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
-70V	160mΩ @ V_{GS}= -10V	-2.6A
	250mΩ @ V_{GS}= -4.5V	-1.6A

Description

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

Applications

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features and Benefits

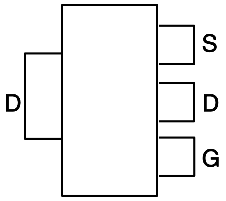
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed

Mechanical Data

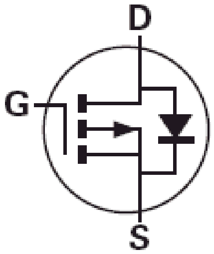
- Case: SOT223
- Case Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223

Top View



Pin Out - Top



Equivalent Circuit

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-70	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current	V_{GS} = -10V	(Note 7)	I_D	-3.7	A
		T_A = +70°C (Note 7)		-2.9	
		(Note 6)		-2.6	
Pulsed Drain Current	V_{GS}= -10V	(Note 8)	I_{DM}	-9.6	A
Continuous Source Current (Body Diode)		(Note 7)	I_S	-4.8	A
Pulsed Source Current (Body Diode)		(Note 8)	I_{SM}	-9.6	A

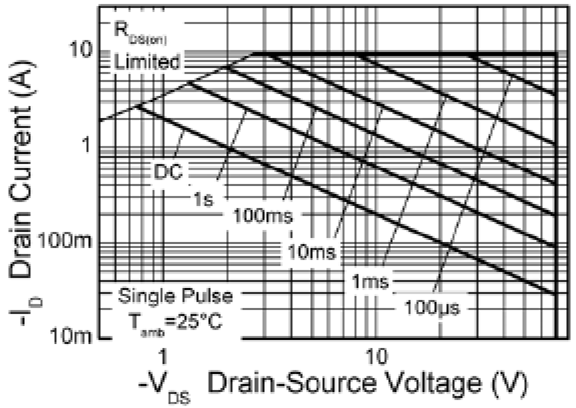
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P_D	2 16	W mW/°C
	(Note 7)		3.9 31	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	62.5	°C/W
	(Note 7)		34	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

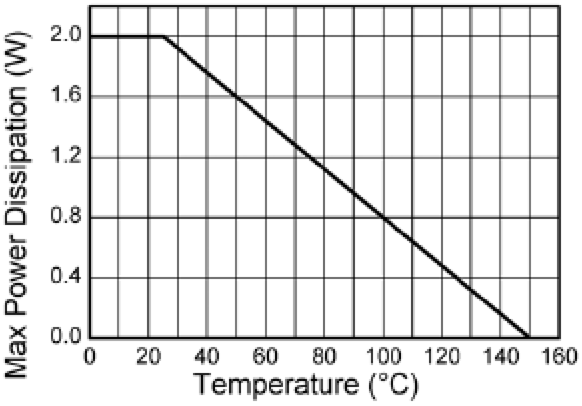
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	-70	—	—	V	I_D = -250µA, V_{GS}= 0V	
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS}= -70V, 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 9)	$R_{DS(ON)}$	—	—	0.16	Ω	V_{GS}= -10V, I_D= -2.1A	
				0.25		V_{GS}= -4.5V, I_D= -1.7A	
Forward Transconductance (Notes 9 & 10)	g_{fs}	—	4.4	—	S	V_{DS}= -15V, I_D= -2.1A	
Diode Forward Voltage (Note 9)	V_{SD}	—	-0.85	-0.95	V	I_S= -2A, V_{GS}= 0V	
Reverse Recovery Time (Note 10)	t_{rr}	—	29.8	—	ns	I_S= -2.1A, di/dt= 100A/µs	
Reverse Recovery Charge (Note 10)	Q_{rr}	—	38.5	—	nC		
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C_{iss}	—	635	—	pF	V_{DS}= -40V, V_{GS}= 0V f= 1MHz	
Output Capacitance	C_{oss}	—	52	—	pF		
Reverse Transfer Capacitance	C_{rss}	—	42.5	—	pF		
Total Gate Charge (Note 11)	Q_g	—	9.6	—	nC	V_{GS}= -5V	V_{DS}= -35V I_D= -2.1A
Total Gate Charge (Note 11)	Q_g	—	18	—	nC	V_{GS}= -10V	
Gate-Source Charge (Note 11)	Q_{gs}	—	1.77	—	nC		
Gate-Drain Charge (Note 11)	Q_{gd}	—	3.66	—	nC		
Turn-On Delay Time (Note 11)	$t_{D(on)}$	—	2.5	—	ns	V_{DD}= -35V, V_{GS}= -10V I_D= -1A, $R_G \cong 6\Omega$	
Turn-On Rise Time (Note 11)	t_r	—	3.4	—	ns		
Turn-Off Delay Time (Note 11)	$t_{D(off)}$	—	27.9	—	ns		
Turn-Off Fall Time (Note 11)	t_f	—	8	—	ns		

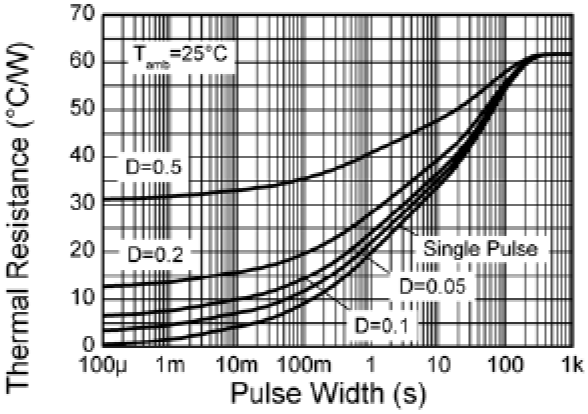
Notes:
6. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. Same as Note 6, except the device is measured at t ≤ 5 seconds.
8. Same as Note 6, except the device is pulsed with D= 0.05 and pulse width 10µs. The pulse current is limited by the maximum junction temperature.
9. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
10. For design aid only, not subject to production testing.
11. Switching characteristics are independent of operating junction temperatures.



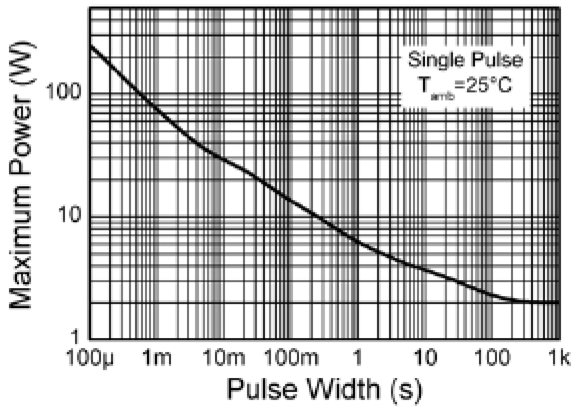
Safe Operating Area



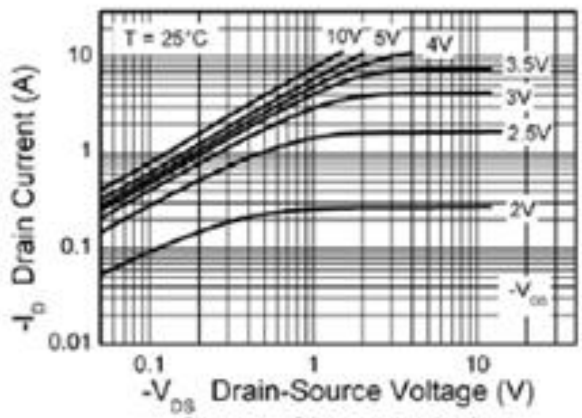
Derating Curve



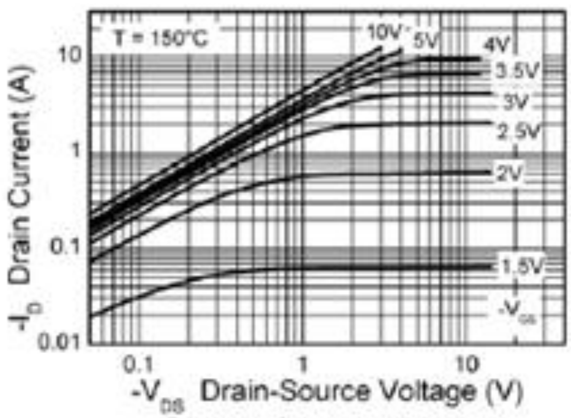
Transient Thermal Impedance



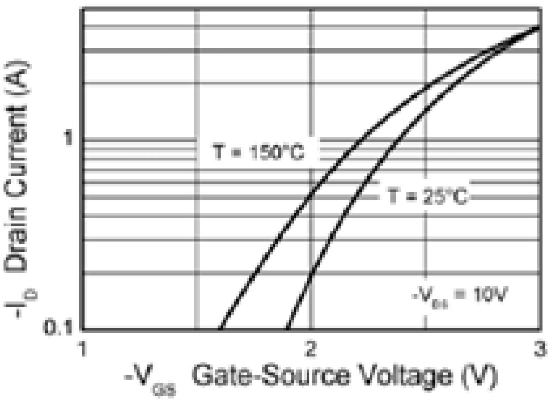
Pulse Power Dissipation



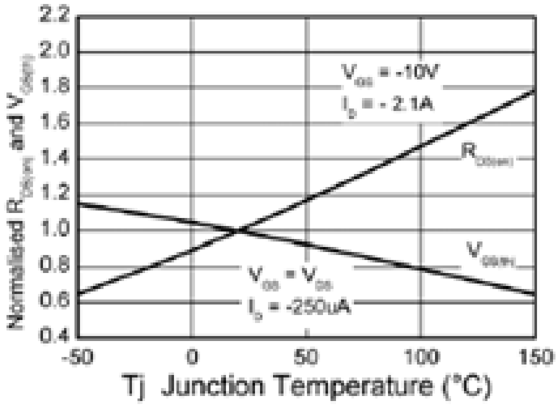
Output Characteristics



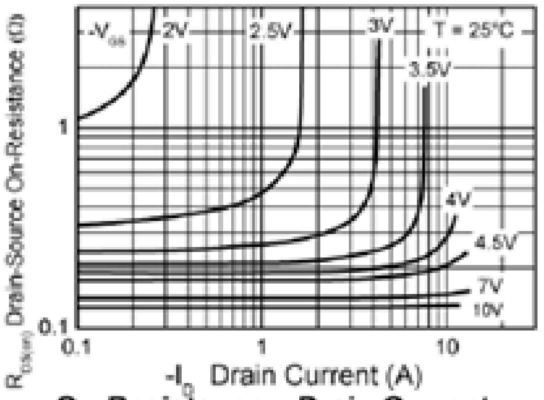
Output Characteristics



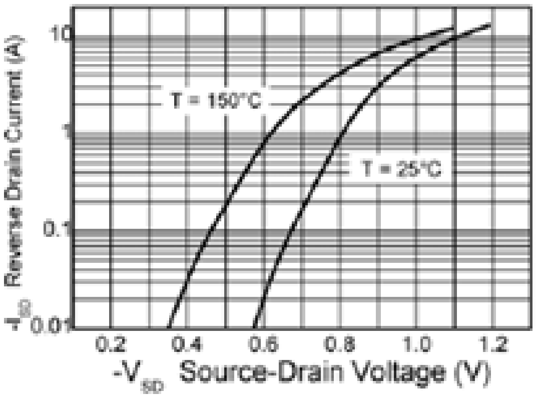
Typical Transfer Characteristics



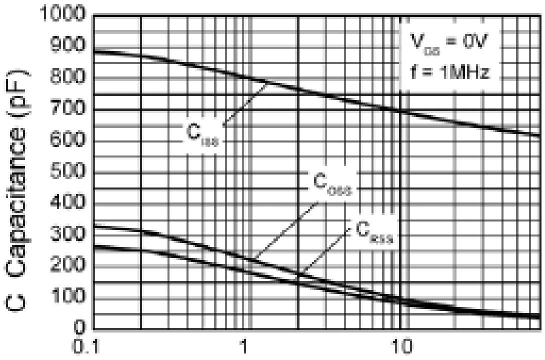
Normalised Curves v Temperature



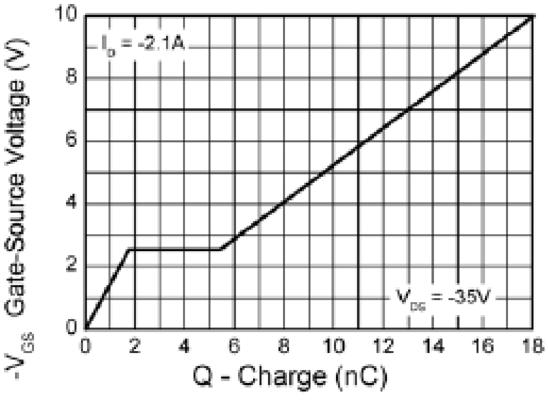
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

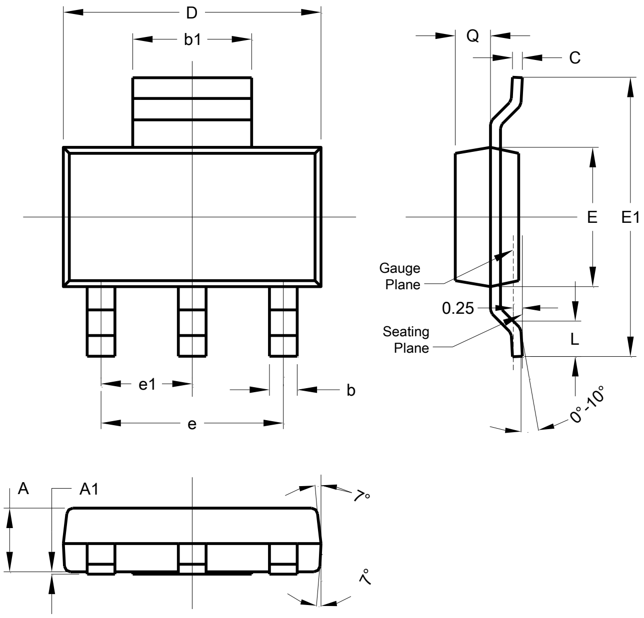


Capacitance v Drain-Source Voltage



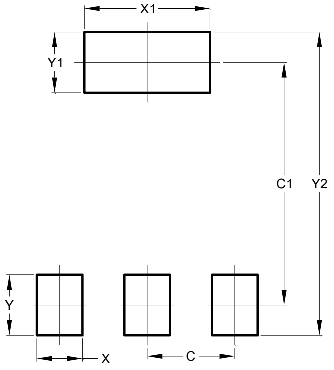
Gate-Source Voltage v Gate Charge

Package Outline Dimensions



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00