



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	BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
N-Channel	30V	25mΩ @ V _{GS} = 10V	6.0A
		40mΩ @ V _{GS} = 4.5V	4.6A
P-Channel	-30V	50mΩ @ V _{GS} = -10V	-4.2A
		80mΩ @ V _{GS} = -4.5V	-3.2A

Description

This new generation complementary MOSFET H-Bridge features low on-resistance achievable with low gate drive.

Applications

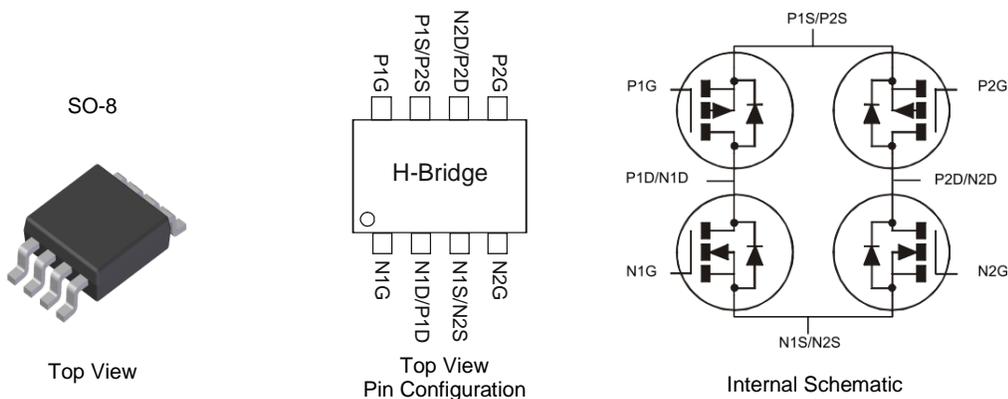
- DC Motor Control
- DC-AC Inverters

Features

- 2 x N + 2 x P Channels in A SO-8 Package
- Low On-Resistance
- Low Input Capacitance
- 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 Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓔ
- Weight: 0.008 grams (Approximate)



Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State $R_{\theta JA}$	83	$^\circ\text{C/W}$
		$t < 10\text{s}$ 50	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	14.5	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Maximum Ratings N-CHANNEL (@ $T_A = +25^\circ\text{C}$, 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 5) $V_{GS} = 10\text{V}$	Steady State I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		6.0 4.8	
	$t < 10\text{s}$ I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		7.8 6.1	
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		4.6 3.6	
	$t < 10\text{s}$ I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		6.1 4.8	
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	2.5	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	60	A

Maximum Ratings P-CHANNEL (@ $T_A = +25^\circ\text{C}$, 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 5) $V_{GS} = -10\text{V}$	Steady State I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-4.2 -3.3	
	$t < 10\text{s}$ I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-5.4 -4.3	
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-3.2 -2.5	
	$t < 10\text{s}$ I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	A
		-4.3 -3.3	
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	-2.5	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	-30	A

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

Electrical Characteristics N-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 30V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 1	μA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	2	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	19	25	m Ω	$V_{GS} = 10V, I_D = 5A$
		—	26	40		$V_{GS} = 4.5V, I_D = 4A$
Forward Transfer Admittance	$ Y_{fs} $	—	4	—	S	$V_{DS} = 5V, I_D = 5A$
Diode Forward Voltage	V_{SD}	—	0.70	1.2	V	$V_{GS} = 0V, I_S = 1.7A$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	590	—	pF	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$
Output Capacitance	C_{oss}	—	122	—		
Reverse Transfer Capacitance	C_{rss}	—	58	—		
Gate Resistance	R_g	—	1.5	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge ($V_{GS} = 4.5V$)	Q_g	—	5.4	—	nC	$V_{DS} = 15V, I_D = 7.8A$
Total Gate Charge ($V_{GS} = 10V$)	Q_g	—	11.7	—		
Gate-Source Charge	Q_{gs}	—	1.8	—		
Gate-Drain Charge	Q_{gd}	—	2.1	—		
Turn-On Delay Time	$t_{D(ON)}$	—	11.2	—	ns	$V_{DD} = 15V, V_{GS} = 4.5V, R_L = 2.4\Omega, R_G = 1\Omega$
Turn-On Rise Time	t_R	—	15	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	17.5	—		
Turn-Off Fall Time	t_F	—	8.7	—		
Reverse Recovery Time	t_{RR}	—	18.3	—	ns	$I_F = 12A, di/dt = 500A/\mu s$
Reverse Recovery Charge	Q_{RR}	—	12	—	nC	

Electrical Characteristics P-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-0.5	μA	$V_{DS} = -30V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 1	μA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1	—	-2	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	43	50	m Ω	$V_{GS} = -10V, I_D = -5A$
		—	68	80		$V_{GS} = -4.5V, I_D = -4A$
Forward Transfer Admittance	$ Y_{fs} $	—	3.5	—	S	$V_{DS} = -5V, I_D = -5A$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0V, I_S = -1.7A$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	631	—	pF	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$
Output Capacitance	C_{oss}	—	137	—		
Reverse Transfer Capacitance	C_{rss}	—	70	—		
Gate Resistance	R_g	—	10.8	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge ($V_{GS} = -4.5V$)	Q_g	—	5.5	—	nC	$V_{DS} = -15V, I_D = -6A$
Total Gate Charge ($V_{GS} = -10V$)	Q_g	—	11.4	—		
Gate-Source Charge	Q_{gs}	—	1.8	—		
Gate-Drain Charge	Q_{gd}	—	2.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	7.5	—	ns	$V_{DD} = -15V, V_{GS} = -10V, R_G = 6\Omega, I_D = -1A$
Turn-On Rise Time	t_R	—	4.9	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	28.2	—		
Turn-Off Fall Time	t_F	—	13.5	—		
Reverse Recovery Time	t_{RR}	—	15.1	—	ns	$I_F = -12A, di/dt = 500A/\mu s$
Reverse Recovery Charge	Q_{RR}	—	15.3	—	nC	

Notes: 6. Short duration pulse test used to minimize self-heating effect.
 7. Guaranteed by design. Not subject to product testing.

Typical Characteristics - N-CHANNEL

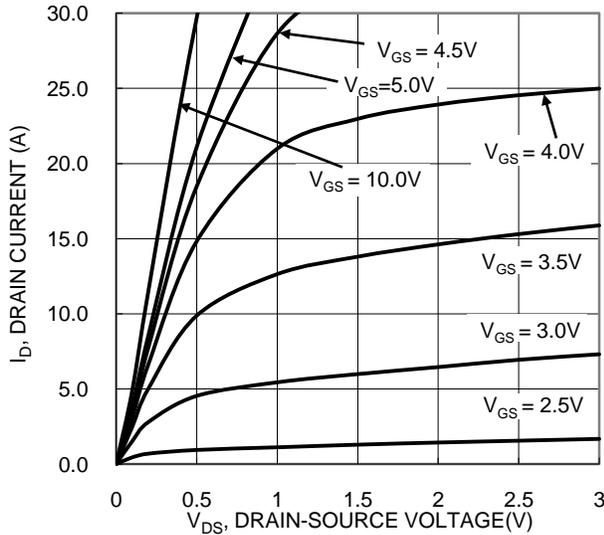


Figure 1. Typical Output Characteristic

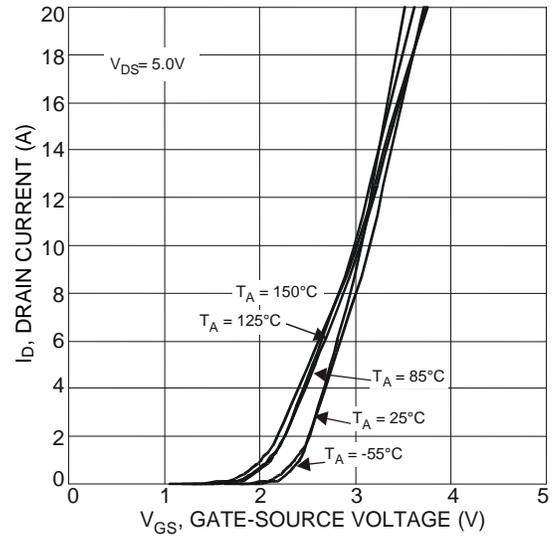


Figure 2 Typical Transfer Characteristics

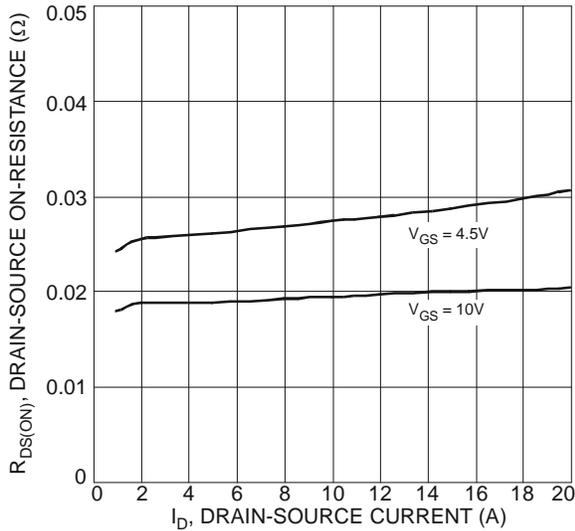


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

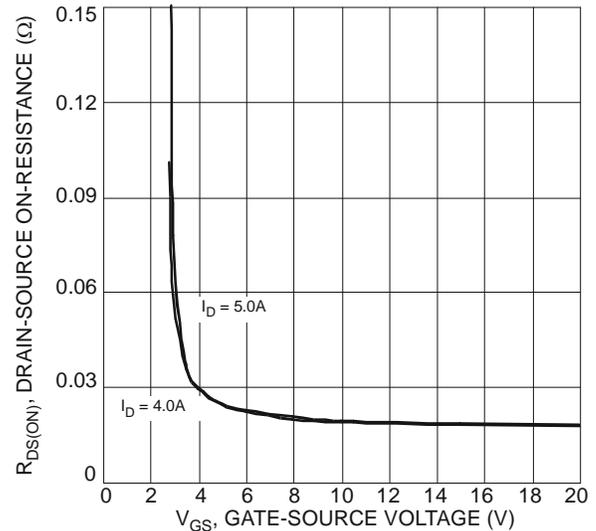


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

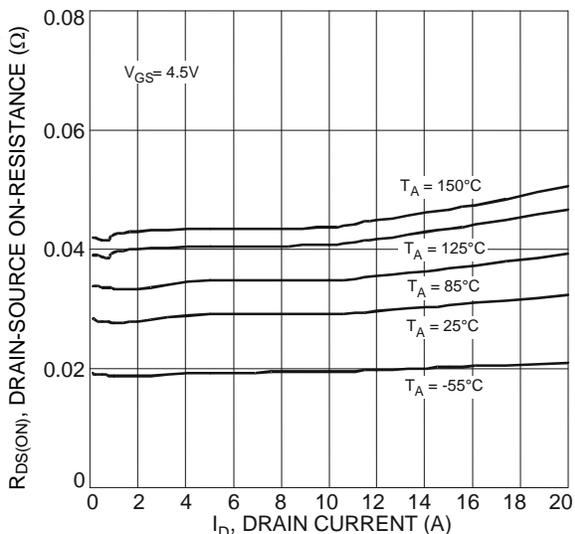


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

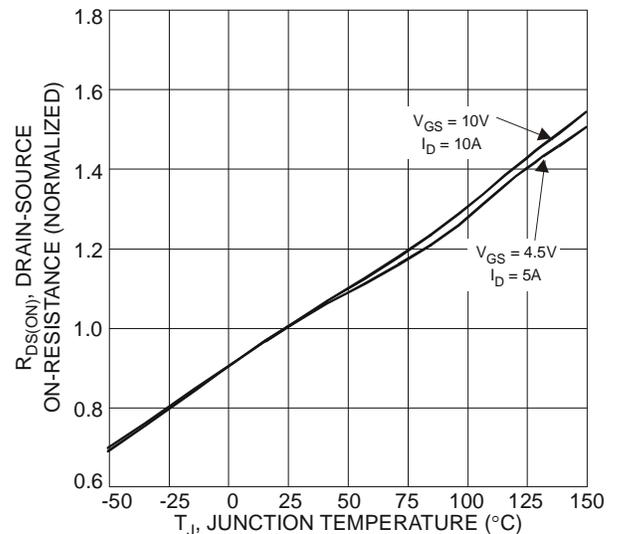


Figure 6 On-Resistance Variation with Temperature

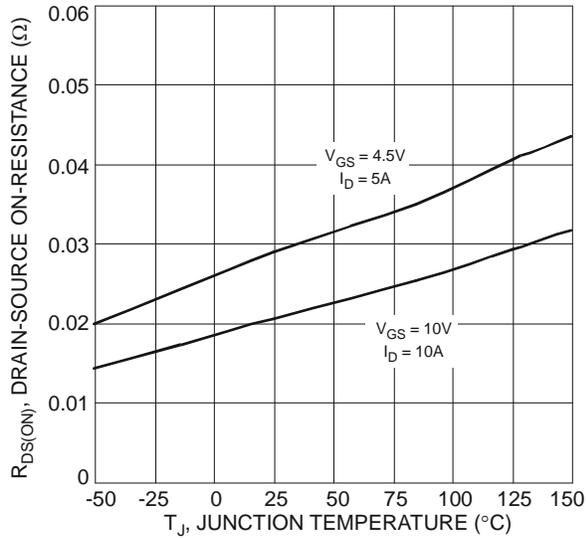


Figure 7 On-Resistance Variation with Temperature

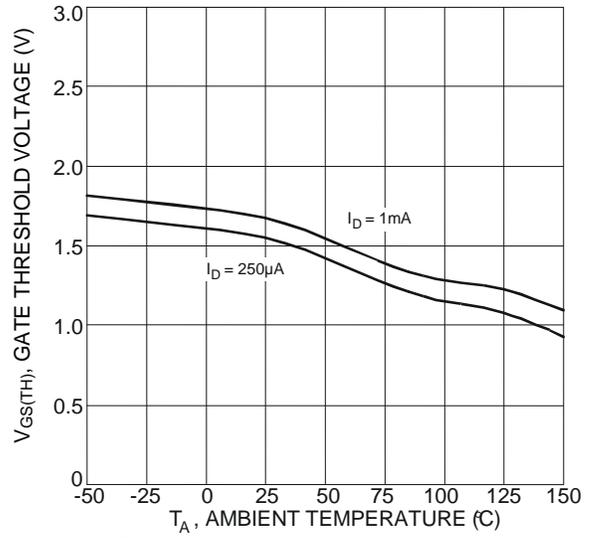


Figure 8 Gate Threshold Variation vs. Ambient Temperature

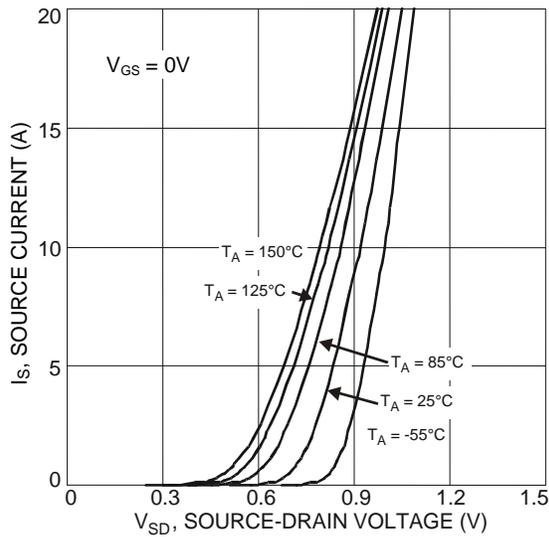


Figure 9 Diode Forward Voltage vs. Current

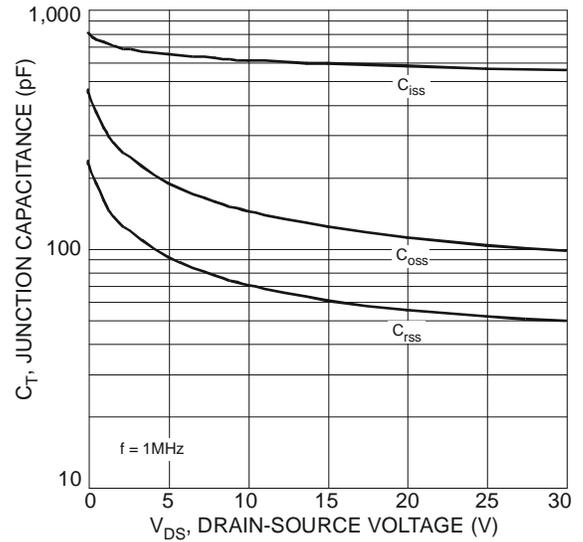


Figure 10 Typical Junction Capacitance

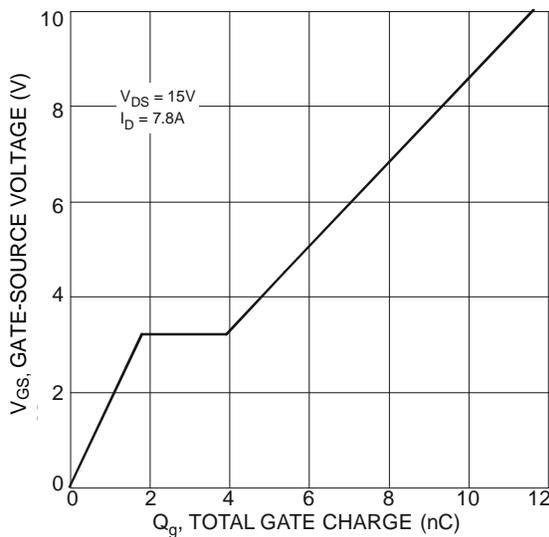


Figure 11 Gate Charge

Typical Characteristics - P-CHANNEL

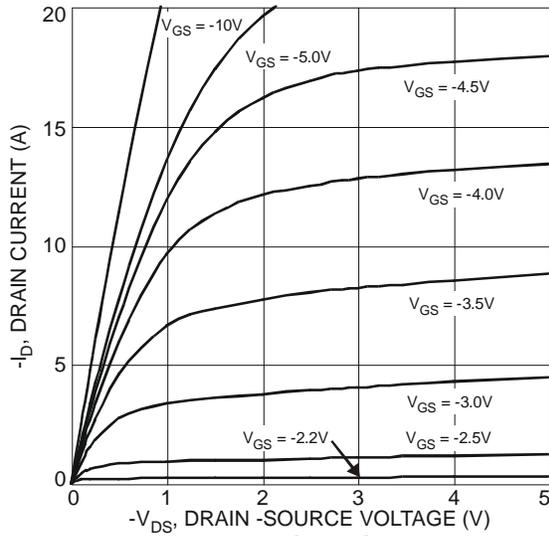


Figure 12 Typical Output Characteristics

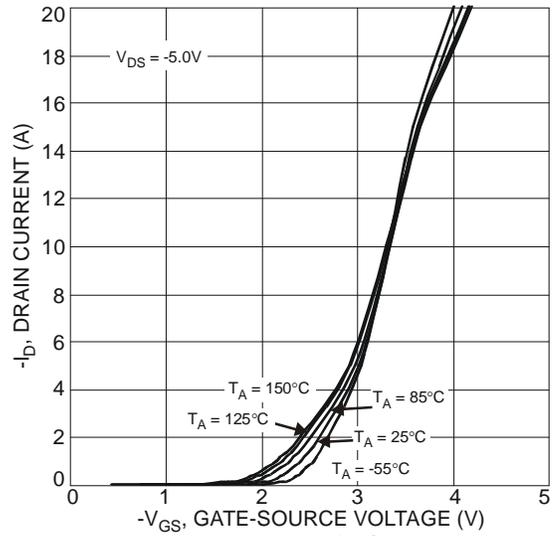


Figure 13 Typical Transfer Characteristics

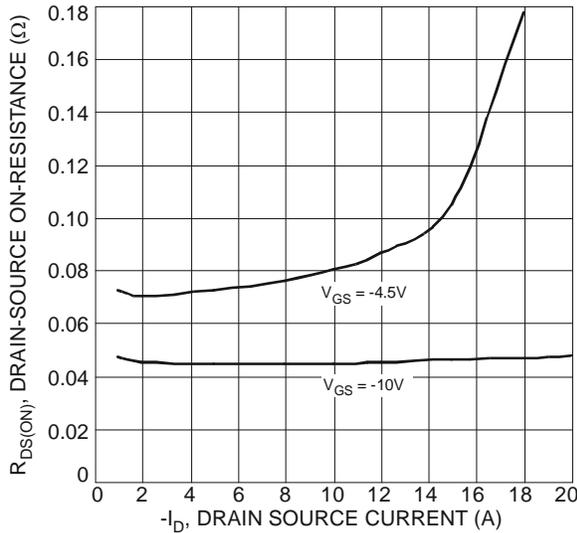


Figure 14 Typical On-Resistance vs. Drain Current and Gate Voltage

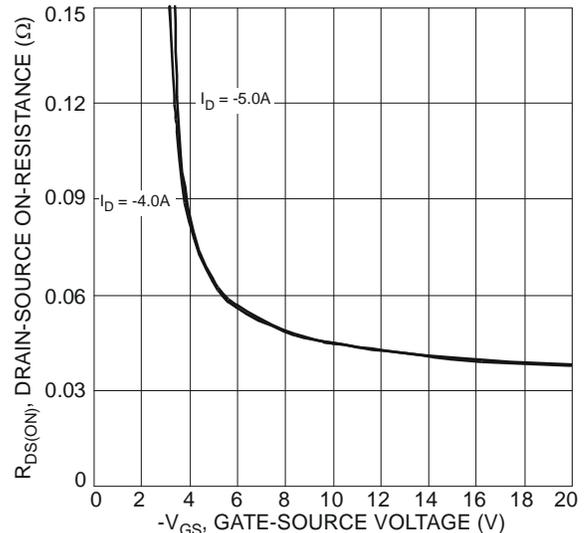


Figure 15 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

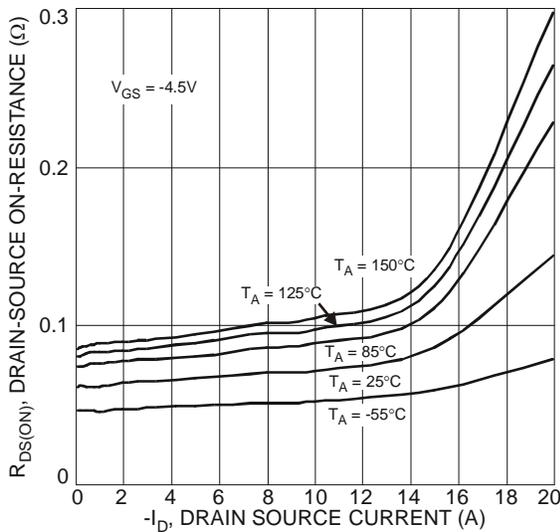


Figure 16 Typical On-Resistance vs. Drain Current and Temperature

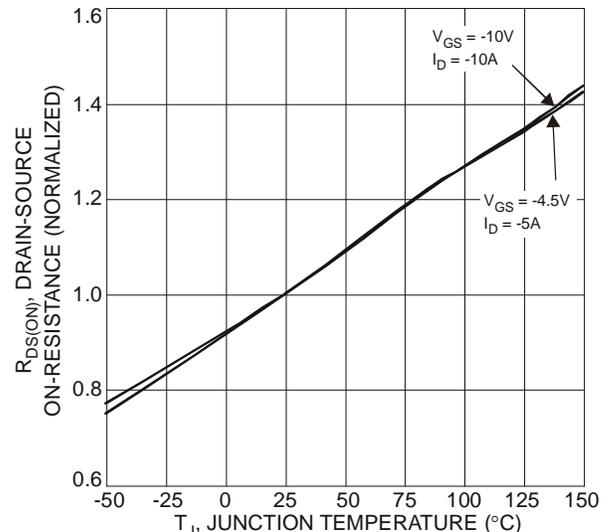


Figure 17 On-Resistance Variation with Temperature

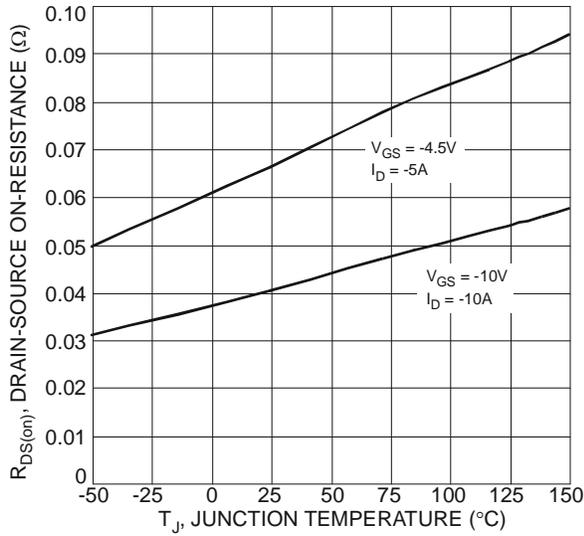


Figure 18 On-Resistance Variation with Temperature

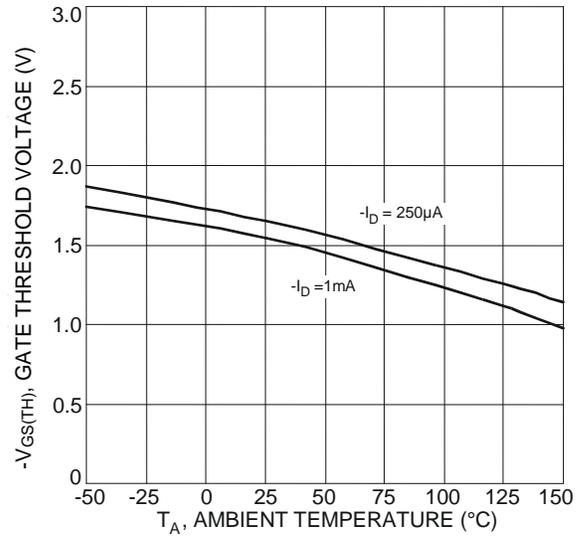


Figure 19 Gate Threshold Variation vs. Ambient Temperature

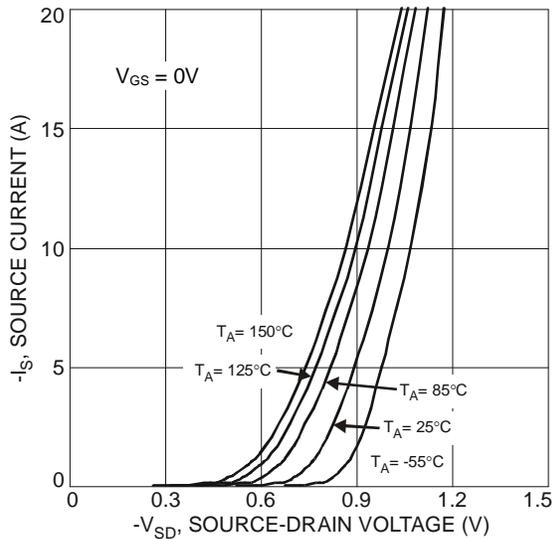


Figure 20 Diode Forward Voltage vs. Current

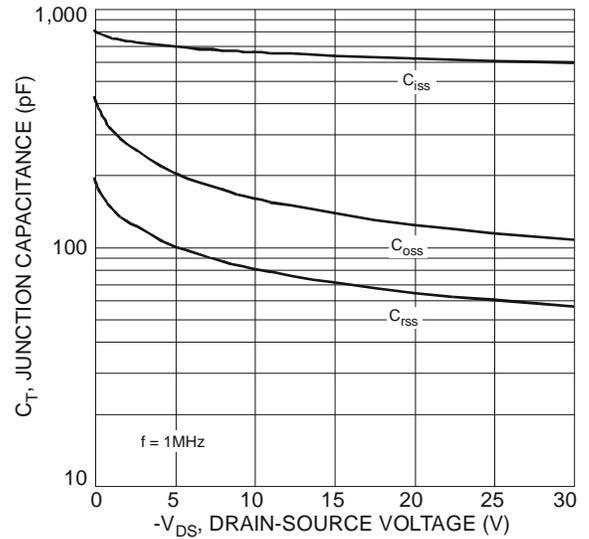


Figure 21 Typical Junction Capacitance

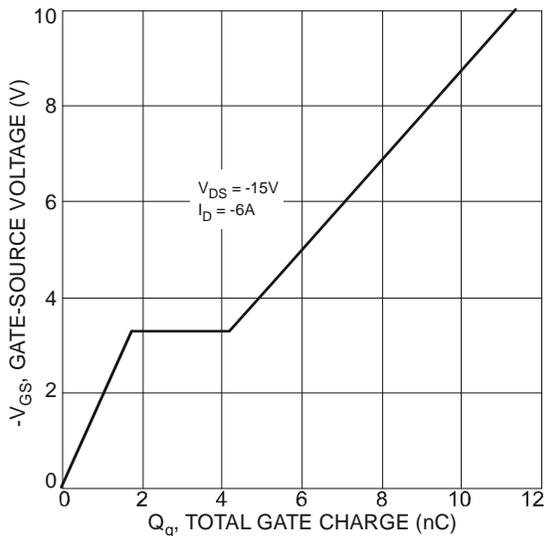
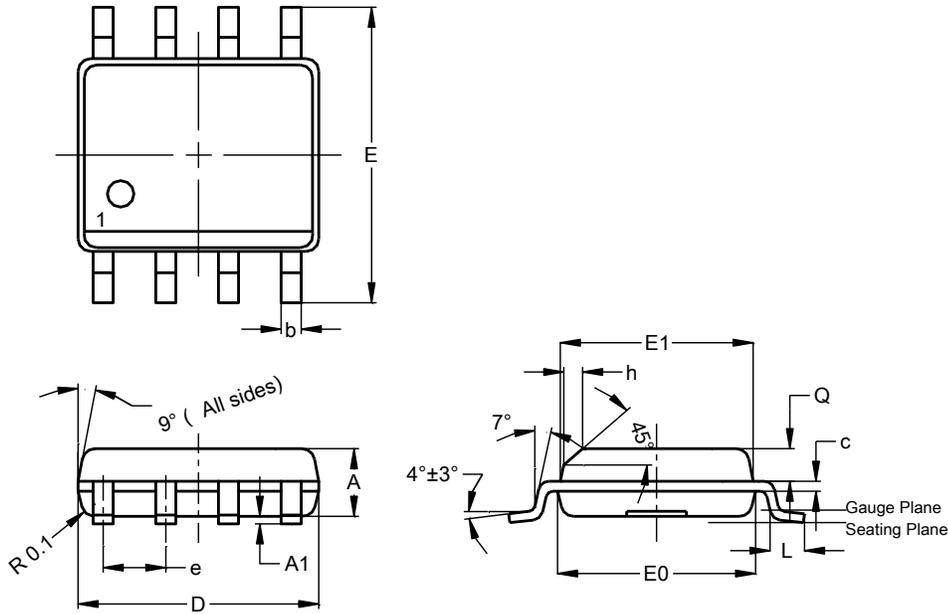


Figure 22 Gate-Charge Characteristics

Package Outline Dimensions

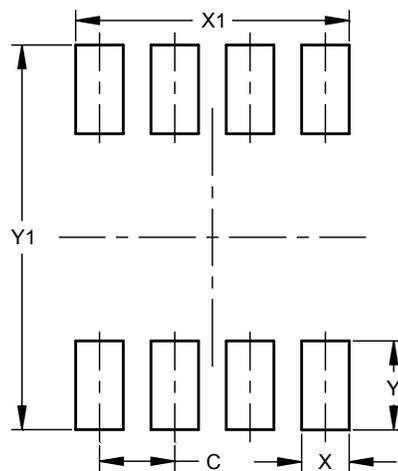
SO-8



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