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

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Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D T_A = +25°C
Q2	60V	55mΩ @ V_{GS} = 10V	4.7A
Q1	-60V	105mΩ @ V_{GS} = -10V	-3.9A

Description

This new generation MOSFET has been 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

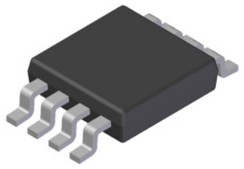
- DC-DC Converters
- Power Management Functions
- Backlighting

Features and Benefits

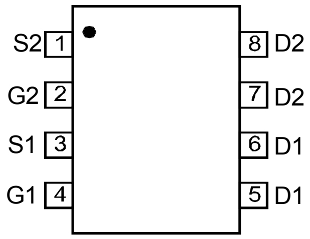
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed

Mechanical Data

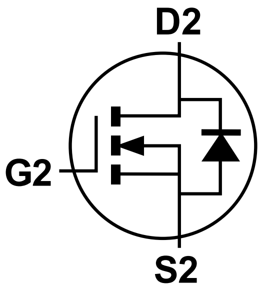
- Case: SO-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe Solderable per MIL-STD-202, Method 208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



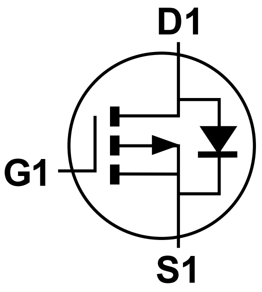
Top View



TOP VIEW
Internal Schematic



N-Channel MOSFET



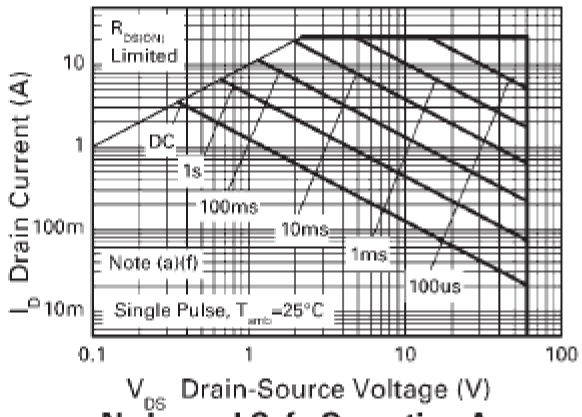
P-Channel MOSFET

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

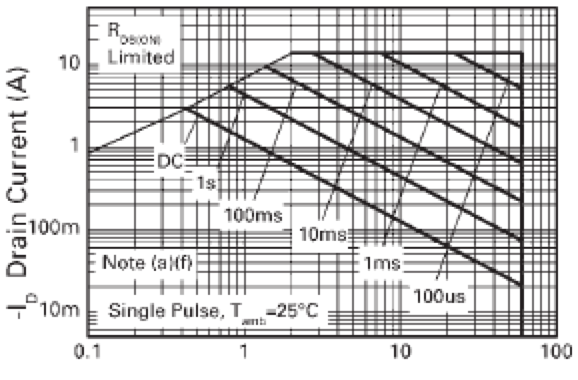
Characteristic		Symbol	Value_Q2	Value_Q1	Units
Drain-Source Voltage		V_{DSS}	60	-60	V
Gate-Source Voltage		V_{GSS}	±20	±20	V
Continuous Drain Current V_{GS} = 10V	SteadyState (Note 5)	I_D	3.6	-2.6	A
	t<10s (Note 6)	I_D	4.7	-3.9	A
Maximum Body Diode Forward Current at t<10s (Note 6)		I_S	3.4	-3.2	A
Pulsed Drain Current (300µs pulse, duty cycle = 2%)		I_{DM}	22.2	-18.3	A
Pulsed Source Current (Body Diode) (300µs pulse, duty cycle = 2%)		I_{SM}	22.2	-18.3	A

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

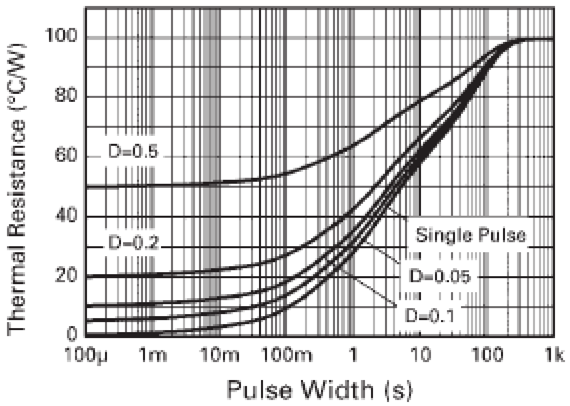
Characteristic	Symbol	Value	Units
Power Dissipation Linear Derating Factor (Note 5)	P_D	1.25 10	W mW/°C
Power Dissipation Linear Derating Factor (Note 6)	P_D	2.1 17	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	100	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	58	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C



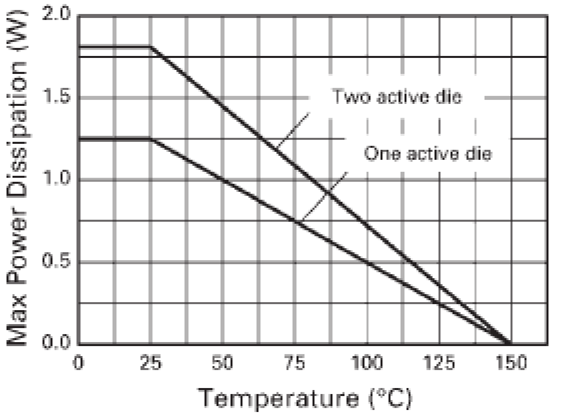
N-channel Safe Operating Area



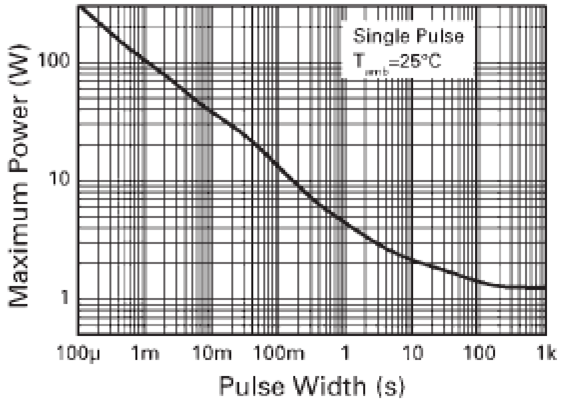
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve

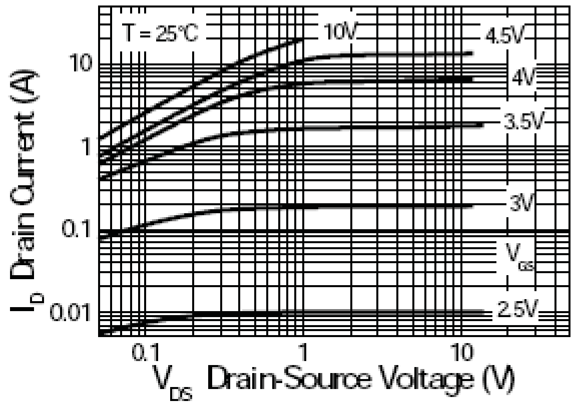


Pulse Power Dissipation

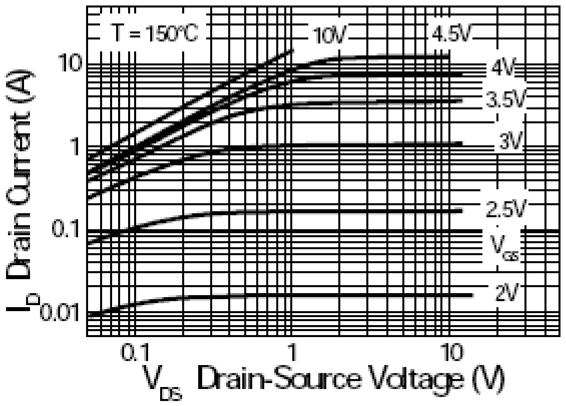
Electrical Characteristics N-Channel Q2 (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 60V, 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	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	55	mΩ	V_{GS} = 10V, I_D = 4.5A
		—	—	75		V_{GS} = 4.5V, I_D = 4.0A
Diode Forward Voltage	V_{SD}	—	0.85	1.2	V	V_{GS} = 0V, I_S = 5.5A
Forward Transconductance	g_{fs}	—	10.2	—	S	V_{DS}=15V,I_D=4.5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1063	—	pF	V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	104	—		
Reverse Transfer Capacitance	C_{rss}	—	64	—		
Total Gate Charge (V_{GS} = 5.0V)	Q_g	—	11	—	nC	V_{DS} = 30V, I_D = 4.5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	20.4	—		
Gate-Source Charge	Q_{gs}	—	4.1	—		
Gate-Drain Charge	Q_{gd}	—	5.1	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.5	—	nS	V_{DD} = 30V, I_D = 1.0A V_{GS} = 10V, R_G = 6.0Ω
Turn-On Rise Time	t_r	—	4.1	—		
Turn-Off Delay Time	$t_{D(off)}$	—	26.2	—		
Turn-Off Fall Time	t_f	—	10.6	—		
Body Diode Reverse Recovery Time	t_{rr}	—	22	—	nS	I_F = 2.2A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	21.4	—	nC	I_F = 2.2A, di/dt = 100A/µs

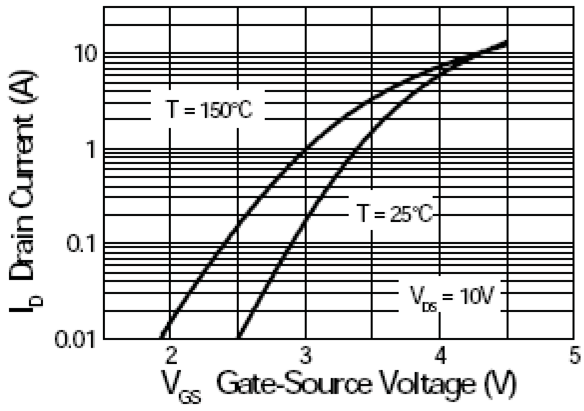
N-Channel Typical Characteristics



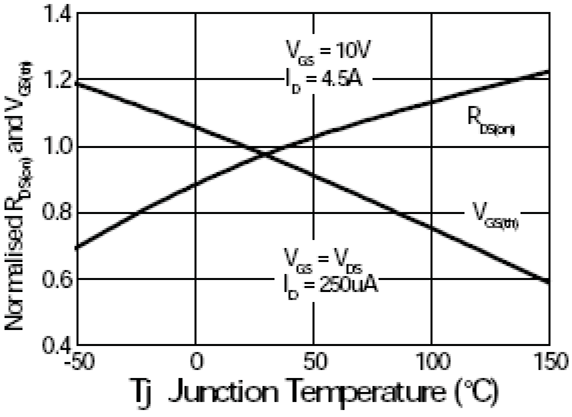
Output Characteristics



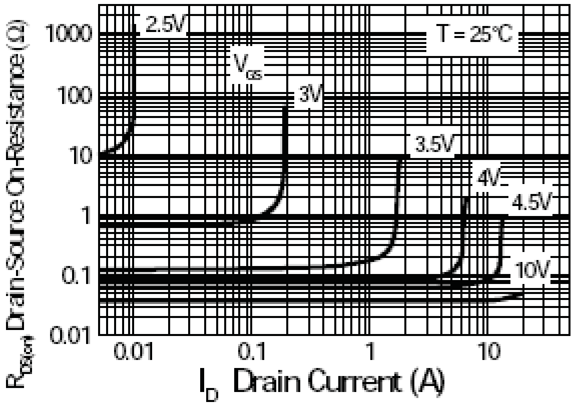
Output Characteristics



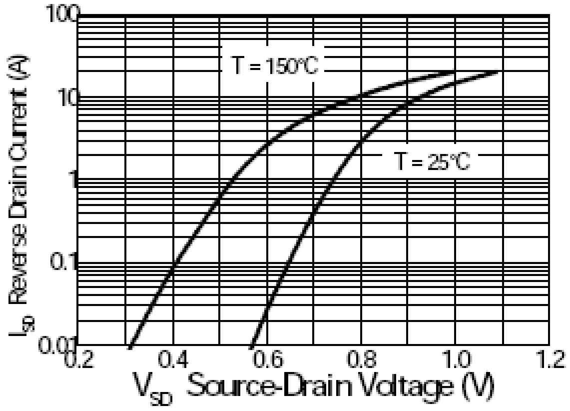
Typical Transfer Characteristics



Normalised Curves v Temperature

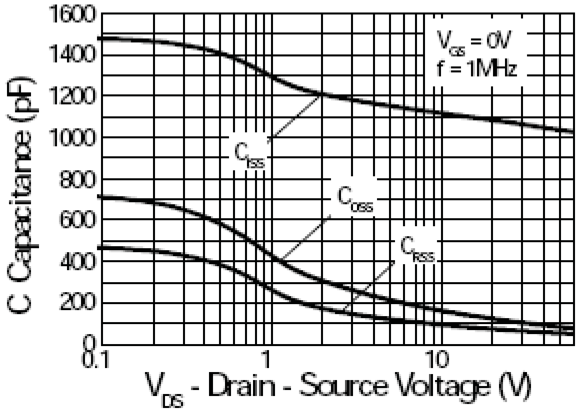


On-Resistance v Drain Current

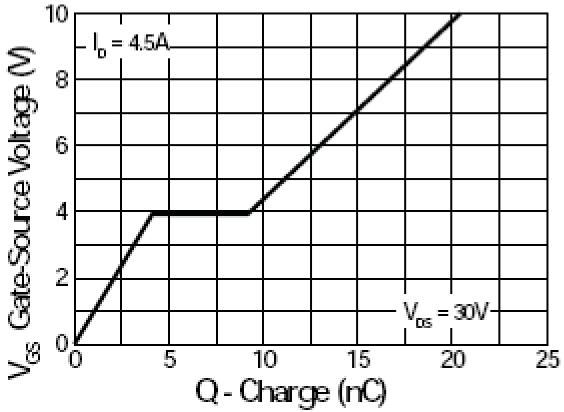


Source-Drain Diode Forward Voltage

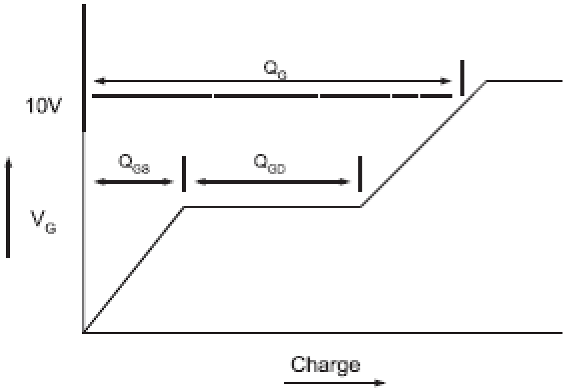
N-Channel Typical Characteristics (cont.)



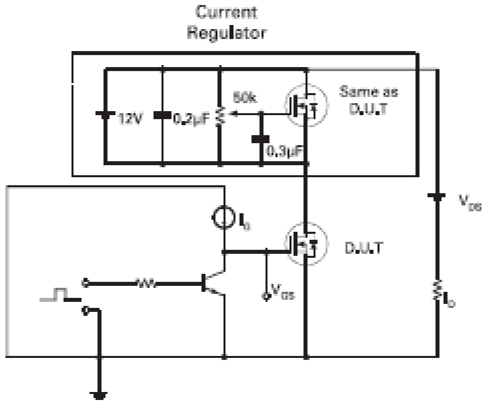
Capacitance v Drain-Source Voltage



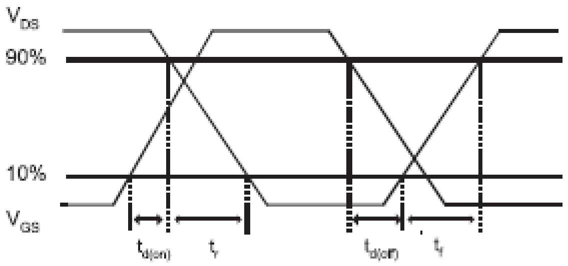
Gate-Source Voltage v Gate Charge



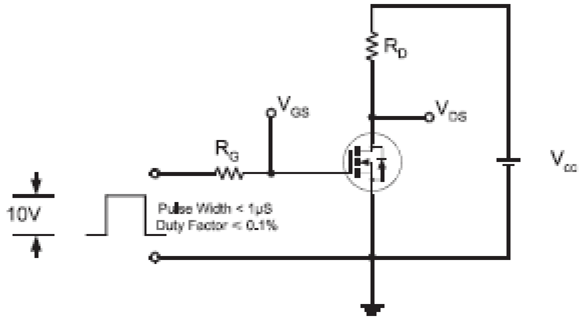
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms



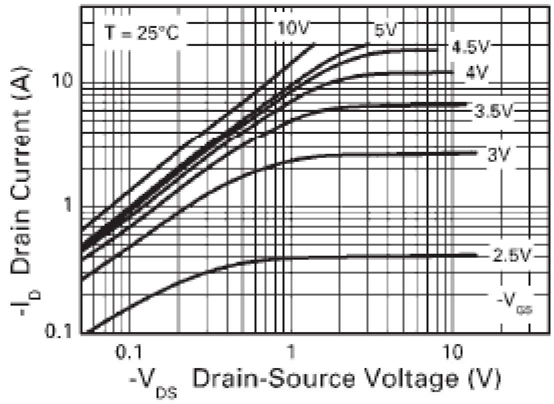
Switching Time Test Circuit

Electrical Characteristics P-Channel Q1 (@T_A = +25°C, unless otherwise specified.)

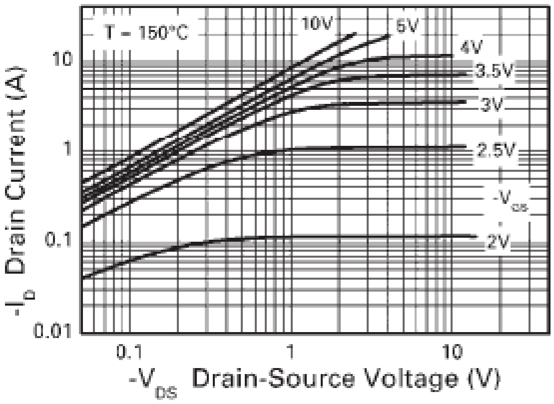
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	μA	V_{DS} = -60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	85	mΩ	V_{GS} = -10V, I_D = -2.9A
		—	—	125		V_{GS} = -4.5V, I_D = -2.4A
Diode Forward Voltage	V_{SD}	—	-0.85	-0.95	V	V_{GS} = 0V, I_S = -3.4A
Forward Transconductance	g_{fs}	—	7.2	—	S	V_{DS}=-15V,I_D=-2.9A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1021	—	pF	V_{DS} = -30V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	83.1	—		
Reverse Transfer Capacitance	C_{rss}	—	56.4	—		
Total Gate Charge (V_{GS} = -5.0V)	Q_g	—	12.1	—	nC	V_{DS} = -30V, I_D = -2.9A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	24.2	—		
Gate-Source Charge	Q_{gs}	—	2.5	—		
Gate-Drain Charge	Q_{gd}	—	3.7	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.5	—	nS	V_{DD} = -30V, I_D = -1.0A V_{GS} = -10V, R_G = 6.0Ω
Turn-On Rise Time	t_r	—	4.1	—		
Turn-Off Delay Time	$t_{D(off)}$	—	35	—		
Turn-Off Fall Time	t_f	—	10	—		
Body Diode Reverse Recovery Time	t_{rr}	—	29.2	—	nS	I_S = -2.0A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	—	39.6	—	nC	I_S = -2.0A, dI/dt = 100A/μs

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

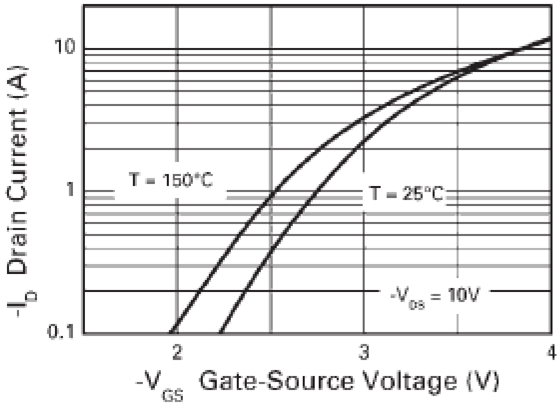
P-Channel Typical Characteristics



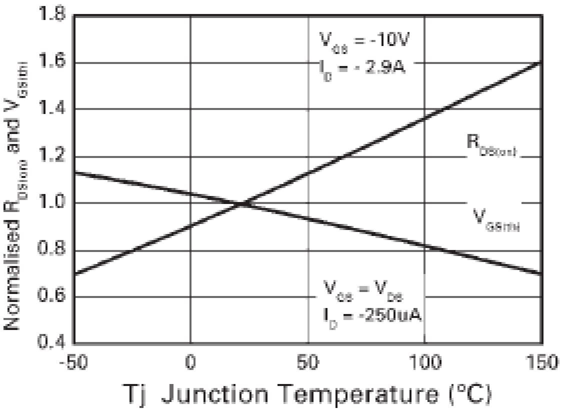
Output Characteristics



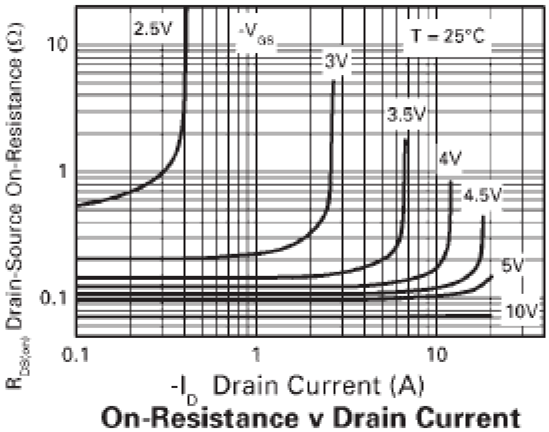
Output Characteristics



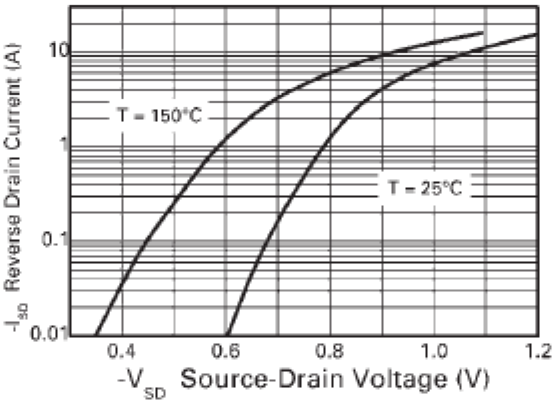
Typical Transfer Characteristics



Normalised Curves v Temperature

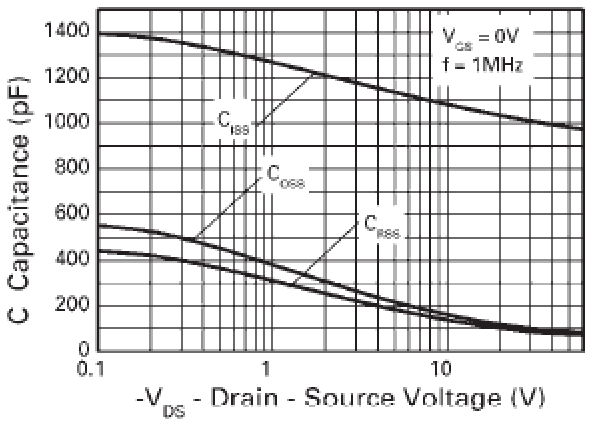


On-Resistance v Drain Current

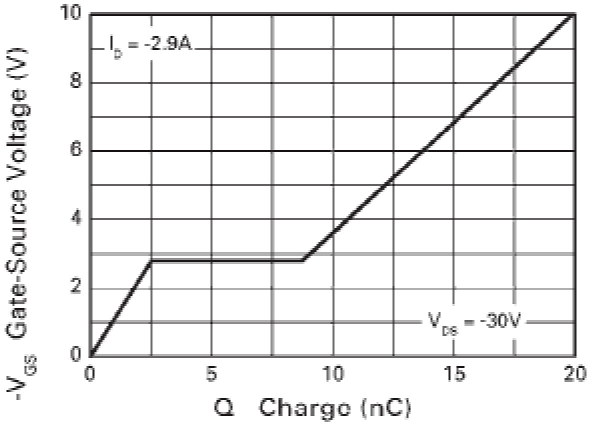


Source-Drain Diode Forward Voltage

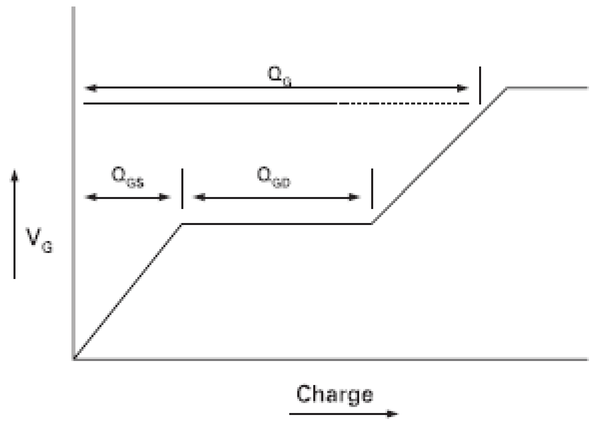
P-Channel Typical Characteristics (cont.)



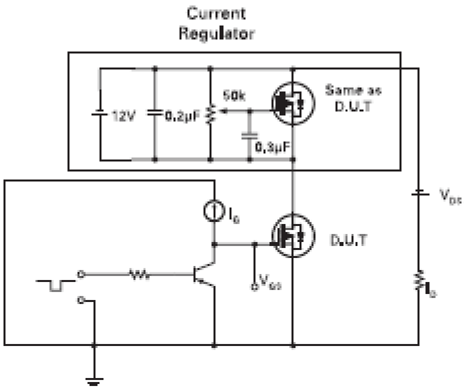
Capacitance v Drain-Source Voltage



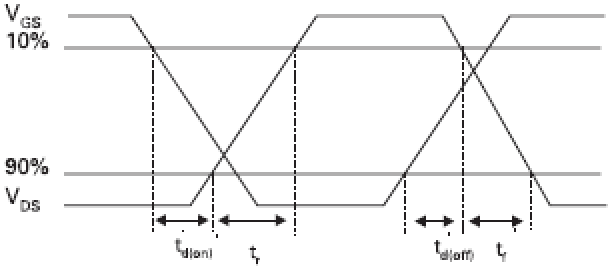
Gate-Source Voltage v Gate Charge



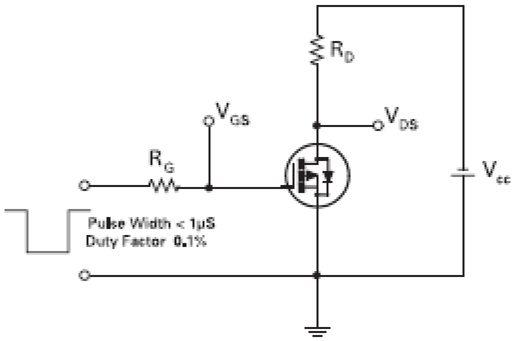
Basic Gate Charge Waveform



Gate Charge Test Circuit

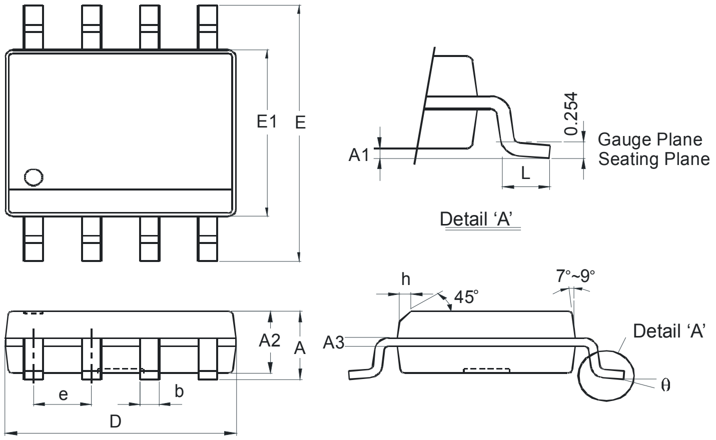


Switching Time Waveforms



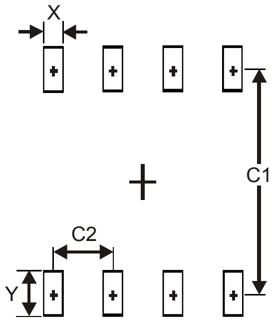
Switching Time Test Circuit

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