



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Features

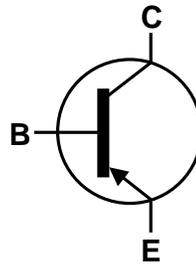
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Complementary NPN Type: DIODES™ NK-MMBTA05Q / DIODES™ NK-MMBTA06Q

Mechanical Data

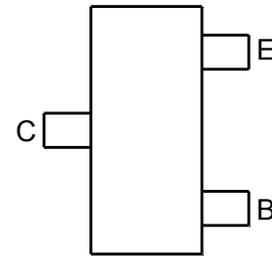
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish-Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	MMBTA55Q	MMBTA56Q	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 - 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

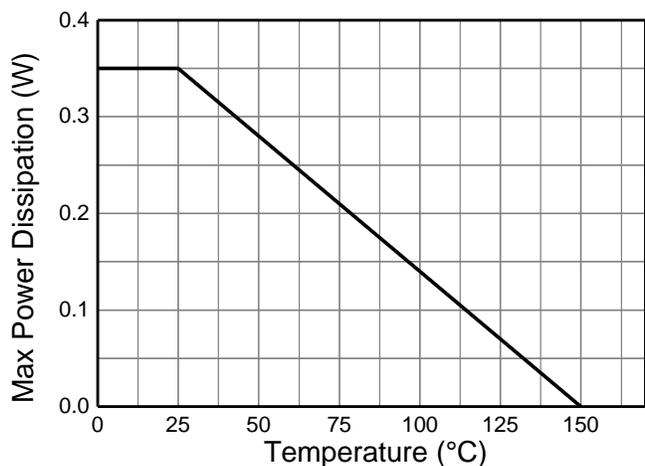


Figure 1. Derating Curve

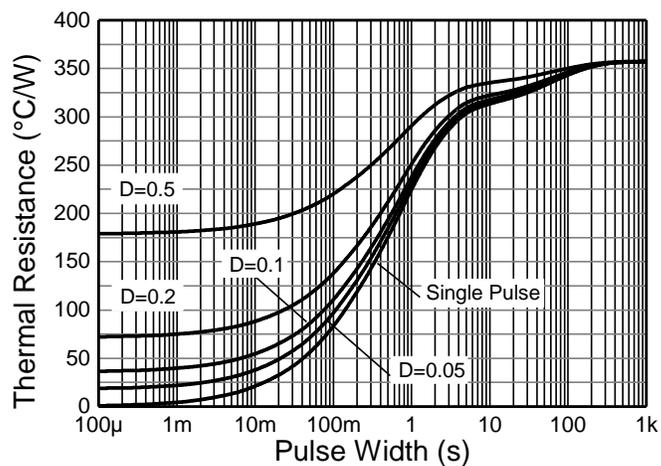


Figure 2. Transient Thermal Impedance

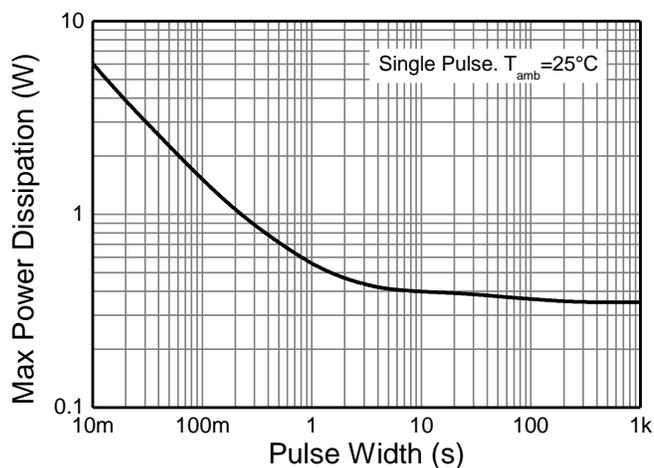


Figure 3. Pulse Power Dissipation

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

Characteristic	Symbol	Min	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)						
Collector-Base Breakdown Voltage	NK-MMBTA55Q NK-MMBTA56Q	BV_{CBO}	-60 -80	—	V	$I_C = -100\mu\text{A}$, $I_E = 0$
Collector-Emitter Breakdown Voltage	NK-MMBTA55Q NK-MMBTA56Q	BV_{CEO}	-60 -80	—	V	$I_C = -1.0\text{mA}$, $I_B = 0$
Emitter-Base Breakdown Voltage		BV_{EBO}	-5.0	-4.0	—	$I_E = -100\mu\text{A}$, $I_C = 0$
Collector Cut-Off Current	NK-MMBTA55Q NK-MMBTA56Q	I_{CBO}	—	-100	nA	$V_{CB} = -60\text{V}$, $I_E = 0$ $V_{CB} = -80\text{V}$, $I_E = 0$
Collector Cut-Off Current	NK-MMBTA55Q NK-MMBTA56Q	I_{CEX}	—	-100	nA	$V_{CE} = -60\text{V}$, $I_{BO} = 0\text{V}$ $V_{CE} = -80\text{V}$, $I_{BO} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
DC Current Gain		h_{FE}	100	—	—	$I_C = -10\text{mA}$, $V_{CE} = -1.0\text{V}$ $I_C = -100\text{mA}$, $V_{CE} = -1.0\text{V}$
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	$I_C = -100\text{mA}$, $V_{CE} = -1.0\text{V}$
SMALL SIGNAL CHARACTERISTICS						
Current Gain-Bandwidth Product		f_T	50	—	MHz	$V_{CE} = -1.0\text{V}$, $I_C = -100\text{mA}$, $f = 100\text{MHz}$

 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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

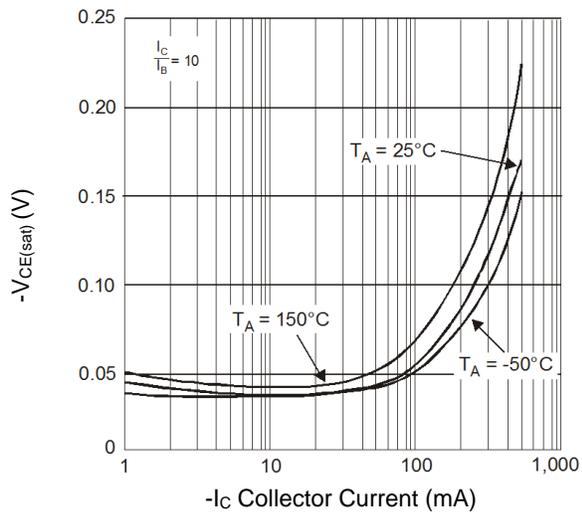


Figure 4. $V_{CE(sat)} \ v \ I_C$

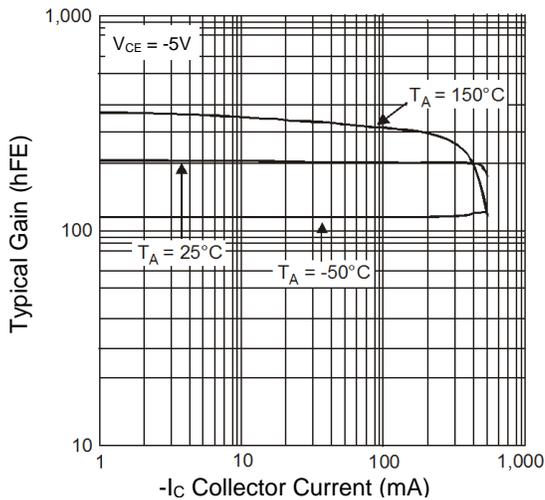


Figure 5. $h_{FE} \ v \ I_C$

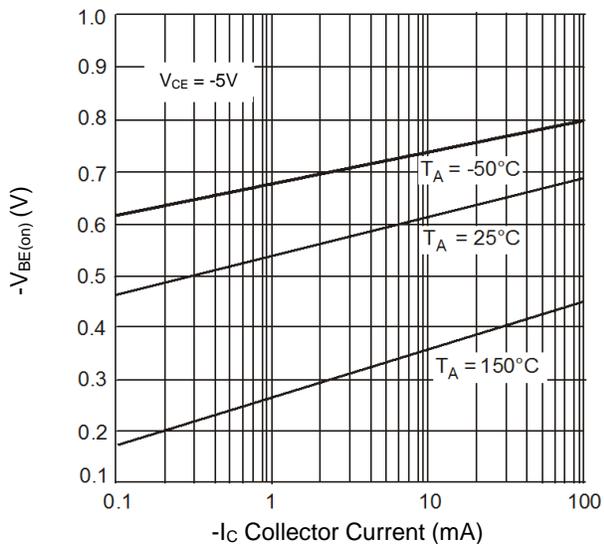


Figure 6. $V_{BE(on)} \ v \ I_C$

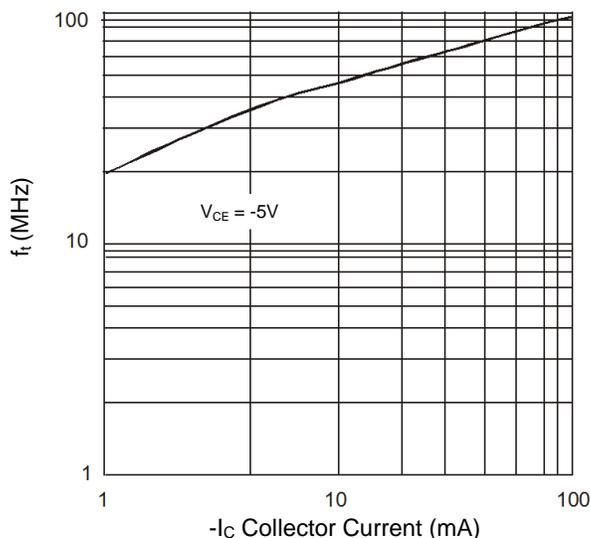
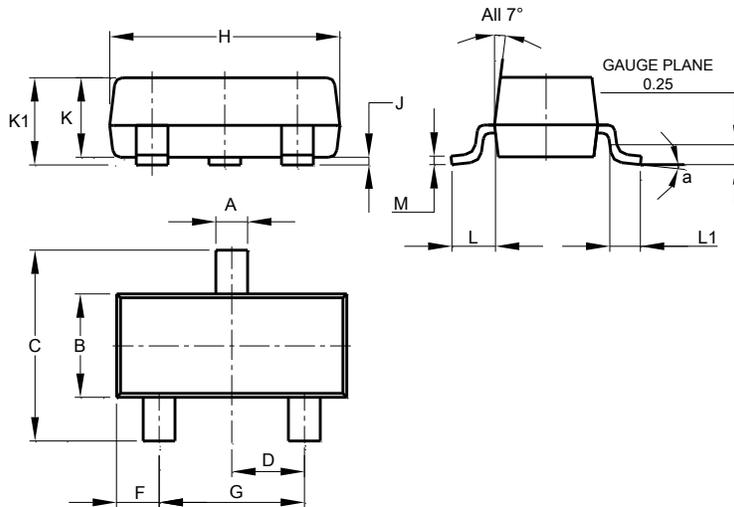


Figure 7. $f_t \ v \ I_C$

Package Outline Dimensions

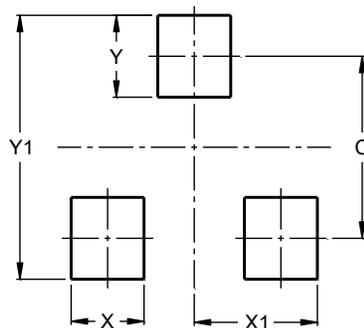
SOT23



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

SOT23



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