



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

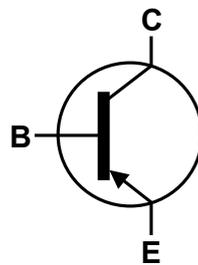
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (NK-DCP68)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications

## Mechanical Data

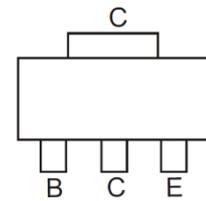
- Case: SOT223
- Case Material: Molded Plastic, "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin, Solderable per MIL-STD -202, Method 208
- Weight: 0.112 grams (Approximate)



Top View



Device Schematic



Top View  
Pin Out Configuration

**Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

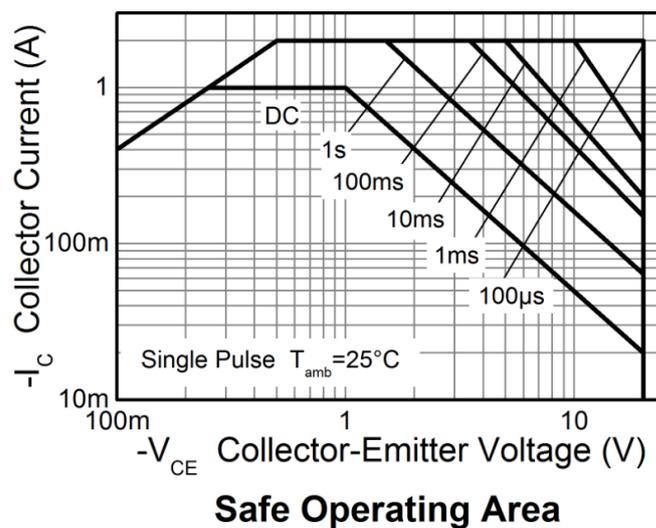
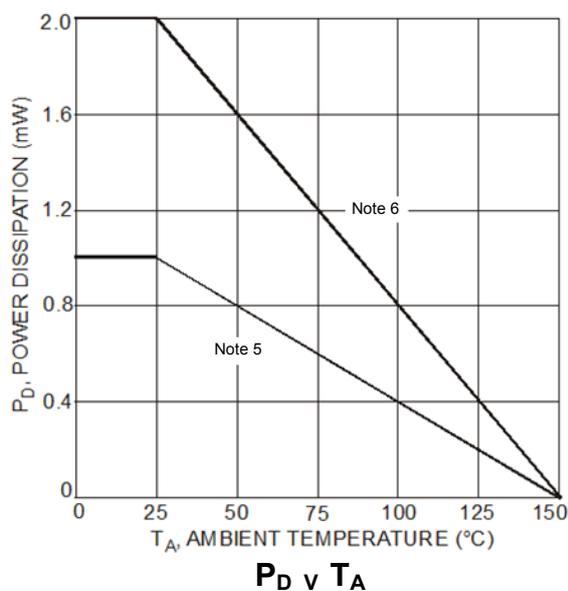
Characteristic	Symbol	Value	Units
Collector-Base Voltage	$V_{CBO}$	-25	V
Collector-Emitter Voltage	$V_{CEO}$	-20	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Collector Current	$I_C$	-1	A
Peak Pulse Current	$I_{CM}$	-2	A

**Thermal Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Power Dissipation (Note 6)	$P_D$	2	W
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**ESD Ratings** (Note 7)

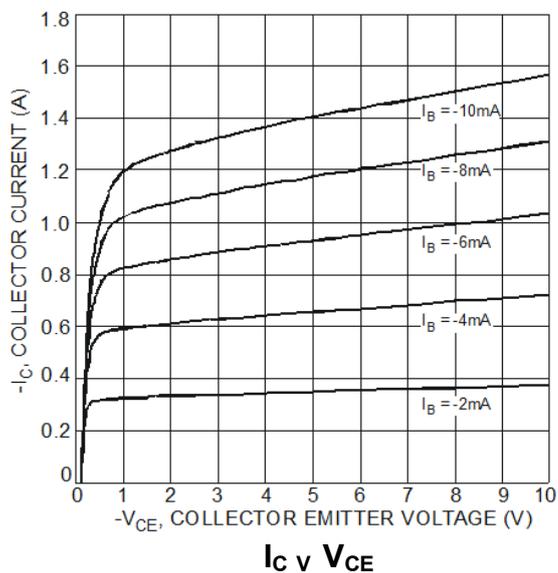
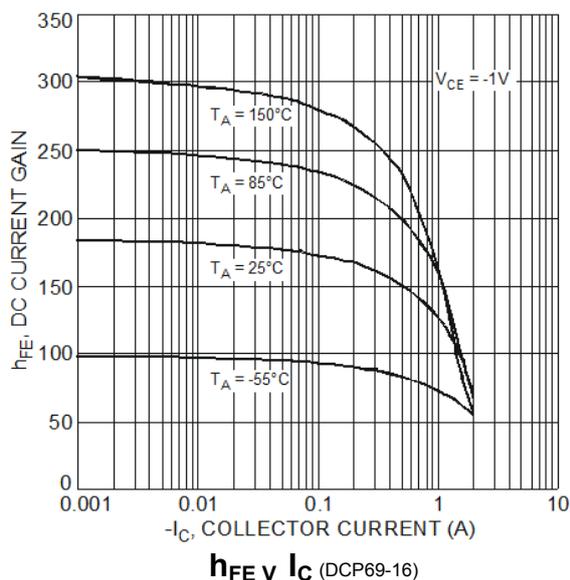
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge—Machine Model	ESD MM	400	V	C

**Thermal Characteristics and Derating Information**


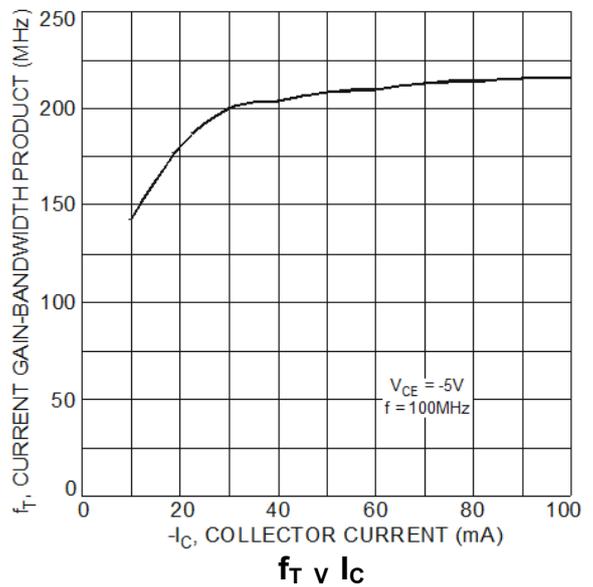
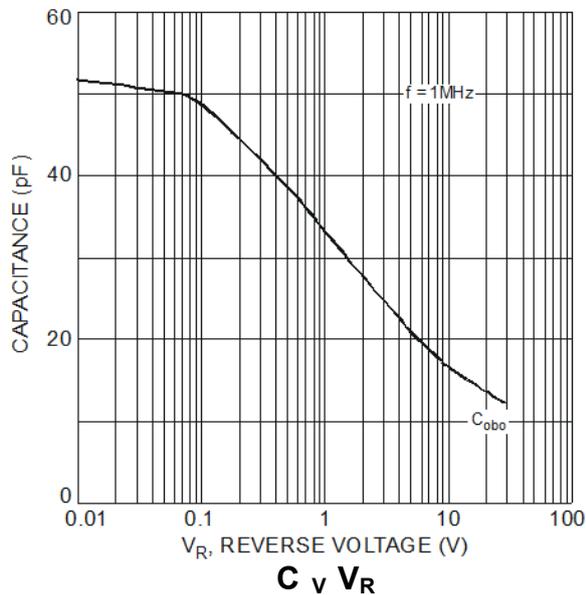
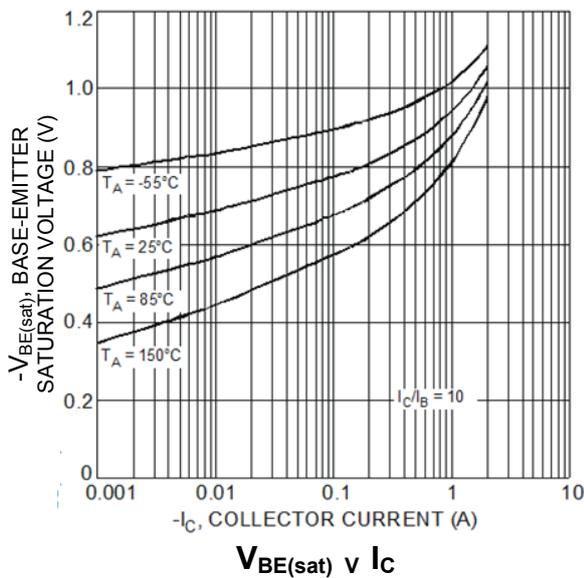
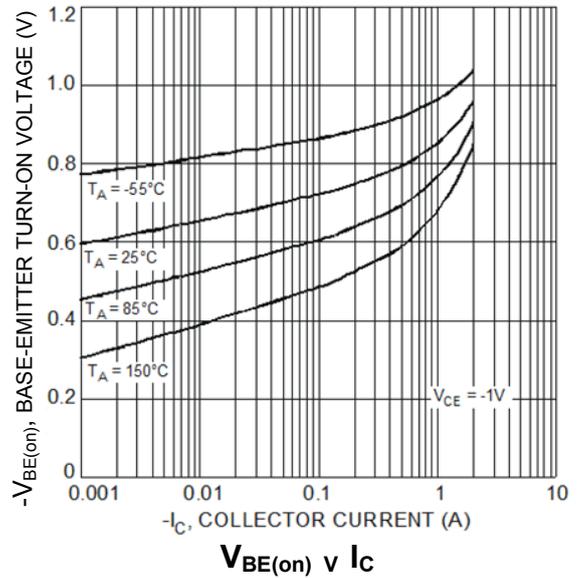
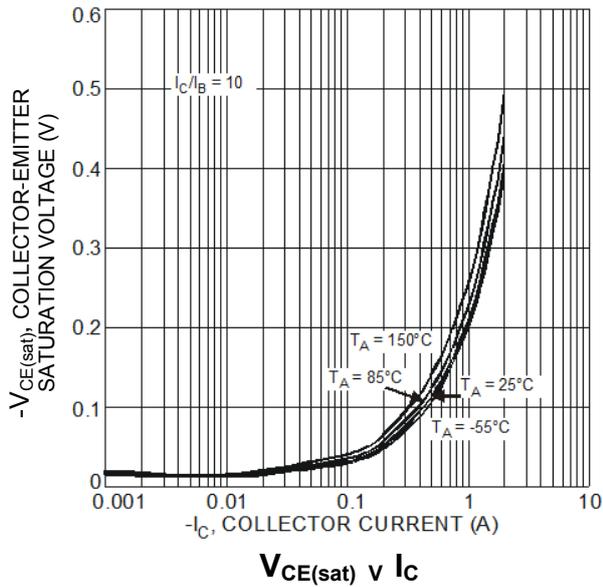
**Electrical Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>							
Collector-Base Breakdown Voltage		$BV_{CBO}$	-25	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 8)		$BV_{CEO}$	-20	—	—	V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage		$BV_{EBO}$	-5	—	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector-Base Cut-Off Current		$I_{CBO}$	—	—	-100 -10	nA $\mu\text{A}$	$V_{CB} = -25\text{V}, I_E = 0$ $V_{CB} = -25\text{V}, I_E = 0, T_A = 150^\circ\text{C}$
Emitter-Base Cut-Off Current		$I_{EBO}$	—	—	-100	nA	$V_{EB} = -5.0\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 8)</b>							
DC Current Gain	NK-DCP69 NK-DCP69-16,NK-DCP69-25	$h_{FE}$	50 60	— —	— —	—	$V_{CE} = -10\text{V}, I_C = -5.0\text{mA}$ $V_{CE} = -1\text{V}, I_C = -1\text{A}$
	NK-DCP69		85	—	375		$V_{CE} = -1\text{V}, I_C = -500\text{mA}$
	NK-DCP69-16		100	—	250		$V_{CE} = -1\text{V}, I_C = -500\text{mA}$
	NK-DCP69-25		160	—	375		$V_{CE} = -1\text{V}, I_C = -500\text{mA}$
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	—	—	-0.5	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage		$V_{BE(on)}$	—	—	-0.7 -1	V	$V_{CE} = -10\text{V}, I_C = -5.0\text{mA}$ $V_{CE} = -1\text{V}, I_C = -1\text{A}$
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Transition frequency		$f_T$	40	200	—	MHz	$V_{CE} = -5\text{V}, I_C = -50\text{mA}, f = 100\text{MHz}$
Output Capacitance		$C_{obo}$	—	17	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

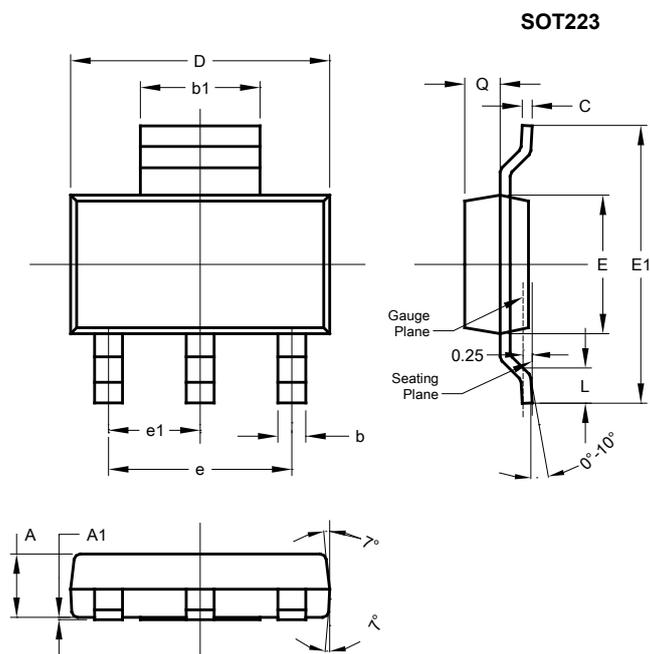
 Notes: 8. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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


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

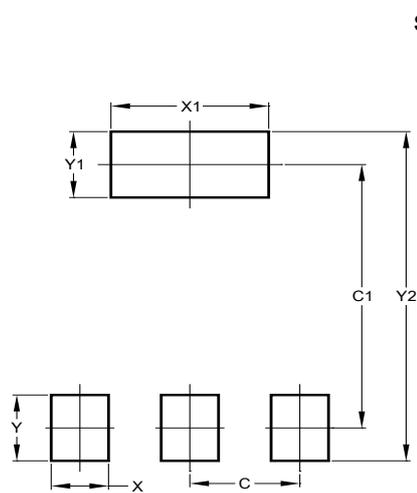


## Package Outline Dimensions



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## Suggested Pad Layout



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00