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

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C (Notes 7 & 9)
-60V	125mΩ @ V_{GS} = -10V	-3.4A
	190mΩ @ V_{GS} = -4.5V	-2.8A

Features

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Profile SOIC Package

Description

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.

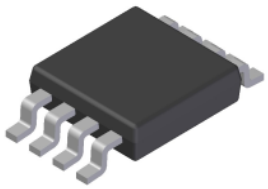
Applications

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

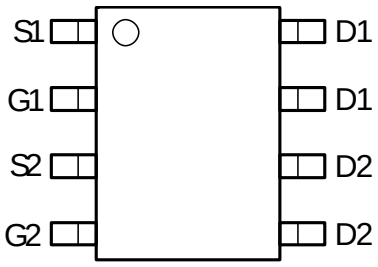
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.074 grams (Approximate)

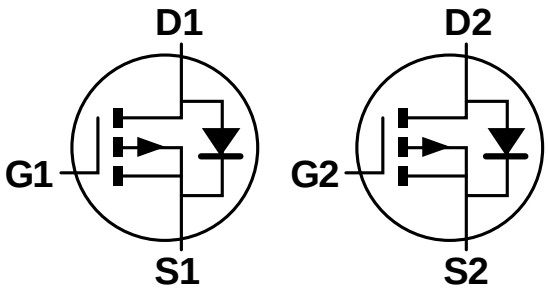
SO-8



Top View



Top View



Equivalent Circuit

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

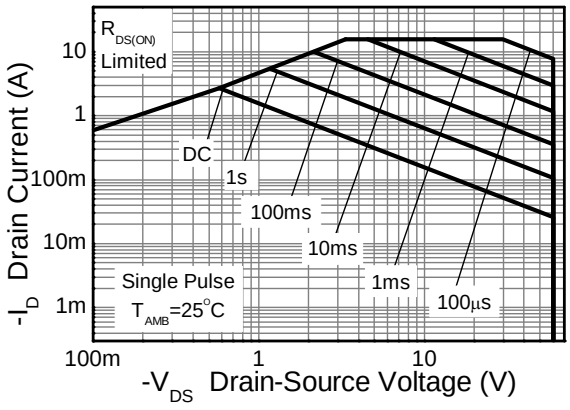
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-60	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current	V_{GS} = 10V	(Notes 7 & 9)	I_D	-3.42	A
		T_A = +70ºC (Notes 7 & 9)		-2.73	
		(Notes 6 & 9)		-2.7	
Pulsed Drain Current		(Notes 8 & 9)	I_{DM}	-15.6	A
Continuous Source Current (Body Diode)		(Notes 7 & 9)	I_S	-3.4	A
Pulsed Source Current (Body Diode)		(Notes 8 & 9)	I_{SM}	-15.6	A

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

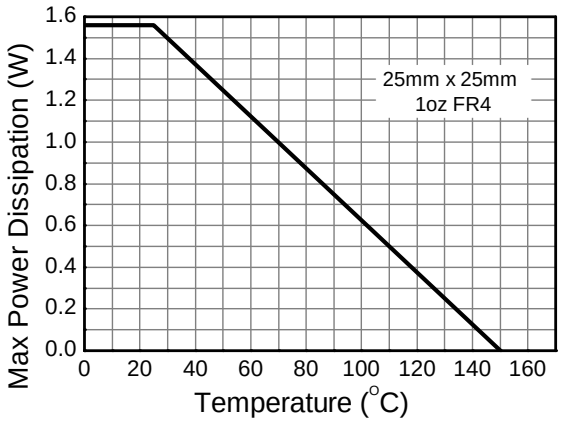
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.25 10.0	W mW/°C
	(Notes 6 & 10)		1.81 14.5	
	(Notes 7 & 9)		2.15 17	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	100	°C/W
	(Notes 6 & 10)		70	
	(Notes 7 & 9)		60	
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	$R_{\theta JL}$	51.68	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
6. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. Same as note (6), except the device is measured at t ≤ 10 sec.
8. Same as note (6), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
9. For a dual device with one active die.
10. For a device with two active die running at equal power.
11. Thermal resistance from junction to solder-point.

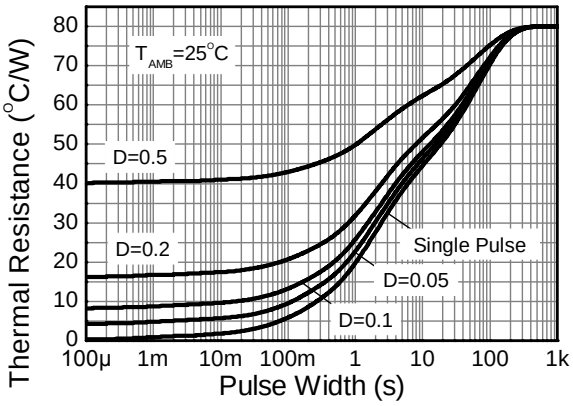
Thermal Characteristics



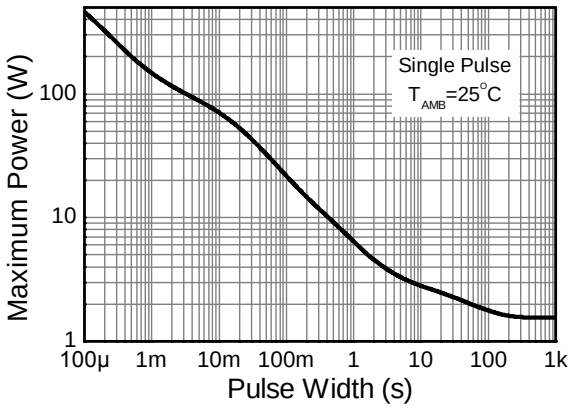
Safe Operating Area



Derating Curve



Transient Thermal Impedance



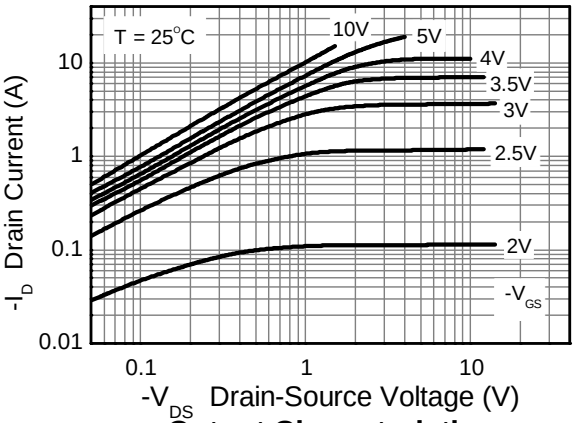
Pulse Power Dissipation

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

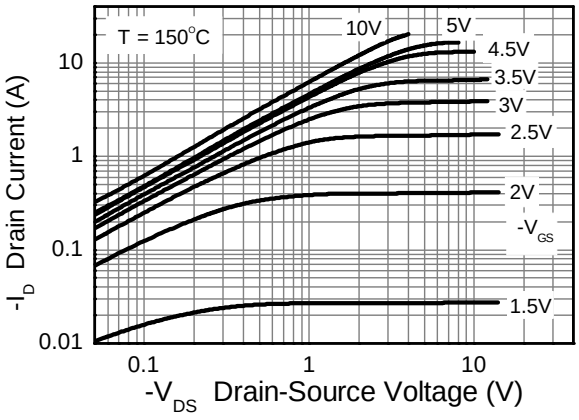
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	I_D = -250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	—	V	I_D = -250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 12)	$R_{DS(ON)}$	—	—	0.125	Ω	V_{GS} = -10V, I_D = -2.3A
				0.190		V_{GS} = -4.5V, I_D = -1.9A
Forward Transconductance (Notes 12 & 13)	g_{fs}	—	4.7	—	s	V_{DS} = -15V, I_D = -2.3A
Diode Forward Voltage (Note 12)	V_{SD}	—	-0.85	-0.95	V	I_S = -2.0A, V_{GS} = 0V
Reverse Recovery Time (Note 13)	t_{RR}		25.1	—	ns	I_S = -1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 13)	Q_{RR}	—	27.2	—	nC	
DYNAMIC CHARACTERISTICS (Note 13)						
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 14)	Q_g	—	9.0	—	nC	V_{GS} = -4.5V
Total Gate Charge (Note 14)	Q_g	—	17.7	—	nC	V_{GS} = -10V V_{DS} = -30V I_D = -2.2A
Gate-Source Charge (Note 14)	Q_{gs}	—	1.6	—	nC	
Gate-Drain Charge (Note 14)	Q_{gd}	—	4.4	—	nC	
Turn-On Delay Time (Note 14)	$t_{D(ON)}$	—	2.6	—	ns	V_{DD} = -30V, V_{GS} = -10V I_D = -1A, $R_g \cong$ 6.0Ω
Turn-On Rise Time (Note 14)	t_R	—	3.4	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(OFF)}$	—	26.2	—	ns	
Turn-Off Fall Time (Note 14)	t_F	—	11.3	—	ns	

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

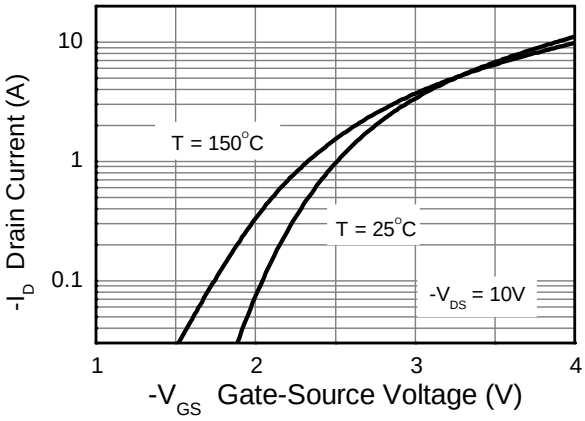
Typical Characteristics



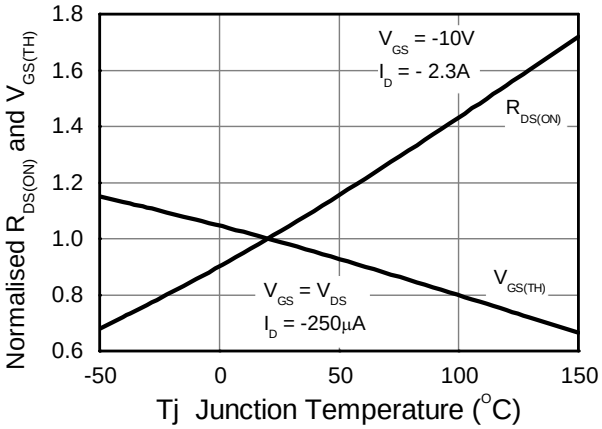
Output Characteristics



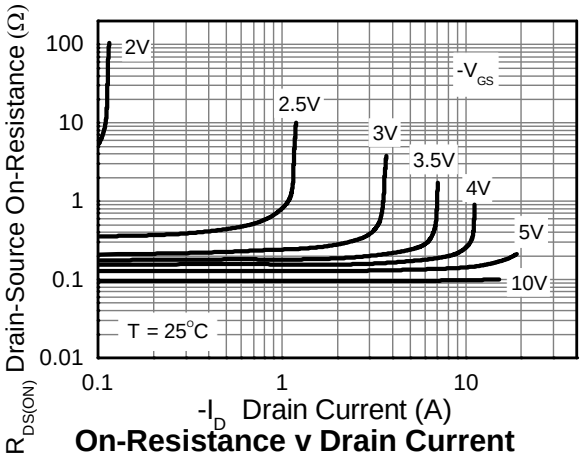
Output Characteristics



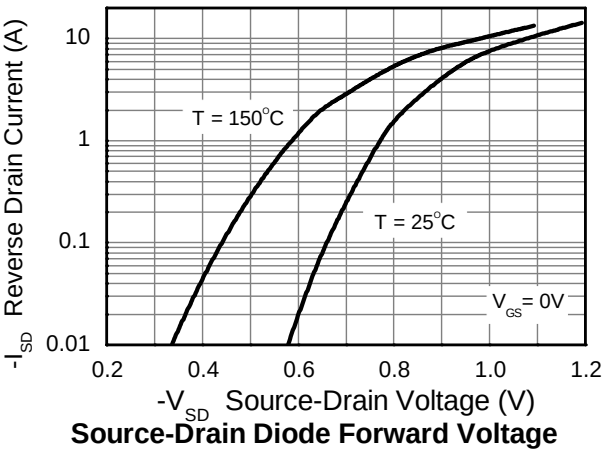
Typical Transfer Characteristics



Normalised Curves v Temperature

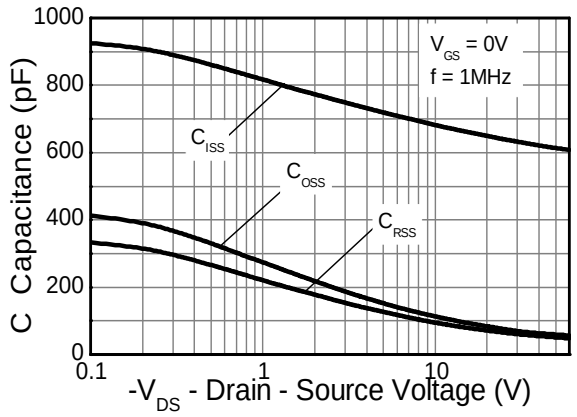


On-Resistance v Drain Current

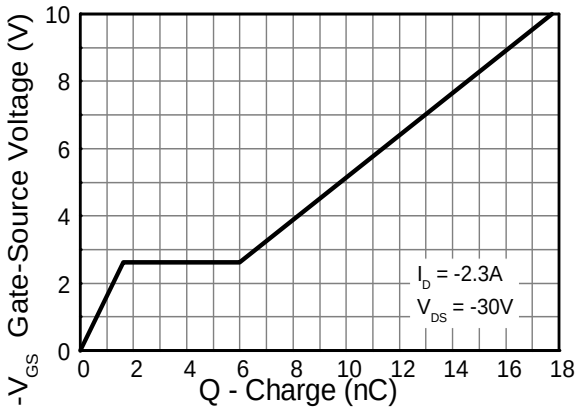


Source-Drain Diode Forward Voltage

Typical Characteristics (Cont.)

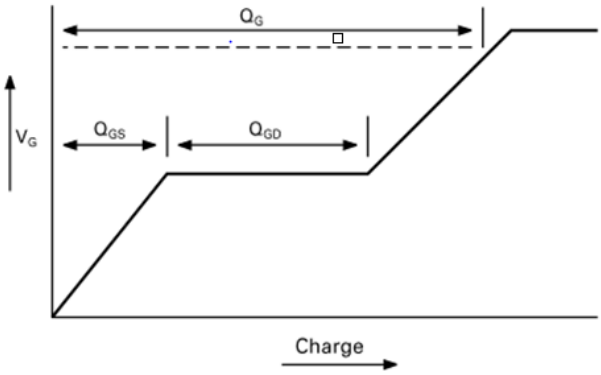


Capacitance v Drain-Source Voltage

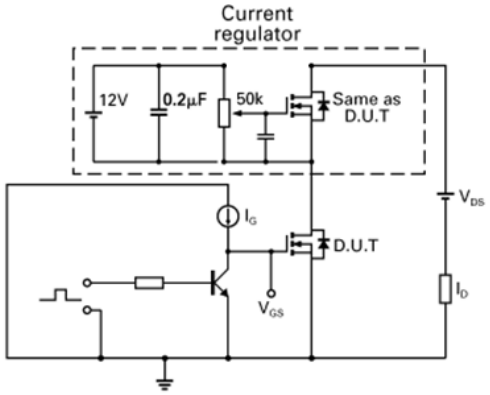


Gate-Source Voltage v Gate Charge

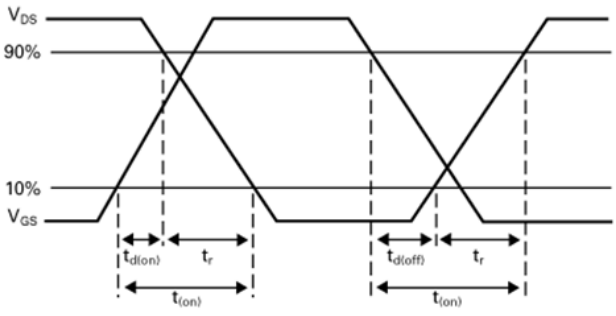
Test Circuits



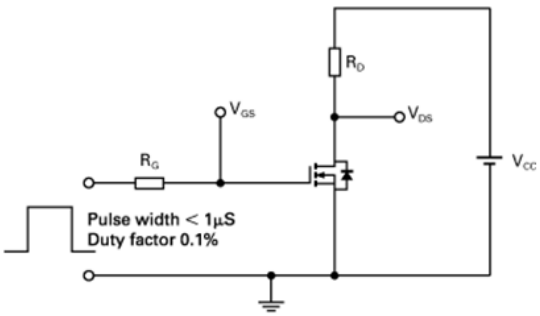
Basic gate charge waveform



Gate charge test circuit



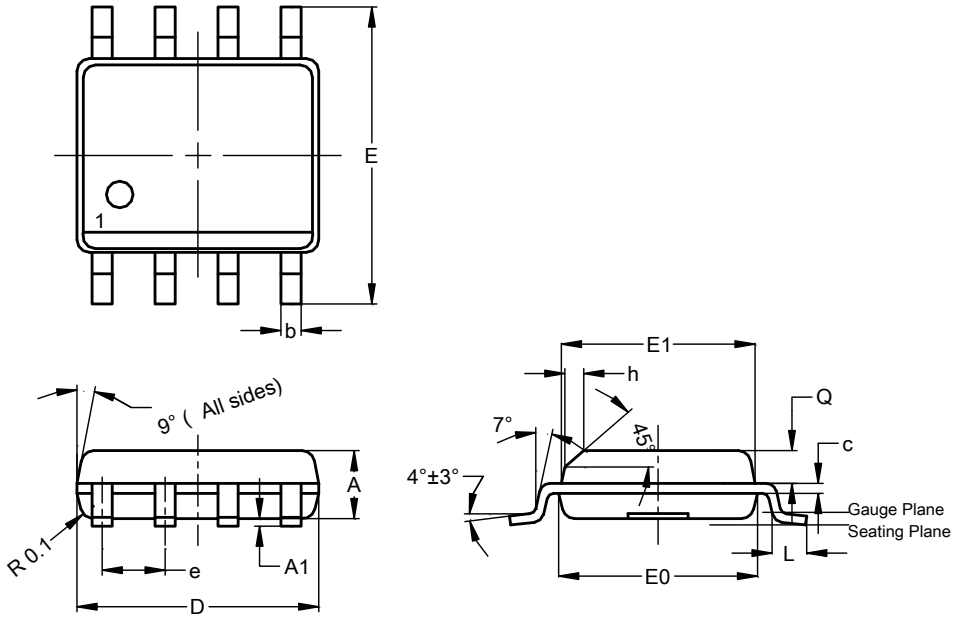
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

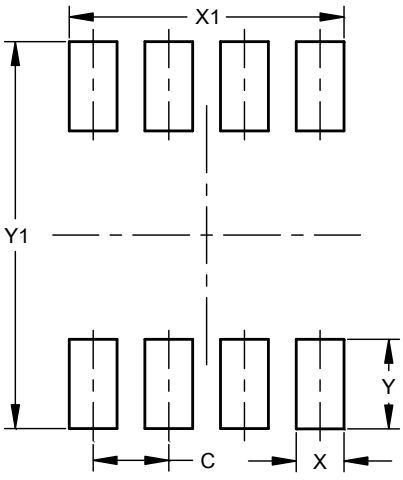
SO-8



SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50