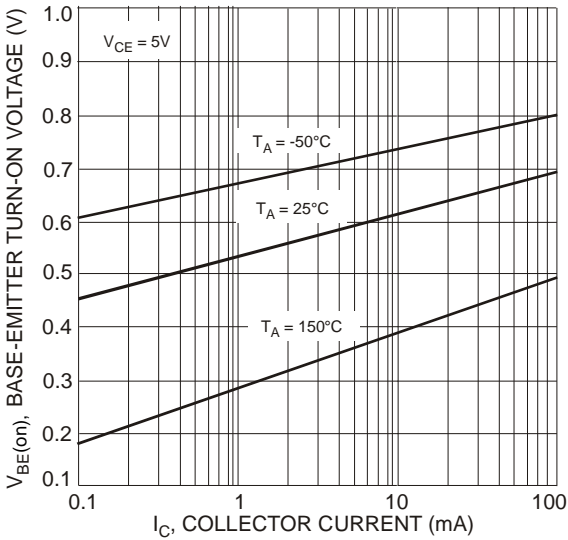


Figure 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

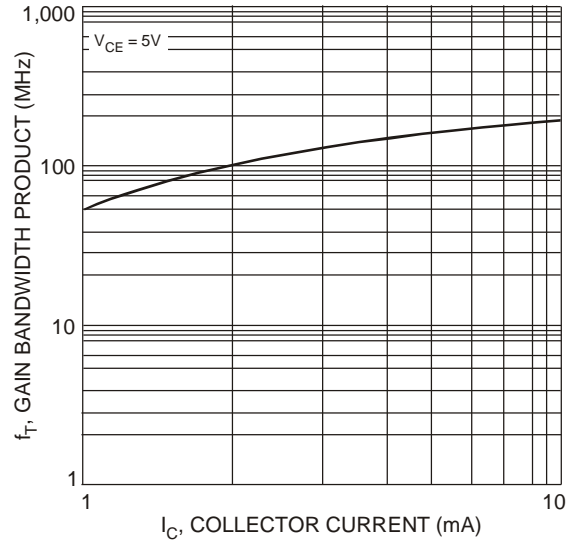


Figure 7 Typical Gain Bandwidth Product vs. Collector Current

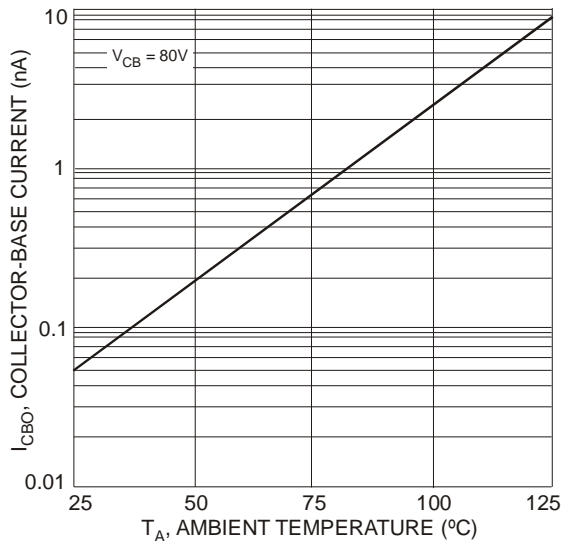


Figure 8 Typical Collector-Cutoff Current vs. Ambient Temperature

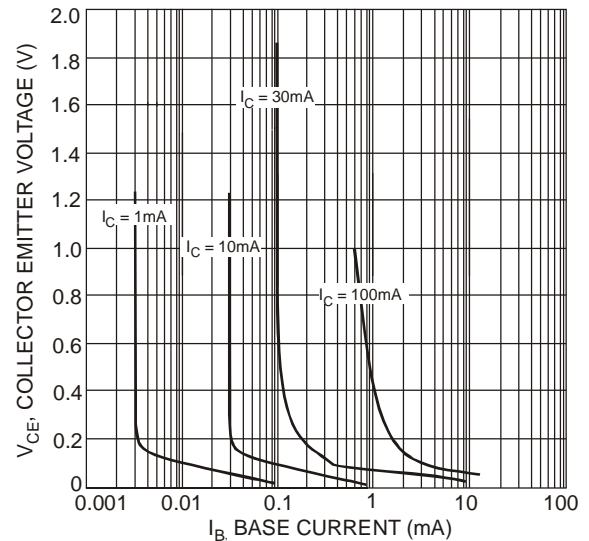
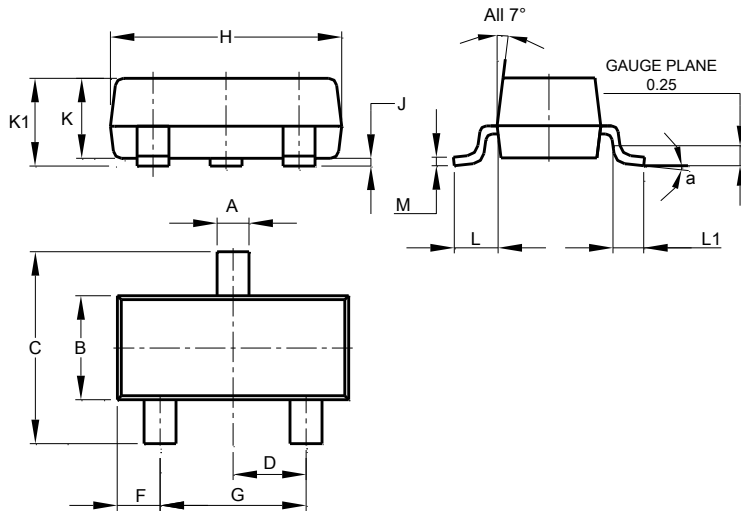


Figure 9 Typical Collector Saturation Region

Package Outline Dimensions

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

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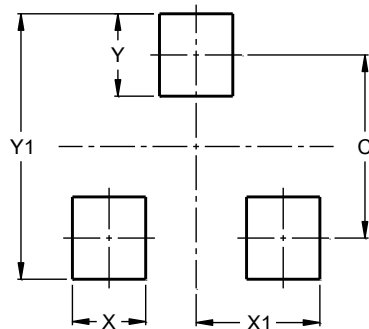


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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