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

Device	$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D Max T_A = +25°C
Q2	30V	21mΩ @ V_{GS} = 10V	8.5A
		32mΩ @ V_{GS} = 4.5V	7.2A
Q1	-30V	39mΩ @ V_{GS} = -10V	-7A
		53mΩ @ V_{GS} = -4.5V	-5.6A

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.

- Power Management Functions
- Analog Switch
- Load Switch

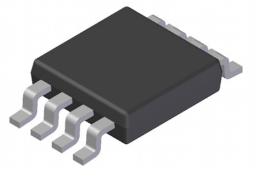
Features

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

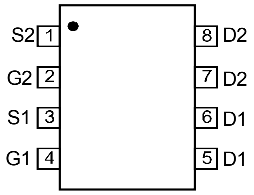
Mechanical Data

- 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 lead frame Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (approximate)

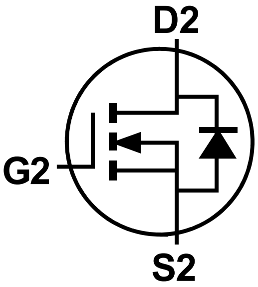
SO-8



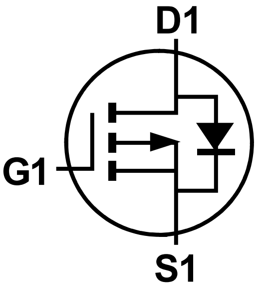
Top View



Top View



N-Channel MOSFET



P-Channel MOSFET

Maximum Ratings N-CHANNEL – Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6)	Steady State	T_A = +25°C T_A = +85°C	I_D	8.5 7.1	A
Pulsed Drain Current (Note 7)			I_{DM}	26	A

Maximum Ratings P-CHANNEL – Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6)	Steady State	T_A = +25°C T_A = +85°C	I_D	-7.0 -4.5	A
Pulsed Drain Current (Note 7)			I_{DM}	-25	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	50	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics N-CHANNEL – Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1	1.45	2.1	V	V_{DS} = V_{GS}, I_C = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	14	21	mΩ	V_{GS} = 10V, I_C = 7A
		—	18	32		V_{GS} = 4.5V, I_C = 5.6A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	8.1	—	S	V_{DS} = 5V, I_C = 7A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.7	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	767	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	110	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	105	—	pF	
Gate Resistance	R_g	—	1.4	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	7.8	—	nC	V_{DS} = 15V, I_D = 9A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	16.1	—	nC	
Gate-Source Charge	Q_{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	5.0	—	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 6Ω , I_D = 1A
Turn-On Rise Time	t_r	—	4.5	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	26.3	—	ns	
Turn-Off Fall Time	t_f	—	8.55	—	ns	

Notes:
6. Device mounted on FR-4 PCB, with minimum recommended pad layout.
7. Repetitive rating, pulse width limited by junction temperature.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

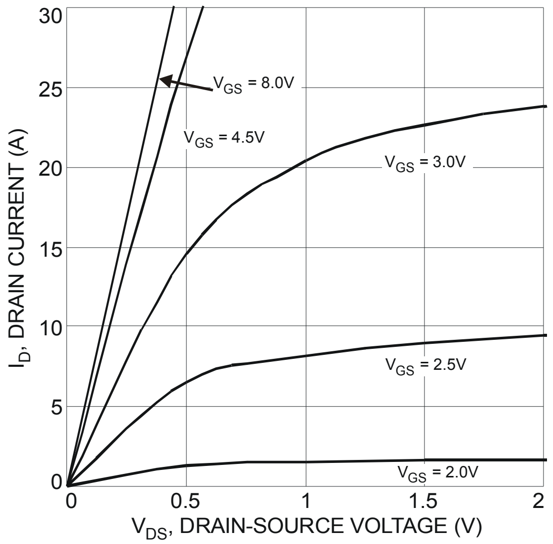


Fig. 1 Typical Output Characteristics

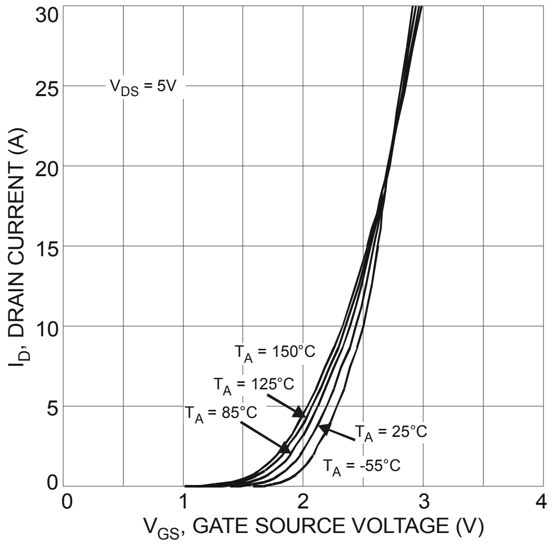


Fig. 2 Typical Transfer Characteristics

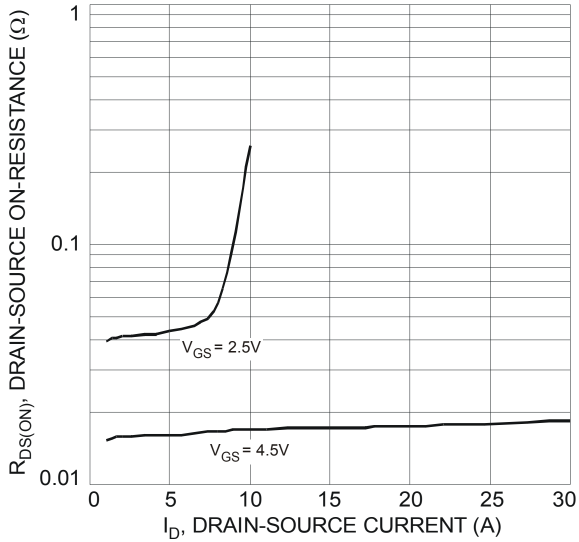


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

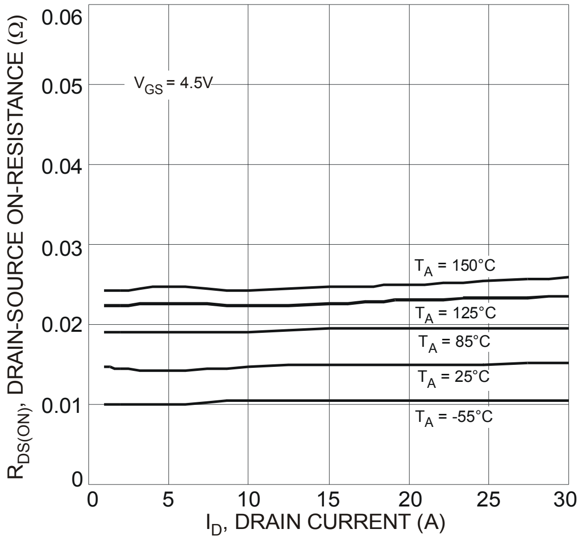


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

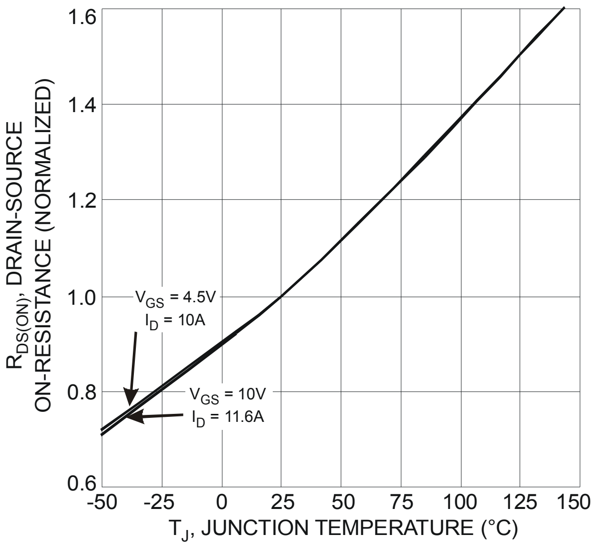


Fig. 5 On-Resistance Variation with Temperature

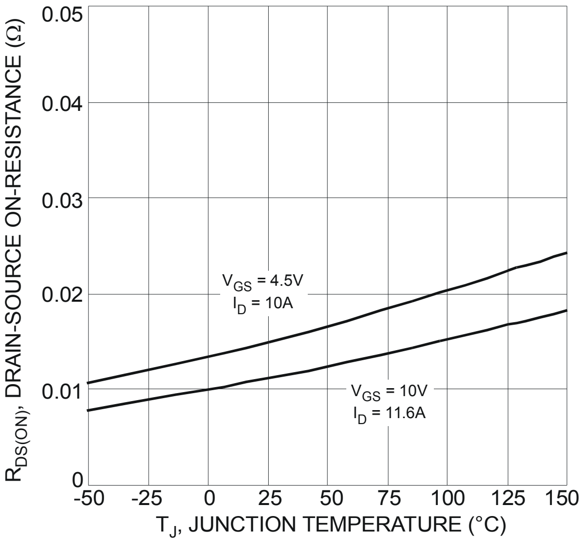


Fig. 6 On-Resistance Variation with Temperature

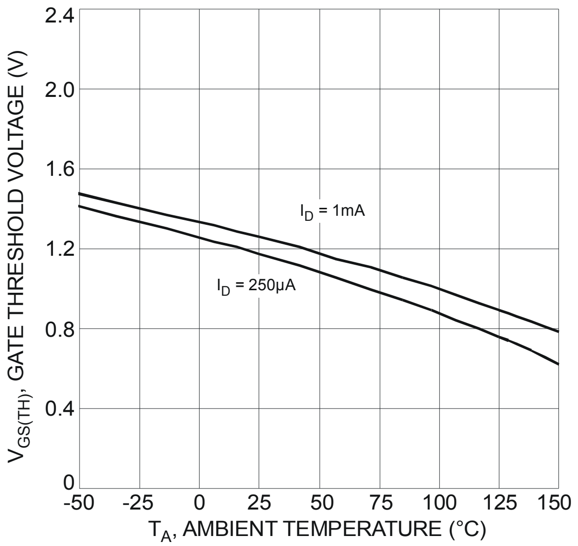


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

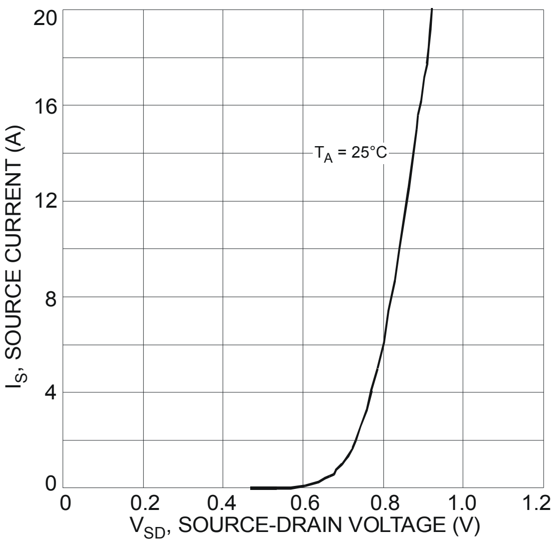


Fig. 8 Diode Forward Voltage vs. Current

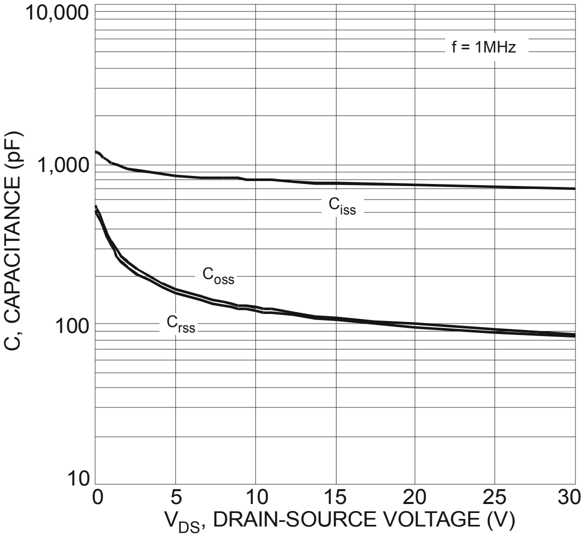


Fig. 9 Typical Capacitance

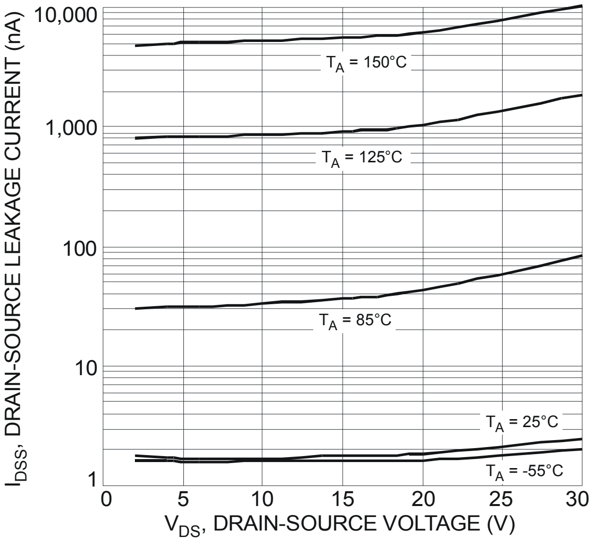


Fig. 10 Typical Drain-Source Leakage Current
vs. Drain-Source Voltage

Electrical Characteristics P-CHANNEL – Q1 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-1	-1.7	-2.2	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	30	39	mΩ	V_{GS} = -10V, I_D = -4.3A
		—	42	53		V_{GS} = -4.5V, I_D = -3.7A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	7	—	S	V_{DS} = -5V, I_D = -4.3A
Diode Forward Voltage (Note 8)	V_{SD}	—	-0.75	-1.0	V	V_{GS} = 0V, I_S = -1.7A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1002	—	pF	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	125	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	118	—	pF	
Gate Resistance	R_g	—	13	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	10.1	—	nC	V_{DS} = -15V, I_D = -6A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	21.1	—	nC	
Gate-Source Charge	Q_{gs}	—	2.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	3.2	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	10.1	—	ns	V_{GS} = -10V, V_{DS} = -15V, R_G = 6Ω , I_D = -1A
Turn-On Rise Time	t_r	—	6.5	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	50.1	—	ns	
Turn-Off Fall Time	t_f	—	22.2	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

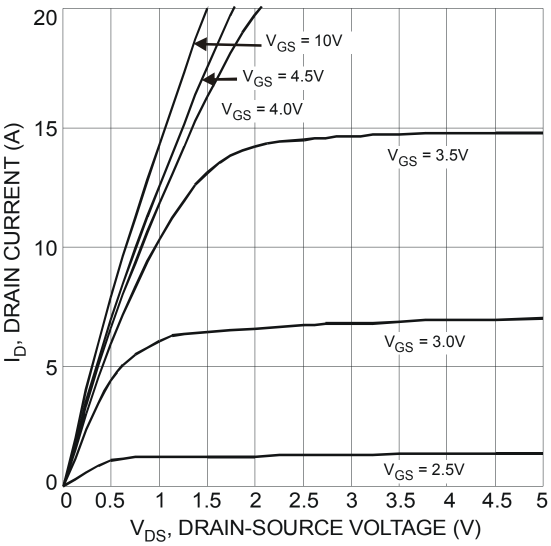


Fig. 11 Typical Output Characteristics

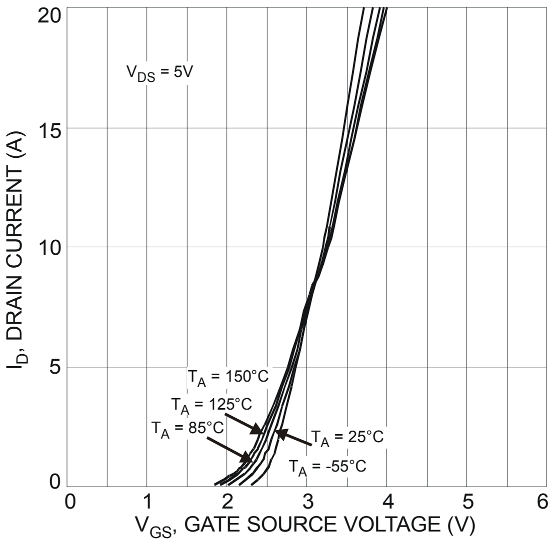


Fig. 12 Typical Transfer Characteristics

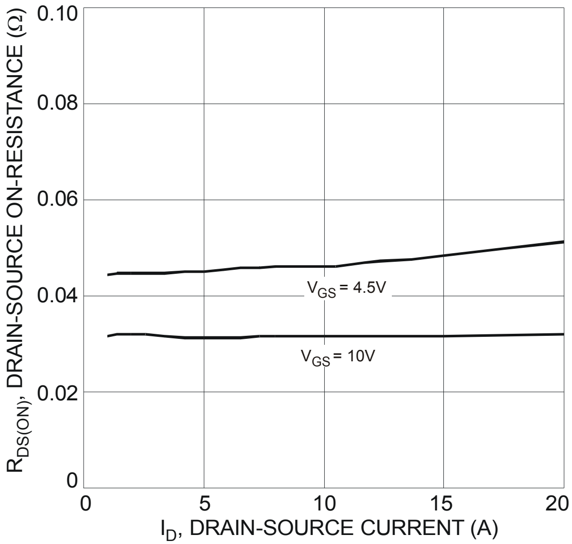


Fig. 13 Typical On-Resistance vs. Drain Current and Gate Voltage

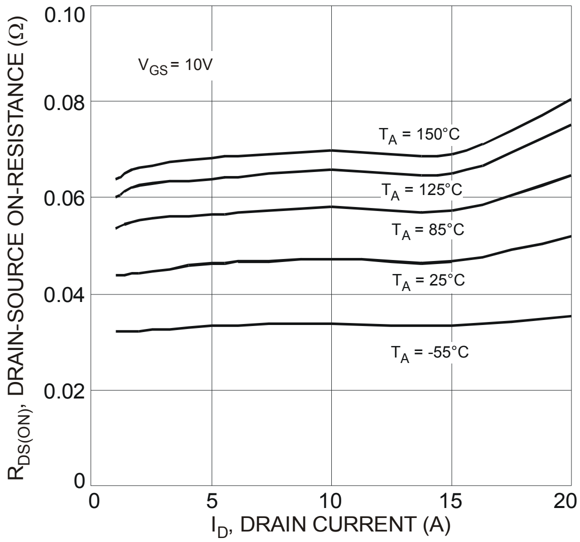


Fig. 14 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

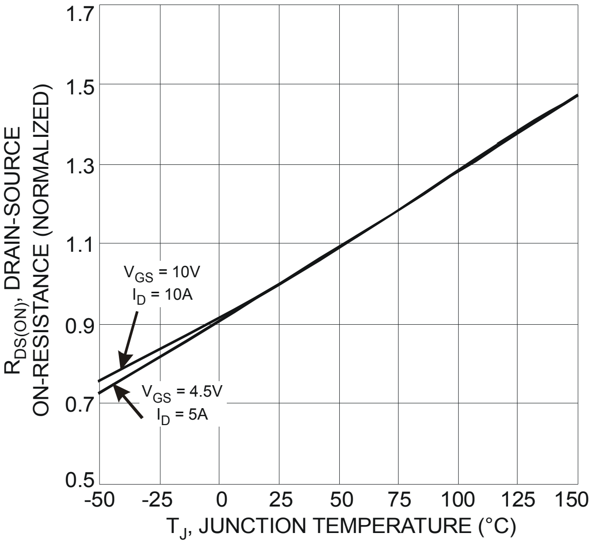


Fig. 15 On-Resistance Variation with Temperature

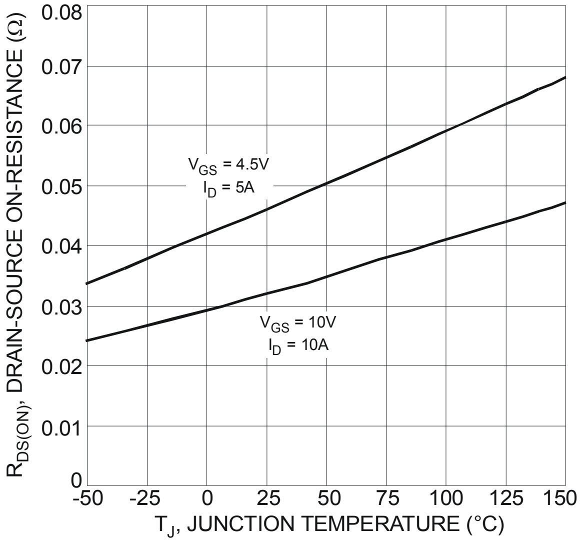


Fig. 16 On-Resistance Variation with Temperature

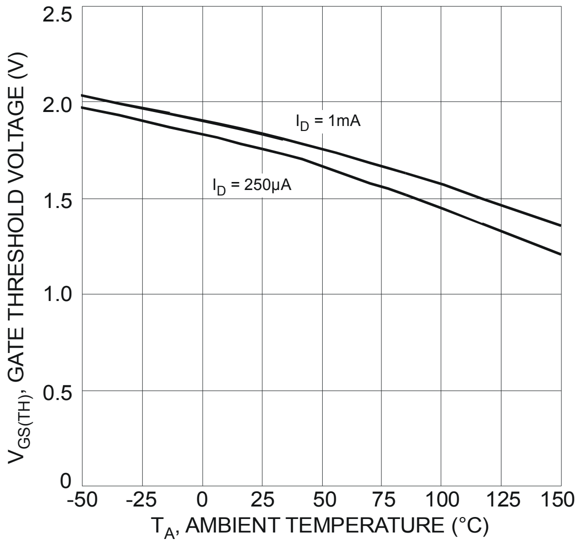


Fig. 17 Gate Threshold Variation vs. Ambient Temperature

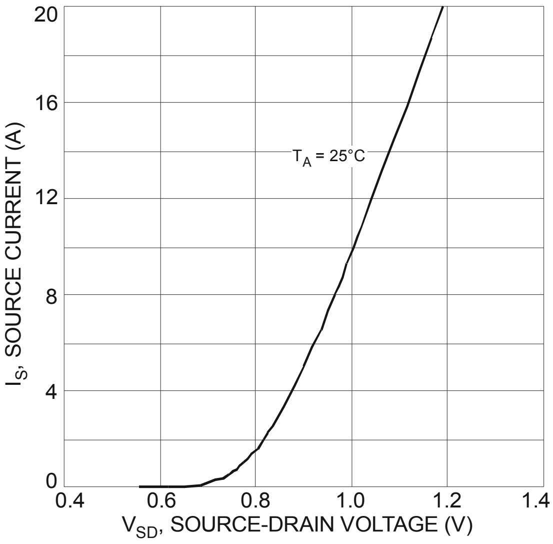


Fig. 18 Diode Forward Voltage vs. Current

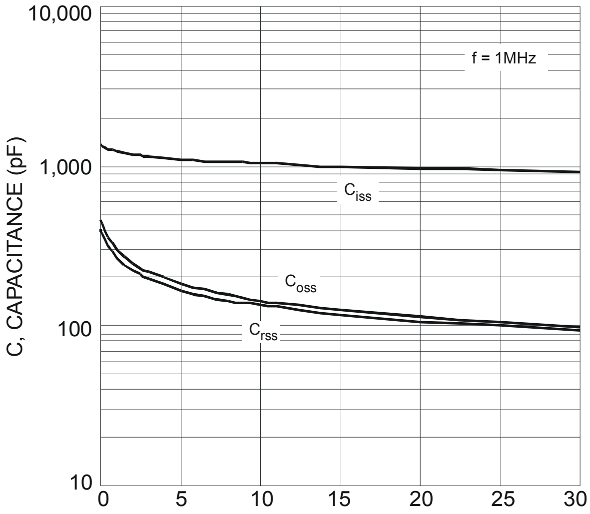


Fig. 19 Typical Capacitance

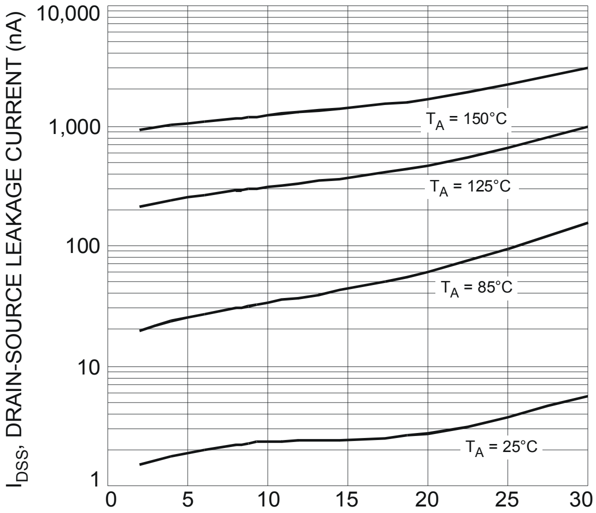
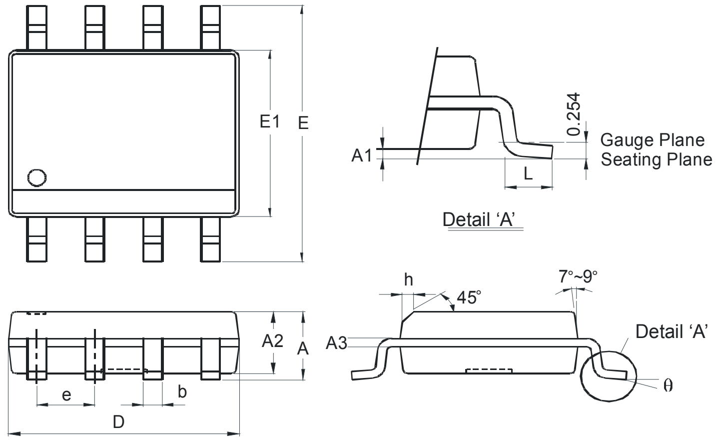


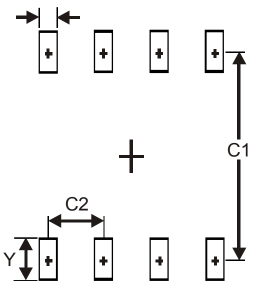
Fig. 20 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

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