

20V N-CHANNEL ENHANCEMENT MODE MOSFET

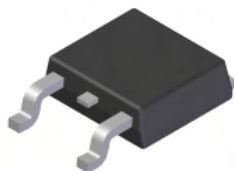
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = 25^{\circ}C$
20V	21mΩ @ $V_{GS} = 10V$	17.0A
	27mΩ @ $V_{GS} = 4.5V$	15.0A
	40mΩ @ $V_{GS} = 2.5V$	12.3A

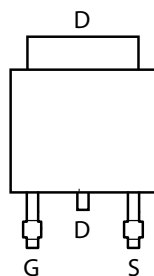
Description and Applications

This new generation 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.

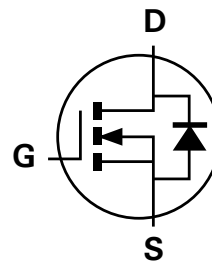
- Backlighting
- DC-DC Converters
- Power management functions



TOP VIEW



PIN OUT -TOP VIEW



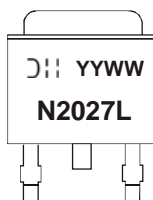
Equivalent Circuit

Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN2027LK3-13	N2027L	13	16	2,500

Note: 1. Diodes, Inc. defines “Green” products as those which are Eu 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



JII = Manufacturer's Marking
 N2027L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01-52)

Maximum Ratings @T_A = 25°C unless otherwise specified

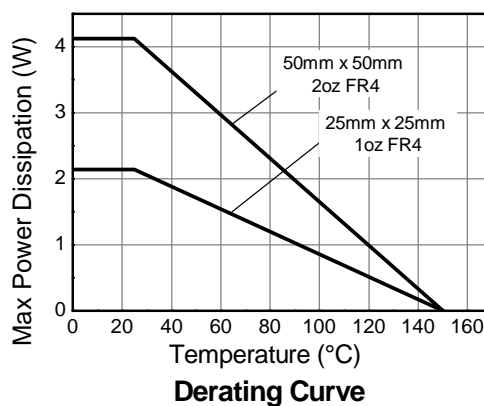
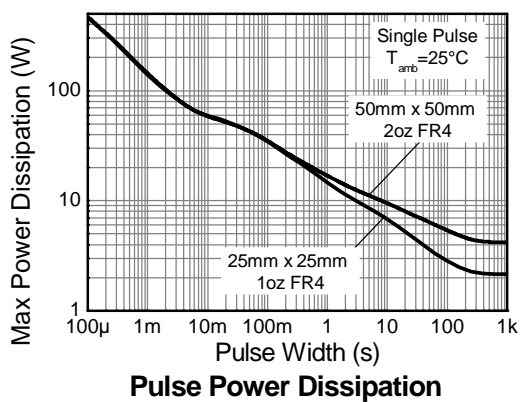
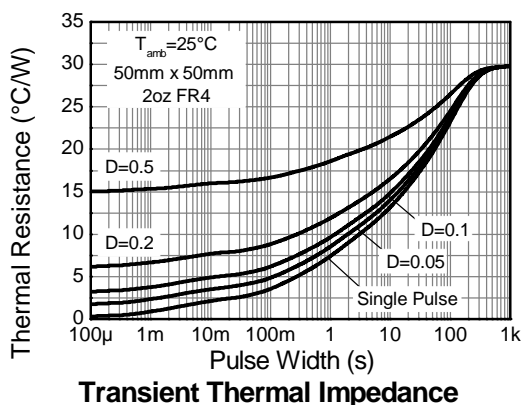
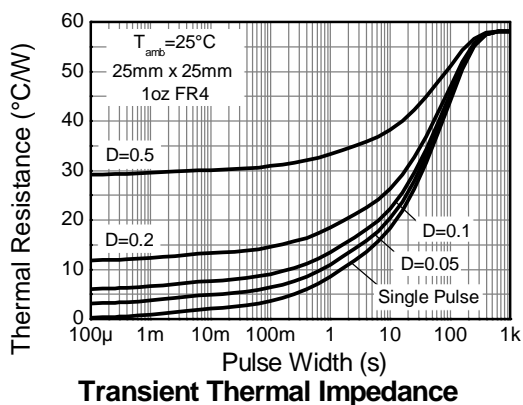
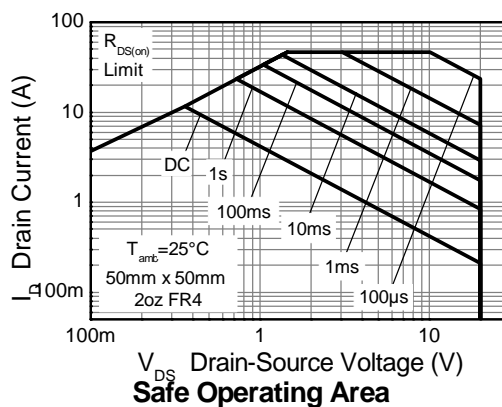
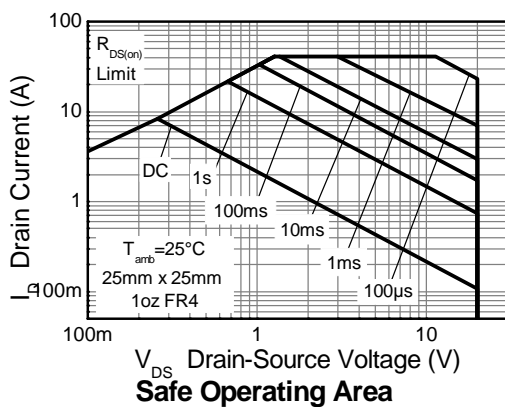
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V _{DSS}	20	V
Gate-Source voltage			V _{GS}	±12	V
Continuous Drain current	V _{GS} = 10V	(Note 3)	I _D	17.0	A
		T _A = 70°C (Note 3)		13.6	
		(Note 2)		11.6	
Pulsed Drain current	V _{GS} = 10V	(Note 4)	I _{DM}	46.8	A
Continuous Source current (Body diode)		(Note 3)	I _S	11.9	A
Pulsed Source current (Body diode)		(Note 4)	I _{SM}	46.8	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	P _D	4.18	W mW/°C
			33.44	
	(Note 3)		8.9	
			71.4	
	(Note 5)		2.14	
Thermal Resistance, Junction to Ambient	(Note 2)	R _{θJA}	29.9	°C/W
	(Note 3)		14.0	
	(Note 5)		58.4	
Thermal Resistance, Junction to Lead	(Note 6)	R _{θJL}	2.46	
Operating and storage temperature range		T _J , T _{STG}	-55 to 150	°C

- Notes:
2. 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.
 3. Same as note 2, except the device is measured at t ≤ 10 sec.
 4. Same as note 2, except the device is pulsed with D = 0.02 and pulse width 300 μs. The pulse current is limited by the maximum junction temperature.
 5. 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.
 6. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

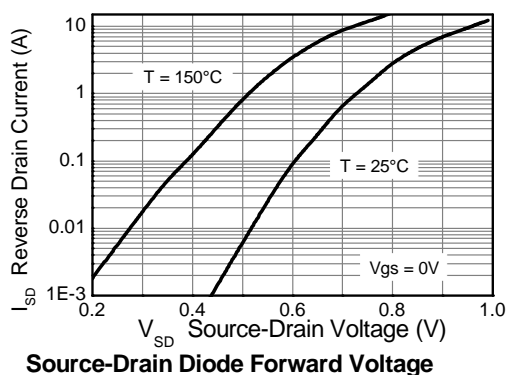
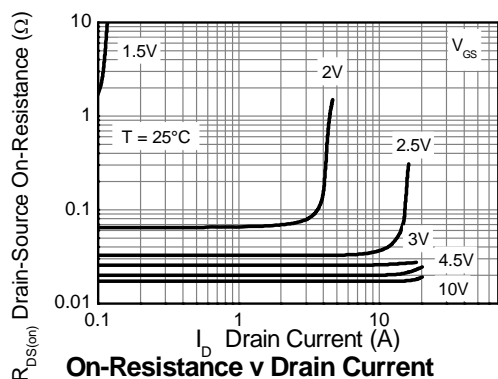
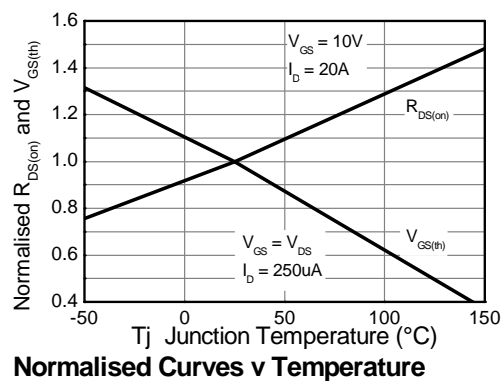
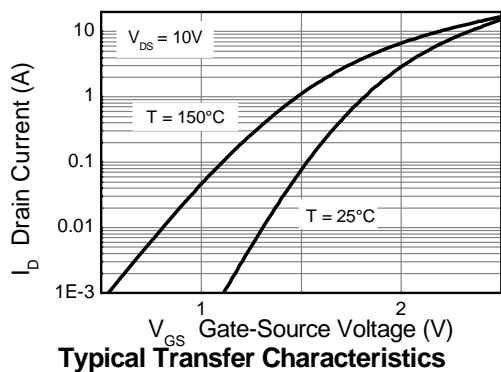
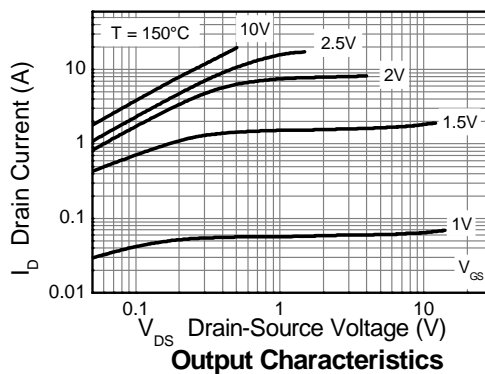
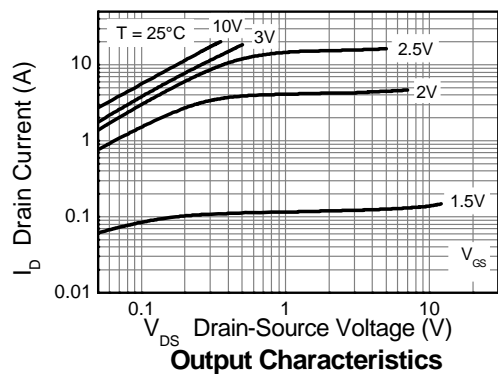


Electrical Characteristics @T_A = 25°C unless otherwise specified

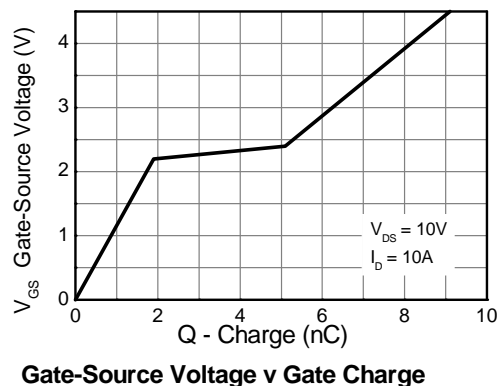
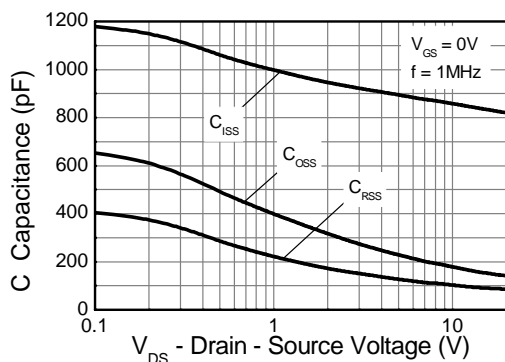
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	20	—	—	V	I _D = 250μA, V _{GS} = 0V	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 20V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(th)}	0.6	—	2.0	V	I _D = 250μA, V _{DS} = V _{GS}	
Static Drain-Source On-Resistance (Note 7)	R _{DS (ON)}	—	—	0.021	Ω	V _{GS} = 10V, I _D = 20A	
				0.027		V _{GS} = 4.5V, I _D = 10A	
				0.040		V _{GS} = 2.5V, I _D = 4A	
Forward Transconductance (Notes 7 & 8)	g _{fs}	—	31.7	—	S	V _{DS} = 15V, I _D = 10A	
Diode Forward Voltage (Note 7)	V _{SD}	—	0.89	1.0	V	I _S = 10A, V _{GS} = 0V	
Reverse recovery time (Note 8)	t _{rr}		121	—	ns	I _S = 10A, di/dt= 100A/μs	
Reverse recovery charge (Note 8)	Q _{rr}	—	583	—	nC		
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	—	857	—	pF	V _{DS} = 10V, V _{GS} = 0V f= 1MHz	
Output Capacitance	C _{oss}	—	177	—	pF		
Reverse Transfer Capacitance	C _{rss}	—	102	—	pF		
Total Gate Charge	Q _g	—	5.2	—	nC	V _{GS} = 2.5V, I _D = 4A	V _{DS} = 10V
Total Gate Charge	Q _g	—	9.1	—	nC	V _{GS} = 4.5V I _D = 10A	
Gate-Source Charge	Q _{gs}	—	1.9	—	nC		
Gate-Drain Charge	Q _{gd}	—	3.2	—	nC		
Turn-On Delay Time (Note 9)	t _{D(on)}	—	5.4	—	ns	V _{DD} = 10V, V _{GS} = 10V I _D = 10A, R _G ≅ 6.0Ω	
Turn-On Rise Time (Note 9)	t _r	—	22.3	—	ns		
Turn-Off Delay Time (Note 9)	t _{D(off)}	—	18.7	—	ns		
Turn-Off Fall Time (Note 9)	t _f	—	12.6	—	ns		

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

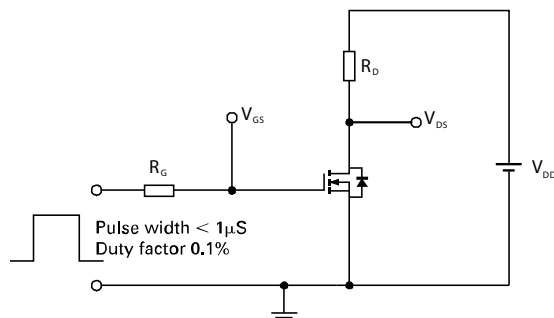
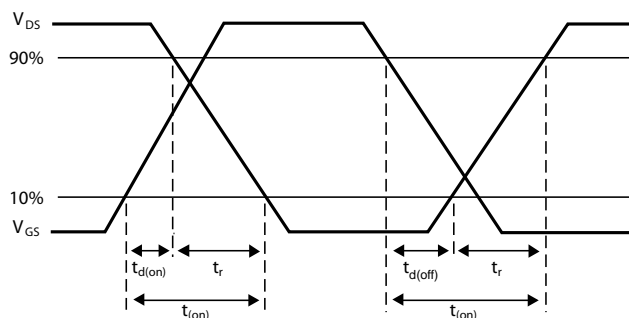
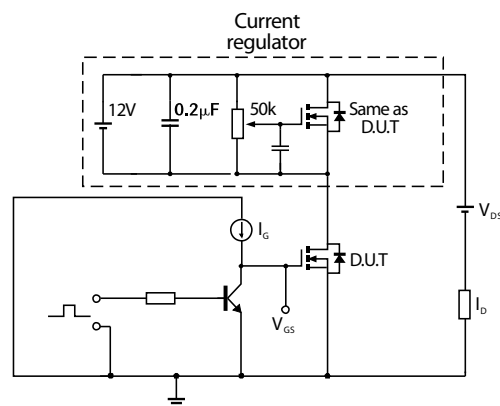
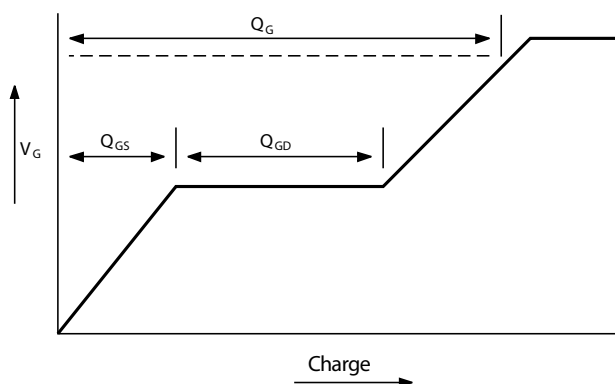
Typical Characteristics



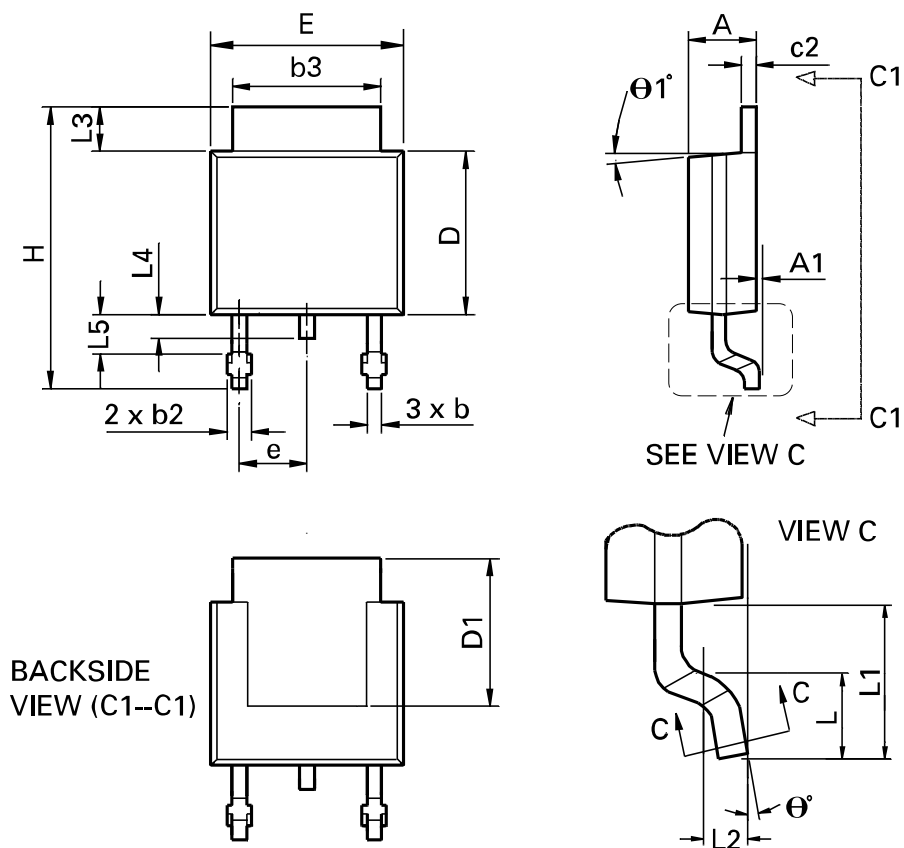
Typical Characteristics - continued



Test Circuits

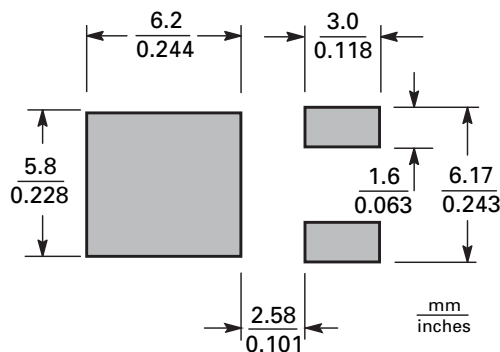


Package Outline Dimensions



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090 BSC		2.29 BSC	
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108 REF		2.74 REF	
b3	0.205	0.215	5.21	5.46	L2	0.020 BSC		0.508 BSC	
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	θ_1°	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	θ°	0°	15°	0°	15°
E1	0.170	-	4.32	-	-	-	-	-	-

Suggested Pad Layout



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