

## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DS(ON)</sub> (Ω) (Max)	I <sub>D</sub> (A) (Max) T <sub>A</sub> = +25°C
Q1	100V	0.230 @ V <sub>GS</sub> = 10V	2.1
		0.300 @ V <sub>GS</sub> = 4.5V	1.9
Q2	-100V	0.235 @ V <sub>GS</sub> = -10V	-2.2
		0.320 @ V <sub>GS</sub> = -4.5V	-1.9

## Description

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

## Applications

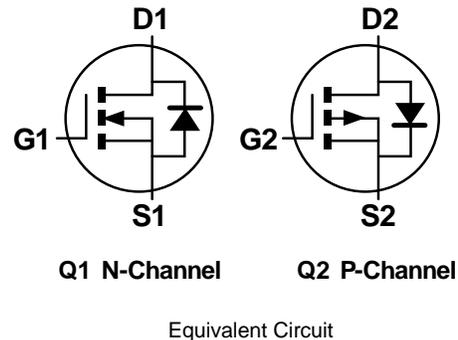
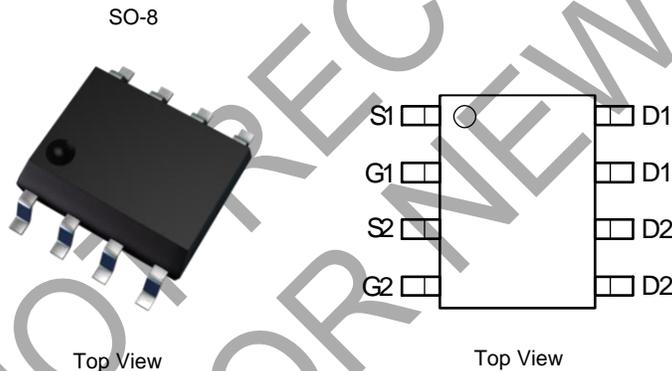
- DC motor controls
- Backlighting

## Features

- 100V Complementary in SO-8 Package
- Low On-Resistance
- Fast Switching Speed
- Low Voltage (V<sub>GS</sub> = 4.5V) Gate Drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

## 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
- Terminals: Finish – Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

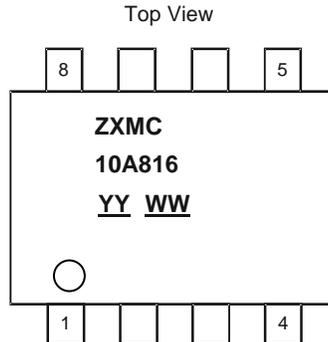


## Ordering Information (Note 4)

Part Number	Package	Reel Size (inches)	Tape Width (mm)	Packing	
				Qty.	Carrier
ZXMC10A816N8TA	SO-8	7	12	500	Reel
ZXMC10A816N8TC	SO-8	13	12	2,500	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



ZXMC10A816 = Product Type Marking Code  
 YY WW = Date Code Marking  
 YY = Year (ex: 24 = 2024)  
 WW = Week (01 to 53)

## Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

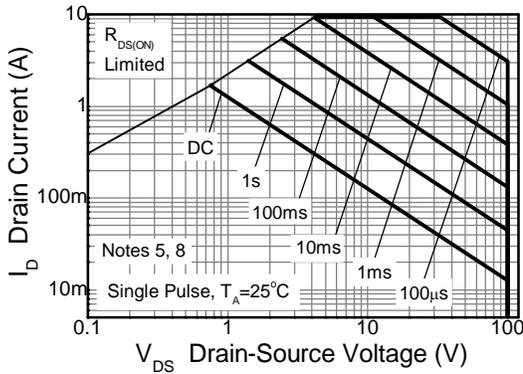
Parameter	Symbol	N-Channel Q1	P-Channel Q2	Unit
Drain-Source Voltage	V <sub>DSS</sub>	100	-100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V
Continuous Drain Current @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Notes 6, 8) @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +70°C (Notes 6, 8) @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Notes 5, 8) @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Notes 5, 9) @ V <sub>GS</sub> = 10V; T <sub>L</sub> = +25°C (Notes 8, 10)	I <sub>D</sub>	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 <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C (Notes 7, 8)	I <sub>DM</sub>	9.4	-10.5	A
Continuous Source Current (Body Diode) at T <sub>A</sub> = +25°C (Notes 6, 8)	I <sub>S</sub>	3.0	-3.1	A
Pulsed Source Current (Body Diode) at T <sub>A</sub> = +25°C (Notes 7, 8)	I <sub>SM</sub>	9.4	-10.5	A
Avalanche Current (Note 11) L = 0.1mH	I <sub>AS</sub>	1.2	-12	A
Power Dissipation at T <sub>A</sub> = +25°C (Notes 5, 8) Linear Derating Factor	P <sub>D</sub>	1.3 10.0		W mW/°C
Power Dissipation at T <sub>A</sub> = +25°C (Notes 5, 9) Linear Derating Factor	P <sub>D</sub>	1.8 14.2		W mW/°C
Power Dissipation at T <sub>A</sub> = +25°C (Notes 6, 8) Linear Derating Factor	P <sub>D</sub>	2.1 16.7		W mW/°C
Power Dissipation at T <sub>L</sub> = +25°C (Notes 8, 10) Linear Derating Factor	P <sub>D</sub>	2.4 18.9	2.6 20.4	W mW/°C
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150		°C

## Thermal Characteristics

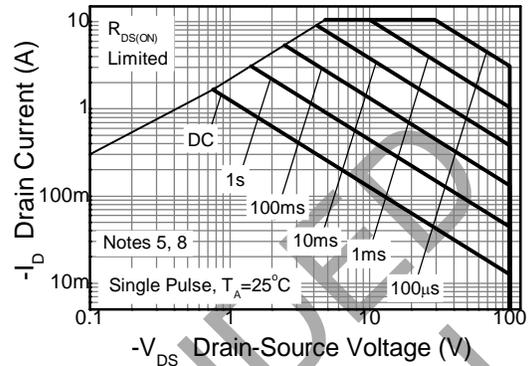
Parameter	Symbol	Value	Unit
Junction to Ambient (Notes 5, 8)	R <sub>θJA</sub>	100	°C/W
Junction to Ambient (Notes 5, 9)	R <sub>θJA</sub>	70	°C/W
Junction to Ambient (Notes 6, 8)	R <sub>θJA</sub>	60	°C/W
Junction to Lead (Notes 8, 10)	R <sub>θJL</sub>	53	°C/W

- Notes:
- For a device surface-mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
  - Same as Note 5, except the device is measured at t ≤ 10 sec.
  - Same as Note 5, except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
  - For a dual device with one active die.
  - For a device with two active dies running at equal power.
  - Thermal resistance from junction to solder-point (at the end of the drain lead); the device is operating in a steady-state condition.
  - I<sub>AS</sub> rating is based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

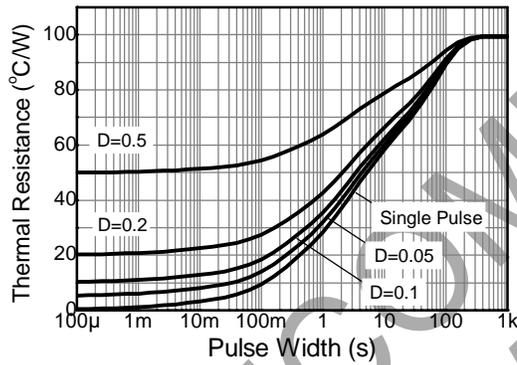
**Thermal Characteristics**



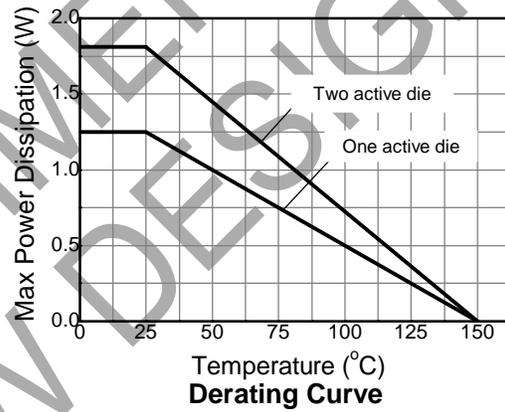
**N-channel Safe Operating Area**



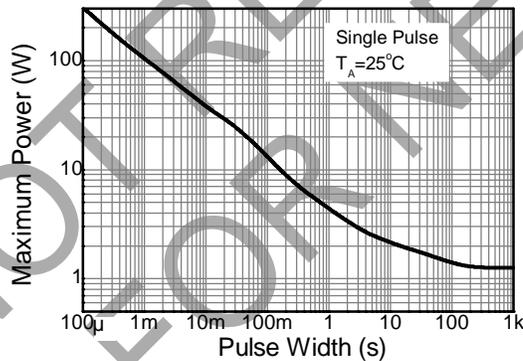
**P-channel Safe Operating Area**



**Transient Thermal Impedance**



**Derating Curve**



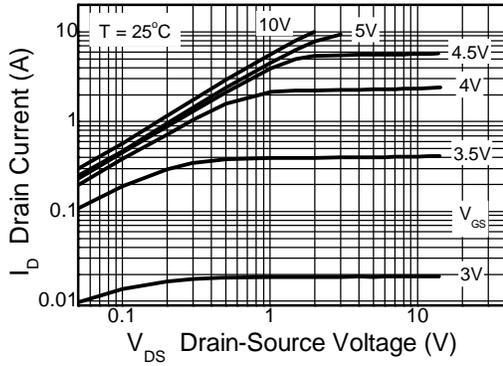
**Pulse Power Dissipation**

**Electrical Characteristics Q1 N-Channel** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

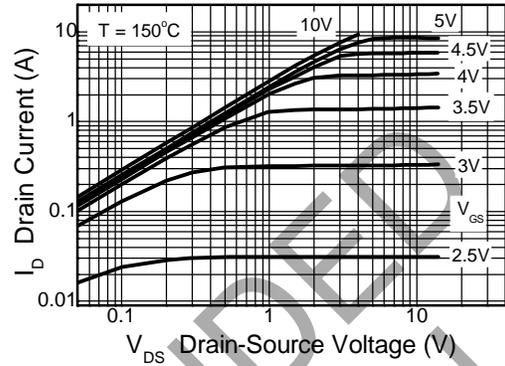
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	0.5	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
Gate-Source Threshold Voltage	V <sub>GS(TH)</sub>	1.7	—	2.4	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-State Resistance (Note 12)	R <sub>DS(ON)</sub>	—	0.170 0.210	0.230 0.300	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.0A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.5A
Forward Transconductance (Notes 12, 14)	g <sub>fs</sub>	—	4.8	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 1.6A
<b>Dynamic Capacitance (Note 14)</b>						
Input Capacitance	C <sub>iss</sub>	—	497	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	29	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	18	—	pF	
<b>Switching (Notes 13, 14)</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.9	—	ns	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1.0A R <sub>G</sub> = 6.0Ω
Rise Time	t <sub>R</sub>	—	2.1	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	12.1	—	ns	
Fall Time	t <sub>F</sub>	—	5.0	—	ns	
<b>Gate Charge (Note 14)</b>						
Total Gate Charge	Q <sub>g</sub>	—	9.2	—	nC	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1.6A
Gate-Source Charge	Q <sub>gs</sub>	—	1.7	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.5	—	nC	
<b>Source-Drain Diode</b>						
Diode Forward Voltage (Note 12)	V <sub>SD</sub>	—	0.85	0.95	V	I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 14)	t <sub>RR</sub>	—	32	—	ns	I <sub>S</sub> = 1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 14)	Q <sub>R</sub>	—	40	—	nC	
<b>Gate Resistance</b>						
Gate Resistance	R <sub>G</sub>	0	—	3	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.  
13. Switching characteristics are independent of operating junction temperature.  
14. For design aid only, not subject to production testing.

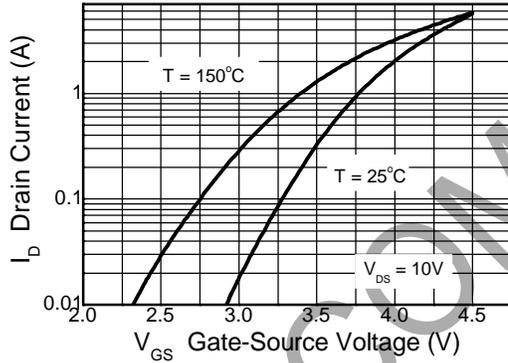
**Typical Characteristics Q1 N-Channel**



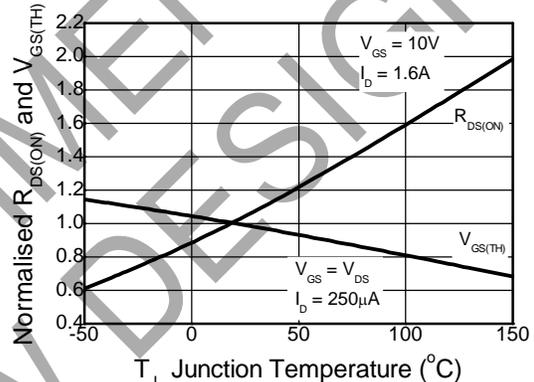
**Output Characteristics**



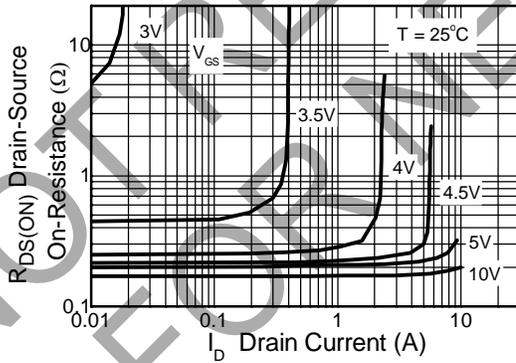
**Output Characteristics**



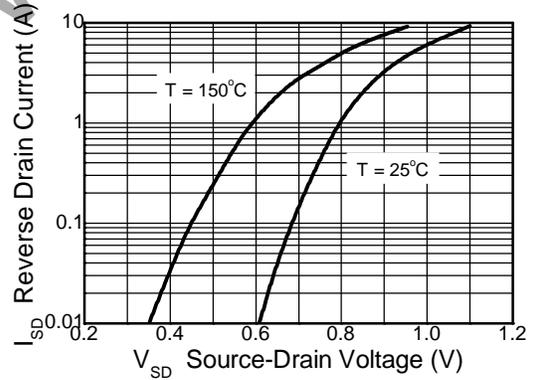
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

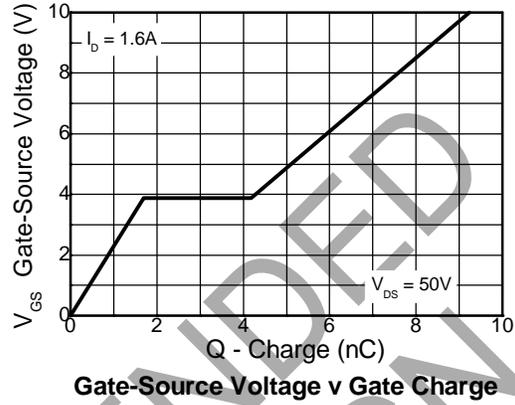
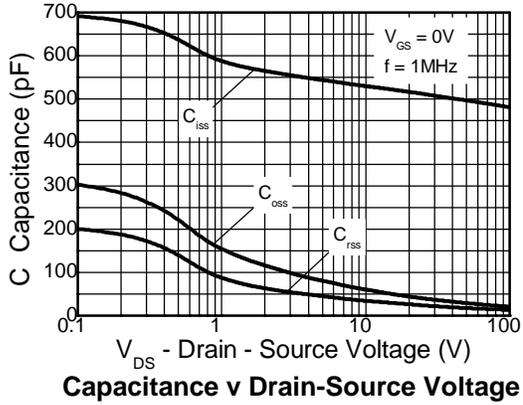


**On-Resistance v Drain Current**

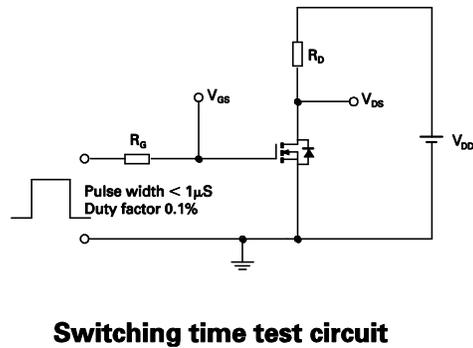
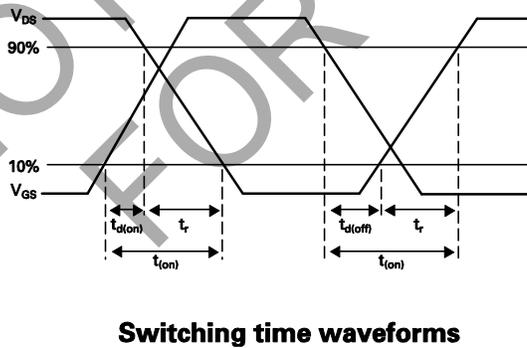
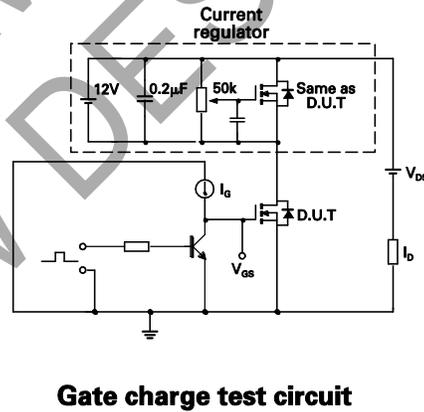
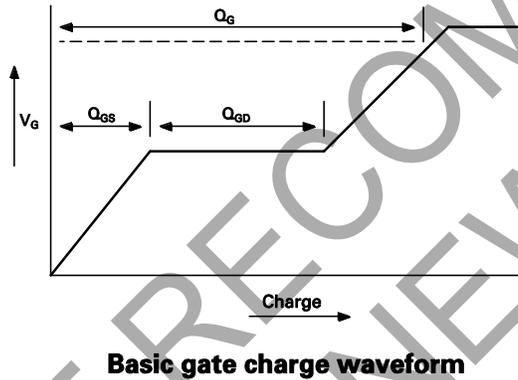


**Source-Drain Diode Forward Voltage**

**Typical Characteristics Q1 N-Channel** (continued)



**Test Circuits**

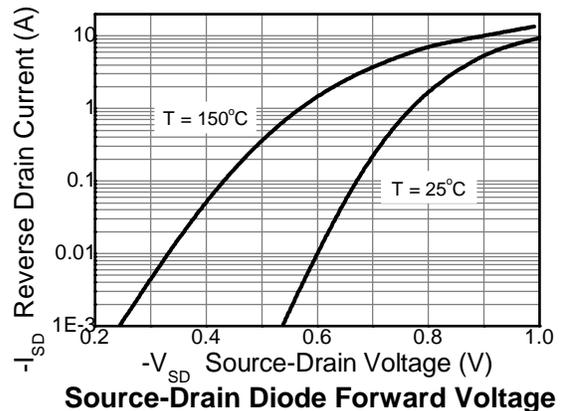
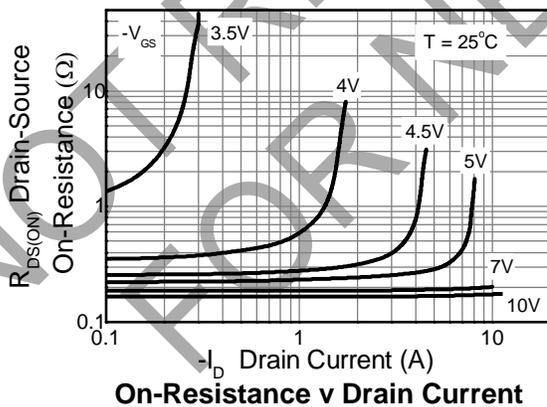
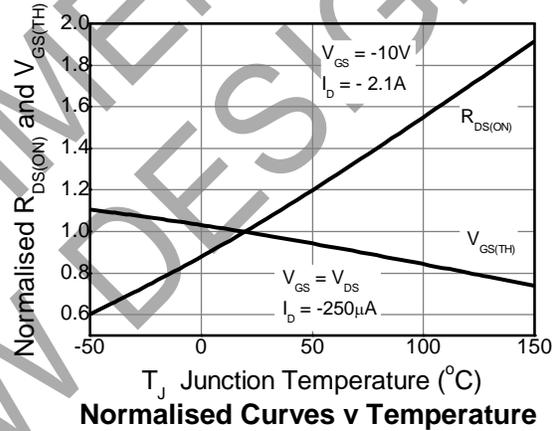
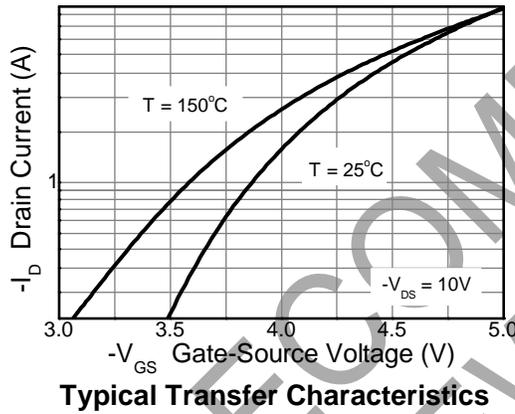
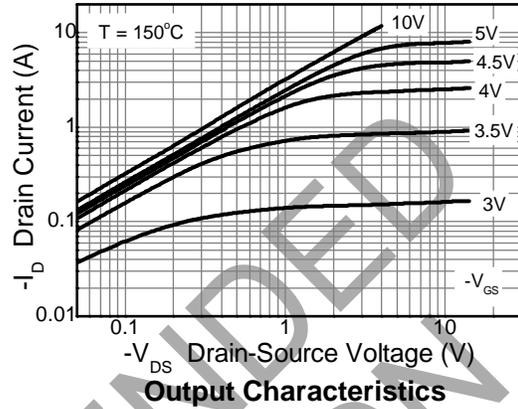
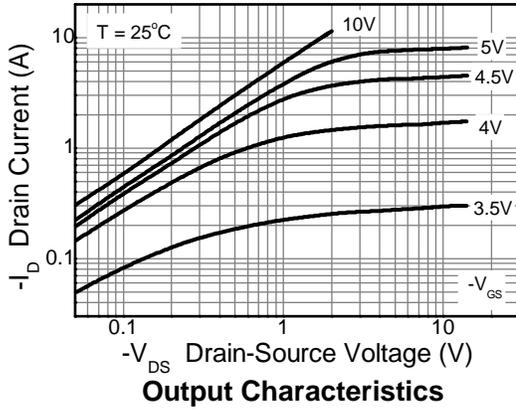


**Electrical Characteristics Q2 P-Channel** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

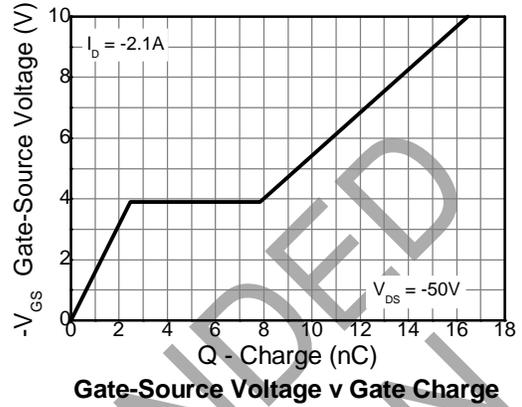
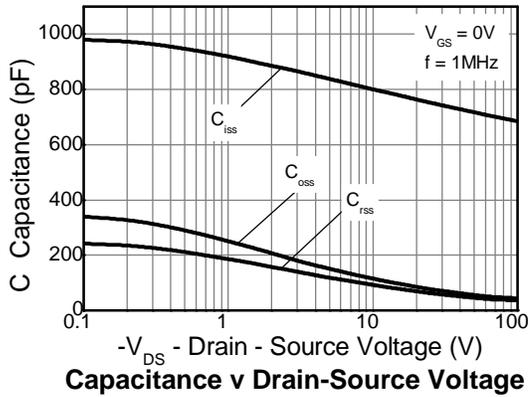
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-100	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -100V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	-100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
Gate-Source Threshold Voltage	V <sub>GS(TH)</sub>	-2.0	—	-3.0	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-State Resistance (Note 12)	R <sub>DS(ON)</sub>	—	0.170 0.250	0.235 0.320	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.0A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.5A
Forward Transconductance (Notes 12, 14)	g <sub>fs</sub>	—	4.7	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A
<b>Dynamic Capacitance (Note 14)</b>						
Input Capacitance	C <sub>iss</sub>	—	717	—	pF	V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	55	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	46	—	pF	
<b>Switching (Notes 13, 14)</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.3	—	ns	V <sub>DD</sub> = -50V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A R <sub>G</sub> = 6.0Ω
Rise Time	t <sub>r</sub>	—	5.2	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	20	—	ns	
Fall Time	t <sub>f</sub>	—	12	—	ns	
<b>Gate Charge (Note 14)</b>						
Total Gate Charge	Q <sub>g</sub>	—	16.5	—	nC	V <sub>DS</sub> = -50V, V <sub>GS</sub> = -10V I <sub>D</sub> = -2.1A
Gate-Source Charge	Q <sub>gs</sub>	—	2.5	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	5.4	—	nC	
<b>Source-Drain Diode</b>						
Diode Forward Voltage (Note 12)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 14)	t <sub>RR</sub>	—	43	—	ns	I <sub>S</sub> = -1.7A, di/dt = 100A/μs
Reverse Recovery Charge (Note 14)	Q <sub>R</sub>	—	77	—	nC	
<b>Gate Resistance</b>						
Gate Resistance	R <sub>G</sub>	0	—	100	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.  
13. Switching characteristics are independent of operating junction temperature.  
14. For design aid only, not subject to production testing.

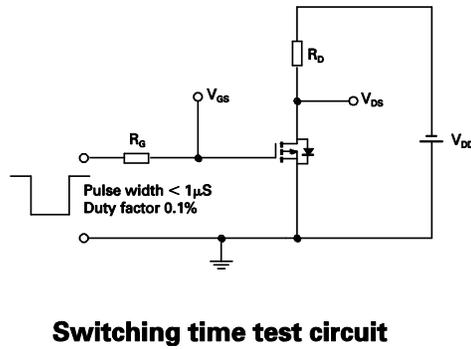
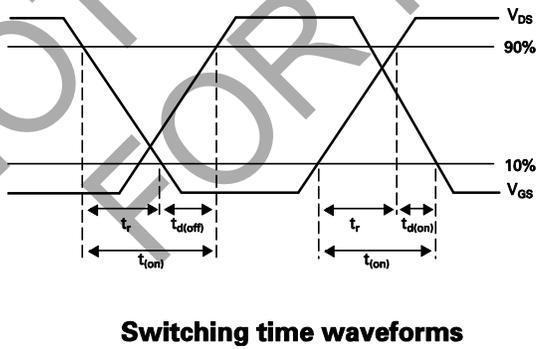
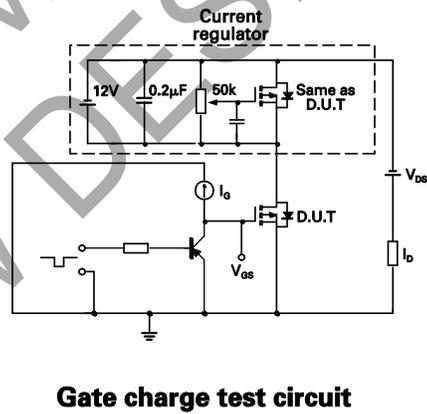
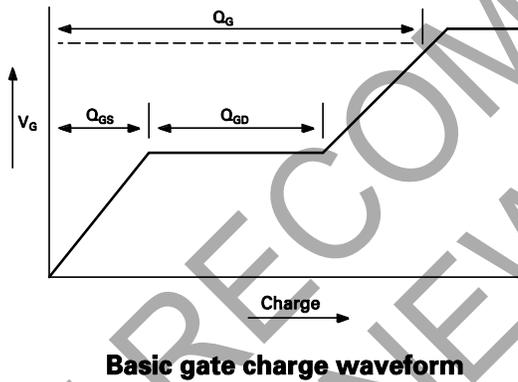
**Typical Characteristics Q2 P-Channel**



**Typical Characteristics Q2 P-Channel** (continued)



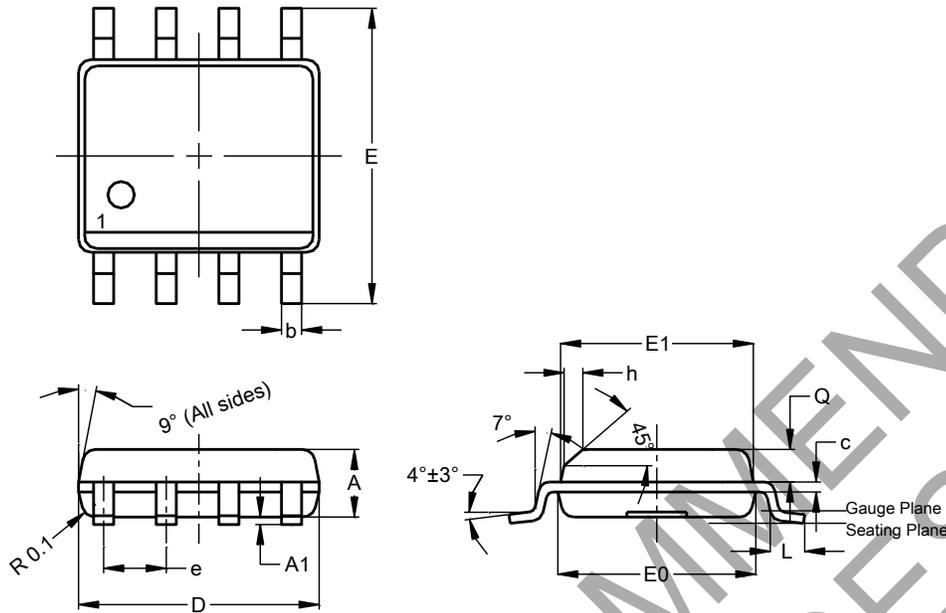
**Test Circuits**



**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8

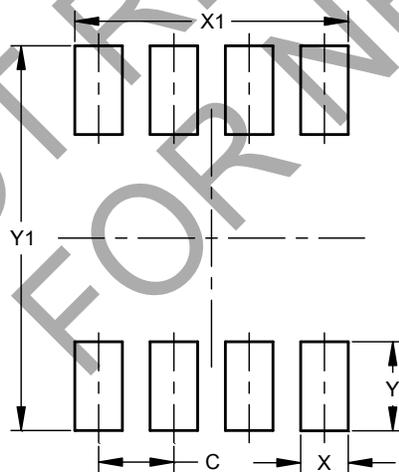


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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