优尚

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

- BV_{CEO} > 45V, 60V & 80V
- I_C = 1A Continuous Collector Current
- I_{CM} = 2A Peak Pulse Current
- Low Saturation Voltage $V_{CE(sat)}$ < 500mV @ 0.5A
- Gain Groups 10 and 16
- Epitaxial Planar Die Construction
- Complementary PNP Types: NK-BCX51, 52, and 53

Mechanical Data

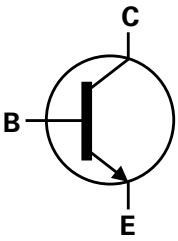
- Package: SOT89
- Package Material: Molded Plastic, “Green” Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Leads. Solderable per MIL-STD-202 Method 208 e3
- Weight: 0.055 grams (Approximate)

Applications

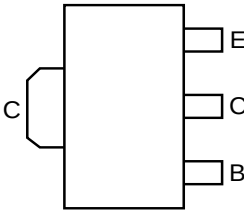
- Medium power switching or amplification applications
- AF driver and output stages

SOT89

Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	NK-BCX54	NK-BCX55	NK-BCX56	Unit
Collector-Base Voltage	V_{CBO}	45	60	100	V
Collector-Emitter Voltage	V_{CEO}	45	60	80	V
Emitter-Base Voltage	V_{EBO}	6			V
Continuous Collector Current	I_C	1			A
Peak Pulse Collector Current	I_{CM}	2			
Continuous Base Current	I_B	100			mA
Peak Pulse Base Current	I_{BM}	200			

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.55	W
	(Note 6)		1	
	(Note 7)		1.5	
	(Note 8)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	225	°C/W
	(Note 6)		125	
	(Note 7)		83	
	(Note 8)		60	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	13	°C/W
Thermal Resistance, Junction to Case	(Notes 5 & 10)	$R_{\theta JC}$	39	°C/W
	(Note 10)		27	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 11)

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 on 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still-air conditions whilst operating in a steady-state.
6. For a device mounted with the exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still-air conditions whilst operating in a steady-state.
7. Same as Note 6, except the device is mounted on 25mm x 25mm 1oz copper.
8. Same as Note 6, except the device is mounted on 50mm x 50mm 1oz copper.
9. Thermal resistance from junction to solder-point (on the exposed collector pad).
10. Thermal resistance from junction to the top of the case.
11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

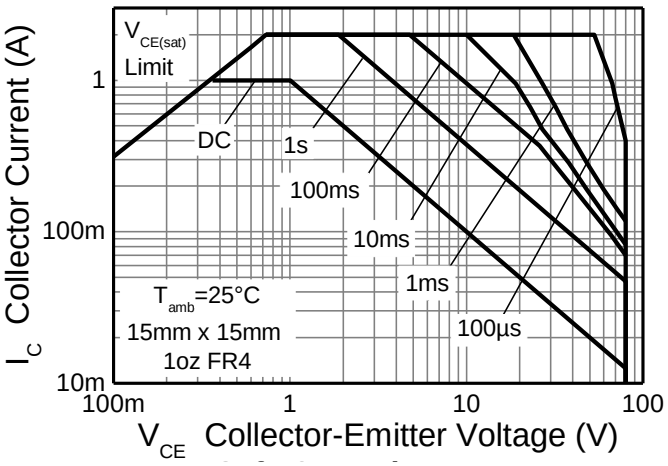


Figure 1. Safe Operation Area

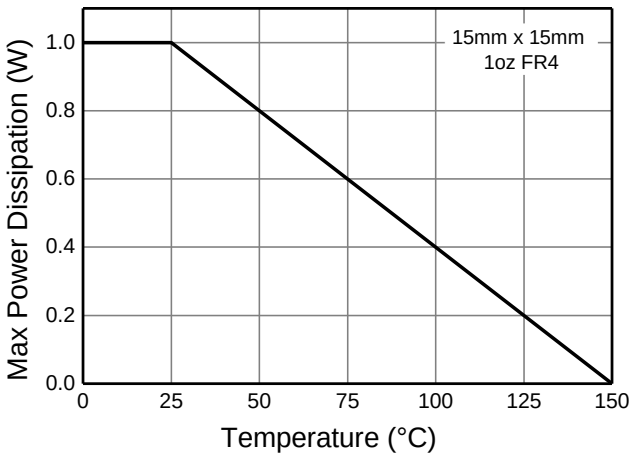


Figure 2. Derating Curve

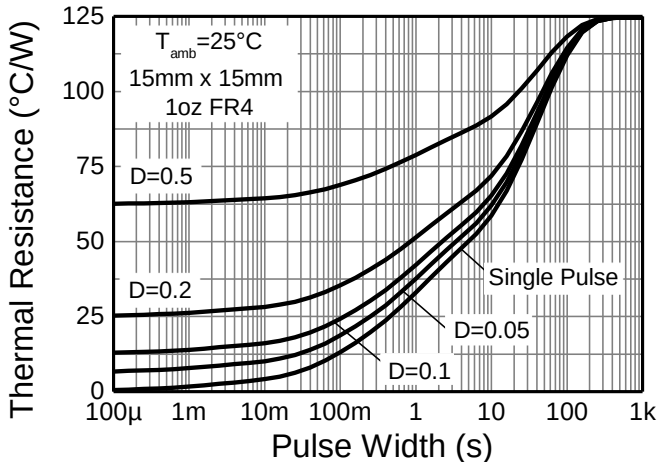


Figure 3. Transient Thermal Impedance

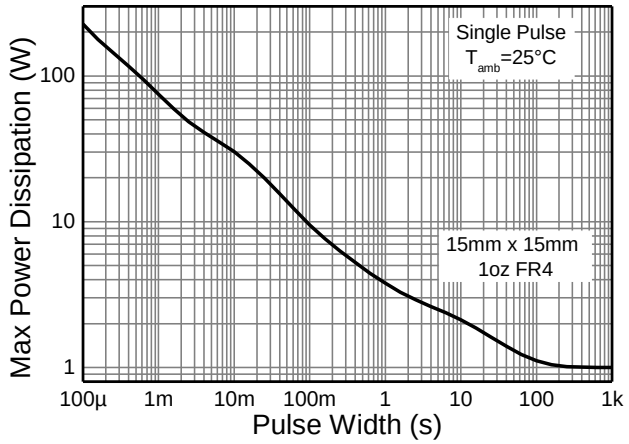


Figure 4. Pulse Power Dissipation

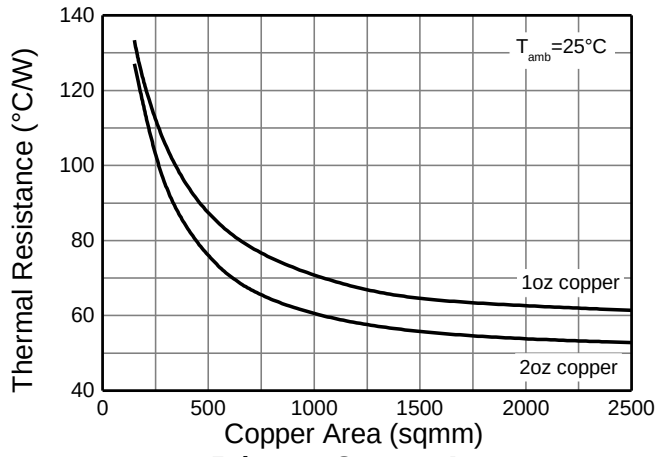


Figure 5. $R_{\theta JA}$ vs. Copper Area

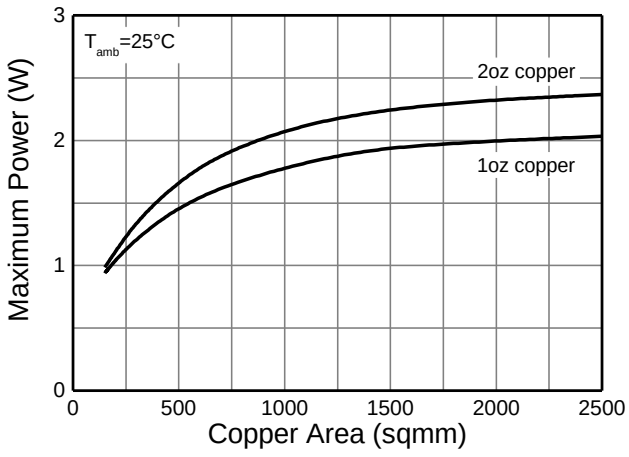


Figure 6. Power Dissipation vs. Copper Area

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	NK-BCX54	BV_{CBO}	45	—	—	V	I_C = 100μA
	NK-BCX55		60				
	NK-BCX56		100				
Collector-Emitter Breakdown Voltage (Note 12)	NK-BCX54	BV_{CEO}	45	—	—	V	I_C = 10mA
	NK-BCX55		60				
	NK-BCX56		80				
Emitter-Base Breakdown Voltage		BV_{EBO}	6	—	—	V	I_E = 100μA
Collector Cutoff Current		I_{CBO}	— —	— —	0.1 20	μA	V_{CB} = 30V V_{CB} = 30V, T_A = +150°C
Emitter Cutoff Current		I_{EBO}	—	—	20	nA	V_{EB} = 5V
Static Forward Current Transfer Ratio (Note 12)	All versions	h_{FE}	25 40 25	— — —	— 250 —	—	I_C = 5mA, V_{CE} = 2V I_C = 150mA, V_{CE} = 2V I_C = 500mA, V_{CE} = 2V
	10 gain grp		63	—	160		I_C = 150mA, V_{CE} = 2V
	16 gain grp		100	—	250		I_C = 150mA, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 12)		$V_{CE(sat)}$	—	—	0.5	V	I_C = 500mA, I_B = 50mA
Base-Emitter Turn-On Voltage (Note 12)		$V_{BE(on)}$	—	—	1.0	V	I_C = 500mA, V_{CE} = 2V
Transition Frequency		f_T	150	—	—	MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output Capacitance		C_{obo}	—	—	25	pF	V_{CB} = 10V, f = 1MHz

Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

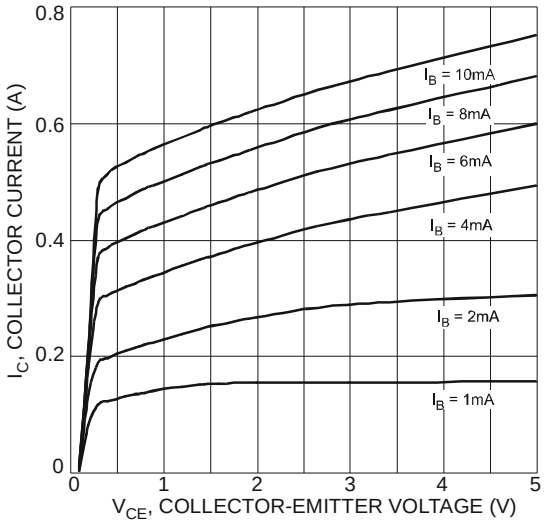


Figure 7. Typical Collector Current vs. Collector-Emitter Voltage

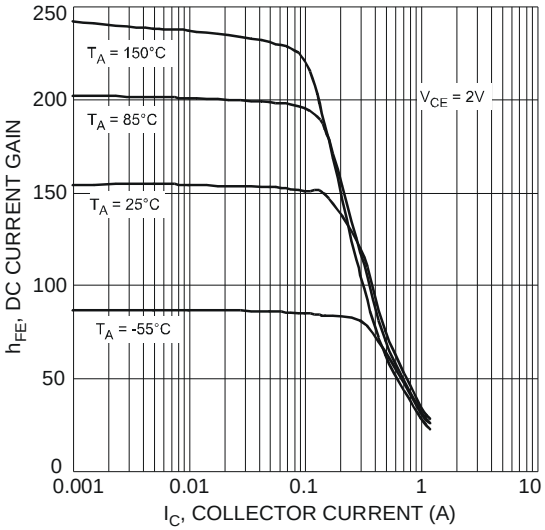


Figure 8. Typical DC Current Gain vs. Collector Current

Typical Electrical Characteristics (continued)

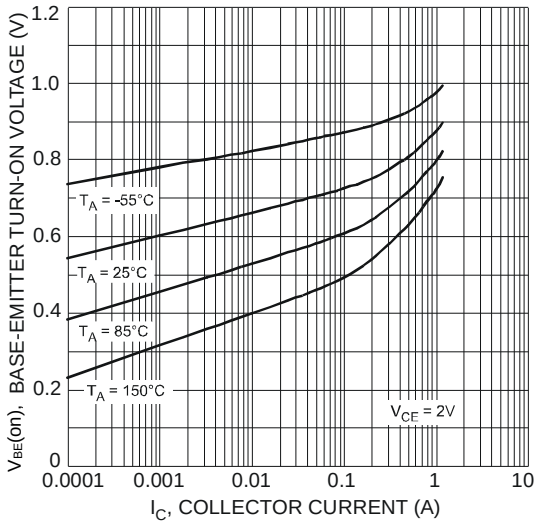


Figure 9. Typical Base-Emitter Turn-On Voltage vs. Collector Current

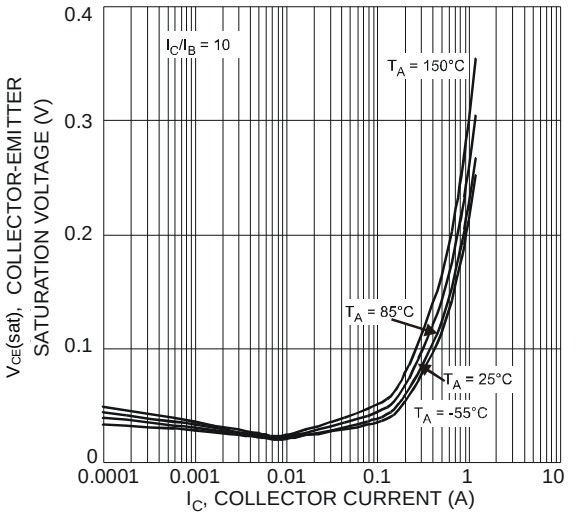


Figure 10. Typical Collector-Emitter Saturation Voltage vs. Collector Current

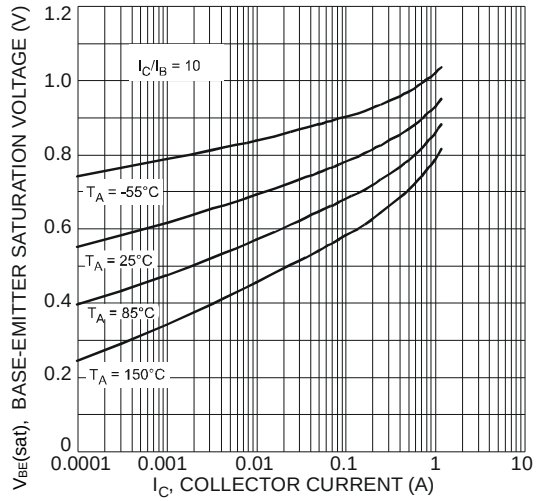


Figure 11. Typical Base-Emitter Saturation Voltage vs. Collector Current

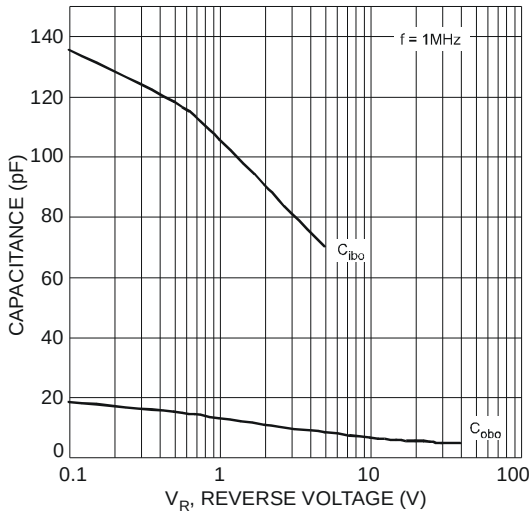


Figure 12. Typical Capacitance Characteristics

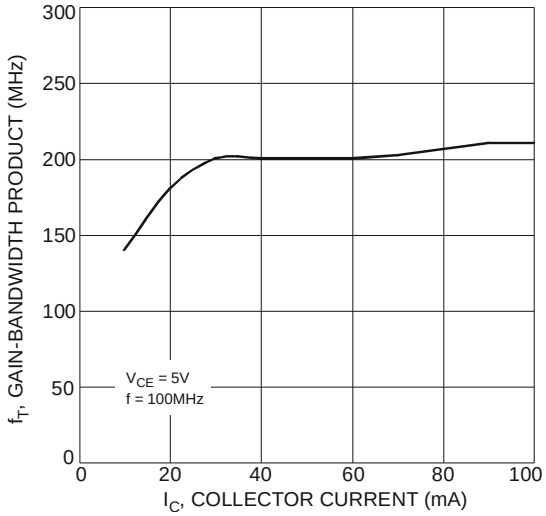
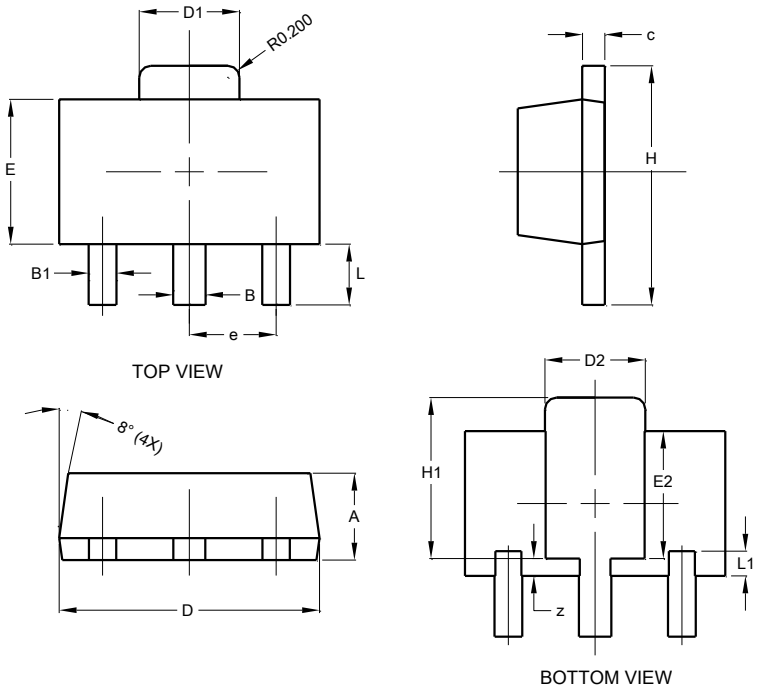


Figure 13. Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

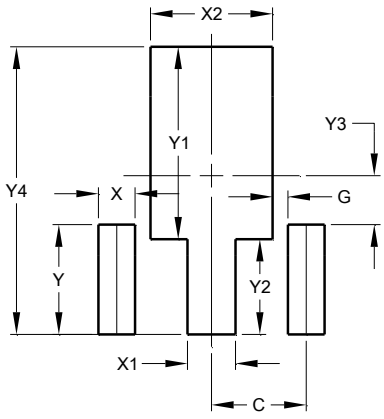
SOT89



SOT89			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530