



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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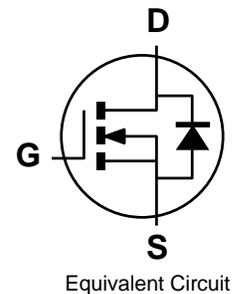
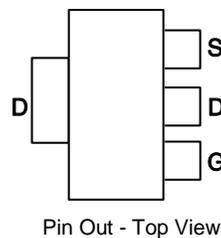
Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C
60V	69mΩ @ V _{GS} = 10V	4.3A
	100mΩ @ V _{GS} = 4.5V	3.5A

Description and Applications

This new generation MOSFET has been designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Motor controls
- Transformer driving switches
- DC-DC converters
- Power-management functions
- Uninterrupted power supplies



Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Fast Switching Speed
- Low On-Resistance

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 Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208^(e)
- Weight: 0.112 grams (Approximate)

Maximum Ratings (@T_A = +25°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 (Note 6) V _{GS} = 10V	T _A = +25°C	4.3	A
	T _A = +70°C	3.3	A
	T _C = +25°C	10	A
	T _C = +70°C	8	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	25	A
Maximum Body Diode Continuous Current	I _S	4.3	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	2.2
		T _A = +70°C	1.4
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	58	°C/W
Total Power Dissipation (Note 5)	P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	100	°C/W
Total Power Dissipation (Note 6)	P _D	11	W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	8.9	°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 (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	47	69	mΩ	V _{GS} = 10V, I _D = 3A
		—	54	100		V _{GS} = 4.5V, I _D = 2.4A
Diode Forward Voltage	V _{SD}	—	0.8	1.1	V	V _{GS} = 0V, I _S = 2.5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	825	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	40	—		
Reverse Transfer Capacitance	C _{rss}	—	29	—		
Gate Resistance	R _g	—	2.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	7.2	—	nC	V _{DS} = 30V, I _D = 12A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	16	—		
Gate-Source Charge	Q _{gs}	—	3.2	—		
Gate-Drain Charge	Q _{gd}	—	2.8	—		
Turn-On Delay Time	t _{D(ON)}	—	3.8	—	ns	V _{DD} = 30V, V _{GS} = 10V, R _G = 6Ω, I _D = 12A
Turn-On Rise Time	t _R	—	6.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	16	—		
Turn-Off Fall Time	t _F	—	5.3	—		

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

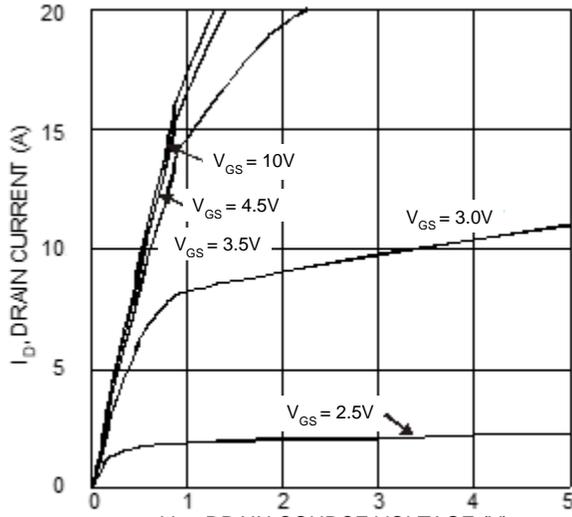


Figure 1 Typical Output Characteristic

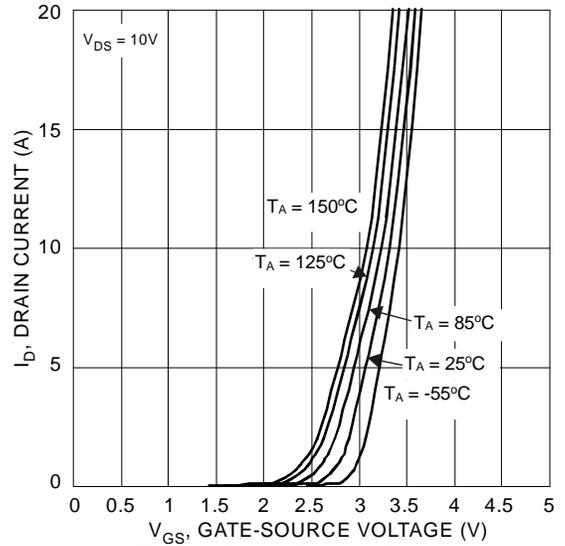


Figure 2 Typical Transfer Characteristic

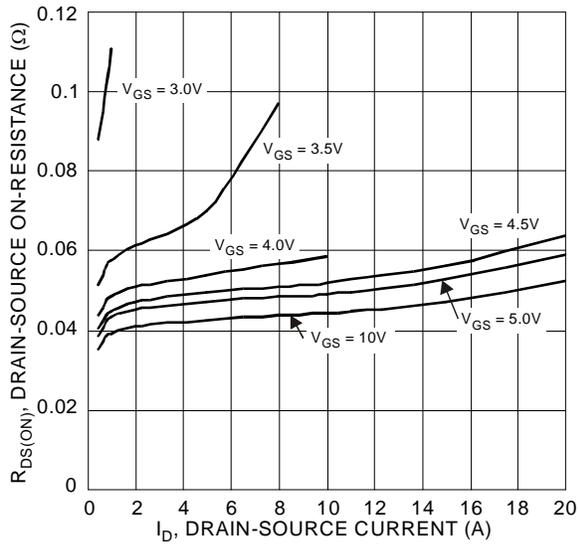


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

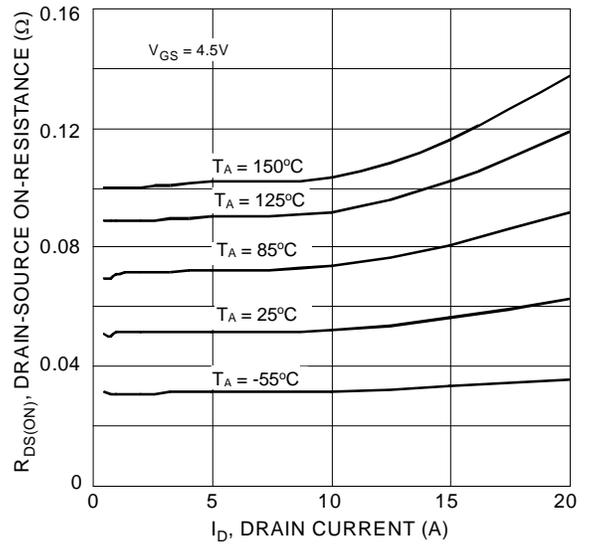


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

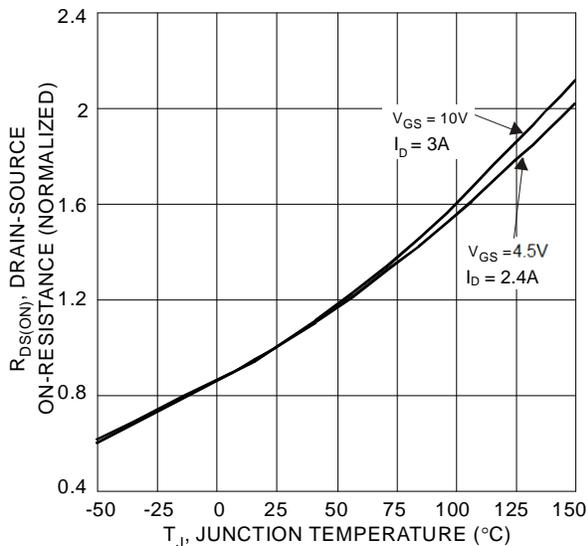


Figure 5 On-Resistance Variation with Temperature

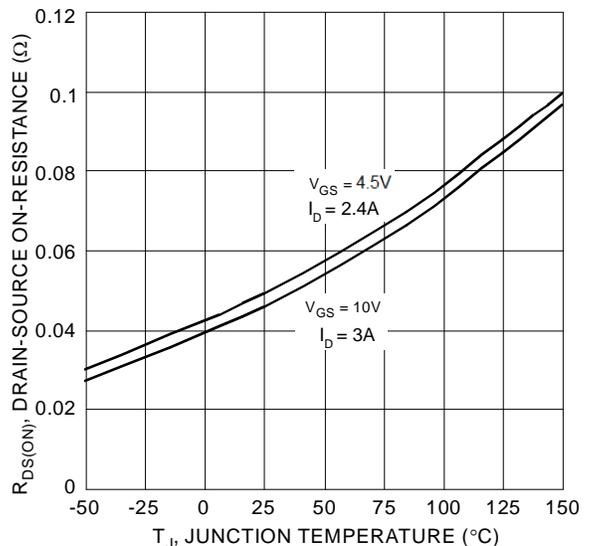


Figure 6 On-Resistance Variation with Temperature

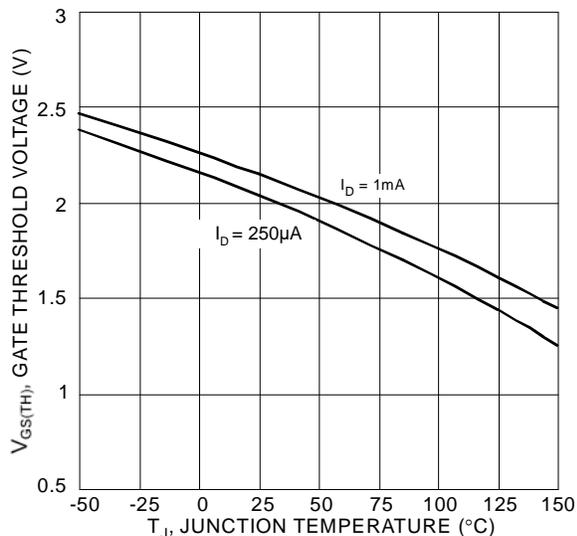


Figure 7 Gate Threshold Variation vs. Junction Temperature

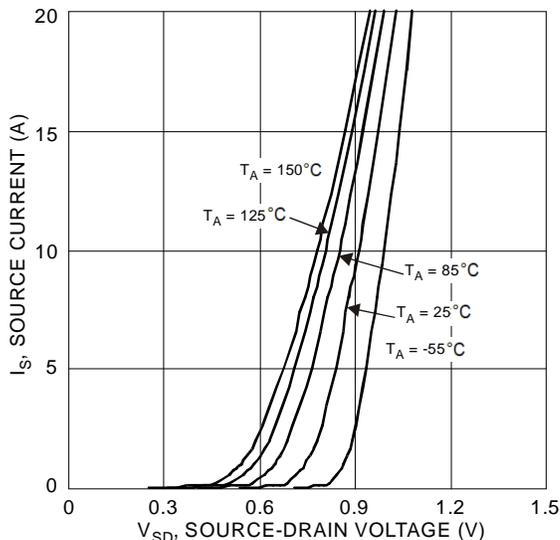


Figure 8 Diode Forward Voltage vs. Current

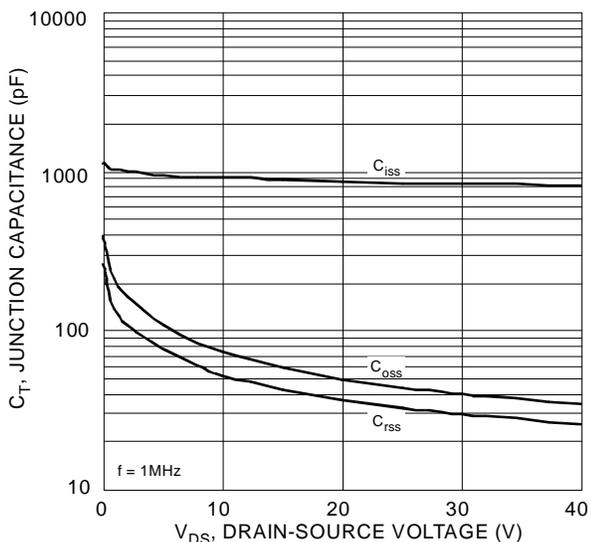


Figure 9 Typical Junction Capacitance

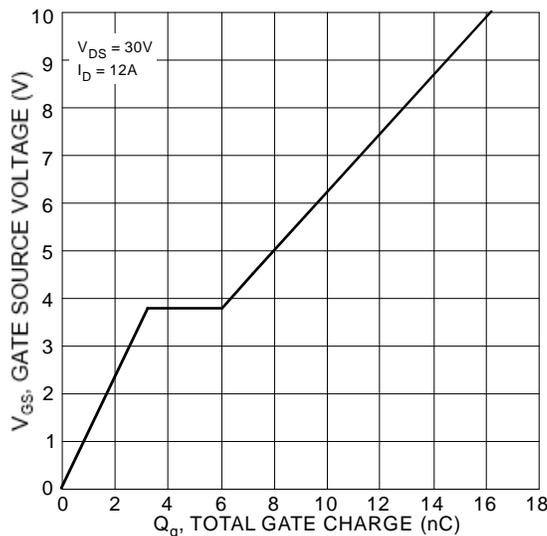


Figure 10 Gate Charge

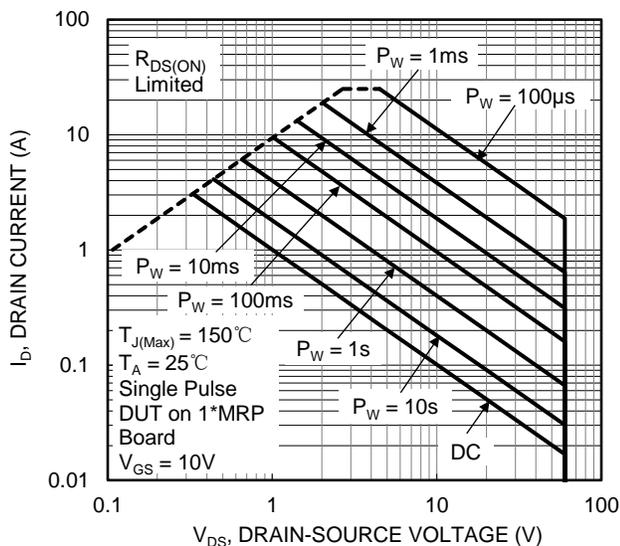


Figure 11 SOA, Safe Operation Area

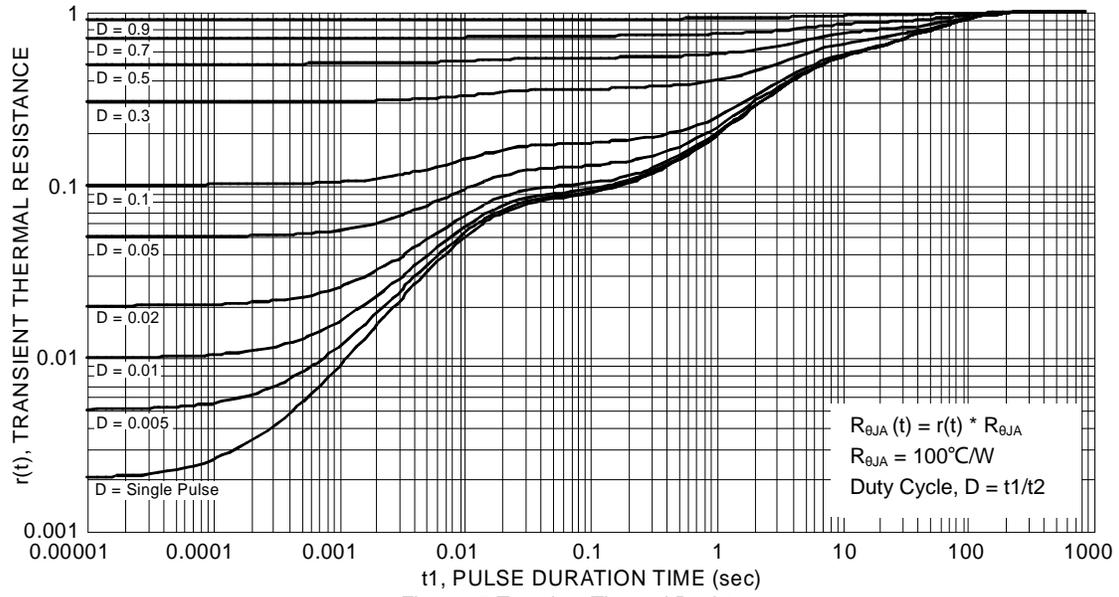
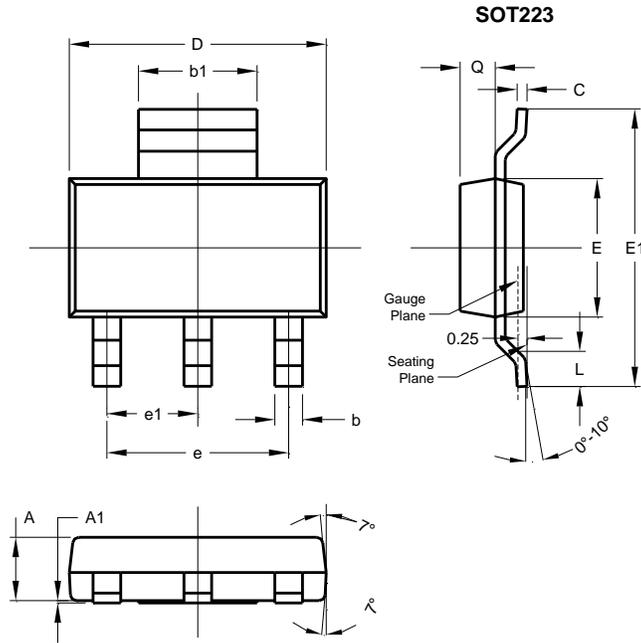


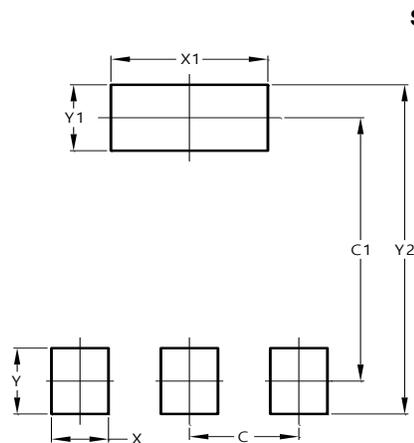
Figure 12 Transient Thermal Resistance

Package Outline Dimensions



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout



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