



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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企业微信二维码



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Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
60V	120m Ω @ $V_{GS} = 10V$	4.4A
	180m Ω @ $V_{GS} = 4.5V$	3.5A

Features and Benefits

- Fast Switching Speed
- Low Gate Drive
- Low Input Capacitance

Description and Applications

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.

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control
- Uninterrupted power supplies

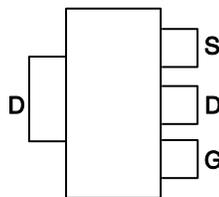
Mechanical Data

- Package: SOT223 (Type DN)
- Package 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 
- Weight: 0.112 grams (Approximate)

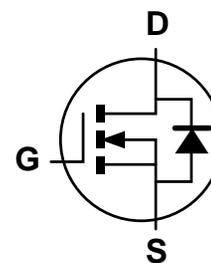
SOT223 (Type DN)



Top View



Pin Out - Top View



Equivalent Circuit

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

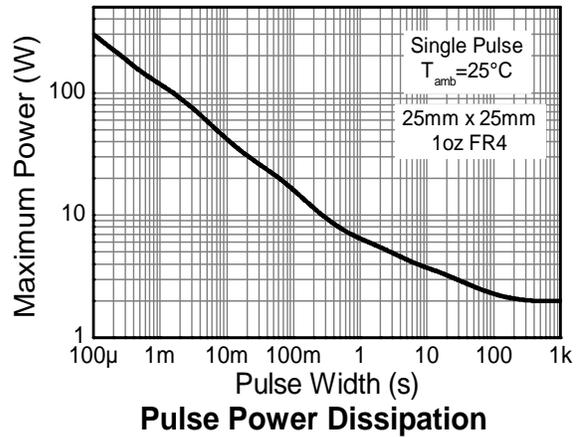
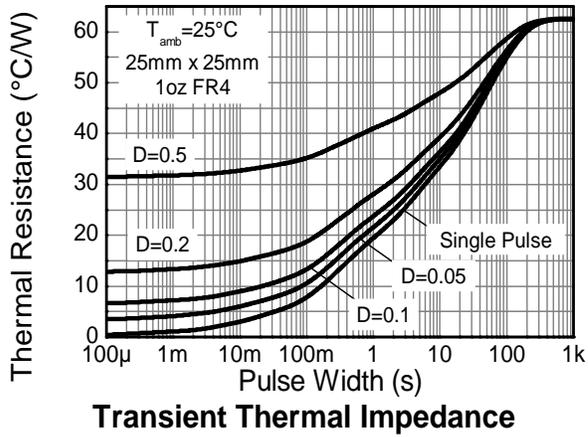
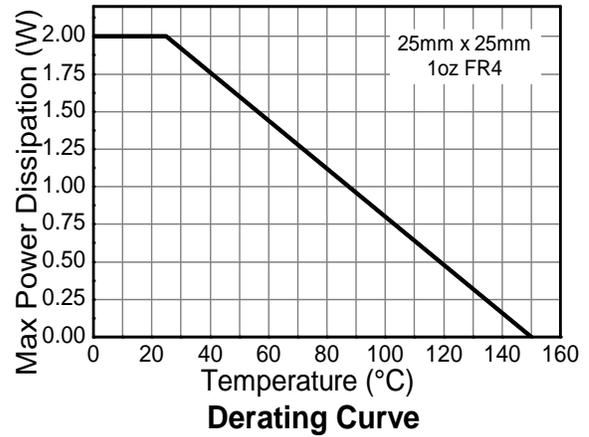
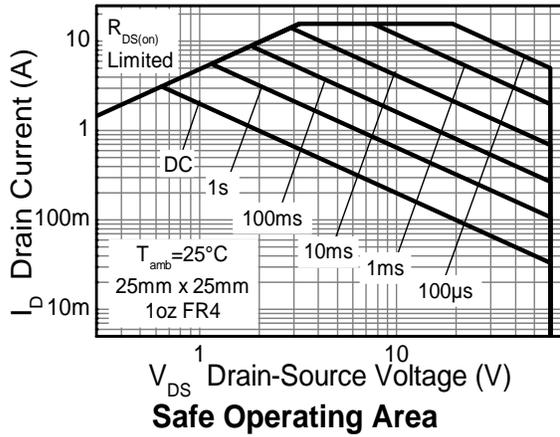
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GS}	±20	
Continuous Drain Current	V _{GS} = 10V	(Note 6)	I _D	4.4	A
		T _A = +70°C (Note 6)		3.5	
		(Note 5)		3.1	
Pulsed Drain Current	V _{GS} = 10V	(Note 7)	I _{DM}	15.6	
Continuous Source Current (Body Diode)			I _S	4.4	
Pulsed Source Current (Body Diode)			I _{SM}	15.6	

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	2.0	W
			16	
Linear Derating Factor	(Note 6)		3.9	
			31	
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	62.5	°C/W
	(Note 6)		32.0	
Thermal Resistance, Junction to Lead	(Note 8)	R _{θJL}	9.8	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	

- Notes:
5. 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.
 6. Same as Note 5, except the device is measured at t ≤ 10 seconds.
 7. Same as Note 5, except the device is pulsed with D = 0.02 and pulse width 300μs.
 8. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

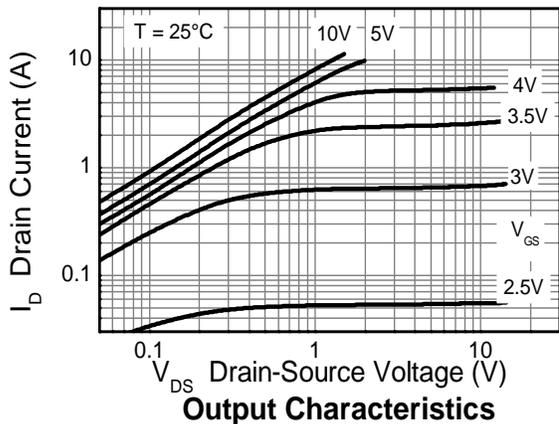


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

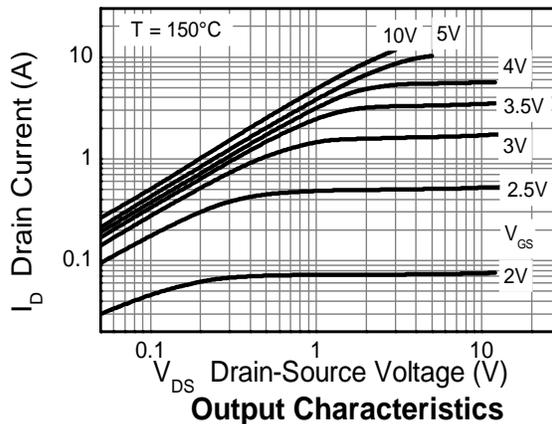
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	μA	$V_{DS} = 60\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 6)	$R_{DS(on)}$	—	0.105	0.120	Ω	$V_{GS} = 10\text{V}$, $I_D = 2.5\text{A}$
		—	0.150	0.180		$V_{GS} = 4.5\text{V}$, $I_D = 2\text{A}$
Forward Transconductance (Notes 6 & 7)	g_{fs}	—	4.9	—	S	$V_{DS} = 15\text{V}$, $I_D = 2.5\text{A}$
Diode Forward Voltage (Note 6)	V_{SD}	—	0.85	0.95	V	$I_S = 2.8\text{A}$, $V_{GS} = 0\text{V}$, $T_J = +25^\circ\text{C}$
Reverse Recovery Time (Note 7)	t_{rr}	—	21.5	—	ns	$I_S = 2.8\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (Note 7)	Q_{rr}	—	20.5	—	nC	$T_J = +25^\circ\text{C}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	330	—	pF	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	35.2	—		
Reverse Transfer Capacitance	C_{rss}	—	17.1	—		
Gate Charge (Note 8)	Q_g	—	3.0	—	nC	$V_{GS} = 4.5\text{V}$ $V_{DS} = 15\text{V}$ $I_D = 2.5\text{A}$
Total Gate Charge (Note 8)	Q_g	—	5.7	—		
Gate-Source Charge (Note 8)	Q_{gs}	—	1.25	—		
Gate-Drain Charge (Note 8)	Q_{gd}	—	0.86	—		
Turn-On Delay Time (Note 8)	$t_{D(on)}$	—	1.95	—	ns	$V_{DD} = 30\text{V}$, $I_D = 2.5\text{A}$, $R_G = 6\Omega$, $V_{GS} = 10\text{V}$
Turn-On Rise Time (Note 8)	t_r	—	3.5	—		
Turn-Off Delay Time (Note 8)	$t_{D(off)}$	—	8.2	—		
Turn-Off Fall Time (Note 8)	t_f	—	4.6	—		

- Notes:
6. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
 7. For design aid only, not subject to production testing.
 8. Switching characteristics are independent of operating junction temperature.

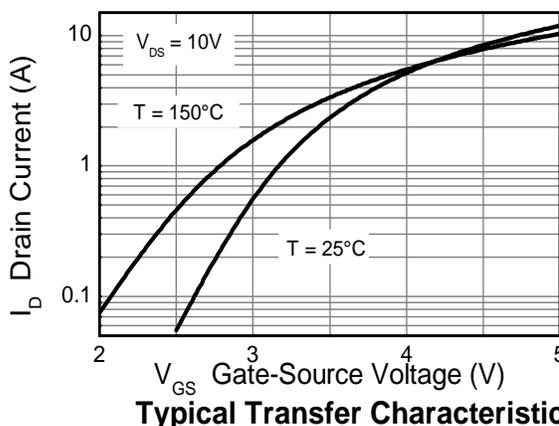
Typical Characteristics



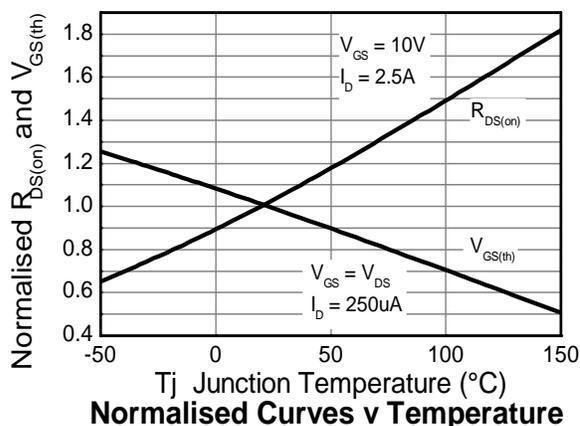
Output Characteristics



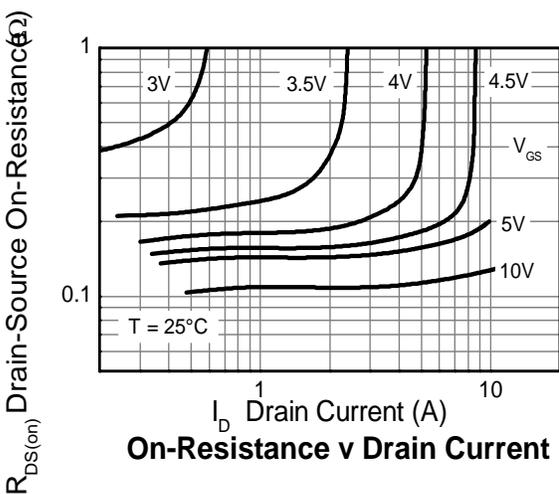
Output Characteristics



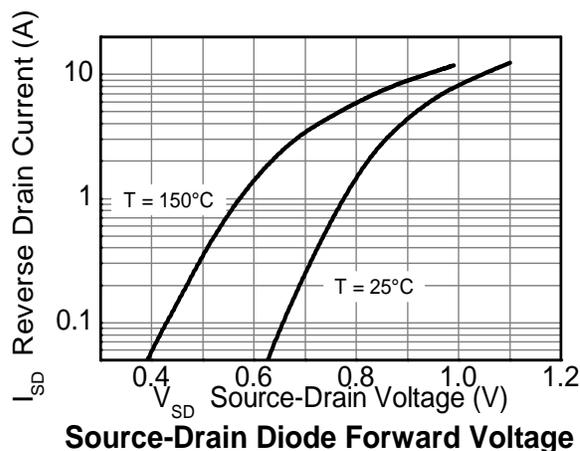
Typical Transfer Characteristics



Normalised Curves v Temperature

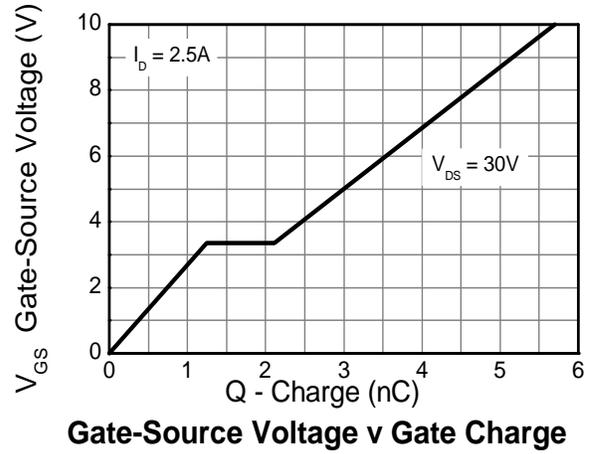
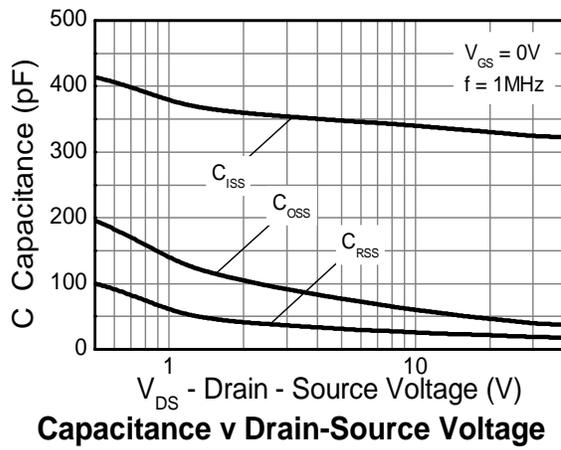


On-Resistance v Drain Current

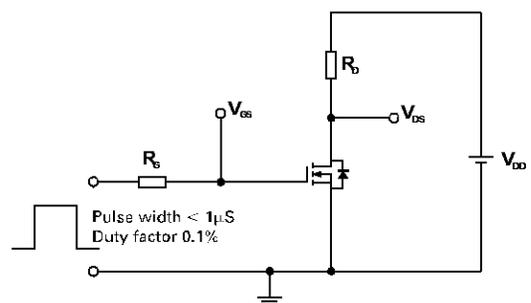
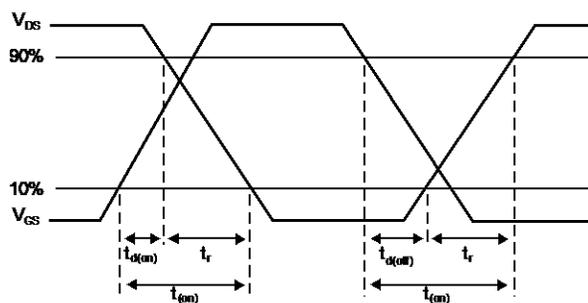
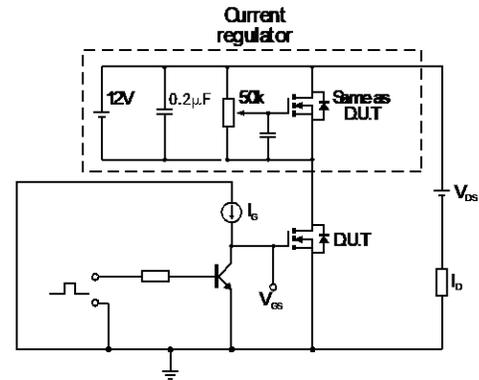
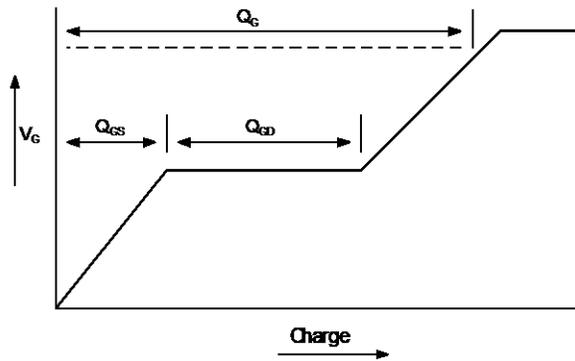


Source-Drain Diode Forward Voltage

Typical Characteristics (continued)

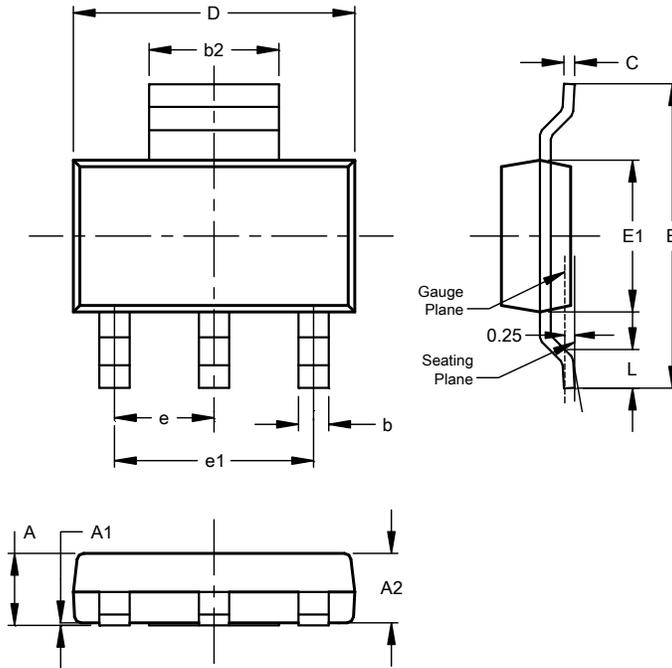


Test Circuit



Package Outline Dimensions

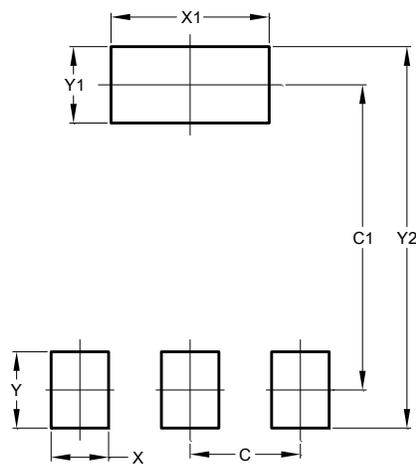
SOT223 (Type DN)



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Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

SOT223 (Type DN)



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