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
- Complementary NPN Types: NK-BCX54, 55, and 56

Mechanical Data

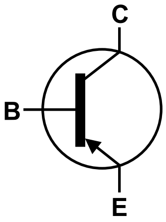
- Case: SOT89
- Case Material: Molded Plastic, “Green” Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Leads; Solderable per MIL-STD-202 Method 208 e3
- Weight: 0.052 grams (Approximate)

Applications

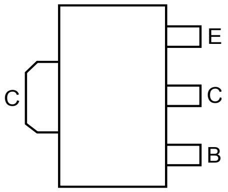
- Medium Power Switching or Amplification Applications
- AF Driver and Output Stages

SOT89

Top View



Device Symbol



Top View
Pin-Out

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

Characteristic	Symbol	NK-BCX51	NK-BCX52	NK-BCX53	Unit
Collector-Base Voltage	V_{CBO}	-45	-60	-100	V
Collector-Emitter Voltage	V_{CEO}	-45	-60	-80	V
Emitter-Base Voltage	V_{EBO}	-5			V
Continuous Collector Current	I_C	-1			A
Peak Pulse Collector Current (Single pulse)	I_{CM}	-2			
Continuous Base Current	I_B	-100			mA
Peak Pulse Base Current (Single pulse)	I_{BM}	-200			

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

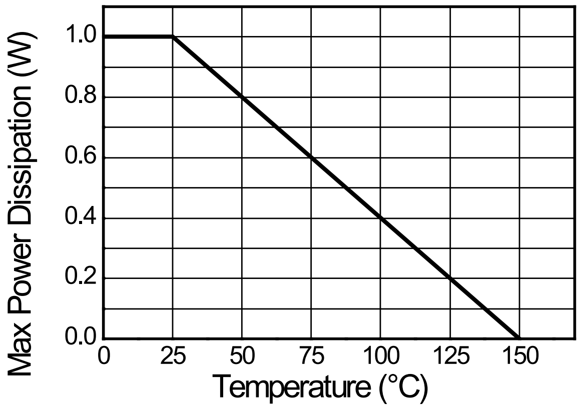
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	1	W
	(Note 6)		1.5	
	(Note 7)		2.0	
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		83	
	(Note 7)		60	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	13	°C/W
Thermal Resistance, Junction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

ESD Ratings (Note 10)

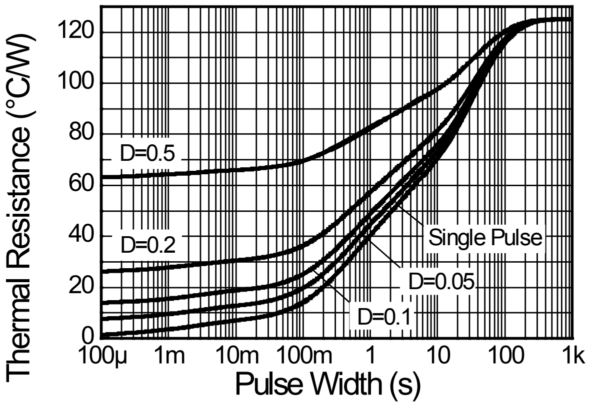
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted 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.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 50mm 1oz copper.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).
9. Thermal resistance from junction to the top of the case.
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

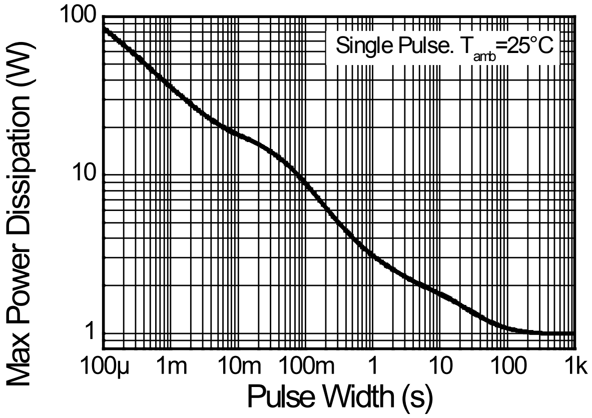
Thermal Characteristics and Derating Information



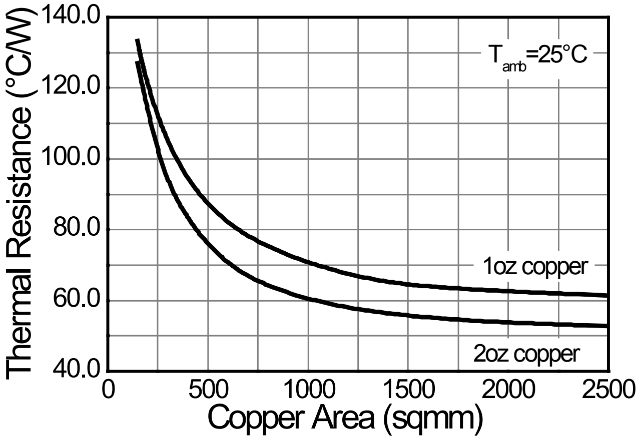
Derating Curve

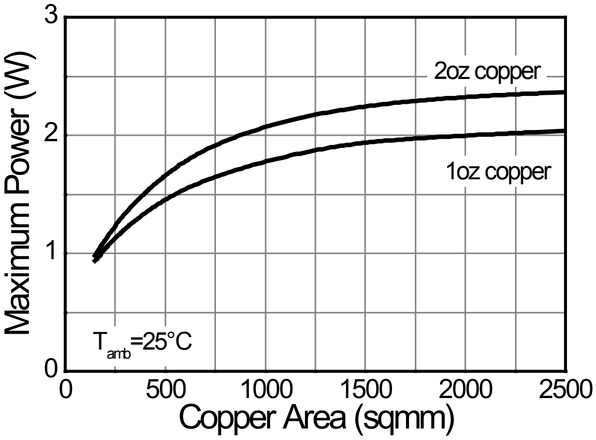


Transient Thermal Impedance



Pulse Power Dissipation



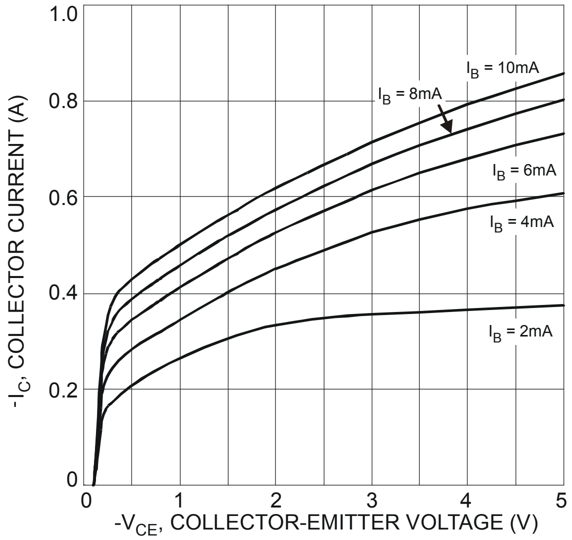


Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

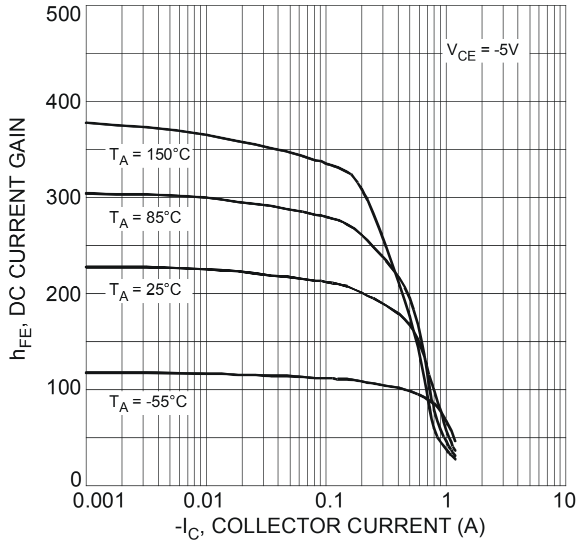
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	NK-BCX51	BV_{CBO}	-45	—	—	V	I_C = -100μA
	NK-BCX52		-60				
	NK-BCX53		-100				
Collector-Emitter Breakdown Voltage (Note 11)	NK-BCX51	BV_{CEO}	-45	—	—	V	I_C = -10mA
	NK-BCX52		-60				
	NK-BCX53		-80				
Emitter-Base Breakdown Voltage		BV_{EBO}	-5	—	—	V	I_E = -10μA
Collector Cut-Off Current		I_{CBO}	—	—	-0.1 -20	μA	V_{CB} = -30V V_{CB} = -30V, T_J = +150°C
Emitter Cut-Off Current		I_{EBO}	—	—	-20	nA	V_{EB} = -5V
DC Current Gain (Note 11)	All versions	h_{FE}	25	—	—	—	I_C = -5mA, V_{CE} = -2V
			40	—	250		I_C = -150mA, V_{CE} = -2V
			25	—	—		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 11)		$V_{CE(sat)}$	—	—	-0.5	V	I_C = -500mA, I_B = -50mA
Base-Emitter Turn-On Voltage (Note 11)		$V_{BE(on)}$	—	—	-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: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

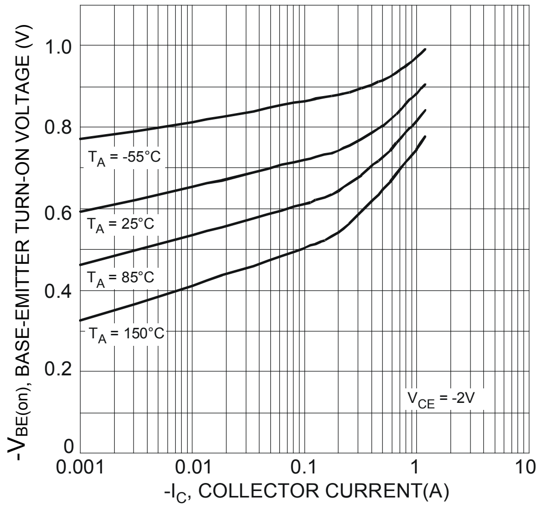


I_C v V_{CE}

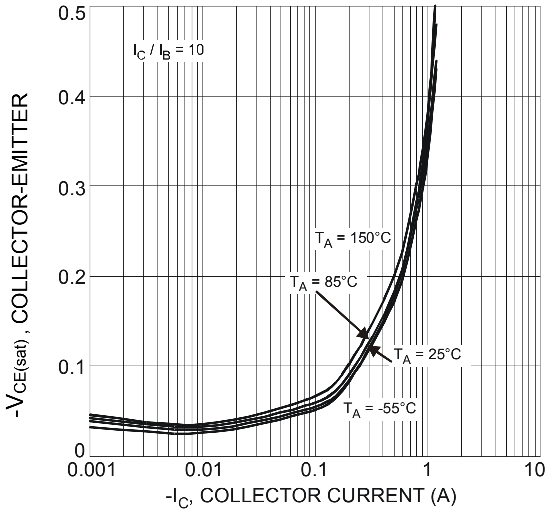


h_{FE} v I_C

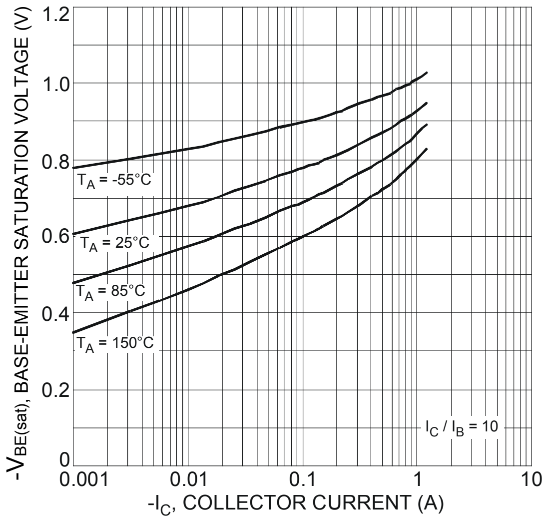
Typical Electrical Characteristics (continued.)



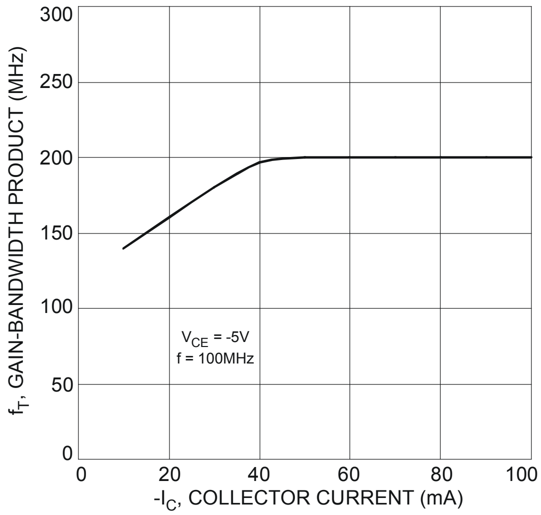
$V_{BE(on)}$ v I_C



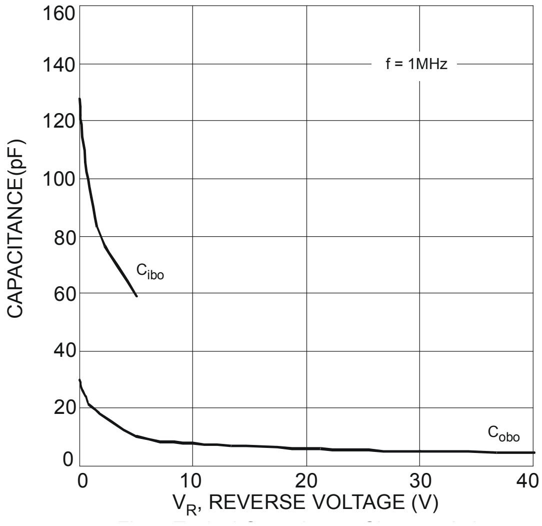
$V_{CE(sat)}$ v I_C



$V_{BE(sat)}$ v I_C



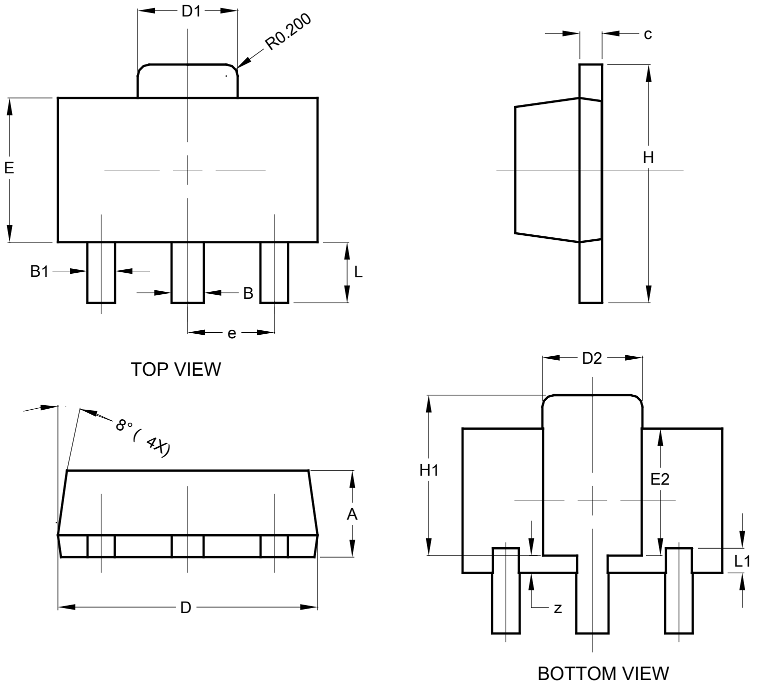
f_T v I_C



C v V_R

Package Outline Dimensions

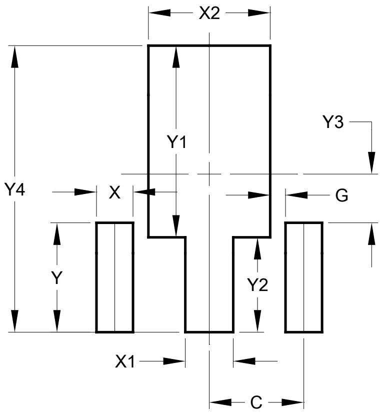
SOT89



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