DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max T_A = 25°C
60V	2.4Ω @ V_{GS} = 10V	510mA
	4.0Ω @ V_{GS} = 4V	390mA

Features and Benefits

- Low On-Resistance
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

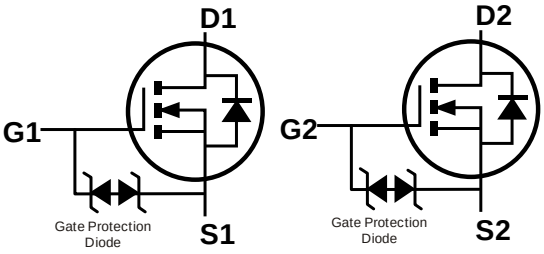
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- DC-DC Converters
- Power Management Functions
- Analog Switch

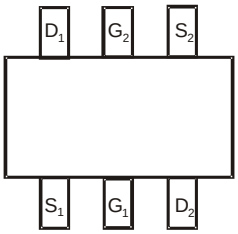
Mechanical Data

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.015 grams (Approximate)

SOT26
Top View



Equivalent Circuit
Per Element



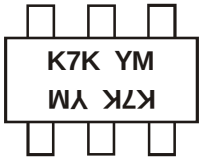
Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN601DMK-7	SOT26	3,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information



K7K = Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: S = 2005)
M = Month (ex: 9 = September)

Date Code Key

Year	2005	---	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Code	S	---	B	C	D	E	F	G	H	I	J	K	L

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) (V_{GS} = 10V)	Steady State	T_A = +25°C T_A = +70°C	I_D	510 400	mA
	t<10s	T_A = +25°C T_A = +70°C	I_D	580 470	mA
Continuous Drain Current (Note 6) (V_{GS} = 4V	Steady State	T_A = +25°C T_A = +70°C	I_D	390 300	mA
	t<10s	T_A = +25°C T_A = +70°C	I_D	440 340	mA
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	850	mA
Maximum Body Diode Continuous Current			I_S	1.2	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	157	°C/W
	t<10s		121	
Total Power Dissipation (Note 6)		P_D	0.98	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	113	°C/W
	t<10s		88	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	26	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate

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 = 10μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	1.6	2.5	V	V_{DS} = 10V, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	— —	2.4 4.0	Ω	V_{GS} = 10V, I_D = 200mA V_{GS} = 4V, I_D = 200mA
Forward Transfer Admittance	$\|Y_{fs}\|$	100	—	—	mS	V_{DS} =10V, I_D = 200mA
Diode Forward Voltage	V_{SD}	0.5	—	1.4	V	V_{GS} = 0V, I_S = 115mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	30	50	pF	V_{DS} = 25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	5	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	3	5.0	pF	
Gate Resistance	R_g	—	133	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	304	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	84	—		
Gate-Drain Charge	Q_{gd}	—	203	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.9	—	nS	V_{DS} = 30V, I_D = 0.2A, V_{GS} = 10V, R_G = 25Ω, R_L = 150Ω
Turn-On Rise Time	t_R	—	3.4	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	15.7	—		
Turn-Off Fall Time	t_F	—	9.9	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

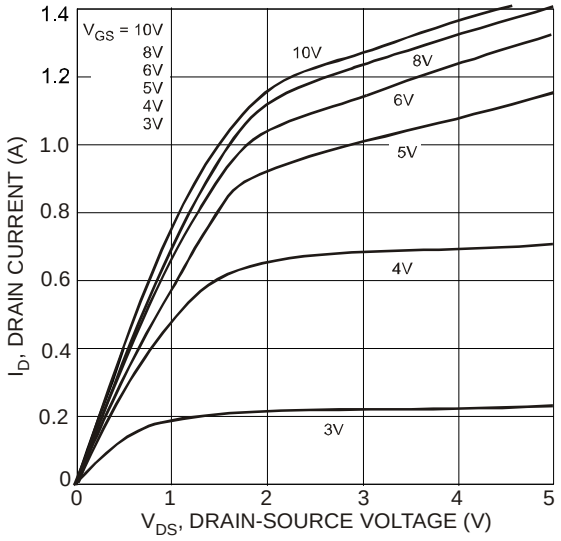


Fig. 1 Typical Output Characteristics

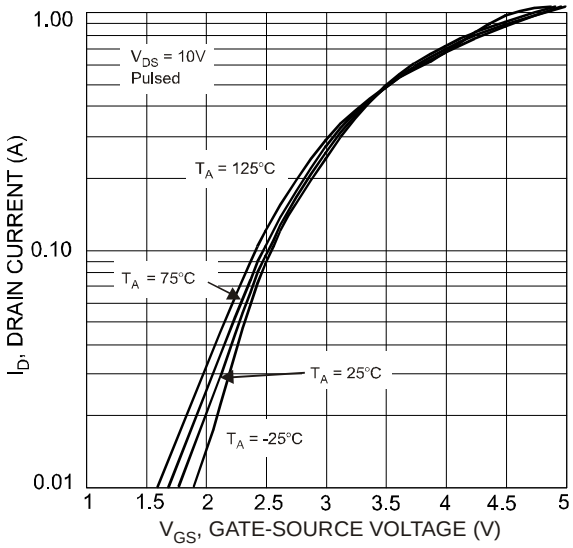


Fig. 2 Typical Transfer Characteristics

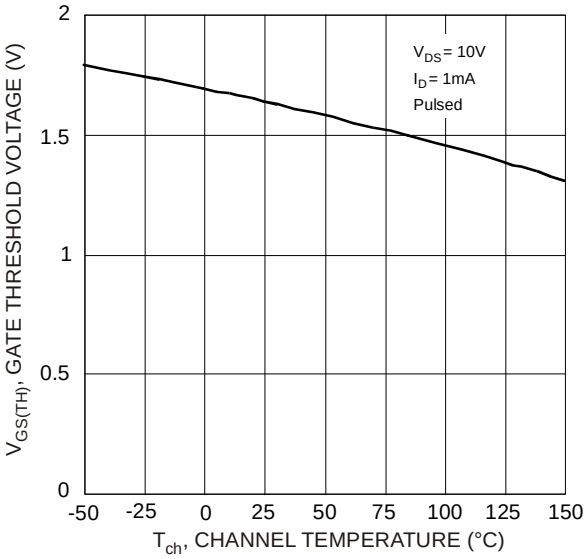


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

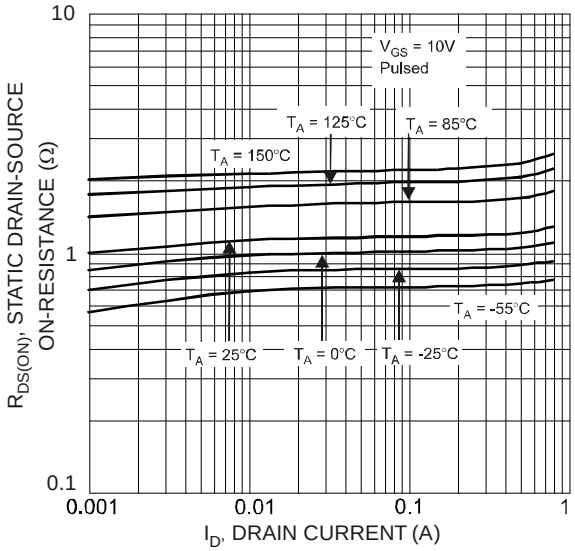


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

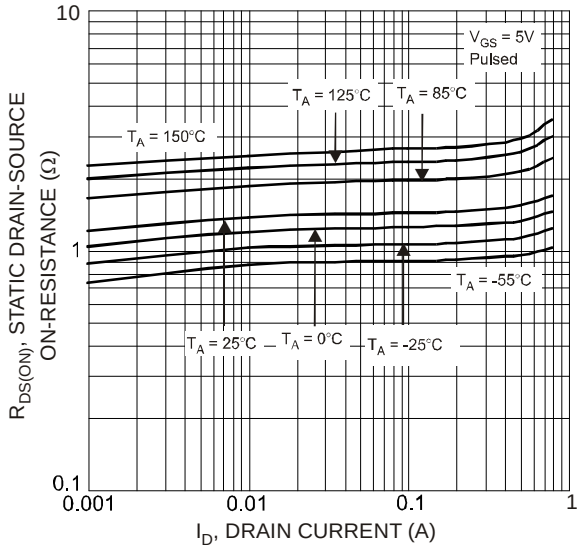


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

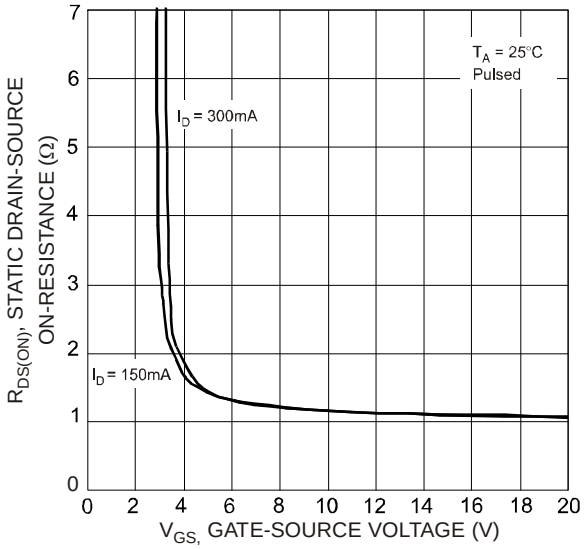


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

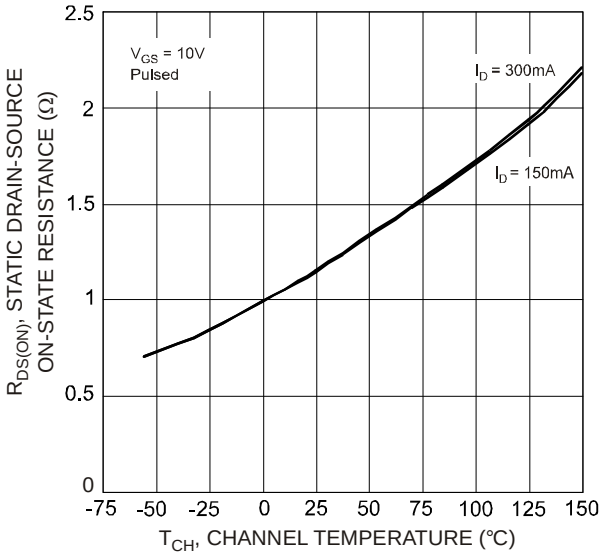


Fig. 7 Static Drain-Source On-State Resistance vs. Channel Temperature

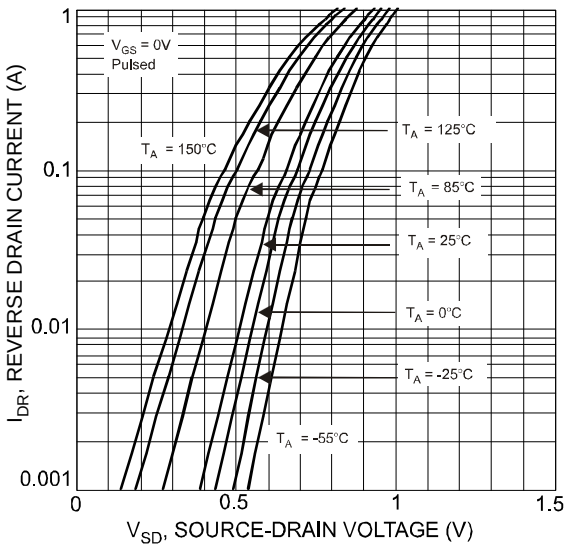


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

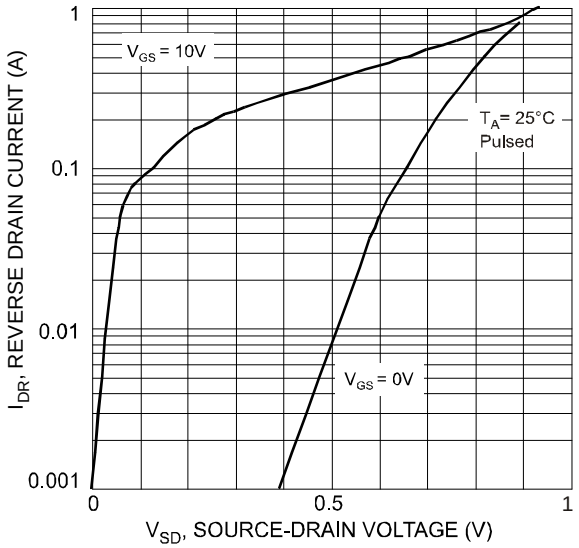


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

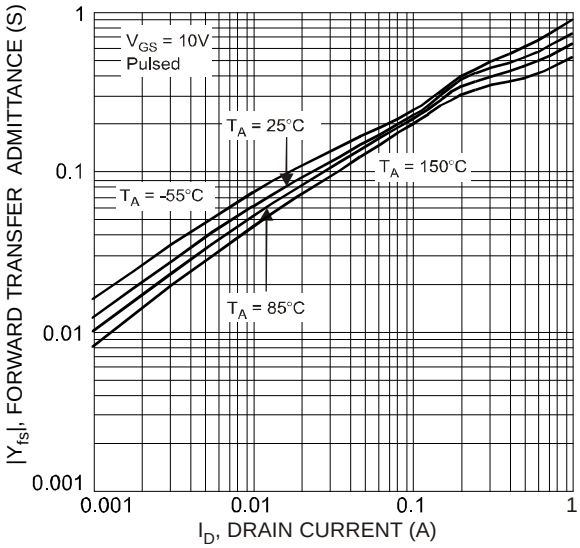


Fig.10 Forward Transfer Admittance vs. Drain Current

Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

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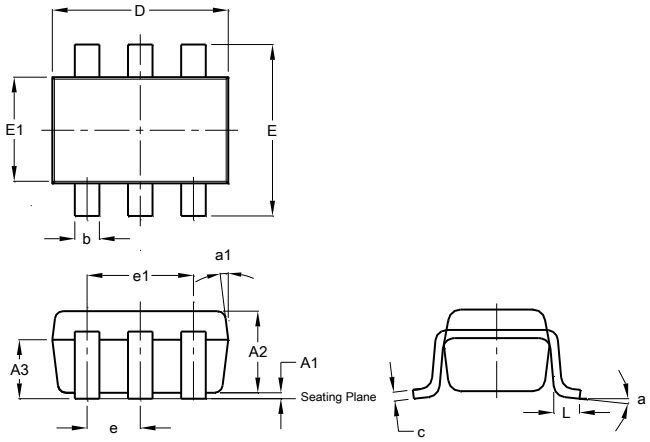
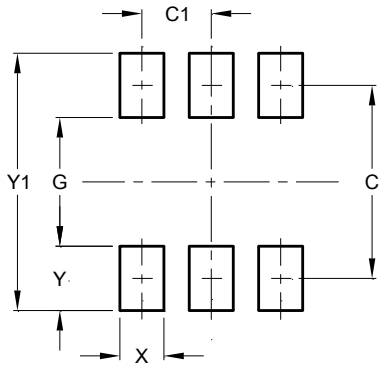


SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	—	—	0.95
e1	—	—	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	—	—	8°
a1	—	—	7°
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

SOT26



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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