



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}	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
60V	$0.33\Omega @ V_{GS} = 10V$	2.1A

Features and Benefits

- $V_{(BR)DSS} > 60V$
- $R_{DS(on)} \leq 0.33\Omega @ V_{GS} = 10V$

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
- Solenoids/relay drivers for automotive applications

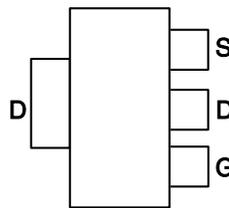
Mechanical Data

- 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 Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

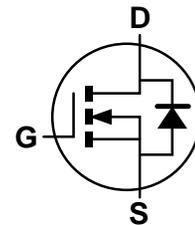
SOT223



Top View



Pin Out - Top



Equivalent Circuit

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	2.1	A
Pulsed Drain Current (Note 6)	I_{DM}	15	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	3	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	-	-	V	$V_{GS} = 0V, I_D = 1mA$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	-	-	10 100	μA	$V_{DS} = 60V, V_{GS} = 0V$ $V_{DS} = 48V, V_{GS} = 0V, T_A = +125^\circ\text{C}$
Gate-Source Leakage	I_{GSS}	-	-	± 20	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
On-State Drain Current	$I_{D(on)}$	12	-	-	A	$V_{GS} = 10V, V_{DS} = 10V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1.3	-	3.0	V	$V_{DS} = V_{GS}, I_D = 1mA$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	0.22 0.32	0.33 0.45	Ω	$V_{GS} = 10V, I_D = 3.0A$ $V_{GS} = 5V, I_D = 1.5A$
Forward Transconductance	g_{fs}	0.7	-	-	S	$V_{DS} = 25V, I_D = 3.0A$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	-	350	pF	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	C_{oss}	-	-	140	pF	
Reverse Transfer Capacitance	C_{rss}	-	-	30	pF	
Turn-On Delay Time	$t_{D(on)}$	-	-	8	ns	$V_{DD} = 25V, I_D = 3A, V_{GEN} = 10V,$ $R_{GS} = 50\Omega$
Turn-On Rise Time	t_R	-	-	25	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	-	30	ns	
Turn-Off Fall Time	t_F	-	-	16	ns	

- Notes:
- For a device mounted on 50mm x 50mm x 1.6mm FR-4 PCB with high coverage of single sided 2oz copper, in still air condition.
 - Device mounted on minimum recommended pad layout test board, 10 μs pulse duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

Typical Characteristics

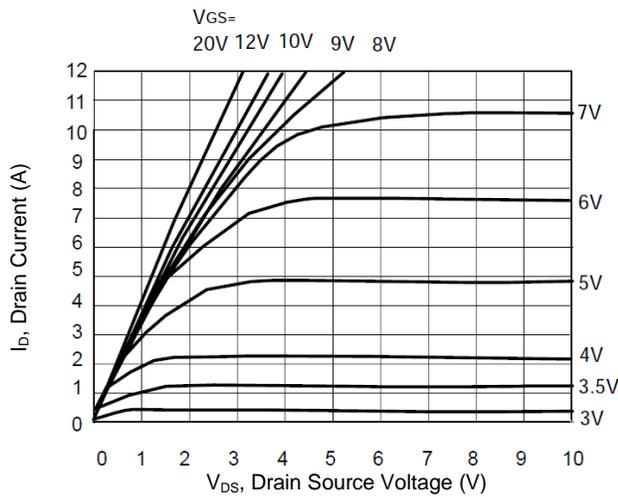


Figure 1. Saturation Characteristics

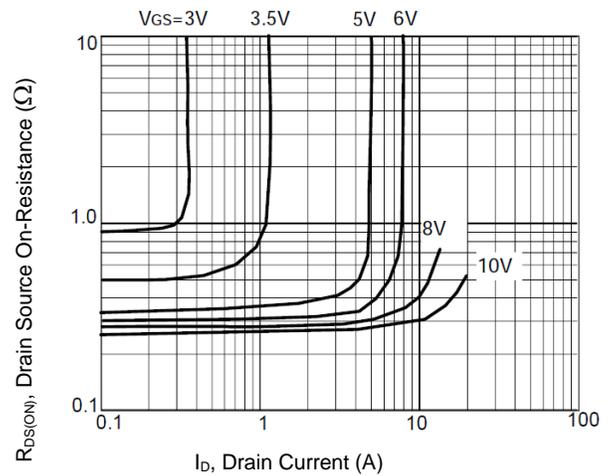


Figure 2. On-resistance vs. drain current

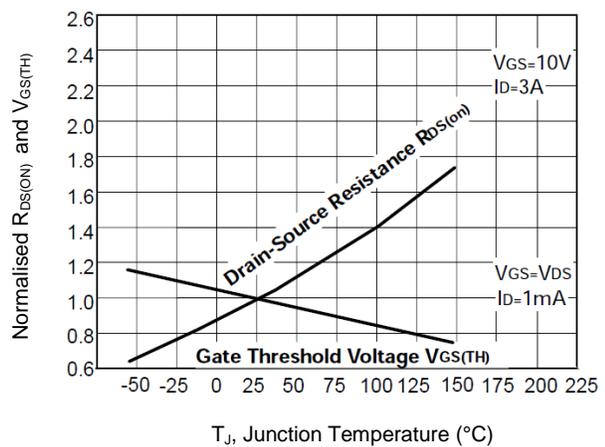


Figure 3. Normalised $R_{DS(ON)}$ and $V_{GS(TH)}$ vs. Temperature

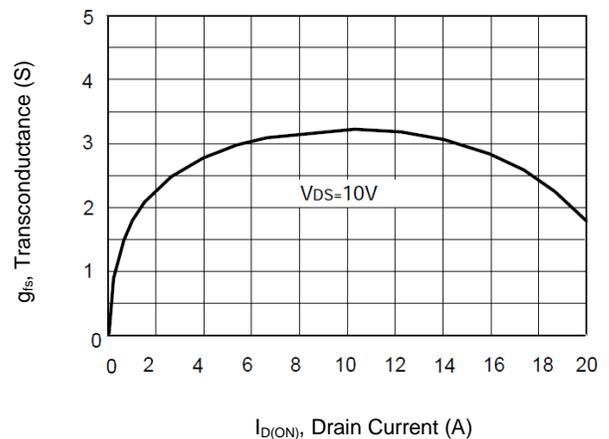


Figure 4. Transconductance vs. Drain Current

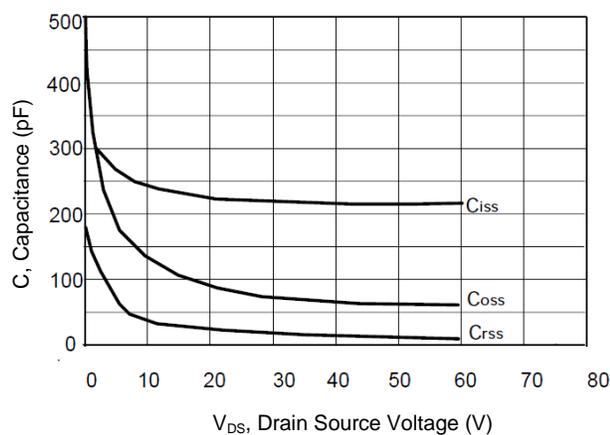


Figure 5. Capacitance vs. Drain-source Voltage

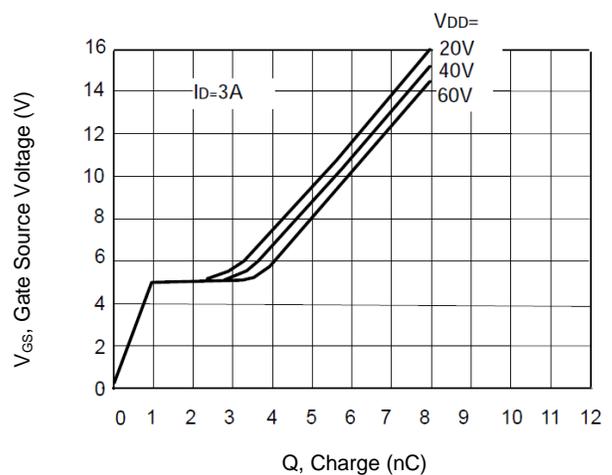
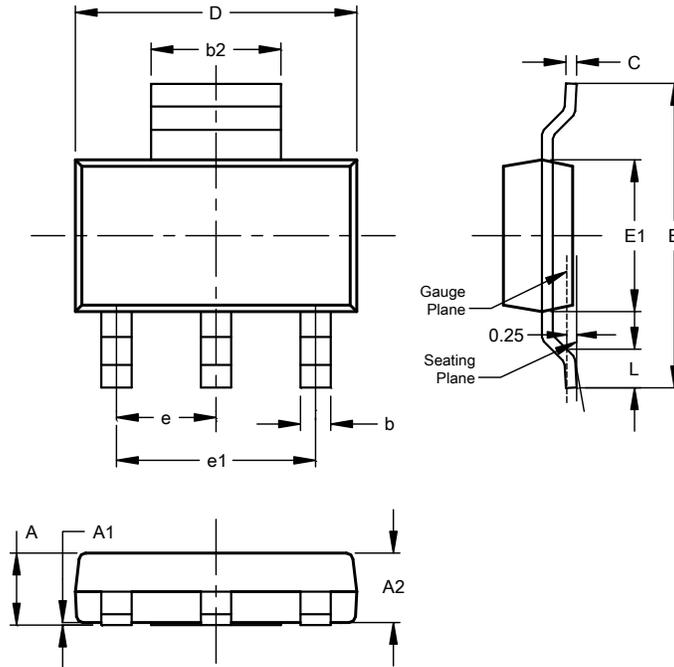


Figure 6. Gate Charge vs. Gate-source Voltage

Package Outline Dimensions

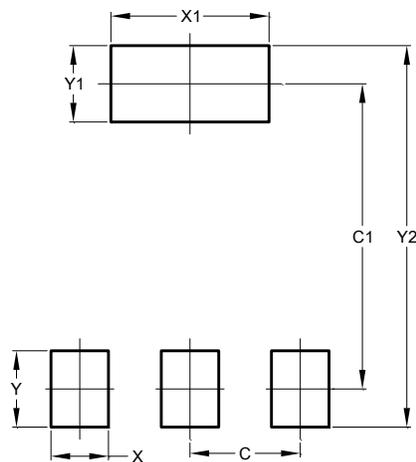
SOT223 (Type DN)



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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