



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 $T_A = +25^\circ C$
Q1 N-Channel	100V	160m Ω @ $V_{GS} = 10V$	2.0A
		200m Ω @ $V_{GS} = 4.5V$	1.5A
Q2 P-Channel	-100V	250m Ω @ $V_{GS} = -10V$	-1.7A
		300m Ω @ $V_{GS} = -4.5V$	-1.3A

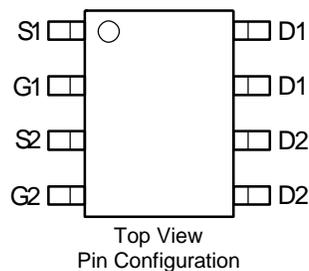
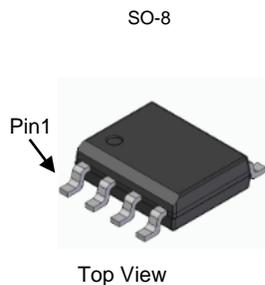
Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed

Description and Applications

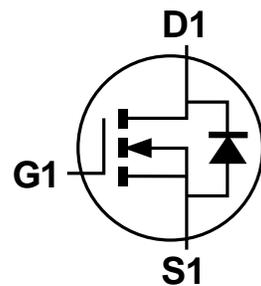
This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC converters
- Power management functions
- Backlighting

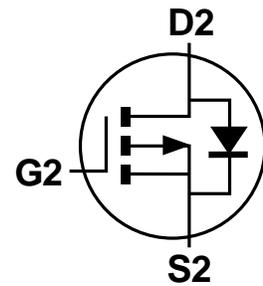


Mechanical Data

- 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)



Q1 N-Channel MOSFET



Q2 P-Channel MOSFET

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

Characteristic			Symbol	Q1	Q2	Units
Drain-Source Voltage			V _{DSS}	100	-100	V
Gate-Source Voltage			V _{GSS}	±20	±20	V
Continuous Drain Current (Note 6)	Steady State	T _A = +25°C	I _D	2.0	-1.7	A
Q1: V _{GS} = 10V Q2: V _{GS} = -10V		T _A = +70°C		1.6	-1.4	
Maximum Body Diode Forward Current (Note 6)			I _S	2.0	-1.7	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	16	-13	A
Avalanche Current, L = 1.43mH			I _{AS}	5.3	-6	A
Avalanche Energy, L = 1.43mH			E _{AS}	20	25	mJ

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

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P _D	1.1	W
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	R _{θJA}	110	°C/W
Total Power Dissipation (Note 6)			P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	R _{θJA}	80	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	103	160	mΩ	V _{GS} = 10V, I _D = 1.6A
		—	110	200		V _{GS} = 4.5V, I _D = 1.3A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1.1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	1145	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	26	—		
Reverse Transfer Capacitance	C _{rss}	—	20	—		
Gate Resistance	R _G	—	1.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	9.6	—	nC	V _{DS} = 50V, I _D = 1A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	19.6	—		
Gate-Source Charge	Q _{gs}	—	2.7	—		
Gate-Drain Charge	Q _{gd}	—	3.3	—		
Turn-On Delay Time	t _{D(ON)}	—	9	—	ns	V _{DS} = 50V, V _{GS} = 4.5V, R _G = 6.8Ω, I _D = 1A
Turn-On Rise Time	t _R	—	13	—		
Turn-Off Delay Time	t _{D(OFF)}	—	22	—		
Turn-Off Fall Time	t _F	—	7.5	—		
Body Diode Reverse Recovery Time	t _{RR}	—	19	—	ns	I _F = 1A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	14	—	nC	

- 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 plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

Electrical Characteristics P-Channel Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	—	-3.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	195	250	mΩ	V _{GS} = -10V, I _D = -1A
		—	210	300		V _{GS} = -4.5V, I _D = -1A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	1030	—	pF	V _{DS} = -50V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	33	—		
Reverse Transfer Capacitance	C _{rss}	—	24	—		
Gate Resistance	R _g	—	13	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	9	—	nC	V _{DS} = -50V, I _D = -1A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	18	—		
Gate-Source Charge	Q _{gs}	—	2	—		
Gate-Drain Charge	Q _{gd}	—	1.9	—		
Turn-On Delay Time	t _{D(ON)}	—	8	—	ns	V _{DD} = -50V, R _G = 9.1Ω, I _D = -1A
Turn-On Rise Time	t _R	—	16	—		
Turn-Off Delay Time	t _{D(OFF)}	—	36	—		
Turn-Off Fall Time	t _F	—	18	—	ns	I _F = -1A, di/dt = 100A/μs
Body Diode Reverse Recovery Time	t _{RR}	—	16	—		
Body Diode Reverse Recovery Charge	Q _{RR}	—	11	—	nC	

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

N-Channel

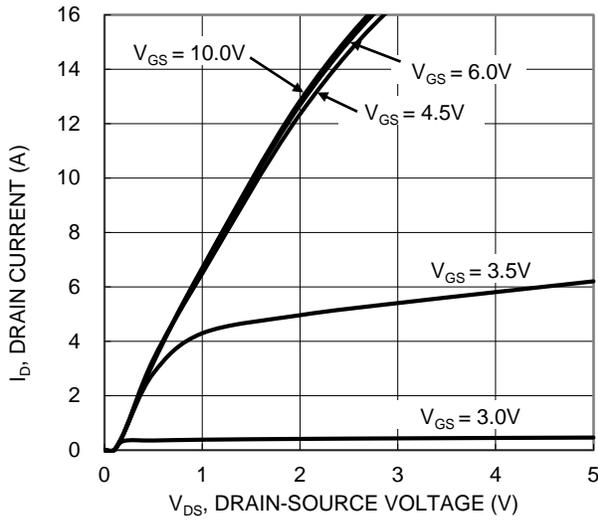


Figure 1. Typical Output Characteristic

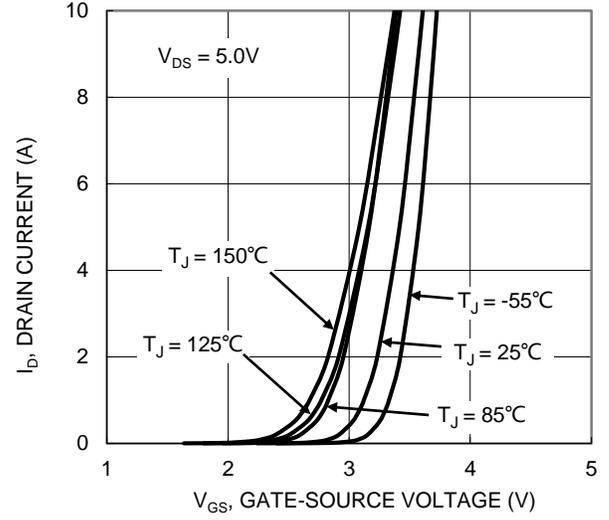


Figure 2. Typical Transfer Characteristic

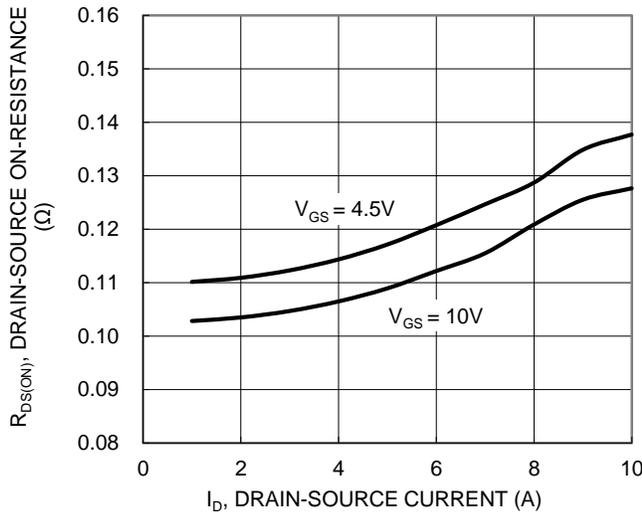


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

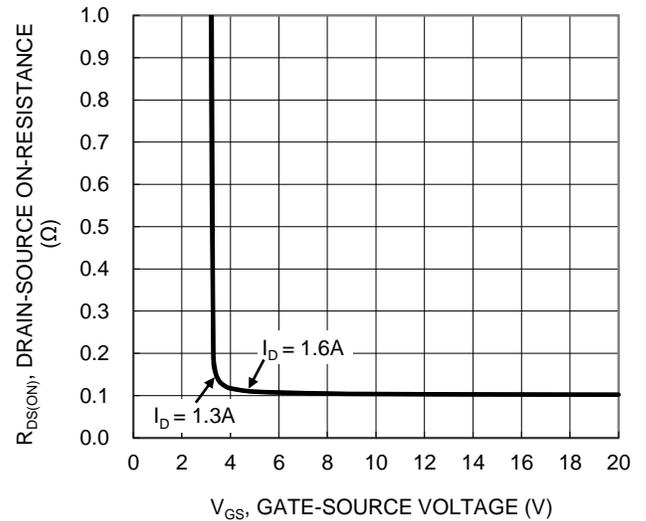


Figure 4. Typical Transfer Characteristic

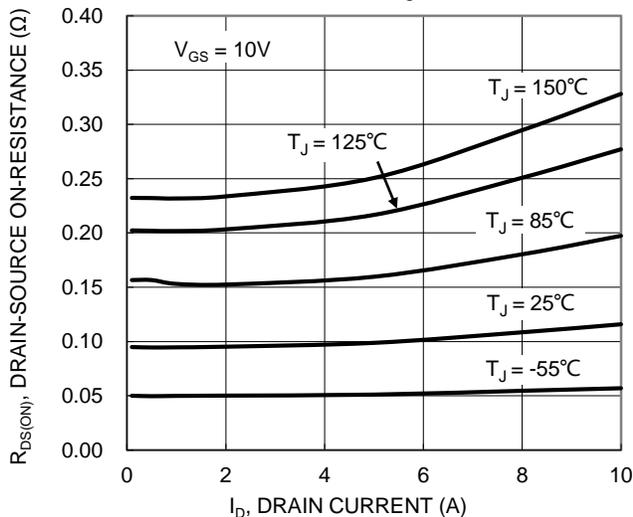


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

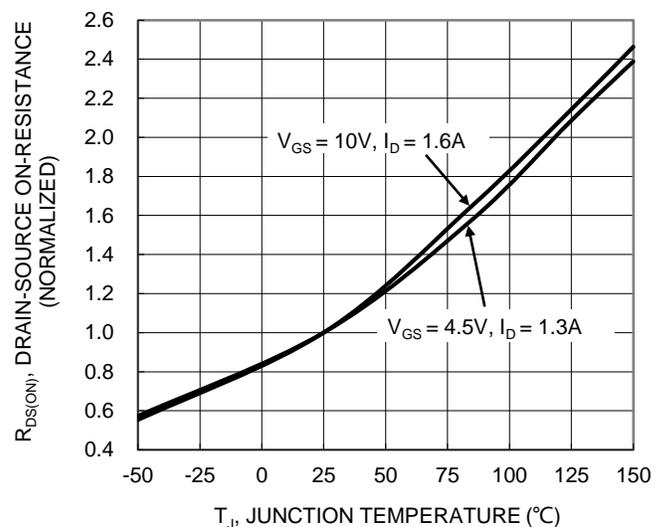


Figure 6. On-Resistance Variation with Junction Temperature

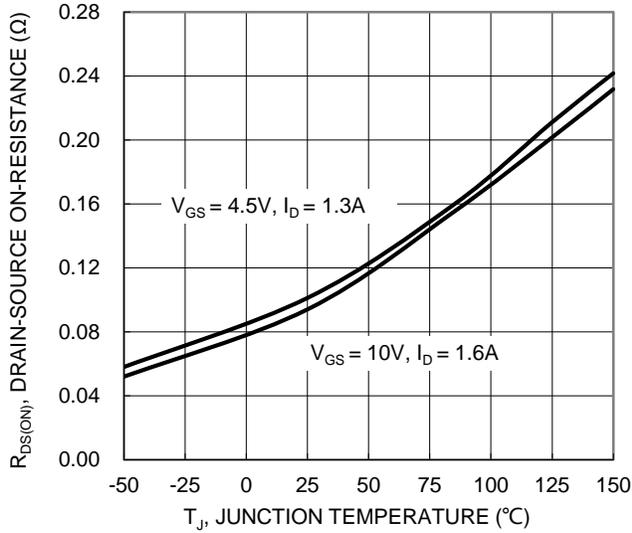


Figure 7. On-Resistance Variation with Junction Temperature

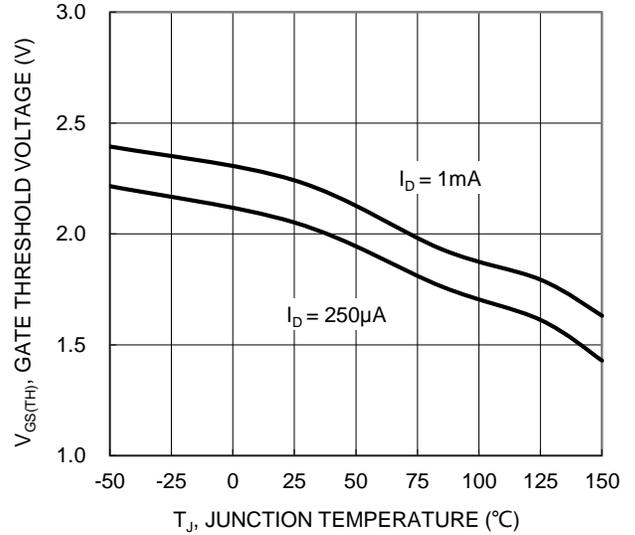


Figure 8. Gate Threshold Variation vs. Junction Temperature

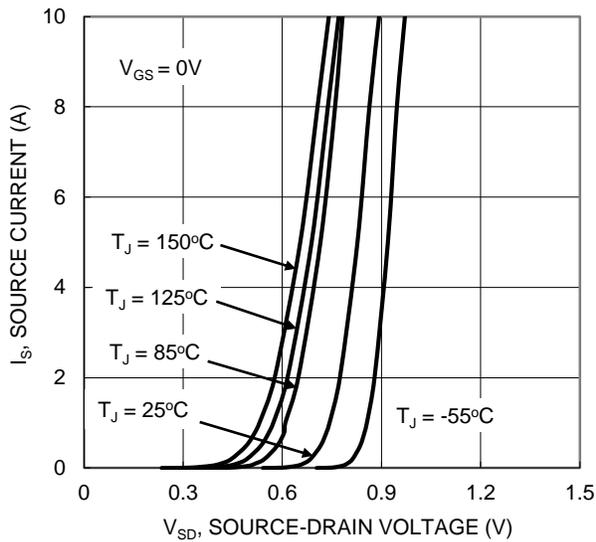


Figure 9. Diode Forward Voltage vs. Current

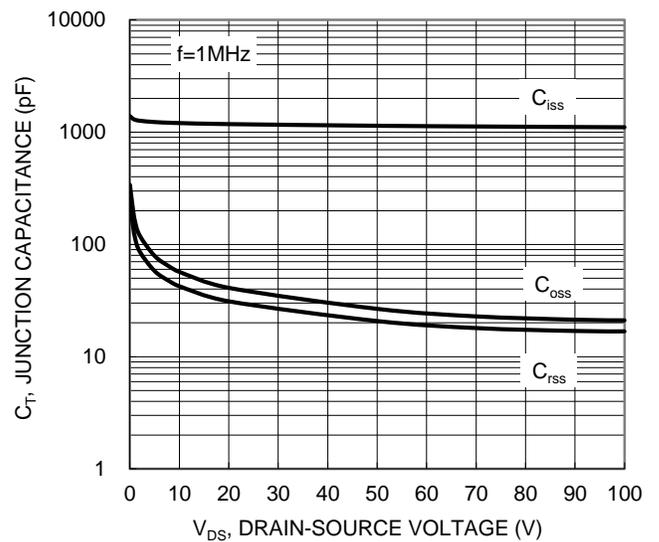


Figure 10. Typical Junction Capacitance

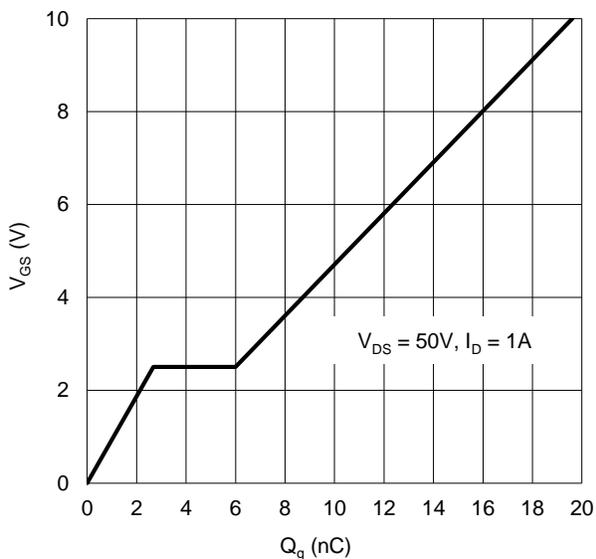


Figure 11. Gate Charge

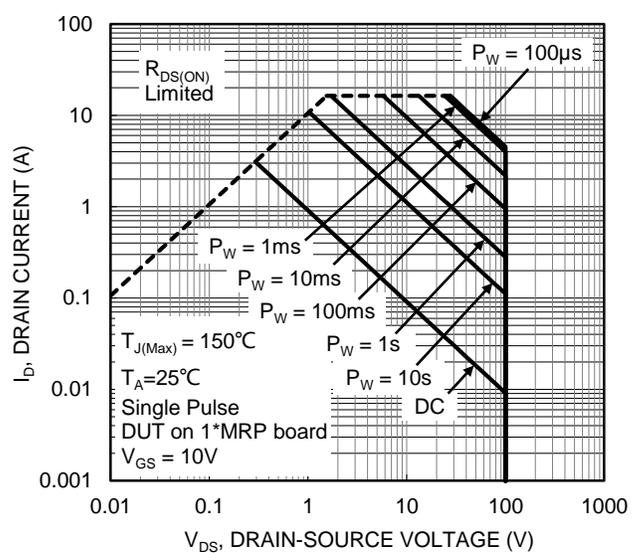


Figure 12. SOA, Safe Operation Area

P-Channel

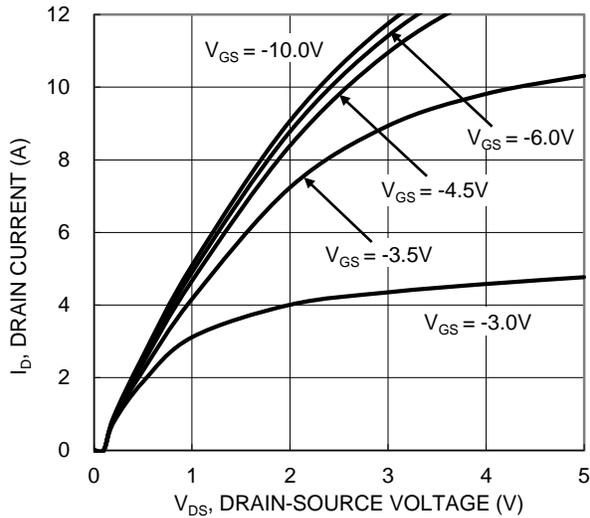


Figure 13. Typical Output Characteristic

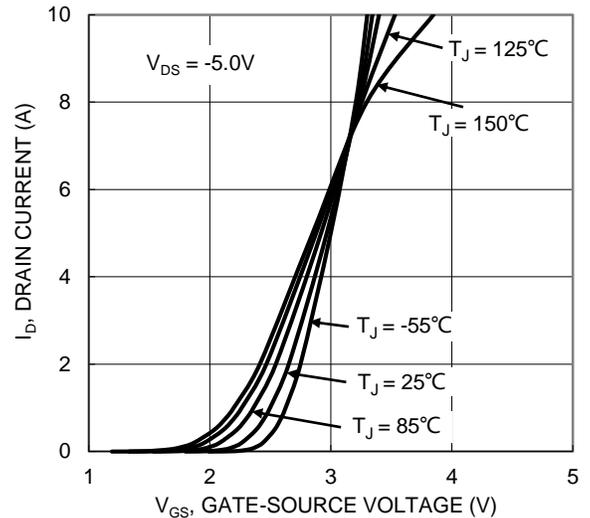


Figure 14. Typical Transfer Characteristic

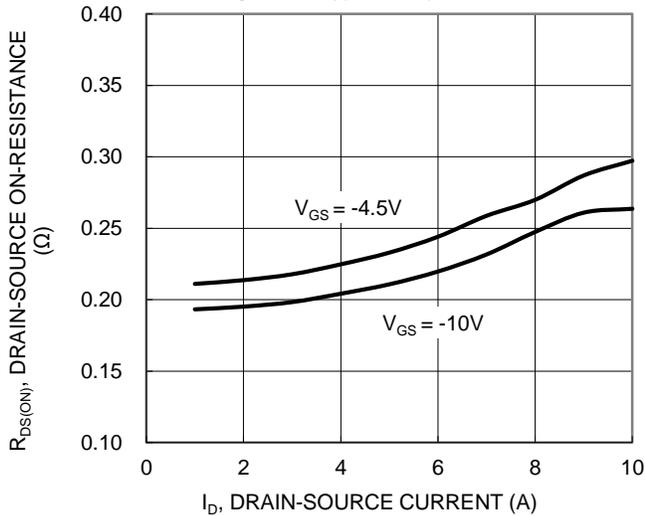


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

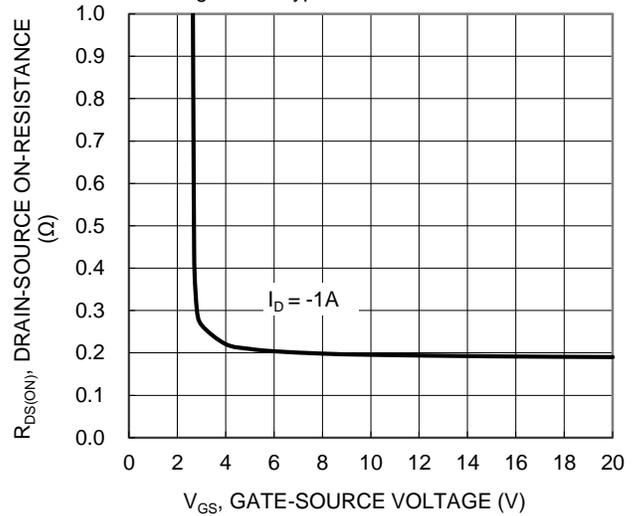


Figure 16. Typical Transfer Characteristic

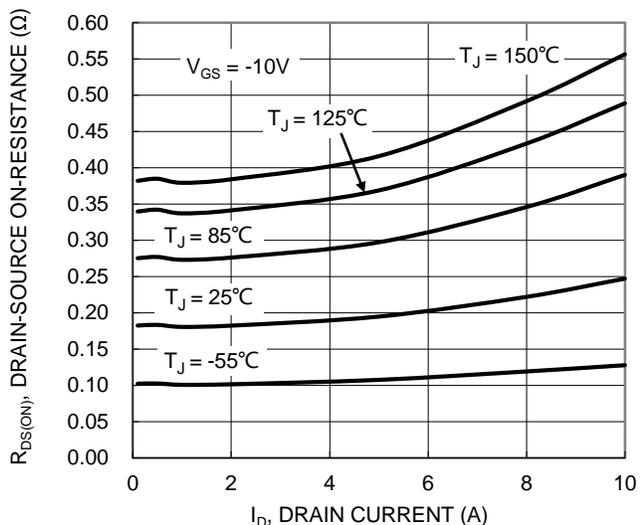


Figure 17. Typical On-Resistance vs. Drain Current and Junction Temperature

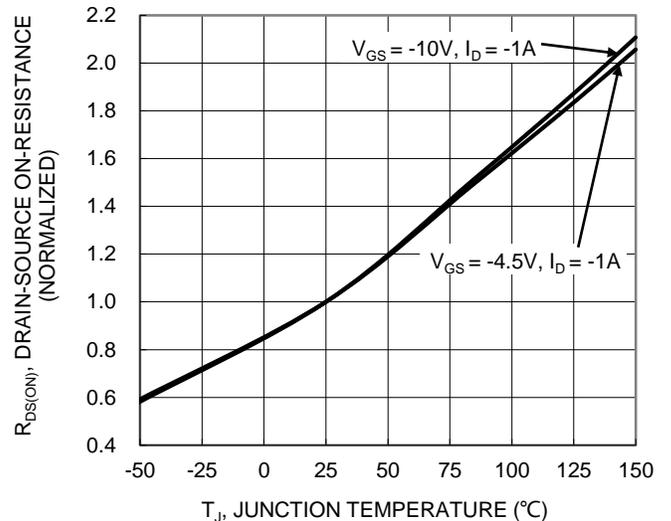


Figure 18. On-Resistance Variation with Junction Temperature

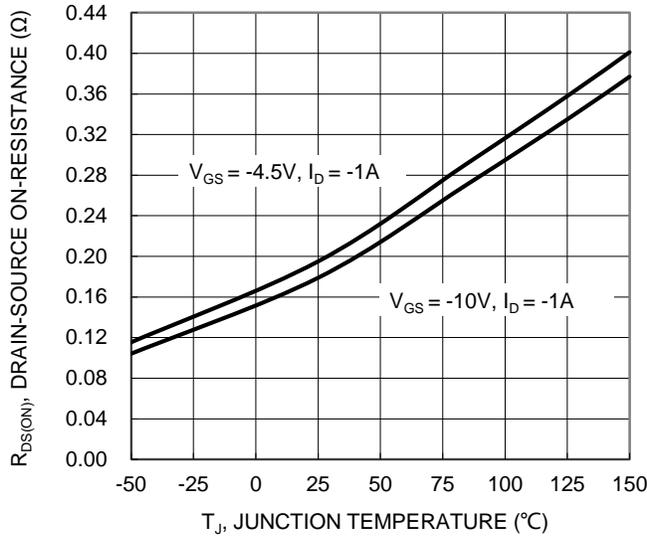


Figure 19. On-Resistance Variation with Junction Temperature

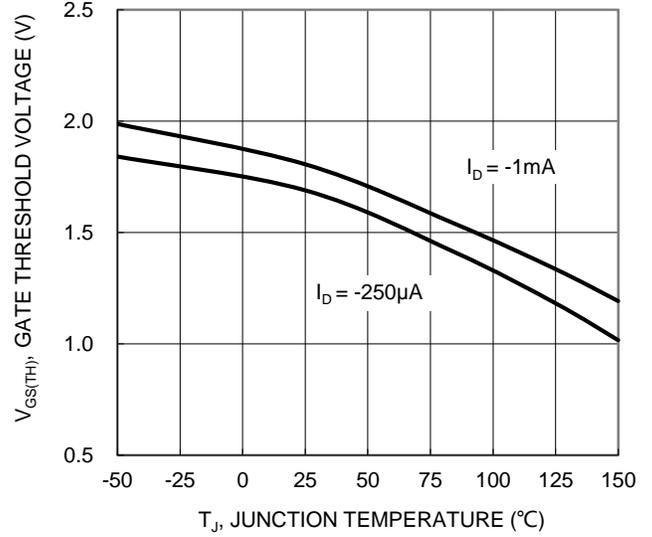


Figure 20. Gate Threshold Variation vs. Junction Temperature

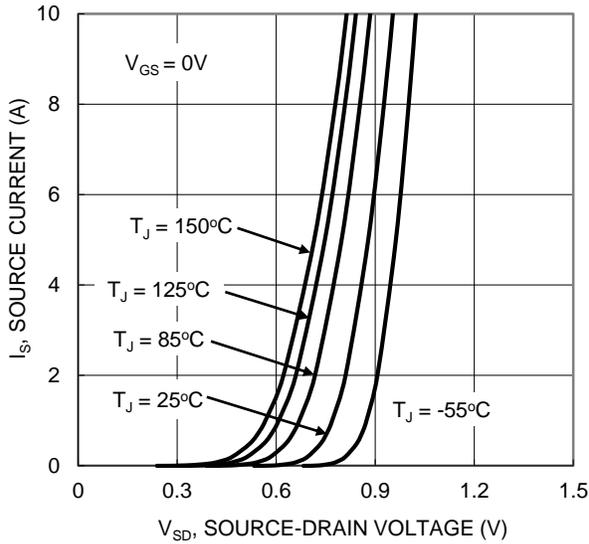


Figure 21. Diode Forward Voltage vs. Current

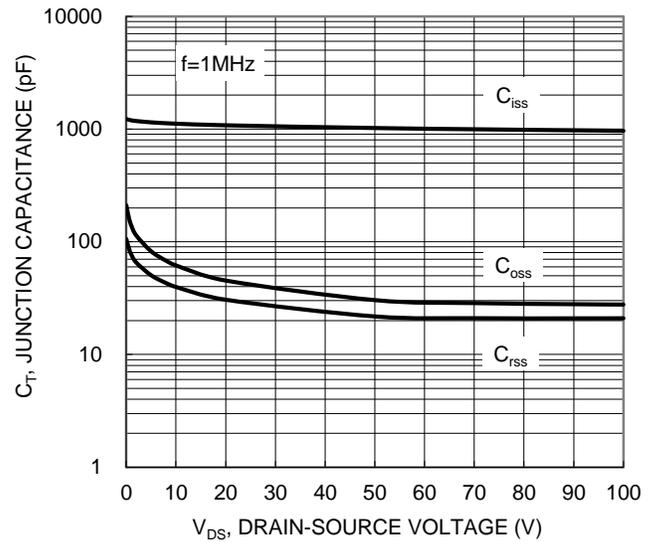


Figure 22. Typical Junction Capacitance

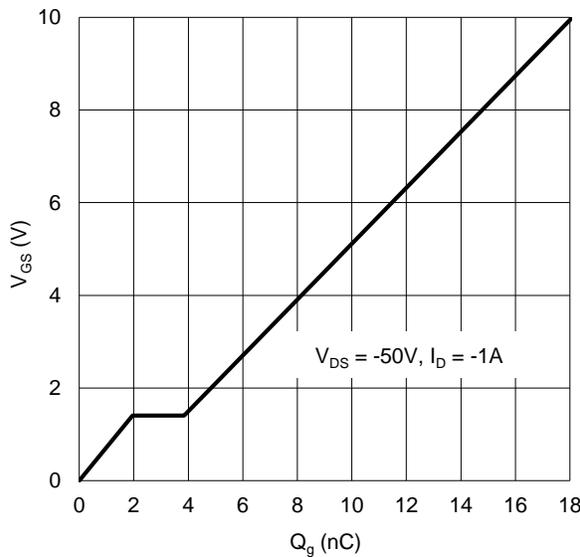


Figure 23. Gate Charge

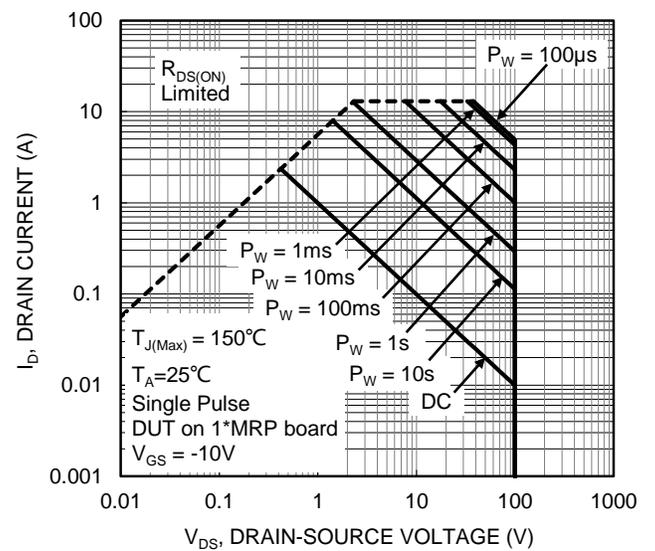


Figure 24. SOA, Safe Operation Area

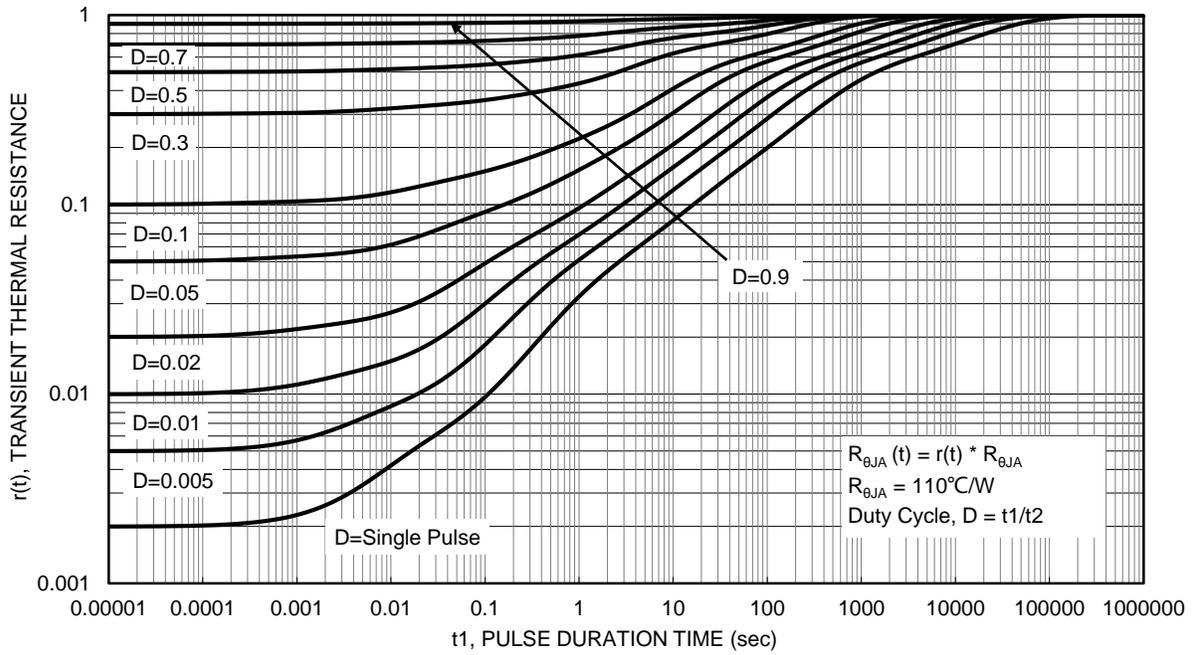
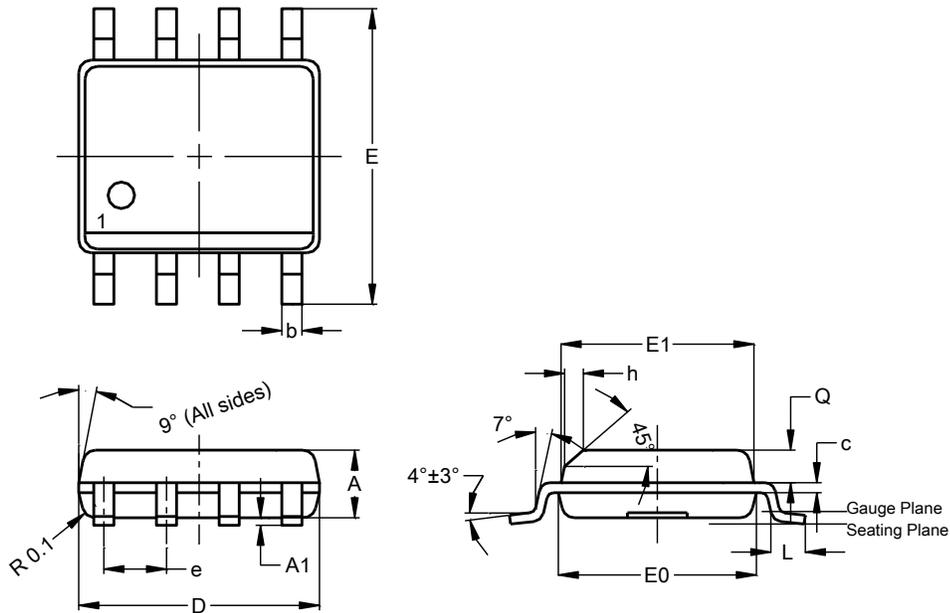


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

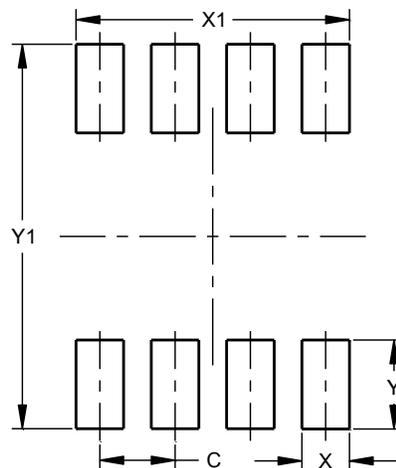
SO-8



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