



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**

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



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## Features

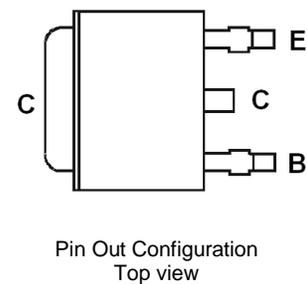
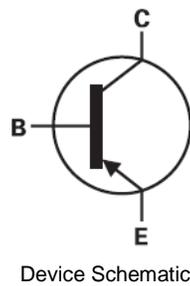
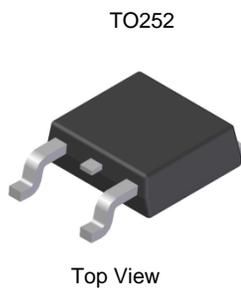
- $BV_{CEO} > -100V$
- $I_C = -5A$  Continuous Collector Current
- $I_{CM} = -10A$  Peak Collector Current
- $R_{SAT} = 67m\Omega$  Typical for Low Equivalent On Resistance
- Low Saturation Voltage
- High Gain Hold-Up (100 min @ 1A)

## Mechanical Data

- Case: TO252 (DPAK)
- 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 (g3)
- Weight: 0.34 grams (Approximate)

## Application

- DC-DC Converters
- Power Switches
- Motor Control
- Automotive Circuits
- Inverter Circuits



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	BV <sub>CBO</sub>	-140	V
Collector-Base Voltage	BV <sub>CER</sub>	-140	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-100	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current	I <sub>C</sub>	-5	A
Base Current	I <sub>B</sub>	-0.5	A
Peak Pulse Collector Current	I <sub>CM</sub>	-10	A

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

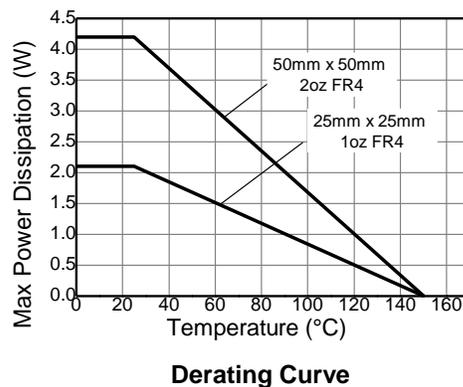
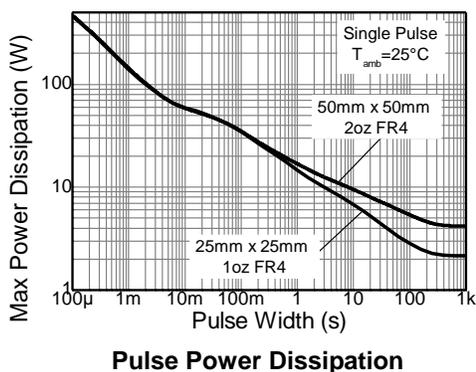
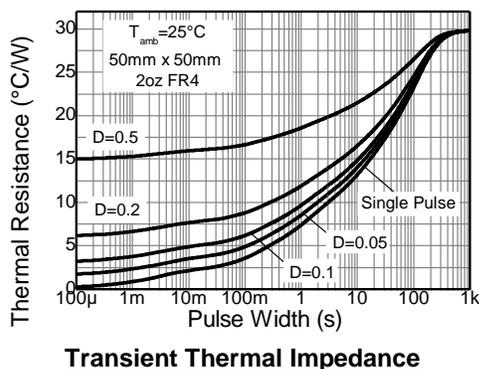
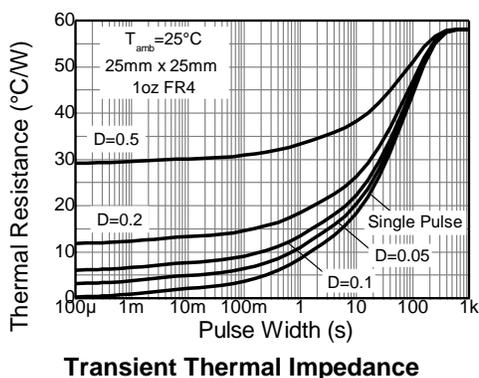
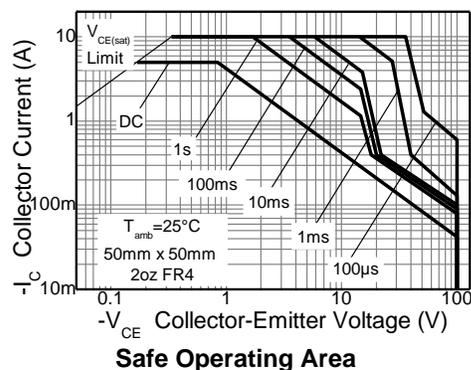
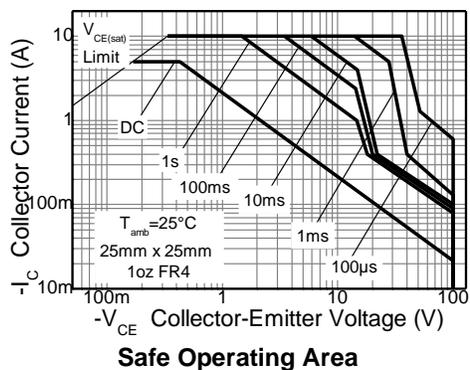
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	2.1
		(Note 6)	3.2
		(Note 7)	4.2
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 5)	59
		(Note 6)	39
		(Note 7)	30
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	1.8	°C/W
Operating and Storage Temperature 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:
- For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm 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 50mm x 50mm with 1oz copper.
  - Same as Note 5, except the device is mounted on 50mm x 50mm with 2oz copper.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

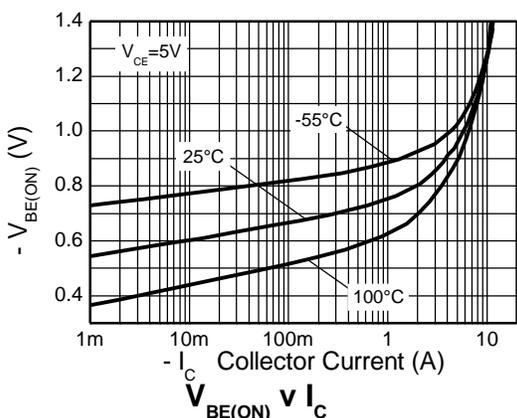
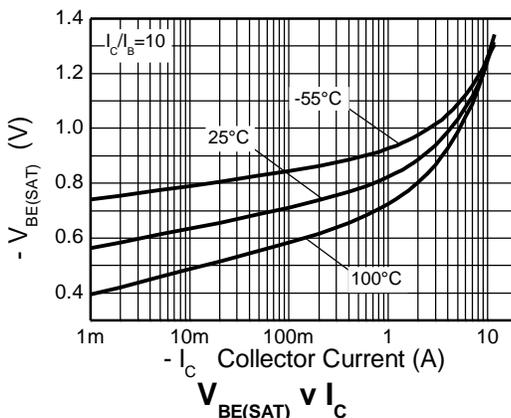
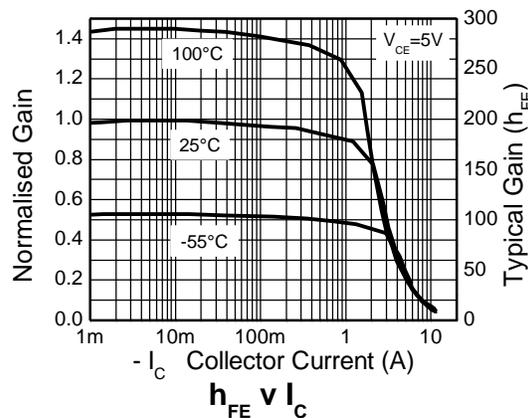
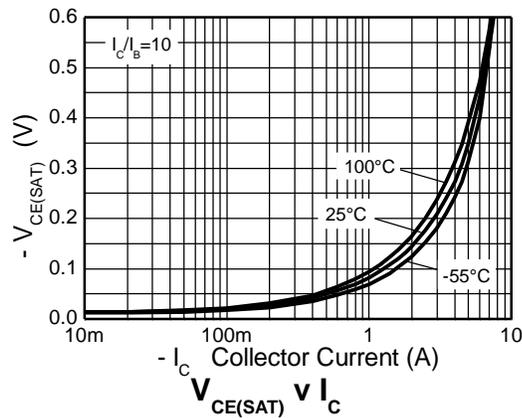
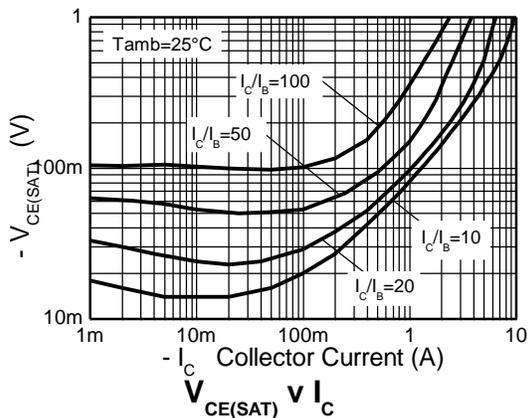


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

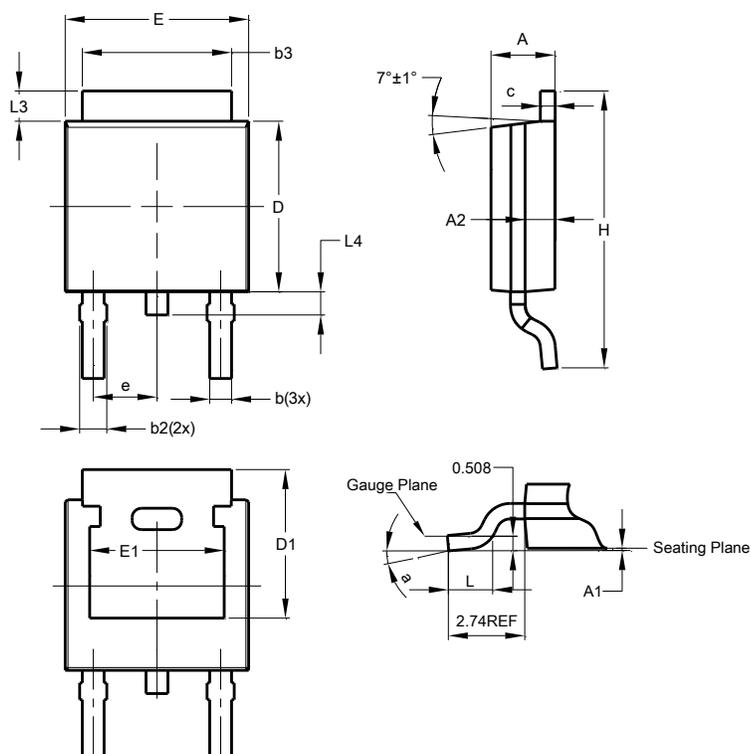
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-140	-170	-	V	I <sub>C</sub> = -100μA
Collector-Base Breakdown Voltage	BV <sub>CER</sub>	-140	-170	-	V	I <sub>C</sub> = -1μA, R <sub>BE</sub> ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 10)	BV <sub>CEO</sub>	-100	-125	-	V	I <sub>C</sub> = -10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.1	-	V	I <sub>E</sub> = -100μA
Collector Cut-Off Current	I <sub>CBO</sub>	-	<1	-20	nA	V <sub>CB</sub> = -100V
Emitter Cut-Off Current	I <sub>EBO</sub>	-	<1	-10	nA	V <sub>EB</sub> = -6V
Emitter Cut-Off Current	I <sub>CER</sub>	-	<1	-20	nA	V <sub>CE</sub> = -100V, R <sub>BE</sub> ≤ 1kΩ
DC Current Transfer Static Ratio (Note 10)	h <sub>FE</sub>	100	220	-	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V
		100	200	300		I <sub>C</sub> = -1A, V <sub>CE</sub> = -1V
		50	85	-		I <sub>C</sub> = -3A, V <sub>CE</sub> = -1V
		15	30	-		I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V
Collector-Emitter Saturation Voltage (Note 10)	V <sub>CE(sat)</sub>	-	-20	-30	mV	I <sub>C</sub> = -0.1A, I <sub>B</sub> = -10mA
		-	-80	-100		I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		-	-140	-175		I <sub>C</sub> = -2A, I <sub>B</sub> = -200mA
		-	-335	-390		I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Saturation Voltage (Note 10)	V <sub>BE(sat)</sub>	-	-1.01	-1.1	V	I <sub>C</sub> = -5A, I <sub>B</sub> = -500mA
Base-Emitter Turn-On Voltage (Note 10)	V <sub>BE(on)</sub>	-	-0.94	-1.05	V	I <sub>C</sub> = -5A, V <sub>CE</sub> = -1V
Transitional Frequency	f <sub>T</sub>	-	125	-	MHz	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -10V f = 50MHz
Output Capacitance	C <sub>OBO</sub>	-	65	-	pF	V <sub>CB</sub> = -10V, f = 1MHz,
Switching Times	t <sub>ON</sub>	-	110	-	nS	I <sub>C</sub> = -2A, V <sub>CC</sub> = -10V, I <sub>B1</sub> = I <sub>B2</sub> = -200mA
	t <sub>OFF</sub>	-	460	-		

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

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

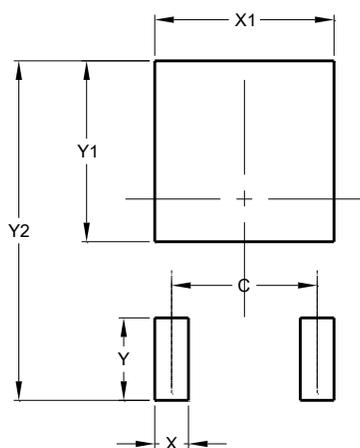


### Package Outline Dimensions



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	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
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



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

For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.