

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = 25^\circ C$
40V	36m Ω @ $V_{GS} = 10V$	12.2A
	61m Ω @ $V_{GS} = 4.5V$	9.4A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

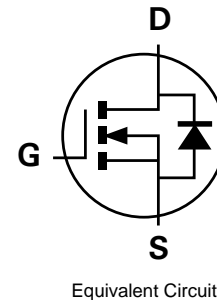
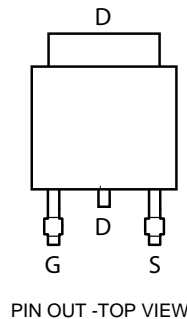
- Backlighting
- DC-DC Converters
- Power management functions

Features and Benefits

- Low on-resistance
- Fast switching speed
- “Green” component and RoHS compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: TO252-3L
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)



Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN4036LK3-13	N4036L	13	16	2,500

Note: 1. Diodes, Inc. defines “Green” products as those which are RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.’s “Green” Policy can be found on our website. For packaging details, go to our website.

Marking Information



⌋⌋⌋ = Manufacturer's Marking
 N4036L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01 - 53)

Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

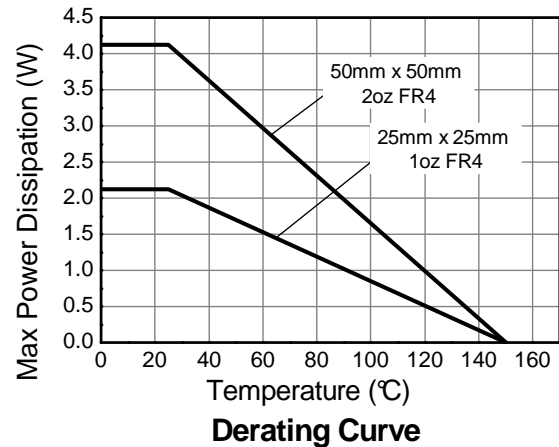
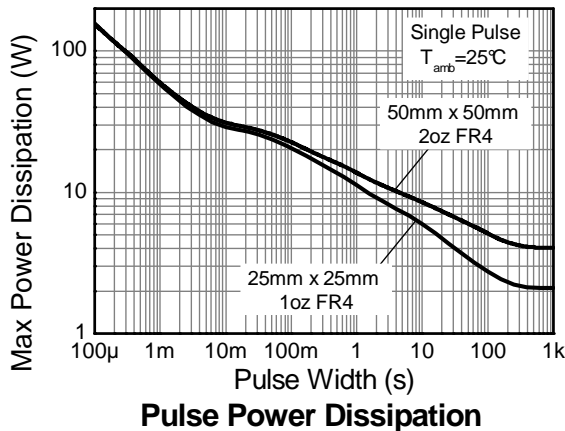
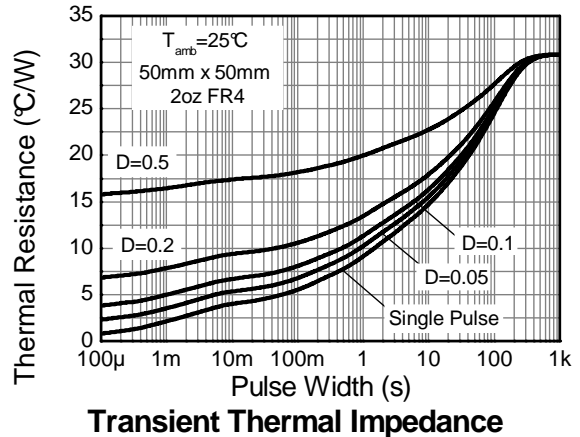
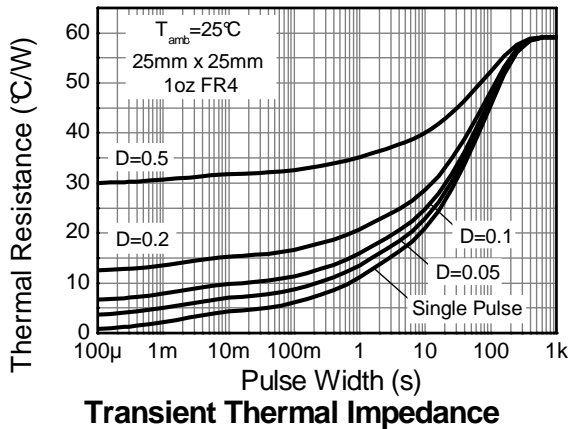
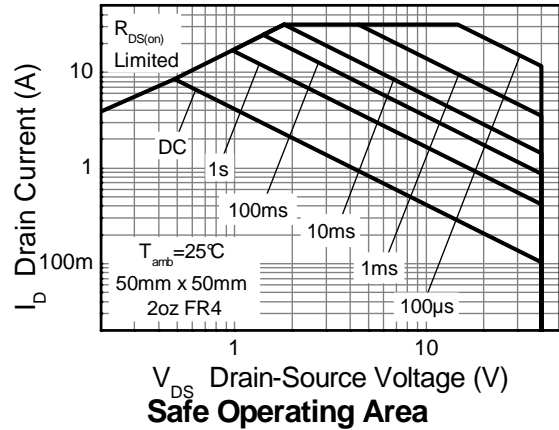
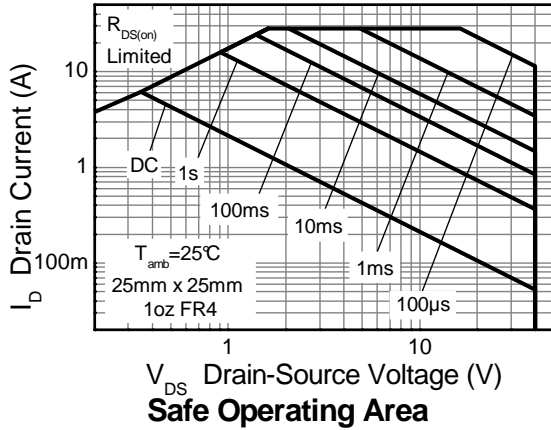
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		V_{DSS}	40	V	
Gate-Source voltage		V_{GS}	± 20	V	
Continuous Drain current	$V_{GS} = 10\text{V}$	(Note 2)	I_D	A	
		(Note 4)			
		$T_A = 70^\circ\text{C}$ (Note 4)			
		(Note 3)	8.5		
Pulsed Drain current	$V_{GS} = 10\text{V}$	(Note 5)	I_{DM}	31.7	A
Continuous Source current (Body diode)		(Note 4)	I_S	10.4	A
Pulsed Source current (Body diode)		(Note 5)	I_{SM}	31.7	A

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 3)	P_D	4.12	W mW/ $^\circ\text{C}$
			33	
	(Note 4)		8.49	
			67.9	
	(Note 6)		2.12	
Thermal Resistance, Junction to Ambient	(Note 3)	$R_{\theta JA}$	30.3	$^\circ\text{C}/\text{W}$
	(Note 4)		14.7	
	(Note 6)		59.0	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	3.1	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

- Notes:
- AEC-Q101 V_{GS} maximum is $\pm 16\text{V}$.
 - For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - Same as note 3, except the device is measured at $t \leq 10$ sec.
 - Same as note 3, except the device is pulsed with $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
 - 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.
 - Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

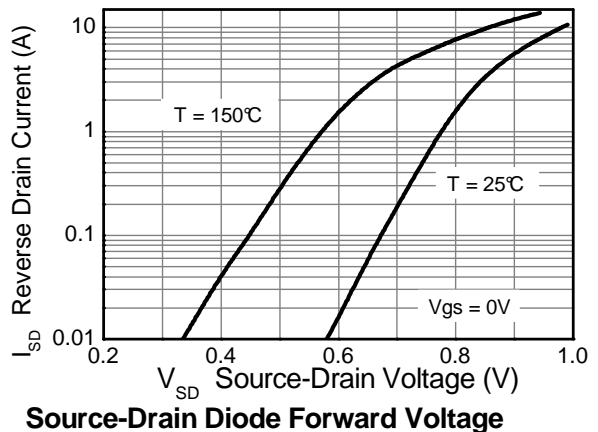
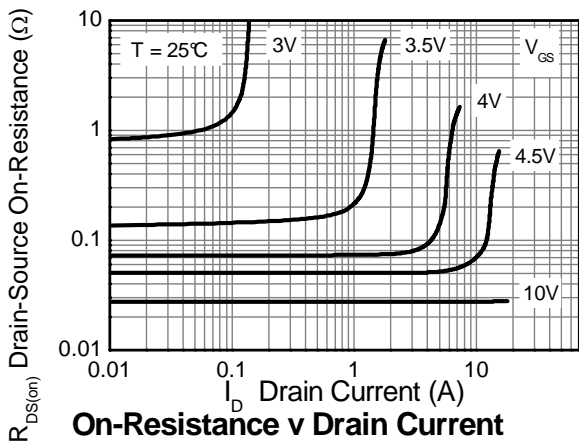
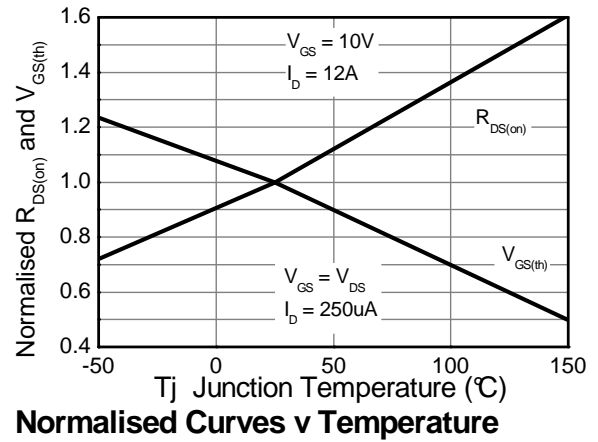
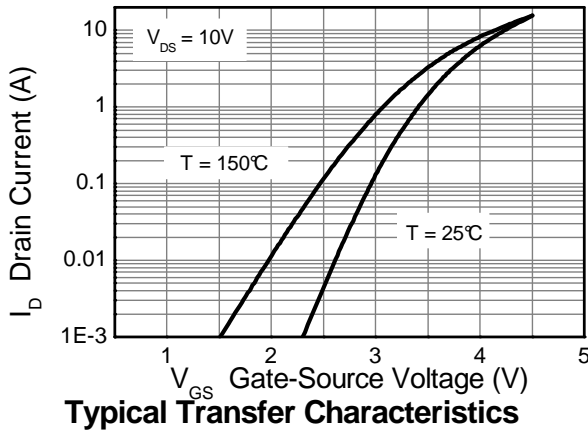
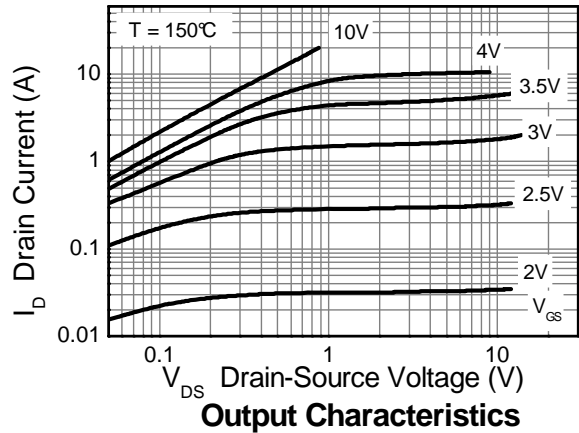
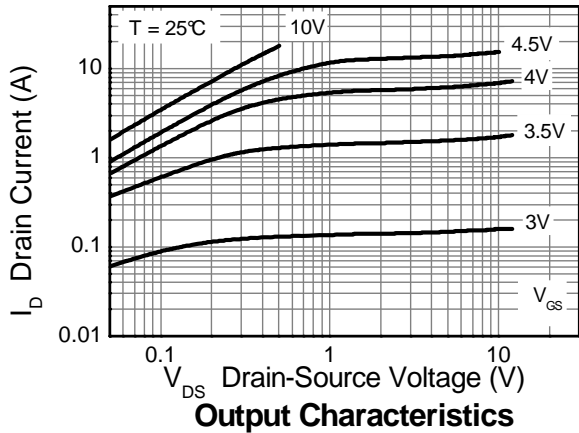


Electrical Characteristics @T_A = 25°C unless otherwise specified

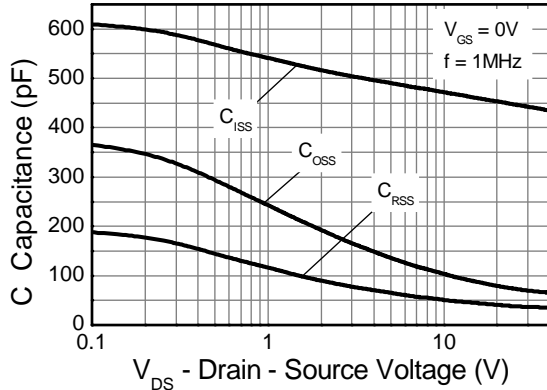
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	40	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	3.0	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 8)	R _{DS(on)}	—	0.026	0.036	Ω	V _{GS} = 10V, I _D = 12A
			0.049	0.061		V _{GS} = 4.5V, I _D = 6A
Forward Transconductance (Notes 8 & 9)	g _{fs}	—	19.6	—	S	V _{DS} = 15V, I _D = 12A
Diode Forward Voltage (Note 8)	V _{SD}	—	0.96	1.1	V	I _S = 12A, V _{GS} = 0V
Reverse recovery time (Note 9)	t _{rr}	—	112	—	ns	I _S = 12A, di/dt = 100A/μs
Reverse recovery charge (Note 9)	Q _{rr}	—	926	—	nC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iSS}	—	453	—	pF	V _{DS} = 20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	79.1	—	pF	
Reverse Transfer Capacitance	C _{rSS}	—	40.5	—	pF	
Total Gate Charge (Note 10)	Q _g	—	4.9	—	nC	V _{GS} = 4.5V
Total Gate Charge (Note 10)	Q _g	—	9.2	—	nC	V _{GS} = 10V
Gate-Source Charge (Note 10)	Q _{gs}	—	1.7	—	nC	
Gate-Drain Charge (Note 10)	Q _{gd}	—	2.7	—	nC	
Turn-On Delay Time (Note 10)	t _{D(on)}	—	3.2	—	ns	V _{DD} = 20V, V _{GS} = 10V I _D = 12A, R _G ≅ 6.0Ω
Turn-On Rise Time (Note 10)	t _r	—	11.7	—	ns	
Turn-Off Delay Time (Note 10)	t _{D(off)}	—	11.6	—	ns	
Turn-Off Fall Time (Note 10)	t _f	—	9.5	—	ns	
Turn-Off Fall Time (Note 10)	t _f	—	9.5	—	ns	

- Notes:
8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
 9. For design aid only, not subject to production testing.
 10. Switching characteristics are independent of operating junction temperatures.

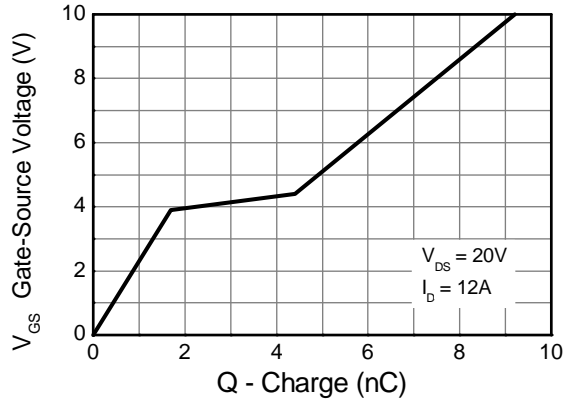
Typical Characteristics



Typical Characteristics - continued

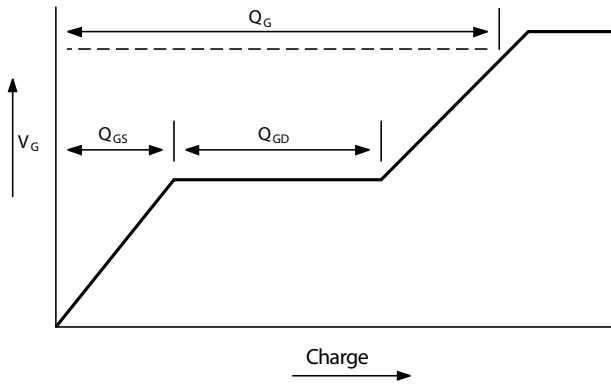


Capacitance v Drain-Source Voltage

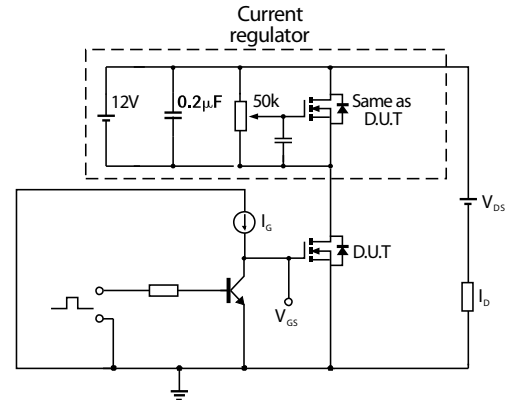


Gate-Source Voltage v Gate Charge

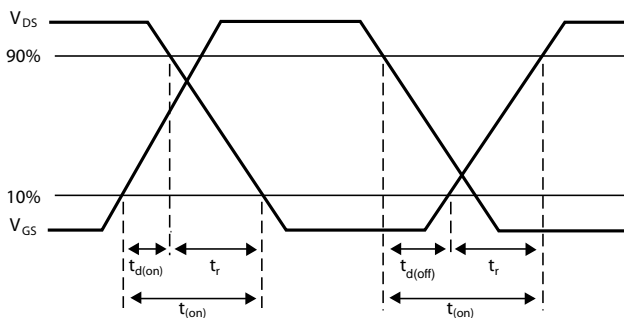
Test Circuits



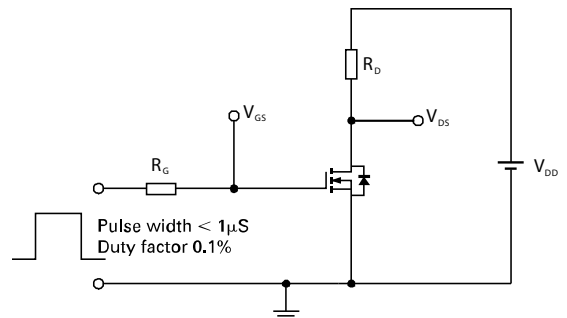
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms



Switching time test circuit