

30V N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

BV _{DSS}	Max R _{DS(on)} MAX	Max I _D MAX T _A = 25°C
30V	65mΩ @ V _{GS} = 10V	3.2A
	95mΩ @ V _{GS} = 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:

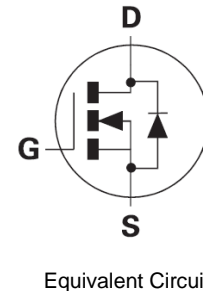
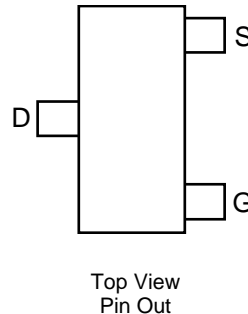
- DC - DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

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)**

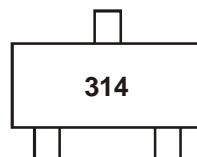
Mechanical Data

- 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 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.
 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_A = +25°C, unless otherwise specified.)

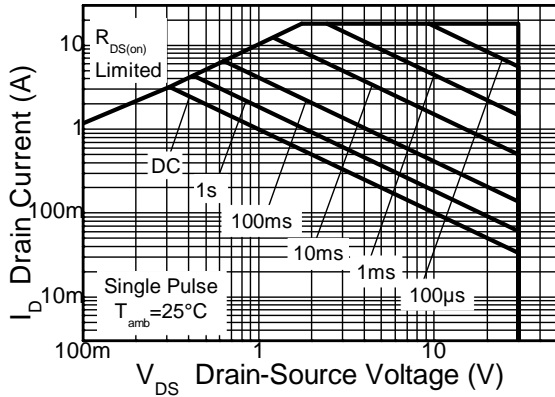
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	T _A = 70°C (Note 7) (Note 7) (Note 6)	I _D	3.9	A
				3.2	
				3.2	
Pulsed Drain Current (Note 8)			I _{DM}	18	A
Continuous Source Current (Body Diode) (Note 7)			I _S	2.3	A
Pulsed Source Current (Body Diode) (Note 8)			I _{SM}	18	A

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

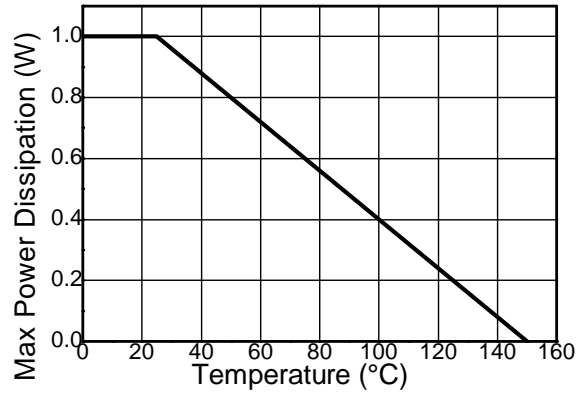
Characteristic		Symbol	Value	Unit
Power Dissipation (Note 6)		P _D	1	W
Linear Derating Factor			8	mW/°C
Power Dissipation (Note 7)		P _D	1.5	W
Linear Derating Factor			12	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)		R _{θJA}	125	°C/W
Thermal Resistance, Junction to Ambient (Note 7)		R _{θJA}	83	°C/W
Thermal Resistance, Junction to Leads (Note 9)		R _{θJL}	70.44	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-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).

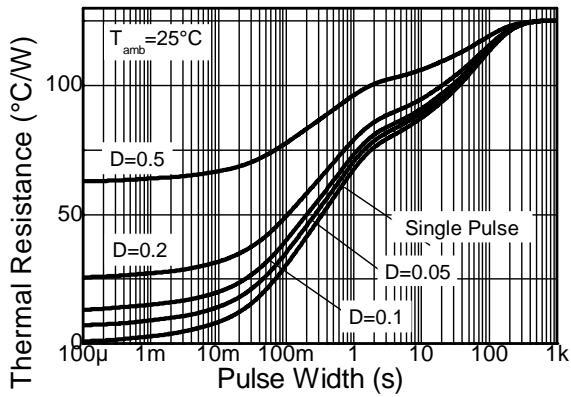
Thermal Characteristics



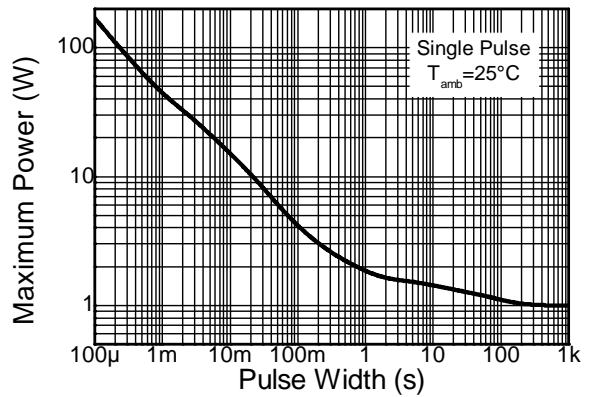
Safe Operating Area



Derating Curve



Transient Thermal Impedance



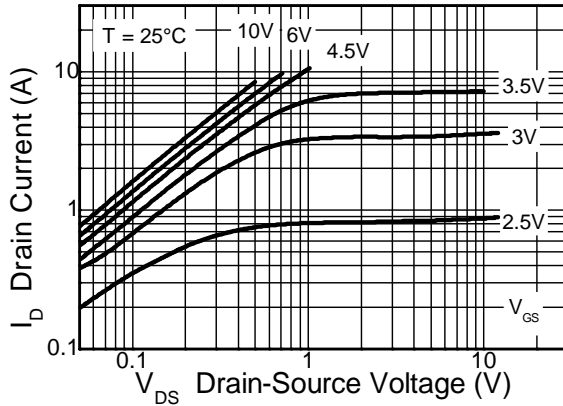
Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

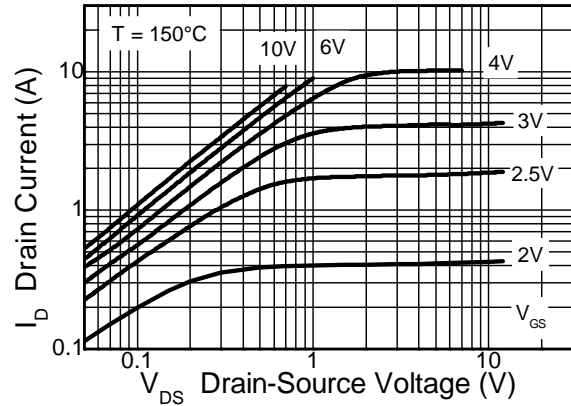
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 12\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.2	V	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 10)	$R_{DS(on)}$	—	48	65	m Ω	$V_{GS} = 10\text{V}$, $I_D = 3.2\text{A}$
			69	95		$V_{GS} = 4.5\text{V}$, $I_D = 2.6\text{A}$
Forward Transconductance (Notes 10 and 12)	g_{fs}	—	7.1	—	S	$V_{DS} = 15\text{V}$, $I_D = 3.2\text{A}$
Diode Forward Voltage (Note 10)	V_{SD}	—	0.85	0.95	V	$T_J = 25^\circ\text{C}$, $I_S = 2.5\text{A}$, $V_{GS} = 0\text{V}$
Reverse Recovery Time (Note 12)	t_{rr}	—	13	—	ns	$T_J = 25^\circ\text{C}$, $I_F = 1.6\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge (Note 12)	Q_{rr}	—	7	—	nC	
DYNAMIC CHARACTERISTICS (Note 12)						
Input Capacitance	C_{iss}	—	448	—	pF	$V_{DS} = 15\text{V}$, $V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	82	—		
Reverse Transfer Capacitance	C_{rss}	—	49	—		
Turn-On Delay Time (Note 11)	$t_{D(on)}$	—	2.4	—	ns	$V_{DD} = 15\text{V}$, $I_D = 1\text{A}$, $R_G \cong 6.0\Omega$, $V_{GS} = 10\text{V}$
Turn-On Rise Time (Note 11)	t_r	—	2.5	—		
Turn-Off Delay Time (Note 11)	$t_{D(off)}$	—	13.1	—		
Turn-Off Fall Time (Note 11)	t_f	—	5.3	—		
Total Gate Charge (Note 11)	Q_g	—	8.6	—	nC	$V_{DS} = 15\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 3.2\text{A}$
Gate-Source Charge (Note 11)	Q_{gs}	—	1.4	—		
Gate-Drain Charge (Note 11)	Q_{gd}	—	1.8	—		

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

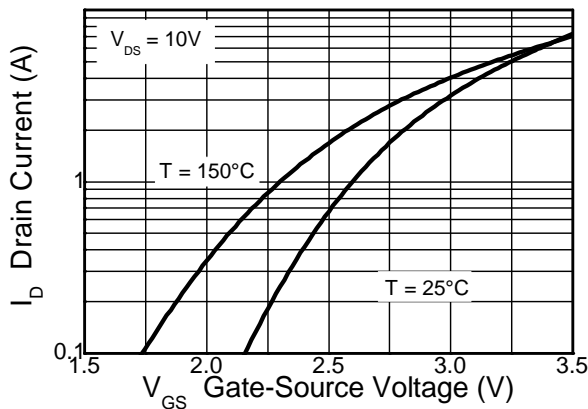
Typical Characteristics



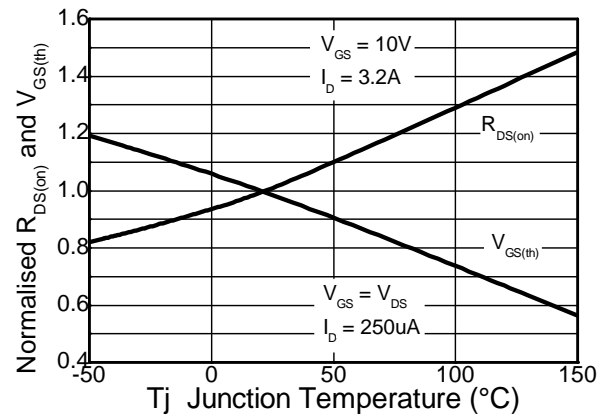
Output Characteristics



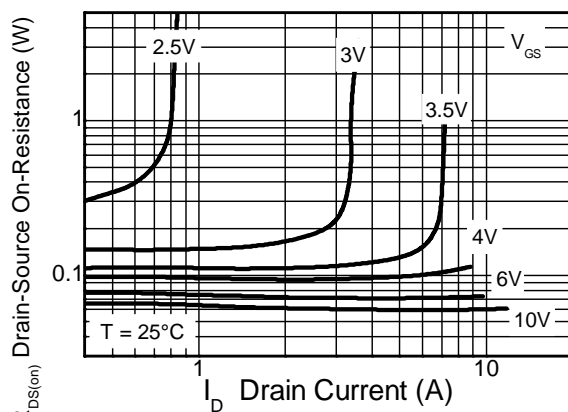
Output Characteristics



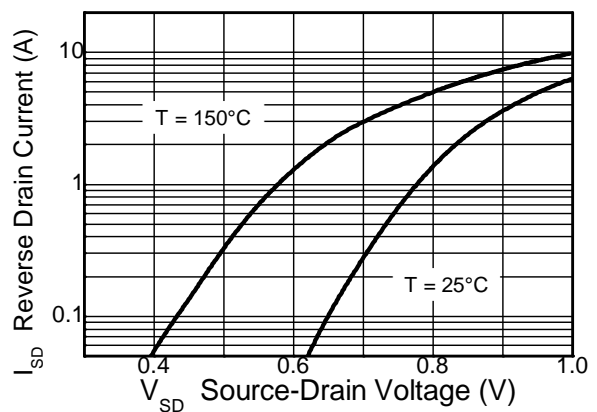
Typical Transfer Characteristics



Normalised Curves v Temperature

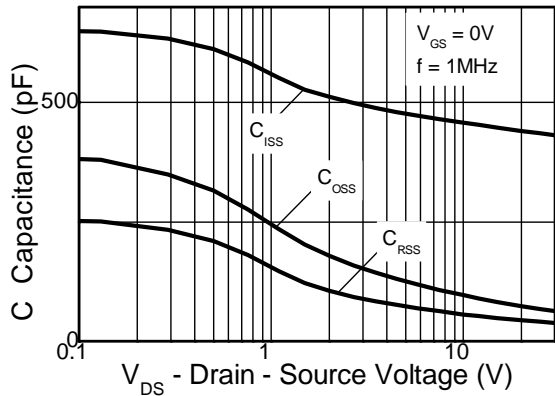


On-Resistance v Drain Current

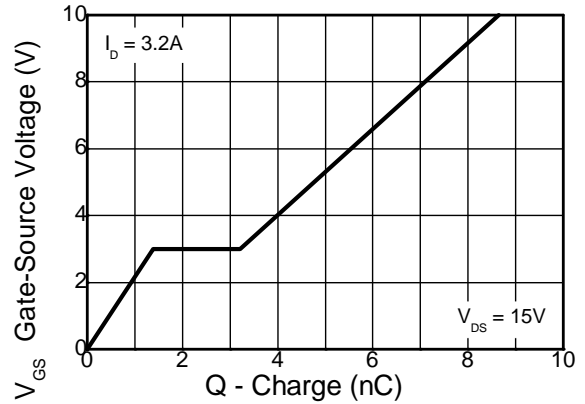


Source-Drain Diode Forward Voltage

Typical Characteristics (continued)

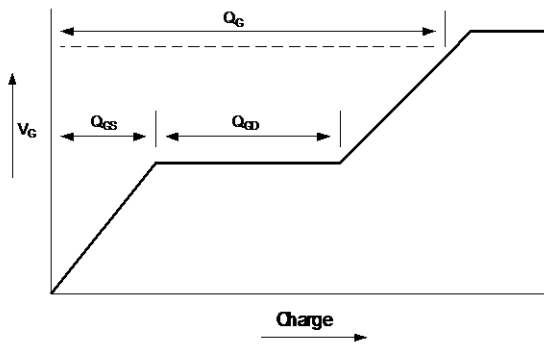


Capacitance v Drain-Source Voltage

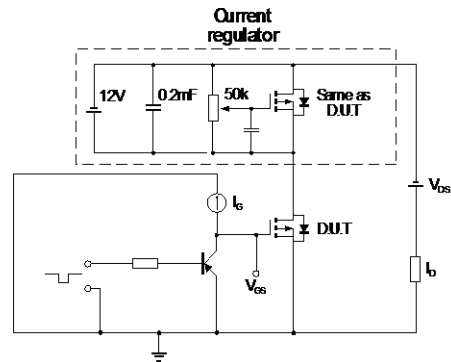


Gate-Source Voltage v Gate Charge

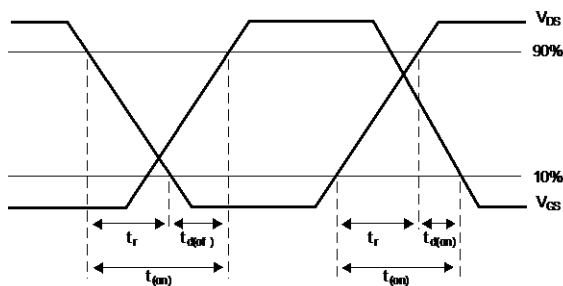
Test Circuits



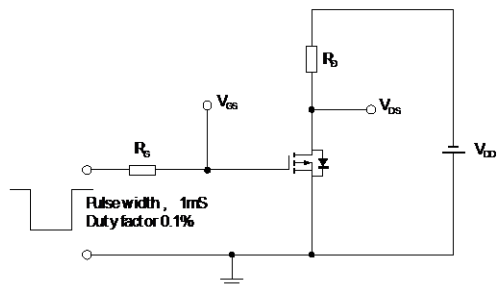
Basic gate charge waveform



Gate charge test circuit



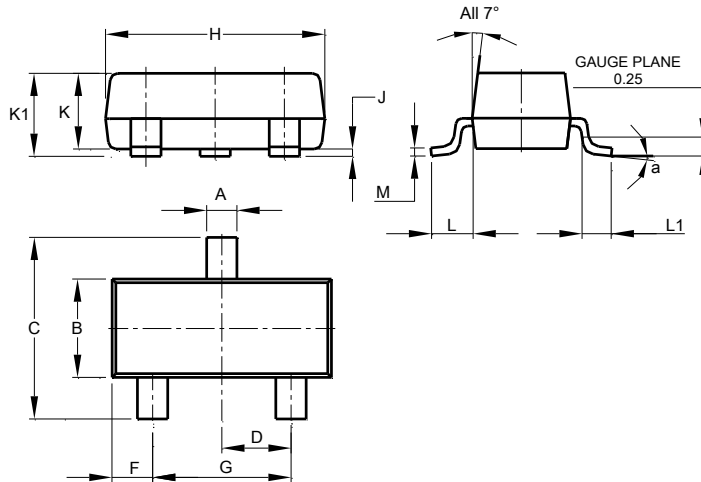
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

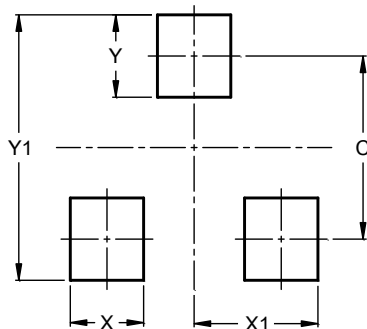
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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