



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



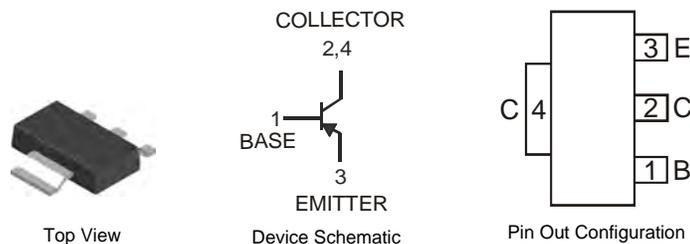
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## Features

- Ideally Suited for Automated Assembly Processes
- Complementary NPN Type Available (NK-DJT4031N)
- Low Collector-Emitter Saturation Voltage
- Ideal for Medium Power Switching or Amplification Applications

## Mechanical Data

- Case: SOT-223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.115 grams (approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-6	V
Peak Pulse Current	$I_{CM}$	-5	A
Continuous Collector Current	$I_C$	-3	A
Base Current	$I_B$	-1	A

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$	$P_D$	1.2	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	104	$^\circ\text{C/W}$
Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$	$P_D$	2	W
Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS (Note 5)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-40	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-40	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-6	—	—	V	$I_E = -50\mu\text{A}$
Collector-Base Cutoff Current	$I_{CBO}$	—	—	-100	nA	$V_{CB} = -40\text{V}, I_E = 0$
		—	—	-50	$\mu\text{A}$	$V_{CB} = -40\text{V}, I_E = 0, T_A = 150^\circ\text{C}$
Emitter-Base Cutoff Current	$I_{EBO}$	—	—	-100	nA	$V_{EB} = -6\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 5)</b>						
DC Current Gain	$h_{FE}$	220	—	—	—	$V_{CE} = -1\text{V}, I_C = -0.5\text{A}$
		200	—	400		$V_{CE} = -1\text{V}, I_C = -1\text{A}$
		100	—	—		$V_{CE} = -1\text{V}, I_C = -3\text{A}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	-150	mV	$I_C = -0.5\text{A}, I_B = -5\text{mA}$
		—	—	-200		$I_C = -1\text{A}, I_B = -10\text{mA}$
		—	—	-500		$I_C = -3\text{A}, I_B = -0.3\text{A}$
Equivalent On-Resistance	$R_{CE(SAT)}$	—	—	167	$\text{m}\Omega$	$I_E = -3\text{A}, I_B = -0.3\text{A}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	-1.0	V	$I_C = -1\text{A}, I_B = -0.1\text{A}$
Base-Emitter Turn-on Voltage	$V_{BE(ON)}$	—	—	-1.0	V	$V_{CE} = -2\text{V}, I_C = -1\text{A}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	—	150	—	MHz	$V_{CE} = -10\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	35	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Input Capacitance	$C_{ibo}$	—	150	—	pF	$V_{CB} = -5\text{V}, f = 1\text{MHz}$
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Time	$t_{on}$	—	53	—	ns	$V_{CC} = -10\text{V}, I_C = -2\text{A}, I_{B1} = -200\text{mA}$
Delay Time	$t_d$	—	12	—	ns	
Rise Time	$t_r$	—	41	—	ns	
Turn-Off Time	$t_{off}$	—	180	—	ns	$V_{CC} = -10\text{V}, I_C = -2\text{A}, I_{B1} = I_{B2} = -200\text{mA}$
Storage Time	$t_s$	—	146	—	ns	
Fall Time	$t_f$	—	34	—	ns	

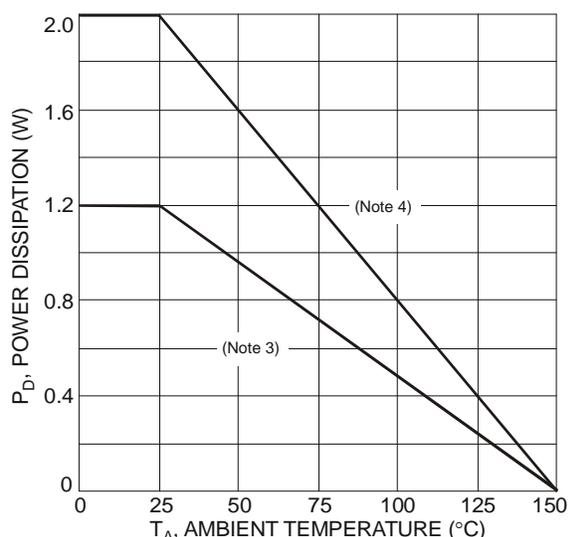
 Notes: 5. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .


Fig. 1 Power Dissipation vs. Ambient Temperature

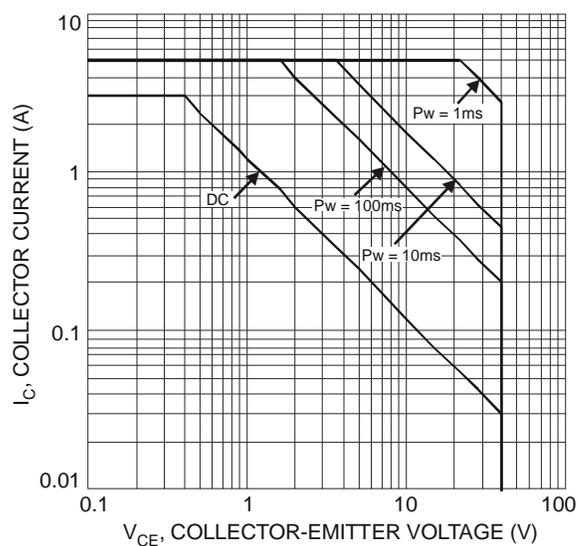


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage (Note 3)

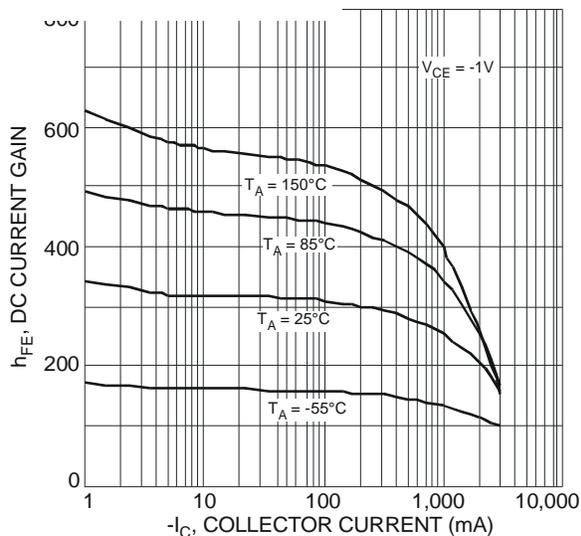


Fig. 3 Typical DC Current Gain vs. Collector Current

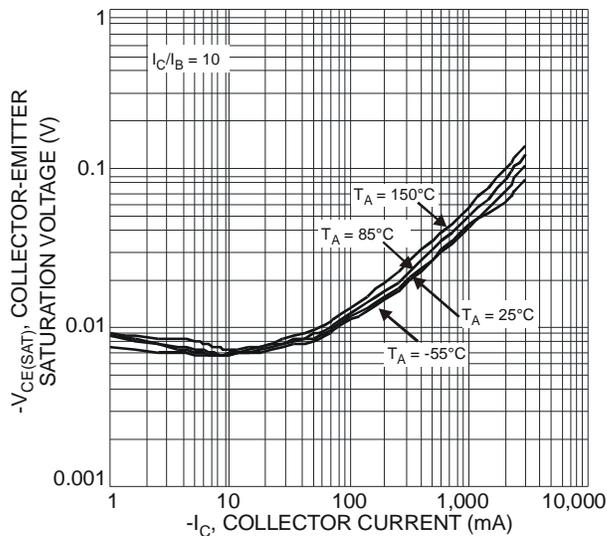


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

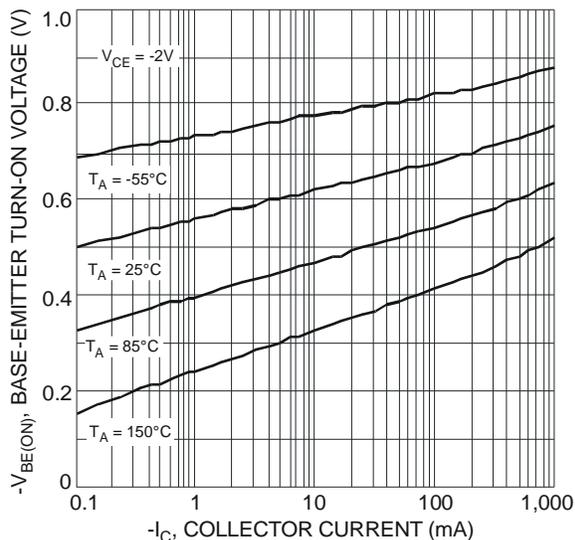


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

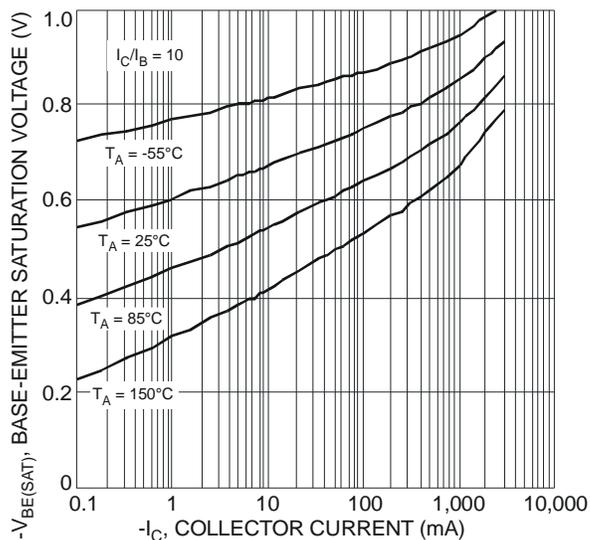


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

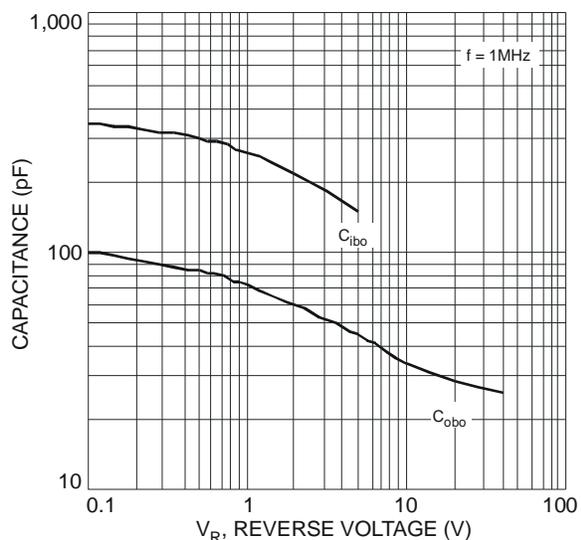


Fig. 7 Typical Capacitance Characteristics

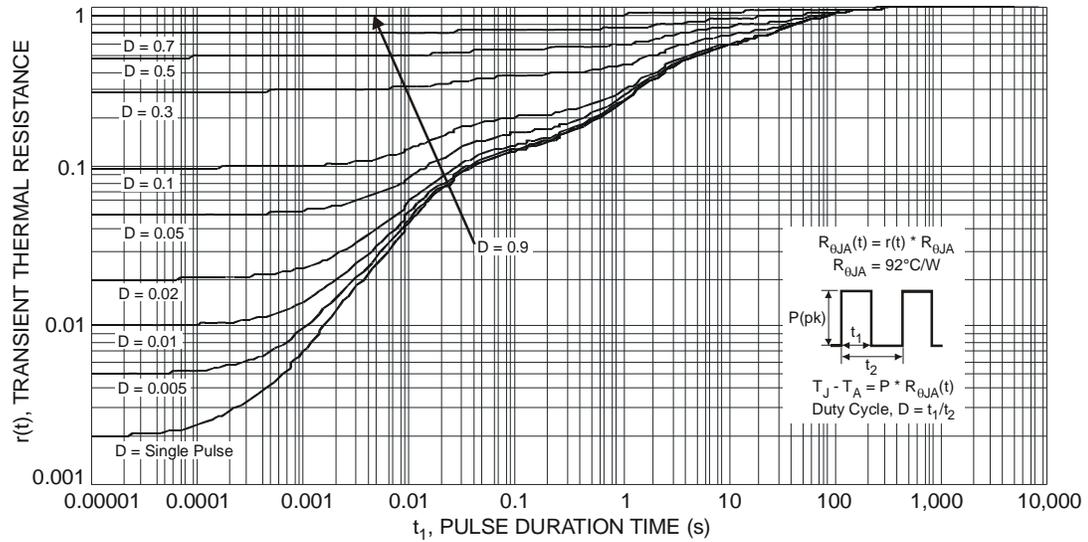
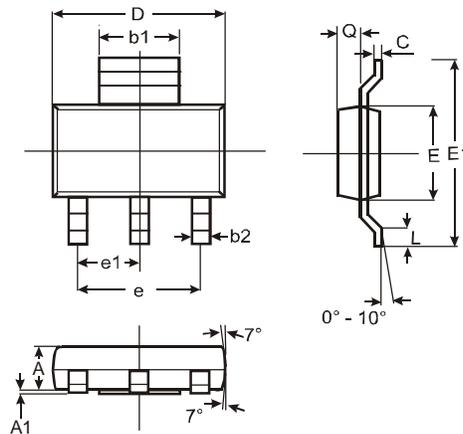


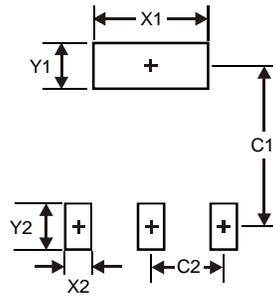
Fig. 8 Transient Thermal Response (Note 3)

### Package Outline Dimensions



SOT-223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
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)
<b>X1</b>	3.3
<b>X2</b>	1.2
<b>Y1</b>	1.6
<b>Y2</b>	1.6
<b>C1</b>	6.4
<b>C2</b>	2.3