

**100V COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET**
**Product Summary**

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

**Description**

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

**Applications**

- DC Motor Control
- Backlighting

**Features**

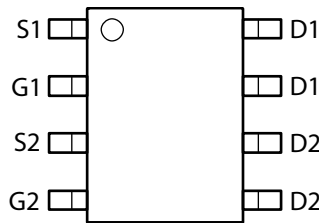
- 100V Complementary in SOIC package
- Low On-Resistance
- Fast Switching Speed
- Low Voltage ( $V_{GS} = 4.5\text{V}$ ) gate drive
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

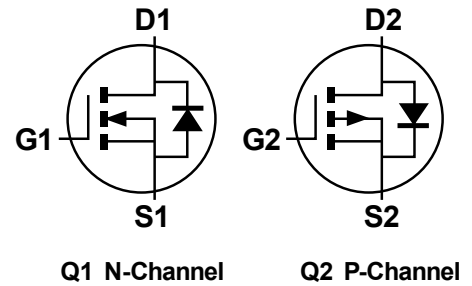
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.074 grams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



Top View



Top View

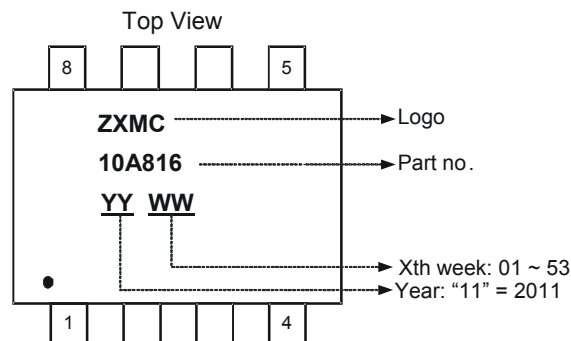


Equivalent Circuit

**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](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**


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

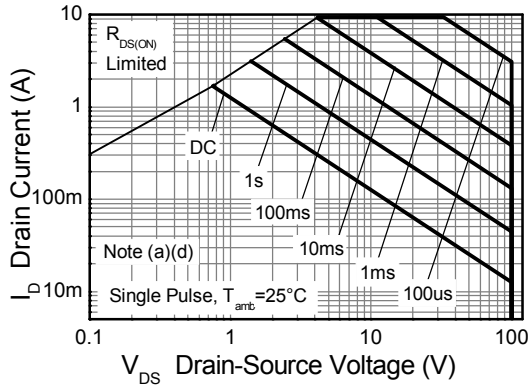
Parameter	Symbol	N-channel Q1	P-channel Q2	Unit
Drain-Source Voltage	V <sub>DSS</sub>	100	-100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	±20	V
Continuous Drain Current @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C <sup>(b)(d)</sup> @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +70°C <sup>(b)(d)</sup> @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C <sup>(a)(d)</sup> @ V <sub>GS</sub> = 10V; T <sub>A</sub> = +25°C <sup>(a)(e)</sup> @ V <sub>GS</sub> = 10V; T <sub>L</sub> = +25°C <sup>(f)(d)</sup>	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 <sup>(c)(d)</sup>	I <sub>DM</sub>	9.4	-10.5	A
Continuous Source Current (Body Diode) at T <sub>A</sub> = +25°C <sup>(b)(d)</sup>	I <sub>S</sub>	3.0	-3.1	A
Pulsed Source Current (Body Diode) at T <sub>A</sub> = +25°C <sup>(c)(d)</sup>	I <sub>SM</sub>	9.4	-10.5	A
Avalanche Current (g) L = 0.1 mH	I <sub>AS</sub>	1.2	12	A
Power Dissipation at T <sub>A</sub> = +25°C <sup>(a)(d)</sup> Linear Derating Factor	P <sub>D</sub>	1.3 10.0		W mW/°C
Power Dissipation at T <sub>A</sub> = +25°C <sup>(a)(e)</sup> Linear Derating Factor	P <sub>D</sub>	1.8 14.2		W mW/°C
Power Dissipation at T <sub>A</sub> = +25°C <sup>(b)(d)</sup> Linear Derating Factor	P <sub>D</sub>	2.1 16.7		W mW/°C
Power Dissipation at T <sub>L</sub> = +25°C <sup>(f)(d)</sup> 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**

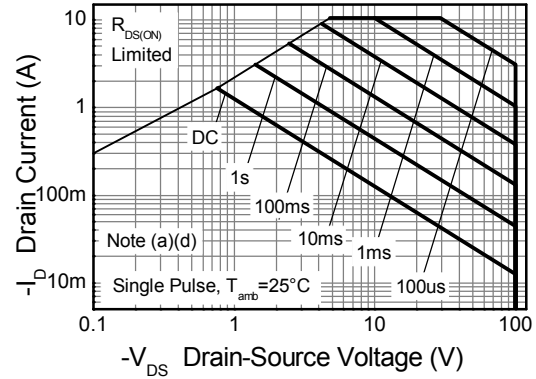
Parameter	Symbol	Value	Unit	
Junction to Ambient <sup>(a)(d)</sup>	R <sub>θJA</sub>	100	°C/W	
Junction to Ambient <sup>(a)(e)</sup>	R <sub>θJA</sub>	70	°C/W	
Junction to Ambient <sup>(b)(d)</sup>	R <sub>θJA</sub>	60	°C/W	
Junction to Lead <sup>(f)(d)</sup>	R <sub>θJL</sub>	53	49	°C/W

- 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<sub>j</sub> = +25°C.

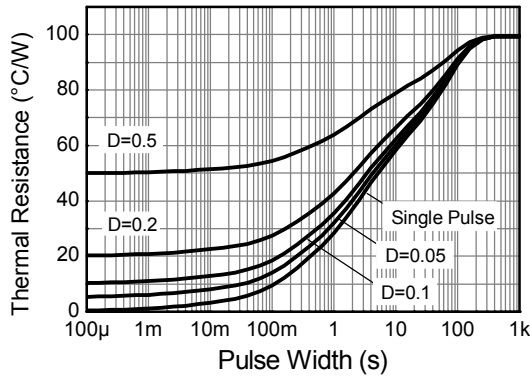
**Thermal Characteristics**



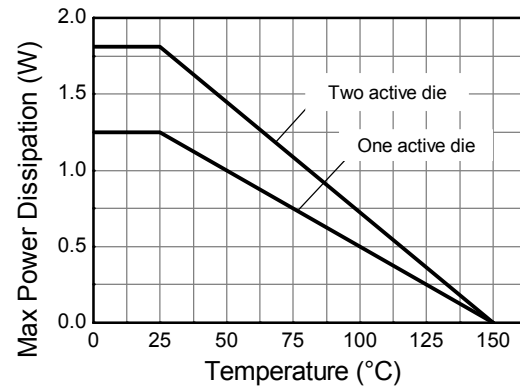
**N-channel Safe Operating Area**



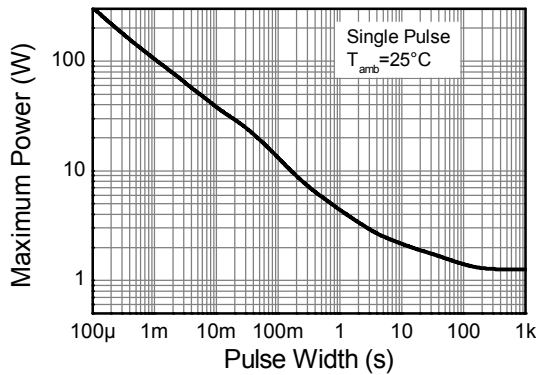
**P-channel Safe Operating Area**



**Transient Thermal Impedance**



**Derating Curve**



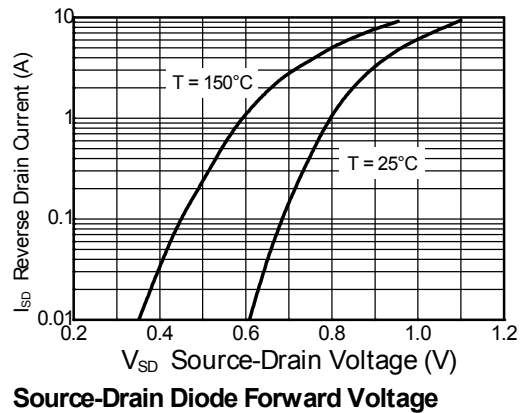
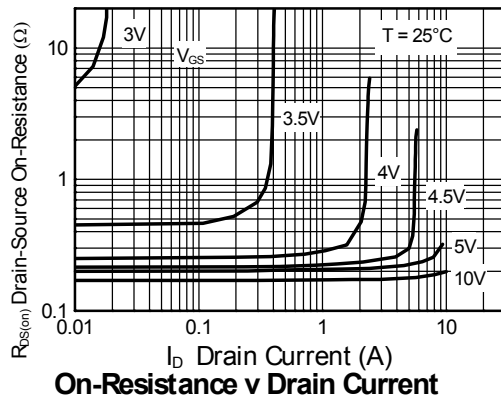
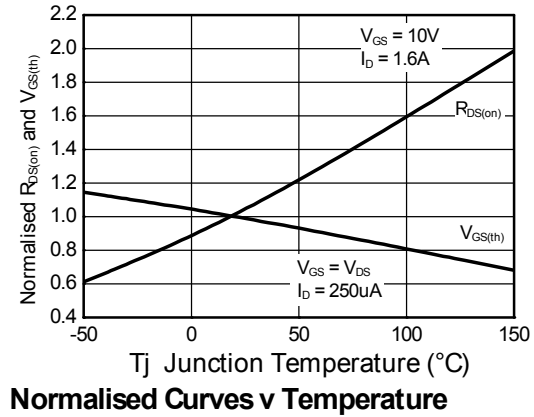
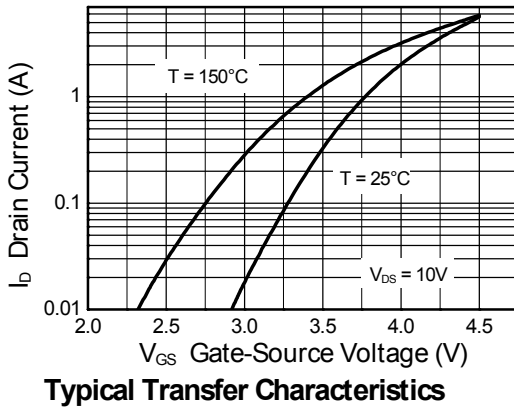
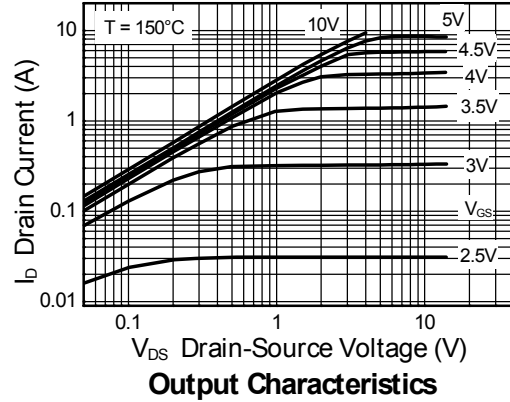
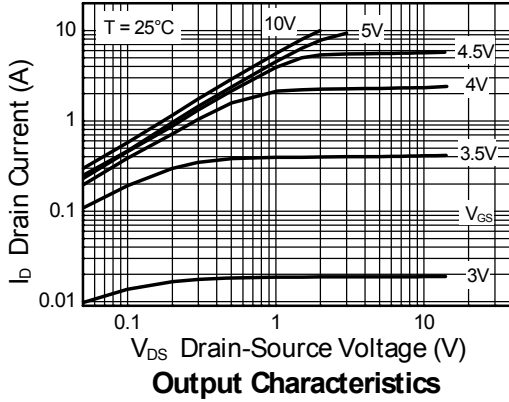
**Pulse Power Dissipation**

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

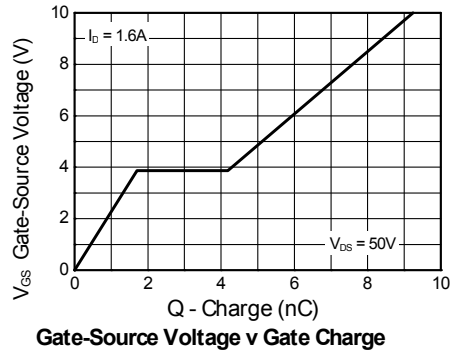
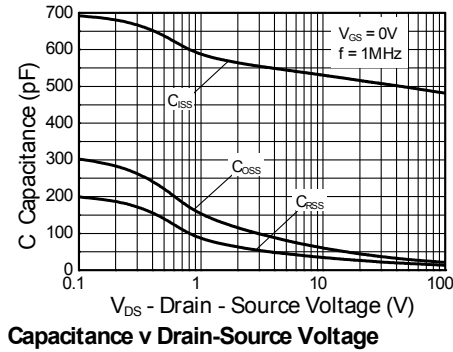
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	100	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	0.5	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</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 <sup>(a)</sup>	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 <sup>(a) (c)</sup>	g <sub>fs</sub>	—	4.8	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 1.6A
<b>Dynamic Capacitance <sup>(c)</sup></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 <sup>(b) (c)</sup></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 <sup>(c)</sup></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 <sup>(a)</sup>	V <sub>SD</sub>	—	0.85	0.95	V	I <sub>S</sub> = 1.7A, V <sub>GS</sub> = 0V
Reverse Recovery Time <sup>(c)</sup>	t <sub>rr</sub>	—	32	—	ns	I <sub>S</sub> = 1.7A, di/dt = 100A/μs
Reverse Recovery Charge <sup>(c)</sup>	Q <sub>rr</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: (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.

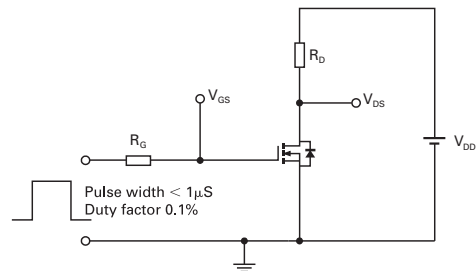
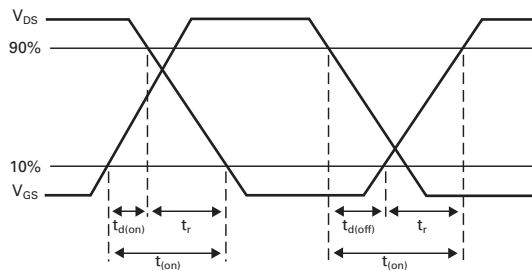
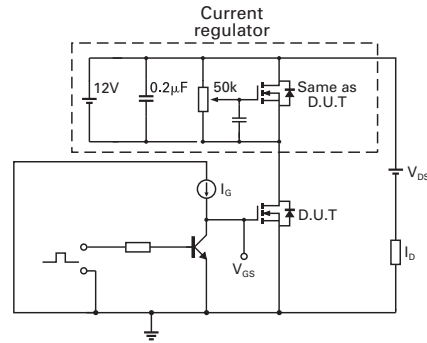
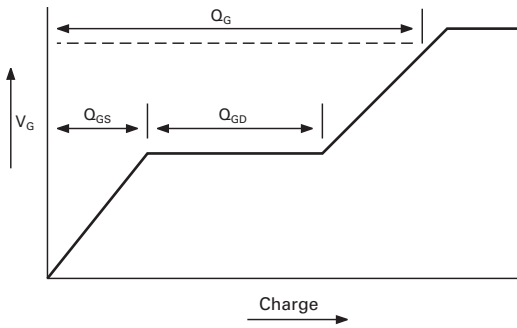
**Typical Characteristics Q1 N-Channel**



**Typical Characteristics Q1 N-Channel (cont.)**



**Test Circuits**

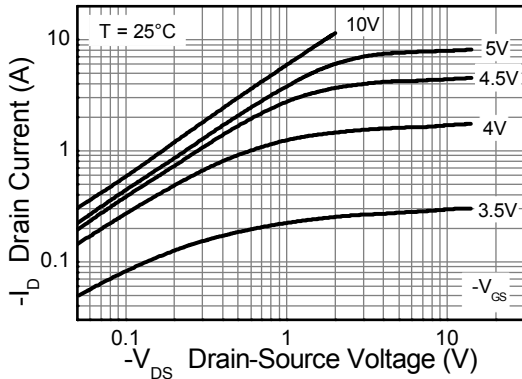


**Electrical Characteristics Q2 P-Channel** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

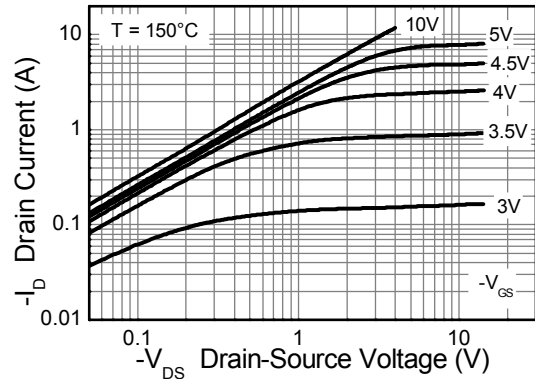
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	-100	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain current	I <sub>DSS</sub>	—	—	-0.5	μA	V <sub>DS</sub> = -100V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <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 <sup>(a)</sup>	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 <sup>(a)(c)</sup>	g <sub>fs</sub>	—	4.7	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A
<b>Dynamic Capacitance <sup>(c)</sup></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 <sup>(b)(c)</sup></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 <sup>(c)</sup></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 <sup>(a)</sup>	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -1.7A, V <sub>GS</sub> = 0V
Reverse Recovery Time <sup>(c)</sup>	t <sub>rr</sub>	—	43	—	ns	I <sub>S</sub> = -1.7A, di/dt = 100A/μs
Reverse Recovery Charge <sup>(c)</sup>	Q <sub>rr</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: (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.

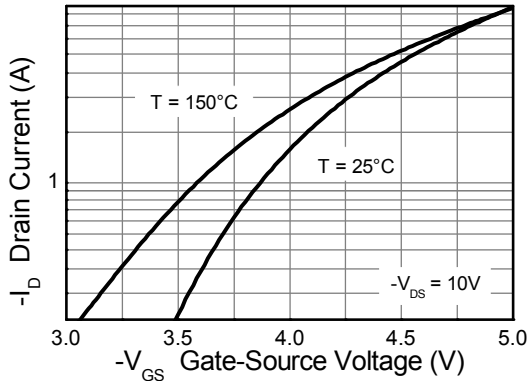
**Typical Characteristics Q2 P-Channel**



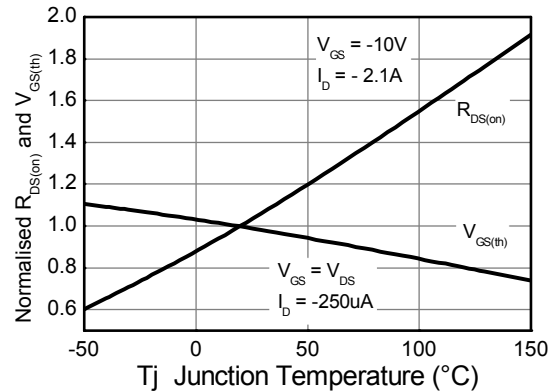
**Output Characteristics**



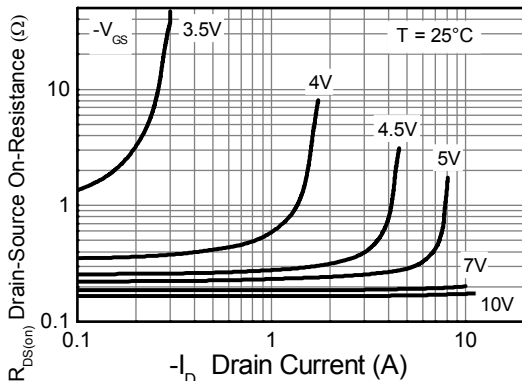
**Output Characteristics**



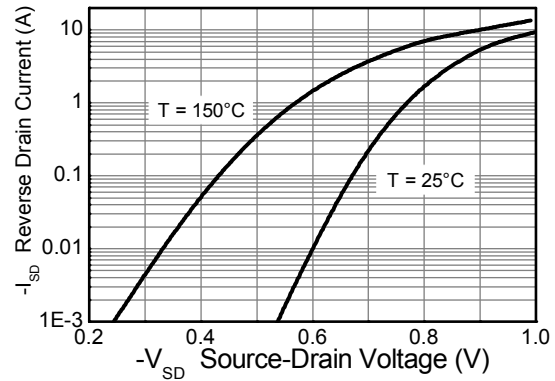
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**



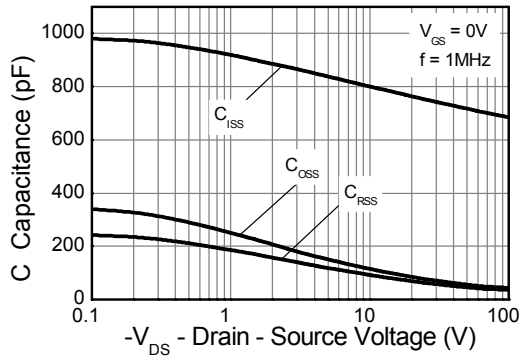
**On-Resistance v Drain Current**



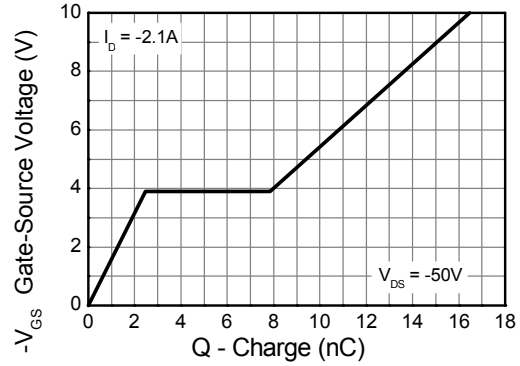
**Source-Drain Diode Forward Voltage**



**Typical Characteristics Q2 P-Channel (cont.)**

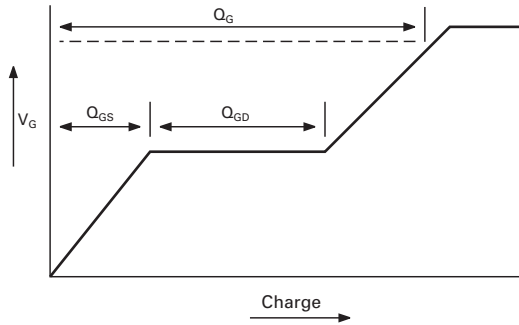


**Capacitance v Drain-Source Voltage**

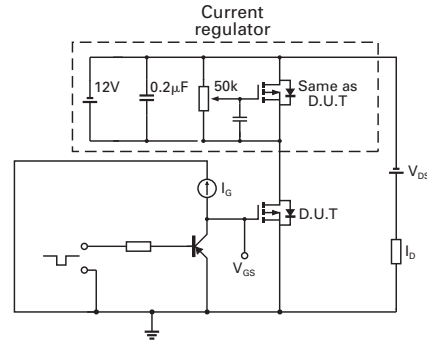


**Gate-Source Voltage v Gate Charge**

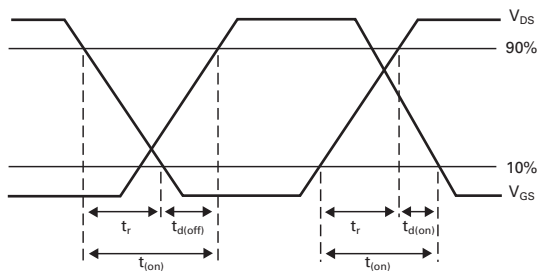
**Test Circuits**



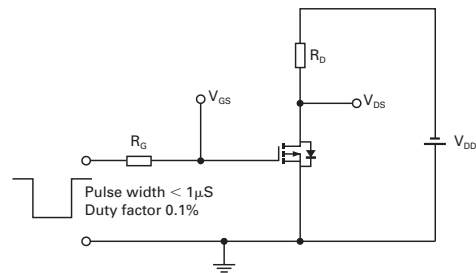
**Basic gate charge waveform**



**Gate charge test circuit**



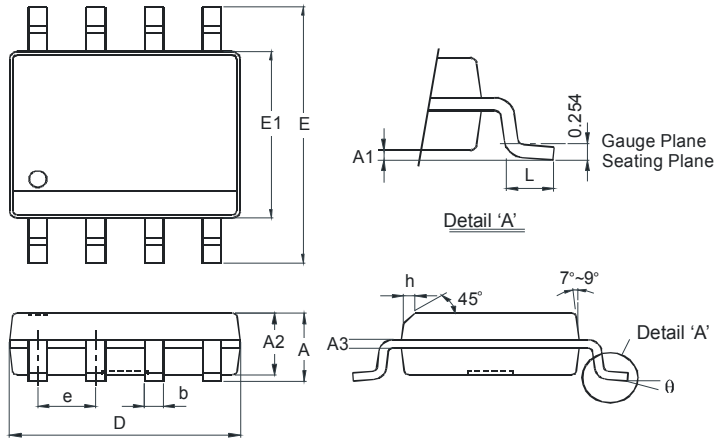
**Switching time waveforms**



**Switching time test circuit**

## Package Outline Dimensions

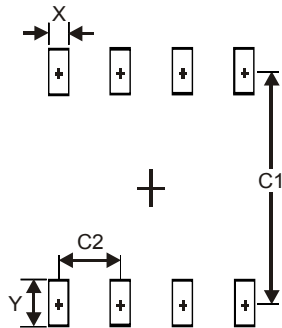
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

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Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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