

**30V N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

BV <sub>DSS</sub>	Max R <sub>DS(on)</sub> MAX	Max I <sub>D</sub> MAX T <sub>A</sub> = 25°C
30V	65mΩ @ V <sub>GS</sub> = 10V	3.2A
	95mΩ @ V <sub>GS</sub> = 4.5V	2.6A

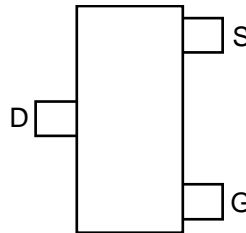
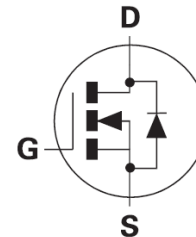
**Description and Applications**

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC - DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control



Top View


 Top View  
Pin Out


Equivalent Circuit

**Features and Benefits**

- Low on-resistance
- Fast switching speed
- Low gate charge
- Low threshold
- **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**
- **PPAP Capable (Note 4)**

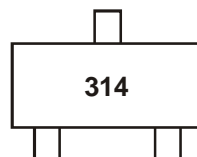
**Mechanical Data**

- Case: SOT23
- 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 Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

**Ordering Information** (Note 5)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN3A14FQTA	314	7	8	3,000 Units

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


314 = Product Type Marking Code

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

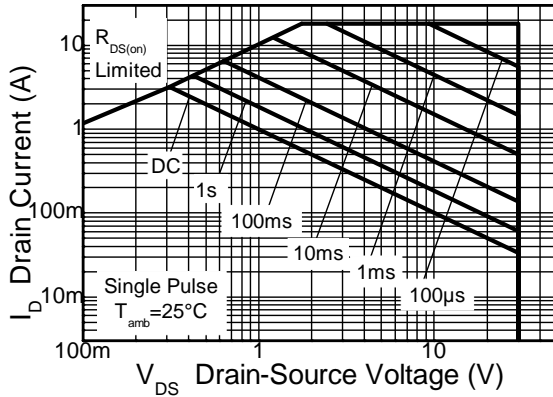
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 10V	T <sub>A</sub> = 70°C (Note 7) (Note 7) (Note 6)	I <sub>D</sub>	3.9	A
				3.2	
				3.2	
Pulsed Drain Current (Note 8)			I <sub>DM</sub>	18	A
Continuous Source Current (Body Diode) (Note 7)			I <sub>S</sub>	2.3	A
Pulsed Source Current (Body Diode) (Note 8)			I <sub>SM</sub>	18	A

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

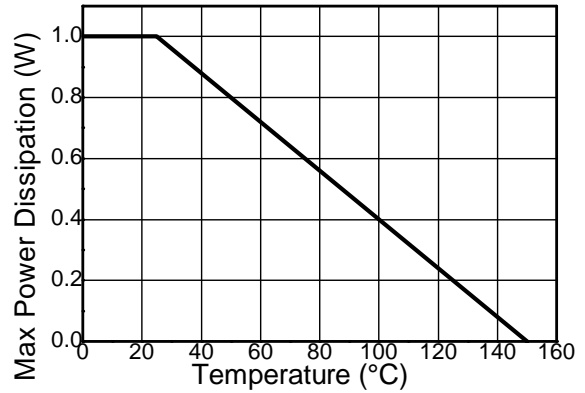
Characteristic		Symbol	Value	Unit
Power Dissipation (Note 6)		P <sub>D</sub>	1	W
Linear Derating Factor			8	mW/°C
Power Dissipation (Note 7)		P <sub>D</sub>	1.5	W
Linear Derating Factor			12	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)		R <sub>θJA</sub>	125	°C/W
Thermal Resistance, Junction to Ambient (Note 7)		R <sub>θJA</sub>	83	°C/W
Thermal Resistance, Junction to Leads (Note 9)		R <sub>θJL</sub>	70.44	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
6. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions
  7. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
  8. Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300µs - pulse current limited by maximum junction temperature.
  9. Thermal resistance from junction to solder-point (at the end of the drain lead).

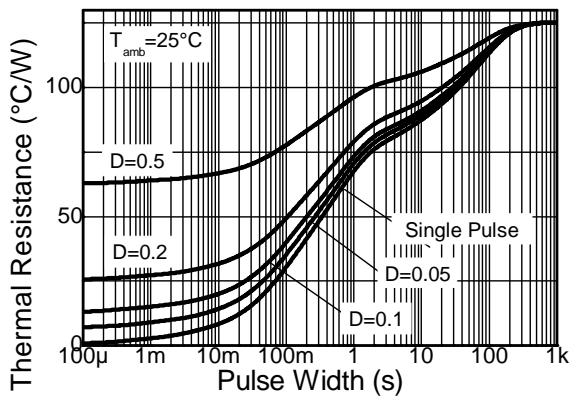
**Thermal Characteristics**



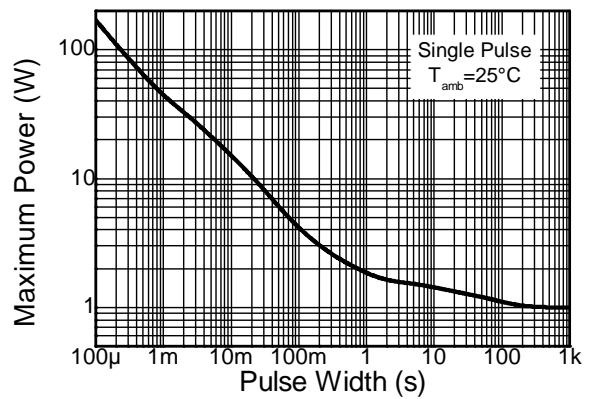
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



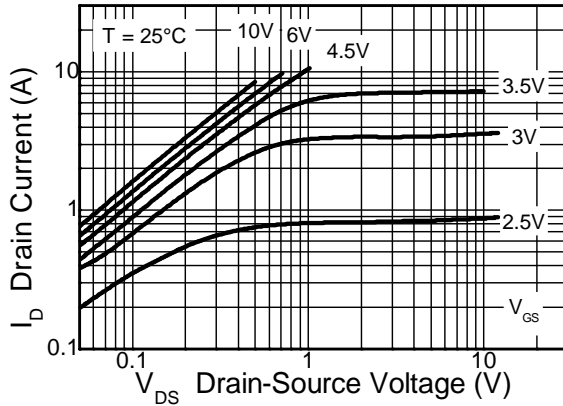
**Pulse Power Dissipation**

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

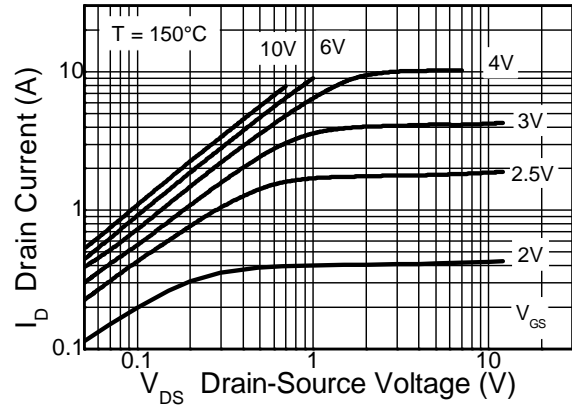
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	2.2	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 10)	R <sub>DS(on)</sub>	—	48	65	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A
			69	95		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.6A
Forward Transconductance (Notes 10 and 12)	g <sub>fs</sub>	—	7.1	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.2A
Diode Forward Voltage (Note 10)	V <sub>SD</sub>	—	0.85	0.95	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 2.5A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 12)	t <sub>rr</sub>	—	13	—	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.6A, di/dt = 100A/μs
Reverse Recovery Charge (Note 12)	Q <sub>rr</sub>	—	7	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 12)</b>						
Input Capacitance	C <sub>iss</sub>	—	448	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	82	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	49	—		
Turn-On Delay Time (Note 11)	t <sub>D(on)</sub>	—	2.4	—	ns	V <sub>DD</sub> = 15V, I <sub>D</sub> = 1A, R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = 10V
Turn-On Rise Time (Note 11)	t <sub>r</sub>	—	2.5	—		
Turn-Off Delay Time (Note 11)	t <sub>D(off)</sub>	—	13.1	—		
Turn-Off Fall Time (Note 11)	t <sub>f</sub>	—	5.3	—		
Total Gate Charge (Note 11)	Q <sub>g</sub>	—	8.6	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A
Gate-Source Charge (Note 11)	Q <sub>gs</sub>	—	1.4	—		
Gate-Drain Charge (Note 11)	Q <sub>gd</sub>	—	1.8	—		

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

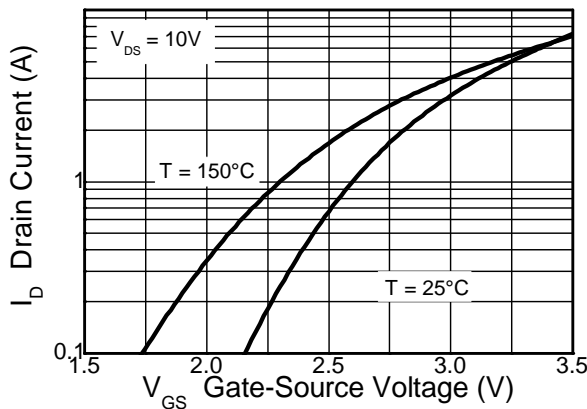
**Typical Characteristics**



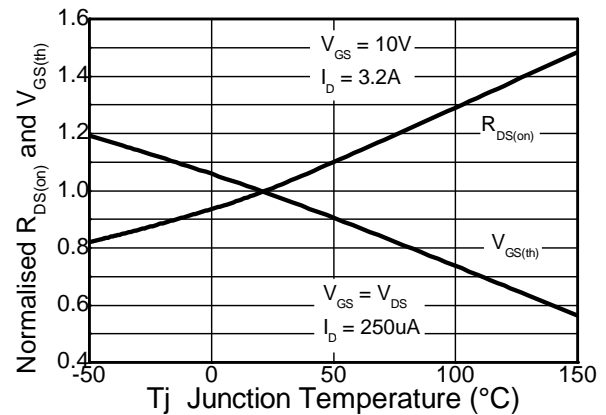
**Output Characteristics**



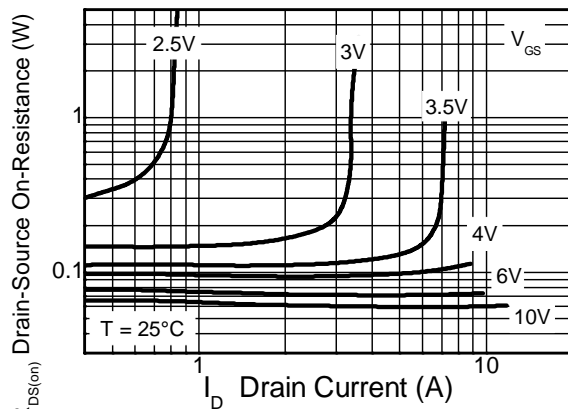
**Output Characteristics**



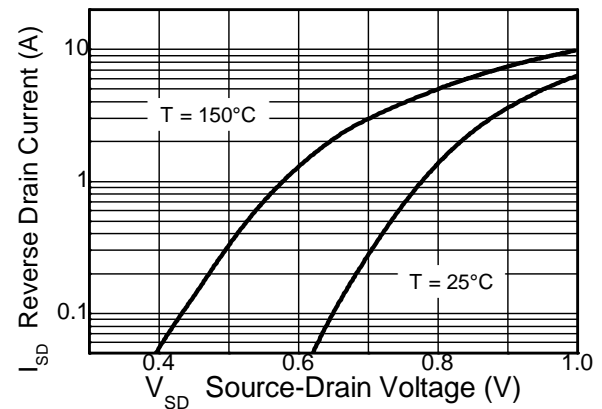
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

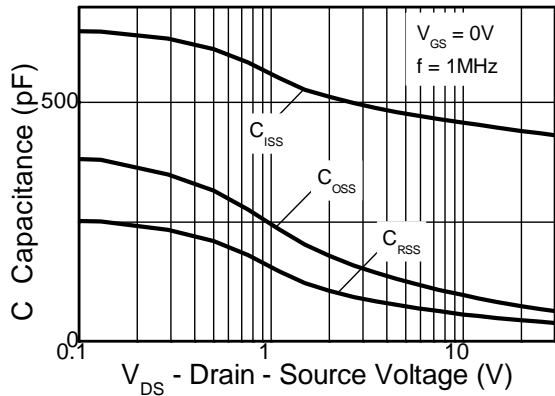


**On-Resistance v Drain Current**

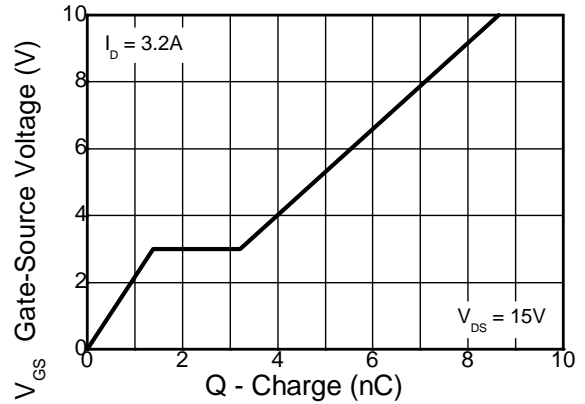


**Source-Drain Diode Forward Voltage**

**Typical Characteristics** (continued)

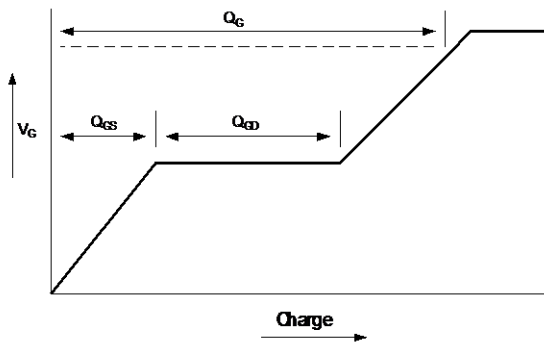


**Capacitance v Drain-Source Voltage**

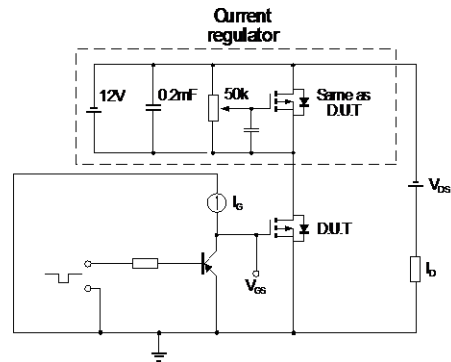


**Gate-Source Voltage v Gate Charge**

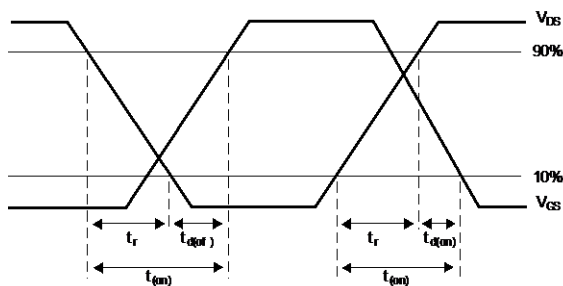
**Test Circuits**



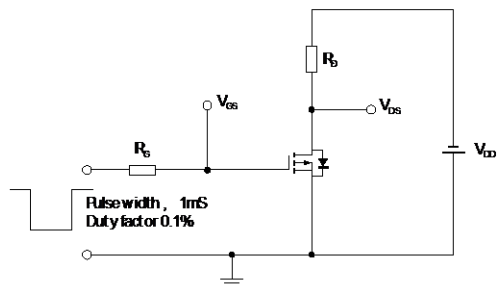
**Basic gate charge waveform**



**Gate charge test circuit**



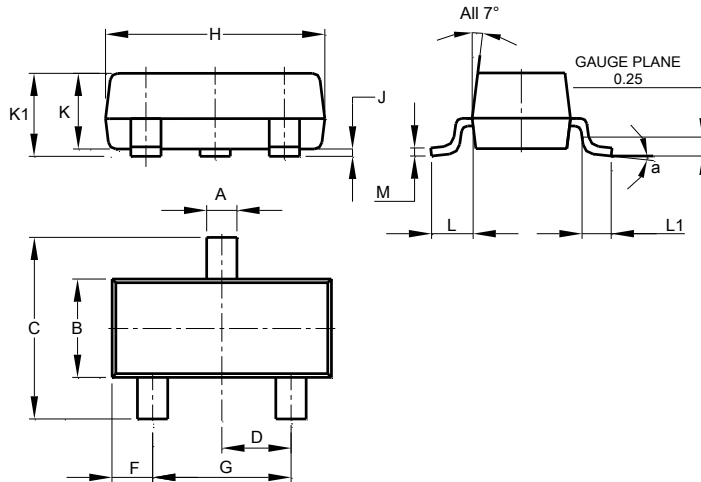
**Switching time waveforms**



**Switching time test circuit**

## Package Outline Dimensions

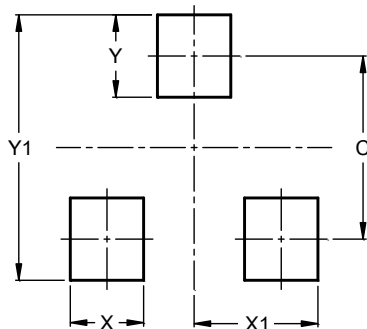
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

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



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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