P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

NEW PRODUCT

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = 25°C
-20V	150mΩ @ V_{GS} = -4.5V	-1.5A
	200mΩ @ V_{GS} = -2.5V	-1A
	240mΩ @ V_{GS} = -1.8V	-0.9A

Description and Applications

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

- Backlighting
- Power Management Functions
- DC-DC Converters

Features

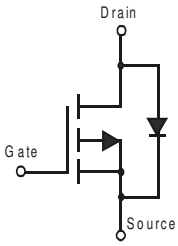
- Low On-Resistance
- Very Low Gate Threshold Voltage $V_{GS(th)}$ ≤ 1V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

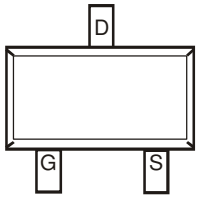
- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.006 grams (Approximate)

SOT-323

Top View



Internal Schematic



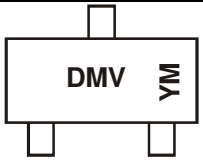
Top View

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP2240UWQ-7	SOT-323	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



DMV = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: B = 2014)
M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021
Code	B	C	D	E	F	G	H	I

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

NEW PRODUCT

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

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	±12	V
Drain Current (Note 6)	T_A = +25°C T_A = +70°C	I_D	-1.5 -1.0	A
Pulsed Drain Current		I_{DM}	-5	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P_D	250	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	500	°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 = -250μA
Zero Gate Voltage Drain Current	T_J = +25°C T_J = +125°C	I_{DSS}	—	—	-1.0 -5.0	μA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage		I_{GSS}	—	—	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage		$V_{GS(th)}$	-0.45	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance		$R_{DS\ (ON)}$	—	92 134 180	150 200 240	mΩ	V_{GS} = -4.5V, I_D = -2.0A V_{GS} = -2.5V, I_D = -1.5A V_{GS} = -1.8V, I_D = -0.5A
Forward Transconductance		g_{FS}	—	3.1	—	S	V_{DS} = -10V, I_D = -810mA
Diode Forward Voltage (Note 7)		V_{SD}	—	—	-0.9	V	V_{GS} = 0V, I_S = -0.5A
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{iss}	—	320	—	pF	V_{DS} = -16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	80	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	60	—	pF	
Turn-On Delay Time		$t_{D(on)}$	—	12.5	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 10Ω, R_G = 1.0Ω
Turn-On Rise Time		t_r	—	10.3	—	ns	
Turn-Off Delay Time		$t_{D(off)}$	—	46.5	—	ns	
Turn-Off Fall Time		t_f	—	22.2	—	ns	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz. Copper, with minimum recommended pad layout.
7. Short duration pulse test used to minimize self-heating effect.

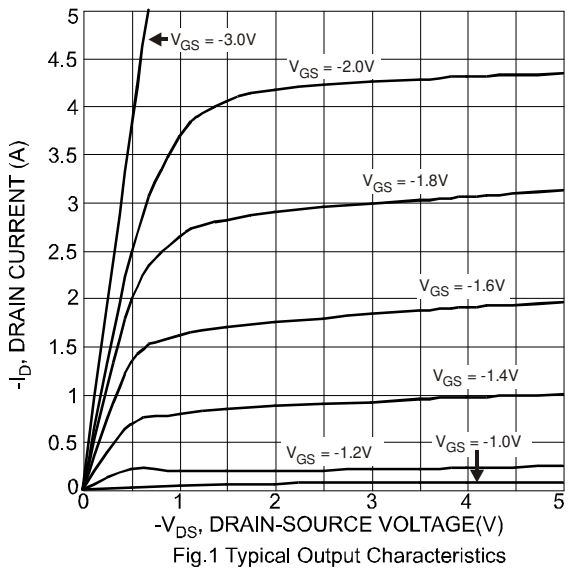


Fig.1 Typical Output Characteristics

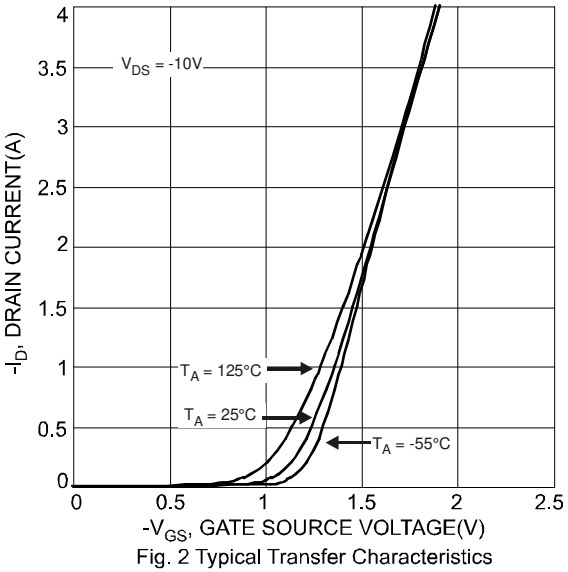


Fig. 2 Typical Transfer Characteristics

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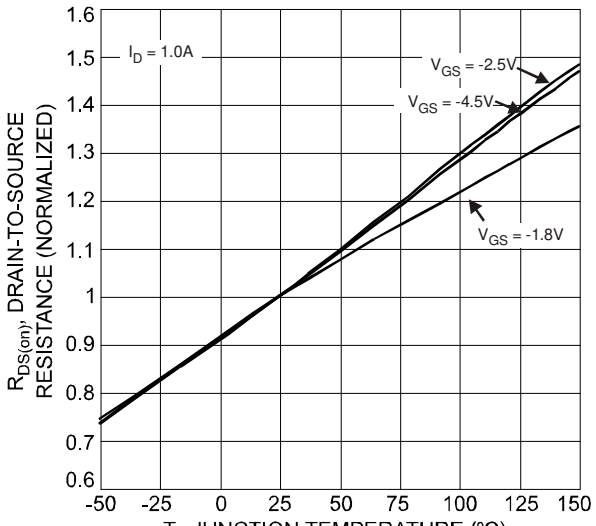

Fig. 3 On-Resistance Variation with Temperature

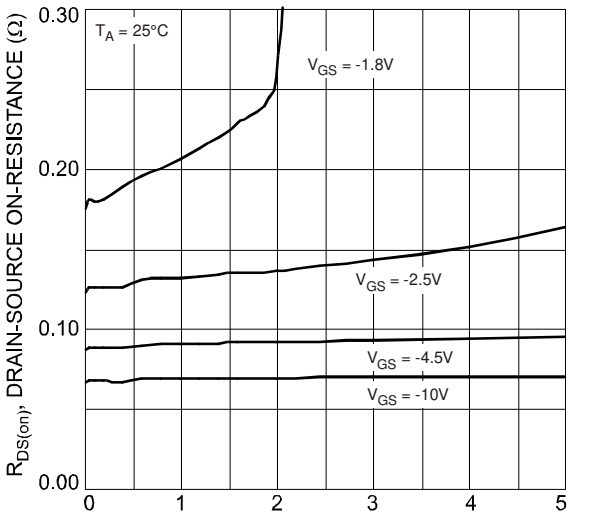

Fig. 4 On-Resistance vs Drain Current and Gate Voltage

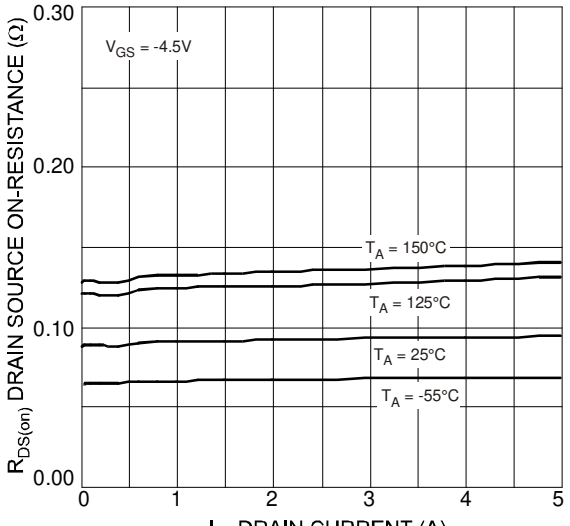

Fig. 5 Drain-Source On-Resistance
Vs. Drain Current and Temperature

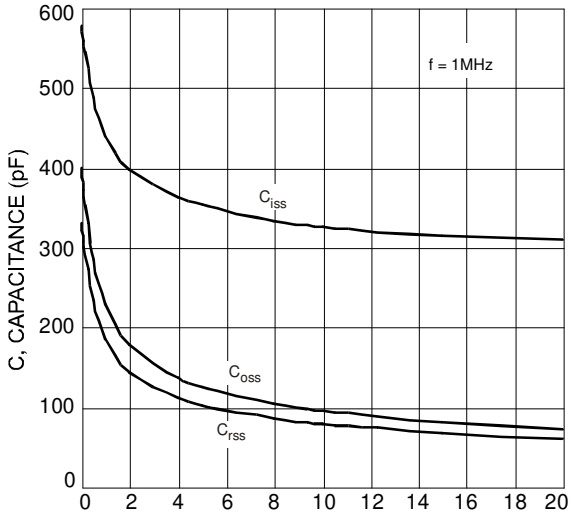

Fig. 6: Typical Capacitance

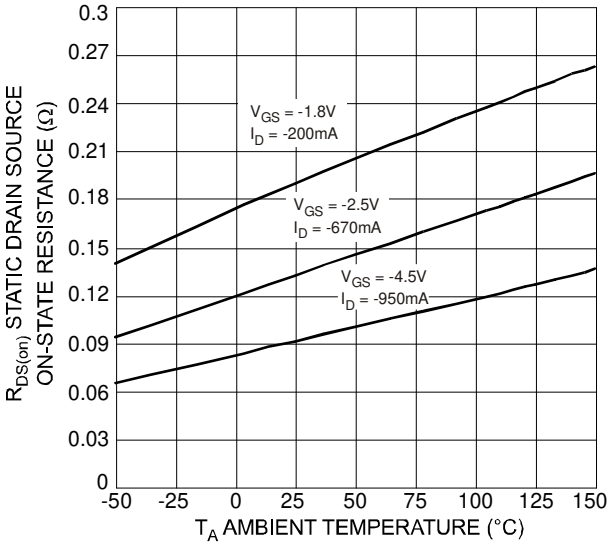

Fig. 7 Static Drain-Source On-State Resistance
vs Ambient Temperature

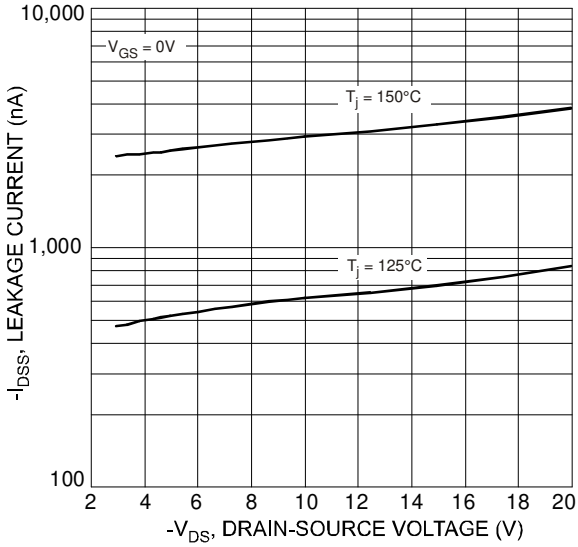

Fig. 8 Drain-Source Leakage Current vs Voltage

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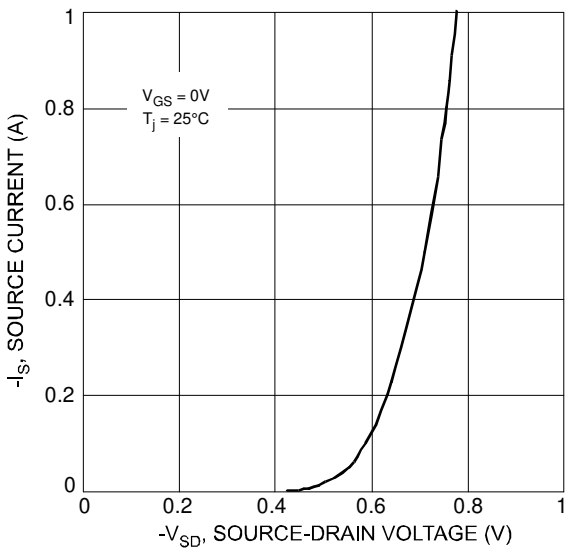
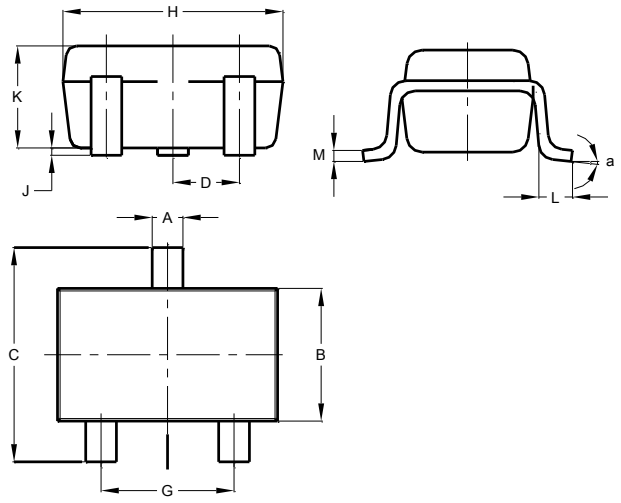


Fig. 9 Diode Forward Voltage vs. Current

Package Outline Dimensions

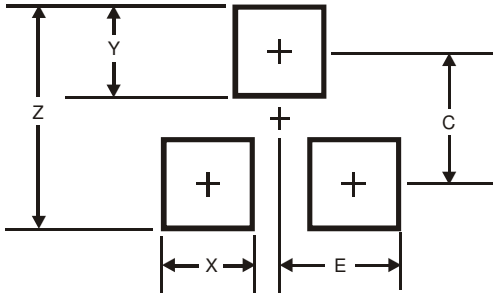
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT323			
Dim	**Min**	**Max**	**Typ**
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.650 BSC		
F	0.375	0.475	0.425
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.00	0.10	0.05
K	0.90	1.00	0.95
L	0.25	0.40	0.30
M	0.10	0.18	0.11
a	8°C		
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

NEW PRODUCT

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