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 max T_A = +25°C**
-100V	150mΩ @ V_{GS} = -10V	-3.7A
	190mΩ @ V_{GS} = -6V	-3.3A

Features and Benefits

- Low On-Resistance
- Fast Switching Speed

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.

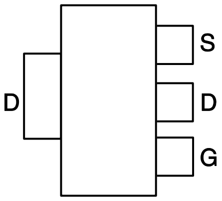
- Motor controls
- DC-DC converters
- Power management functions
- Relay and solenoid driving

Mechanical Data

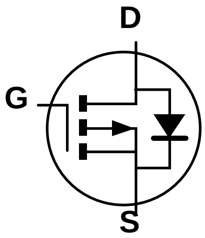
- Package: SOT223 (Type DN)
  Package Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
  Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

SOT223 (Type DN)

Top View



Pin Out - Top View



Equivalent Circuit

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	V_{GS} = 10V	(Note 6)	I_D	-3.7	A
		T_A = +70°C (Note 6)		-3.0	
		(Note 5)		-2.6	
Pulsed Drain Current	V_{GS} = 10V	(Note 7)	I_{DM}	-16.5	A
Continuous Source Current (Body diode)		(Note 6)	I_S	-3.7	A
Pulsed Source Current (Body diode)		(Note 7)	I_{SM}	-16.5	A

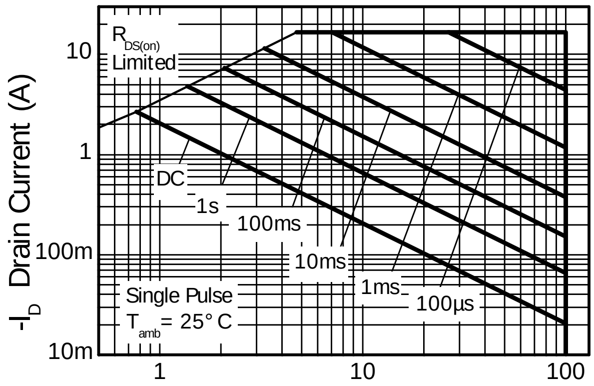
Thermal Characteristics (@T_A = +25°C unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	2.0 16	W mW/°C
	(Note 6)		3.9 31	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	62.5	°C/W
	(Note 6)		32.2	
Thermal Resistance, Junction to Lead	(Note 8)	$R_{\theta JL}$	7.65	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

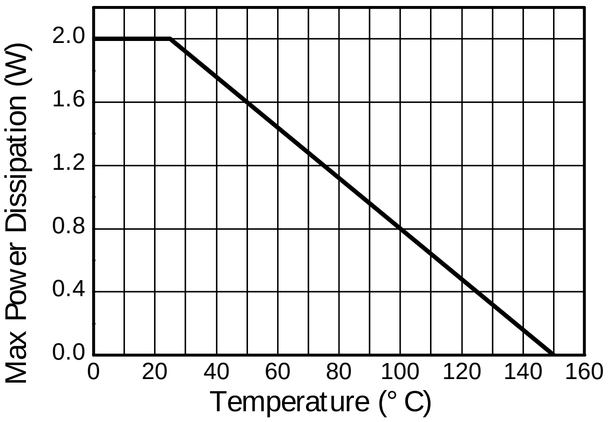
Notes:

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. The pulse current is limited by the maximum junction temperature.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).

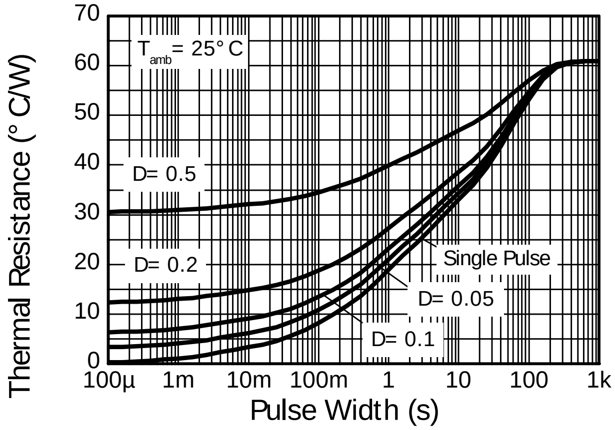
Thermal Characteristics



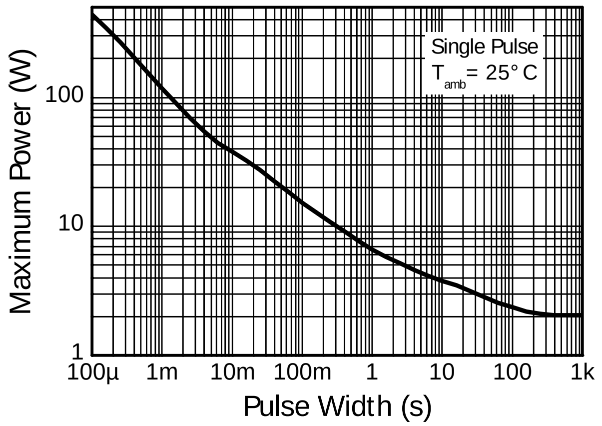
Safe Operating Area



Derating Curve



Transient Thermal Impedance



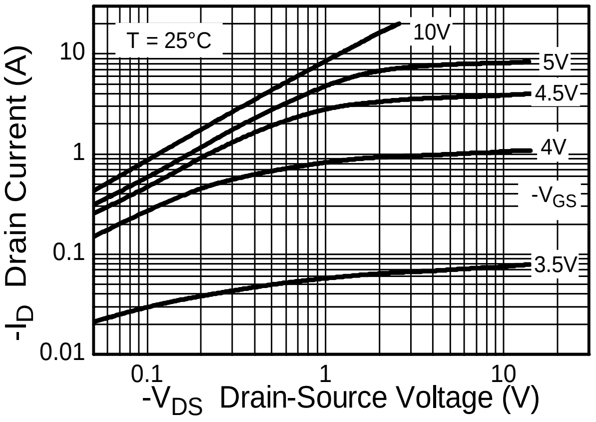
Pulse Power Dissipation

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

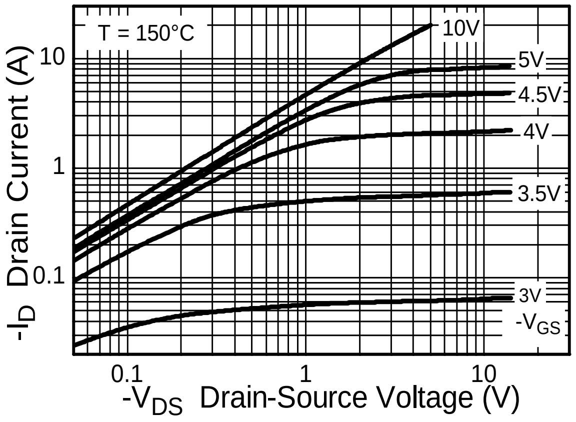
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	-100	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -100V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	-2.0	—	-4.0	V	I_D = -250µA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance (Note 9)	$R_{DS(on)}$	—	—	150	mΩ	V_{GS} = -10V, I_D = -2.8A
				190		V_{GS} = -6V, I_D = -2.4A
Forward Transconductance (Notes 9 & 10)	g_{fs}	—	6.0	—	S	V_{DS} = -15V, I_D = -2.8A
Diode Forward Voltage (Note 9)	V_{SD}	—	-0.85	-0.95	V	I_S = -3.5A, V_{GS} = 0V, T_J = +25°C
Reverse Recovery Time (Note 10)	t_{rr}		49	—	ns	I_S = -2.8A, di/dt = 100A/µs, T_J = +25°C
Reverse Recovery Charge (Note 10)	Q_{rr}	—	107	—	nC	
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	1055	—	pF	V_{DD} = -50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	90	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	76	—	pF	
Total Gate Charge (Note 11)	Q_g	—	26.9	—	nC	V_{GS} = -10V, V_{DS} = -50V I_D = -2.8A
Gate-Source Charge (Note 11)	Q_{gs}	—	3.9	—	nC	
Gate-Drain Charge (Note 11)	Q_{gd}	—	10.2	—	nC	
Turn-On Delay Time (Note 11)	$t_{D(on)}$	—	4.6	—	ns	V_{DD} = -50V, V_{GS} = -10V I_D = -1A, R_G ≅ 6.0Ω
Turn-On Rise Time (Note 11)	t_r	—	6.8	—	ns	
Turn-Off Delay Time (Note 11)	$t_{D(off)}$	—	33.9	—	ns	
Turn-Off Fall Time (Note 11)	t_f	—	17.9	—	ns	

Notes: 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.

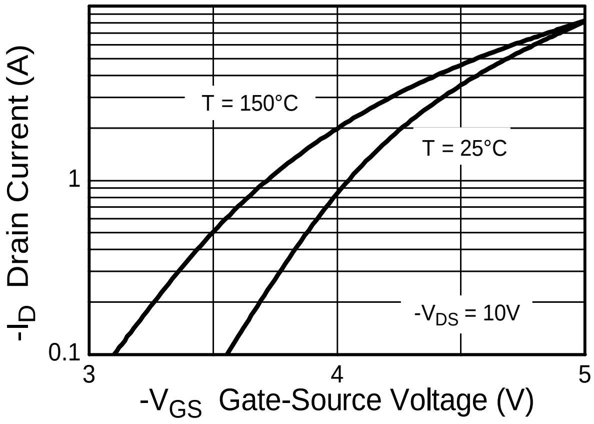
Typical Characteristics



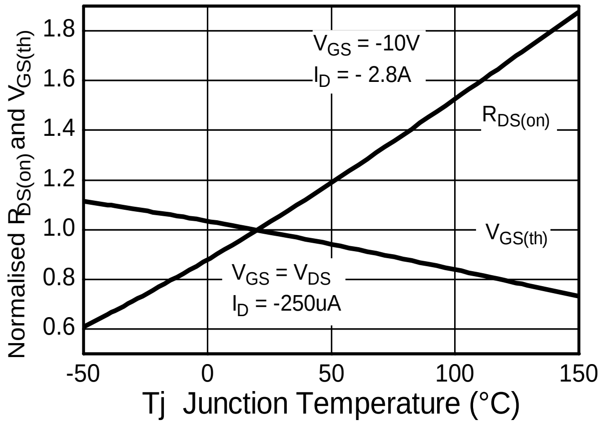
Output Characteristics



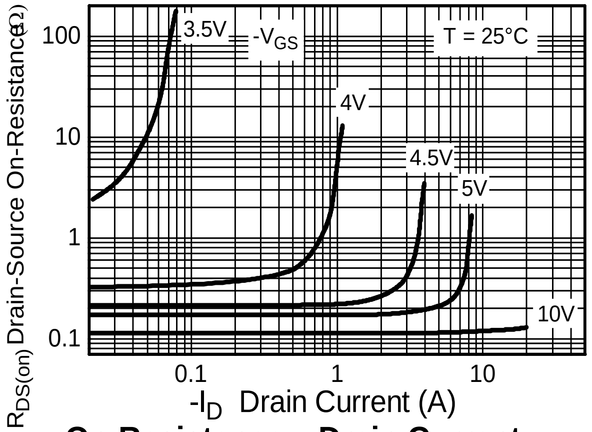
Output Characteristics



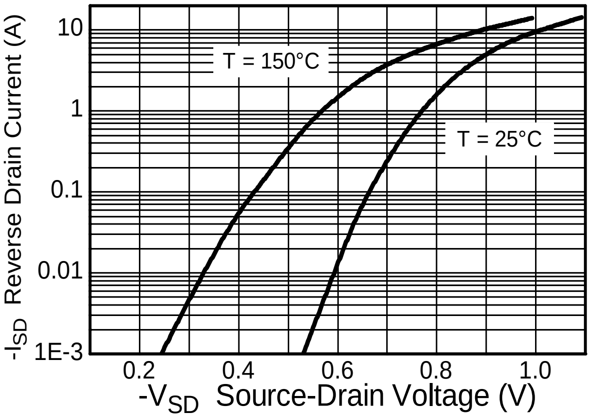
Typical Transfer Characteristics



Normalised Curves v Temperature

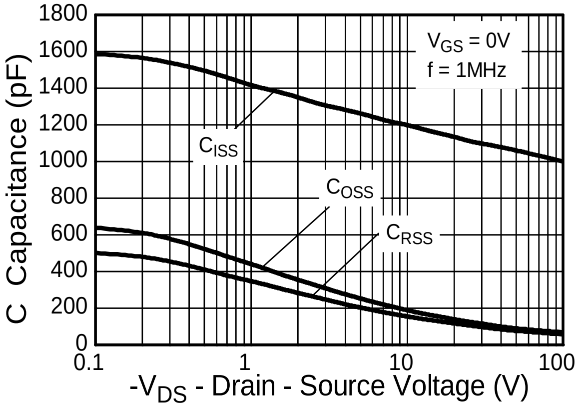


On-Resistance v Drain Current

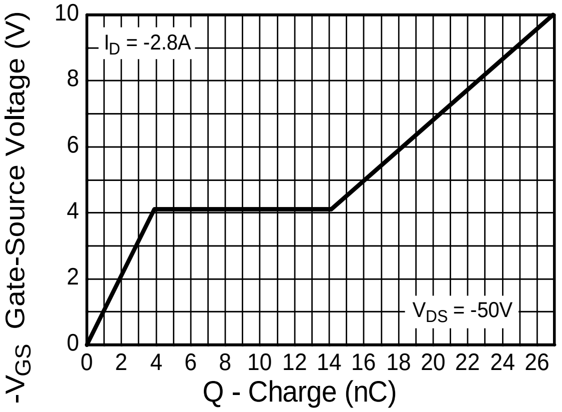


Source-Drain Diode Forward Voltage

Typical Characteristics (continued)

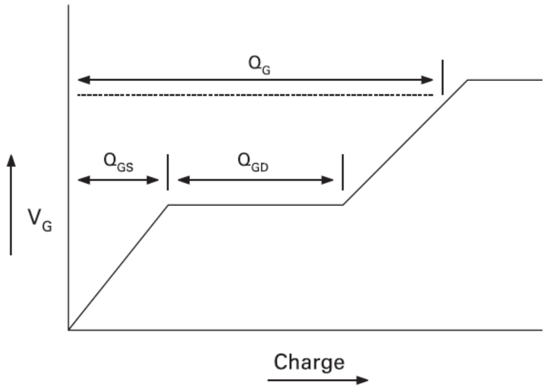


Capacitance v Drain-Source Voltage

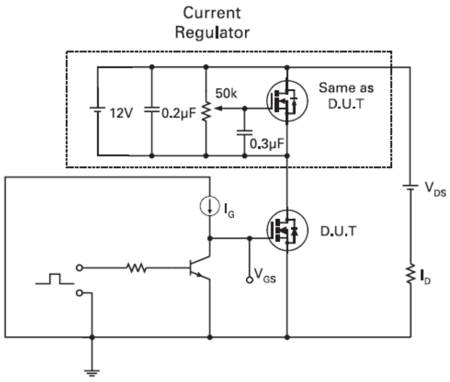


Gate-Source Voltage v Gate Charge

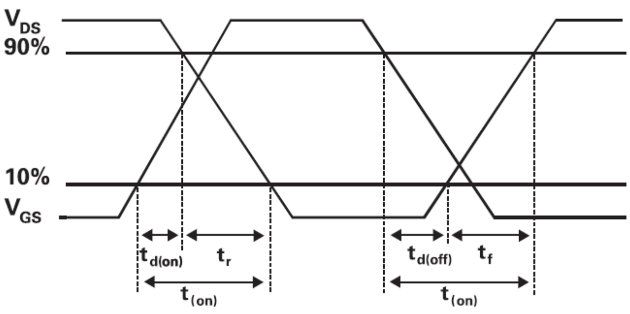
Test Circuits



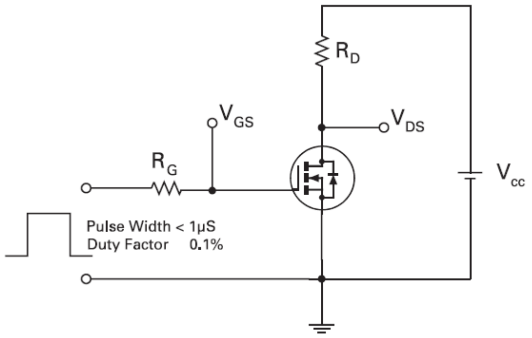
Basic Gate Charge Waveform



Gate Charge Test Circuit



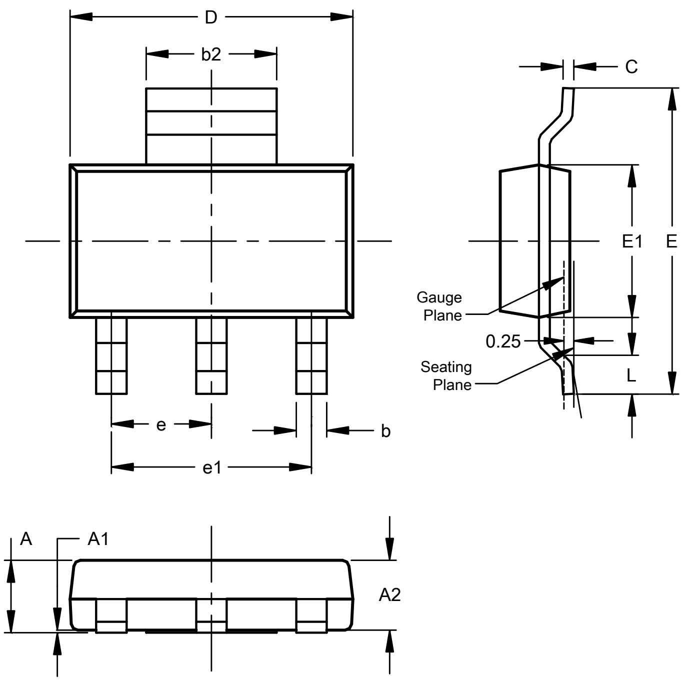
Switching Time Waveforms



Switching Time Test Circuit

Package Outline Dimensions

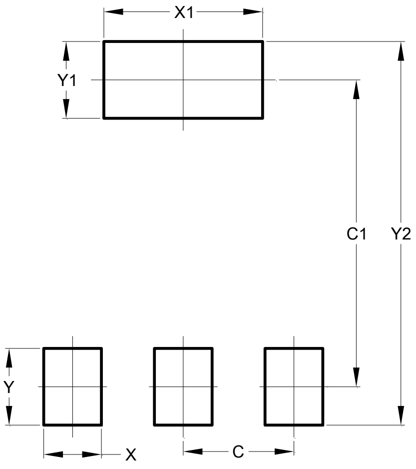
SOT223 (Type DN)



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