Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
60V	69mΩ @ V_{GS} = 10V	4.3A
	100mΩ @ V_{GS} = 4.5V	3.5A

Description and Applications

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

- Motor controls
- Transformer driving switches
- DC-DC converters
- Power-management functions
- Uninterrupted power supplies

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Fast Switching Speed
- Low On-Resistance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An automotive-compliant part is available under separate datasheet (DMN6069SEQ)**

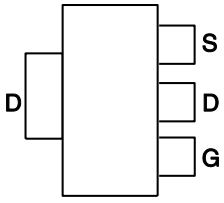
Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- 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 e3
- Weight: 0.112 grams (Approximate)

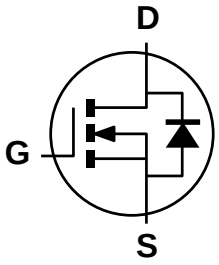
SOT223



Top View



Pin Out - Top View



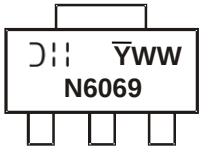
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN6069SE-13	SOT223	2,500	Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See https://www.diodes.com/quality/lead-free/ 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



= Manufacturer's Marking
N6069 = Product Type Marking Code
YWW = Date Code Marking
Y or Y = Year (ex: 3 = 2023)
WW = Week (01 to 53)

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	4.3 3.3	A
	T_C = +25°C T_C = +70°C	I_D	10 8	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	25	A
Maximum Body Diode Continuous Current		I_S	4.3	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.2	W
	T_A = +70°C		1.4	
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	58	°C/W
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	100	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	11	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	8.9	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	47	69	mΩ	V_{GS} = 10V, I_D = 3A
		—	54	100		V_{GS} = 4.5V, I_D = 2.4A
Diode Forward Voltage	V_{SD}	—	0.8	1.1	V	V_{GS} = 0V, I_S = 2.5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	825	—	pF	V_{DS} = 30V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	40	—		
Reverse Transfer Capacitance	C_{rss}	—	29	—		
Gate Resistance	R_g	—	2.3	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	7.2	—	nC	V_{DS} = 30V, I_D = 12A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	16	—		
Gate-Source Charge	Q_{gs}	—	3.2	—		
Gate-Drain Charge	Q_{gd}	—	2.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.8	—	ns	V_{DD} = 30V, V_{GS} = 10V, R_G = 6Ω, I_D = 12A
Turn-On Rise Time	t_R	—	6.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	16	—		
Turn-Off Fall Time	t_F	—	5.3	—		

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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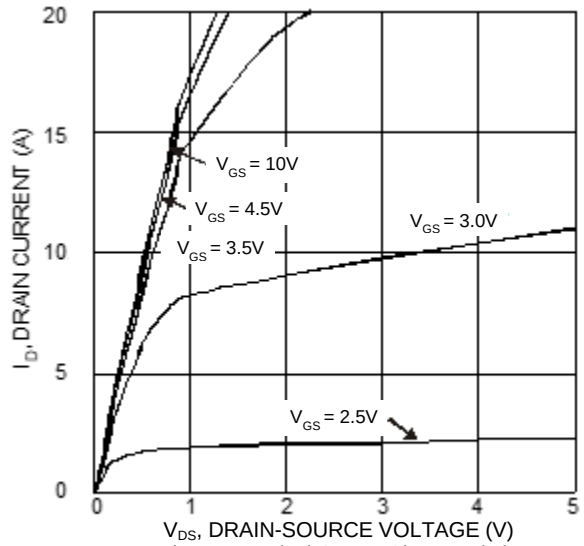


Figure 1 Typical Output Characteristic

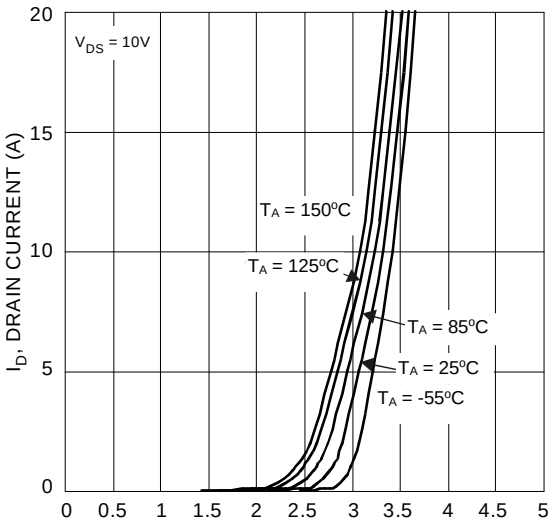


Figure 2 Typical Transfer Characteristic

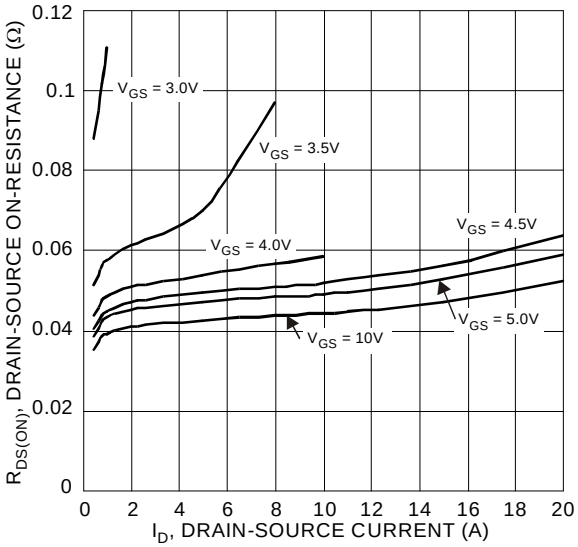


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

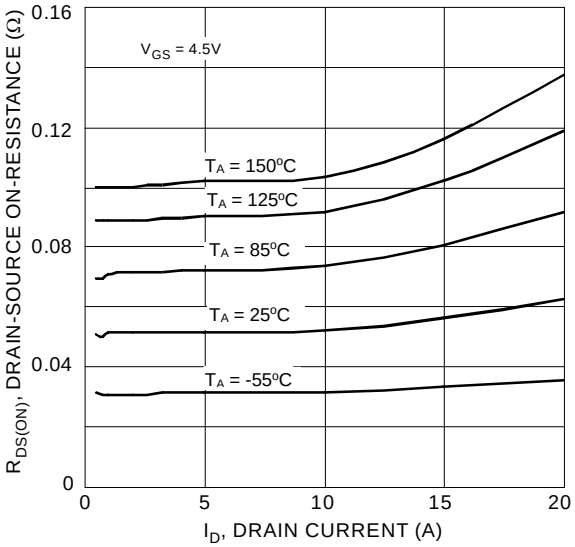


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

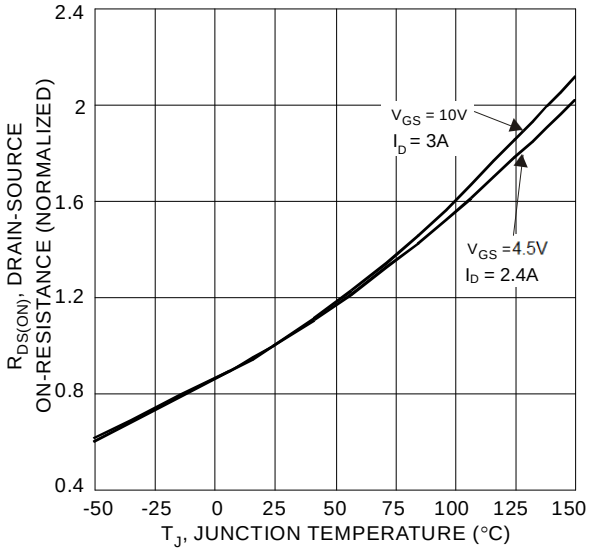


Figure 5 On-Resistance Variation with Temperature

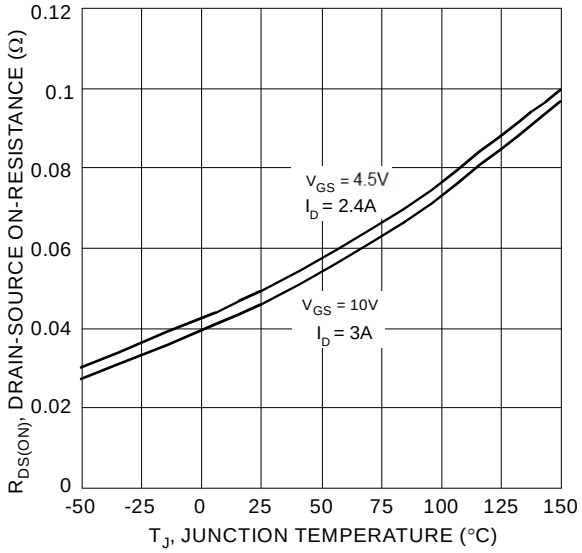


Figure 6 On-Resistance Variation with Temperature

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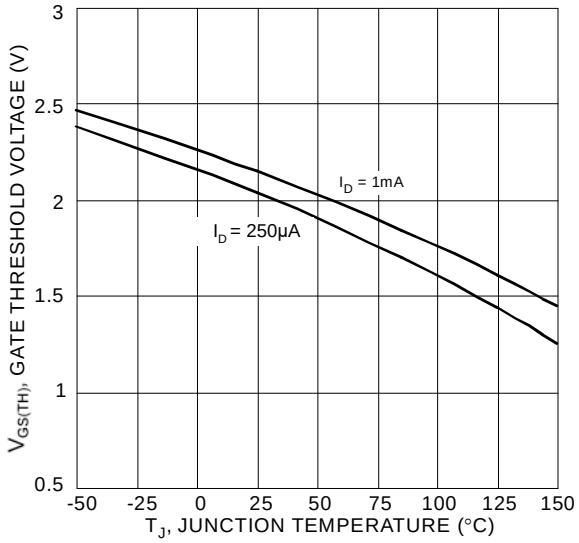


Figure 7 Gate Threshold Variation vs. Junction Temperature

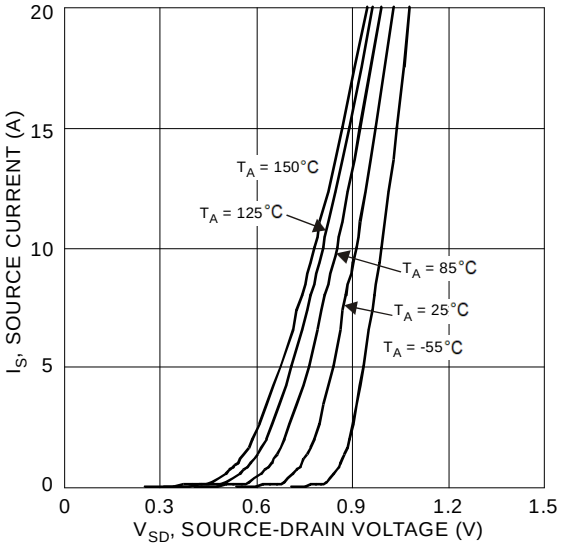


Figure 8 Diode Forward Voltage vs. Current

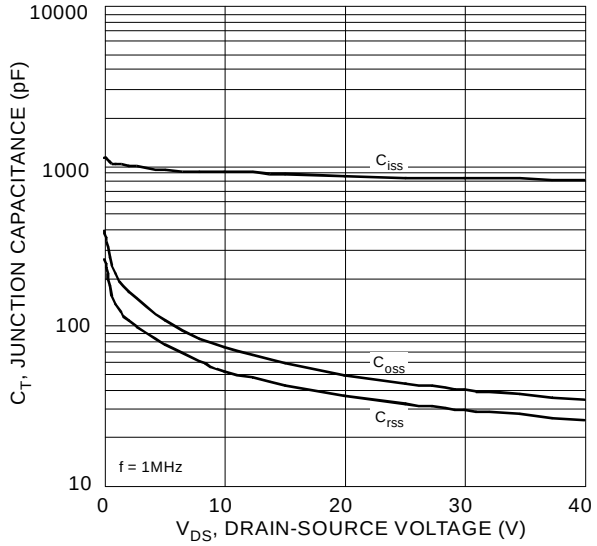


Figure 9 Typical Junction Capacitance

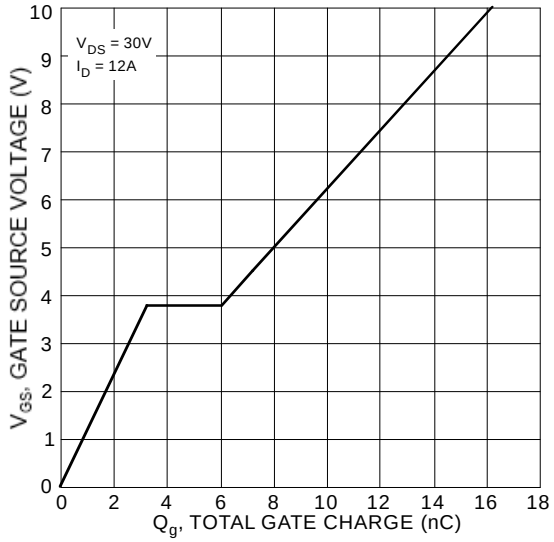


Figure 10 Gate Charge

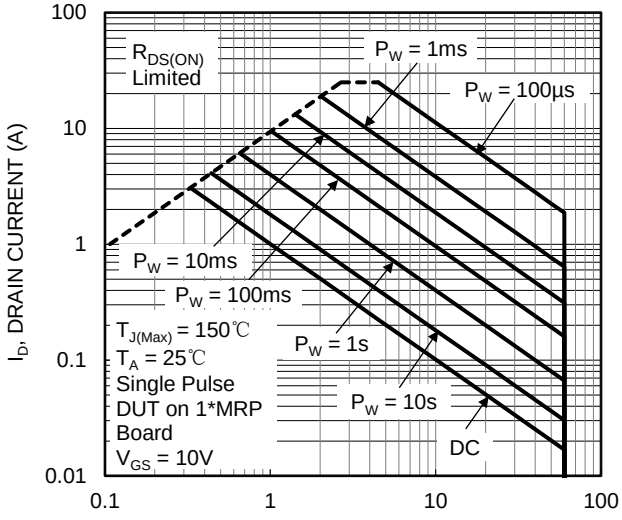


Figure 11 SOA, Safe Operation Area

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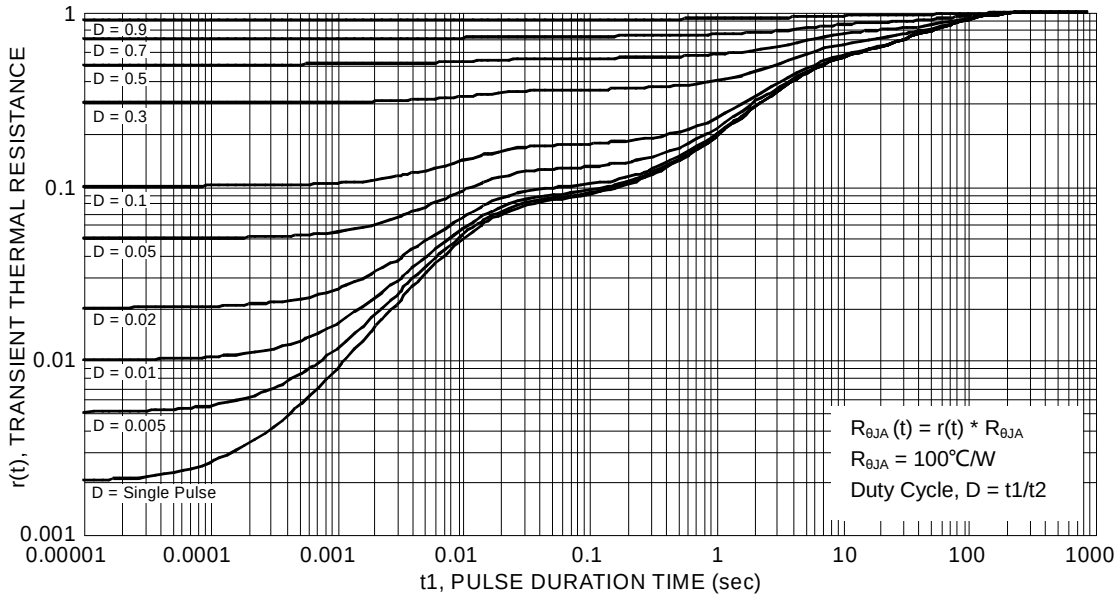


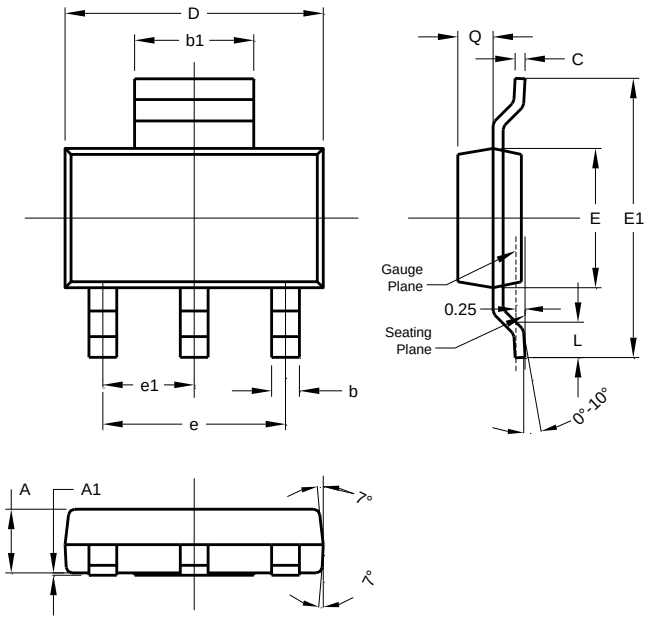
Figure 12 Transient Thermal Resistance

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Package Outline Dimensions

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

SOT223

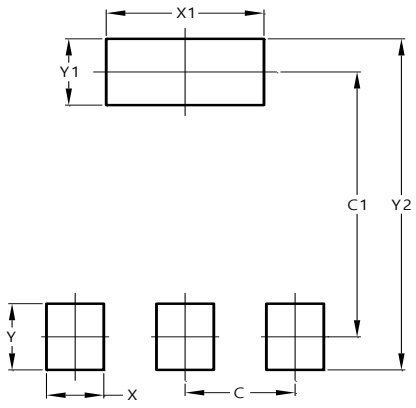


SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

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

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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