优尚

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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Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	**Max I_D** **T_A = +25°C**
100V	125mΩ @ V_{GS}= 10V	TO252 (DPAK)	6.4A
	150mΩ @ V_{GS}= 6V		5.8A

Description

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features

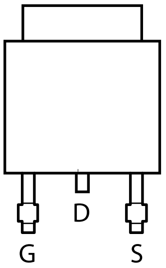
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive

Mechanical Data

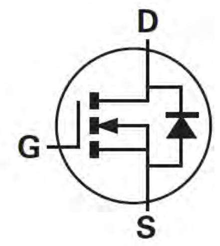
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)

TO252

Top View



Pin Out -Top View



Equivalent Circuit

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

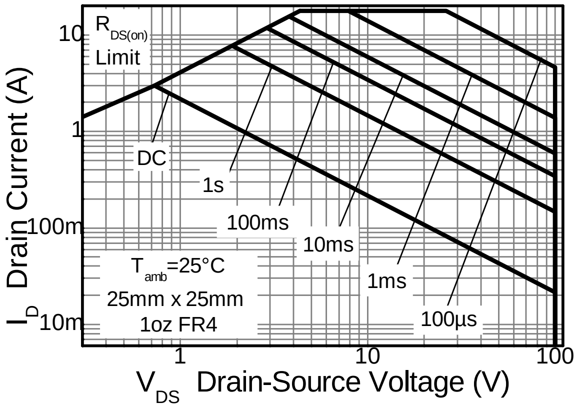
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	100	V
Gate-Source voltage			V_{GS}	±20	V
Continuous Drain current	V_{GS} = 10V	(Note 7)	I_D	6.4	A
		T_A = +70°C (Note 7)		5	
		(Note 6)		4.2	
Pulsed Drain current		(Note 8)	I_{DM}	21	A
Continuous Source current (Body diode)		(Note 7)	I_S	10	A
Pulsed Source current (Body diode)		(Note 8)	I_{SM}	21	A

Thermal Characteristics

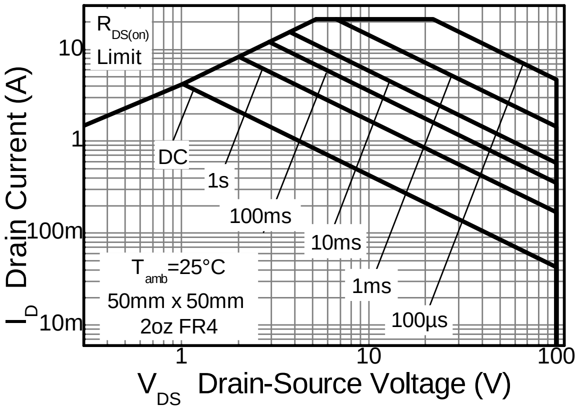
Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 6)	P_D	4.25 34	W mW/°C
	(Note 7)		9.85 78.7	
	(Note 9)		2.11 16.8	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	29.4	°C/W
	(Note 7)		12.7	
	(Note 9)		59.1	
Thermal Resistance, Junction to Lead	(Note 10)	$R_{\theta JL}$	1.43	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

Notes:
6. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.
8. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
10. Thermal resistance from junction to solder-point (at the end of the drain lead).

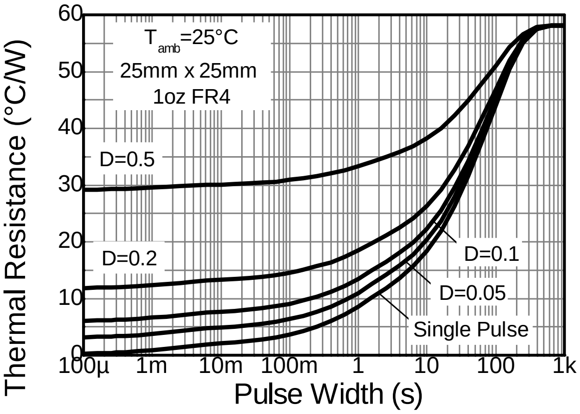
Thermal Characteristics



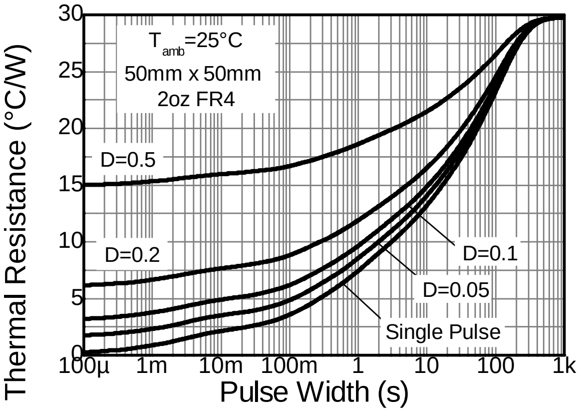
Safe Operating Area



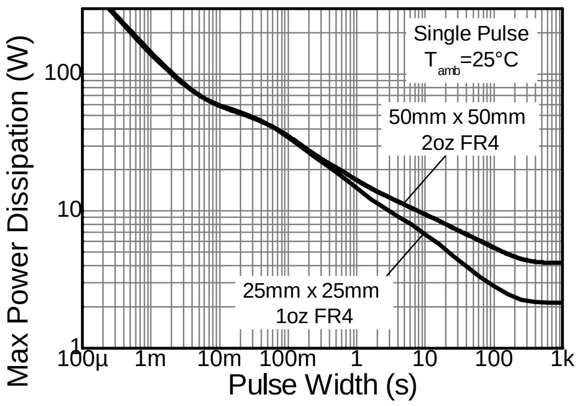
Safe Operating Area



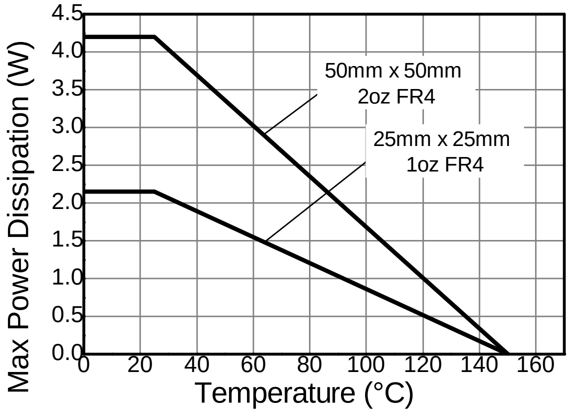
Transient Thermal Impedance



Transient Thermal Impedance



Pulse Power Dissipation



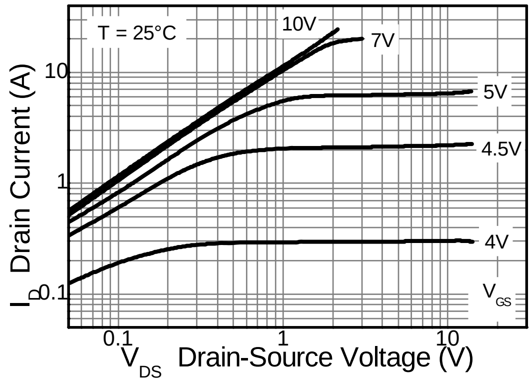
Derating Curve

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

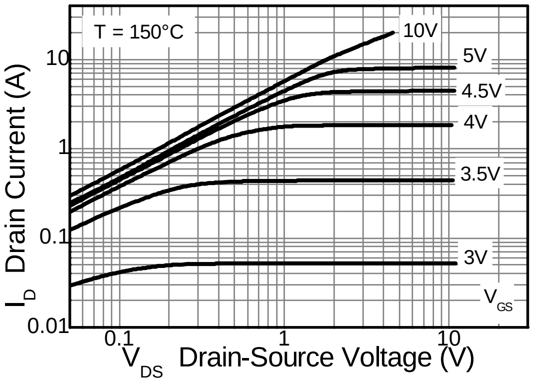
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	I_D = 250µA, V_{GS} = 0V	
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	µA	V_{DS} = 100V, V_{GS} = 0V	
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	2.0	—	4.0	V	I_D = 250µA, V_{DS} = V_{GS}	
Static Drain-Source On-Resistance (Note 11)	$R_{DS\ (ON)}$	—	—	125	mΩ	V_{GS} = 10V, I_D = 3.2A	
				150		V_{GS} = 6V, I_D = 2.6A	
Forward Transconductance (Notes 11 & 12)	g_{fs}	—	7.3	—	S	V_{DS} = 15V, I_D = 2.9A	
Diode Forward Voltage (Note 11)	V_{SD}	—	0.85	0.95	V	I_S = 3.2A, V_{GS} = 0V, T_J = +25°C	
Reverse recovery time (Note 12)	t_{rr}		40.5	—	ns	I_S = 2.9A, di/dt = 100A/µs T_J = +25°C	
Reverse recovery charge (Note 12)	Q_{rr}	—	62	—	nC		
DYNAMIC CHARACTERISTICS (Note 12)							
Input Capacitance	C_{iss}	—	859	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1MHz	
Output Capacitance	C_{oss}	—	57.3	—	pF		
Reverse Transfer Capacitance	C_{rss}	—	33	—	pF		
Total Gate Charge (Note 13)	Q_g	—	9.6	—	nC	V_{GS} = 5V	V_{DS} = 50V I_D = 2.9A
Total Gate Charge (Note 13)	Q_g	—	17.16	—	nC	V_{GS} = 10V	
Gate-Source Charge (Note 13)	Q_{gs}	—	3.77	—	nC		
Gate-Drain Charge (Note 13)	Q_{gd}	—	5.36	—	nC		
Turn-On Delay Time (Note 13)	$t_{D(on)}$	—	4.9	—	ns	V_{DD} = 50V, V_{GS} = 10V I_D = 1A, R_G ≅ 6.0Ω	
Turn-On Rise Time (Note 13)	t_r	—	3.7	—	ns		
Turn-Off Delay Time (Note 13)	$t_{D(off)}$	—	17.7	—	ns		
Turn-Off Fall Time (Note 13)	t_f	—	9.4	—	ns		

Notes:
11. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%
12. For design aid only, not subject to production testing.
13. Switching characteristics are independent of operating junction temperatures.

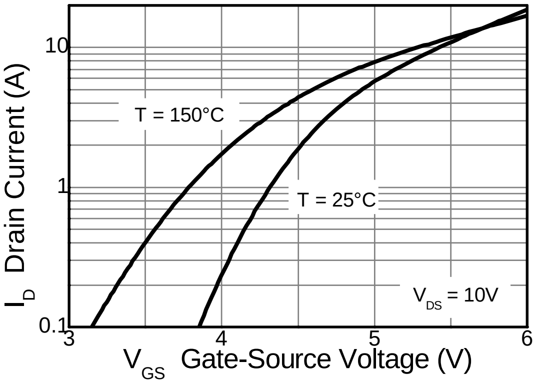
Typical Characteristics



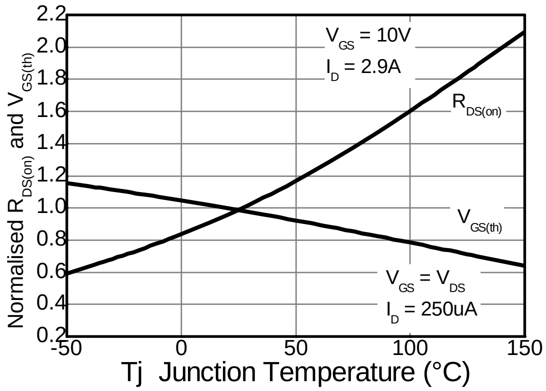
Output Characteristics



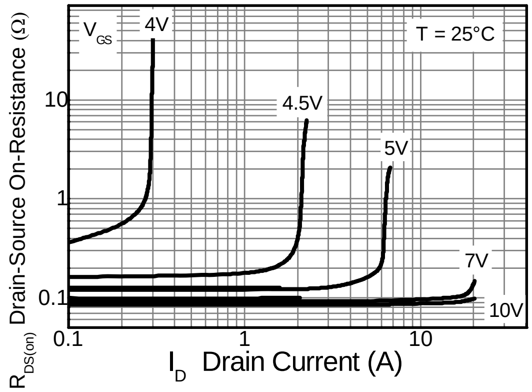
Output Characteristics



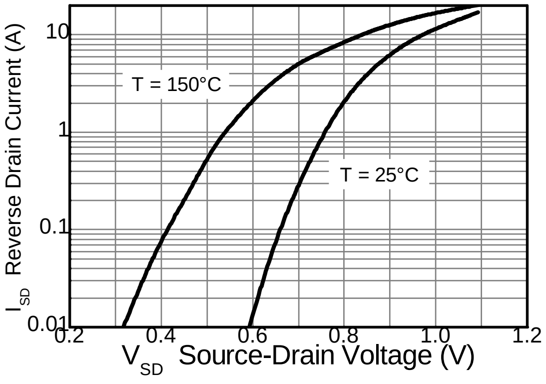
Typical Transfer Characteristics



Normalised Curves v Temperature

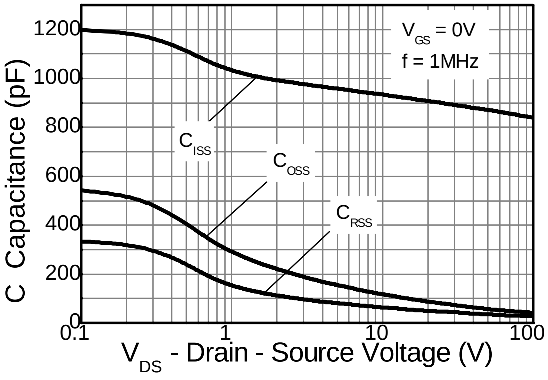


On-Resistance v Drain Current

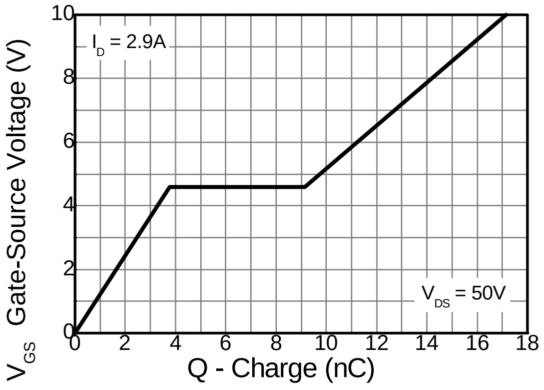


Source-Drain Diode Forward Voltage

Typical Characteristics (cont.)

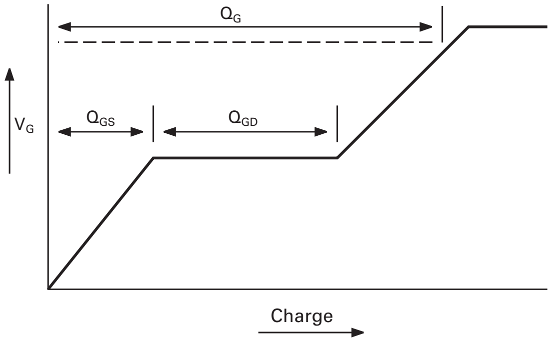


Capacitance v Drain-Source Voltage

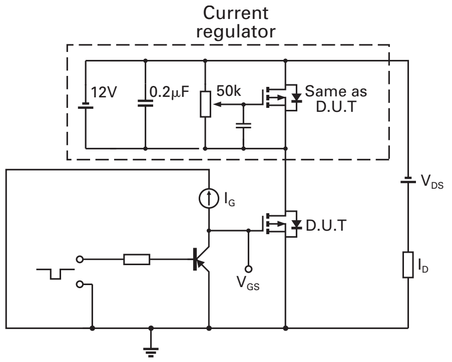


Gate-Source Voltage v Gate Charge

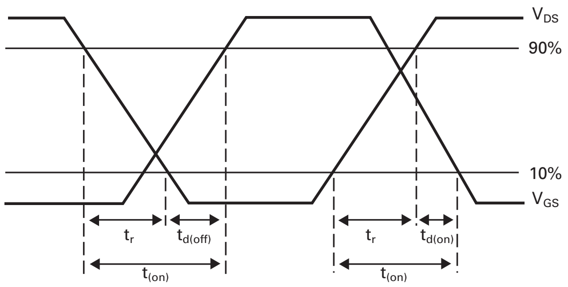
Test Circuits



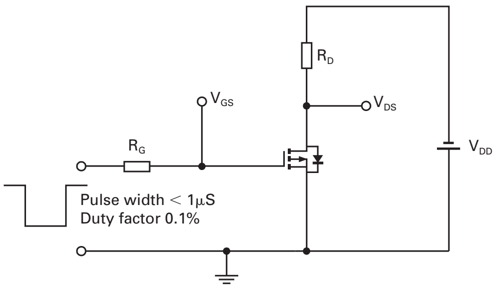
Basic gate charge waveform



Gate charge test circuit

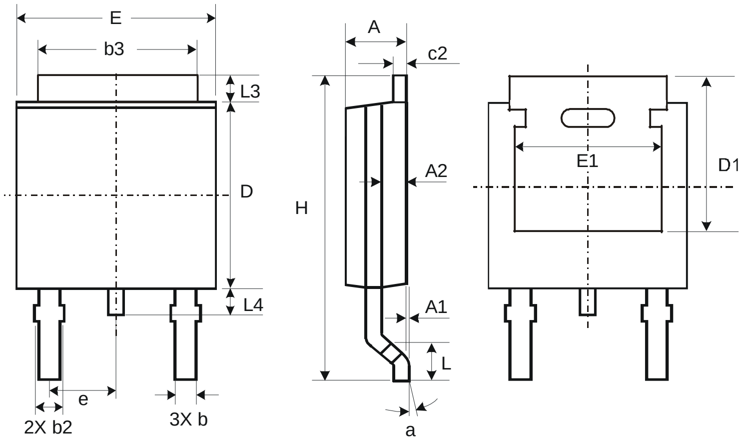


Switching time waveforms



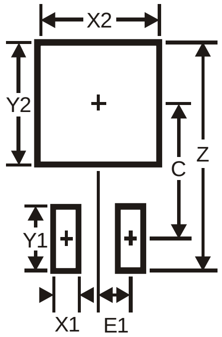
Switching time test circuit

Package Outline Dimensions



TO252			
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
c2	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



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3