



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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企业微信二维码



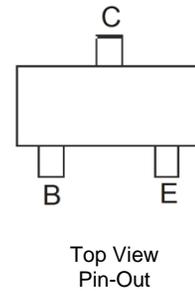
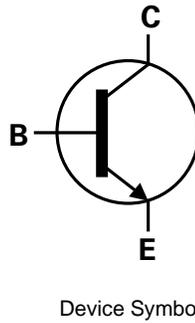
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## Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types: NK-BC856AQ–BC858CQ
- For Switching and AF Amplifier Applications

## 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 (A3)
- Weight: 0.008 grams (Approximate)



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

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	NK-BC846AQ/BQ	$V_{CBO}$	80	V
	NK-BC847AQ/BQ/CQ		50	
	NK-BC848CQ		30	
Collector-Emitter Voltage	NK-BC846AQ/BQ	$V_{CEO}$	65	V
	NK-BC847AQ/BQ/CQ		45	
	NK-BC848CQ		30	
Emitter-Base Voltage	NK-BC846AQ/BQ	$V_{EBO}$	6.0	V
	NK-BC847AQ/BQ/CQ		5.0	
	NK-BC848CQ			
Continuous Collector Current		$I_C$	100	mA
Peak Collector Current		$I_{CM}$	200	mA
Peak Emitter Current		$I_{EM}$	200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	$P_D$	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	403	$^\circ\text{C/W}$
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Operating and Storage Temperature Range		$T_J, T_{STG}$	-65 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:
- 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.
  - Same as Note 5, except the device is mounted on 15mm x 15mm 1oz copper.
  - Thermal resistance from junction to solder-point (at the end of the leads).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

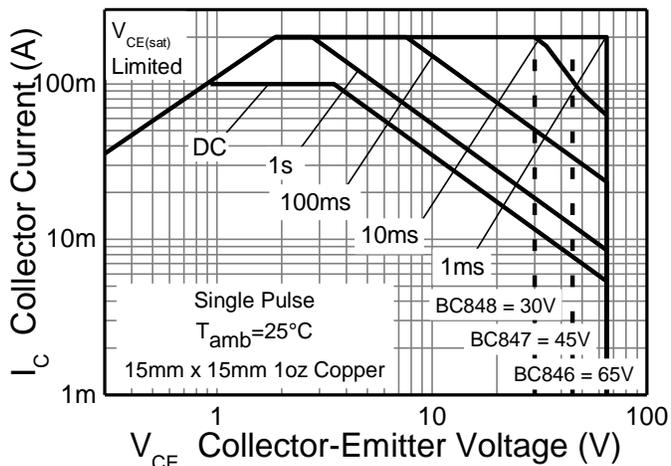


Figure 1. Safe Operating Area

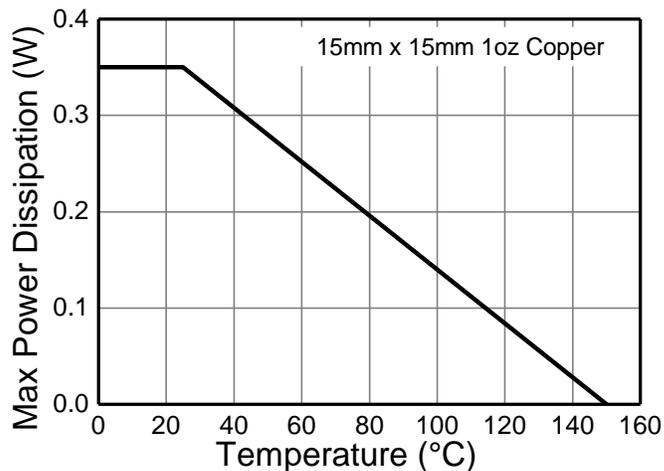


Figure 2. Derating Curve

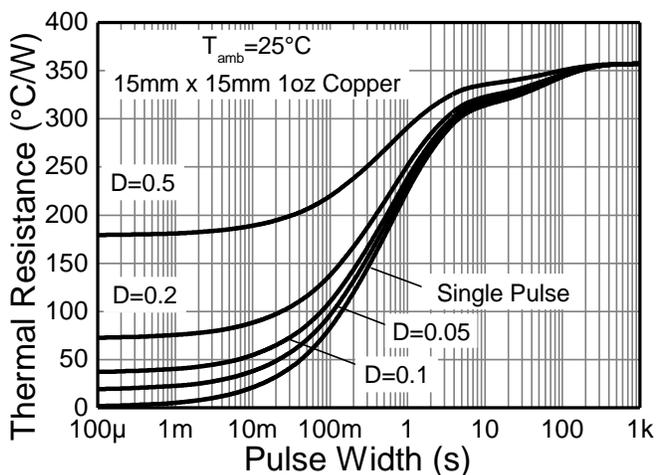


Figure 3. Transient Thermal Impedance

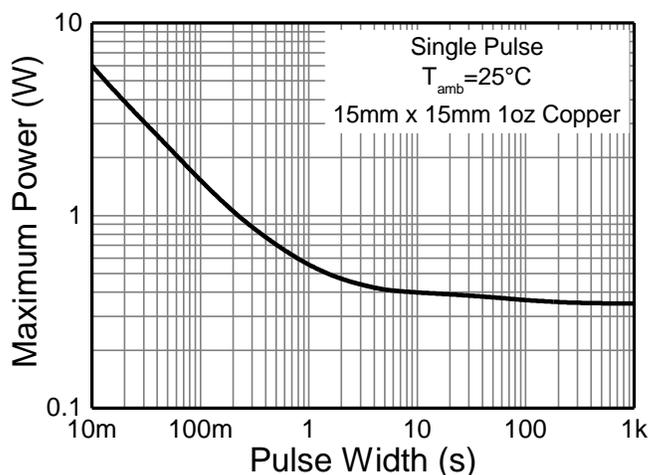


Figure 4. Pulse Power Dissipation

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	NK-BC846AQ/BQ	BV <sub>CB0</sub>	80	—	—	V	I <sub>C</sub> = 10μA
	NK-BC847AQ/BQ/CQ		50				
	NK-BC848CQ		30				
Collector-Emitter Breakdown Voltage (Note 9)	NK-BC846AQ/BQ	BV <sub>CEO</sub>	65	—	—	V	I <sub>C</sub> = 10mA
	NK-BC847AQ/BQ/CQ		45				
	NK-BC848CQ		30				
Emitter-Base Breakdown Voltage	NK-BC846AQ/BQ	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 1μA
	NK-BC847AQ/BQ/CQ		5				
	NK-BC848CQ		5				
Collector Cutoff Current		I <sub>CBO</sub>	—	—	15	nA	V <sub>CB</sub> = 30V
					5	μA	V <sub>CB</sub> = 30V, T <sub>J</sub> = +150°C
Collector Emitter Cutoff Current	NK-BC846AQ/BQ	I <sub>CES</sub>	—	—	15	nA	V <sub>CE</sub> = 80V
	NK-BC847AQ/BQ/CQ				15		V <sub>CE</sub> = 50V
	NK-BC848CQ				15		V <sub>CE</sub> = 30V
Emitter Base Cutoff Current		I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5V
Small Signal Current Gain (Note 9)	NK-BC846AQ/BC847AQ	h <sub>FE</sub>	—	200	—	—	I <sub>C</sub> = 2.0mA, V <sub>CE</sub> = 5V f = 1.0kHz
	NK-BC846BQ/BC847BQ			330			
	NK-BC847CQ/BC848CQ			600			
Input Impedance (Note 9)	NK-BC846AQ/BC847AQ	h <sub>ie</sub>	—	2.7	—	kΩ	
	NK-BC846BQ/BC847BQ			4.5			
	NK-BC847CQ/BC848CQ			8.7			
Output Admittance (Note 9)	NK-BC846AQ/BC847AQ	h <sub>oe</sub>	—	18	—	μS	
	NK-BC846BQ/BC847BQ			30			
	NK-BC847CQ/BC848CQ			60			
Reverse Voltage Transfer Ratio (Note 9)	NK-BC846AQ/BC847AQ	h <sub>re</sub>	—	1.5 × 10 <sup>-4</sup>	—	—	
	NK-BC846BQ/BC847BQ			2 × 10 <sup>-4</sup>			
	NK-BC847CQ/BC848CQ			3 × 10 <sup>-4</sup>			
DC Current Gain (Note 9)	NK-BC846AQ/BC847AQ	h <sub>FE</sub>	110	180	220	—	I <sub>C</sub> = 2.0mA, V <sub>CE</sub> = 5V
	NK-BC846BQ/BC847BQ		200	290	450		
	NK-BC847CQ/BC848CQ		420	520	800		
Collector-Emitter Saturation Voltage (Note 9)		V <sub>CE(sat)</sub>	—	90	250	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
				200	600		I <sub>C</sub> = 100mA, I <sub>B</sub> = 5.0mA
Base-Emitter Turn-On Voltage (Note 9)		V <sub>BE(on)</sub>	580	660	700	mV	I <sub>C</sub> = 2mA, V <sub>CE</sub> = 5V
			—	—	770		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V
Base-Emitter Saturation Voltage (Note 9)		V <sub>BE(sat)</sub>	—	700	—	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA
				900			I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA
Output Capacitance		C <sub>obo</sub>	—	3	—	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Transition Frequency		f <sub>T</sub>	100	300	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA f = 100MHz
Noise Figure		NF	—	2	10	dB	V <sub>CE</sub> = 5V, I <sub>C</sub> = 200μA R <sub>S</sub> = 2kΩ, f = 1kHz Δf = 200Hz

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

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

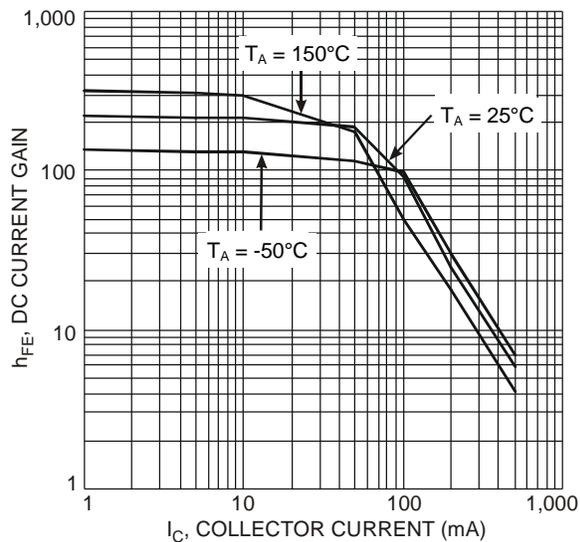


Figure 5. Typical DC Current Gain vs. Collector Current

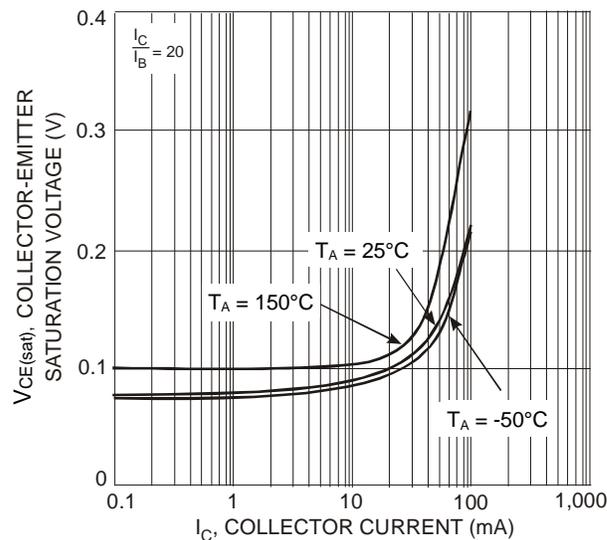


Figure 6. Typical Collector-Emitter Saturation Voltage vs. Collector Current

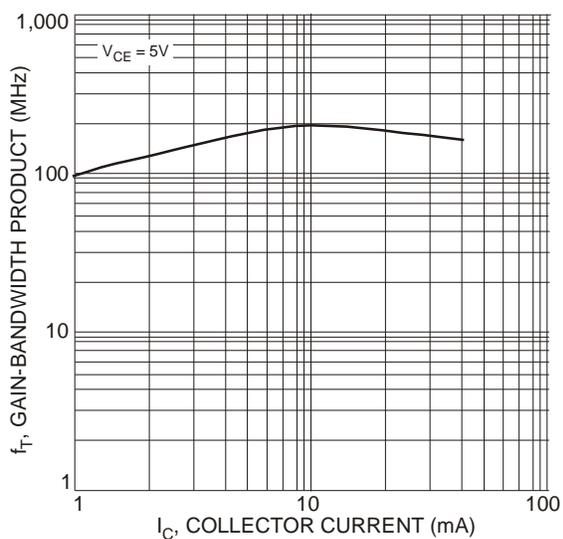
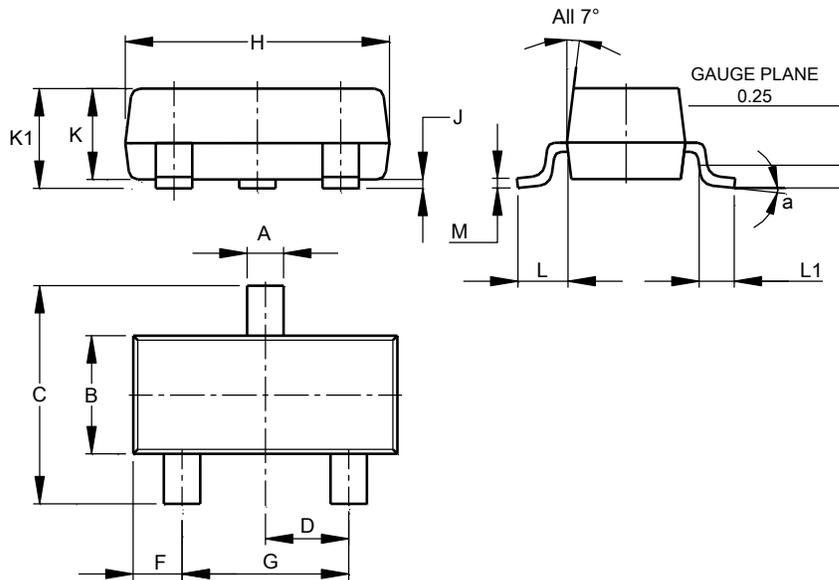


Figure 7. Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

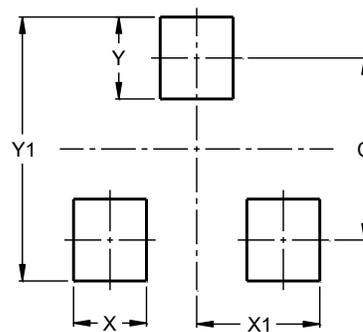
SOT23



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