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

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D T_A = +25°C
-60V	55mΩ @ V_{GS} = -10V	-4.8A

Description

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

Applications

- Disconnect Switches
- Motor Drive

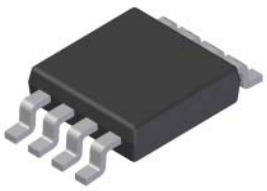
Features

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

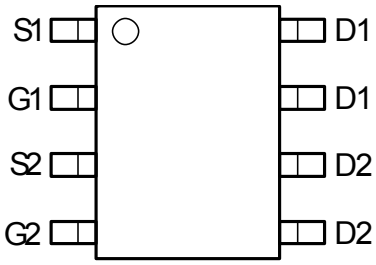
Mechanical Data

- 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)

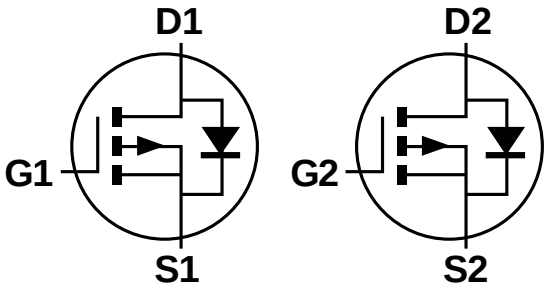
SO-8



Top View



Top View



Equivalent Circuit

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

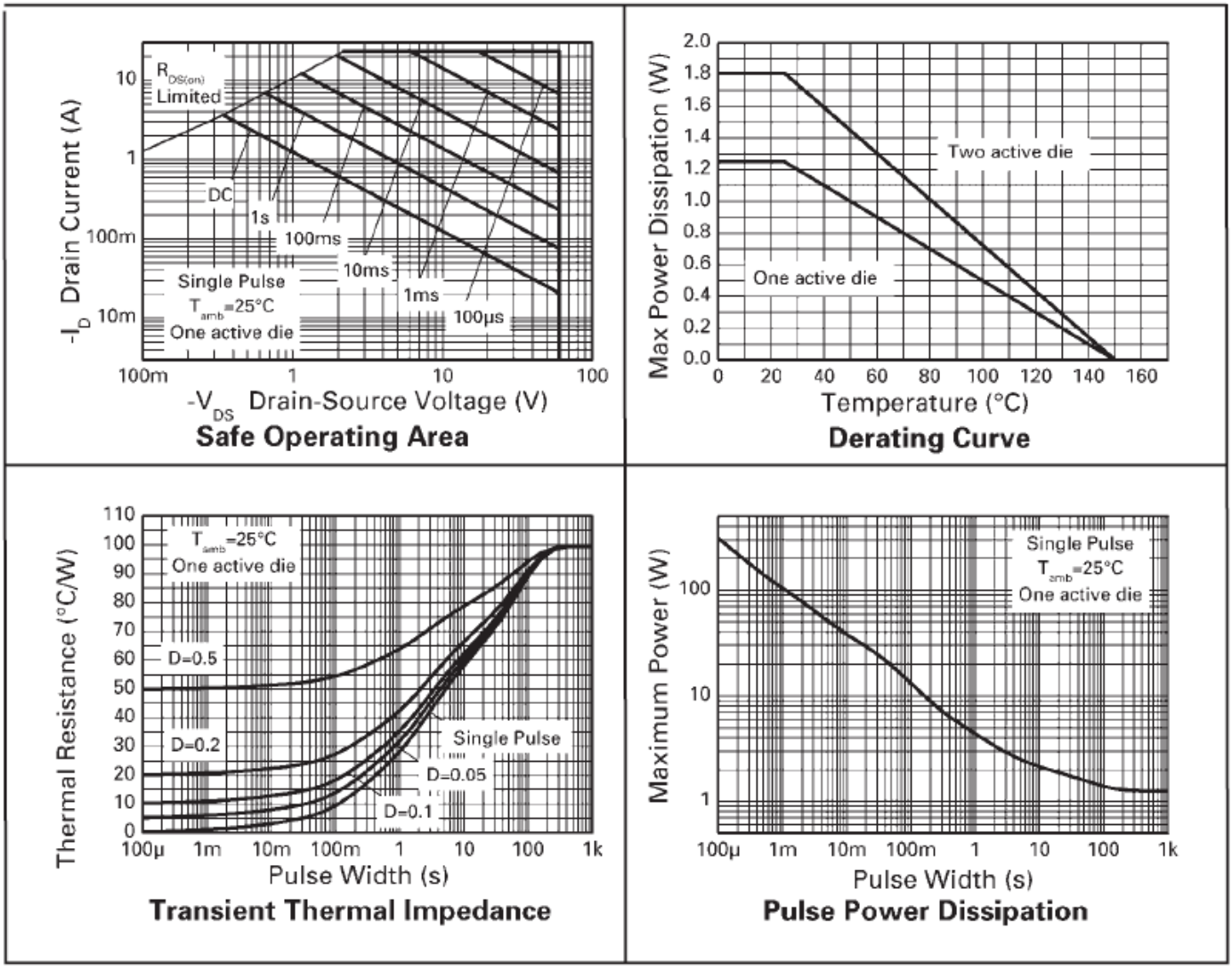
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (V_{GS} = 10V)	(Notes 7 & 9)	I_D	-4.8	A
	T_A = +70°C (Notes 7 & 9)		-3.8	
	(Notes 6 & 9)		-3.7	
Pulsed Drain Current	(Notes 8)	I_{DM}	-23	A
Continuous Source Current (Body Diode)	(Notes 7)	I_S	-3.3	A
Pulsed Source Current (Body Diode)	(Notes 8)	I_{SM}	-23	A
Single Pulsed Avalanche Energy (L = 0.1mH)	(Note 11)	E_{AS}	38.2	mJ
Single Pulsed Avalanche Current (L = 0.1mH)	(Note 11)	I_{AS}	27.6	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	W mW/°C
	(Notes 6 & 10)		1.8 14	
	(Notes 7 & 9)		2.1 17	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	+100	°C/W
	(Notes 7 & 10)		+69	
	(Notes 7 & 9)		+58	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
6. For a dual device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 1oz copper in still air conditions.
7. For a dual device surface mounted FR4 PCB measured at t ≤ 10 sec.
8. Repetitive rating 25mm x 25mm x 1.6mm FR4 PCB, D = 0.02, pulse width = 300μs – pulse width limited by 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. IAR and EAR rating are based on low frequency and duty cycles to keep T_J = +25°C.

Thermal Characteristics

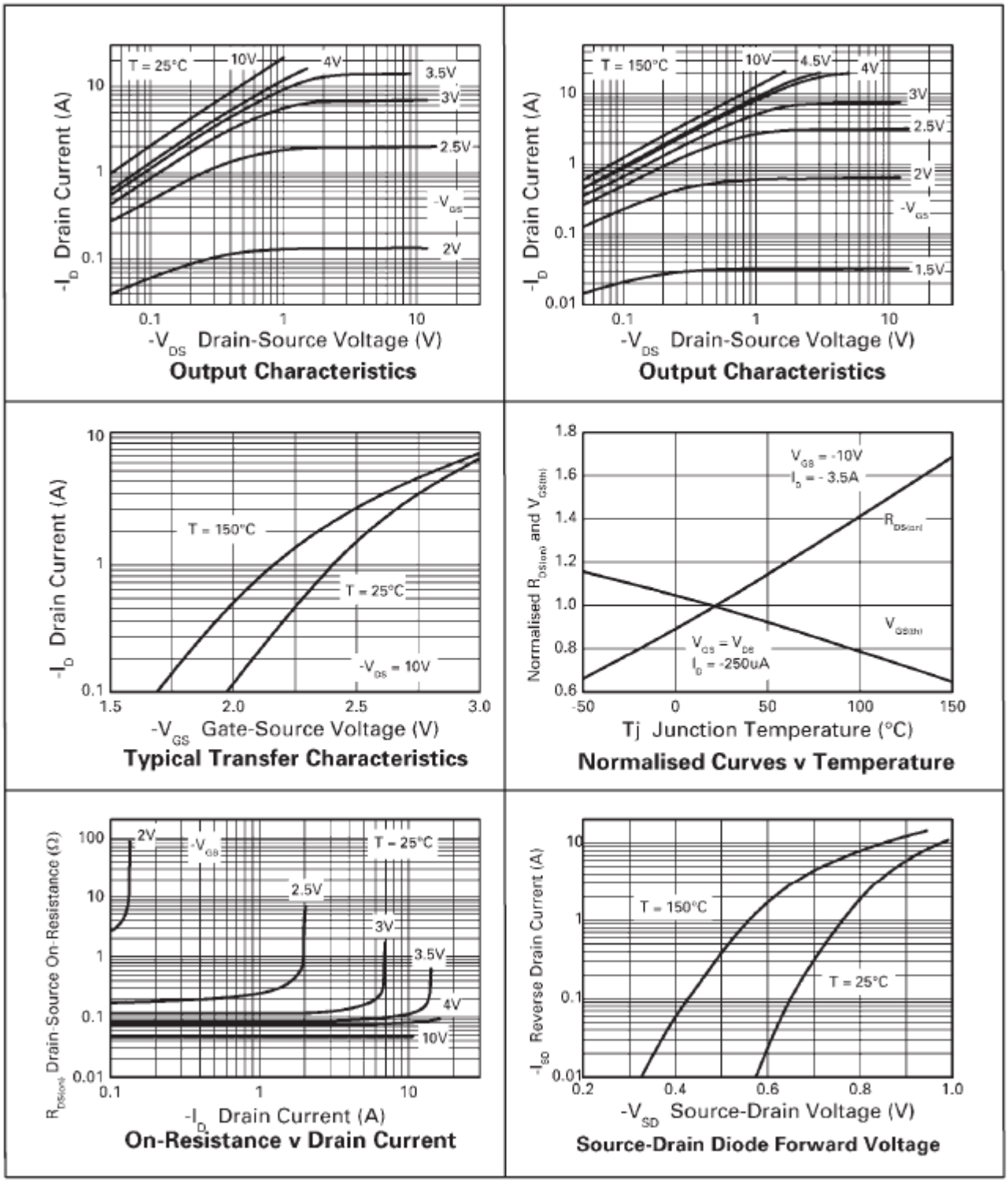


Electrical Characteristics (@T_A= +25°C, unless otherwise specified.)

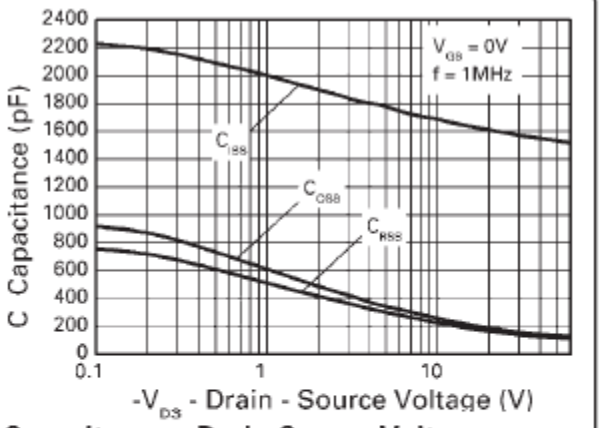
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	I_D = -250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	—	V	I_D = -250μA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 12)	$R_{DS(ON)}$	—	—	0.055	Ω	V_{GS} = -10V, I_D = -3.5A
				0.08		V_{GS} = -4.5V, I_D = -2.9A
Forward Transconductance (Notes 12 & 14)	g_{fs}	—	8.7	—	S	V_{DS} = -15V, I_D = -3.5A
Diode Forward Voltage (Note 12)	V_{SD}	—	-0.85	-0.95	V	I_S = -4.2A, V_{GS} = 0V, T_J = +25°C
Reverse Recovery Time (Note 14)	t_{rr}		37	—	ns	I_F = -2.1A, di/dt = 100A/μs, T_J = +25°C
Reverse Recovery Charge (Note 14)	Q_{rr}	—	56	—	nC	
DYNAMIC CHARACTERISTICS (Note 14)						
Input Capacitance	C_{iss}	—	1580	—	pF	V_{DS} = -30V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	160	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	140	—	pF	
Total Gate Charge (Note 13)	Q_g	—	23	—	nC	V_{GS} = -5V; V_{DS} = -30V, I_D = -3.5A
Total Gate Charge (Note 13)	Q_g	—	44	—	nC	V_{GS} = -10V; V_{DS} = -30V, I_D = -3.5A
Gate-Source Charge (Note 13)	Q_{gs}	—	3.9	—	nC	
Gate-Drain Charge (Note 13)	Q_{gd}	—	9.8	—	nC	
Turn-On Delay Time (Note 13)	$t_{D(on)}$	—	4.6	—	ns	V_{DD} = -30V, V_{GS} = -10V I_D = -1A, $R_G \cong$ 6.0Ω
Turn-On Rise Time (Note 13)	t_r	—	5.8	—	ns	
Turn-Off Delay Time (Note 13)	$t_{D(off)}$	—	55	—	ns	
Turn-Off Fall Time (Note 13)	t_f	—	23	—	ns	

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

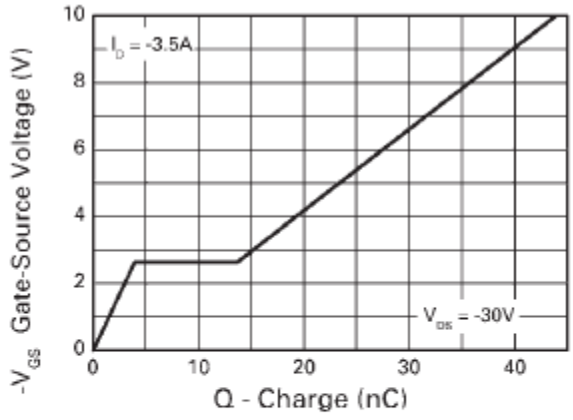
Typical Characteristics



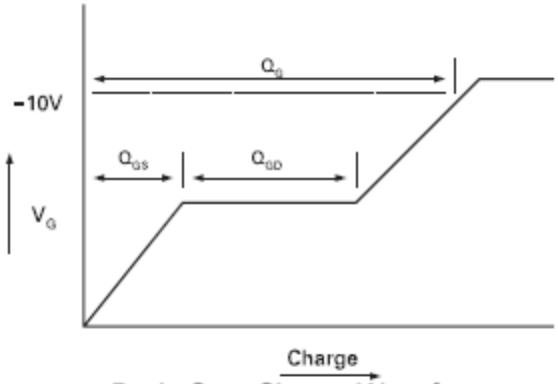
Typical Characteristics (cont.)



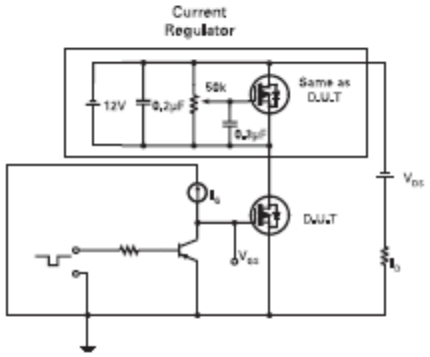
Capacitance v Drain-Source Voltage



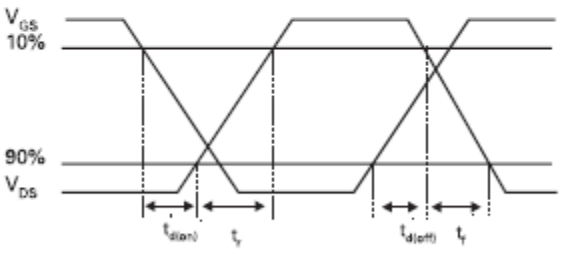
Gate-Source Voltage v Gate Charge



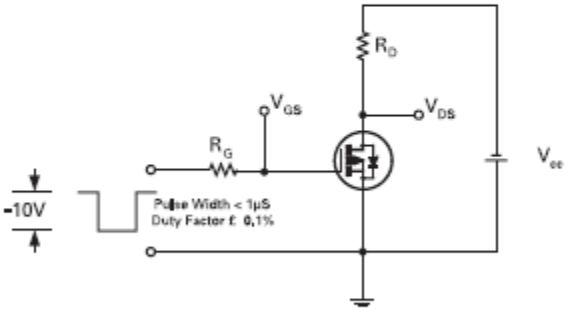
Basic Gate Charge Waveform



Gate Charge Test Circuit

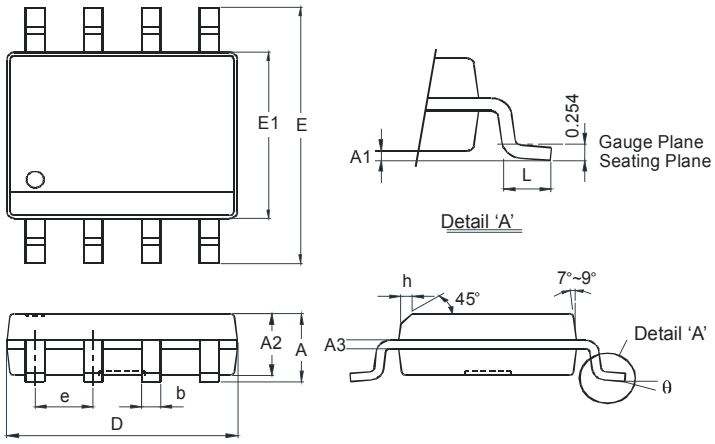


Switching Time Waveforms



Switching Time Test Circuit

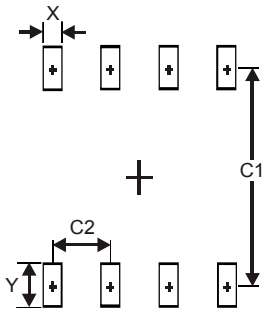
Package Outline Dimensions



SO-8		
Dim	**Min**	**Max**
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

SO-8



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27