



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

- $BV_{CEO} > 30V$
- $I_C = 7A$ High Continuous Collector Current
- $I_{CM} = 20A$ Peak Pulse Current
- $R_{CE(SAT)} = 33m\Omega$ for Low Equivalent On-Resistance
- h_{FE} Specified Up to 20A for a High Gain Hold Up
- Low Saturation Voltages

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 Plated Leads. Solderable per MIL-STD-202, Method 208
- Weight: 0.34 grams (Approximate)

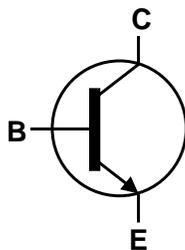
Applications

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

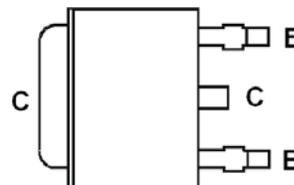
TO252 (DPAK)



Top View



Equivalent Circuit



Package Pin Configuration

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	BV _{CBO}	80	V
Collector-Emitter Voltage	BV _{CER}	80	V
Collector-Emitter Voltage	BV _{CEO}	30	V
Emitter-Base Voltage	BV _{EBO}	7	V
Continuous Collector Current	I _C	7	A
Peak Pulse Current	I _{CM}	20	A
Base Current	I _B	0.5	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P _D	2.1	W mW/°C
		16.8	
		3.2	
		25.6	
		4.2	
		33.6	
Thermal Resistance, Junction to Ambient Air	R _{θJA}	59	°C/W
		39	
		30	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

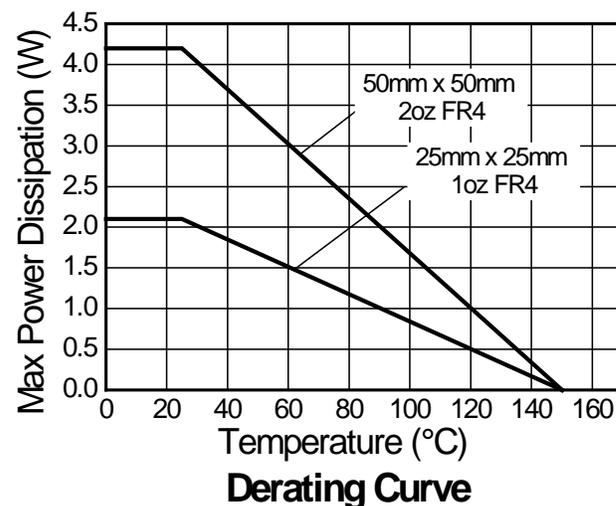
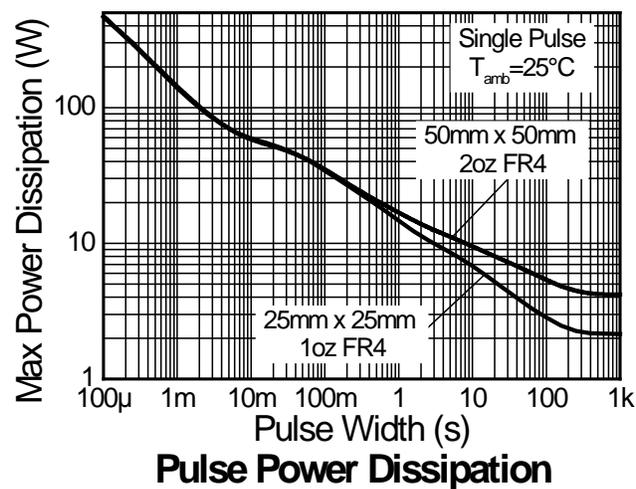
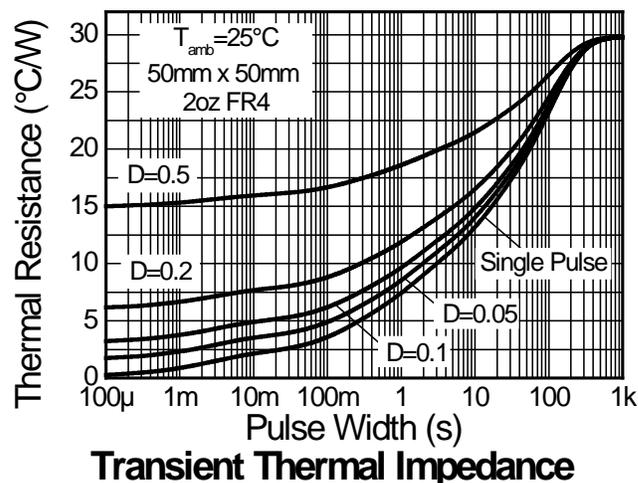
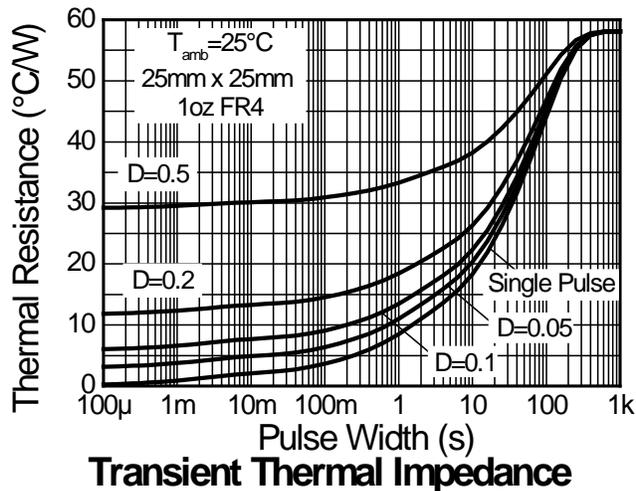
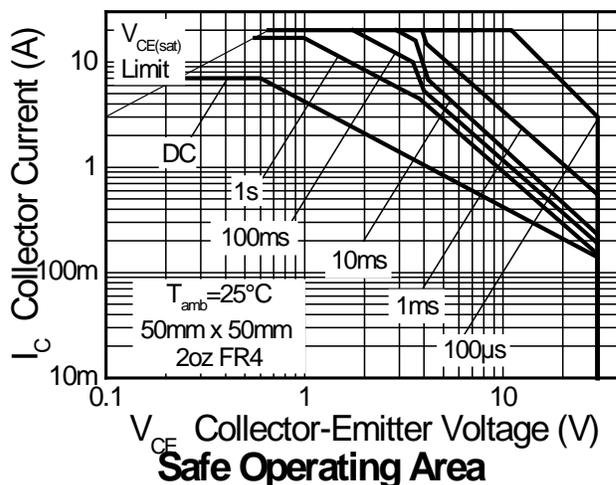
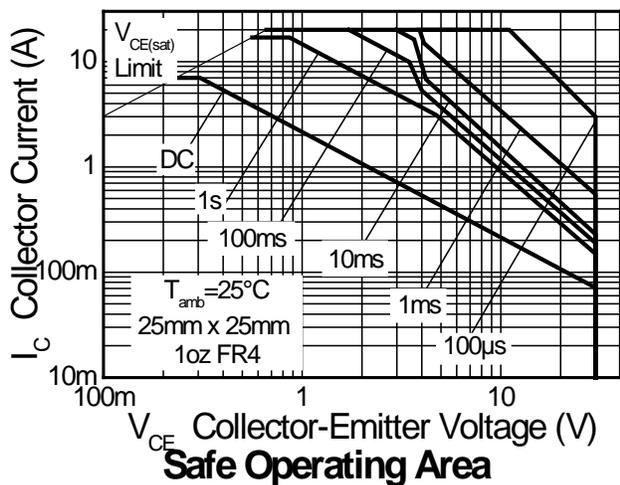
ESD Ratings (Note 8)

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

Notes:

5. For a device mounted with the exposed collector pad on 25mm × 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.
6. Same as Note 5 except mounted on 50mm × 50mm 1oz copper.
7. Same as Note 5 except mounted on 25mm × 25mm 2oz copper.
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

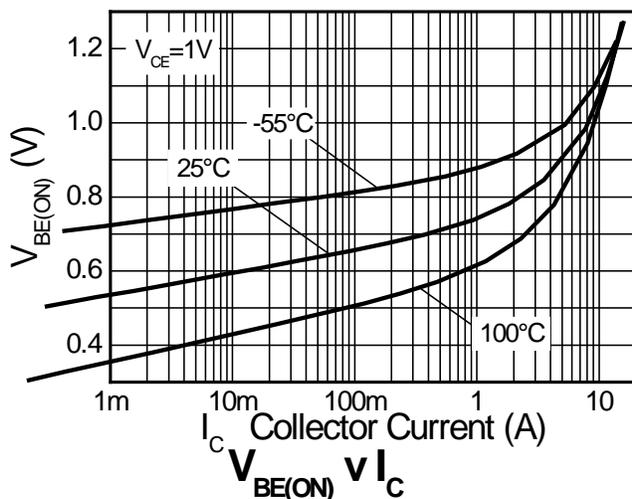
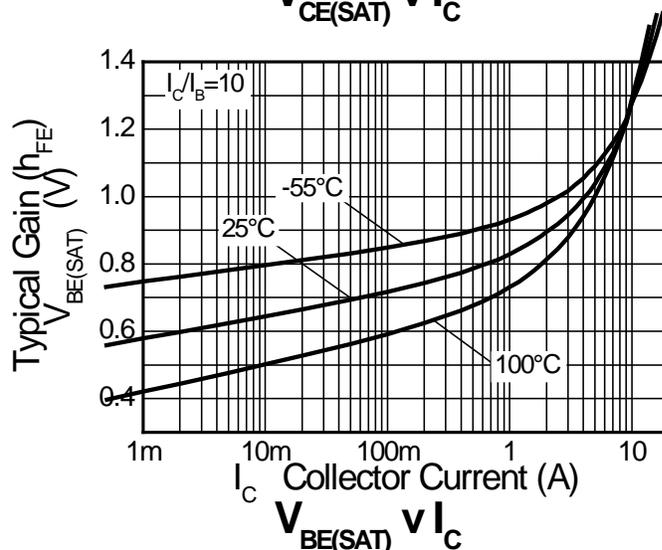
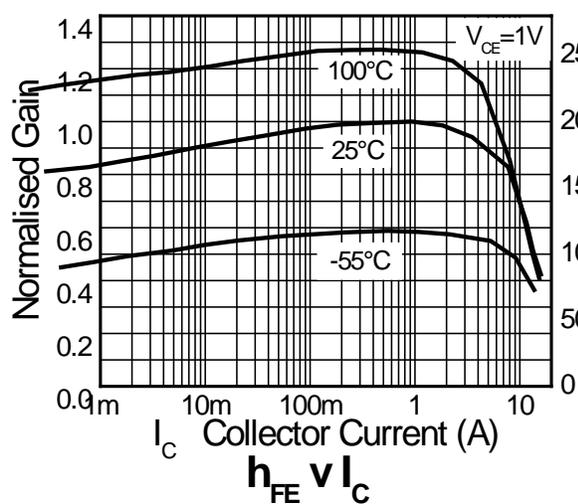
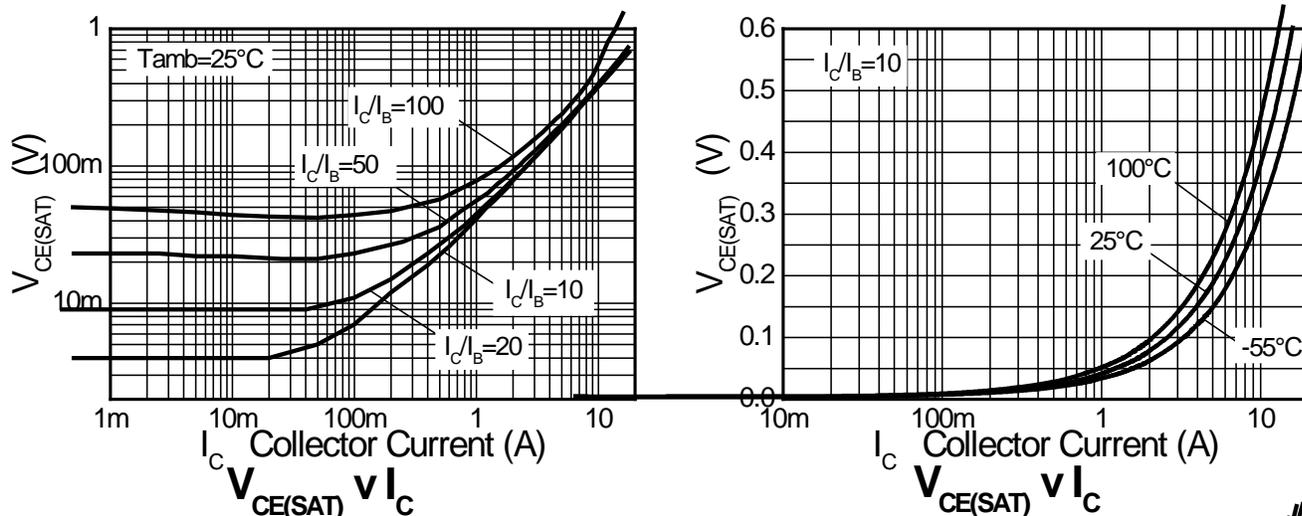


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BV_{CBO}	80	125	—	V	$I_C = 100\mu\text{A}$	
Collector-Emitter Breakdown Voltage	BV_{CER}	80	125	—	V	$I_C = 1\mu\text{A}$, $R_{BE} = \leq 1\text{k}\Omega$	
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	30	40	—	V	$I_C = 10\text{mA}$	
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8	—	V	$I_E = 100\mu\text{A}$	
Collector Cutoff Current	I_{CBO}	—	—	20	nA	$V_{CB} = 70\text{V}$	
Collector Cutoff Current	I_{CER}	—	—	20	nA	$V_{CE} = 70\text{V}$, $R_{BE} = \leq 1\text{k}\Omega$	
Emitter Cutoff Current	I_{EBO}	—	—	10	nA	$V_{EB} = 6\text{V}$	
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(SAT)}$	—	27	40	mV	$I_C = 0.5\text{A}$, $I_B = 20\text{mA}$	
			55	80		$I_C = 1\text{A}$, $I_B = 20\text{mA}$	
			115	180		$I_C = 2\text{A}$, $I_B = 20\text{mA}$	
			230	280		$I_C = 7\text{A}$, $I_B = 350\text{mA}$	
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(SAT)}$	—	1.04	1.15	mV	$I_C = 7\text{A}$, $I_B = 350\text{mA}$	
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(ON)}$	—	0.93	1.1	V	$I_C = 7\text{A}$, $V_{CE} = 1\text{V}$	
DC Current Gain (Note 9)	h_{FE}	—	100	190	—	$I_C = 10\text{mA}$, $V_{CE} = 1\text{V}$	
			100	200		300	$I_C = 1\text{A}$, $V_{CE} = 1\text{V}$
			100	165		—	$I_C = 7\text{A}$, $V_{CE} = 1\text{V}$
			40	90		—	$I_C = 20\text{A}$, $V_{CE} = 2\text{V}$
Current Gain-Bandwidth Product	f_T	—	100	—	MHz	$I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$	
Output Capacitance	C_{OBO}	—	75	—	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$	
Turn-On Time	t_{ON}	—	45	—	ns	$I_C = 1\text{A}$, $V_{CC} = 10\text{V}$,	
Turn-Off Time	t_{OFF}	—	630	—	ns	$I_{B1} = -I_{B2} = 100\text{mA}$	

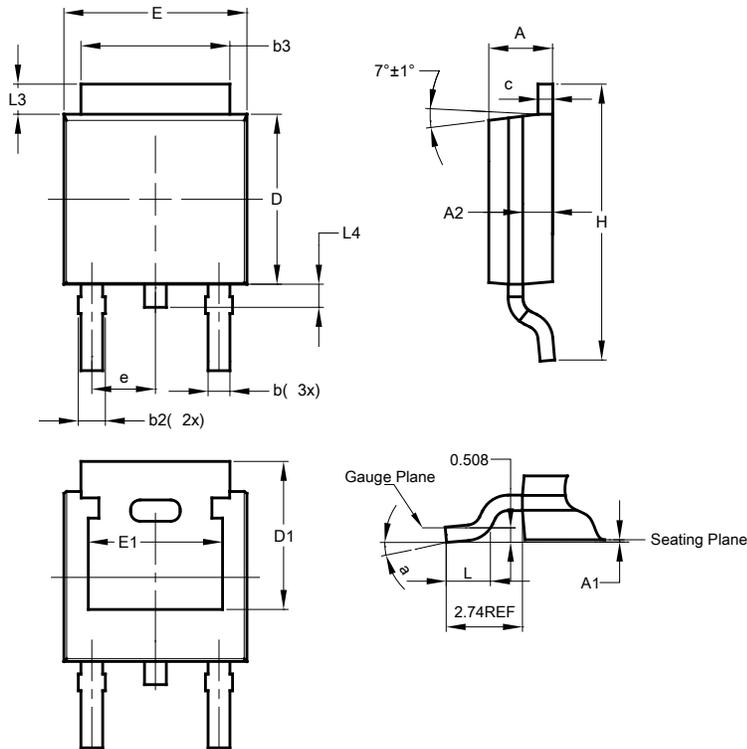
 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

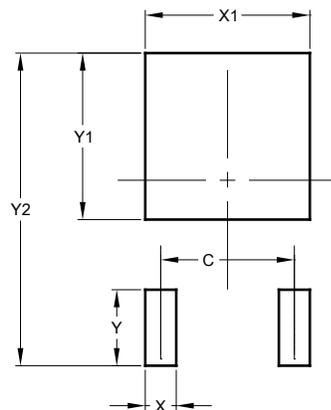
TO252 (DPAK)



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	5.46	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°	—
All Dimensions in mm			

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