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 $T_A = +25°C$
70V	0.13Ω @ V_{GS} = 10V	3.8A

Features and Benefits

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

Description

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

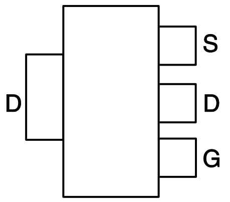
- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control
- Class-D audio output stages

Mechanical Data

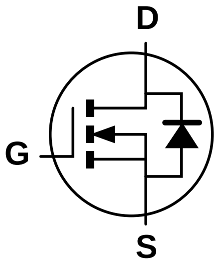
- Package: SOT223 (Type DN)
- Package Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per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

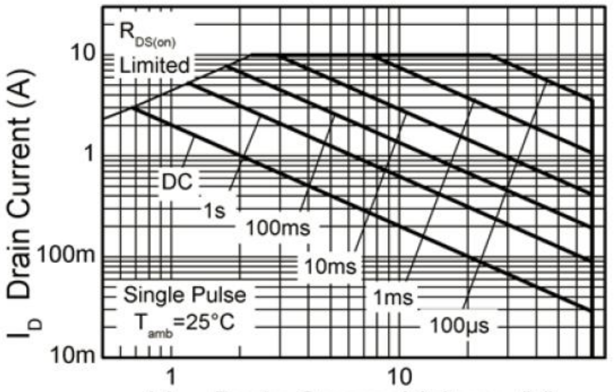
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	70	V
Gate-Source Voltage		V_G	±20	V
Continuous Drain Current, V_{GS} = 10V	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A = +25°C (Note 5)	I_D	3.8 3.0 2.7	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	3.8	A
Pulsed Drain Current		I_{DM}	10	A
Pulsed Source Current (Body Diode)		I_{SM}	10	A

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

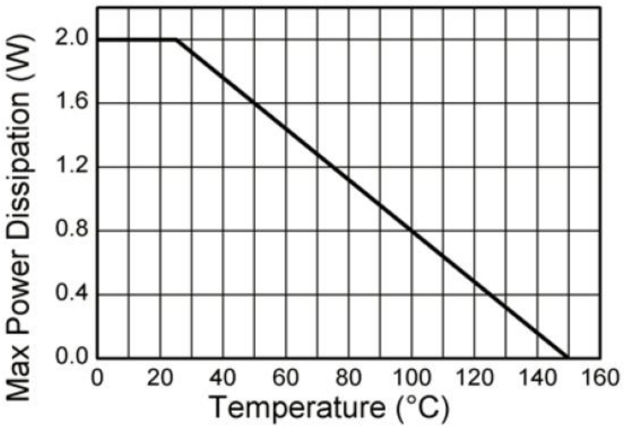
Characteristic	Symbol	Value	Unit
Total Power Dissipation at T_A = +25°C (Note 5)	P_D	2.0	W
Linear Derating Factor (Note 5)		16	mW/°C
Total Power Dissipation at T_A = +25°C (Note 6)	P_D	3.9	W
Linear Derating Factor (Note 6)		31	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	°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

Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR-4 PCB measured at t ≤ 5 sec.

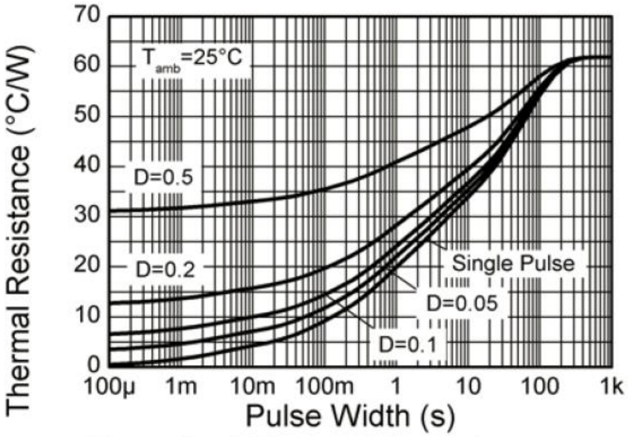
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)



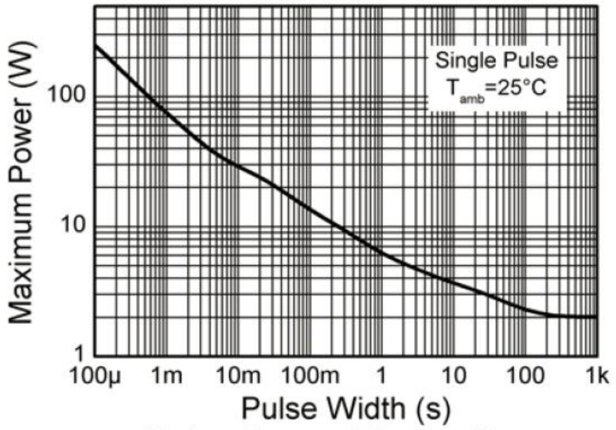
Safe Operating Area



Derating Curve



Transient Thermal Impedance



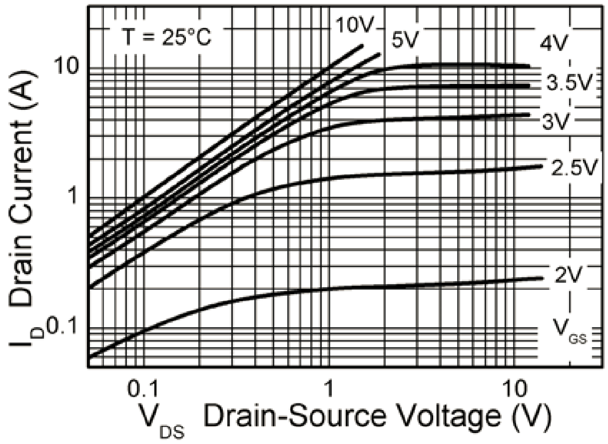
Pulse Power Dissipation

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

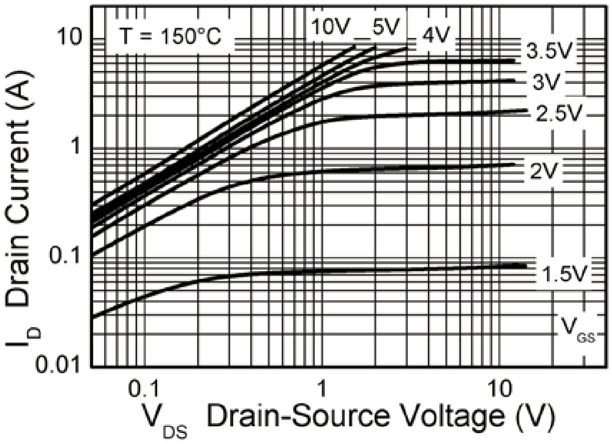
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	70	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 70V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance (Note 7)	$R_{DS(on)}$	—	—	0.13	Ω	V_{GS} = 10V, I_D = 4.4A
		—	—	0.19		V_{GS} = 4.5V, I_D = 3.8A
Forward Transfer Admittance	g_{fs}	—	4.66	—	S	V_{DS} = 15V, I_D = 4.4A
Diode Forward Voltage (Note 7)	V_{SD}	—	0.85	0.95	V	T_J = +25°C , V_{GS} = 0V, I_S = 2.5A
DYNAMIC CHARACTERISTICS (Notes 8 &9)						
Input Capacitance	C_{iss}	—	298	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	35	—		
Reverse Transfer Capacitance	C_{rss}	—	21	—		
Total Gate Charge	Q_g	—	4.35	—	nC	V_{DS} = 35V, V_{GS} = 5.0V, I_D = 4.4A
Total Gate Charge	Q_g	—	7.4	—	nC	V_{DS} = 35V, V_{GS} = 10V, I_D = 4.4A
Gate-Source Charge	Q_{gs}	—	1.06	—		
Gate-Drain Charge	Q_{gd}	—	1.8	—		
Turn-On Delay Time	$t_{D(on)}$	—	1.9	—	ns	V_{DS} = 35V, V_{GS} = 10V, I_D = 1A, R_G ≅ 6.0Ω
Turn-On Rise Time	t_R	—	2	—		
Turn-Off Delay Time	$t_{D(off)}$	—	11.5	—		
Turn-Off Fall Time	t_F	—	5.8	—		
Body Diode Reverse Recovery Time	t_{RR}	—	19.8	—	ns	T_J = +25°C, I_S = 2.5A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{RR}	—	14	—	nC	

Notes: 7. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
8 .Switching characteristics are independent of operating junction temperature.
9. For design aid only, not subject to production testing.

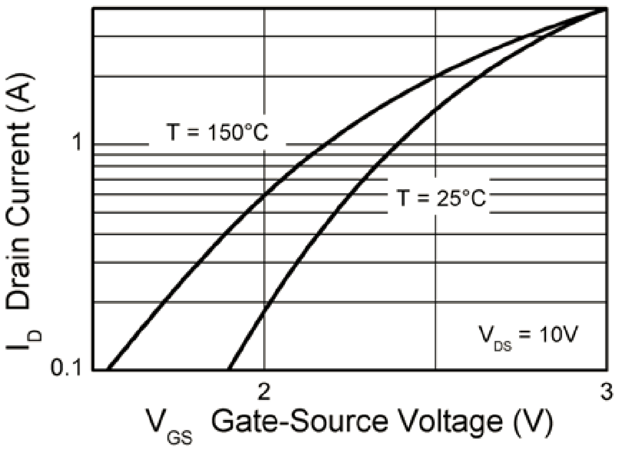
Typical Characteristics



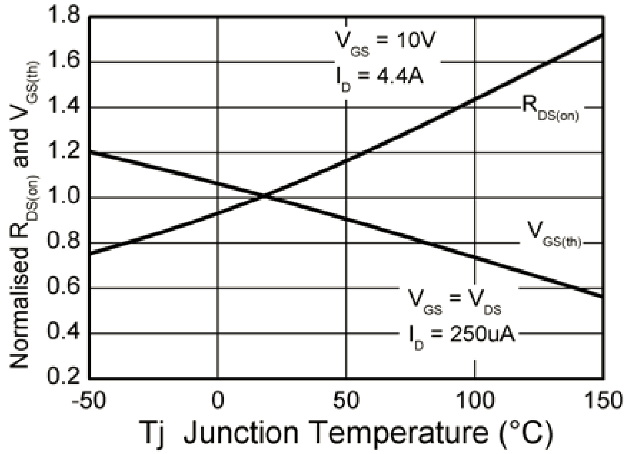
Output Characteristics



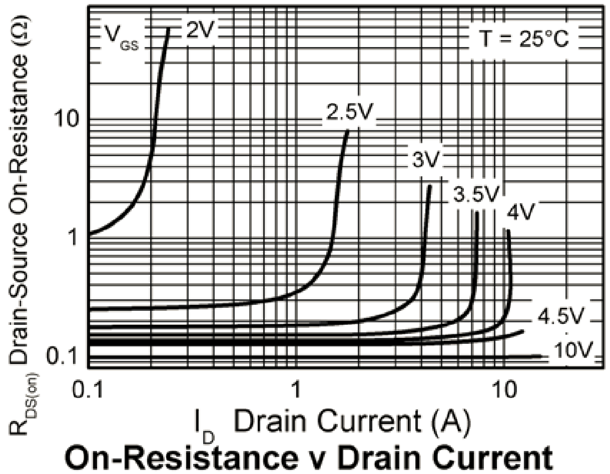
Output Characteristics



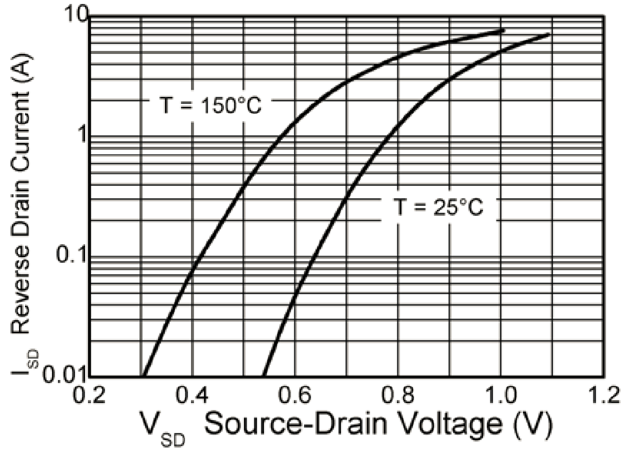
Typical Transfer Characteristics



Normalised Curves v Temperature

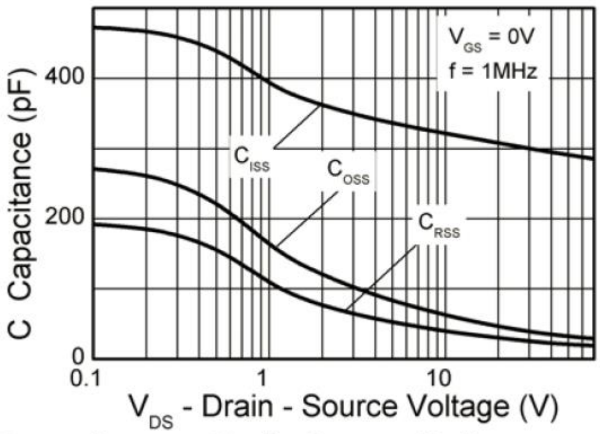


On-Resistance v Drain Current

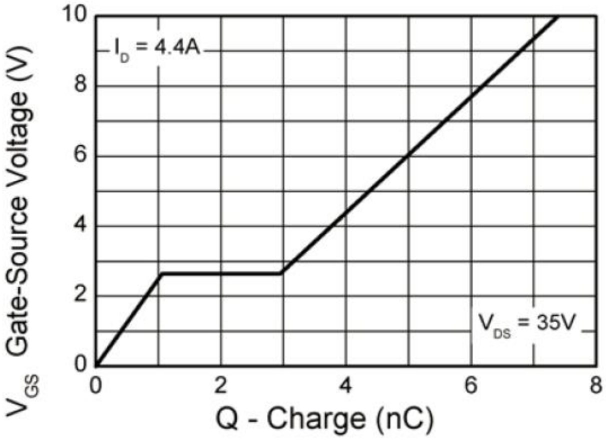


Source-Drain Diode Forward Voltage

Typical Characteristics (continued)



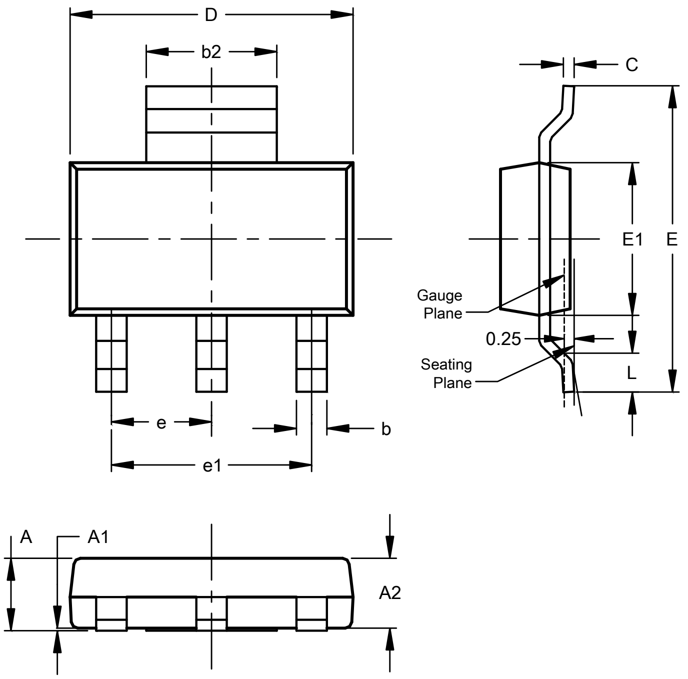
Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

Package Outline Dimensions

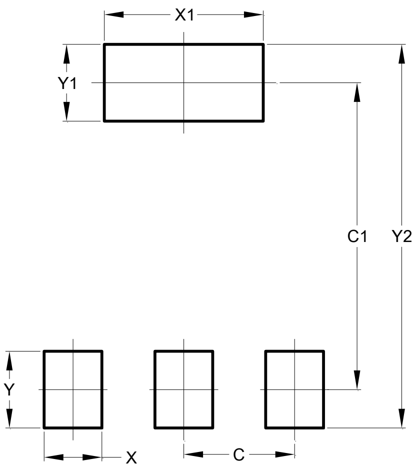
SOT223 (Type DN)



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