



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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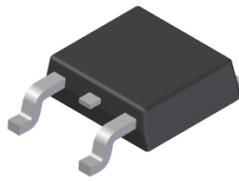
## Features

- $BV_{CEO} > 100V$
- $I_C = 3A$  High Continuous Collector Current
- $I_{CM} = 5A$  Peak Pulse Current
- Ideal for Power Switching or Amplification Applications
- Complementary PNP Type: NK-MJD32CUQ

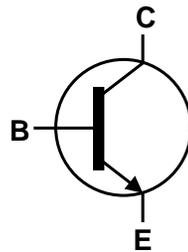
## Mechanical Data

- Package: TO252
- 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: 0.34 grams (Approximate)

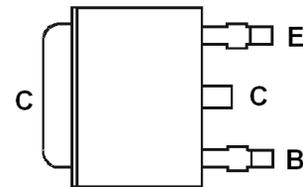
TO252 (DPAK)



Top View



Device Schematic



Pin Out Configuration  
Top View

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter-Base Voltage	V <sub>EB0</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	3	A
Peak Pulse Collector Current	I <sub>CM</sub>	5	A
Continuous Base Current	I <sub>B</sub>	1	A
Power Dissipation	P <sub>D</sub>	16	W

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

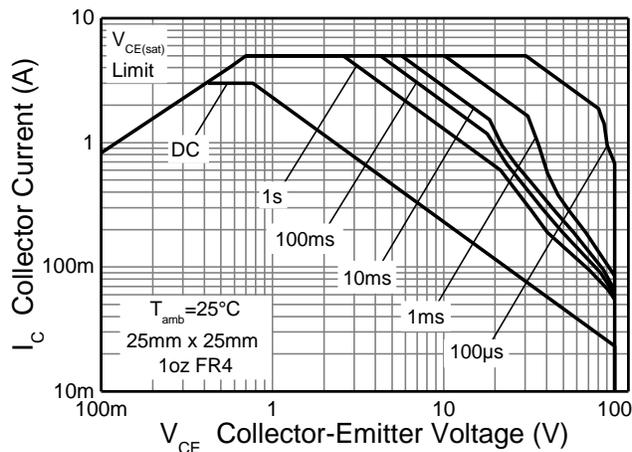
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	2.60
		(Note 6)	2.30
		(Note 7)	1.45
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 5)	48
		(Note 6)	54
		(Note 7)	86
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	7.8	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	7.3	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 9)

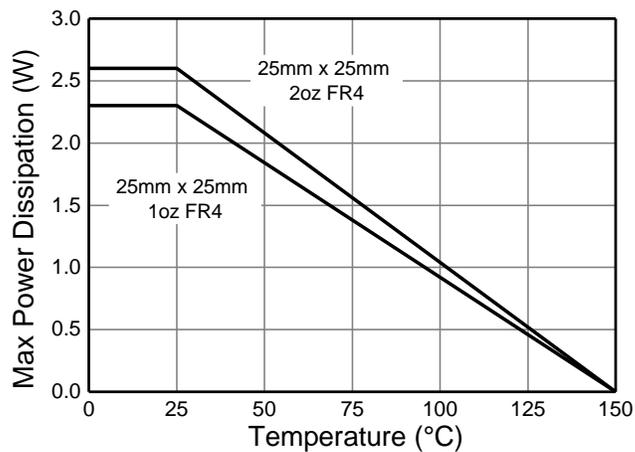
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as note (5), except mounted on 25mm x 25mm 1oz copper.
  7. Same as note (5), except mounted on minimum recommended pad (MRP) layout.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

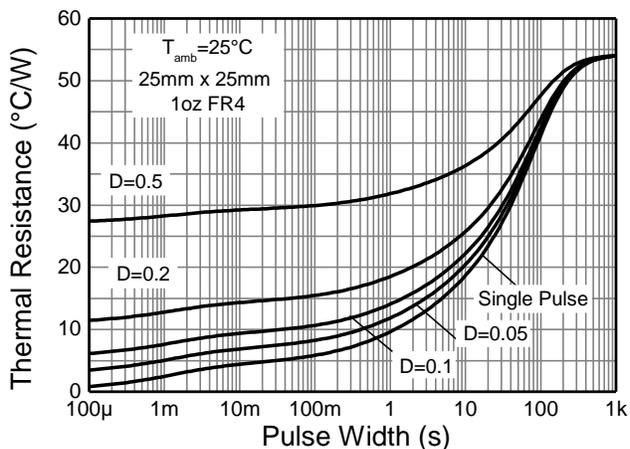
## Thermal Characteristics



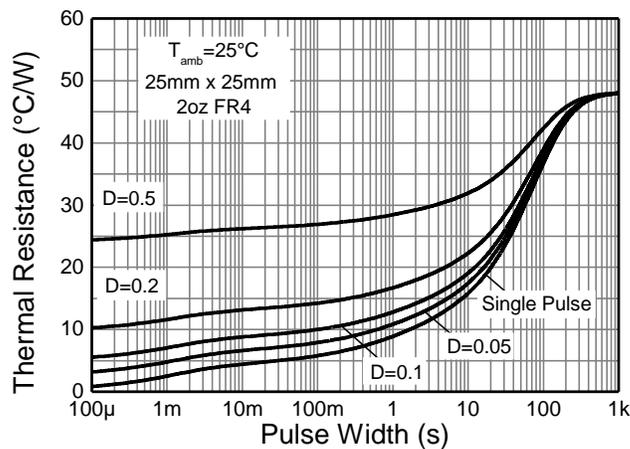
**Safe Operating Area**



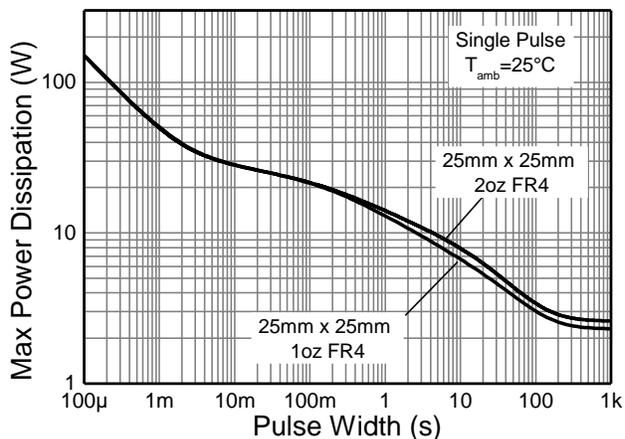
**Derating Curve**



**Transient Thermal Impedance**



**Transient Thermal Impedance**



**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	BV <sub>CB0</sub>	120	—	—	V	I <sub>C</sub> = 20μA
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	100	—	—	V	I <sub>C</sub> = 30mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector-Base Cut-off Current	I <sub>CB0</sub>	—	—	1	μA	V <sub>CB</sub> = 100V
Collector Cut-off Current	I <sub>CEO</sub>	—	—	1	μA	V <sub>CE</sub> = 60V
Collector Cut-off Current	I <sub>CES</sub>	—	—	1	μA	V <sub>CE</sub> = 100V
Emitter Cut-off Current	I <sub>EBO</sub>	—	—	1	μA	V <sub>EB</sub> = 5V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	—	—	300	mV	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	—	500	mV	I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA
		—	—	700	mV	I <sub>C</sub> = 3A, I <sub>B</sub> = 375mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	—	—	1.2	V	I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	—	—	950	mV	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		—	—	1.4	V	I <sub>C</sub> = 3A, V <sub>CE</sub> = 4V
DC Current Gain (Note 10)	h <sub>FE</sub>	25	—	—	—	V <sub>CE</sub> = 4V, I <sub>C</sub> = 1A
		10	—	50	—	V <sub>CE</sub> = 4V, I <sub>C</sub> = 3A
Current Signal Current Gain	H <sub>fe</sub>	20	—	—	—	V <sub>CE</sub> = 10V, I <sub>C</sub> = 0.5A, f = 1kHz
Current Gain-Bandwidth Product	f <sub>T</sub>	3	—	—	MHz	I <sub>C</sub> = 0.5A, V <sub>CE</sub> = 10V, f = 1MHz

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

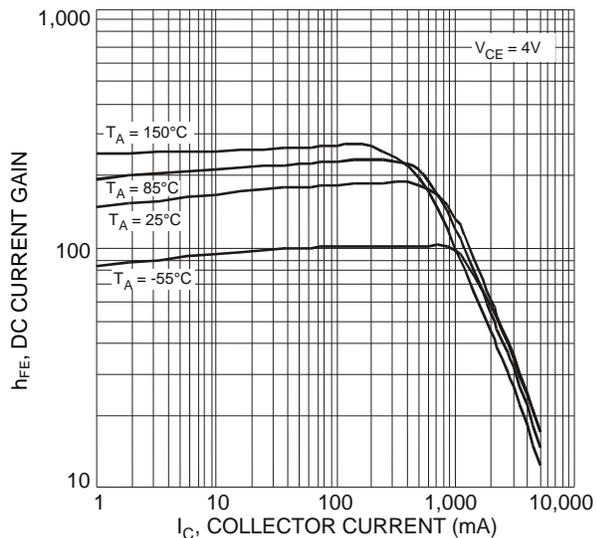


Figure 1 Typical DC Current Gain vs. Collector Current

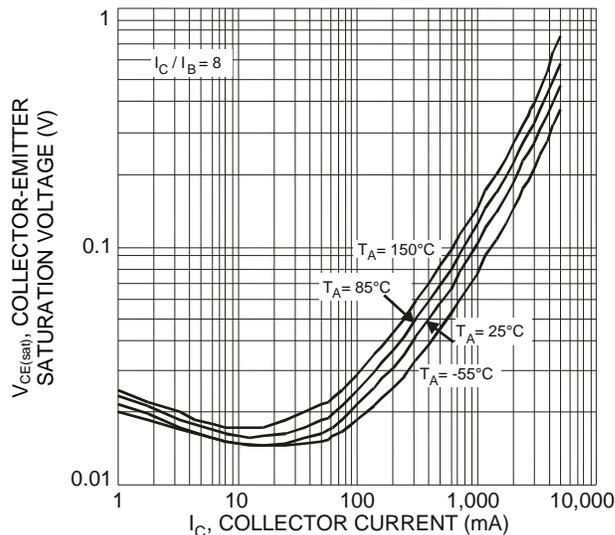


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

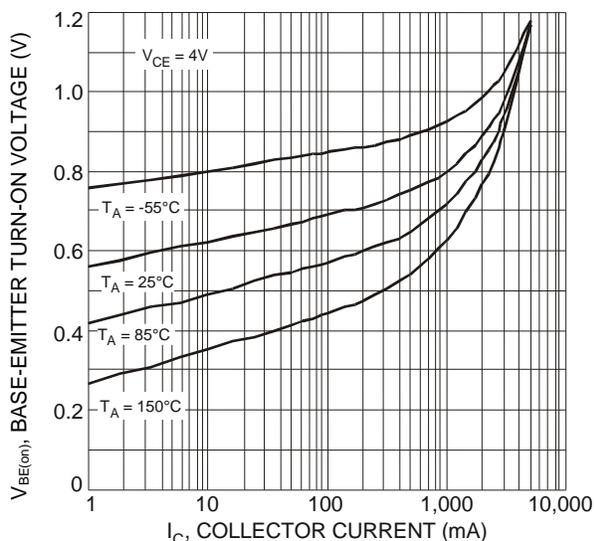


Figure 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

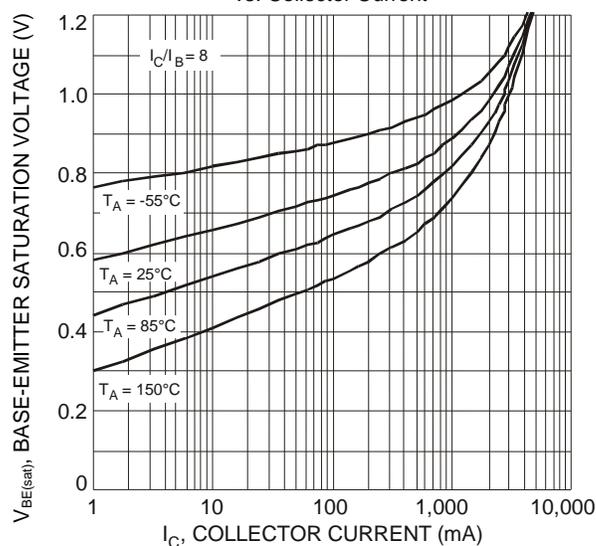


Figure 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

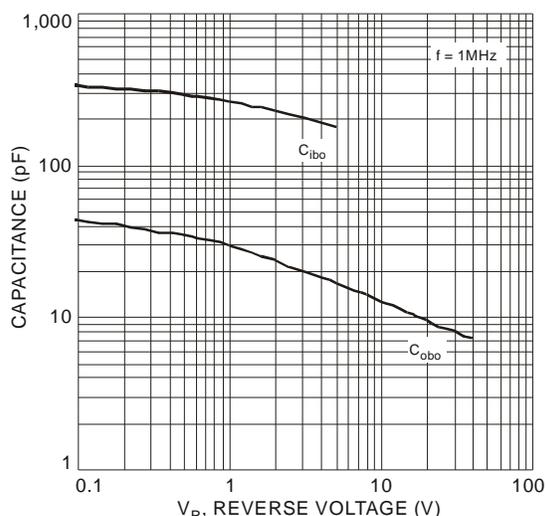
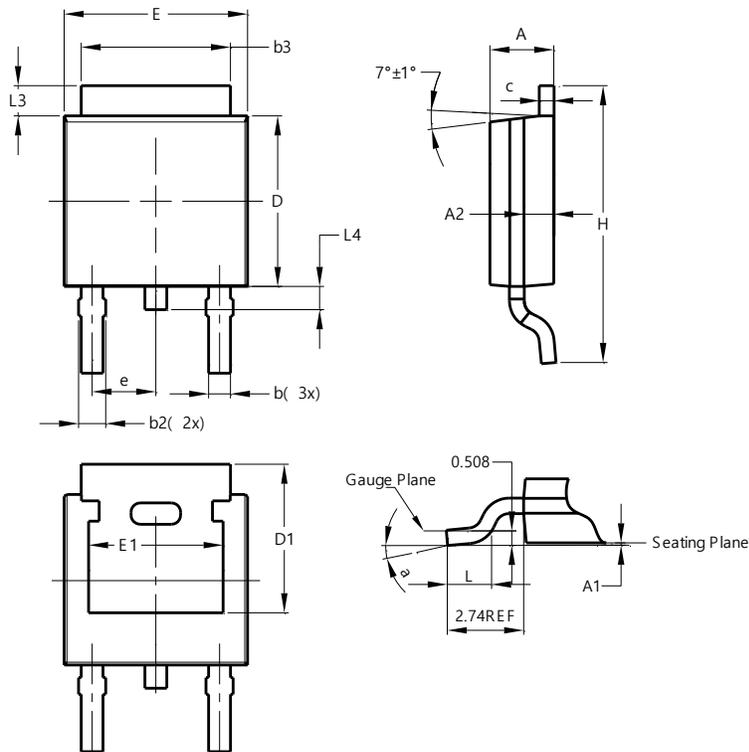


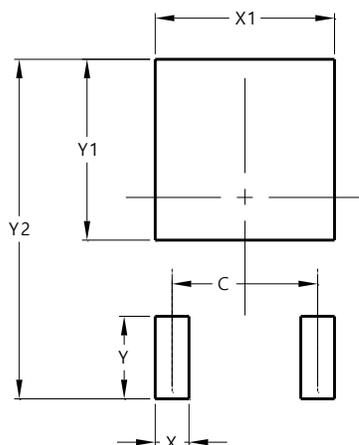
Figure 5 Typical Capacitance Characteristics

## Package Outline Dimensions

**TO252 (DPAK)**


TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.50	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	--	--
e	2.286 BSC		
E	6.45	6.70	6.58
E1	4.32	--	--
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	--
<b>All Dimensions in mm</b>			

## Suggested Pad Layout

**TO252 (DPAK)**


Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700