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 T_A = +25°C
-100V	350mΩ @ V_{GS} = -10V	-2.4A
	450mΩ @ V_{GS} = -6V	-2.1A

Description and Applications

This MOSFET has been 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

Features and Benefits

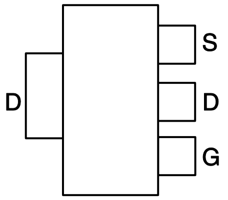
- Fast Switching Speed
- Low Input Capacitance
- Low Gate Drive

Mechanical Data

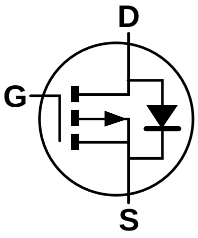
- Package: SOT223
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

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_{GS}	±20	V
Continuous Drain Current	V_{GS} = -10V	(Note 6)	I_D	-2.4	A
		T_A = +70°C (Note 6)		-1.9	
		(Note 5)		-1.7	
Pulsed Drain Current	V_{GS} = -10V	(Note 7)	I_{DM}	-9.4	A
Continuous Source Current (Body Diode)		(Note 6)	I_S	-2.4	A
Pulsed Source Current (Body Diode)		(Note 7)	I_{SM}	-9.4	A

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

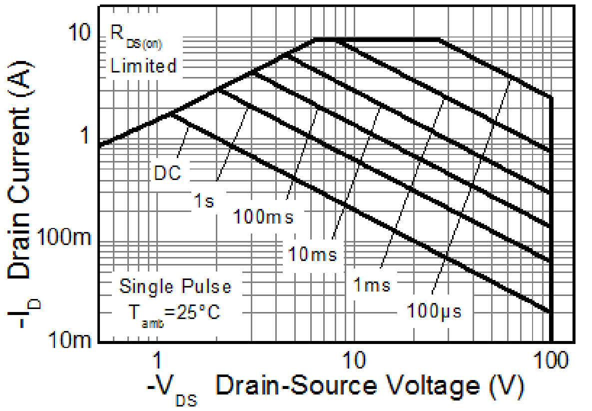
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	2.0 16	W mW/°C
	(Note 6)		3.9 31	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	62.5	°C/W
	(Note 6)		32.0	
Thermal Resistance, Junction to Case	(Note 5)	$R_{\theta JC}$	7.7	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

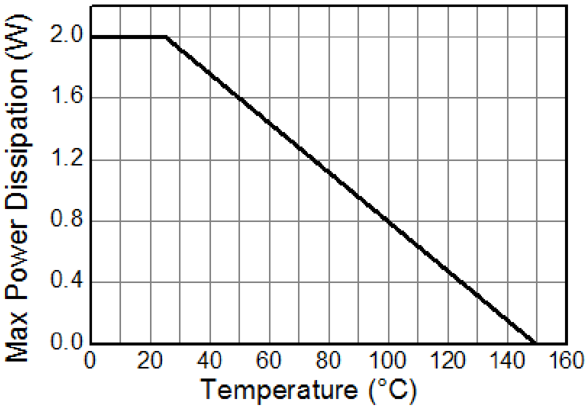
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	-100	—	—	V	I_D = -250µA, V_{GS} = 0V	
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	µA	V_{DS} = -100V, V_{GS} = 0V	
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(th)}$	-2.0	—	-4.0	V	I_D = -250µA, V_{DS} = V_{GS}	
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	—	0.350	Ω	V_{GS} = -10V, I_D = -1.4A	
				0.450		V_{GS} = -6V, I_D = -1.2A	
Forward Transconductance (Notes 8, 9)	g_{fs}	—	2.8	—	S	V_{DS} = -15V, I_D = -1.4A	
Diode Forward Voltage (Note 8)	V_{SD}	—	-0.85	-0.95	V	I_S = -1.7A, V_{GS} = 0V	
Reverse Recovery Time (Note 9)	t_{RR}		33	—	ns	I_F = -1.5A, di/dt = 100A/µs	
Reverse Recovery Charge (Note 9)	Q_{RR}	—	48	—	nC		
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C_{iss}	—	424	—	pF	V_{DS} = -50V, V_{GS} = 0V f = 1MHz	
Output Capacitance	C_{oss}	—	36.6	—	pF		
Reverse Transfer Capacitance	C_{rss}	—	29.8	—	pF		
Total Gate Charge (Note 10)	Q_g	—	7.1	—	nC	V_{GS} = -6.0V	V_{DS} = -50V I_D = -1.4A
Total Gate Charge (Note 10)	Q_g	—	10.7	—	nC	V_{GS} = -10V	
Gate-Source Charge (Note 10)	Q_{gs}	—	1.7	—	nC		
Gate-Drain Charge (Note 10)	Q_{gd}	—	3.8	—	nC		
Turn-On Delay Time (Note 10)	$t_{D(on)}$	—	3.0	—	ns	V_{DD} = -15V, V_{GS} = -10V I_D = -1A, R_G ≅ 6.0Ω	
Turn-On Rise Time (Note 10)	t_R	—	3.5	—	ns		
Turn-Off Delay Time (Note 10)	$t_{D(off)}$	—	13.4	—	ns		
Turn-Off Fall Time (Note 10)	t_F	—	7.2	—	ns		

Notes:
5. For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 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. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
9. For design aid only, not subject to production testing.
10. Switching characteristics are independent of operating junction temperatures.

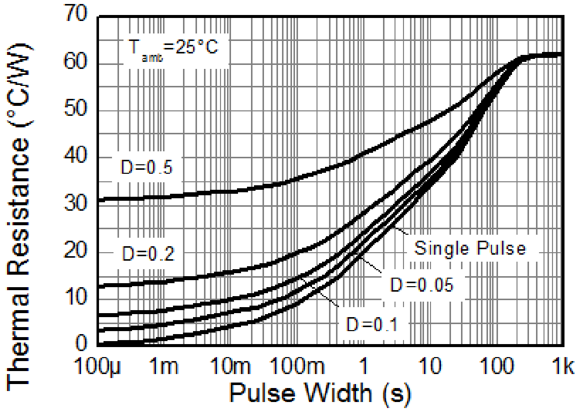
Thermal Characteristics



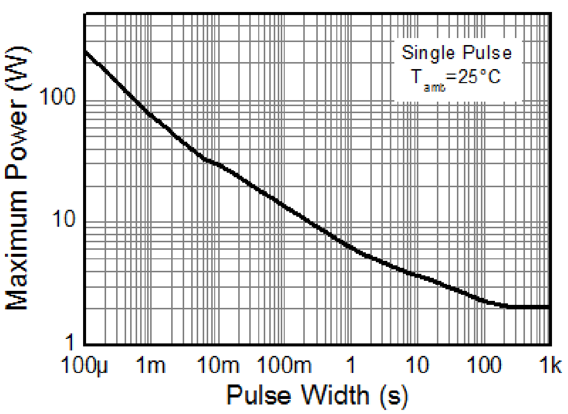
Safe Operating Area



Derating Curve

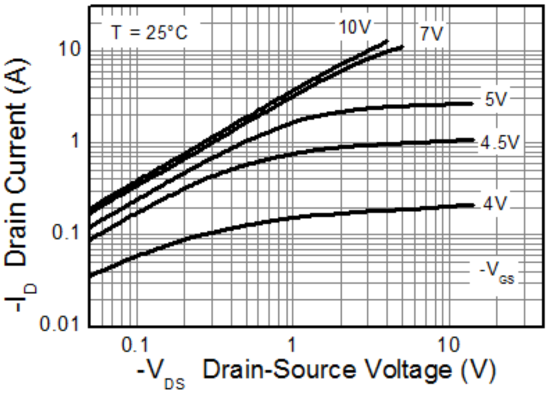


Transient Thermal Impedance

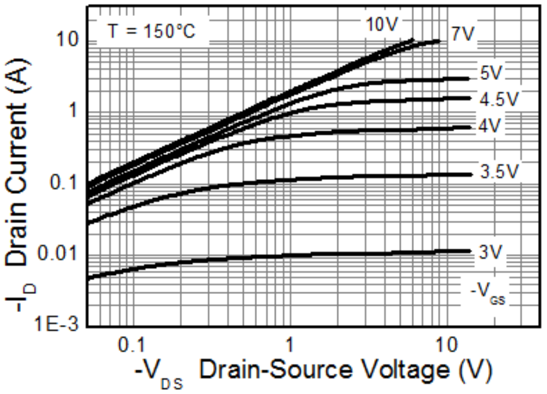


Pulse Power Dissipation

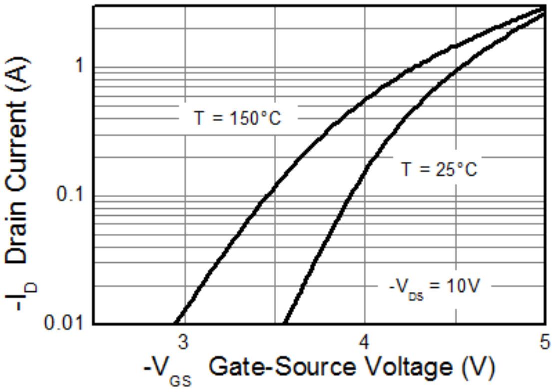
Typical Characteristics (continued)



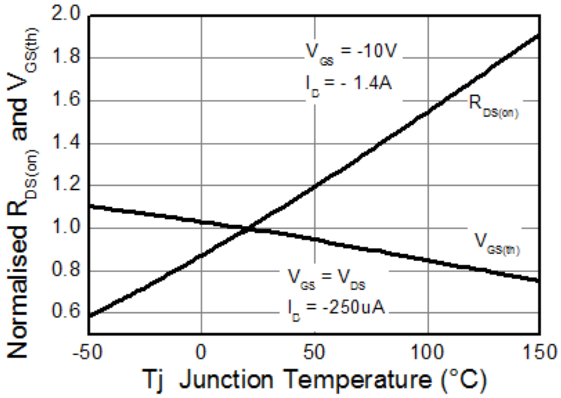
Output Characteristics



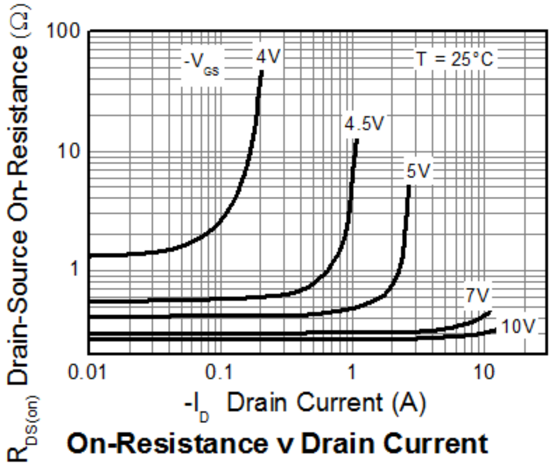
Output Characteristics



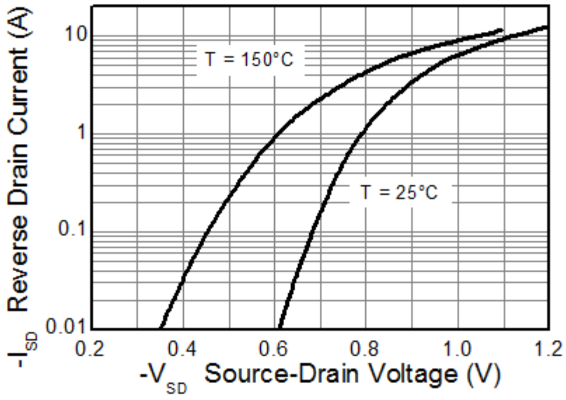
Typical Transfer Characteristics



Normalised Curves v Temperature



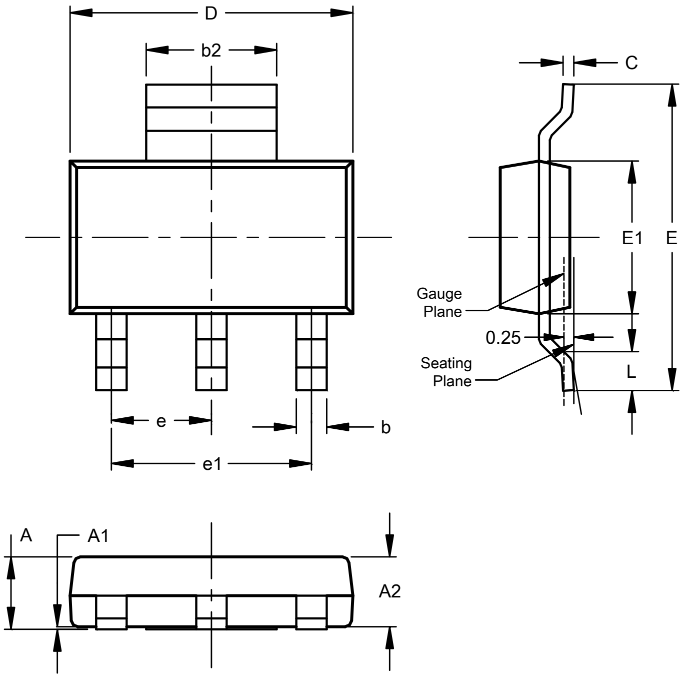
On-Resistance v Drain Current



Source-Drain Diode Forward Voltage

Package Outline Dimensions

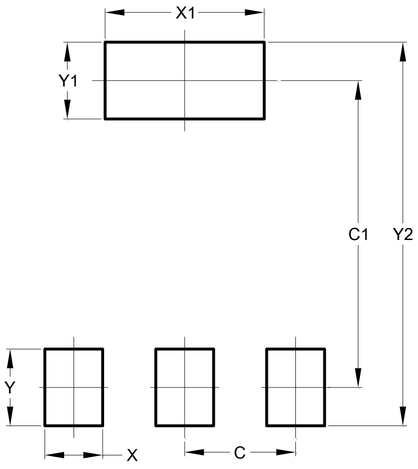
SOT223 (Type DN)



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