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

企业微信二维码　　　企业QQ二维码

YOUSHANG SEMICONDUCTOR

Product Summary

BV$_{DSS}$	R$_{DS(on)}$ Max	I$_D$ T$_A$ = +25°C
-12V	31mΩ @ V$_{GS}$ = -4.5V	-5.4A
	45mΩ @ V$_{GS}$ =-2.5V	-4.5A

Features and Benefits

• Low On-Resistance
• Low Input Capacitance
• Fast Switching Speed
• Low Input/Output Leakage

Description

This new generation MOSFET is designed to minimize the on-state resistance (R$_{DS(on)}$) while maintaining superior switching performance, which makes the device ideal for high-efficiency power-management applications.

Applications

• DC-DC Converters
• Power Management Functions
• Analog Switch

Mechanical Data

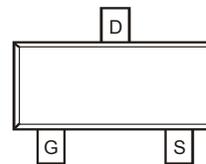• Case: SOT23
• Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
• Moisture Sensitivity: Level 1 per J-STD-020
• Terminal Connections: See Diagram
• Terminals: Finish—Matte Tin Annealed Over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 (e3)
• Weight: 0.009 grams (Approximate)

ESD Protected Gate

SOT23

Top View

Pin Configuration
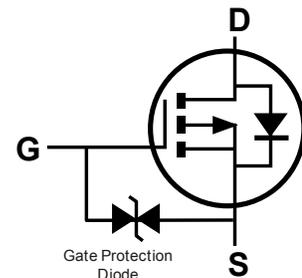
Internal Schematic

Gate Protection Diode

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C	I_D	-5.4	A
		T_A = +70°C		-4.3	
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-1.8	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I_{DM}	-33	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.89	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	140	°C/W
Total Power Dissipation (Note 6)	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	89	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	17	°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}	-12	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	-1.0	μA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.3	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	23	31	mΩ	V_{GS} = -4.5V, I_D = -4.0A
			33	45		V_{GS} = -2.5V, I_D = -3.5A
			46	75		V_{GS} = -1.8V, I_D = -2.7A
Diode Forward Voltage	V_{SD}	—	-0.6	-1.0	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	143	—	pF	V_{DS} = -10V, V_{GS} = 0V
Output Capacitance	C_{oss}	—	123	—	pF	f = 1.0MHz
Reverse Transfer Capacitance	C_{rss}	—	16	—	pF	
Gate Resistance	R_G	—	401	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q_G	—	11.5	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -4A
Gate-Source Charge	Q_{gs}	—	1.4	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.9	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	125	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time	t_R	—	192	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	685	—	ns	
Turn-Off Fall Time	t_F	—	950	—	ns	

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 1inch square copper plate..
7 .Short duration pulse test used to minimize self-heating effect.
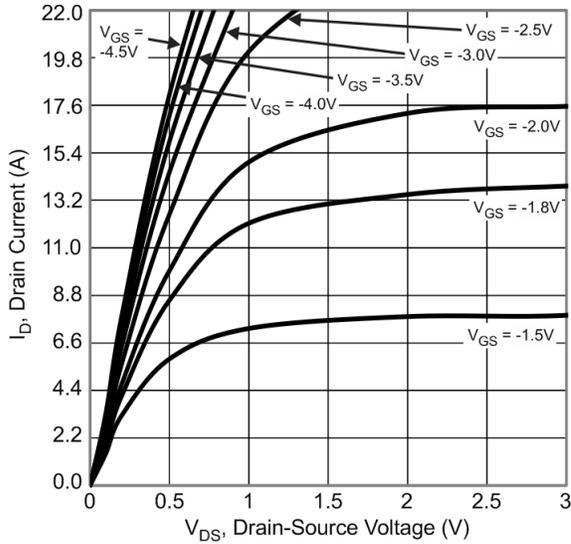8. Guaranteed by design. Not subject to production testing.
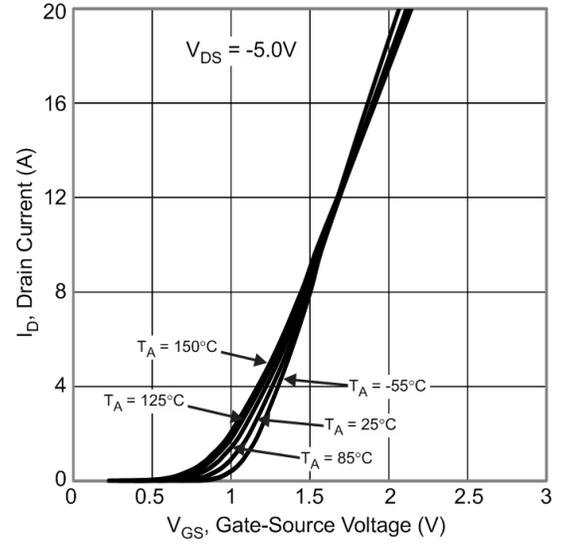
Fig. 1 Typical Output Characteristic

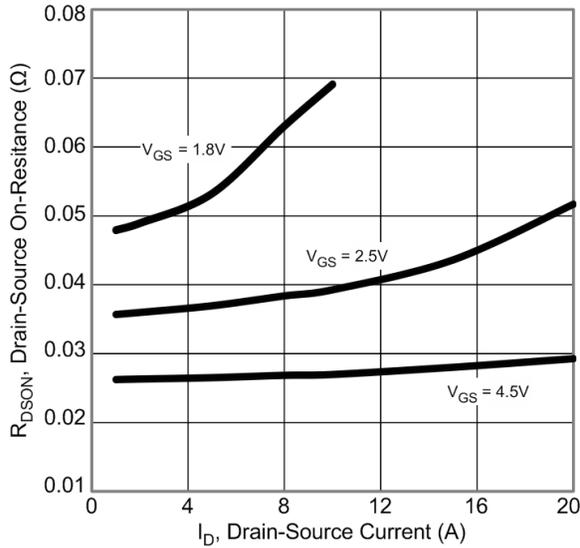Fig. 2 Typical Transfer Characteristic

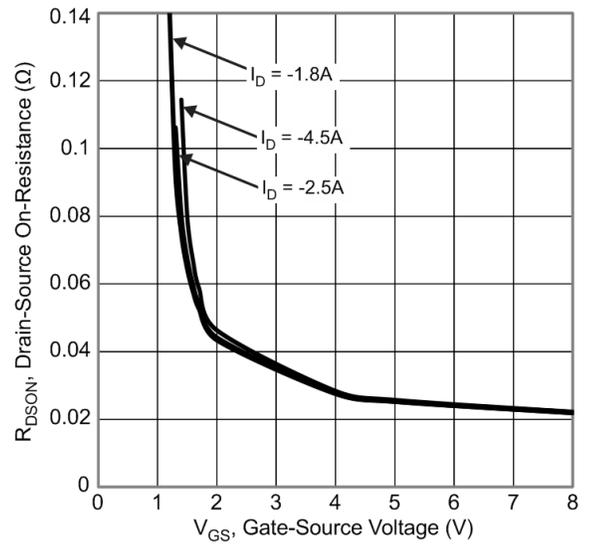Fig. 3 Typical On-Resistance vs Drain Current and Gate Voltage
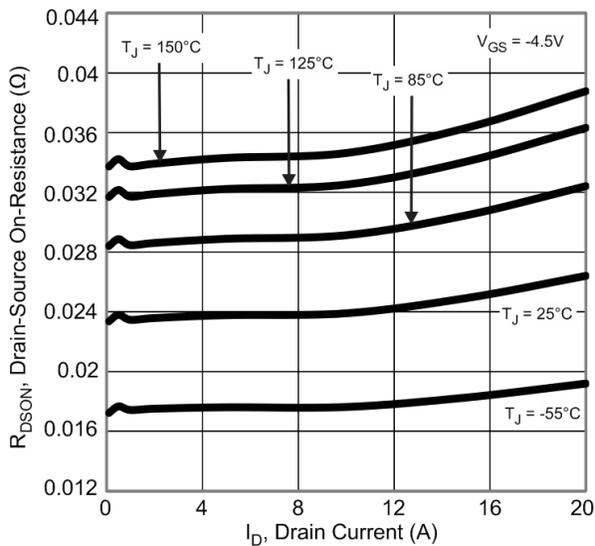

Fig. 4 Typical Transfer Characteristic

Fig. 5 Typical On-Resistance vs Drain Current and Junction Temperature
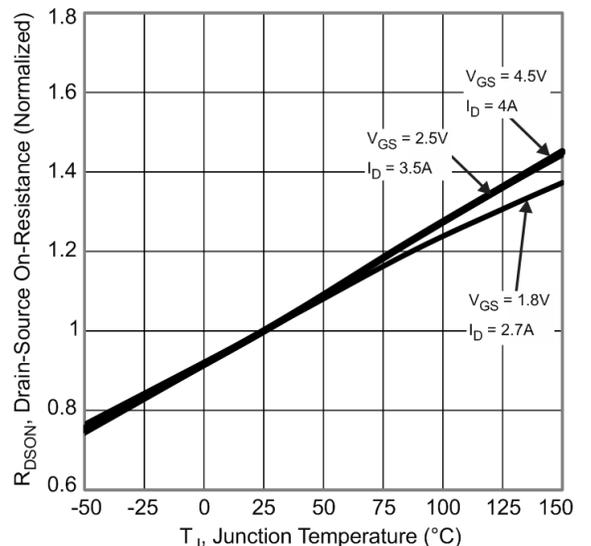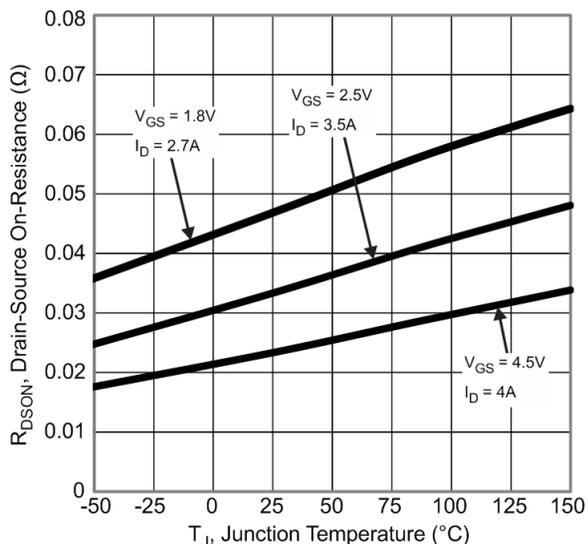

Fig. 6 On-Resistance Variation with Junction Temperature

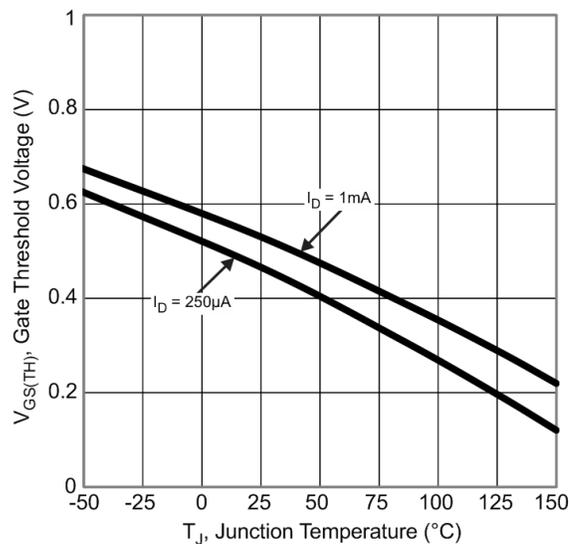Fig. 7 On-Resistance Variation with Junction Temperature

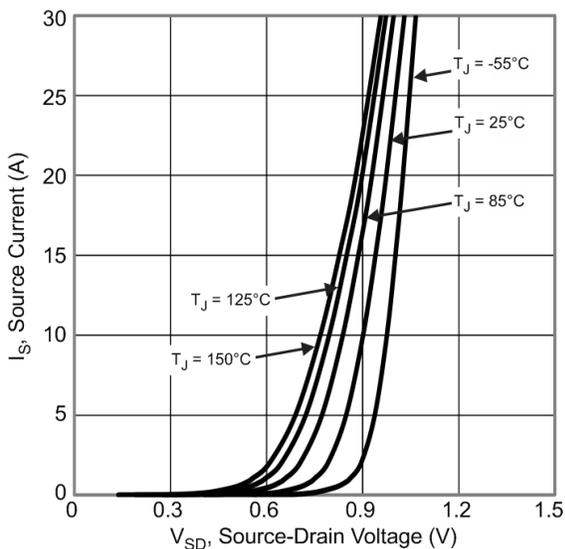Fig. 8 Gate Threshold Variation vs Junction Temperature

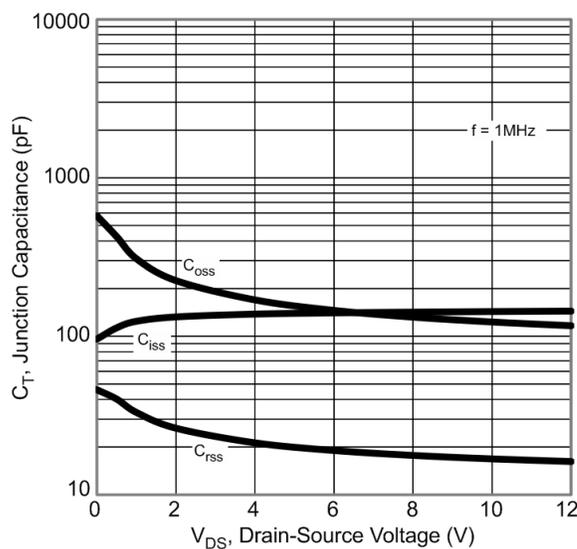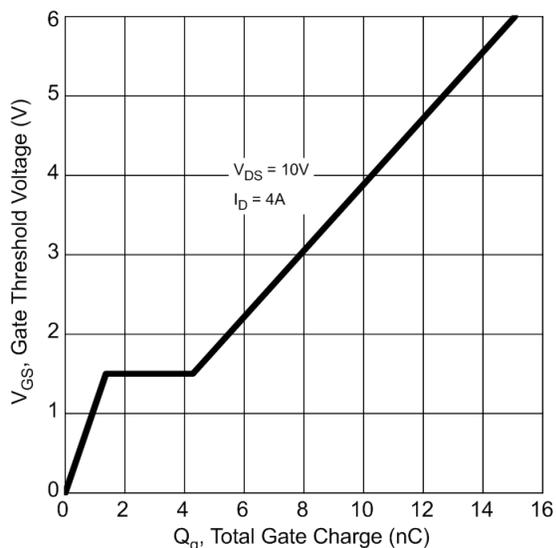Fig. 9 Diode Forward Voltage vs Current

Fig. 10 Typical Junction Capacitance
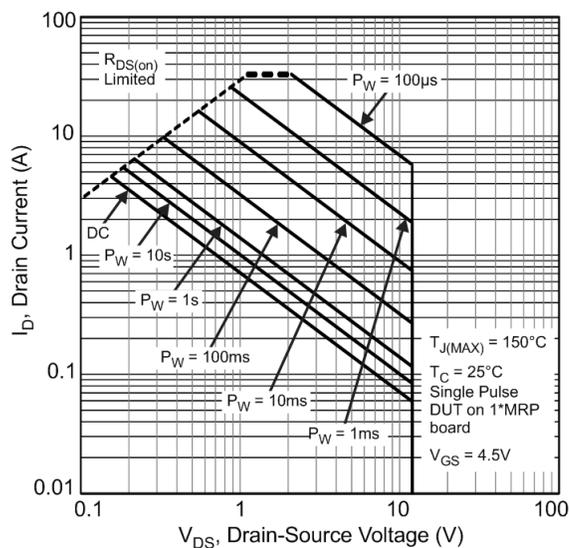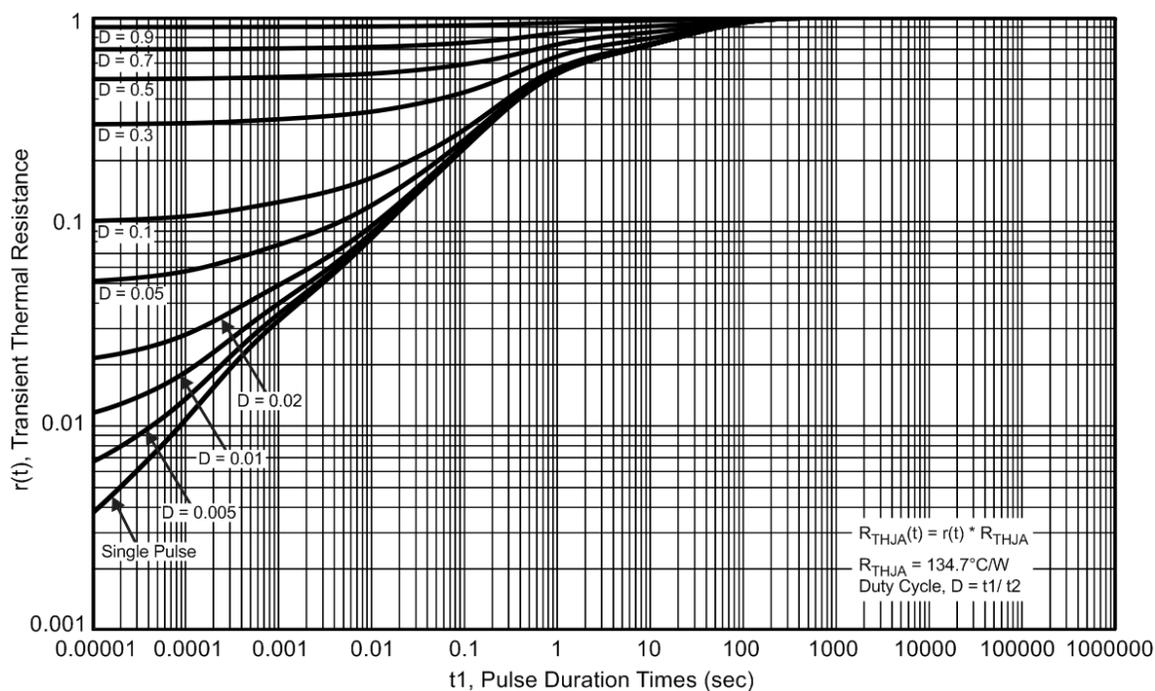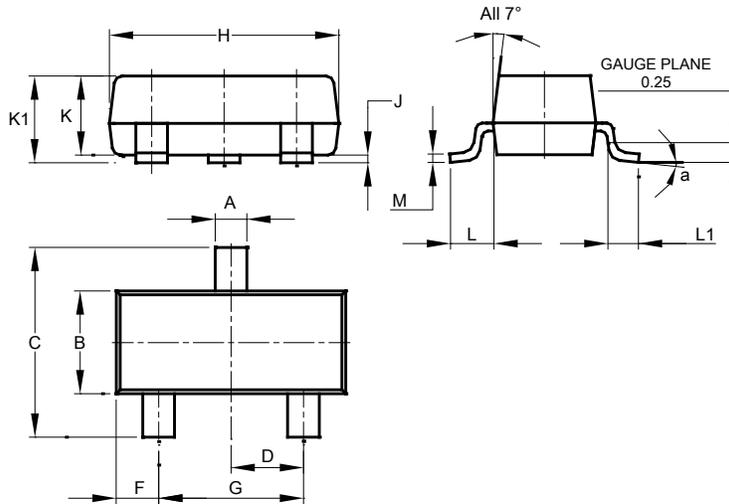

Fig. 11 Gate Charge

Fig. 12 SOA, Safe Operation Area
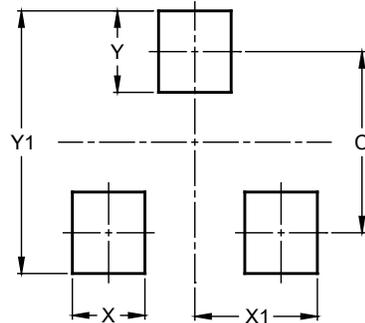
Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

SOT23

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	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

SOT23

Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9