N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Features

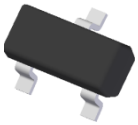
- Low On-Resistance
- Very Low Gate Threshold Voltage, 0.9V Max.
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected Gate**
- **For 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 contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

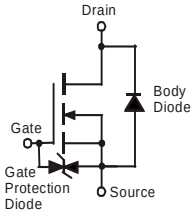
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Ordering & Date Code Information: See Below
- Weight: 0.008 grams (Approximate)



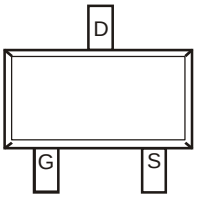
SOT23



TOP VIEW



Equivalent Circuit



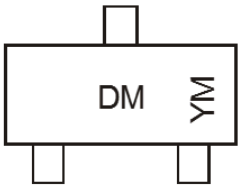
TOP VIEW

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2005K-7	SOT23	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



DM = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

Year	2006	…	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	T	…	H	I	J	K	L	M	N	O	P	R

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

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±10	V
Drain Current Per Element (Note 5)	Continuous Pulsed (Note 6)	I_D	300 600	mA

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	350	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	357	°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}	20	—	—	V	V_{GS} = 0V, I_D = 100µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	10	µA	V_{DS} = 17V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±5	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.53	—	0.9	V	V_{DS} = V_{GS}, I_D = 100µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	— —	0.55 0.4	3.5 1.7	Ω	V_{GS} = 1.8V, I_D = 200mA V_{GS} = 2.7V, I_D = 200mA
Forward Transfer Admittance	$\lvert Y_{fs} \rvert$	40	—	—	mS	V_{DS} = 3V, I_D = 10mA
Diode Forward Voltage	V_{SD}	—	0.7	1.4	V	V_{GS} = 0V, I_S = 200mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	36.0	—	pF	V_{DS} =16V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	5.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	4.2	—	pF	
Gate Resistance	R_g	—	68	—	Ω	V_{DS} = 0V, V_{GS} = 0V
Total Gate Charge	Q_g	—	0.5	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	0.07	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.06	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47Ω, R_G = 10Ω, I_D = 200mA
Turn-On Rise Time	t_R	—	7.28	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	13.74	—	ns	
Turn-Off Fall Time	t_F	—	10.54	—	ns	

Notes:
5. Device mounted on FR-4 PCB.
6. Pulse width ≤10µS, Duty Cycle ≤1%.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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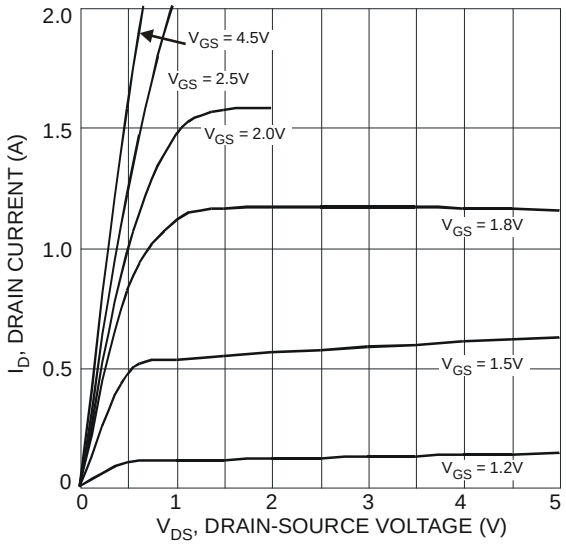

Fig. 1 Typical Output Characteristics

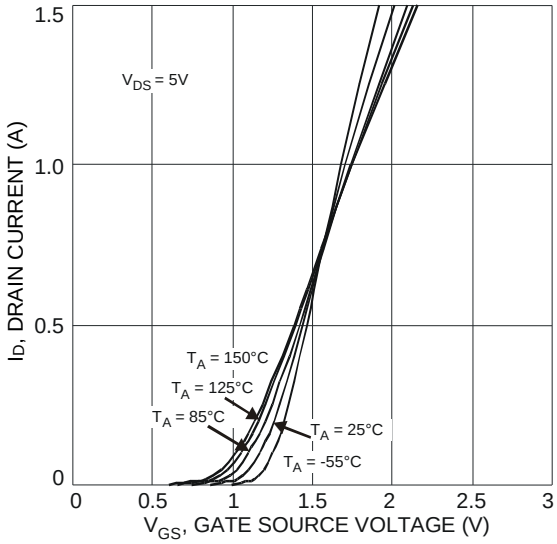

Fig. 2 Typical Transfer Characteristics

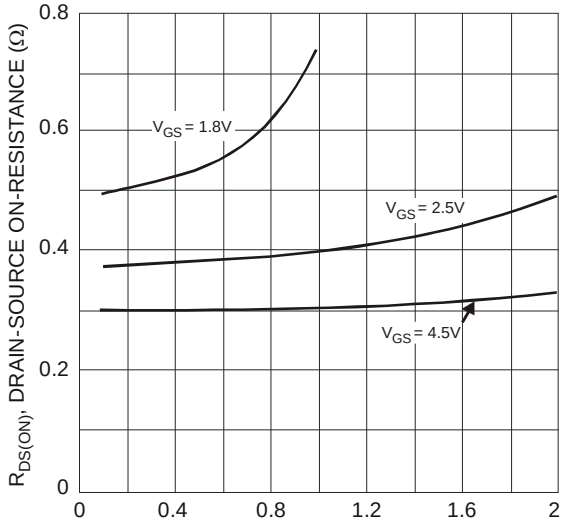

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

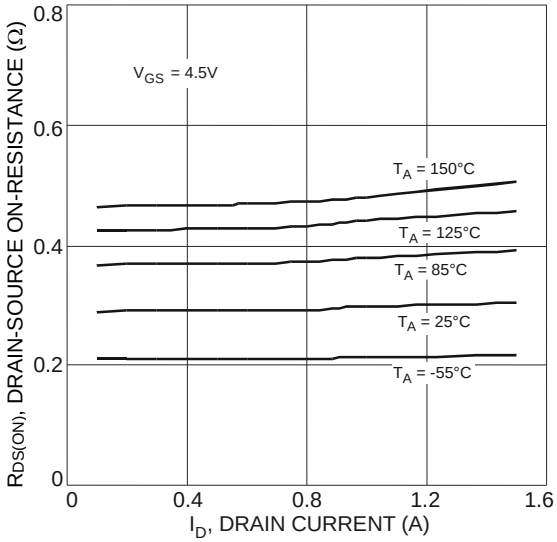

Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

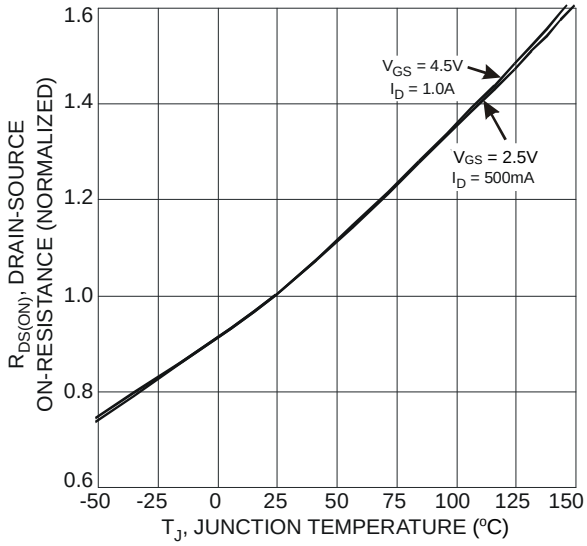

Fig. 5 On-Resistance Variation with Temperature

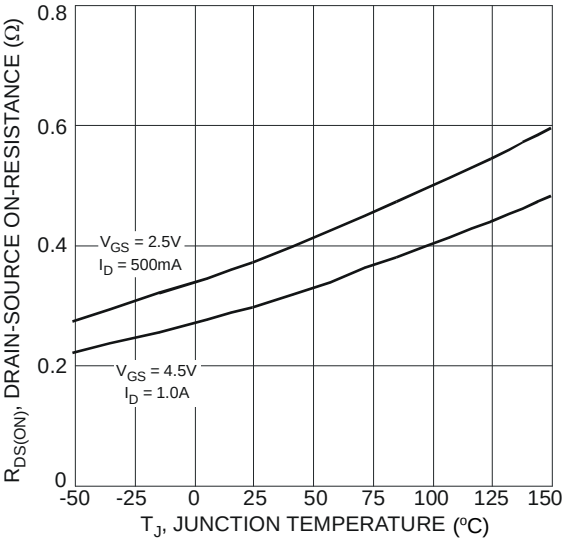

Fig. 6 On-Resistance Variation with Temperature

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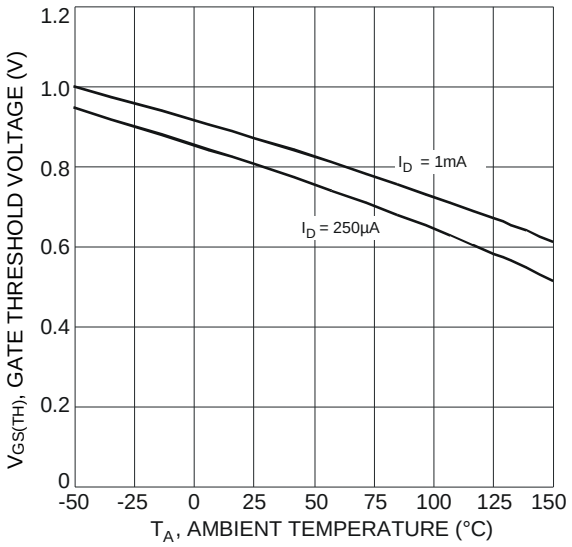

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

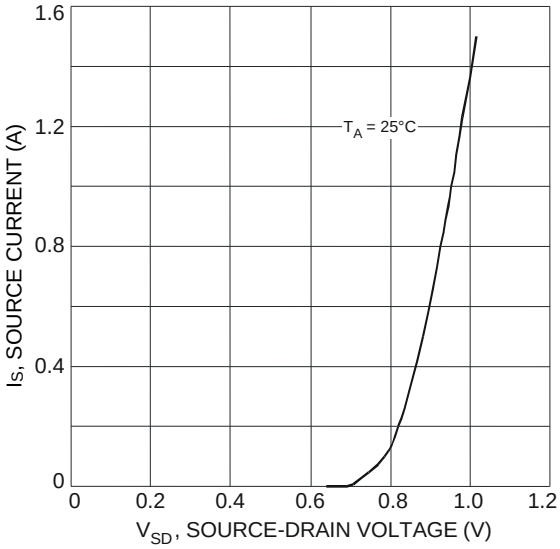

Fig. 8 Diode Forward Voltage vs. Current

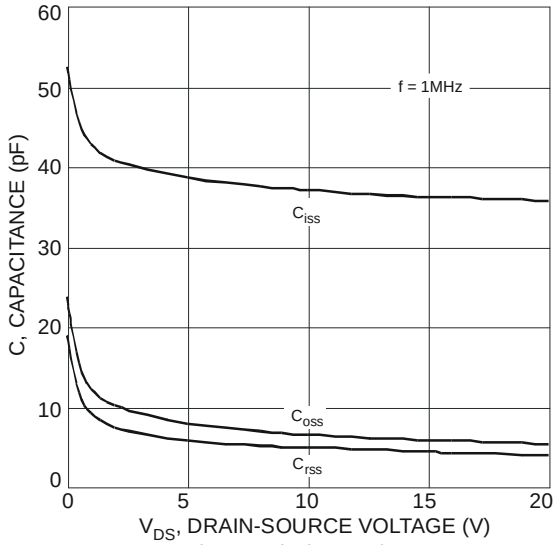

Fig. 9 Typical Capacitance

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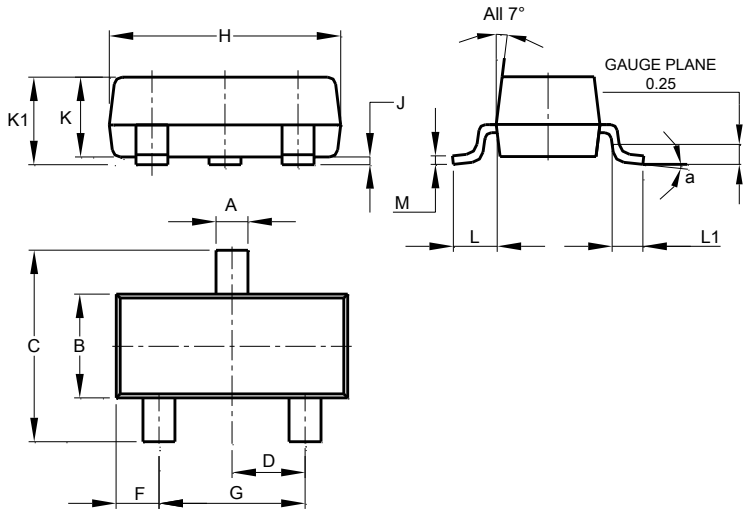
Package Outline Dimensions

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

SOT23

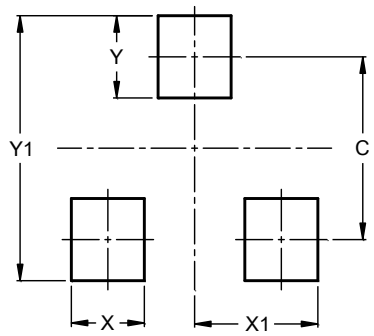


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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