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 Max $T_A = +25°C$
30V	16mΩ @ V_{GS} = 10V	9.8A
	22mΩ @ V_{GS} = 4.5V	8.4A

Description

This 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.

Applications

- Backlighting
- Power management functions
- DC-DC converters

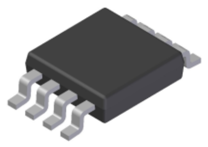
Features and Benefits

- 100% Avalanche Rated Part
- Low $R_{DS(ON)}$ – Minimizes Conduction Losses
- Low Q_g – Minimizes Switching Losses

Mechanical Data

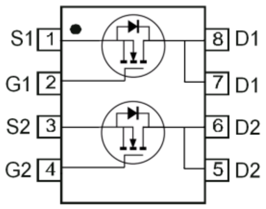
- Package: SO-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.076 grams (Approximate)

SO-8

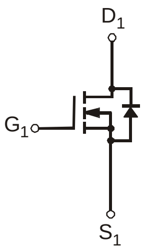


Top View

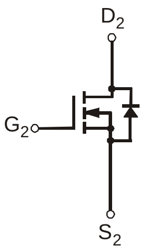
Top View



Pin Configuration
Internal Schematic



N-Channel MOSFET



N-Channel MOSFET

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	7.5 6.0	A
	t < 10s	T_A = +25°C T_A = +70°C	I_D	9.8 7.7	A
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	6.4 5.0	A
	t < 10s	T_A = +25°C T_A = +70°C	I_D	8.4 6.6	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	42	A
Avalanche Current (Notes 6 & 7) L = 0.1mH			I_{AR}	17	A
Repetitive Avalanche Energy (Notes 6 & 7) L = 0.1mH			E_{AR}	14	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 8)		P_D	1.17	W
Thermal Resistance, Junction to Ambient (Note 8)	Steady State	$R_{\theta JA}$	107	°C/W
	t < 10s		61	
Total Power Dissipation (Note 5)		P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	83	°C/W
	t < 10s		49	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	14.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. I_{AR} and E_{AR} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
7. Applicable to products manufactured with Data Code “1146” (Nov, 2011) and newer.
8. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	—	1.6	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	12	16	mΩ	V_{GS} = 10V, I_D = 9A
			16	22		V_{GS} = 4.5V, I_D = 7A
Forward Transfer Admittance	$\lvert Y_{fs}\rvert$	—	8	—	S	V_{DS} = 10V, I_D = 9A
Diode Forward Voltage	V_{SD}	—	0.72	0.94	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	798	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	128	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	122	—	pF	
Gate Resistance	R_g	—	1.37	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	8.56	—	nC	V_{GS} = 5V, V_{DS} = 15V I_D = 9A
Gate-Source Charge	Q_{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.03	—	ns	V_{DD} = 15V, V_{GEN} = 10V R_L = 15Ω, R_G = 6Ω, I_D = 1A
Turn-On Rise Time	t_R	—	4.50	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	26.33	—	ns	
Turn-Off Fall Time	t_F	—	8.55	—	ns	

Notes: 9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

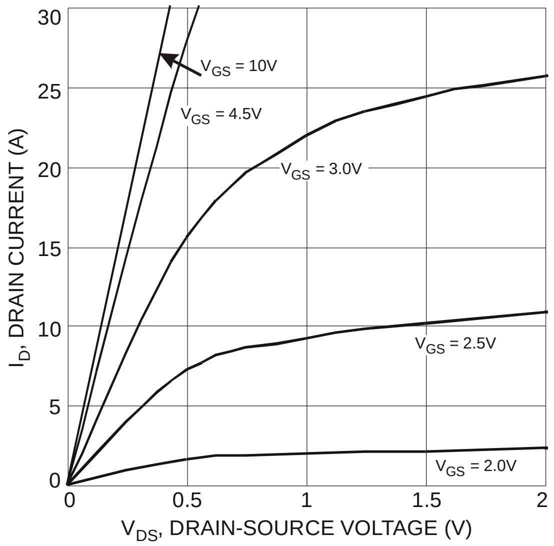


Fig. 1 Typical Output Characteristic

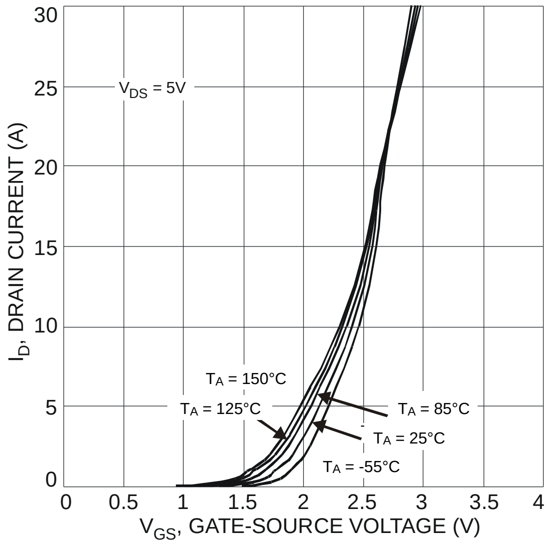


Fig. 2 Typical Transfer Characteristic

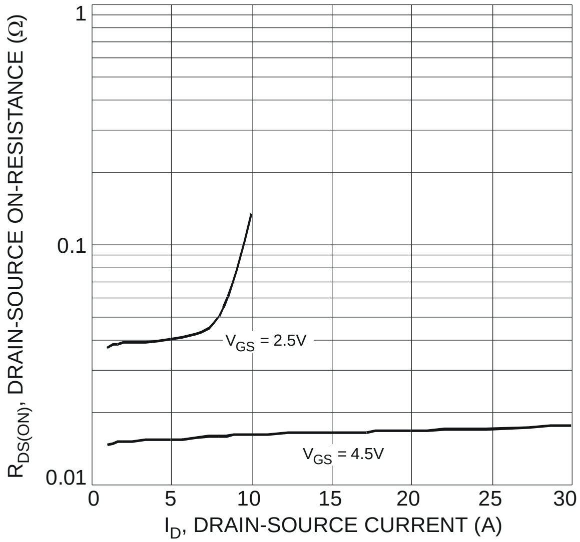


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

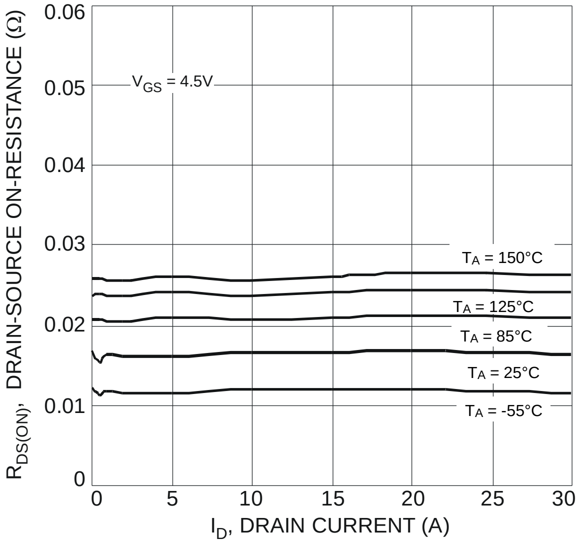


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

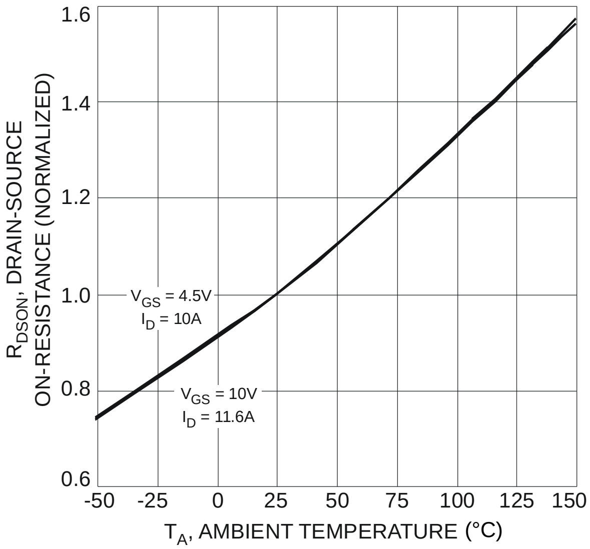


Fig. 5 On-Resistance Variation with Temperature

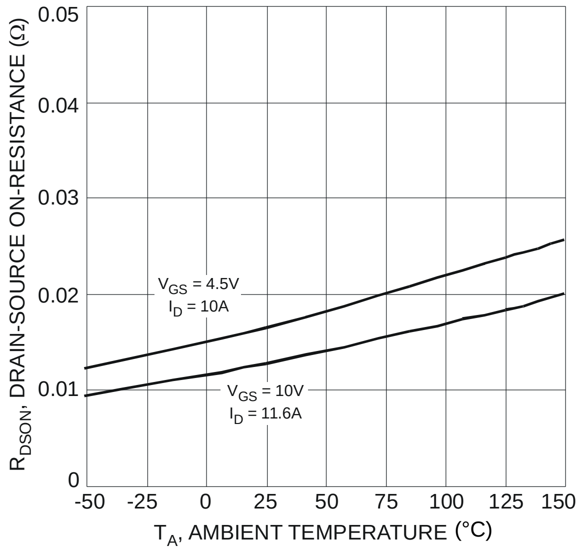


Fig. 6 On-Resistance Variation with Temperature

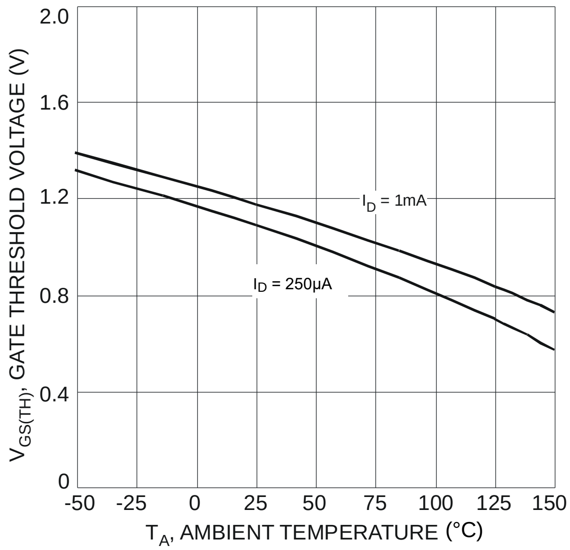


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

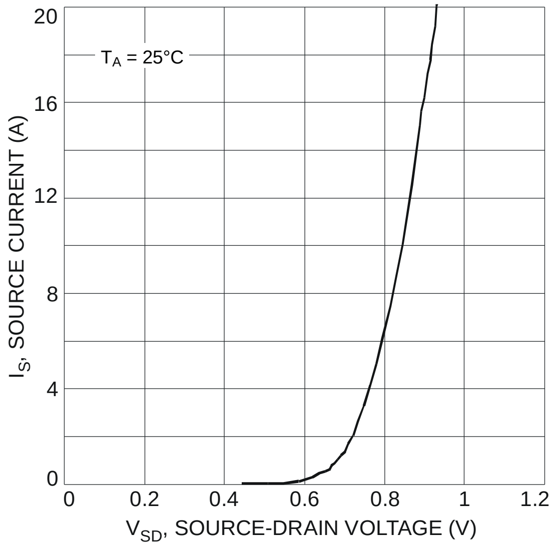


Fig. 8 Diode Forward Voltage vs. Current

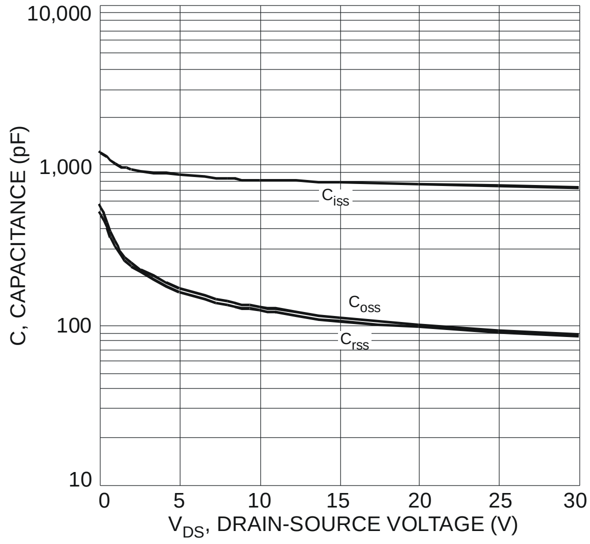


Fig. 9 Typical Total Capacitance

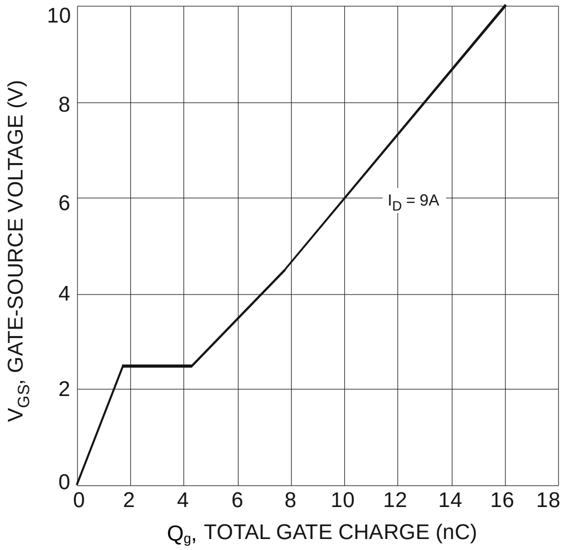


Fig. 10 Total Gate Charge

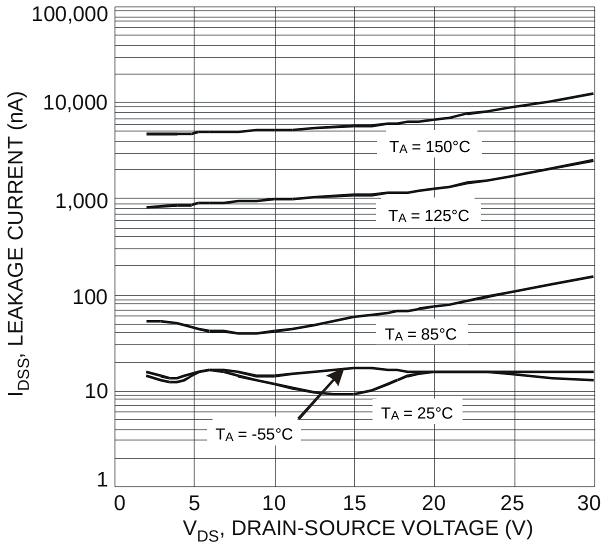


Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

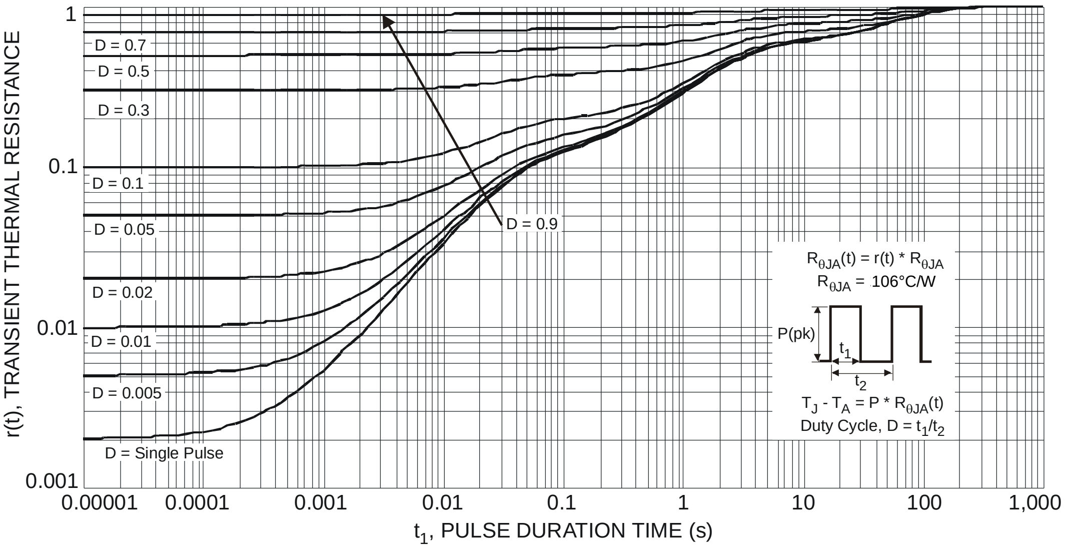
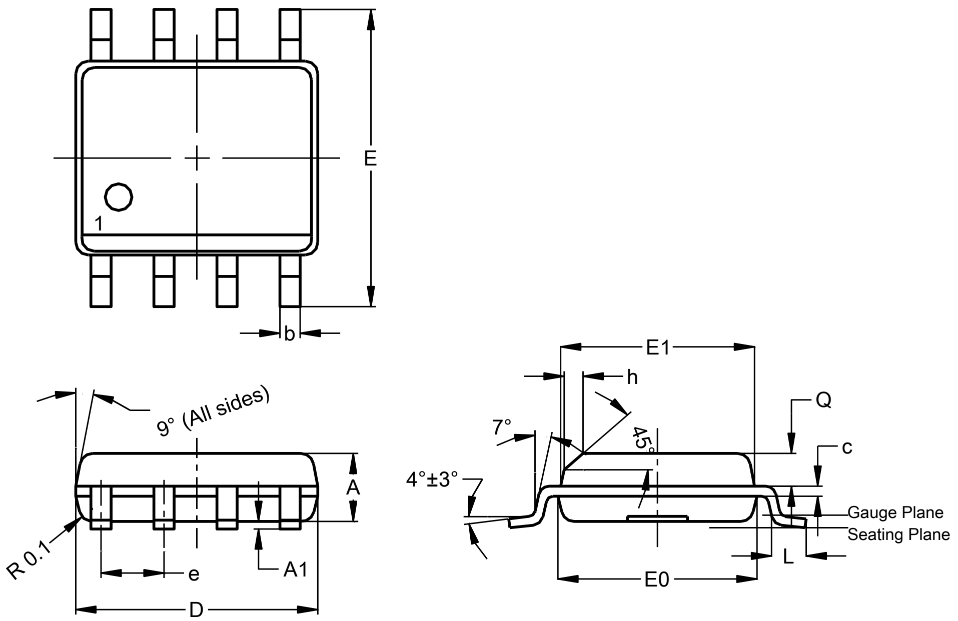


Fig. 12 Transient Thermal Response

Package Outline Dimensions

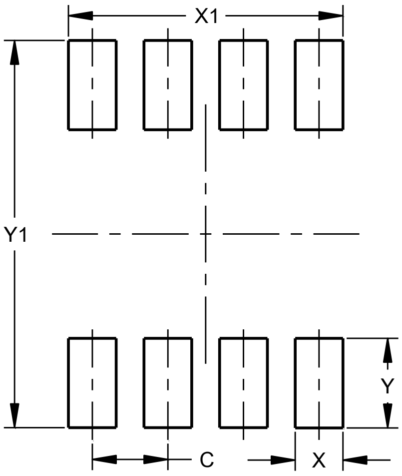
SO-8



SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50