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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企业微信二维码　　企业QQ二维码

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
Q1	30V	27mΩ @ V_{GS} = 10V	7.2A
		35mΩ @ V_{GS} = 4.5V	6.0A
Q2	-30V	25mΩ @ V_{GS} = -10V	-7.6A
		41mΩ @ V_{GS} = -4.5V	-6.2A

Description

This new generation 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

- DC-DC Converters
- Power Management Functions
- Backlighting

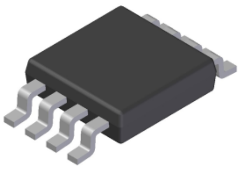
Features and Benefits

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

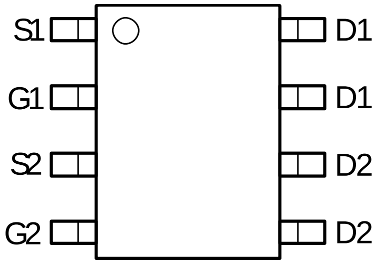
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

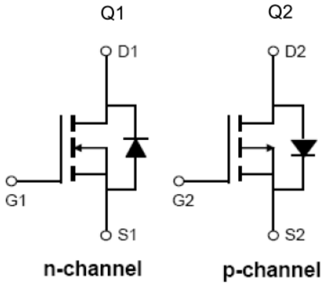
SO-8



Top View



Top View
Pin Configuration



Equivalent Circuit

Maximum Ratings – Q1 and Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Q1	Q2	Units
Drain-Source Voltage			V_{DSS}	30	-30	V
Gate-Source Voltage			V_{GSS}	±20	±20	V
Continuous Drain Current (Note 6) V_{GS} =10V	Steady State	T_A = +25°C	I_D	5.5	-5.8	A
		T_A = +70°C		4.1	-4.3	
	t<10s	T_A = +25°C	I_D	7.2	-7.6	A
		T_A = +70°C		5.7	-6.1	
Maximum Body Diode Forward Current (Note 6)			I_S	2.2	-2.2	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	40	-30	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.2	W
	T_A = +70°C		0.75	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	108	°C/W
	t<10s		65	
Total Power Dissipation (Note 7)	T_A = +25°C	P_D	1.5	W
	T_A = +70°C		0.95	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	85	°C/W
	t<10s		50	
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	14.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics – 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	I_{DSS}	—	—	1	µA	V_{DS} = 24V, 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	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	19	27	mΩ	V_{GS} = 10V, I_D = 6A
		—	22	35		V_{GS} = 4.5V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1.3A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	641	—	pF	V_{DS} = 15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	66	—		
Reverse Transfer Capacitance	C_{rss}	—	51	—		
Gate Resistance	R_G	—	2.2	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	6	—	nC	V_{DS} = 15V, I_D = 10A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	13.2	—		
Gate-Source Charge	Q_{gs}	—	1.7	—		
Gate-Drain Charge	Q_{gd}	—	2.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.3	—	nS	V_{GS} = 10V, V_{DD} = 15V, R_G = 6Ω, I_D = 1A
Turn-On Rise Time	t_r	—	4.4	—		
Turn-Off Delay Time	$t_{D(off)}$	—	22.3	—		
Turn-Off Fall Time	t_f	—	5.3	—		

Electrical Characteristics – 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	I_{DSS}	—	—	-1	µA	V_{DS} = -24V, 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	—	-3	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	21	25	mΩ	V_{GS} = -10V, I_D = -6A
		—	29	41		V_{GS} = -4.5V, I_D = -5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1.3A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1241	—	pF	V_{DS} = -15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	146	—		
Reverse Transfer Capacitance	C_{rss}	—	110	—		
Gate Resistance	R_G	—	14.8	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	10.9	—	nC	V_{DS} = -15V, I_D = -7A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	22	—		
Gate-Source Charge	Q_{gs}	—	3.5	—		
Gate-Drain Charge	Q_{gd}	—	4.7	—		
Turn-On Delay Time	$t_{D(on)}$	—	9.7	—	nS	V_{GS} = -10V, V_{DD} = -15V, R_{GEN} = 6Ω, I_D = -7A
Turn-On Rise Time	t_r	—	17.1	—		
Turn-Off Delay Time	$t_{D(off)}$	—	60.5	—		
Turn-Off Fall Time	t_f	—	40.4	—		

Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

N-Channel – Q1

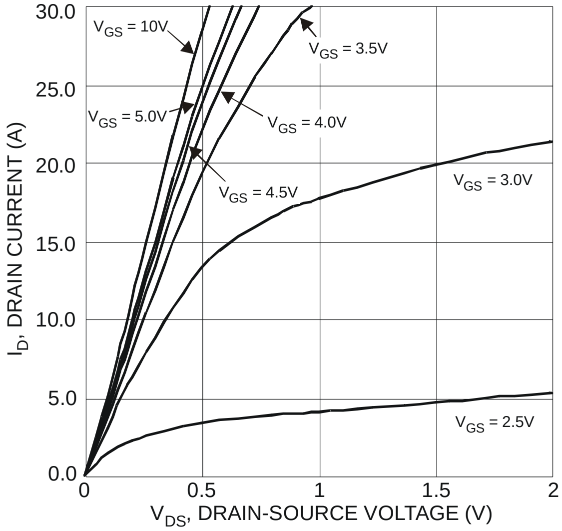


Figure 1 Typical Output Characteristic

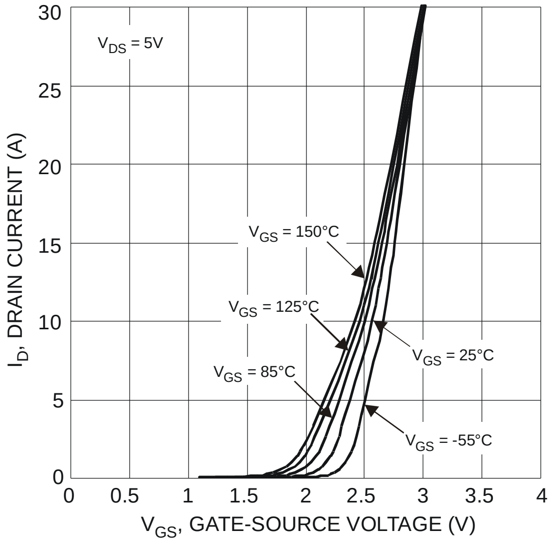


Figure 2 Typical Transfer Characteristic

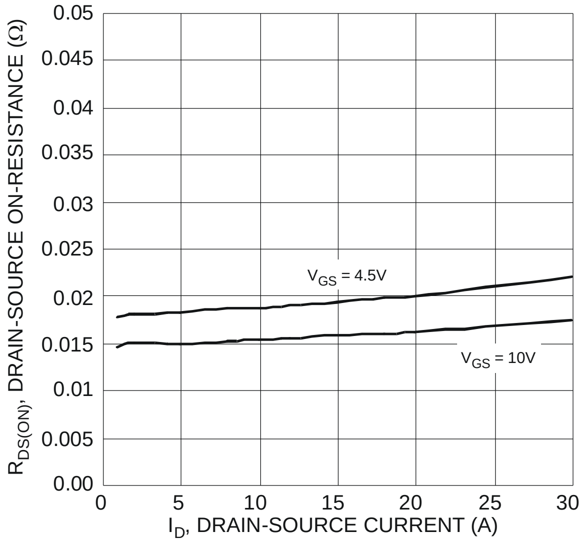


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

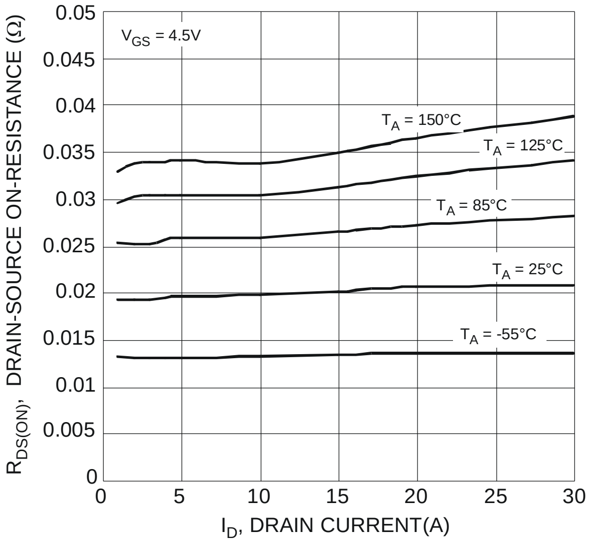


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

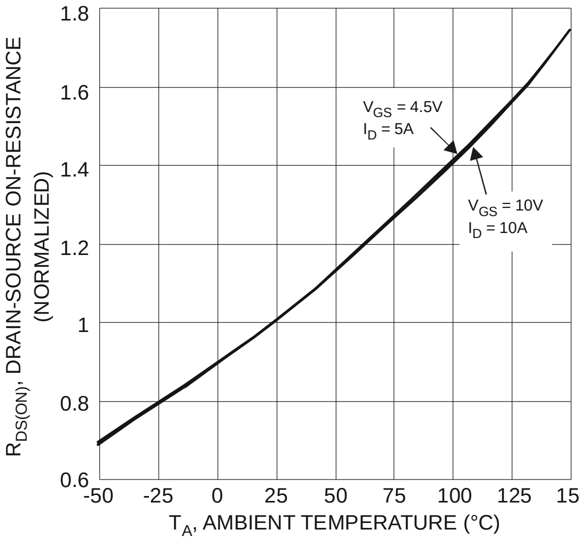


Figure 5 On-Resistance Variation with Temperature

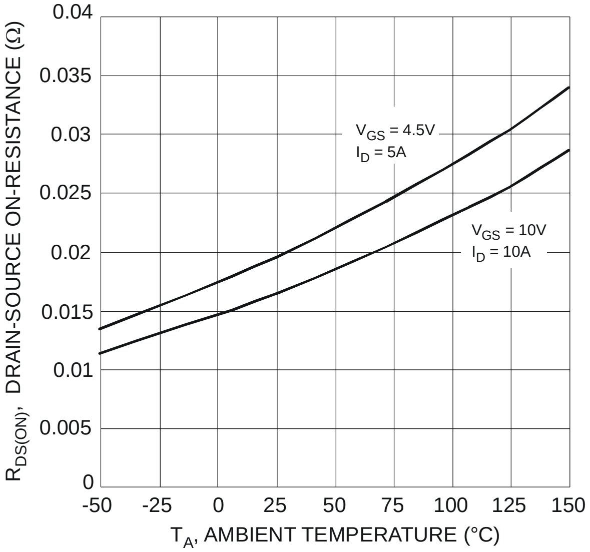


Figure 6 On-Resistance Variation with Temperature

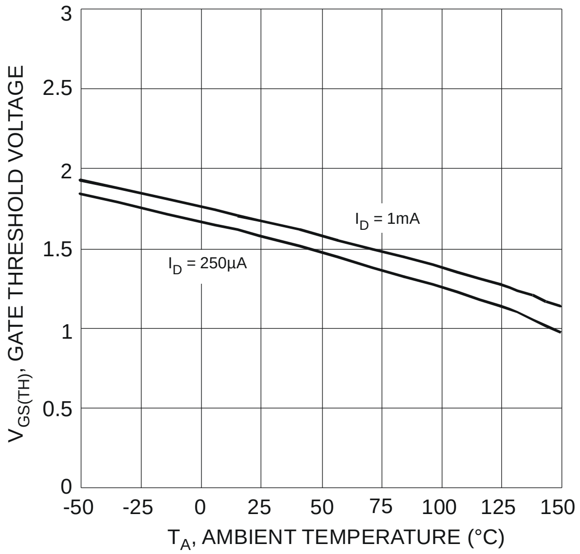


Figure 7 Gate Threshold Variation vs. Ambient Temperature

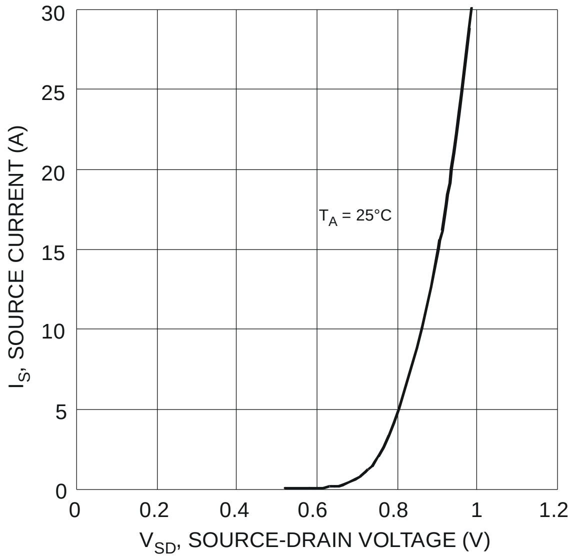


Figure 8 Diode Forward Voltage vs. Current

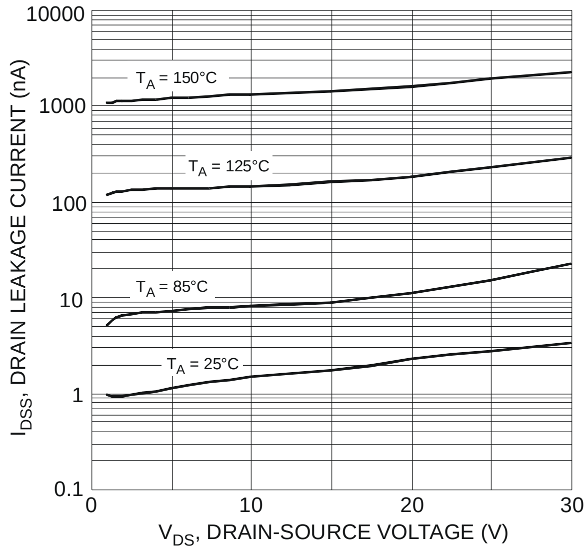


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

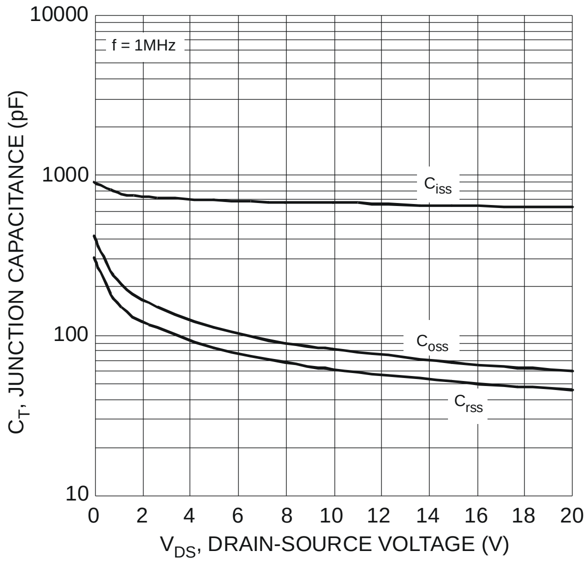


Figure 10 Typical Junction Capacitance

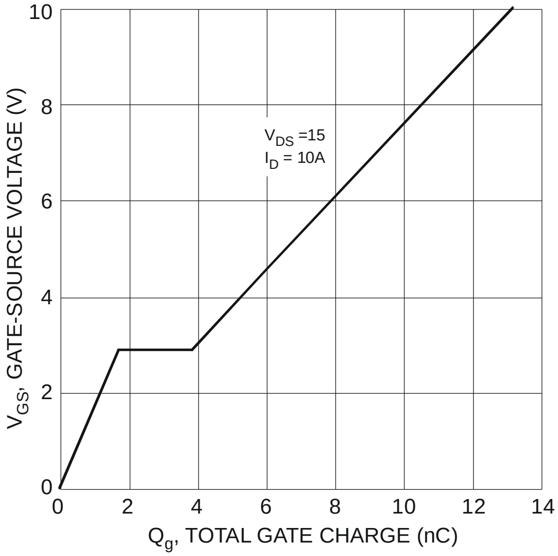


Figure 11 Gate-Source Voltage vs. Total Gate Charge

P-Channel – Q2

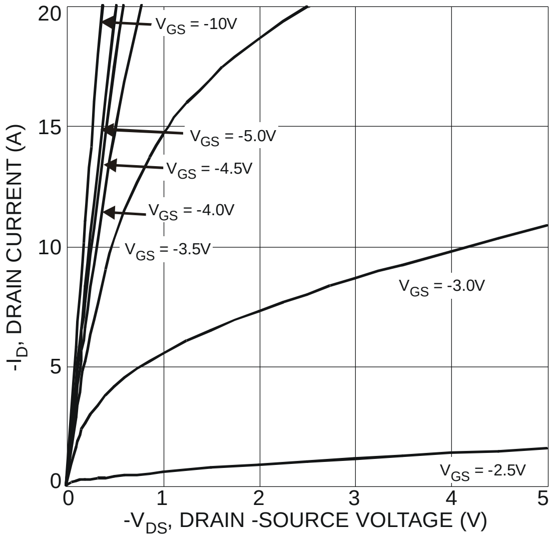


Figure 1 Typical Output Characteristics

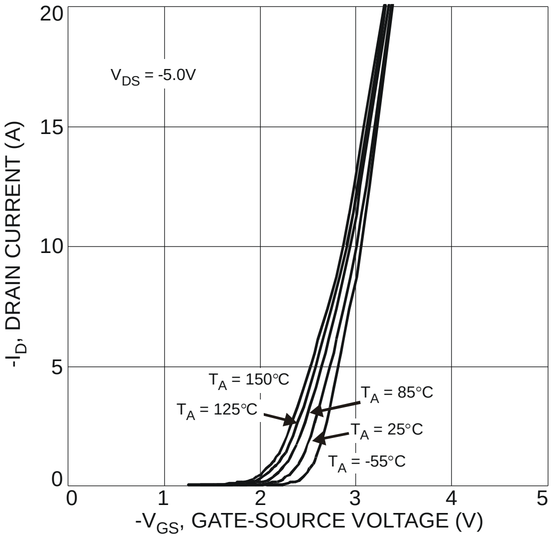


Figure 2 Typical Transfer Characteristics

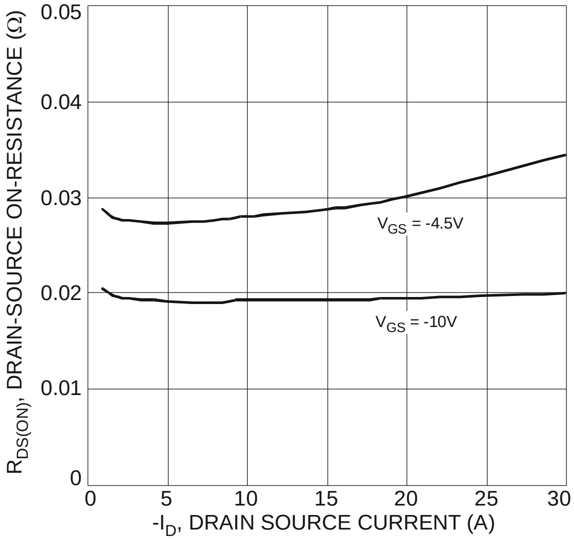


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

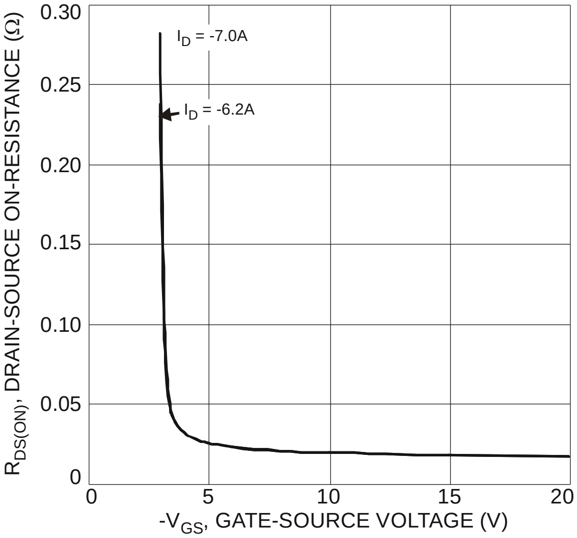


Figure 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

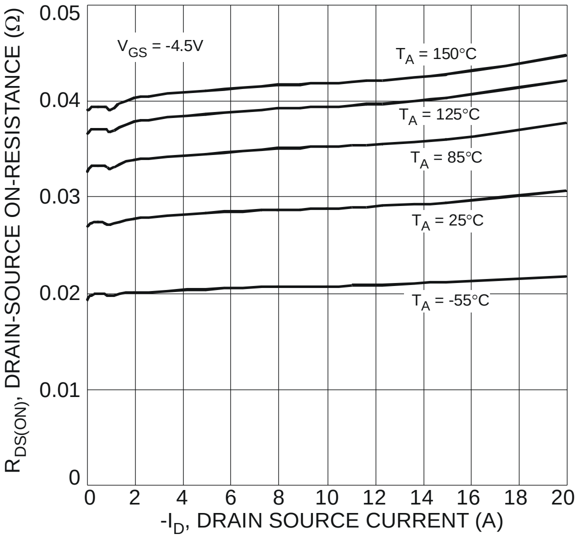


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

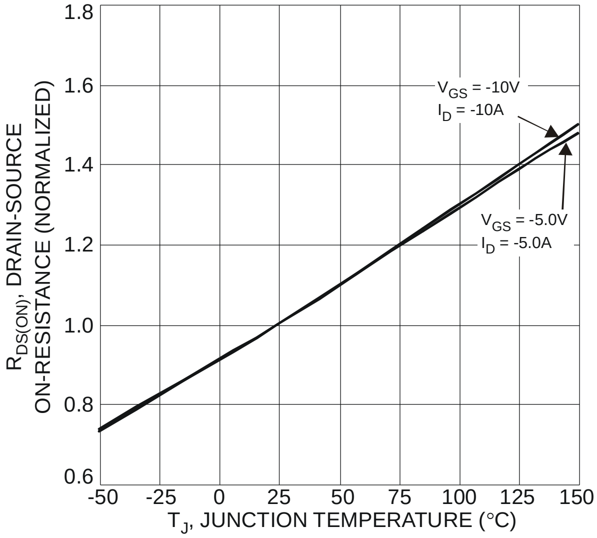


Figure 6 On-Resistance Variation with Temperature

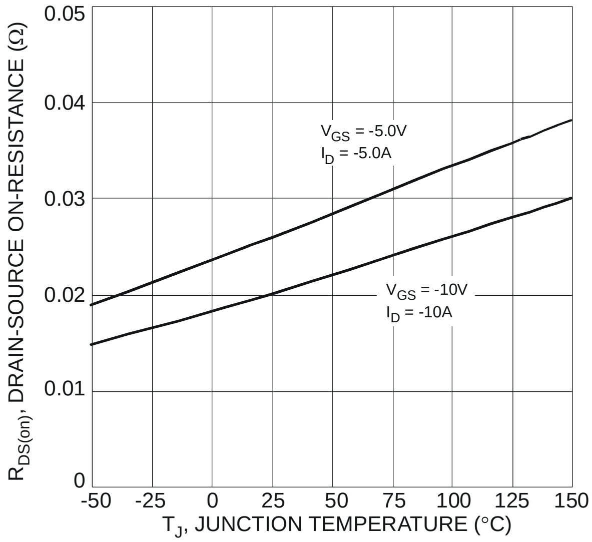


Figure 7 On-Resistance Variation with Temperature

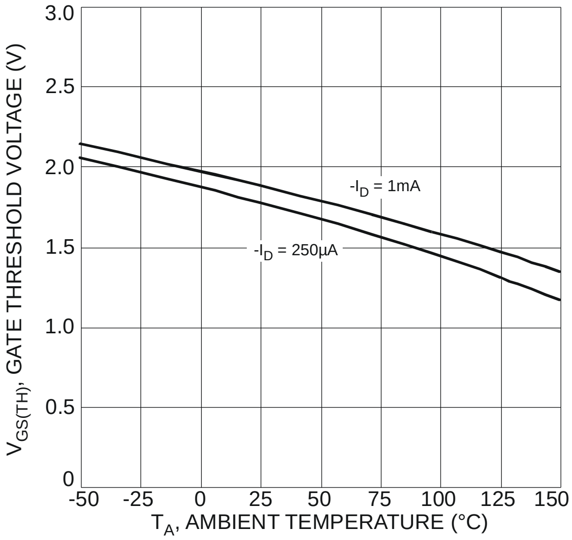


Figure 8 Gate Threshold Variation vs. Ambient Temperature

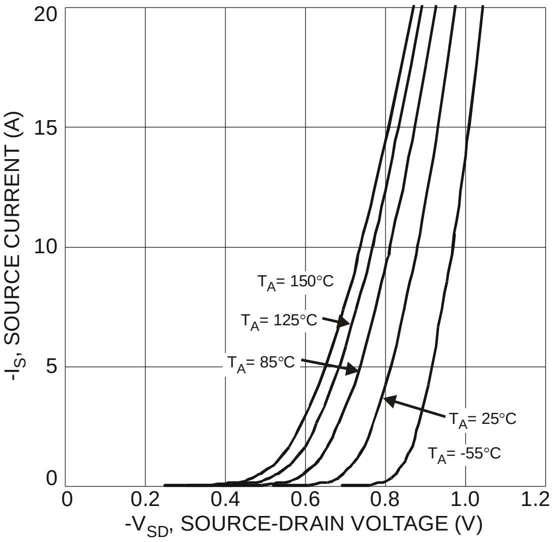
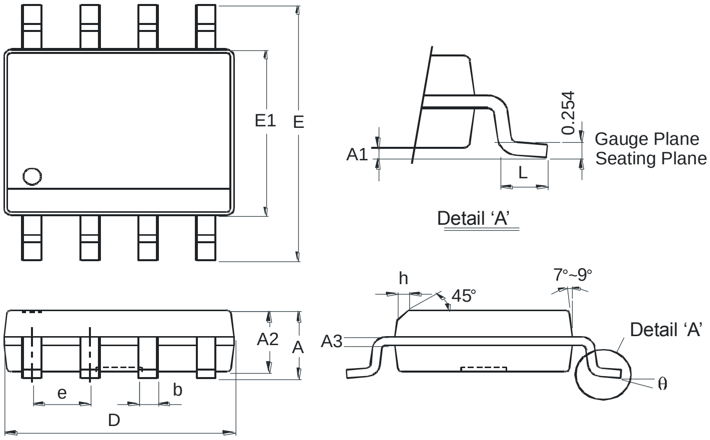


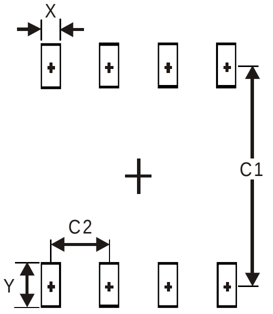
Figure 9 Diode Forward Voltage vs. Current

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