DMN6068SE

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D T_A = 25°C
60V	68mΩ @ V_{GS}= 10V	5.6A
	100mΩ @ V_{GS}= 4.5V	4.7A

Description and Applications

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

- Motor control
- Transformer driving switch
- DC-DC Converters
- Power management functions
- Uninterrupted power supply

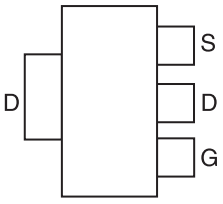
Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- Low on-resistance
- Fast switching speed
- **"Green" component and RoHS compliant (Note 1)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

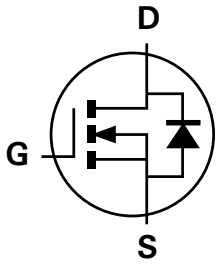
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (approximate)

SOT223



Top View

Pin Out - Top View



Equivalent Circuit

Ordering Information (Note 1)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN6068SE-13	N6068	13	12	4,000

Notes: 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
N6068 = Product Type Marking Code
YWW = Date Code Marking
Y = Year (ex: 9 = 2009)
WW = Week (01 - 53)

Maximum Ratings @T_A = 25℃ unless otherwise specified

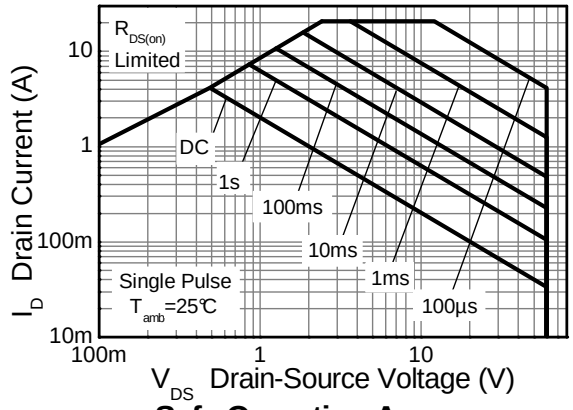
Characteristic			Symbol	Value	Unit
Drain-Source voltage			V_{DSS}	60	V
Gate-Source voltage		(Note 2)	V_{GS}	±20	V
Single Pulsed Avalanche Energy		(Note 7)	E_{AS}	37.5	mJ
Single Pulsed Avalanche Current		(Note 7)	I_{AS}	5.0	A
Continuous Drain current	V_{GS} = 10V	(Note 4)	I_D	5.6	A
		T_A = 70℃ (Note 4)		4.5	
		(Note 3)		4.1	
Pulsed Drain current	V_{GS}= 10V	(Note 5)	I_{DM}	20.8	A
Continuous Source current (Body diode)		(Note 4)	I_S	4.9	A
Pulsed Source current (Body diode)		(Note 5)	I_{SM}	20.8	A

Thermal Characteristics @T_A = 25℃ unless otherwise specified

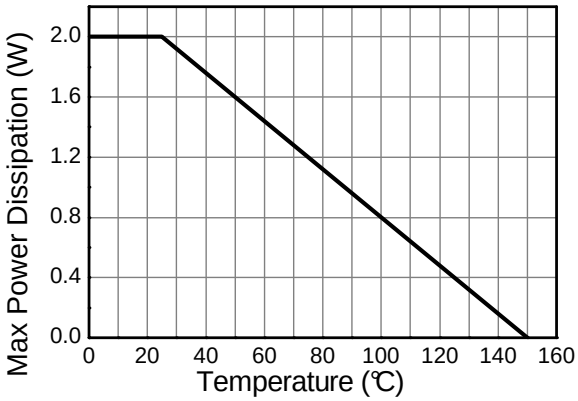
Characteristic		Symbol	Value	Unit
Power dissipation	(Note 3)	P_D	2.0	W
Linear derating factor			16.0	mW/°C
	(Note 4)		3.7	W
			29.5	mW/°C
Thermal Resistance, Junction to Ambient	(Note 3)	$R_{\theta JA}$	62.5	°C/W
	(Note 4)		34	
Thermal Resistance, Junction to Lead	(Note 6)	$R_{\theta JL}$	11.5	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	°C

Notes:
2. AEC-Q101 V_{GS} maximum is ±16V.
3. For a device surface mounted on 25mm x 25mm 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.
4. Same as note (3), except the device is measured at t ≤ 10 sec.
5. 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.
6. Thermal resistance from junction to solder-point (at the end of the drain lead).
7. UIS in production with L = 3.0mH, I_{AS} = 5.0A, R_G = 25Ω, V_{DD}=50V, starting T_J = 25℃.

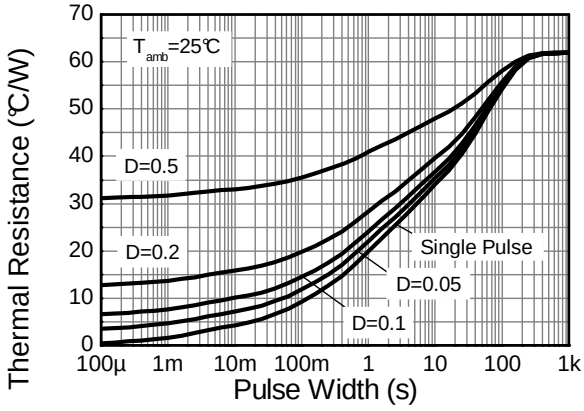
Thermal Characteristics



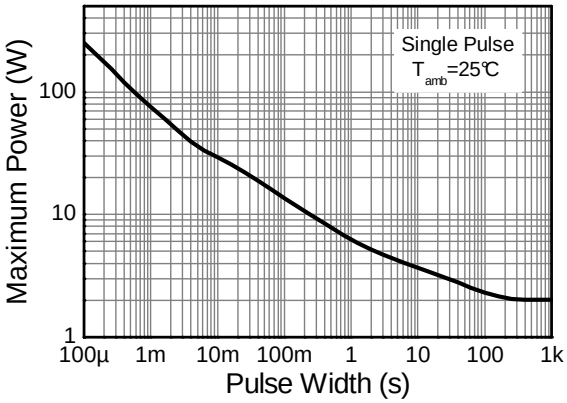
Safe Operating Area



Derating Curve



Transient Thermal Impedance



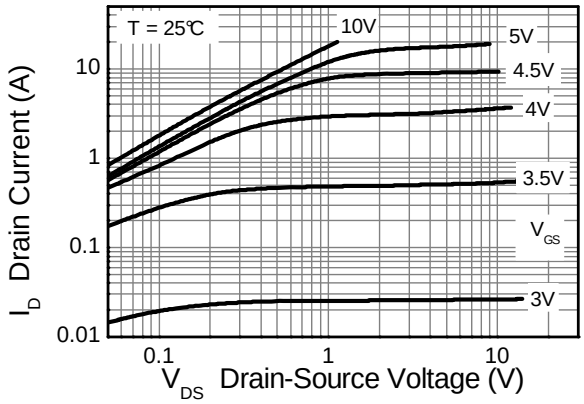
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

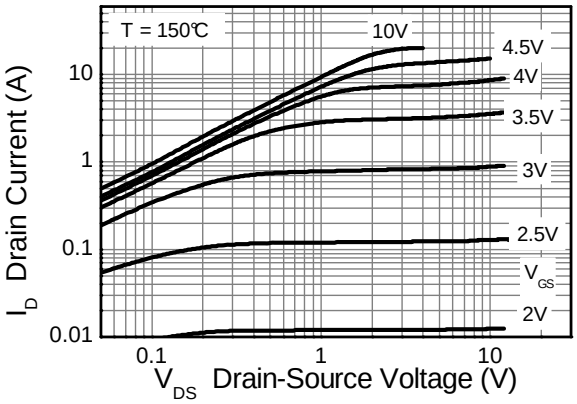
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	I_D = 250μA, V_{GS}= 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS}= 60V, V_{GS}= 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS}= ±20V, V_{DS}= 0V
ON CHARACTERISTICS						
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)	$R_{DS\ (ON)}$	—	—	0.068	Ω	V_{GS}= 10V, I_D= 12A
				0.100		V_{GS}= 4.5V, I_D= 6A
Forward Transconductance (Notes 8 & 9)	g_{fs}	—	19.7	—	S	V_{DS}= 15V, I_D= 12A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.98	1.15	V	I_S= 12A, V_{GS}= 0V
Reverse recovery time (Note 9)	t_{rr}		145	—	ns	I_S= 12A, di/dt= 100A/μs
Reverse recovery charge (Note 9)	Q_{rr}	—	929	—	nC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	502	—	pF	V_{DS}= 30V, V_{GS}= 0V f= 1MHz
Output Capacitance	C_{oss}	—	45.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	27.1	—	pF	
Total Gate Charge (Note 10)	Q_g	—	5.55	—	nC	V_{GS}= 4.5V
Total Gate Charge (Note 10)	Q_g	—	10.3	—	nC	V_{GS}= 10V; V_{DS}= 30V; I_D= 12A
Gate-Source Charge (Note 10)	Q_{gs}	—	1.6	—	nC	
Gate-Drain Charge(Note 10)	Q_{gd}	—	3.5	—	nC	
Turn-On Delay Time (Note 10)	$t_{D(on)}$	—	3.6	—	ns	V_{DD}= 30V, V_{GS}= 10V I_D= 12A, $R_G \cong$ 6.0Ω
Turn-On Rise Time (Note 10)	t_r	—	10.8	—	ns	
Turn-Off Delay Time (Note 10)	$t_{D(off)}$	—	11.9	—	ns	
Turn-Off Fall Time (Note 10)	t_f	—	8.7	—	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.

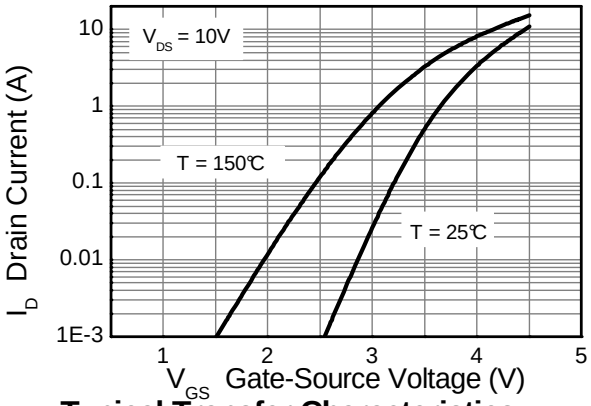
Typical Characteristics



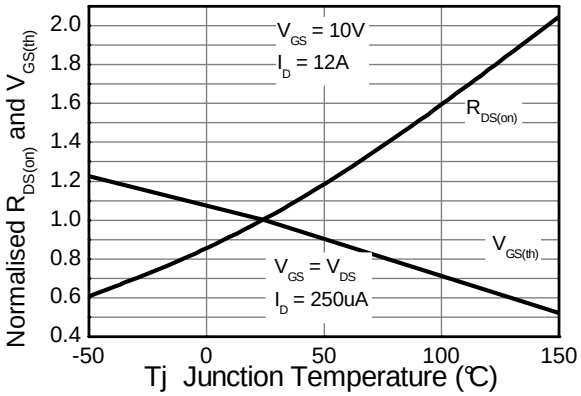
Output Characteristics



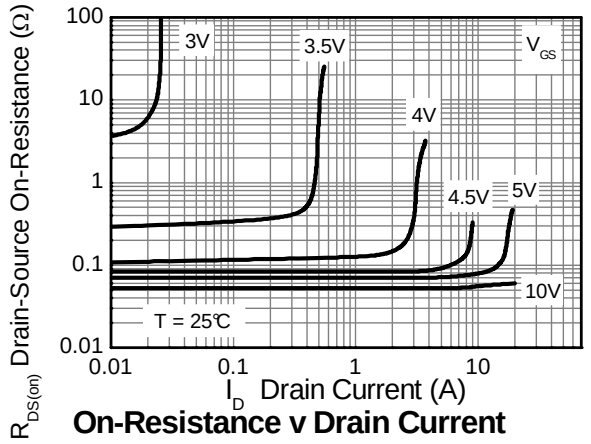
Output Characteristics



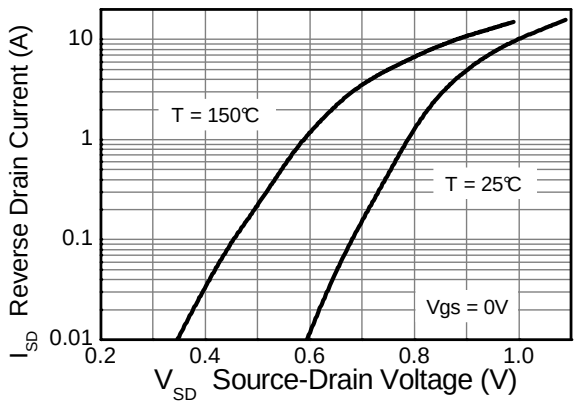
Typical Transfer Characteristics



Normalised Curves v Temperature

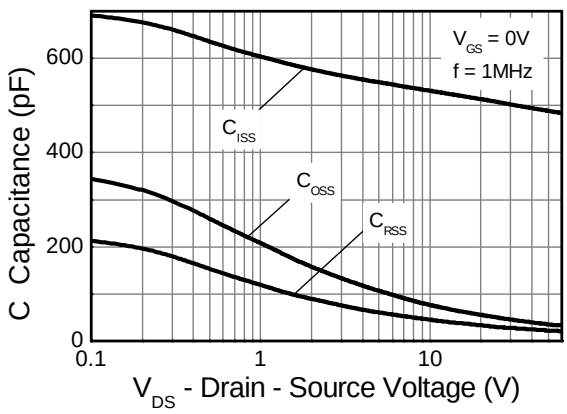


On-Resistance v Drain Current

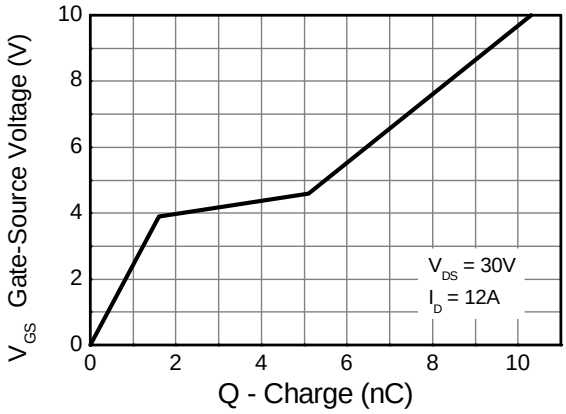


Source-Drain Diode Forward Voltage

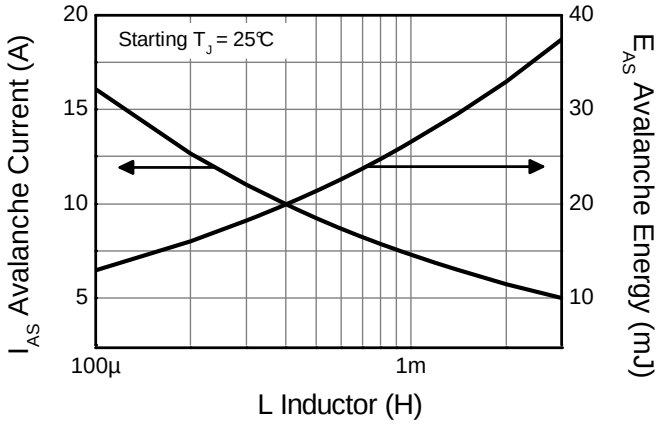
Typical Characteristics - continued



Capacitance v Drain-Source Voltage

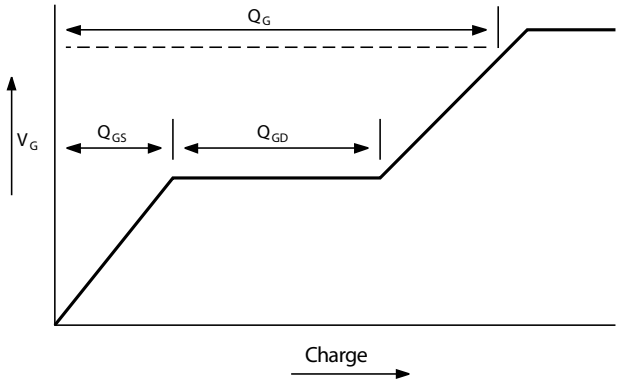


Gate-Source Voltage v Gate Charge

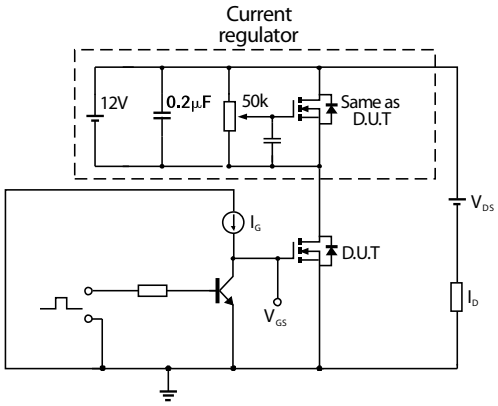


Single-Pulsed Avalanche Rating

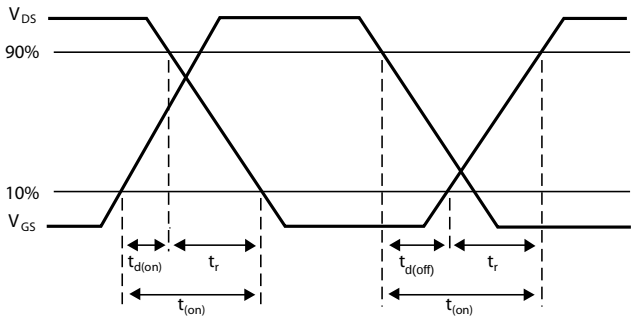
Test Circuits



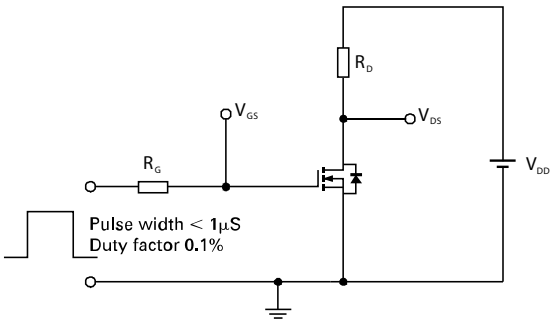
Basic gate charge waveform



Gate charge test circuit

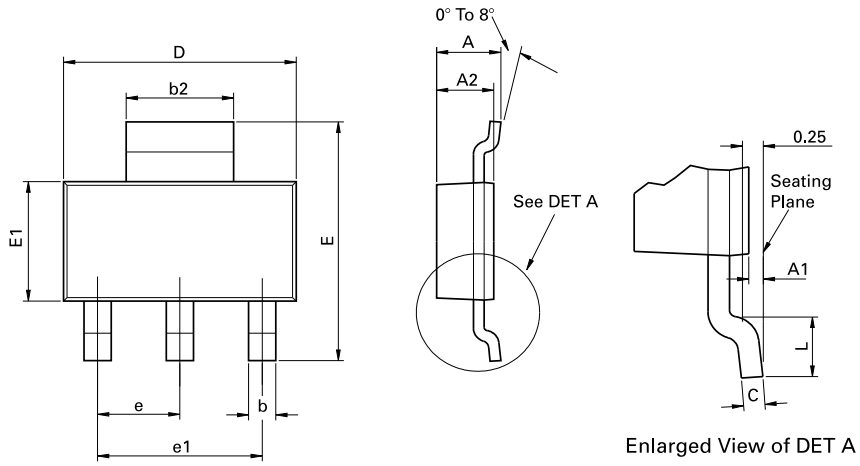


Switching time waveforms



Switching time test circuit

Package Outline Dimensions

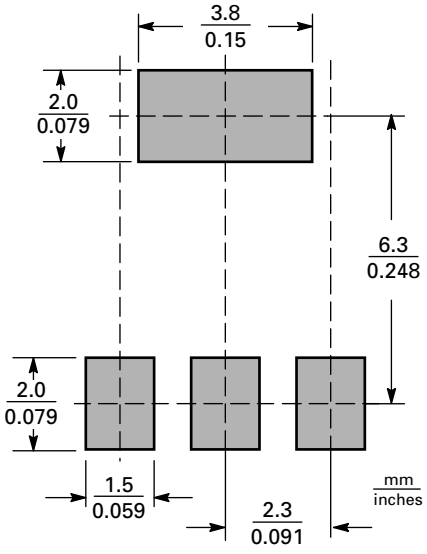


Conforms to JEDEC TO-261 AA Issue B

Enlarged View of DET A

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	-	1.80	-	0.071	D	6.30	6.70	0.248	0.264
A1	0.02	0.10	0.0008	0.004	e	2.30 BSC		0.0905 BSC	
A2	1.55	1.65	0.0610	0.0649	e1	4.60 BSC		0.181 BSC	
b	0.66	0.84	0.026	0.033	E	6.70	7.30	0.264	0.287
b2	2.90	3.10	0.114	0.122	E1	3.30	3.70	0.130	0.146
C	0.23	0.33	0.009	0.013	L	0.90	-	0.355	-

Suggested Pad Layout



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