



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

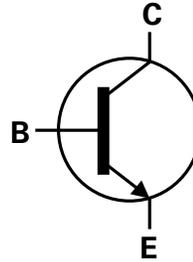
- Ideally Suited for Automatic Insertion
- Complementary PNP Types: NK-BC856–BC858
- For Switching and AF Amplifier Applications

Mechanical Data

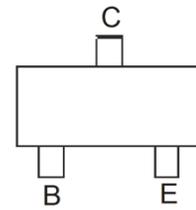
- Package: SOT23
- Package Material: Molded Plastic, “Green” Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per
MIL-STD-202, Method 208 
- Weight: 0.008 grams (Approximate)



Top View



Device Symbol



Top View
Pin-Out

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

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	NK-BC846A/B	V _{CB0}	80	V
	NK-BC847A/B/C		50	
	NK-BC848A/B/C		30	
Collector-Emitter Voltage	NK-BC846A/B	V _{CEO}	65	V
	NK-BC847A/B/C		45	
	NK-BC848A/B/C		30	
Emitter-Base Voltage	NK-BC846A/B	V _{EBO}	6.0	V
	NK-BC847A/B/C		5.0	
	NK-BC848A/B/C			
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°C, unless otherwise specified.)

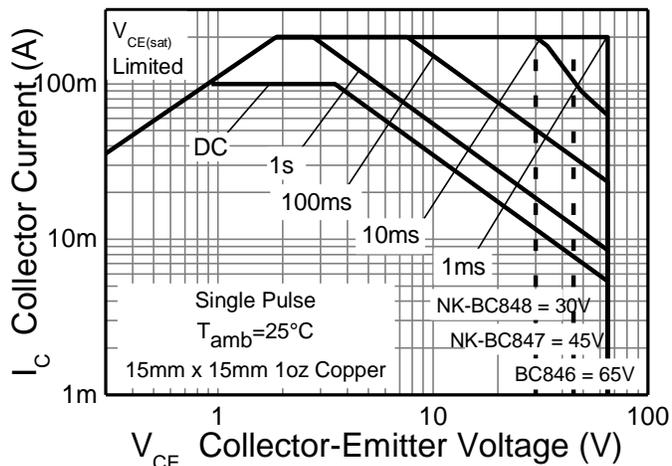
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	R _{θJL}	350	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 8)

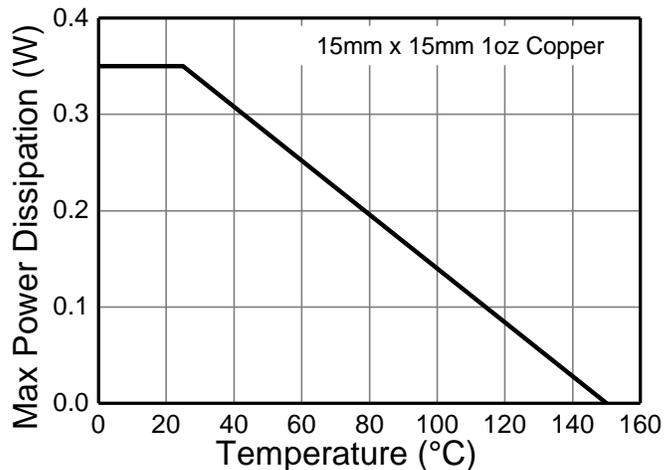
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
- 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.

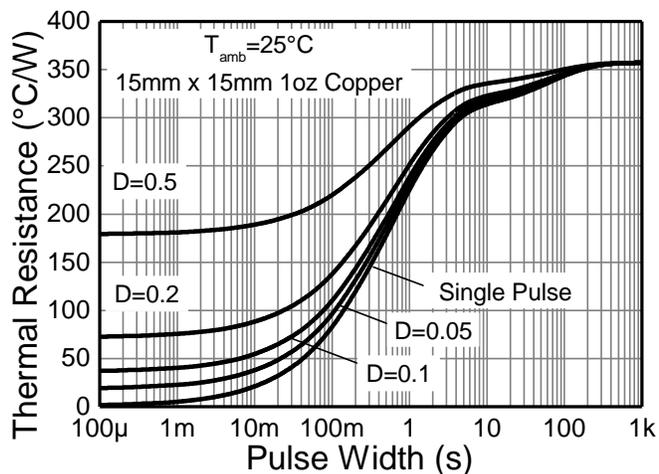
Thermal Characteristics and Derating Information



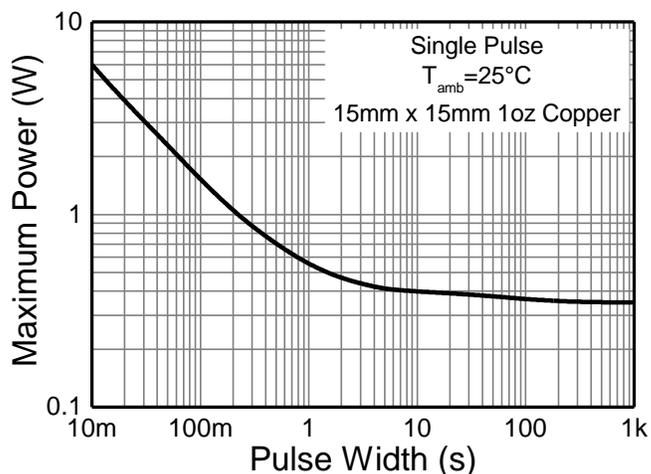
Safe Operating Area
Figure 1. Safe Operating Area



Derating Curve
Figure 2. Derating Curve



Transient Thermal Impedance
Figure 3. Transient Thermal Impedance



Pulse Power Dissipation
Figure 4. Pulse Power Dissipation

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BC846A/B	BV_{CBO}	80	—	—	V	$I_C = 10\mu\text{A}$
	BC847A/B/C		50				
	BC848A/B/C		30				
Collector-Emitter Breakdown Voltage (Note 9)	BC846A/B	BV_{CEO}	65	—	—	V	$I_C = 10\text{mA}$
	BC847A/B/C		45				
	BC848A/B/C		30				
Emitter-Base Breakdown Voltage	BC846A/B	BV_{EBO}	6	—	—	V	$I_E = 1\mu\text{A}$
	BC847A/B/C		5				
	BC848A/B/C		5				
Collector Cutoff Current		I_{CBO}	—	—	15	nA	$V_{CB} = 30\text{V}$
					5	μA	$V_{CB} = 30\text{V}, T_J = +150^\circ\text{C}$
Collector Emitter Cutoff Current	BC846A/B	I_{CES}	—	—	15	nA	$V_{CE} = 80\text{V}$
	BC847A/B/C				15		$V_{CE} = 50\text{V}$
	BC848A/B/C				15		$V_{CE} = 30\text{V}$
Emitter Base Cutoff Current		I_{EBO}	—	—	100	nA	$V_{EB} = 5\text{V}$
Small Signal Current Gain (Note 9)	BC846A/BC847A/BC848A	h_{FE}	—	200	—	—	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	BC846B/BC847B/BC848B			330			
	BC847C/BC848C			600			
Input Impedance (Note 9)	BC846A/BC847A/BC848A	h_{ie}	—	2.7	—	k Ω	
	BC846B/BC847B/BC848B			4.5			
	BC847C/BC848C			8.7			
Output Admittance (Note 9)	BC846A/BC847A/BC848A	h_{oe}	—	18	—	μS	
	BC846B/BC847B/BC848B			30			
	BC847C/BC848C			60			
Reverse Voltage Transfer Ratio (Note 9)	BC846A/BC847A/BC848A	h_{re}	—	1.5×10^{-4}	—	—	
	BC846B/BC847B/BC848B			2×10^{-4}			
	BC847C/BC848C			3×10^{-4}			
DC Current Gain (Note 9)	BC846A/BC847A/BC848A	h_{FE}	110	180	220	—	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$
	BC846B/BC847B/BC848B		200	290	450		
	BC847C/BC848C		420	520	800		
Collector-Emitter Saturation Voltage (Note 9)		$V_{CE(sat)}$	—	90	250	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				200	600		$I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)		$V_{BE(on)}$	580	660	700	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
			—	—	770		$I_C = 10\text{mA}, V_{CE} = 5\text{V}$
Base-Emitter Saturation Voltage (Note 9)		$V_{BE(sat)}$	—	700	—	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				900	—		$I_C = 100\text{mA}, I_B = 5\text{mA}$
Output Capacitance		C_{obo}	—	3	—	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Transition Frequency		f_T	100	300	—	MHz	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$ $f = 100\text{MHz}$
Noise Figure		NF	—	2	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$

 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.)

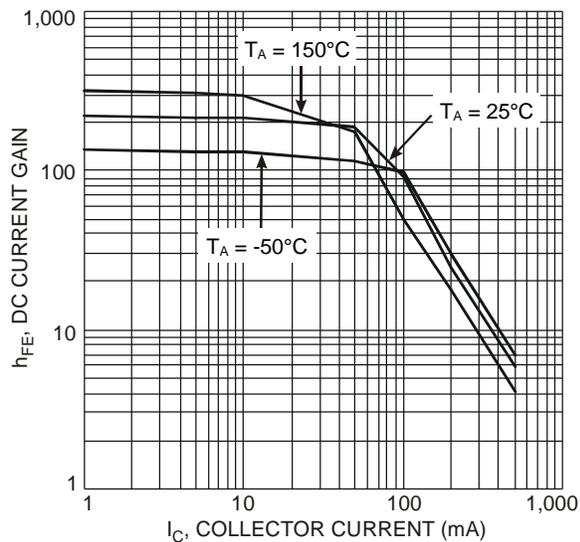


Figure 5. Typical DC Current Gain vs. Collector Current

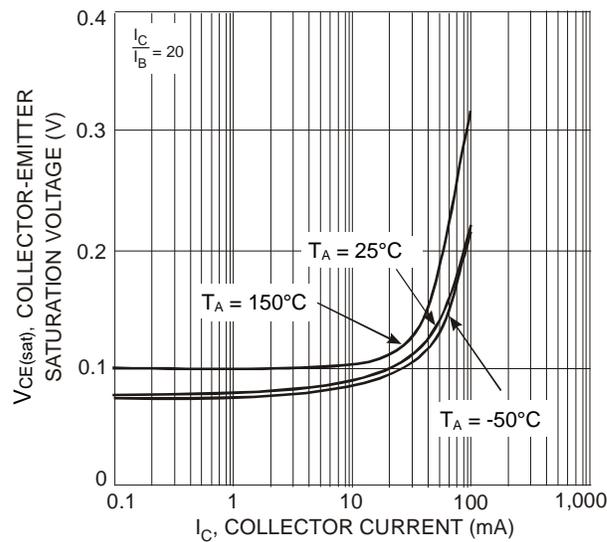


Figure 6. Typical Collector-Emitter Saturation Voltage vs. Collector Current

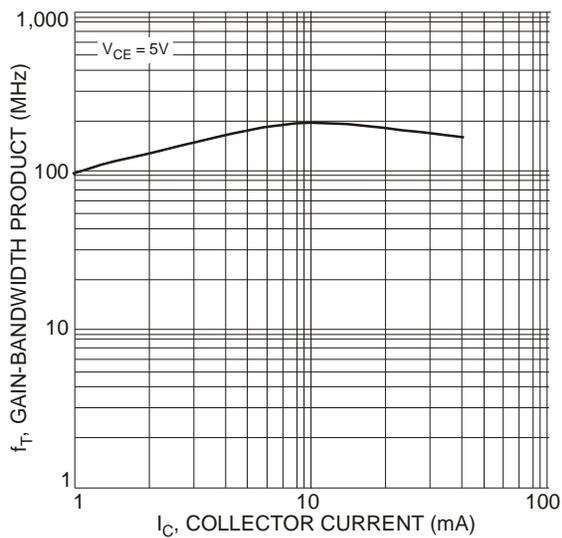
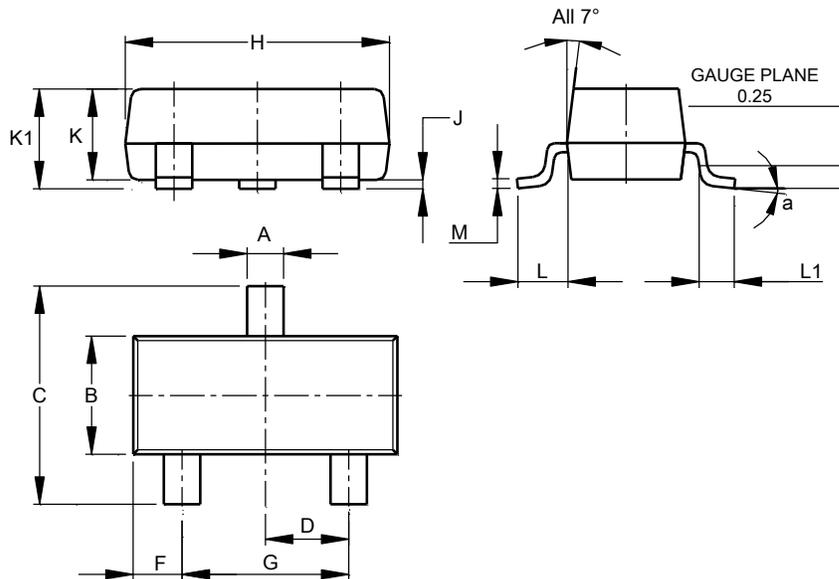


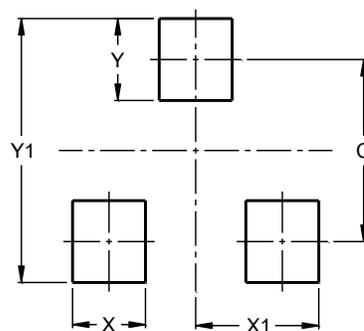
Figure 7. Typical Gain-Bandwidth Product vs. Collector Current

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