100V COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)}$ (Ω)max	I_D (A)max T_A = +25°C
Q1	100V	0.230 @ V_{GS}= 10V	2.1
		0.300 @ V_{GS}= 4.5V	1.9
Q2	-100V	0.235 @ V_{GS}= -10V	-2.2
		0.320 @ V_{GS}= -4.5V	-1.9

Features

- 100V Complementary in SOIC package
- Low On-Resistance
- Fast Switching Speed
- Low Voltage (V_{GS} = 4.5V) gate drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description

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

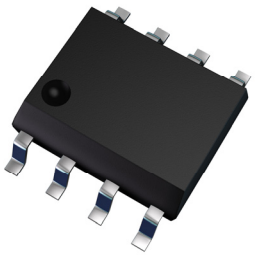
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (approximate)

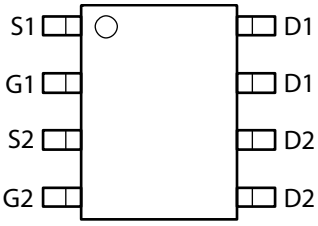
Applications

- DC Motor Control
- Backlighting

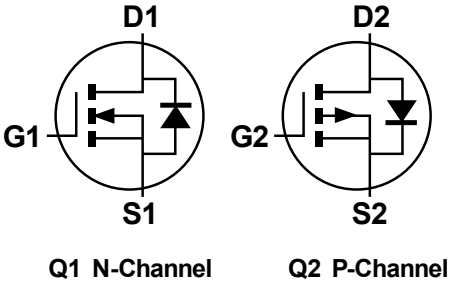
SO-8



Top View



Top View



Equivalent Circuit

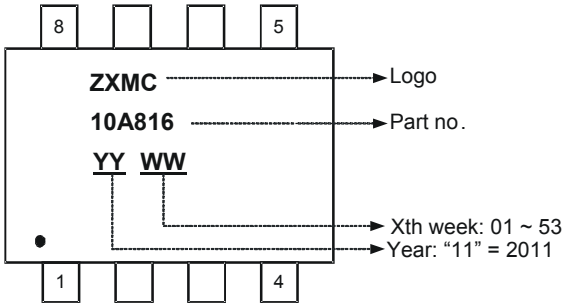
Ordering Information (Note 4)

Product	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMC10A816N8	13	12	2,500

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at http"//www.diodes.com/products/packages.html.

Marking Information

Top View



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

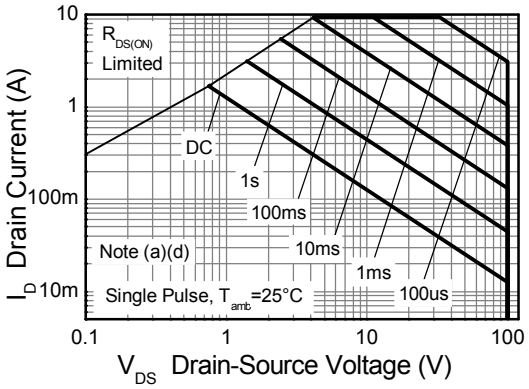
Parameter	Symbol	N-channel Q1	P-channel Q2	Unit
Drain-Source Voltage	V_{DSS}	100	-100	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current @ V_{GS}= 10V; T_A= +25°C [b)(d)] @ V_{GS}= 10V; T_A= +70°C [b)(d)] @ V_{GS}= 10V; T_A= +25°C [a)(d)] @ V_{GS}= 10V; T_A= +25°C [a)(e)] @ V_{GS}= 10V; T_L= +25°C [f)(d)]	I_D	2.1 1.7 1.7 2.0 2.3	-2.2 -1.8 -1.7 -2.0 -2.4	A
Pulsed Drain Current @ V_{GS} = 10V; T_A = +25°C [c)(d)]	I_{DM}	9.4	-10.5	A
Continuous Source Current (Body Diode) at T_A = +25°C [b)(d)]	I_S	3.0	-3.1	A
Pulsed Source Current (Body Diode) at T_A = +25°C [c)(d)]	I_{SM}	9.4	-10.5	A
Avalanche Current (g) L = 0.1 mH	I_{AS}	1.2	12	A
Power Dissipation at T_A = +25°C [a)(d)] Linear Derating Factor	P_D	1.3 10.0		W mW/°C
Power Dissipation at T_A = +25°C [a)(e)] Linear Derating Factor	P_D	1.8 14.2		W mW/°C
Power Dissipation at T_A = +25°C [b)(d)] Linear Derating Factor	P_D	2.1 16.7		W mW/°C
Power Dissipation at T_L = +25°C [f)(d)] Linear Derating Factor	P_D	2.4 18.9	2.6 20.4	W mW/°C
Operating and Storage Temperature Range	T_j, T_{stg}	-55 to +150		°C

Thermal Characteristics

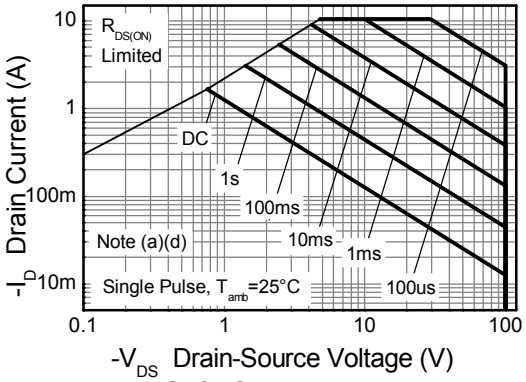
Parameter	Symbol	Value		Unit
Junction to Ambient [a)(d)]	$R_{\theta JA}$	100		°C/W
Junction to Ambient [a)(e)]	$R_{\theta JA}$	70		°C/W
Junction to Ambient [b)(d)]	$R_{\theta JA}$	60		°C/W
Junction to Lead [f)(d)]	$R_{\theta JL}$	53	49	°C/W

Notes:
(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
(b) Same as note (a), except the device is measured at t ≤ 10 sec.
(c) Same as note (a), except the device is pulsed with D= 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
(d) For a dual device with one active die.
(e) For a device with two active die running at equal power.
(f) Thermal resistance from junction to solder-point (at the end of the drain lead); the device is operating in a steady-state condition.
(g) IAS rating are based on low frequency and duty cycles to keep T_J = +25°C.

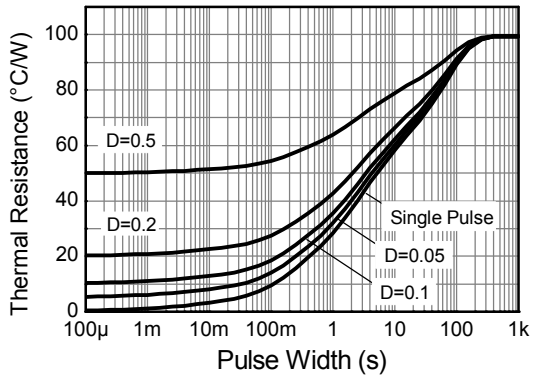
Thermal Characteristics



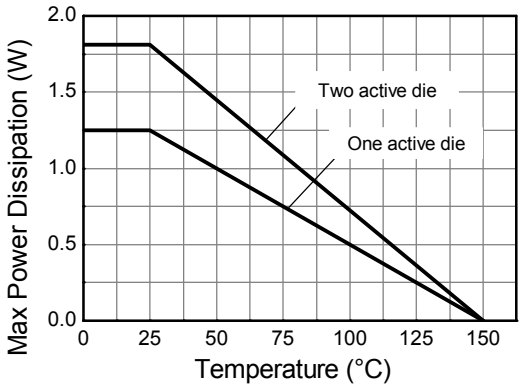
N-channel Safe Operating Area



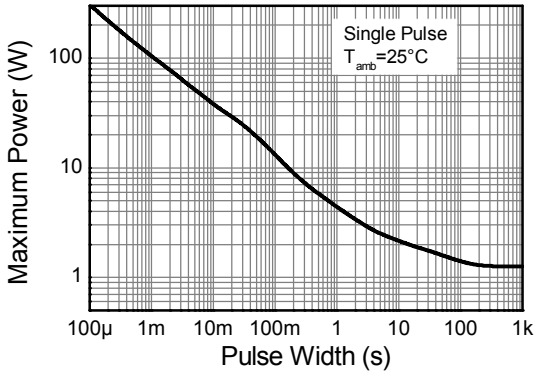
P-channel Safe Operating Area



Transient Thermal Impedance



Derating Curve



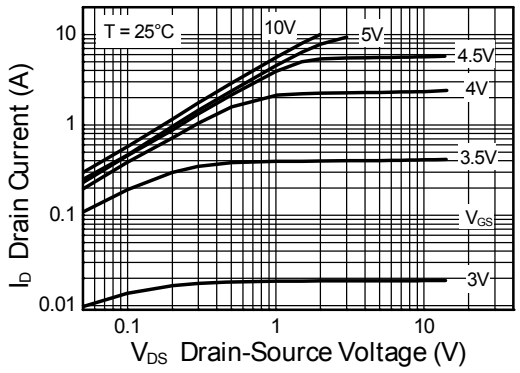
Pulse Power Dissipation

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

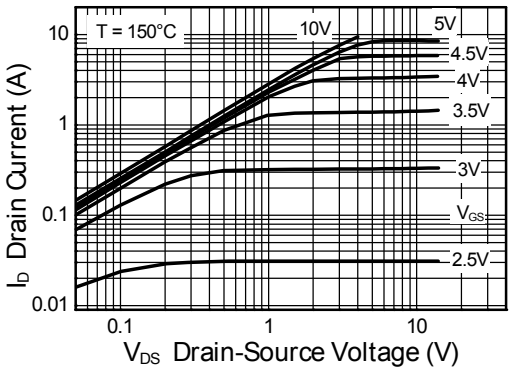
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	100	—	—	V	I_D = 250μA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS} = 100V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±20V, V_{DS} = 0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	1.7	—	2.4	V	I_D = 250μA, V_{DS} = V_{GS}
Static Drain-Source On-State Resistance [a]	$R_{DS(ON)}$	—	0.170 0.210	0.230 0.300	Ω	V_{GS} = 10V, I_D = 1.0A V_{GS} = 4.5V, I_D = 0.5A
Forward Transconductance [a] [c]	g_{fs}	—	4.8	—	S	V_{DS}= 15V, I_D= 1.6A
Dynamic Capacitance [c]						
Input Capacitance	C_{iss}	—	497	—	pF	V_{DS} = 50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	29	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	18	—	pF	
Switching [b] [c]						
Turn-On-Delay Time	$t_{d(ON)}$	—	2.9	—	ns	V_{DD} = 50V, V_{GS} = 10V I_D = 1.0A $R_G \cong 6.0\Omega$,
Rise Time	t_r	—	2.1	—	ns	
Turn-Off Delay Time	$t_{d(OFF)}$	—	12.1	—	ns	
Fall Time	t_f	—	5.0	—	ns	
Gate Charge [c]						
Total Gate Charge	Q_g	—	9.2	—	nC	V_{DS} = 50V, V_{GS} = 10V I_D = 1.6A
Gate-Source Charge	Q_{gs}	—	1.7	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.5	—	nC	
Source–Drain Diode						
Diode Forward Voltage [a]	V_{SD}	—	0.85	0.95	V	I_S = 1.7A, V_{GS} = 0V
Reverse Recovery Time [c]	t_{rr}	—	32	—	ns	I_S = 1.7A, di/dt = 100A/μs
Reverse Recovery Charge[c]	Q_{rr}	—	40	—	nC	
Gate Resistance						
Gate Resistance	R_G	0	—	3	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz

Notes: (a) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
(b) Switching characteristics are independent of operating junction temperature.
(c) For design aid only, not subject to production testing.

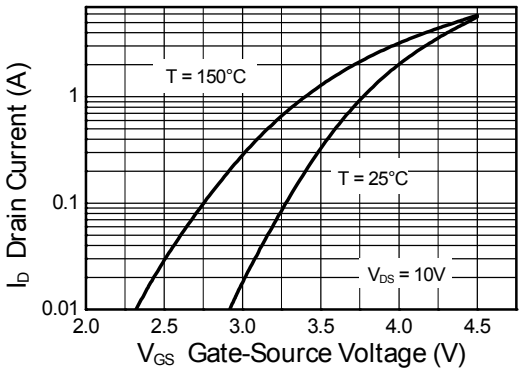
Typical Characteristics Q1 N-Channel



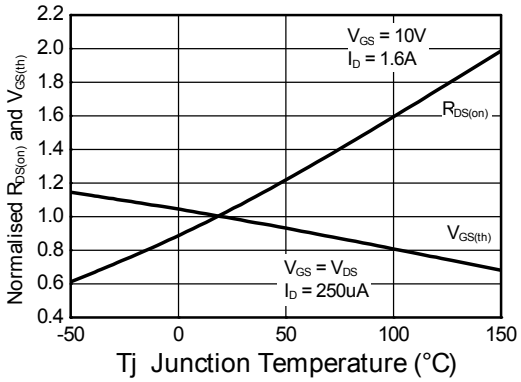
Output Characteristics



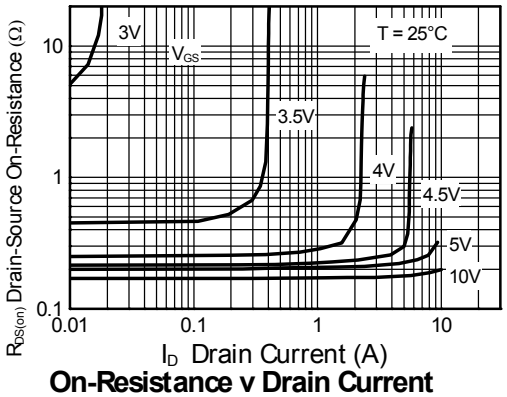
Output Characteristics



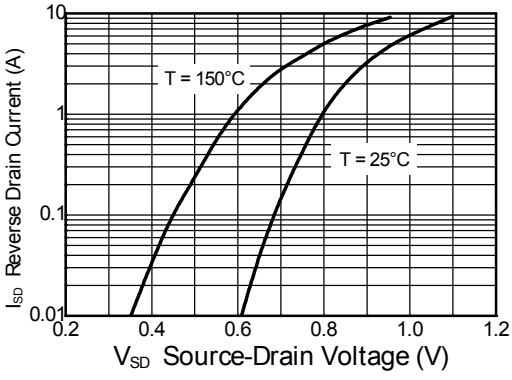
Typical Transfer Characteristics



Normalised Curves v Temperature

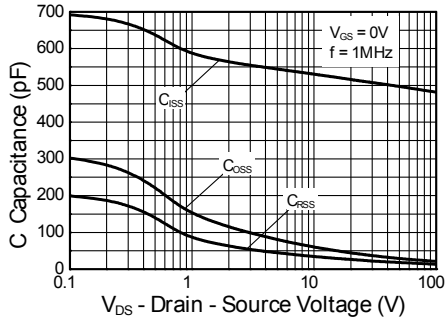


On-Resistance v Drain Current

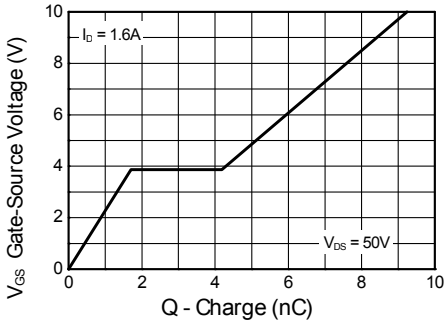


Source-Drain Diode Forward Voltage

Typical Characteristics Q1 N-Channel (cont.)

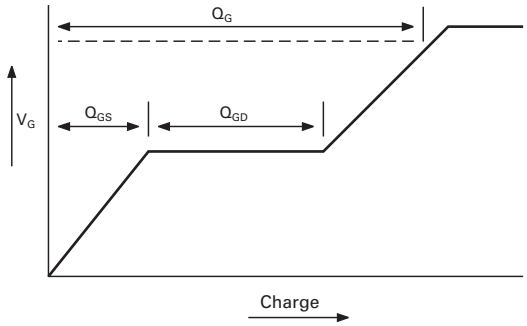


Capacitance v Drain-Source Voltage

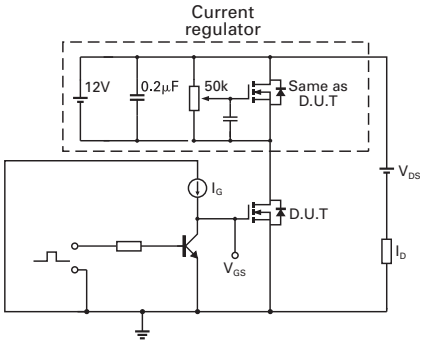


Gate-Source Voltage v Gate Charge

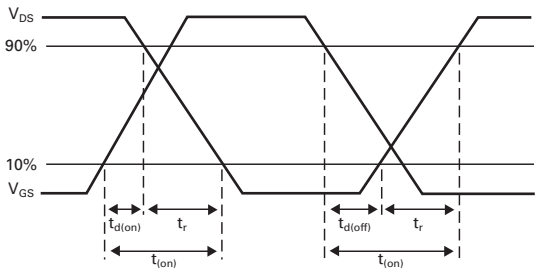
Test Circuits



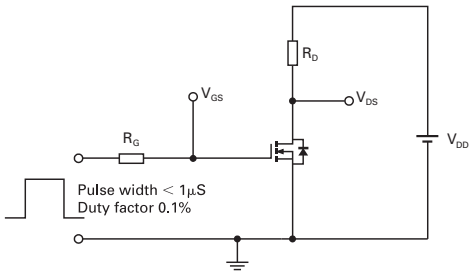
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



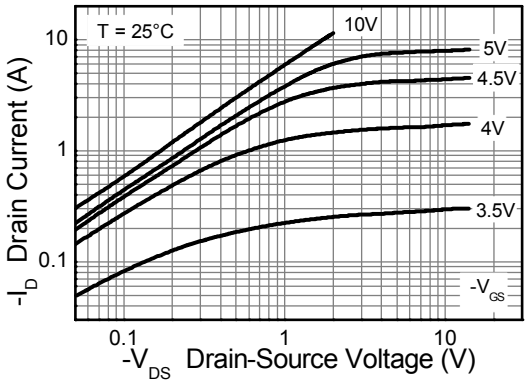
Switching time test circuit

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

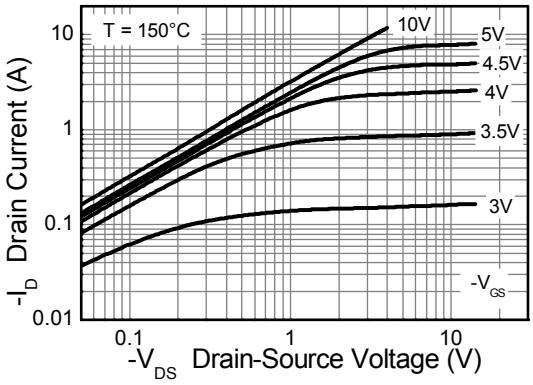
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	-100	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain current	I_{DSS}	—	—	-0.5	µA	V_{DS} = -100V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±20V, V_{DS} = 0V
Gate-Source Threshold Voltage	$V_{GS(th)}$	-2.0	—	-3.0	V	I_D = -250µA, V_{DS} = V_{GS}
Static Drain-Source On-State Resistance [a]	$R_{DS(ON)}$	—	0.170 0.250	0.235 0.320	Ω	V_{GS} = -10V, I_D = -1.0A V_{GS} = -4.5V, I_D = -0.5A
Forward Transconductance [a] [c]	g_{fs}	—	4.7	—	S	V_{DS} = -15V, I_D = -2.1A
Dynamic Capacitance [c]						
Input Capacitance	C_{iss}	—	717	—	pF	V_{DS} = -50V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	55	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	46	—	pF	
Switching [b] [c]						
Turn-On-Delay Time	$t_{d(ON)}$	—	4.3	—	ns	V_{DD} = -50V, V_{GS} = -10V I_D = -1A $R_G \cong 6.0\Omega$,
Rise Time	t_r	—	5.2	—	ns	
Turn-Off Delay Time	$t_{d(OFF)}$	—	20	—	ns	
Fall Time	t_f	—	12	—	ns	
Gate Charge [c]						
Total Gate Charge	Q_g	—	16.5	—	nC	V_{DS} = -50V, V_{GS} = -10V I_D = -2.1A
Gate-Source Charge	Q_{gs}	—	2.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	5.4	—	nC	
Source–Drain Diode						
Diode Forward Voltage [a]	V_{SD}	—	-0.85	-0.95	V	I_S = -1.7A, V_{GS} = 0V
Reverse Recovery Time [c]	t_{rr}	—	43	—	ns	I_S = -1.7A, di/dt = 100A/µs
Reverse Recovery Charge[c]	Q_{rr}	—	77	—	nC	
Gate Resistance						
Gate Resistance	R_G	0	—	100	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz

Notes: (a) Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
(b) Switching characteristics are independent of operating junction temperature.
(c) For design aid only, not subject to production testing.

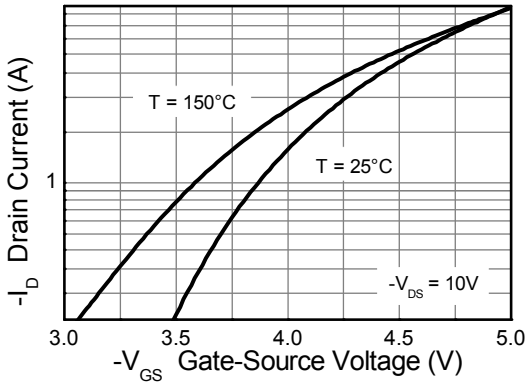
Typical Characteristics Q2 P-Channel



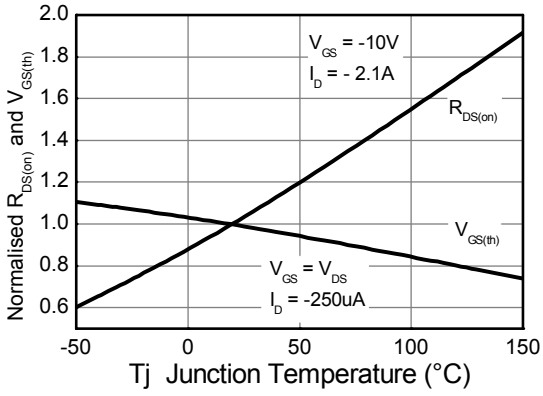
Output Characteristics



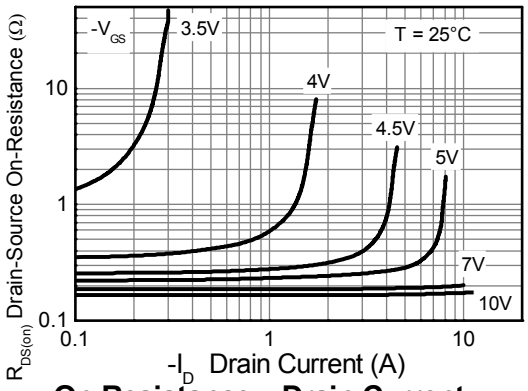
Output Characteristics



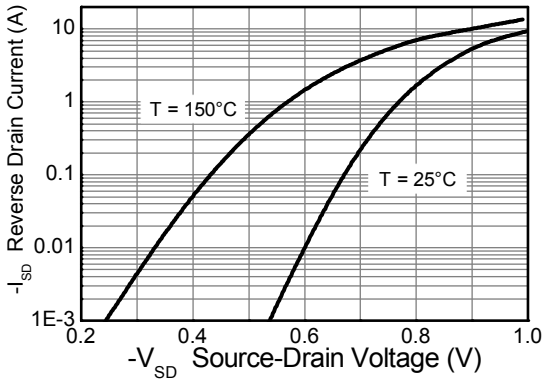
Typical Transfer Characteristics



Normalised Curves v Temperature

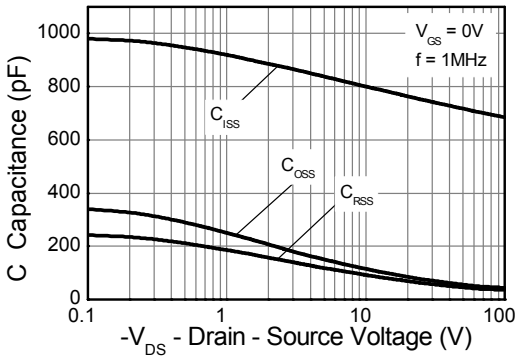


On-Resistance v Drain Current

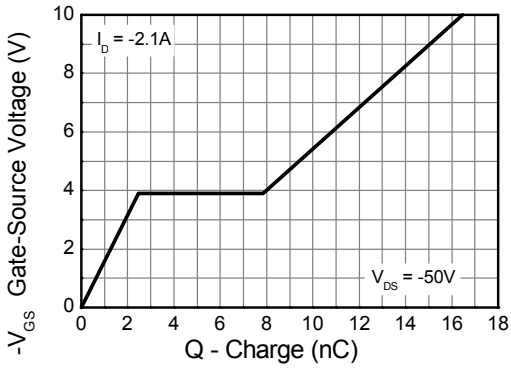


Source-Drain Diode Forward Voltage

Typical Characteristics Q2 P-Channel (cont.)

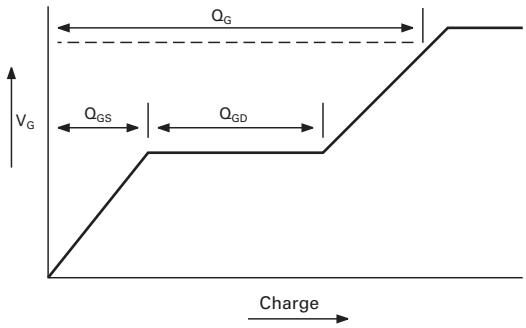


Capacitance v Drain-Source Voltage

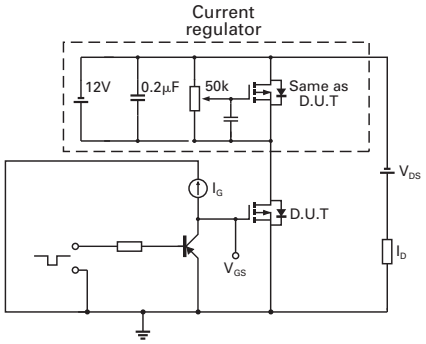


Gate-Source Voltage v Gate Charge

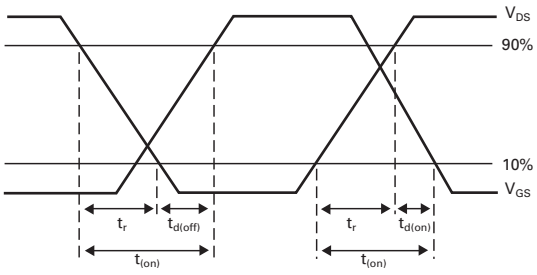
Test Circuits



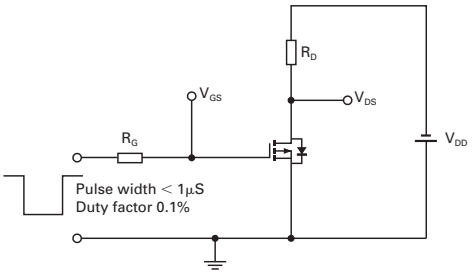
Basic gate charge waveform



Gate charge test circuit



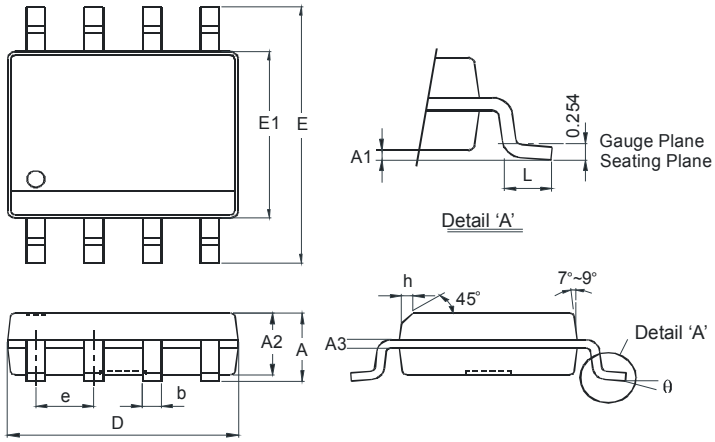
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

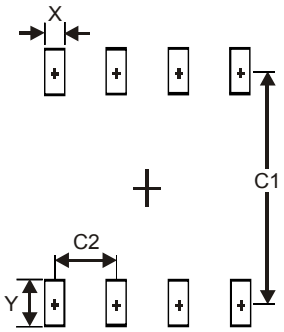
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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Поставка электронных компонентов

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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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