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
100V	250mΩ @ V_{GS}= 10V	2.9A
	300mΩ @ V_{GS}= 6V	2.6A

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold

Description and Applications

This new generation trench MOSFET features a unique structure that combines the benefits of low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control

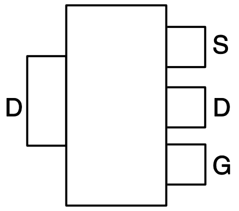
Mechanical Data

- 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: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

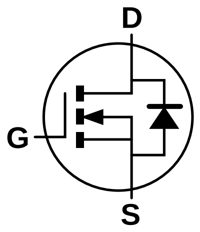
e3

SOT223 (Type DN)

Top View



Pin Out - Top View



Equivalent Circuit

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (V_{GS}=10V; TA = +25°C) (Note 6)	I_D	2.9	A
(V_{GS}=10V; TA = +70°C) (Note 6)		2.3	
(V_{GS}=10V; TA = +25°C) (Note 5)		2.0	
Pulsed Drain Current (Note 7)	I_{DM}	11	A
Continuous Source Current (Body Diode) (Note 6)	I_S	2.9	A
Pulsed Source Current (Body Diode) (Note 7)	I_{SM}	11	A

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

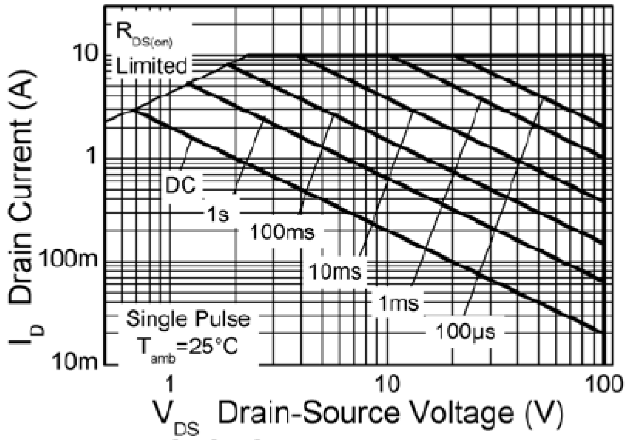
Characteristic	Symbol	Value	Unit
Power Dissipation at T_A = +25°C (Note 5) Linear Derating Factor	P_D	2.0 16	W mW/°C
Power Dissipation at T_A = +25°C (Note 6) Linear Derating Factor	P_D	3.9 31	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

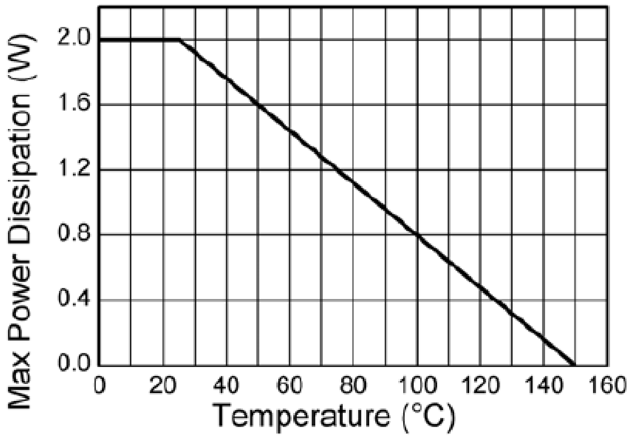
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	100	-	-	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	0.5	µA	V_{DS} =100V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	2	-	-	V	V_{DS} = V_{GS}, I_D =250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	-	- -	0.25 0.30	Ω	V_{GS} = 10V, I_D = 3.2A V_{GS} = 6V, I_D =2.6A
Forward Transconductance (Notes 8, 10)	g_{fs}	-	5	-	S	V_{DS} = 15V, I_D =3.2A
Diode Forward Voltage (Note 8)	V_{SD}	-	0.87	0.95	V	T_J=25°C, I_S=3.2A, V_{GS}=0V
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	-	405	-	pF	V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	28.2	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	14.2	-	pF	
Turn-On Delay Time (Note 9)	$t_{D(on)}$	-	3.4	-	ns	V_{DD} = 30V, I_D = 1.2A, V_{GS} = 10V, R_G =6Ω
Turn-On Rise Time (Note 9)	t_R	-	2.2	-	ns	
Turn-Off Delay Time (Note 9)	$t_{D(off)}$	-	8	-	ns	
Turn-Off Fall Time (Note 9)	t_F	-	3.2	-	ns	
Gate Charge (Note 9)	Q_g	-	4.2	-	nC	V_{DS} = 50V, V_{GS} = 5V I_D = 1.2A
Total Gate Charge (Note 9)	Q_g	-	7.7	-	nC	V_{DS} = 50V, V_{GS} = 10V I_D = 1.2A
Gate-Source Charge (Note 9)	Q_{gs}	-	1.8	-	nC	
Gate-Drain Charge (Note 9)	Q_{gd}	-	2.1	-	nC	
Reverse Recovery Time	t_{rr}	-	27	-	ns	T_J=25°C, I_S=1.2A, di/dt= 100A/µs
Reverse Recovery Charge	Q_{rr}	-	32	-	nC	

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t≦10 secs.
7. Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300µs - pulse width limited by maximum junction temperature.
8. Measured under pulsed conditions. Pulse width≦300µs. Duty cycle ≦2%.
9. Switching characteristics are independent of operating junction temperature.
10. For design aid only, not subject to production testing.

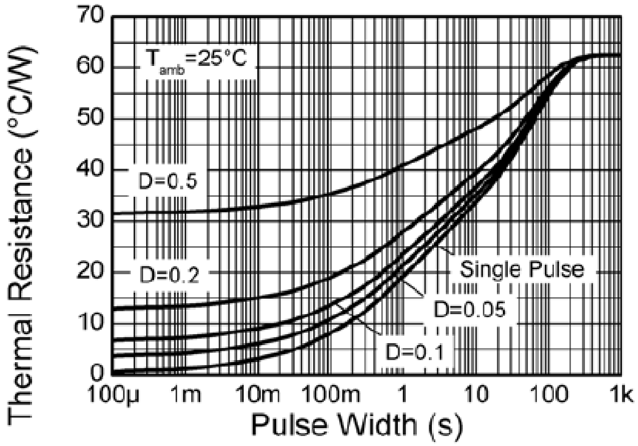
Thermal Characteristics



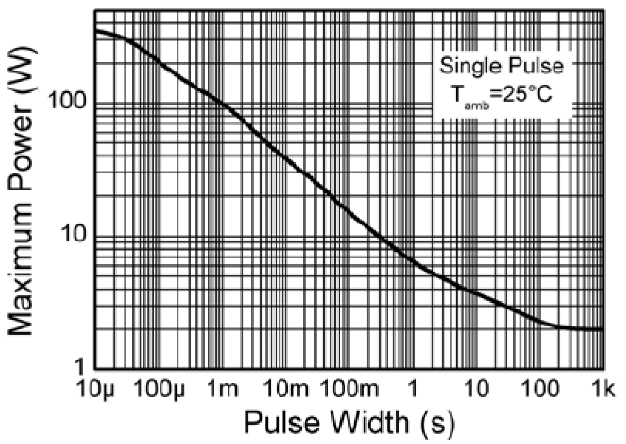
Safe Operating Area



Derating Curve

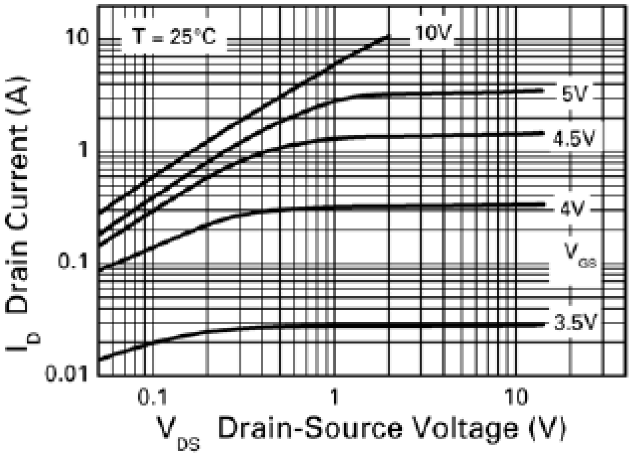


Transient Thermal Impedance

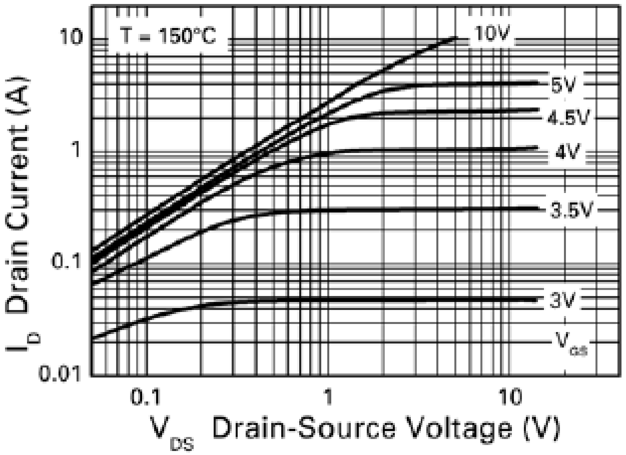


Pulse Power Dissipation

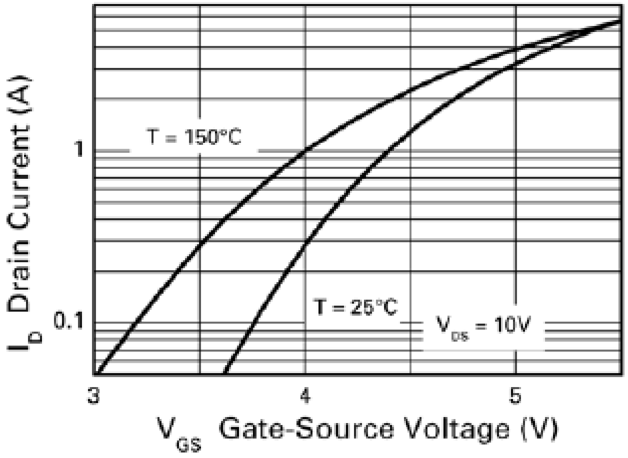
Typical Characteristics



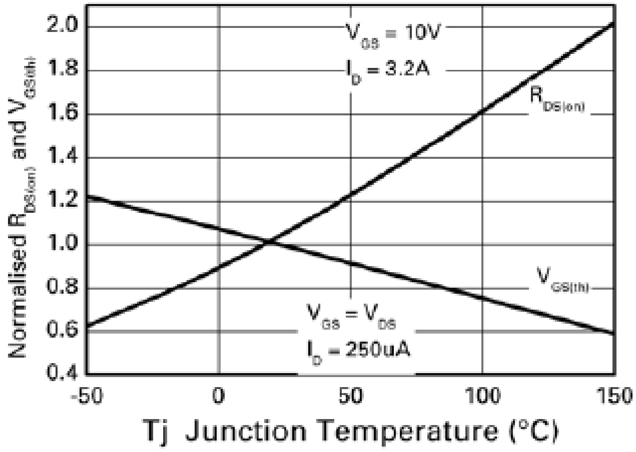
Output Characteristics



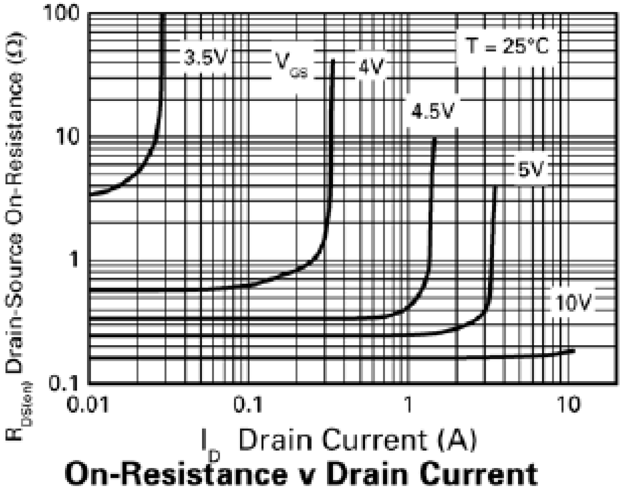
Output Characteristics



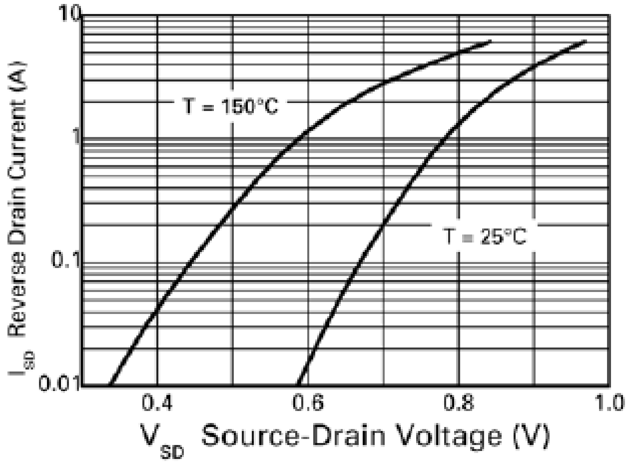
Typical Transfer Characteristics



Normalised Curves v Temperature

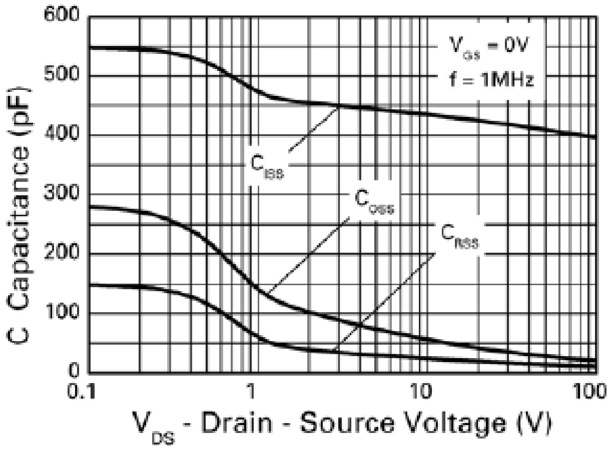


On-Resistance v Drain Current

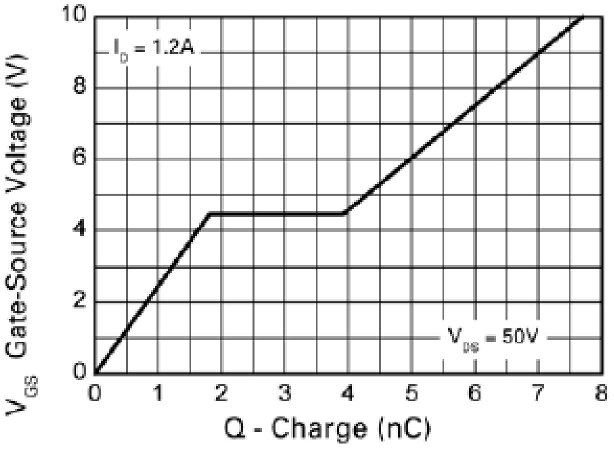


Source-Drain Diode Forward Voltage

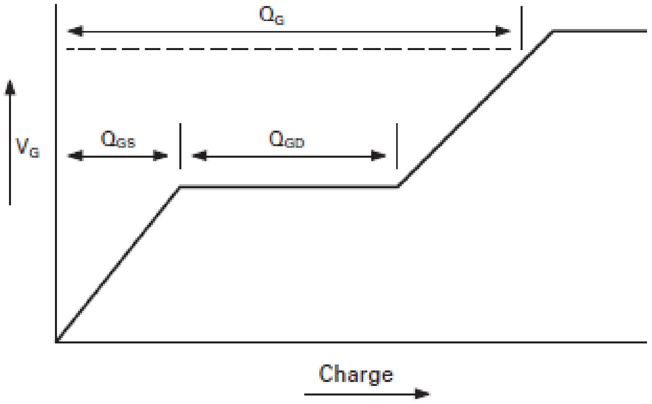
Typical Characteristics (continued)



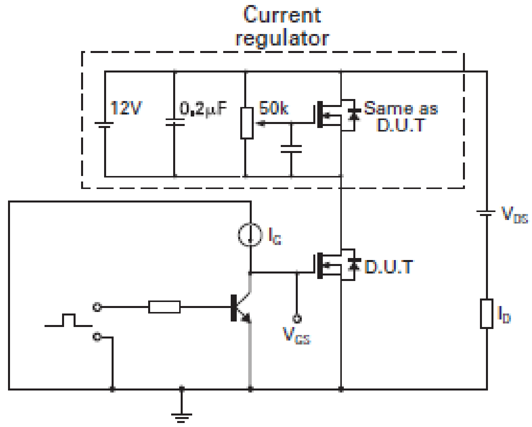
Capacitance v Drain-Source Voltage



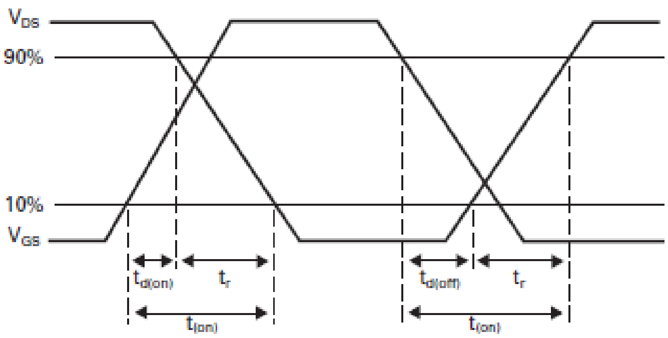
Gate-Source Voltage v Gate Charge



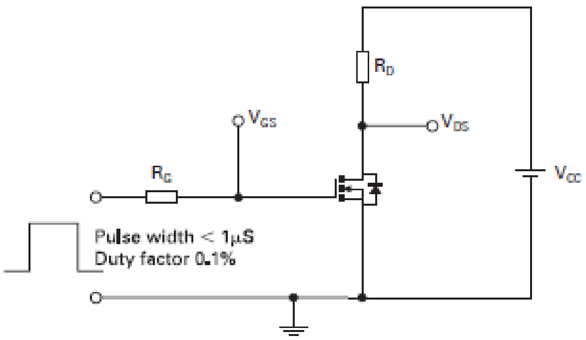
Basic gate charge waveform



Gate charge test circuit



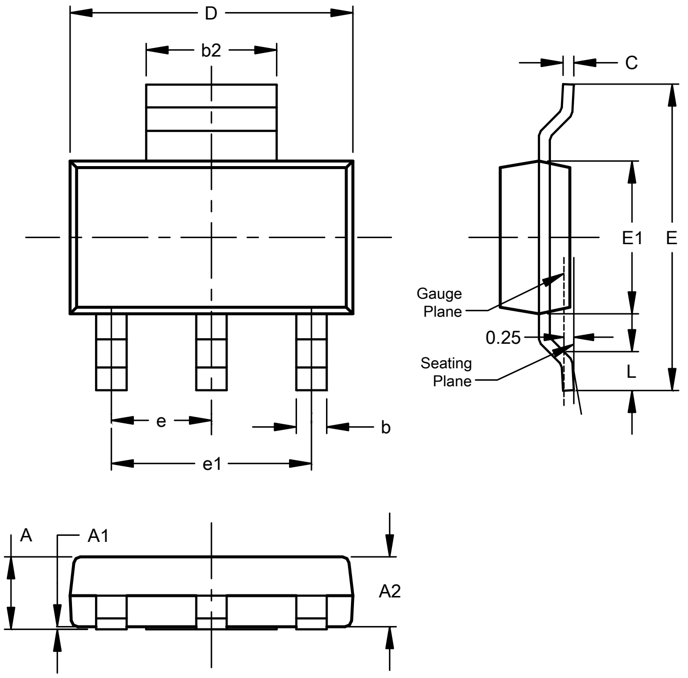
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

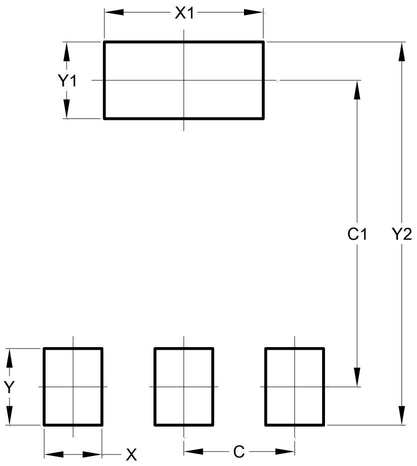
SOT223 (Type DN)



SOT223 (Type DN)			
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