



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



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Product Summary

Device	V _{(BR)DSS}	R _{DS(ON)} max	Package	I _D MAX T _A = +25°C
N-Channel	30V	20mΩ @ V _{GS} = 10V	SO-8	8.5A
		32mΩ @ V _{GS} = 4.5V		7.0A
P-Channel	-30V	45mΩ @ V _{GS} = -10V		-5.5A
		85mΩ @ V _{GS} = -4.5V		-4.1A

Description

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.

Applications

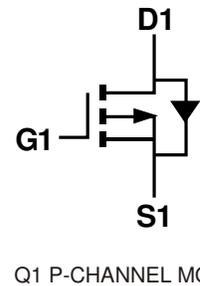
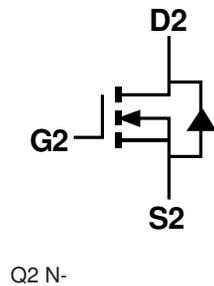
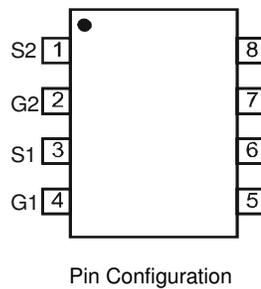
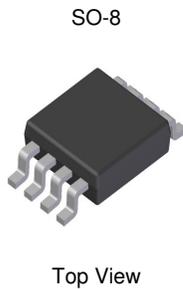
- DC Motor Control
- DC-AC Inverters

Features

- 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)



Equivalent Circuit

Maximum Ratings N-CHANNEL– Q2 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
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	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	6.5 5.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	8.5 6.8	A
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	5.3 4.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	7.0 5.5	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	2	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	60	A
Pulsed Body Diode Current (10 μs pulse, duty cycle = 1%)			I_{SM}	60	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	14	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	10	mJ

Maximum Ratings P-CHANNEL– Q1 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Units
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	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.2 -3.2	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-5.5 -4.3	A
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-3.5 -2.3	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.1 -3.2	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-2	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	-30	A
Pulsed Body Diode Current (10 μs pulse, duty cycle = 1%)			I_{SM}	-30	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	-14	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	10	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.2	W
	$T_A = +70^\circ\text{C}$		0.77	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	104	$^\circ\text{C/W}$
	$t < 10\text{s}$		62	
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	1.5	W
	$T_A = +70^\circ\text{C}$		0.95	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	83	$^\circ\text{C/W}$
	$t < 10\text{s}$		49	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	15	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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	I _{DSS}	—	—	1	μA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±1	μA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	15	20	mΩ	V _{GS} = 10V, I _D = 7.4A
		—	23	32		V _{GS} = 4.5V, I _D = 6A
Forward Transfer Admittance	Y _{fs}	—	8	—	S	V _{DS} = 5V, I _D = 10A
Diode Forward Voltage	V _{SD}	—	0.70	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	501	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	72	—		
Reverse Transfer Capacitance	C _{rss}	—	57	—		
Gate Resistance	R _g	—	1.84	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	4.6	—	nC	V _{DS} = 15V, I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	9.8	—		
Gate-Source Charge	Q _{gs}	—	1.6	—		
Gate-Drain Charge	Q _{gd}	—	2.0	—		
Turn-On Delay Time	t _{D(on)}	—	3.9	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _G = 6Ω, I _D = 1A
Turn-On Rise Time	t _r	—	4.2	—		
Turn-Off Delay Time	t _{D(off)}	—	16.6	—		
Turn-Off Fall Time	t _f	—	5.8	—		
Reverse Recovery Time	t _{rr}	—	5.5	—	ns	I _F = 12A, di/dt = 500A/μs
Reverse Recovery Charge	Q _{rr}	—	2.6	—	nC	

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	I _{DSS}	—	—	-1	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)}	-1.0	—	-2.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	38	45	mΩ	V _{GS} = -10V, I _D = -5.2A
		—	65	85		V _{GS} = -4.5V, I _D = -4A
Forward Transfer Admittance	Y _{fs}	—	5	—	S	V _{DS} = -5V, I _D = -5.2A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	590	—	pF	V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	69	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	53	—	pF	
Gate Resistance	R _g	—	11	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	5.1	—	nC	V _{DS} = -15V, I _D = -6A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	10.5	—	nC	
Gate-Source Charge	Q _{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.9	—	nC	
Turn-On Delay Time	t _{D(on)}	—	6.8	—	ns	V _{DD} = -15V, V _{GS} = -10V, R _G = 6Ω, I _D = -1A
Turn-On Rise Time	t _r	—	4.9	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	28.4	—	ns	
Turn-Off Fall Time	t _f	—	12.4	—	ns	
Reverse Recovery Time	t _{rr}	—	14	—	ns	I _F = 12A, di/dt = 500A/μs
Reverse Recovery Charge	Q _{rr}	—	11	—	nC	

- Notes: 7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.

N-CHANNEL

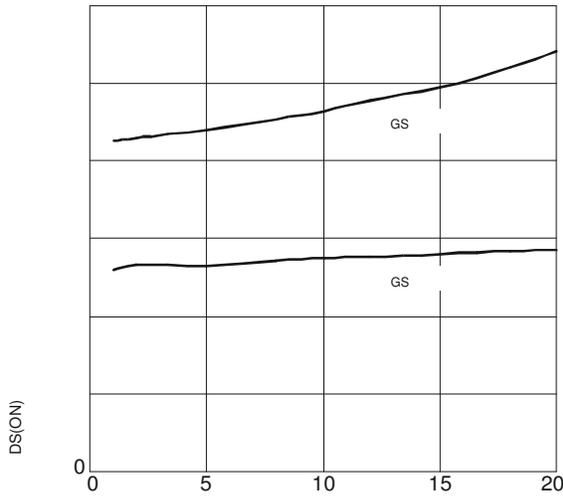
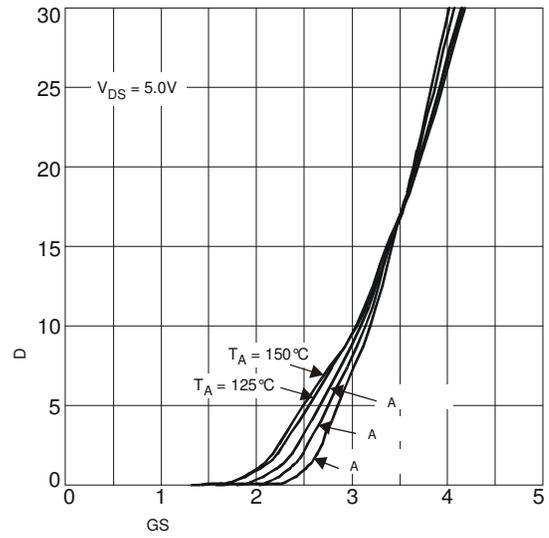
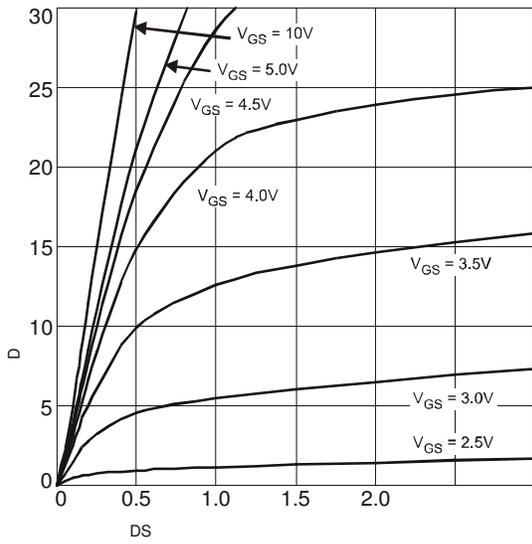
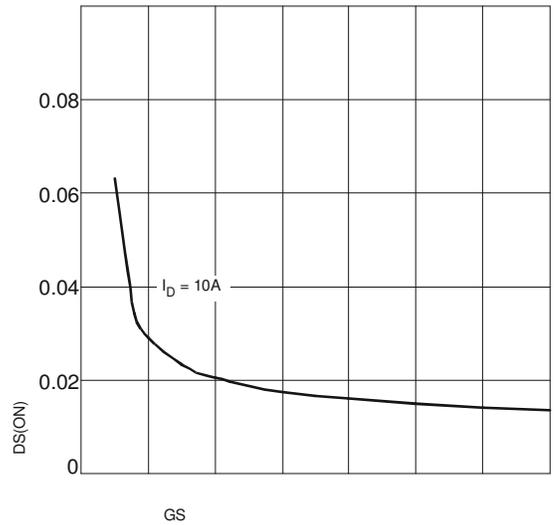
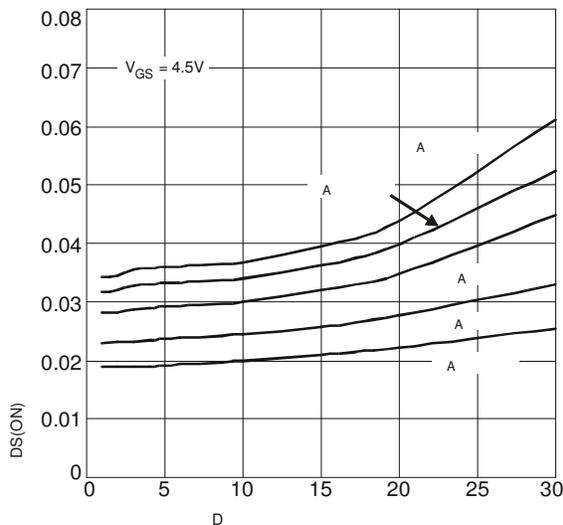


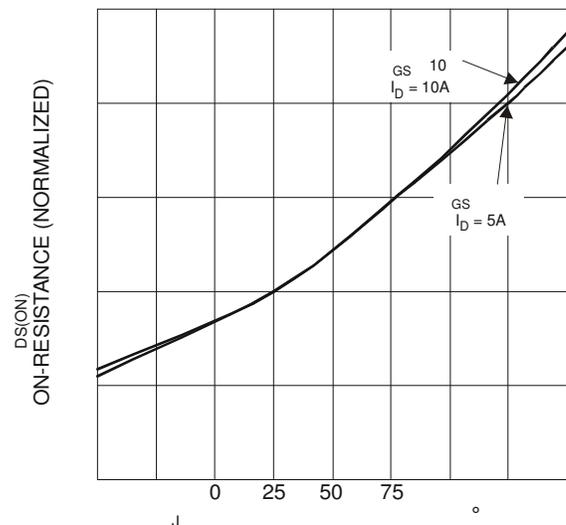
Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage



Drain Current and Gate Voltage



Drain Current and Temperature



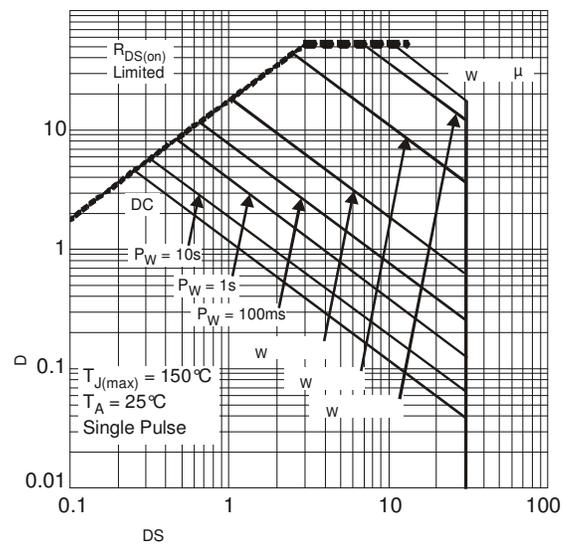
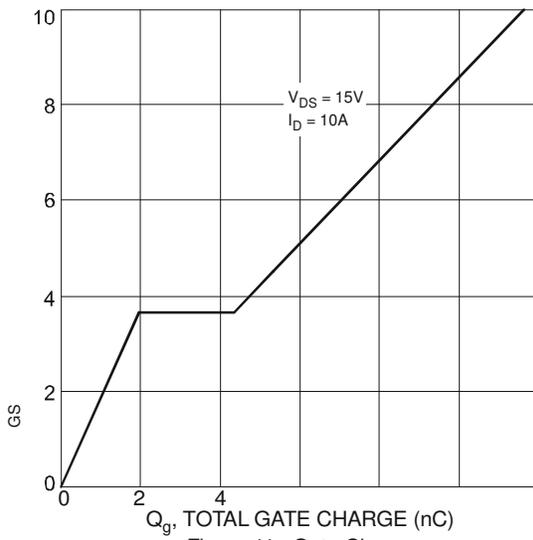
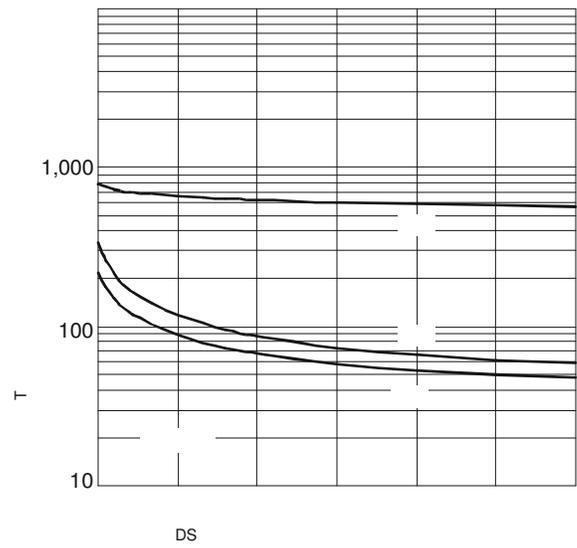
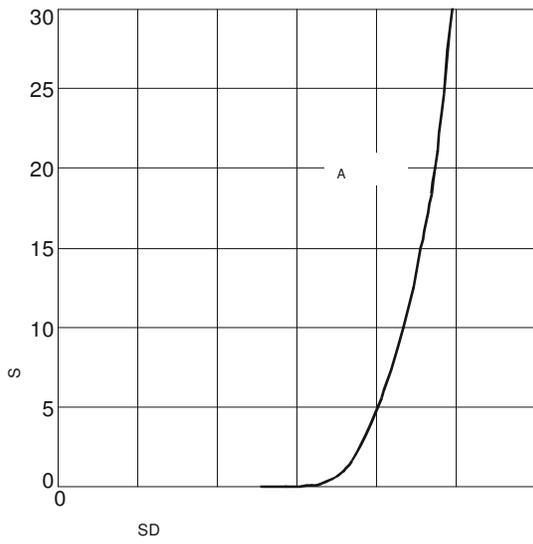
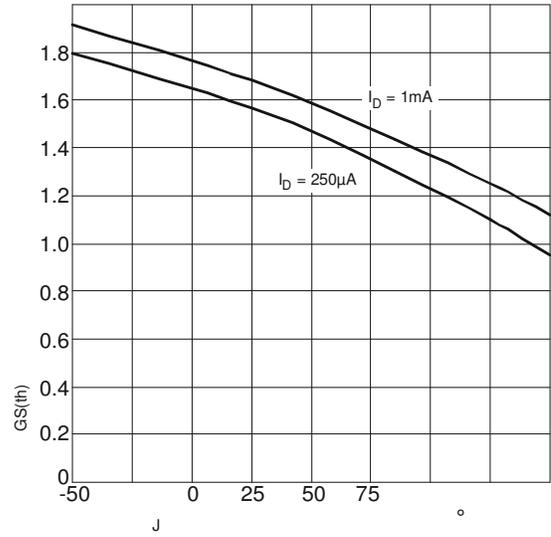
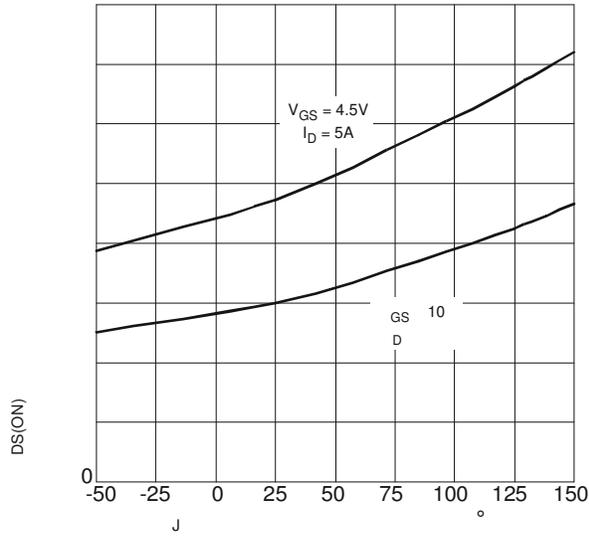


Figure 11. Gate Charge

P-CHANNEL

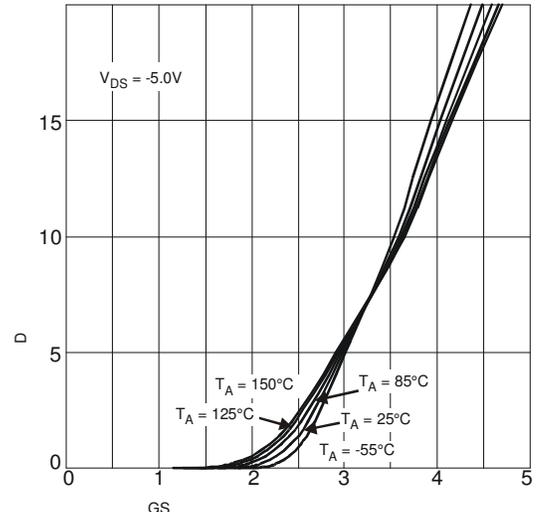
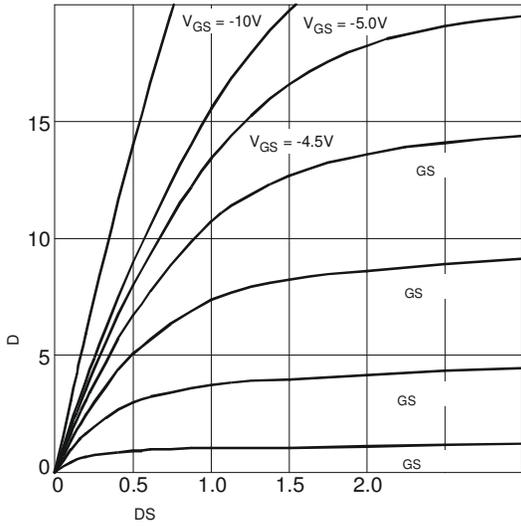


Figure 14. Typical Transfer Characteristics

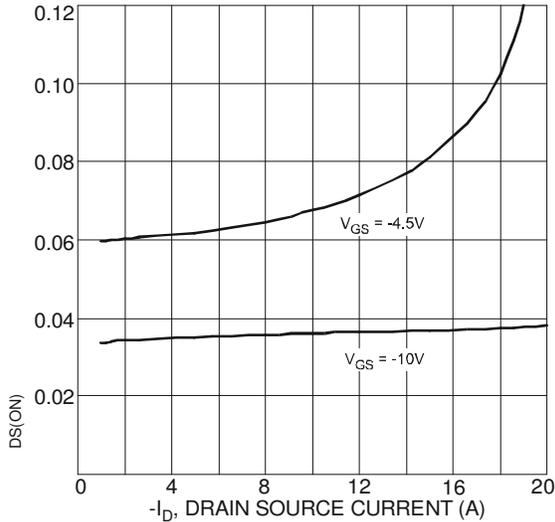
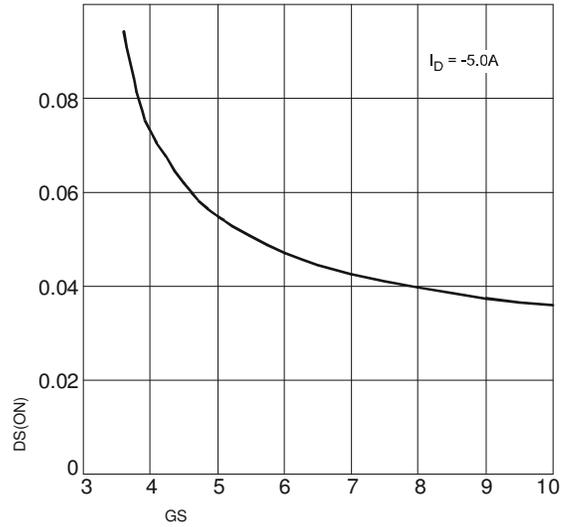
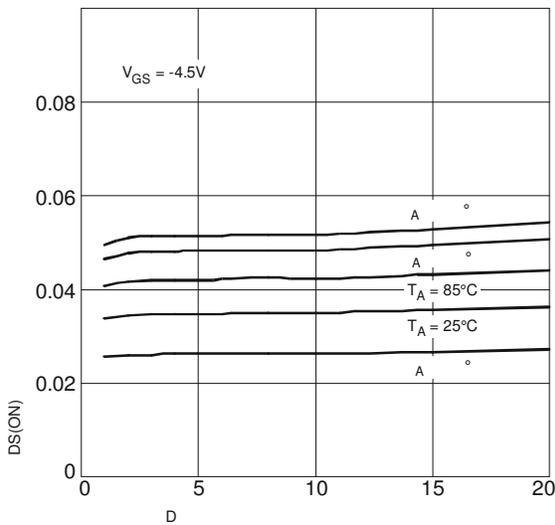


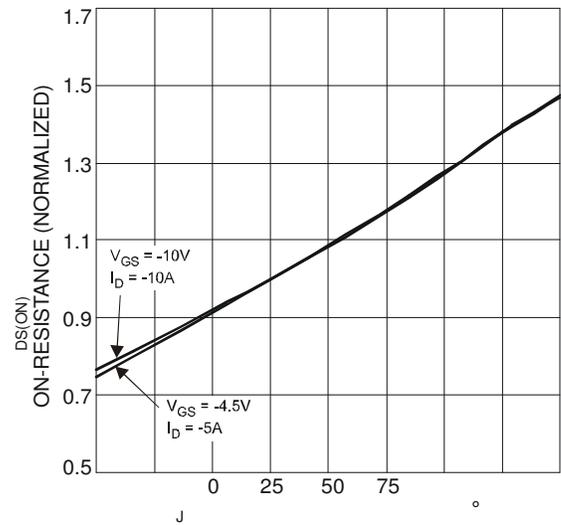
Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage



Drain Current and Gate Voltage



Drain Current and Temperature



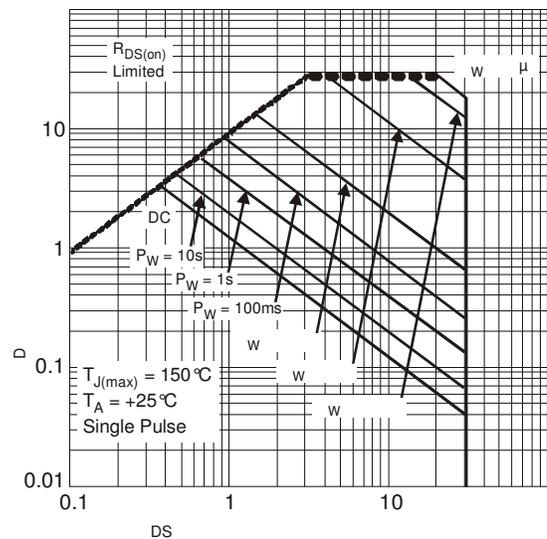
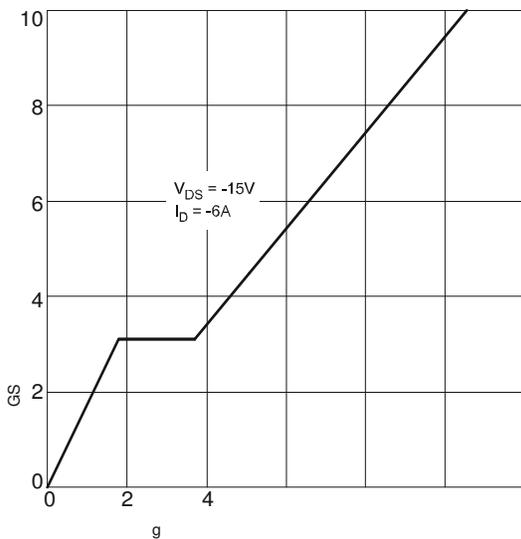
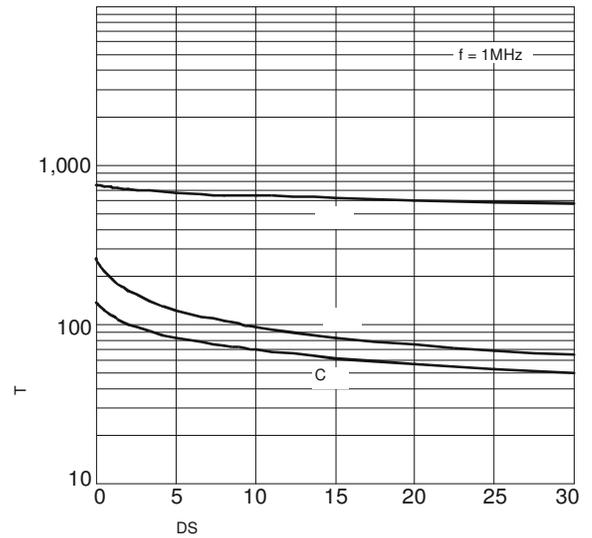
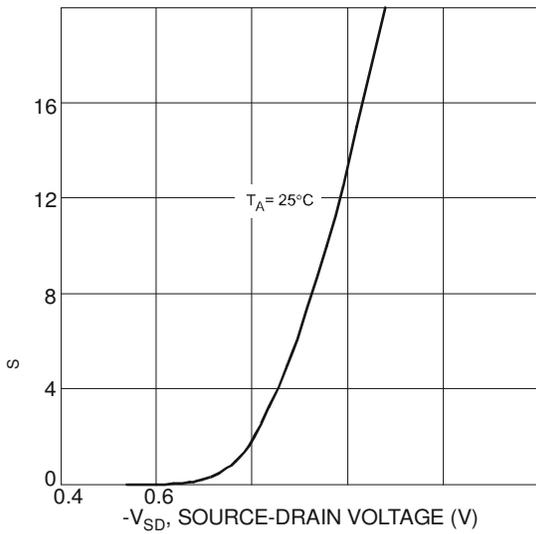
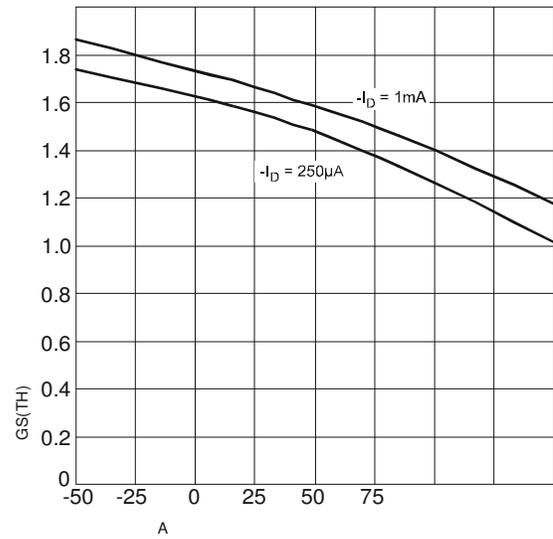
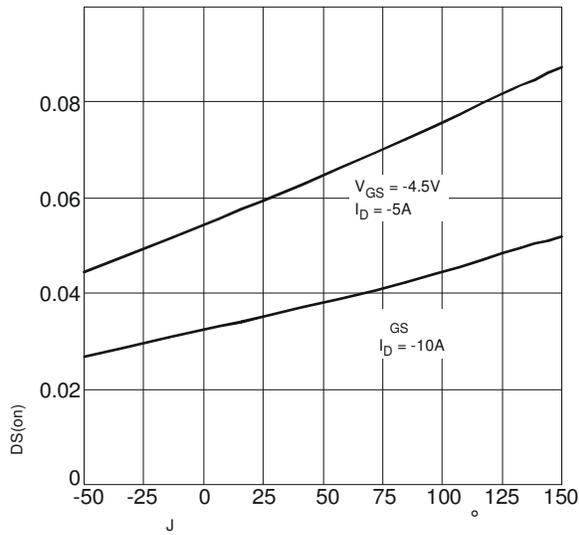
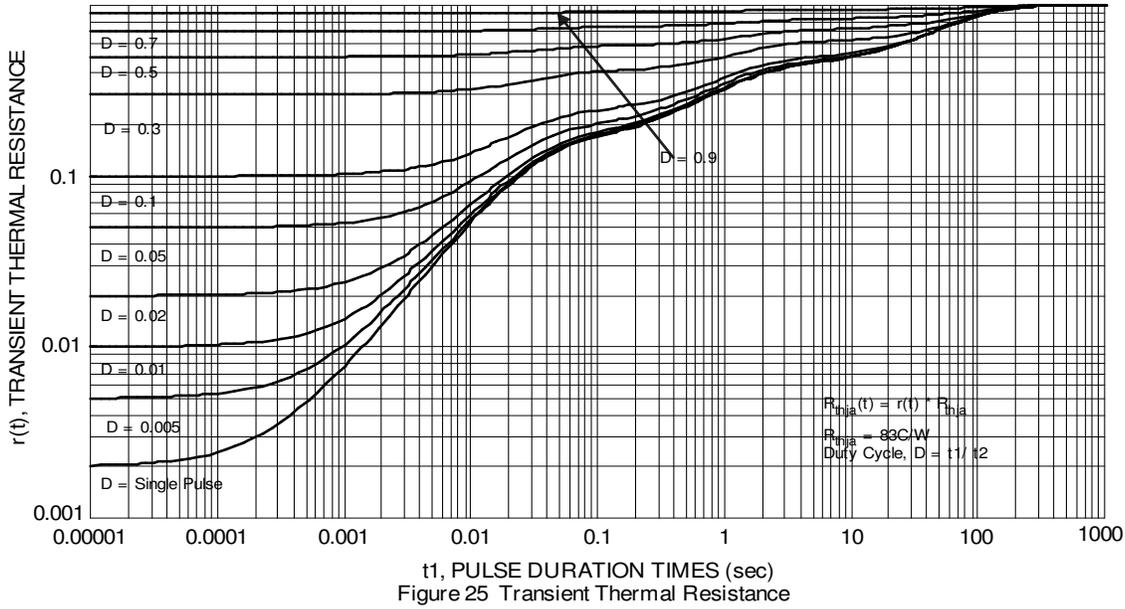
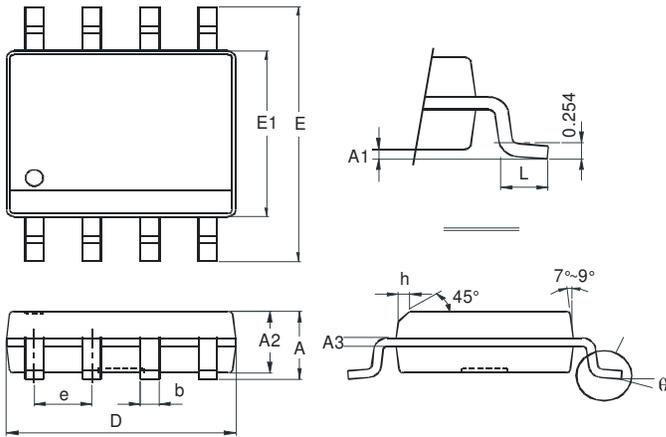


Figure 23. Gate-Charge Characteristics

Figure 24. SOA, Safe Operation Area

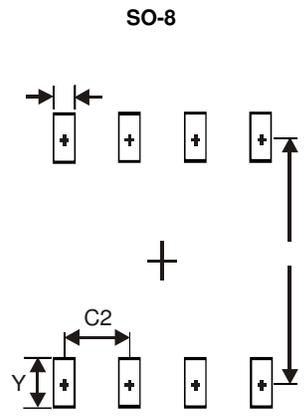


Package Outline Dimensions



	-	1.75
	0.10	0.20
	1.30	1.50
	0.15	0.25
	0.3	0.5
	4.85	4.95
	5.90	6.10
	3.85	3.95
	1.27 Typ	
	-	0.35
	0.62	0.82
	0°	8°
All Dimensions in mm		

Suggested Pad Layout



	0.60
	1.55
	5.4
	1.27