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

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = 25°C
-60V	125mΩ @ V_{GS} = -10V	-3.4A
	190mΩ @ V_{GS} = -4.5V	-2.8A

Description and Applications

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

- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

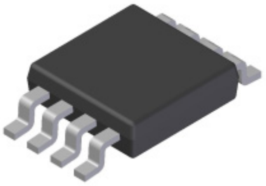
Features and Benefits

- Fast switching speed
- Low input capacitance

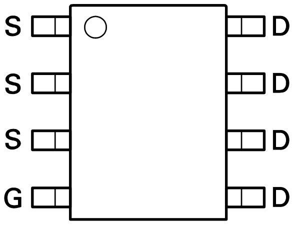
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)

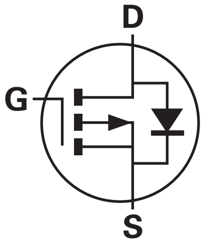
SO-8



Top View



Top View



Equivalent Circuit

Maximum Ratings @T_A = 25°C unless otherwise specified

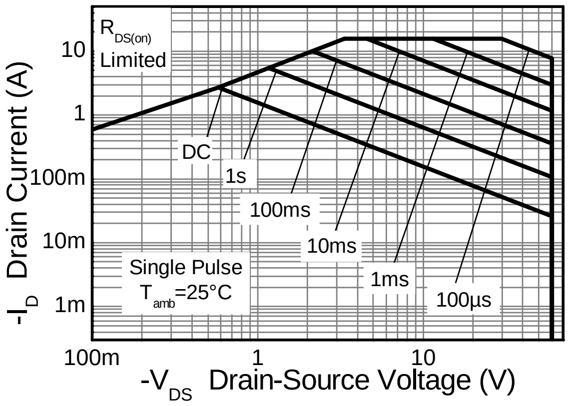
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	-60	V
Gate-Source voltage			V_{GS}	±20	V
Continuous Drain current	V_{GS} = 10V	(Note 3)	I_D	-3.42	A
		T_A = 70°C (Note 3)		-2.73	
		(Note 2)		-2.7	
Pulsed Drain current	V_{GS} = 10V	(Note 4)	I_{DM}	-15.6	A
Continuous Source current (Body diode)		(Note 3)	I_S	-3.4	A
Pulsed Source current (Body diode)		(Note 4)	I_{SM}	-15.6	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

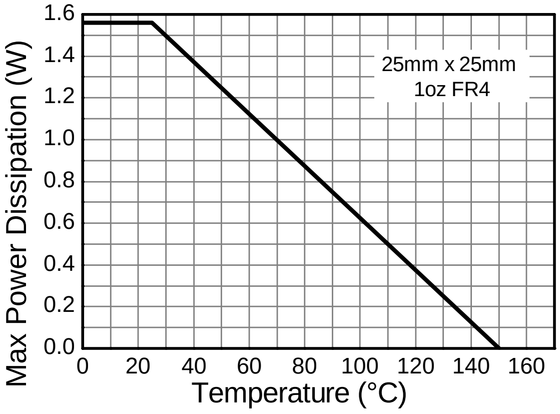
Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	P_D	1.56 12.5	W mW/°C
	(Note 3)		2.5 20	
Thermal Resistance, Junction to Ambient	(Note 2)	$R_{\theta JA}$	80	°C/W
	(Note 3)		50	
Thermal Resistance, Junction to Lead	(Note 5)	$R_{\theta JL}$	32	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

Notes:
2. 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.
3. Same as note (2), except the device is measured at t ≤ 10 sec.
4. Same as note (2), except the device is pulsed with D= 0.02 and pulse width 300 µs. The pulse current is limited by the maximum junction temperature.
5. Thermal resistance from junction to solder-point (at the end of the drain lead).

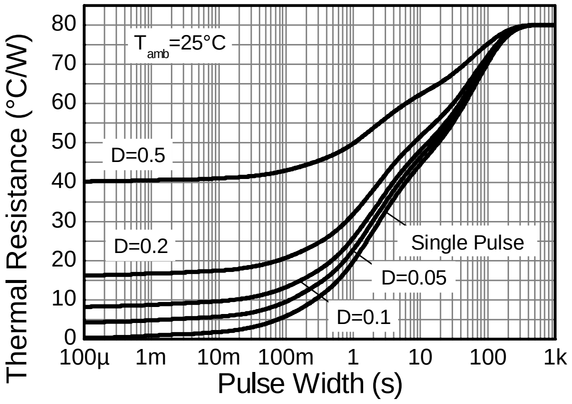
Thermal Characteristics



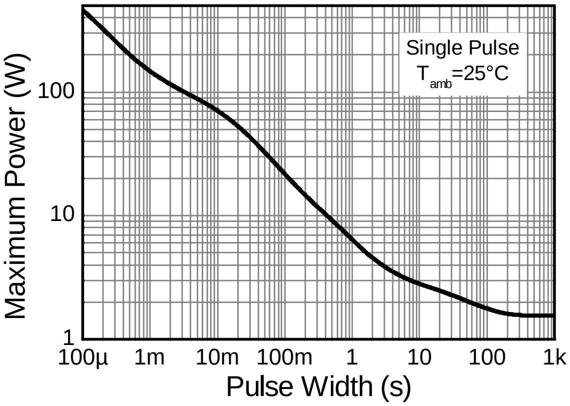
Safe Operating Area



Derating Curve



Transient Thermal Impedance



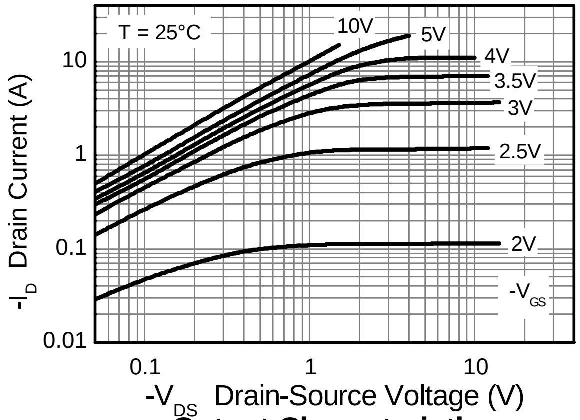
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

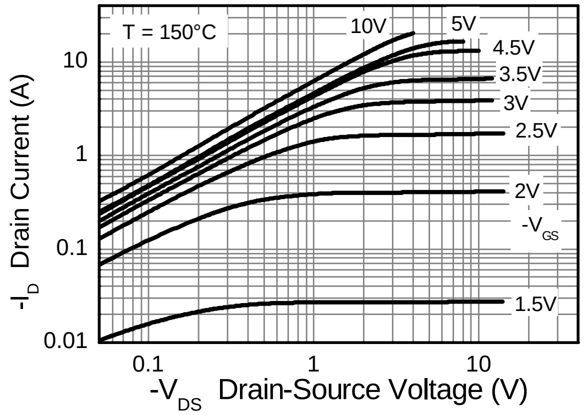
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	I_D = -250µA, V_{GS} = 0V	
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	µA	V_{DS} = -60V, V_{GS} = 0V	
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	I_D = -250µA, V_{DS} = V_{GS}	
Static Drain-Source On-Resistance (Note 6)	$R_{DS\ (ON)}$	—	—	0.125	Ω	V_{GS} = -10V, I_D = -2.3A	
				0.190		V_{GS} = -4.5V, I_D = -1.9A	
Forward Transconductance (Notes 6 & 7)	g_{fs}	—	4.7	—	S	V_{DS} = -15V, I_D = -2.3A	
Diode Forward Voltage (Note 6)	V_{SD}	—	-0.85	-0.95	V	I_S = -2.0A, V_{GS} = 0V	
Reverse recovery time (Note 7)	t_{rr}		25.1	—	ns	I_S = -1.7A, di/dt = 100A/µs	
Reverse recovery charge (Note 7)	Q_{rr}	—	27.2	—	nC		
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	C_{iss}	—	637	—	pF	V_{DS} = -30V, V_{GS}= 0V f = 1MHz	
Output Capacitance	C_{oss}	—	70	—	pF		
Reverse Transfer Capacitance	C_{rss}	—	53	—	pF		
Total Gate Charge (Note 8)	Q_g	—	9.0	—	nC	V_{GS} = -4.5V	V_{DS} = -30V I_D = -2.2A
Total Gate Charge (Note 8)	Q_g	—	17.7	—	nC	V_{GS} = -10V	
Gate-Source Charge (Note 8)	Q_{gs}	—	1.6	—	nC		
Gate-Drain Charge (Note 8)	Q_{gd}	—	4.4	—	nC		
Turn-On Delay Time (Note 8)	$t_{D(on)}$	—	2.6	—	ns	V_{DD} = -30V, V_{GS} = -10V I_D = -1A, R_G ≅ 6.0Ω	
Turn-On Rise Time (Note 8)	t_r	—	3.4	—	ns		
Turn-Off Delay Time (Note 8)	$t_{D(off)}$	—	26.2	—	ns		
Turn-Off Fall Time (Note 8)	t_f	—	11.3	—	ns		

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

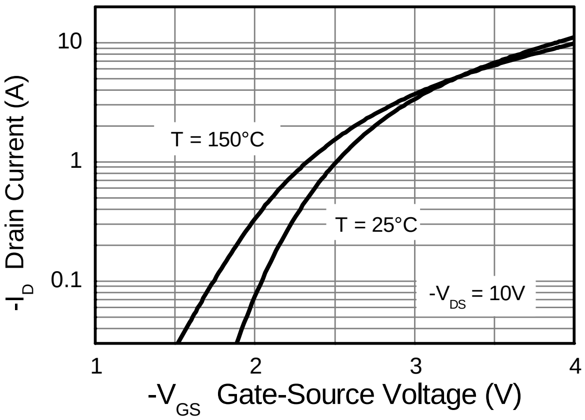
Typical Characteristics



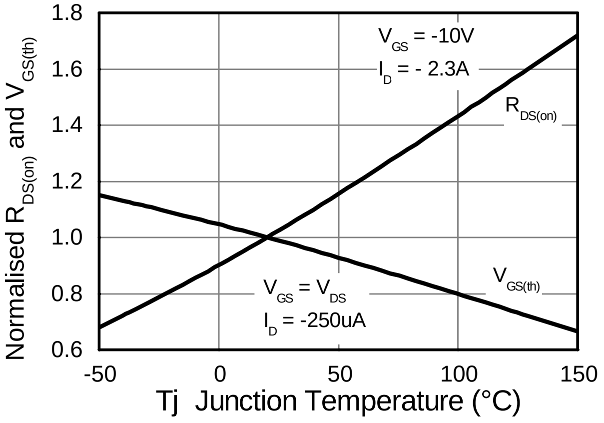
Output Characteristics



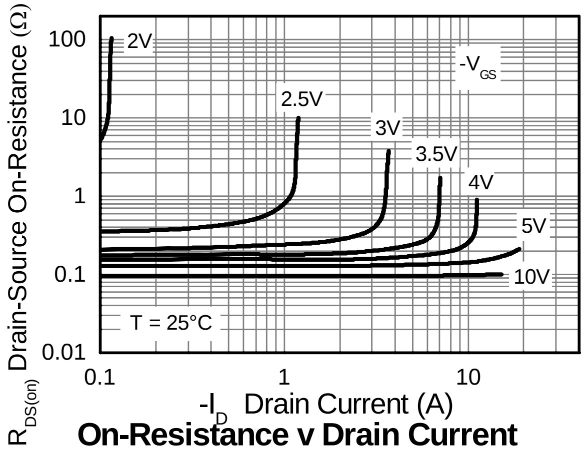
Output Characteristics



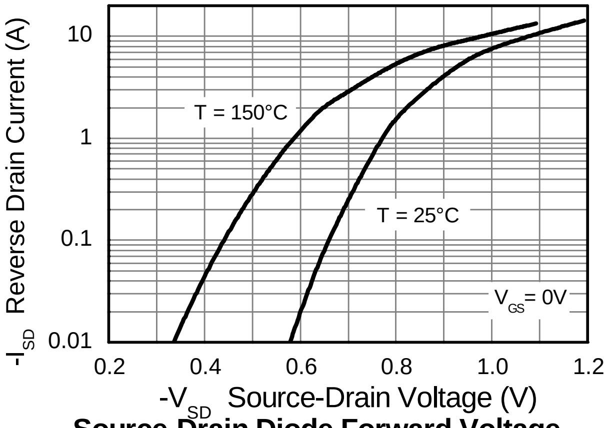
Typical Transfer Characteristics



Normalised Curves v Temperature

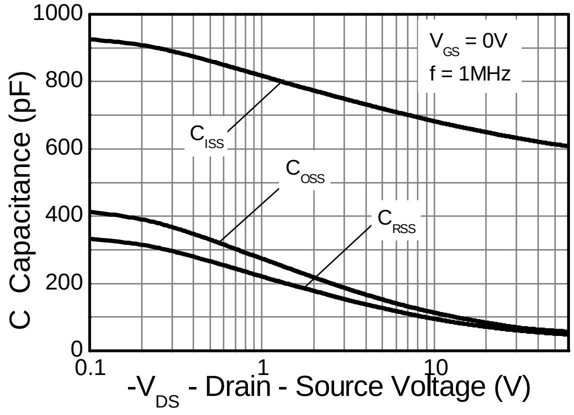


On-Resistance v Drain Current

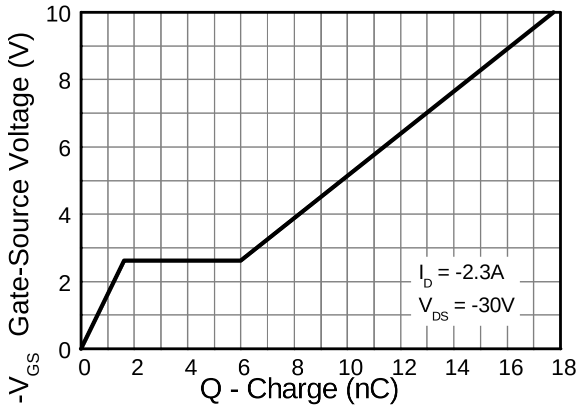


Source-Drain Diode Forward Voltage

Typical Characteristics - continued

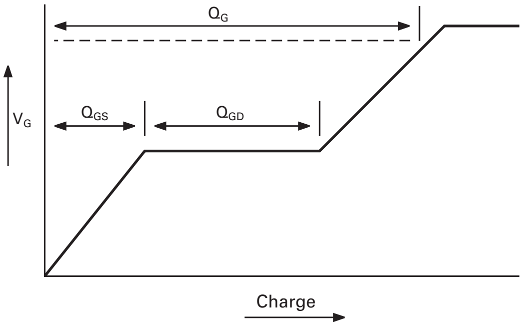


Capacitance v Drain-Source Voltage

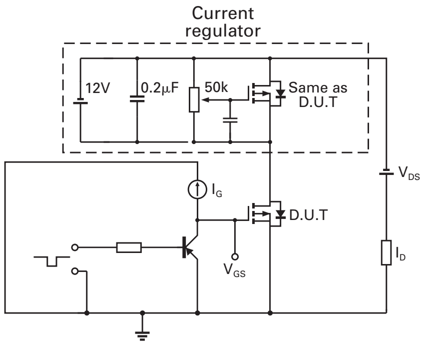


Gate-Source Voltage v Gate Charge

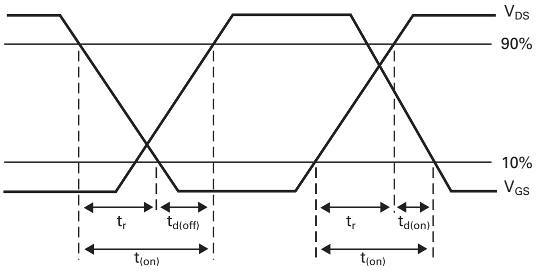
Test Circuits



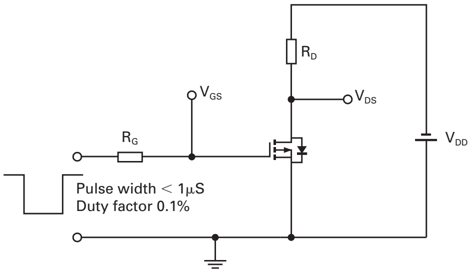
Basic gate charge waveform



Gate charge test circuit

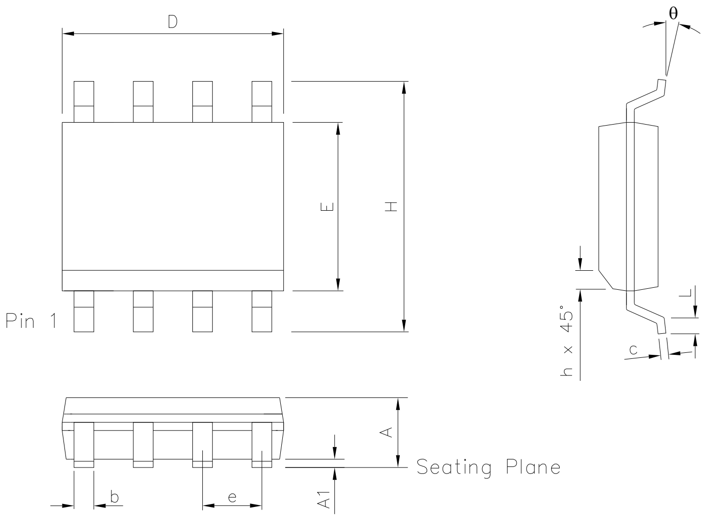


Switching time waveforms



Switching time test circuit

Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.053	0.069	1.35	1.75	e	0.050 BSC		1.27 BSC	
A1	0.004	0.010	0.10	0.25	b	0.013	0.020	0.33	0.51
D	0.189	0.197	4.80	5.00	c	0.008	0.010	0.19	0.25
H	0.228	0.244	5.80	6.20	θ	0°	8°	0°	8°
E	0.150	0.157	3.80	4.00	h	0.010	0.020	0.25	0.50
L	0.016	0.050	0.40	1.27	-	-	-	-	-

Suggested Pad Layout