





N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(on)}	I _D T _A = +25°C
20V	0.55Ω @ $V_{GS} = 4.5V$	630mA
200	0.9Ω @ V _{GS} = 1.8V	410mA

Description

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

Applications

- DC-DC Converters
- · Power Management Functions

Features and Benefits

- Low On-Resistance: R_{DS(on)} = 550_(max)mΩ @ V_{GS} = 4.5V
- Low Gate Threshold Voltage
- Low Input Capacitance
- · Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected up to 2KV
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at

https://www.diodes.com/products/automotive/automotive-products/.

 This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.

https://www.diodes.com/quality/product-definitions/

Mechanical Data

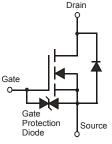
- Case: SOT23 (Standard)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin annealed over Alloy 42 leadframe.
 Solderable per MIL-STD-202, Method 208 @3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)



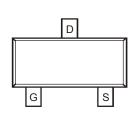


SOT23









Top View

Ordering Information (Note 4)

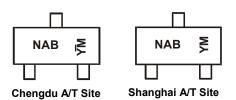
Part Number	Case	Packaging
DMN2004K-7	SOT23 (Standard)	3000/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 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



NAB = Product Type Marking Code YM = Date Code Marking for SAT (Shanghai Assembly/ Test site) \overline{Y} M = Date Code Marking for CAT (Chengdu Assembly/ Test site) Y or \overline{Y} = Year (ex: I = 2021) M = Month (ex: 9 = September)

Date Code Key

Year	2008		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	V		ı	J	K	L	М	N	0	Р	R	S
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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

Characte	eristic		Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +85°C	I _D	630 450	mA
Drain Current (Note 5) V _{GS} = 1.8V	Steady State	T _A = +25°C T _A = +85°C	I _D	410 300	mA
Pulsed Drain Current (Note 6)	·		I _{DM}	1.5	Α

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_{D}	350	mW
Thermal Resistance, Junction to Ambient	$R_{ heta JA}$	357	°C/W
Operating and Storage Temperature Range	T _{J,} T _{STG}	-65 to +150	°C

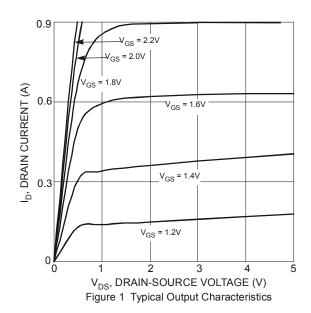


Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 7)								
Drain-Source Breakdown Voltage	BV _{DSS}	20	_	_	V	$V_{GS} = 0V, I_D = 10\mu A$		
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μA	V _{DS} = 16V, V _{GS} = 0V		
Gate-Source Leakage	I _{GSS}	_	_	±1	μA	$V_{GS} = \pm 4.5V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 7)								
Gate Threshold Voltage	V _{GS(th)}	0.5	_	1.0	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$		
			0.4	0.55		V _{GS} = 4.5V, I _D = 540mA		
Static Drain-Source On-Resistance	R _{DS(on)}	_	0.5	0.70	Ω	$V_{GS} = 2.5V, I_D = 500mA$		
			0.7	0.9		V_{GS} = 1.8V, I_D = 350mA		
Forward Transfer Admittance	Y _{fs}	200	_	_	ms	V _{DS} =10V, I _D = 0.2A		
Source Current	I _S		_	0.5	Α	_		
Diode Forward Voltage (Note 7)	V_{SD}	0.6	_	1	V	$V_{GS} = 0V, I_{S} = 500mA$		
DYNAMIC CHARACTERISTICS								
Input Capacitance	C _{iss}	_		150	pF	<u></u>		
Output Capacitance	Coss		_	25	pF	V _{DS} = 16V, V _{GS} = 0V f = 1.0MHz		
Reverse Transfer Capacitance	C _{rss}		_	20	pF	1.01/11/2		
Gate Resistance	Rg		292	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1.0MHz$		
Total Gate Charge	Q_g	_	0.9	_				
Gate-Source Charge	Qgs	_	0.2	_	nC	$V_{DS} = 15V, V_{GS} = 4.5V, I_{D} = 0.5A$		
Gate-Drain Charge	Q_{gd}	_	0.2	_				
Turn-On Delay Time	t _{D(on)}	_	5.7	_				
Turn-On Rise Time	t _r	_	8.4	_		V _{GS} = 8V, V _{DS} = 15V,		
Turn-Off Delay Time	t _{D(off)}	_	59.4	_	ns	$R_G = 6\Omega$, $R_L = 30\Omega$		
Turn-Off Fall Time	t _f	_	37.6	_				
Body Diode Reverse Recovery Time	t _{rr}	_	5.5	_	ns	I _S = 0.5A, dI/dt = -100A/μs		
Body Diode Reverse Recovery Charge	Q _{rr}	_	0.85	_	nC	I _S = 0.5A, dI/dt = -100A/μs		

Notes:

7. Short duration pulse test used to minimize self-heating effect.



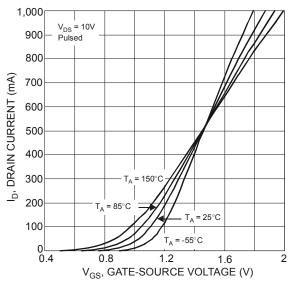


Figure 2 Reverse Drain Current vs. Source-Drain Voltage

^{5.} Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided. 6. Pulse width ≤10µS, Duty Cycle ≤1%.



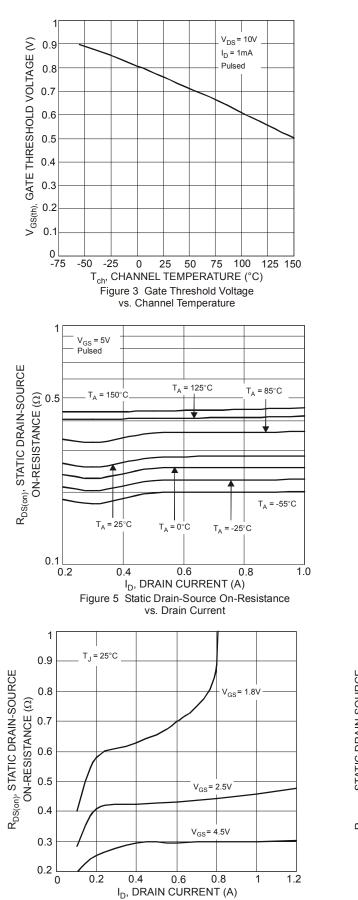


Figure 7 On-Resistance vs. Drain Current and Gate Voltage

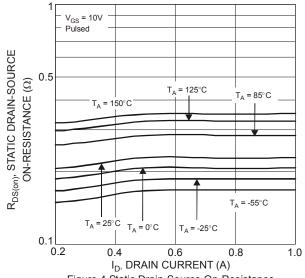


Figure 4 Static Drain-Source On-Resistance vs. Drain Current

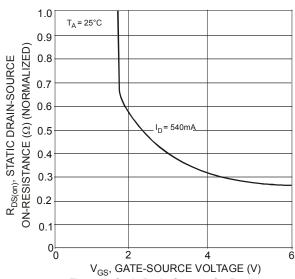


Figure 6 Static Drain-Source, On-Resistance vs. Gate-Source Voltage

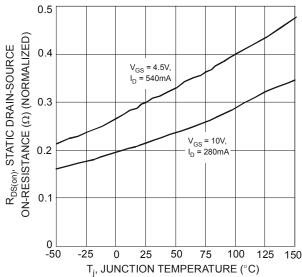
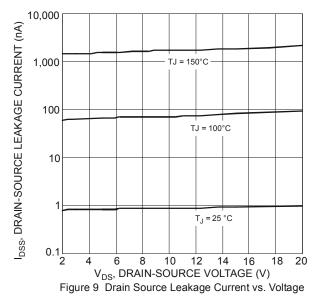


Figure 8 Static Drain-Source, On-Resistance vs. Temperature





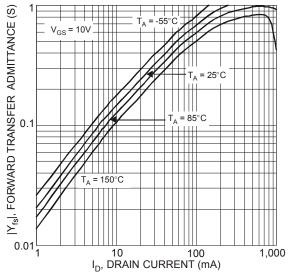
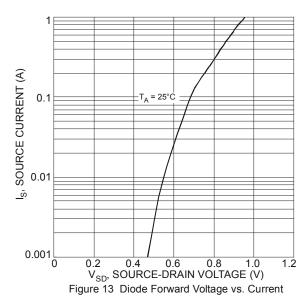


Figure 11 Forward Transfer Admittance vs. Drain Current



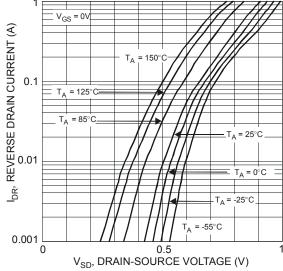
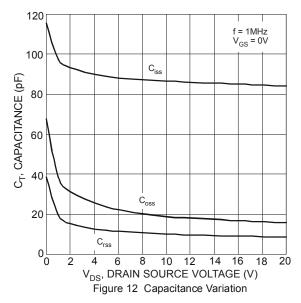
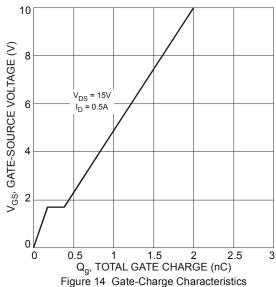


Figure 10 Reverse Drain Current vs. Source-Drain Voltage



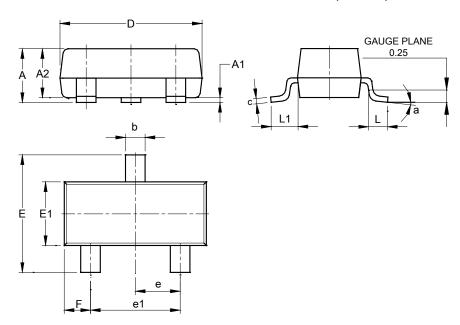




Package Outline Dimensions

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

SOT23 (Standard)

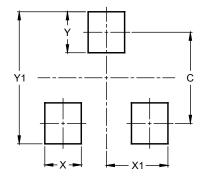


SOT23 (Standard)								
Dim	Min	Max	Тур					
Α	0.90	1.15	1.025					
A1	0.00	0.10	0.05					
A2	0.85	1.10	0.975					
b	0.30	0.51	0.40					
С	0.080	0.202	0.11					
D	2.80	3.00	2.90					
Е	2.25	2.55	2.40					
E1	1.20	1.40	1.30					
е	0.89	1.03	0.915					
e1	1.78	2.05	1.83					
F	0.40	0.60	0.535					
L1	0.45	0.61	0.55					
٦	0.25	0.55	0.40					
а	0°	8°						
All Dimensions in mm								

Suggested Pad Layout

 $\label{prop:lease} Please see \ http://www.diodes.com/package-outlines.html for the latest version.$

SOT23 (Standard)



Dimensions	Value (in mm)			
С	2.0			
Х	0.8			
X1	1.35			
Y	0.9			
Y1	2.0			



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