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

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码

企业QQ二维码

Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ Max	I_D $T_A = +25°C$
Q1 N-Channel	60V	40mΩ @ $V_{GS} = 10V$	6.5A
		55mΩ @ $V_{GS} = 4.5V$	5.6A
Q2 P-Channel	-60V	110mΩ @ $V_{GS} = -10V$	-3.9A
		130mΩ @ $V_{GS} = -4.5V$	-3.6A

Features and Benefits

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

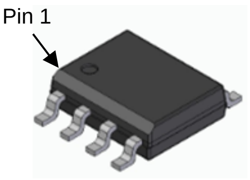
Description and Applications

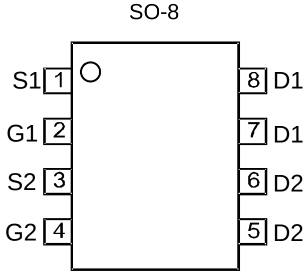
This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- DC-DC converters
- Power-management functions
- Backlighting

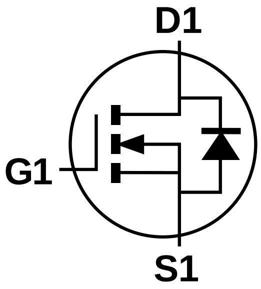
Mechanical Data

- 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: See Diagram
- Terminals: Finish – Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

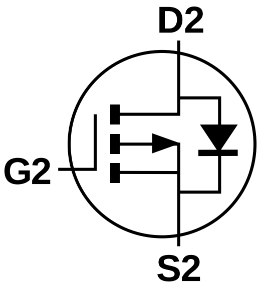




Top View
Pin Configuration



Q1 N-Channel MOSFET



Q2 P-Channel MOSFET

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

Characteristic			Symbol	Q1	Q2	Unit
Drain-Source Voltage			V_{DSS}	60	-60	V
Gate-Source Voltage			V_{GSS}	±20	±20	V
Continuous Drain Current (Note 5) V_{GS} = -10V	Steady State	T_A = +25°C	I_D	5.1	-3.1	A
		T_A = +70°C		4.1	-2.5	
	t < 10s	T_A = +25°C	I_D	6.5	-3.9	A
		T_A = +70°C		5.2	-3.1	
Maximum Body Diode Forward Current (Note 5)			I_S	2.1	-2.1	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	28	-19	A
Avalanche Current (Note 6) L = 0.1mH			I_{AS}	17.2	-17.6	A
Avalanche Energy (Note 6) L = 0.1mH			E_{AS}	14.7	15.4	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 7)	T_A = +25°C	P_D	1.24	W
	T_A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	101	°C/W
	t < 10s		61	
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.56	W
	T_A = +70°C		1.0	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	80	°C/W
	t < 10s		49	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	14.7	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics N-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}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 48V, 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	$R_{DS(ON)}$	—	33	40	mΩ	V_{GS} = 10V, I_D = 8A
		—	37	55		V_{GS} = 4.5V, I_D = 5A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1130	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	69	—		
Reverse Transfer Capacitance	C_{rss}	—	42	—		
Gate Resistance	R_G	—	1.7	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	20.8	—	nC	V_{DS} = 30V, I_D = 4.3A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	9.4	—		
Gate-Source Charge	Q_{gs}	—	3.3	—		
Gate-Drain Charge	Q_{gd}	—	3.0	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.6	—	ns	V_{GS} = 10V, V_{DD} = 30V, R_G = 6Ω I_D = 4.3A
Turn-On Rise Time	t_r	—	1.8	—		
Turn-Off Delay Time	$t_{D(off)}$	—	20.1	—		
Turn-Off Fall Time	t_f	—	4.3	—		
Body Diode Reverse Recovery Time	t_{rr}	—	14.2	—	ns	I_S = 4.3A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	7.5	—	nC	I_S = 4.3A, di/dt = 100A/µs

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. UIS in production with L = 0.1mH, starting T_A = +25°C.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

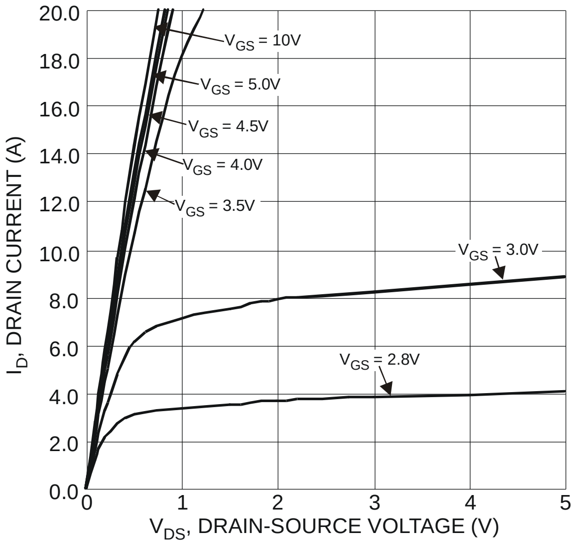


Figure 1 Typical Output Characteristics

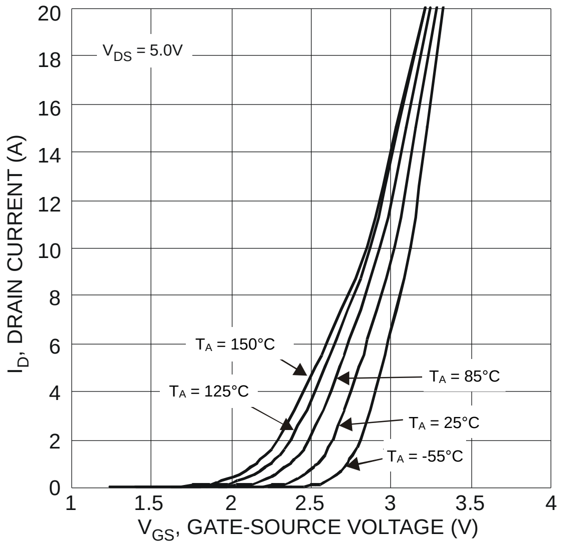


Figure 2 Typical Transfer Characteristics

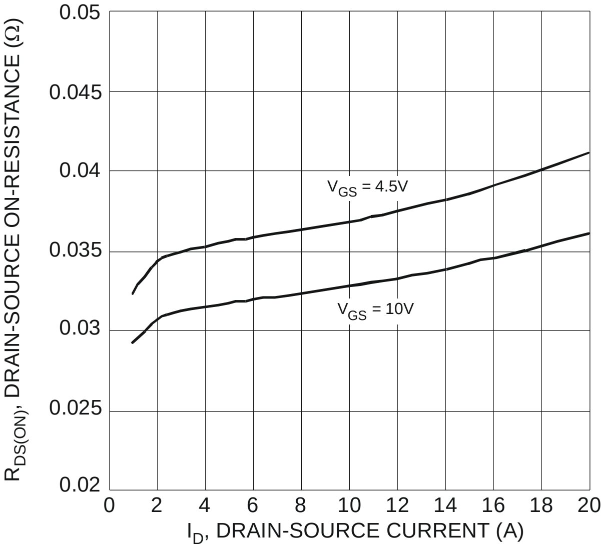


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

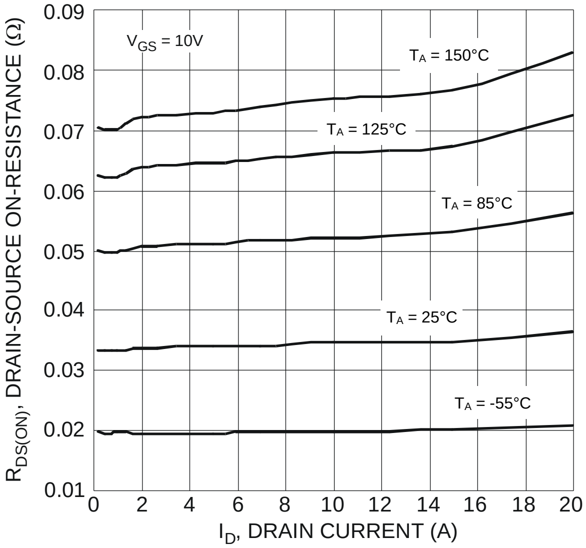


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

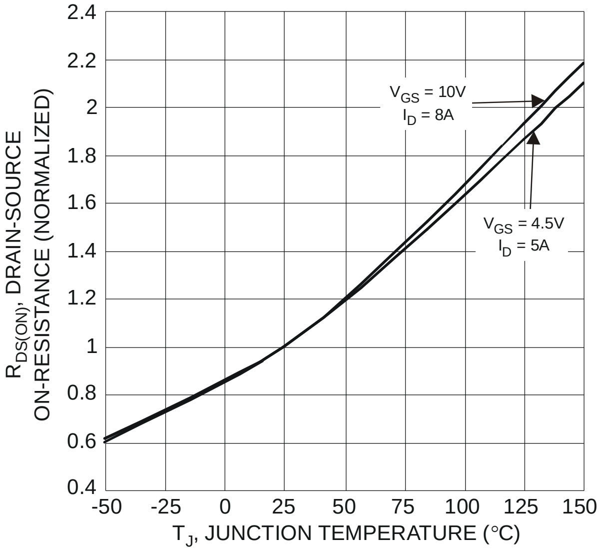


Figure 5 On-Resistance Variation with Temperature

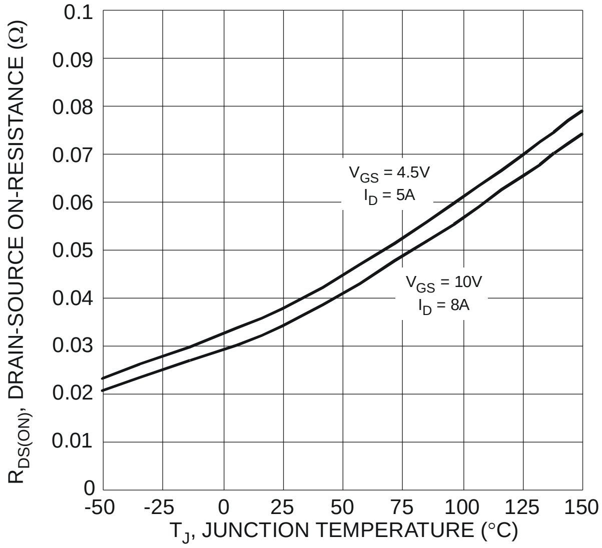


Figure 6 On-Resistance Variation with Temperature

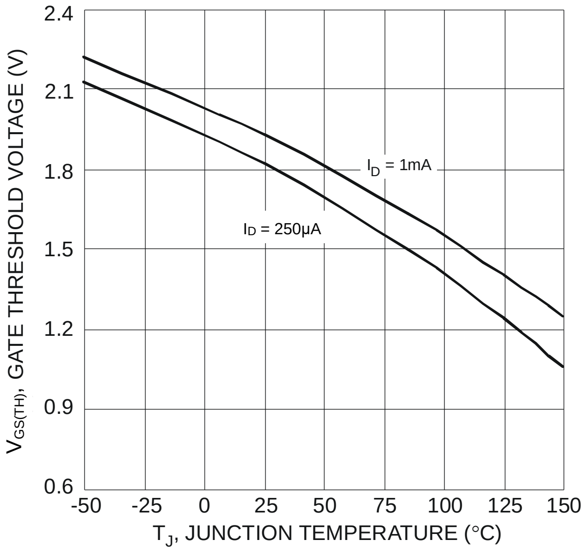


Figure 7 Gate Threshold Variation vs. Ambient Temperature

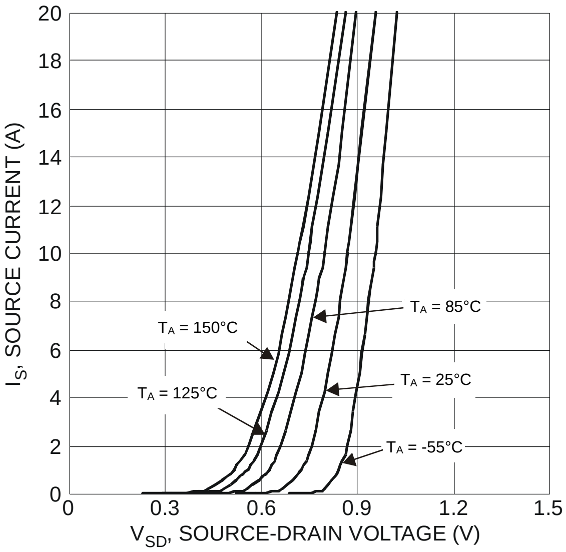


Figure 8 Diode Forward Voltage vs. Current

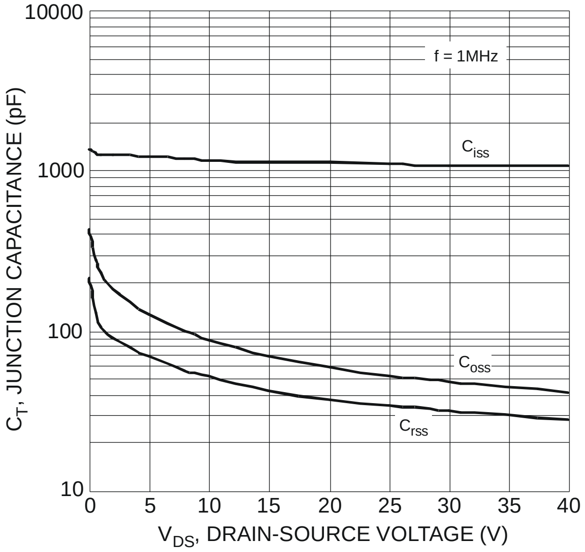


Figure 9 Typical Junction Capacitance

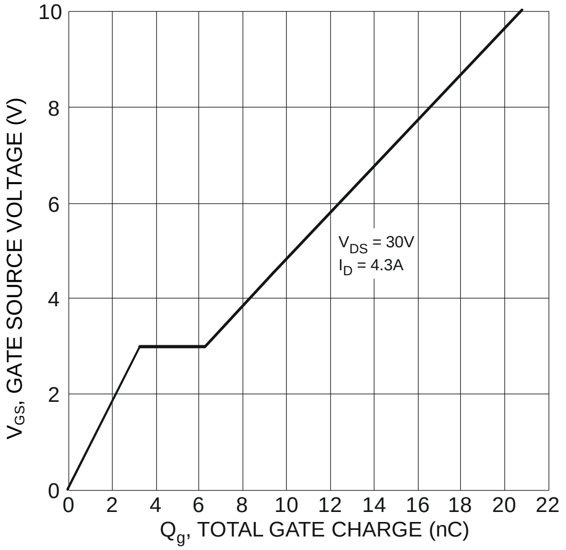


Figure 10 Gate Charge

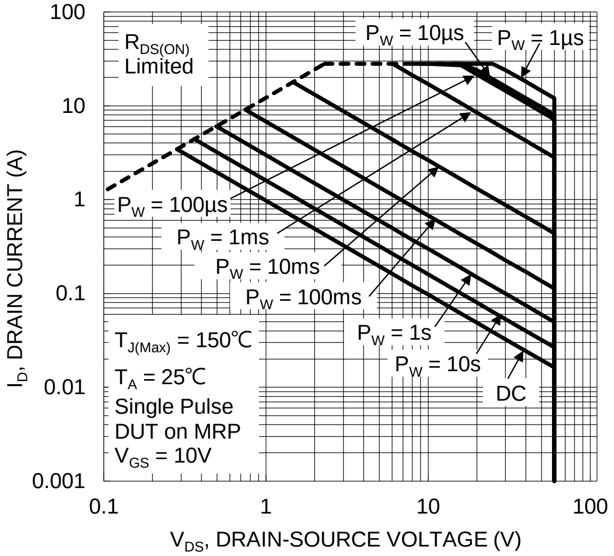


Figure 11 SOA, Safe Operation Area

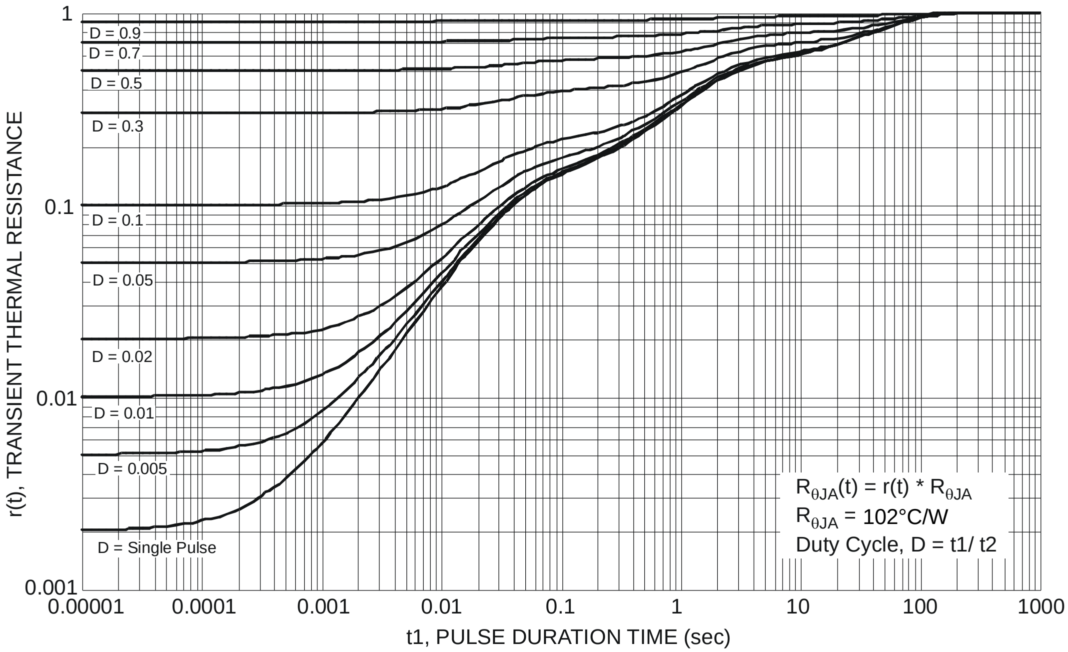


Figure 12 Transient Thermal Resistance

Electrical Characteristics P-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}	-60	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -48V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±16V, 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	$R_{DS(ON)}$	—	86	110	mΩ	V_{GS} = -10V, I_D = -4.5A
		—	98	130		V_{GS} = -4.5V, I_D = -3.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1030	—	pF	V_{DS} = -30V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	49.1	—		
Reverse Transfer Capacitance	C_{rss}	—	38.7	—		
Gate Resistance	R_G	—	13.6	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	9.5	—	nC	V_{DS} = -30V, I_D = -5A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	19.4	—		
Gate-Source Charge	Q_{gs}	—	2.3	—		
Gate-Drain Charge	Q_{gd}	—	3.6	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.7	—	ns	V_{GS} = -10V, V_{DS} = -30V, R_G = 6Ω I_D = -5A
Turn-On Rise Time	t_r	—	6.3	—		
Turn-Off Delay Time	$t_{D(off)}$	—	58.7	—		
Turn-Off Fall Time	t_f	—	26.1	—		
Body Diode Reverse Recovery Time	t_{rr}	—	14.85	—	ns	I_S = -5A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	8.8	—	nC	I_S = -5A, di/dt = 100A/µs

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

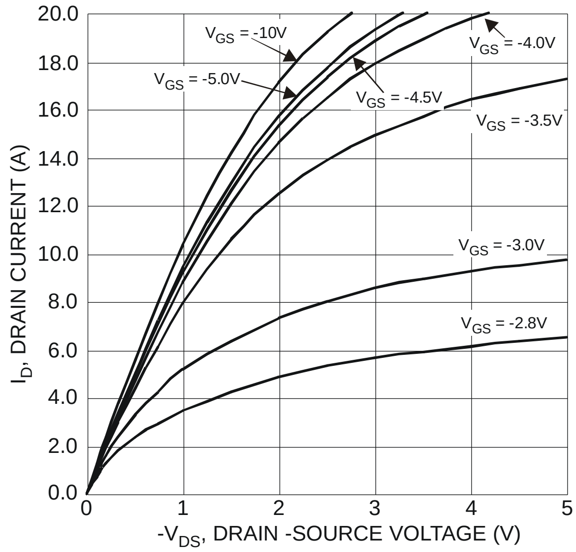


Figure 13 Typical Output Characteristics

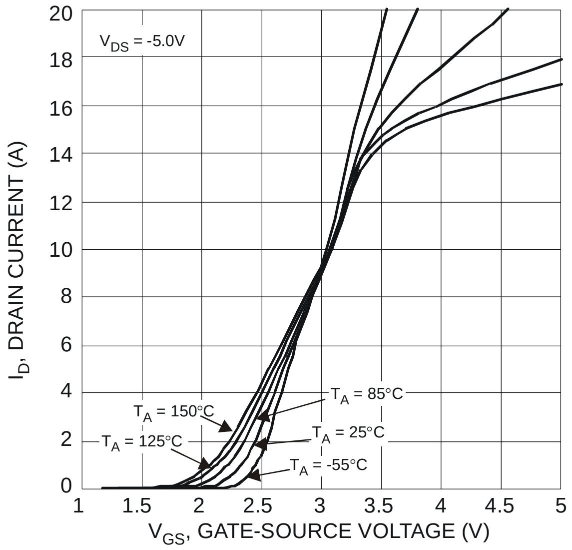


Figure 14 Typical Transfer Characteristics

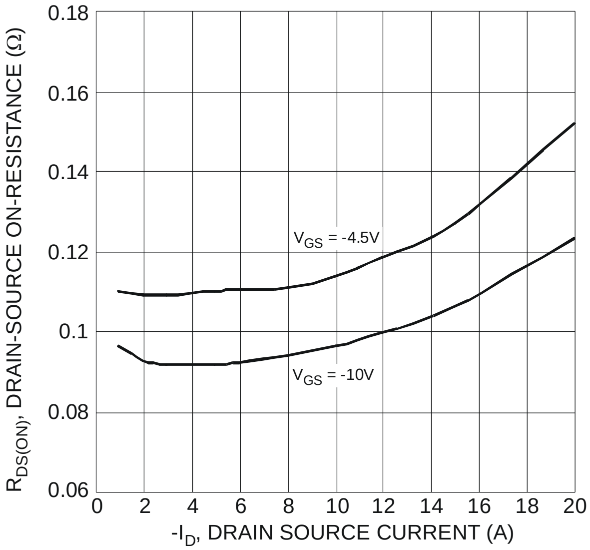


Figure 15 Typical On-Resistance vs.
Drain Current and Gate Voltage

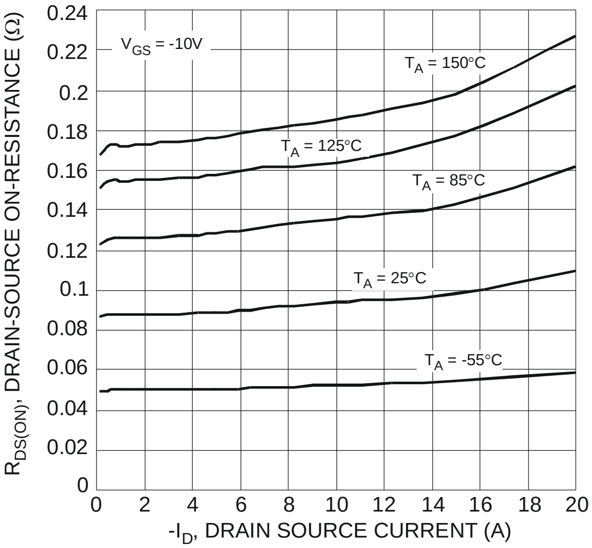


Figure 16 Typical On-Resistance vs.
Drain Current and Temperature

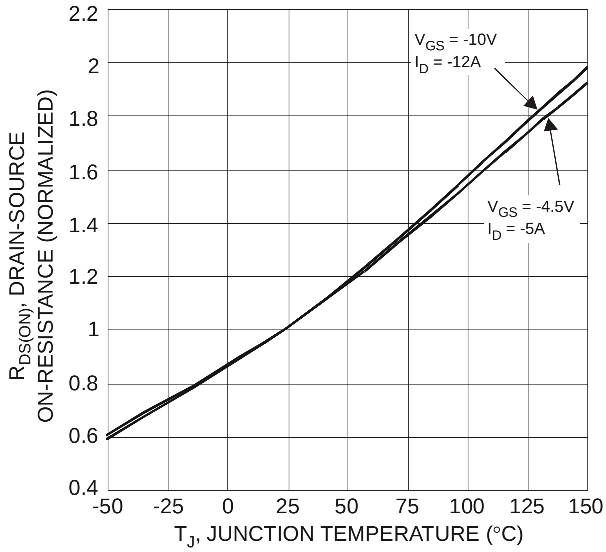


Figure 17 On-Resistance Variation with Temperature

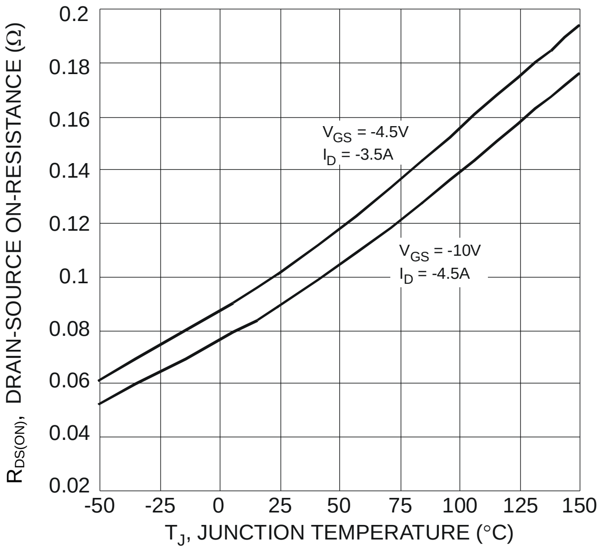


Figure 18 On-Resistance Variation with Temperature

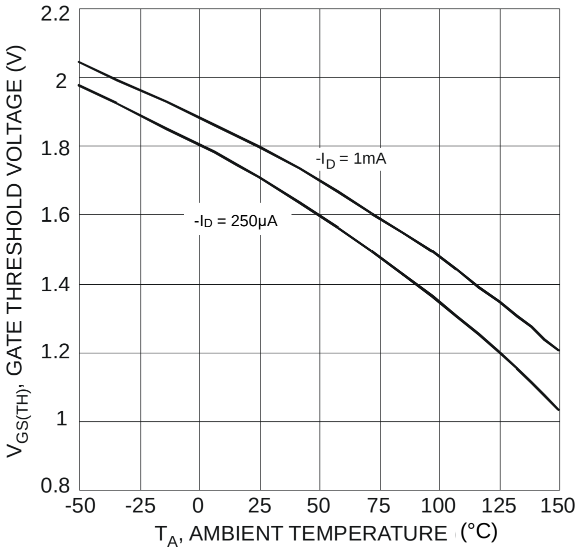


Figure 19 Gate Threshold Variation vs. Ambient Temperature

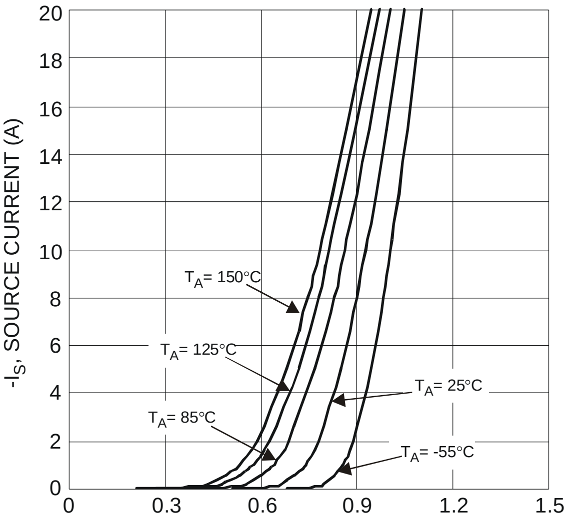


Figure 20 Diode Forward Voltage vs. Current

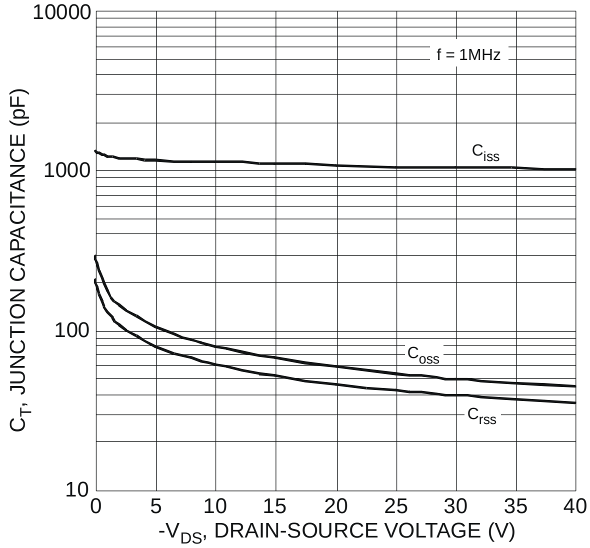


Figure 21 Typical Junction Capacitance

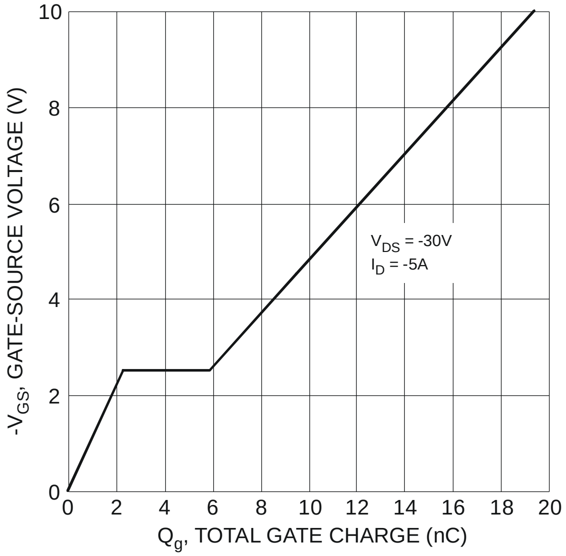


Figure 22 Gate-Charge Characteristics

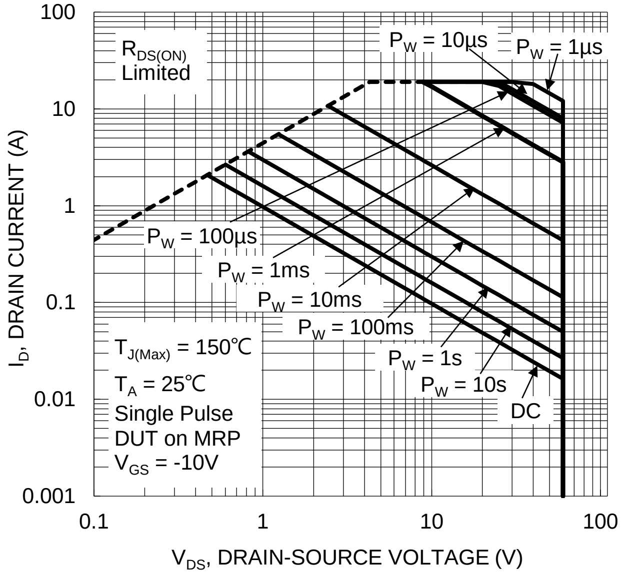
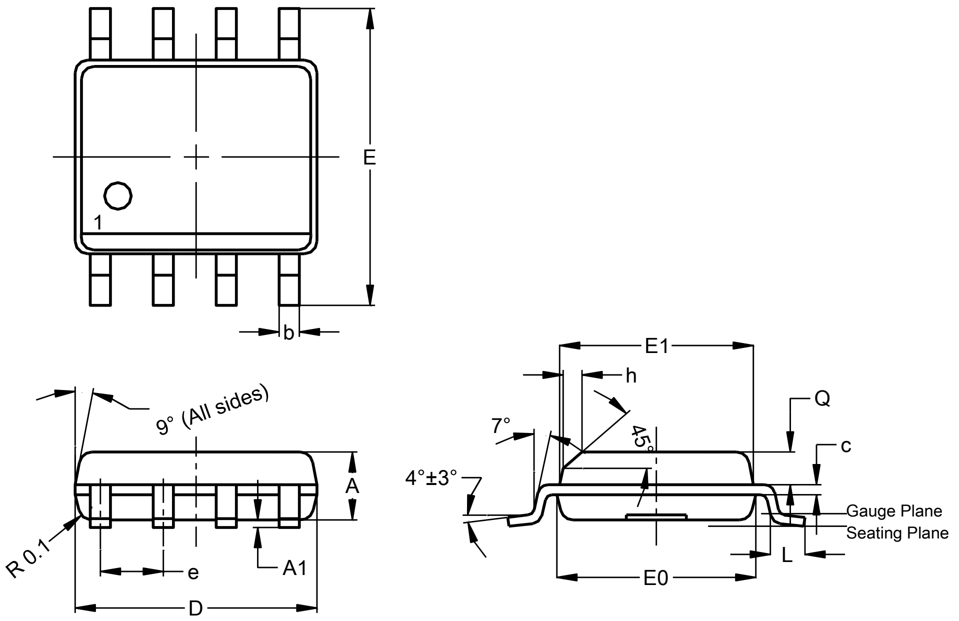


Figure 23 SOA, Safe Operation Area

Package Outline Dimensions

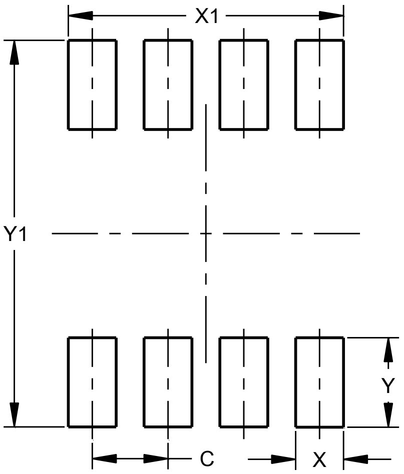
SO-8



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