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

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
-20V	120mΩ @ V_{GS} = -4.5V	-3A
	150mΩ @ V_{GS} = -2.5V	

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed

Description and Applications

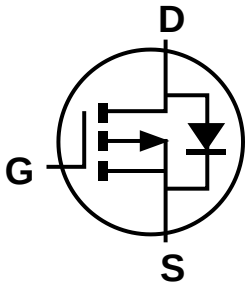
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control

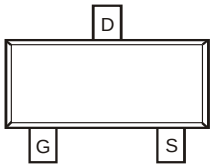
Mechanical Data

- Case: SOT23
- Case 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 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

Top View



Internal Schematic



Top View

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3 -1	A
Pulsed Drain Current (Note 6)			I_{DM}	-10	A
Drain-Source Diode Forward Current (t < 5 sec)			I_S	-0.75	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.5	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	83	°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}	-20	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	T_J = +25°C	I_{DSS}	—	—	-1.0	μA	V_{DS} = -16V, V_{GS} = 0V
Gate-Source Leakage		I_{GSS}	—	—	±100	nA	V_{GS} = ±6V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage		$V_{GS(TH)}$	-0.4	—	-1.2	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance		$R_{DS(ON)}$	—	—	120	mΩ	V_{GS} = -4.5V, I_D = -2.8A
					150		V_{GS} = -2.5V, I_D = -2.0A
Diode Forward Voltage		V_{SD}	—	—	-1.2	V	V_{GS} = 0V, I_S = -0.75A
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance		C_{iss}	—	476	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	53	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	45	—	pF	
Total Gate Charge		Q_g	—	5.5	—	nC	V_{GS} = -4.5V, V_{DS} = -6V, I_D = -2.8A
Gate-Source Charge		Q_{gs}	—	0.9	—	nC	
Gate-Drain Charge		Q_{gd}	—	1.8	—	nC	
Turn-On Delay Time		$t_{D(ON)}$	—	5	—	ns	V_{DS} = -6V, V_{GS} = -4.5V, R_{GEN} = 6Ω, I_D = -1A
Turn-On Rise Time		t_R	—	10	—	ns	
Turn-Off Delay Time		$t_{D(OFF)}$	—	30	—	ns	
Turn-Off Fall Time		t_F	—	20	—	ns	

Notes:
5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

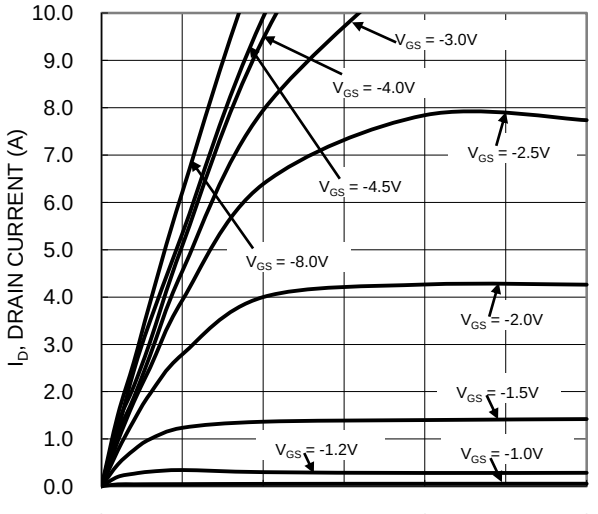


Figure 1 Typical Output Characteristic

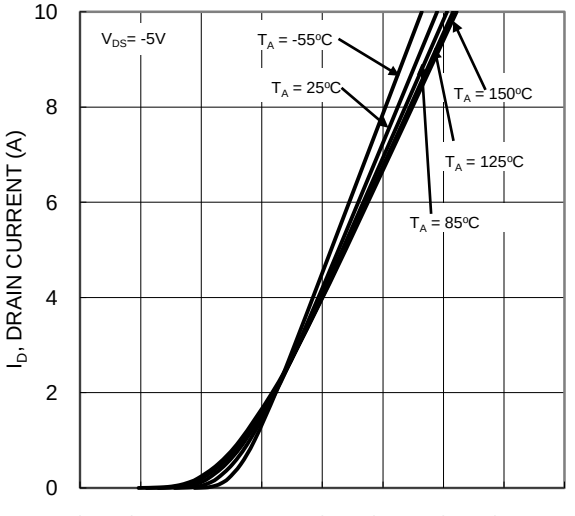


Figure 2 Typical Transfer Characteristic

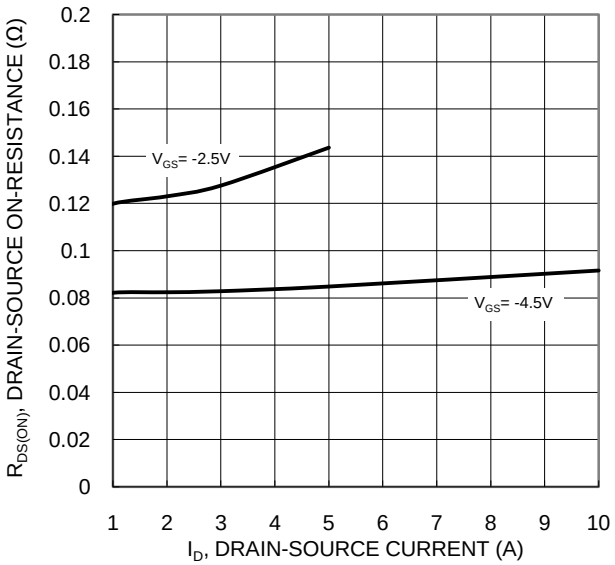


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

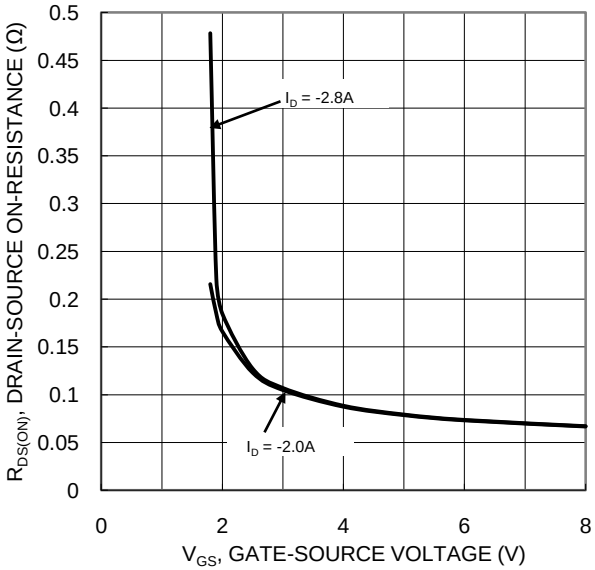


Figure 4 Typical Transfer Characteristic

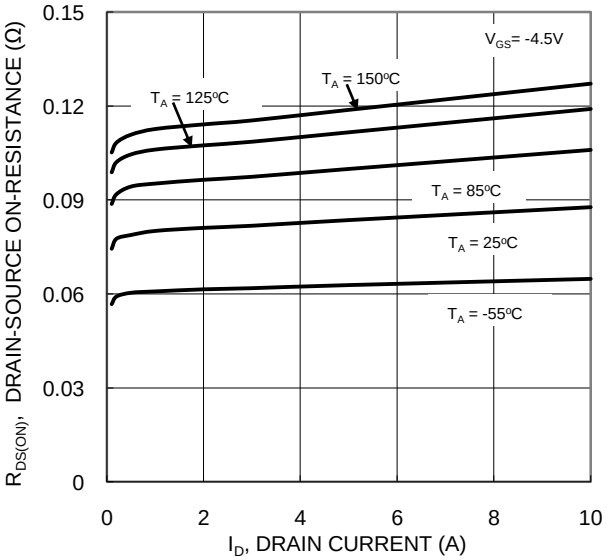


Figure 5 Typical On-Resistance vs Drain Current and Temperature

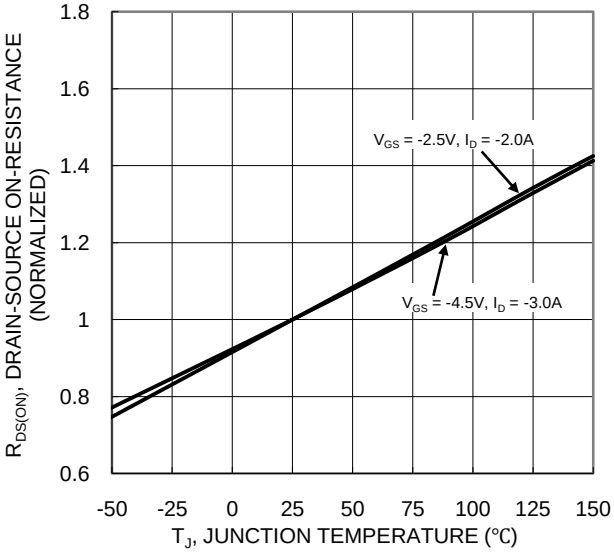


Figure 6 On-Resistance Variation with Temperature

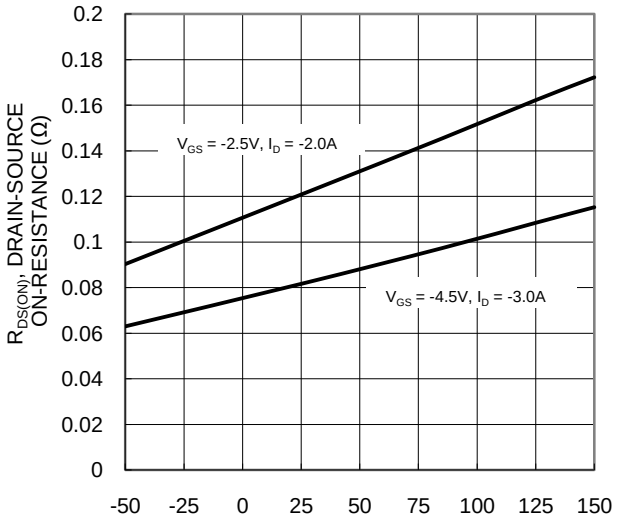


Figure 7 On-Resistance Variation with Temperature

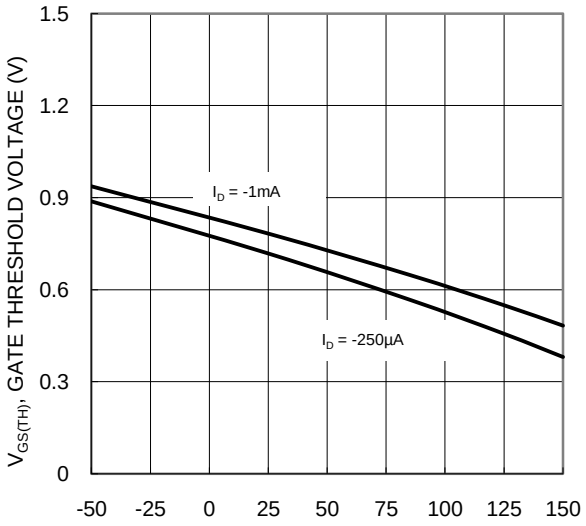


Figure 8 Gate Threshold Variation vs Ambient Temperature

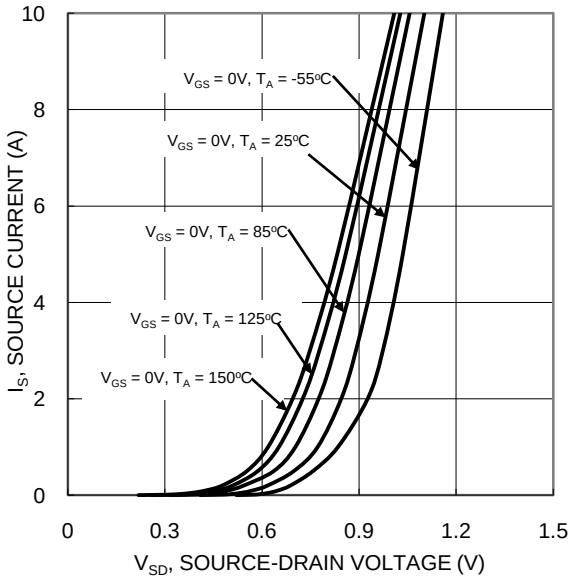


Figure 9 Diode Forward Voltage vs. Current

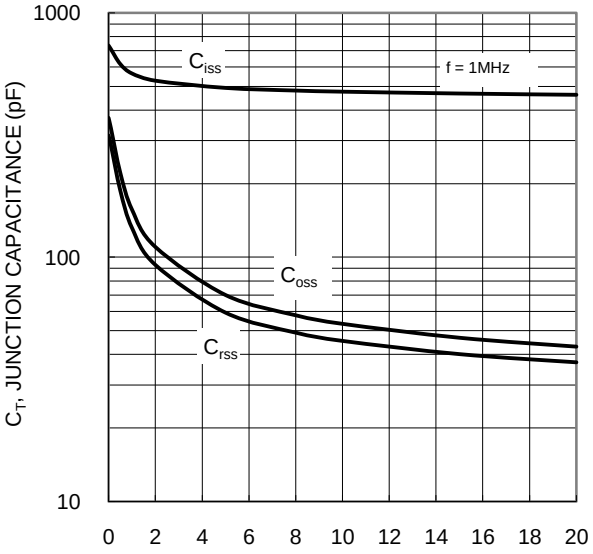


Figure 10 Typical Junction Capacitance

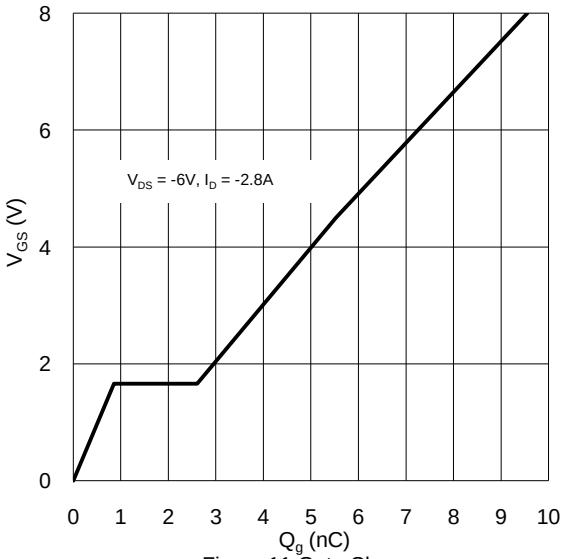


Figure 11 Gate Charge

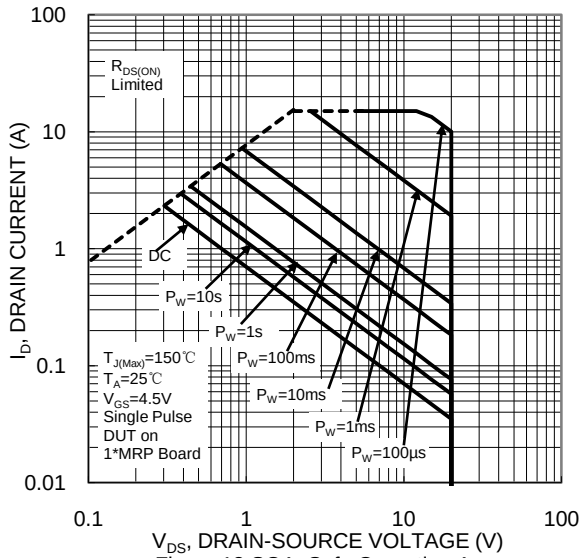


Figure 12 SOA, Safe Operation Area

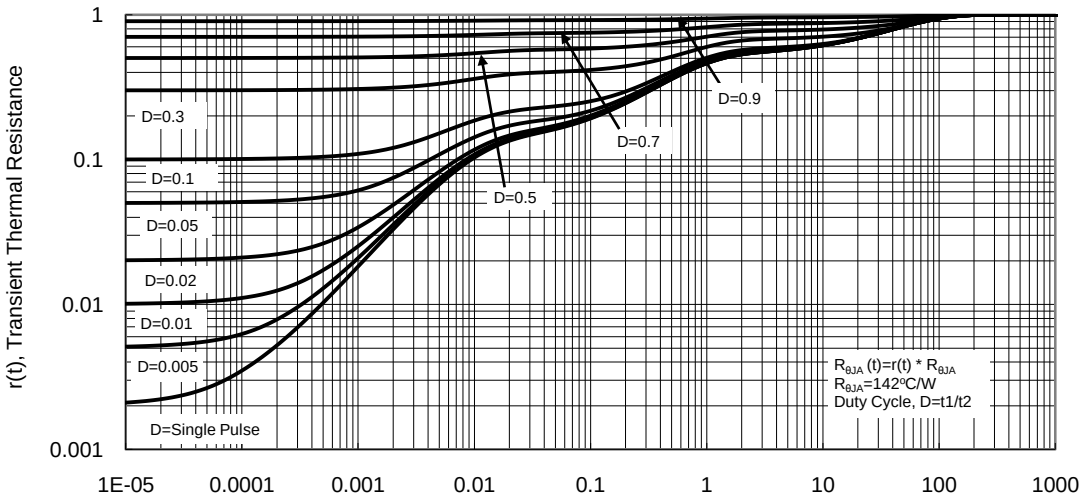
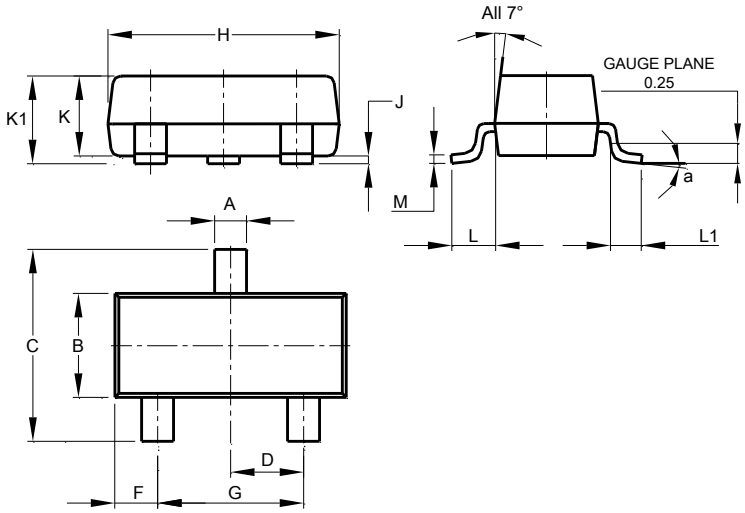


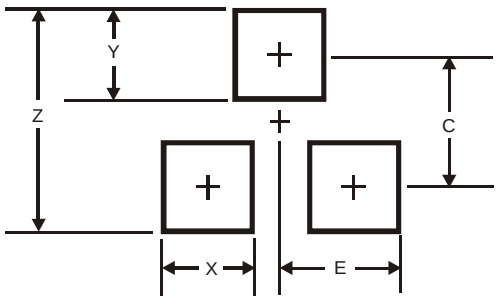
Figure 13 Transient Thermal Resistance

Package Outline Dimensions



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35