



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 $T_A = +25^\circ C$
30V	14m Ω @ $V_{GS} = 10V$	8.6A
	20m Ω @ $V_{GS} = 4.5V$	7.1A

Description

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.

Applications

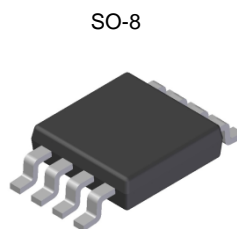
- Backlighting
- Power Management Functions
- DC-DC Converters

Features

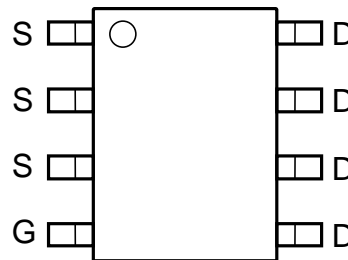
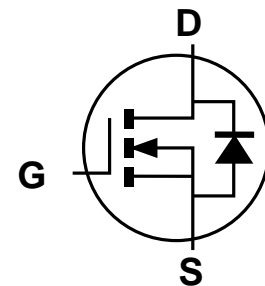
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 $\text{\textcircled{E}}$
- Weight: 0.072g (Approximate)



Top View


 Top View
 Internal Schematic


Equivalent Circuit

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, 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 7) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	8.6 6.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	11.8 9.0	A
Maximum Body Diode Forward Current (Note 7)		I_S	2.4	A
Pulsed Drain Current (Note 8)		I_{DM}	50	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.46	W
	$T_A = +70^\circ\text{C}$		0.9	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	86	$^\circ\text{C/W}$
	$t < 10\text{s}$		46	
Total Power Dissipation (Note 7)	$T_A = +25^\circ\text{C}$	P_D	1.7	W
	$T_A = +70^\circ\text{C}$		1.0	
Thermal Resistance, Junction to Ambient (Note 7)	Steady state	$R_{\theta JA}$	75	$^\circ\text{C/W}$
	$t < 10\text{s}$		40	
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	15	
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 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(th)}$	0.8	1.2	1.6	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	11	14	m Ω	$V_{GS} = 10\text{V}, I_D = 9\text{A}$
		—	14	20		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
Forward Transconductance	g_{fs}	—	8	—	S	$V_{DS} = 10\text{V}, I_D = 9\text{A}$
Diode Forward Voltage	V_{SD}	—	0.72	0.94	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	798	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	128	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	122	—	pF	
Gate Resistance	R_G	—	1.37	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	Q_g	—	8.7	—	nC	$V_{GS} = 5\text{V}, V_{DS} = 15\text{V}, I_D = 9\text{A}$
Gate-Source Charge	Q_{gs}	—	1.7	—		
Gate-Drain Charge	Q_{gd}	—	2.4	—		
Turn-On Delay Time	$t_{d(on)}$	—	5.03	—	ns	$V_{DD} = 15\text{V}, V_{GEN} = 10\text{V},$ $R_L = 15\Omega, R_G = 6.0\Omega, I_D = 1\text{A}$
Rise Time	t_r	—	4.50	—		
Turn-Off Delay Time	$t_{d(off)}$	—	26.33	—		
Fall Time	t_f	—	8.55	—		

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

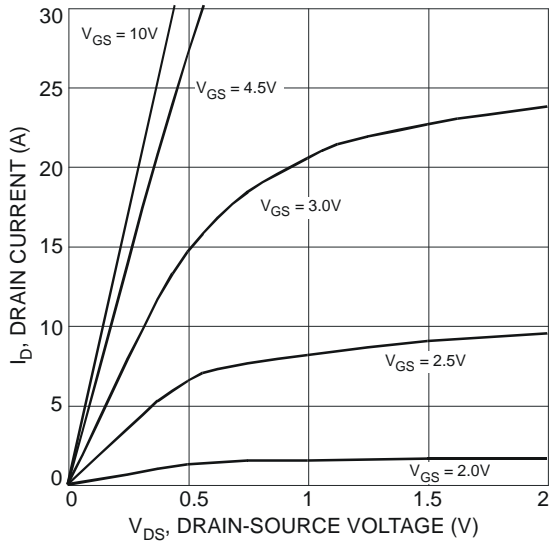


Fig. 1 Typical Output Characteristic

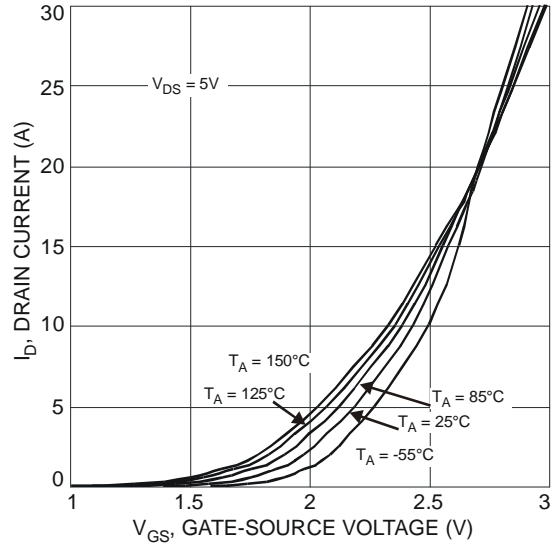


Fig. 2 Typical Transfer Characteristic

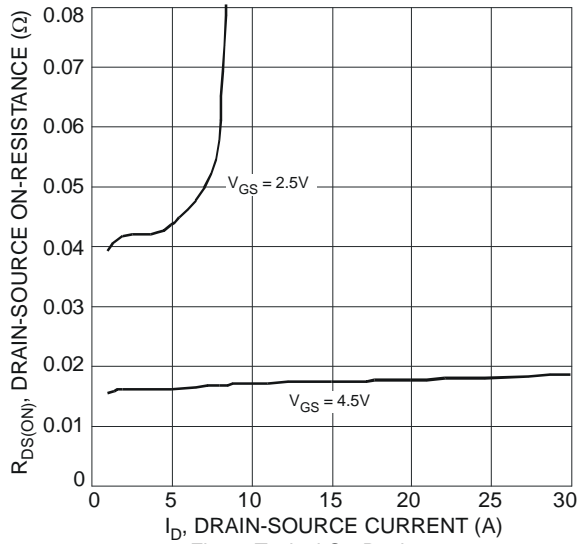


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

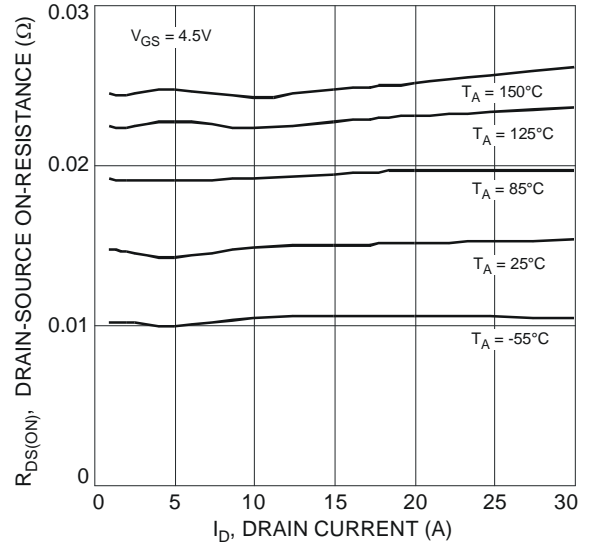


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

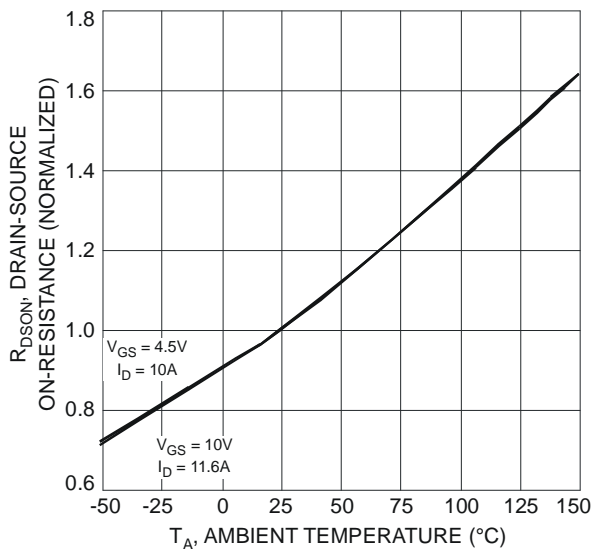


Fig. 5 On-Resistance Variation with Temperature

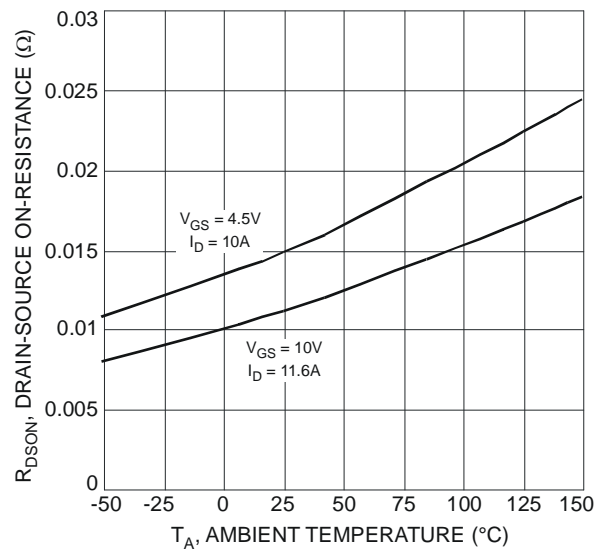
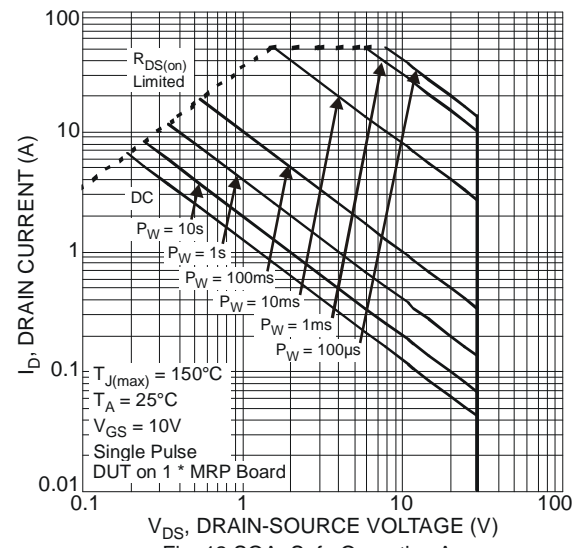
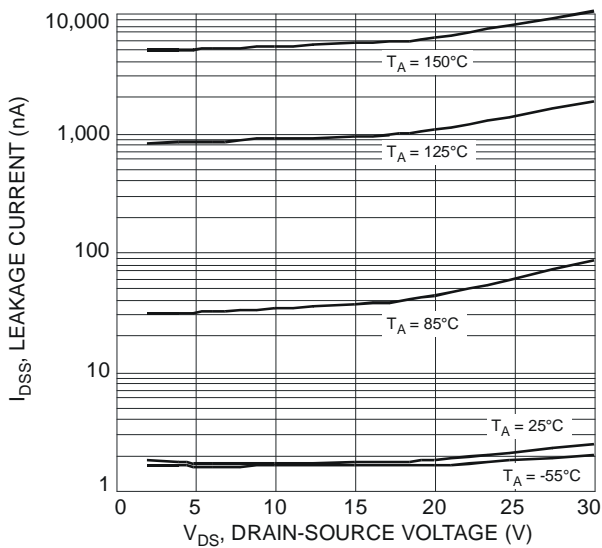
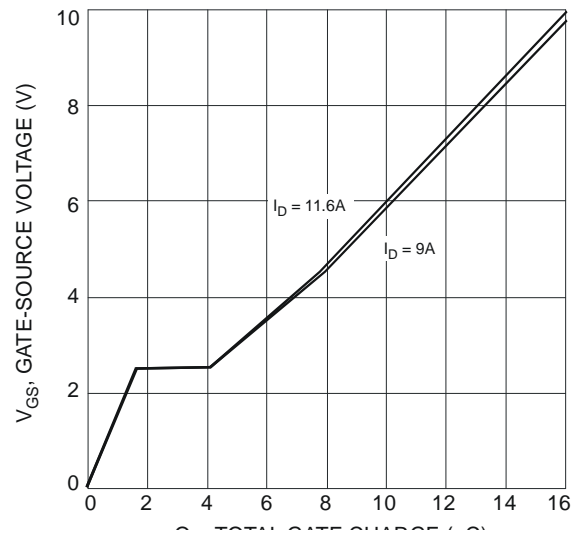
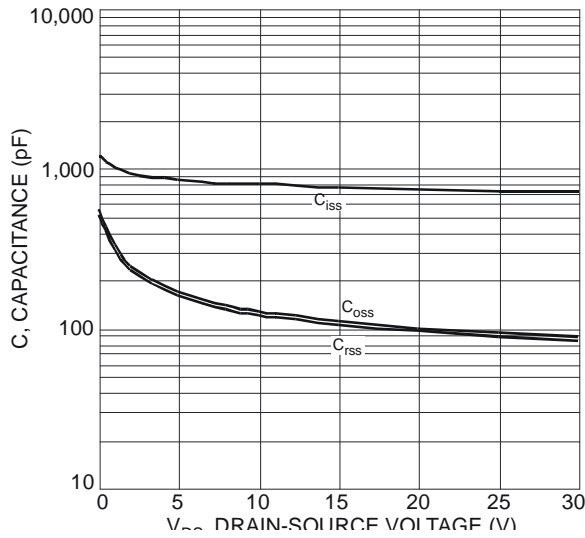
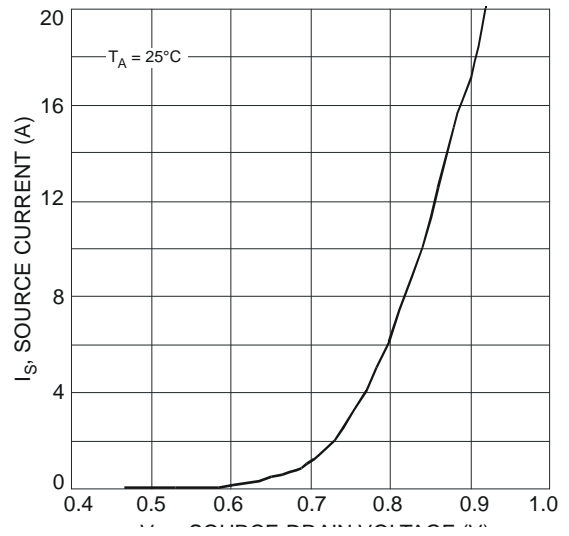
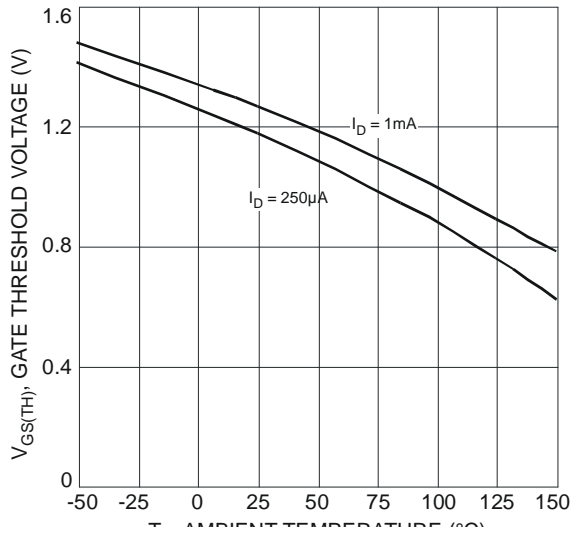
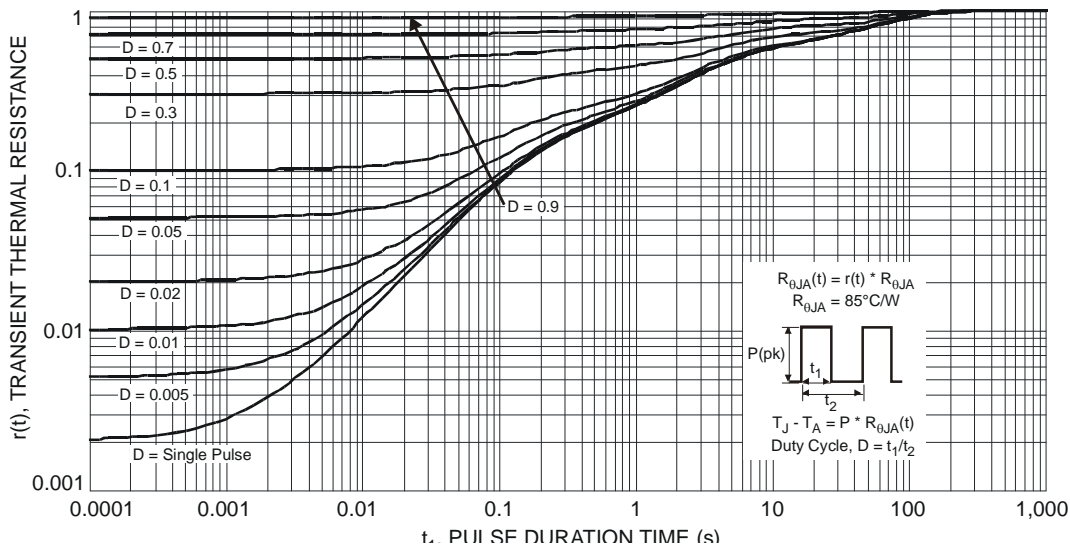
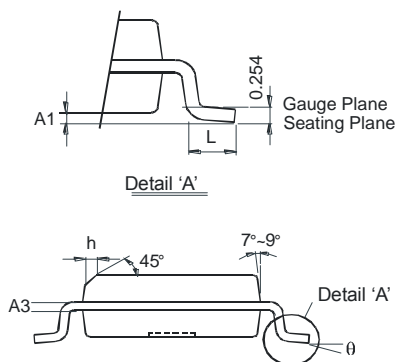
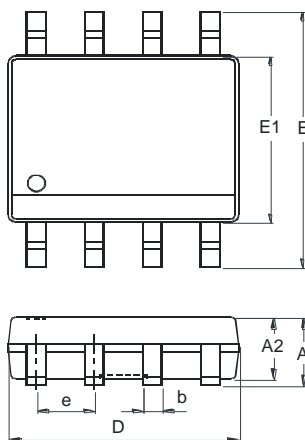


Fig. 6 On-Resistance Variation with Temperature



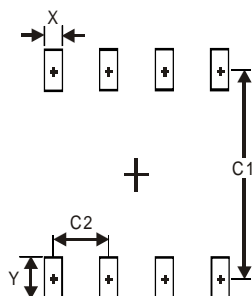


Package Outline Dimensions



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27