



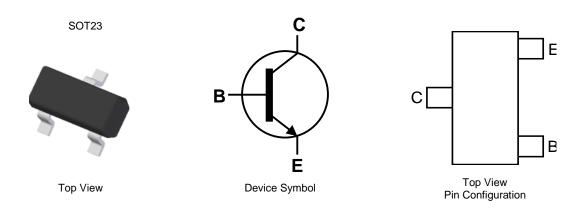
NPN SMALL SIGNAL TRANSISTOR IN SOT23

Features

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Complementary PNP Type: MMBTA55 & MMBTA56
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The DIODES™ MMBTA05Q and DIODES™ 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 208⁽³⁾
- Weight: 0.008 grams (Approximate)



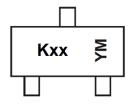
Ordering Information (Note 4)

Product	Product Marking Reel size (inche		Tape width (mm)	Packing		
Product	Warking	Reel Size (Iliches)	rape width (min)	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 \overline{Y} = Year (ex: K = 2023)

M or \overline{M} = Month (ex: 9 = September)

Date Code Kev

Year	2010		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	Х		K	L	М	N	0	Р	R	S	Т	U
	_			_		_		A	C	0-1		Dec
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	פפ



Absolute Maximum Ratings (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	MMBTA05	MMBTA06	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	Ic	500 m		mA
Peak Collector Current	I _{CM}	1		А

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

Characteristic	Symbol	Value	Unit	
Power Dissipation	(Note 5)	D-	310	mW
Power Dissipation	(Note 6)	P _D	350	IIIVV
Thermal Resistance, Junction to Ambient	(Note 5)	D	403	°C/W
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	357	-C/VV
Thermal Resistance, Junction to Leads (Note 7)		$R_{ heta JL}$	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	С

Notes:

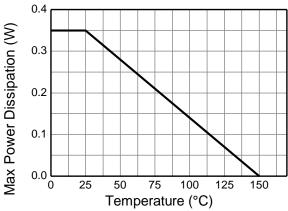
^{5.} For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.

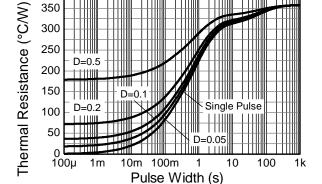
^{6.} Same as note (5), except the device is mounted on 15 mm x 15mm 1oz copper.

^{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





400

Figure 1 Derating Curve

Figure 2 Transient Thermal Impedance

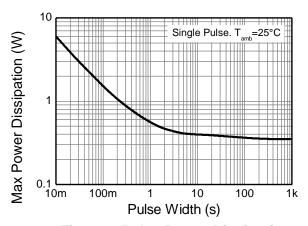


Figure 3 Pulse Power Dissipation



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	$I_C = 100\mu A, I_E = 0$
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	$I_E = 100 \mu A, I_C = 0$
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	$I_C = 100 \text{mA}, I_B = 10 \text{mA}$	
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	100		MHz	$V_{CE} = 2.0V, I_{C} = 10mA, f = 100MHz$

Note: 9. Measured under pulsed conditions. Pulse width \leq 300 μ s. Duty cycle \leq 2%.





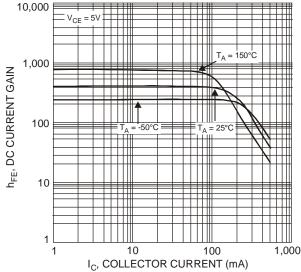
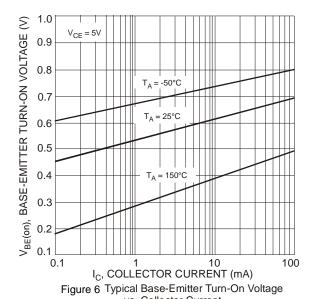
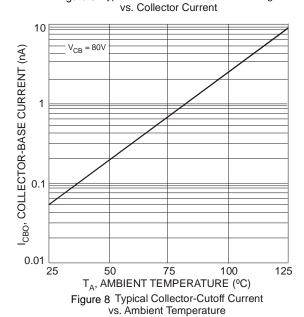


Figure 4 Typical DC Current Gain vs. Collector Current





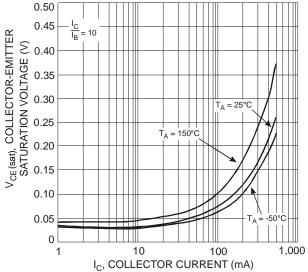


Figure 5 Collector-Emitter Saturation Voltage vs. Collector Current

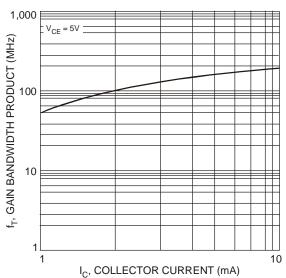


Figure 7 Typical Gain Bandwidth Product vs. Collector Current

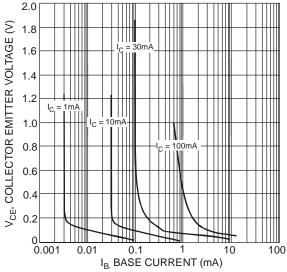


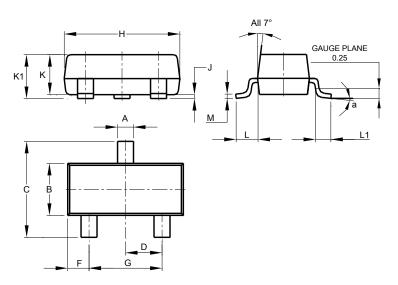
Figure 9 Typical Collector Saturation Region



Package Outline Dimensions

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

SOT23

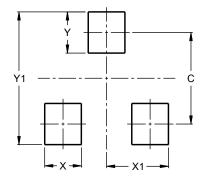


SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
В	1.20	1.40	1.30			
C	2.30	2.50	2.40			
D	0.89	1.03	0.915			
F	0.45	0.60	0.535			
G	1.78	2.05	1.83			
Н	2.80	3.00	2.90			
J	0.013	0.10	0.05			
K	0.890	1.00	0.975			
K1	0.903	1.10	1.025			
L	0.45	0.61	0.55			
L1	0.25	0.55	0.40			
М	0.085	0.150	0.110			
а	0°	8°				
All	Dimens	ions in	mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
С	2.0
Х	0.8
X1	1.35
Υ	0.9
Y1	2.9



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