Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_A = +25°C
20V	110mΩ @ V_{GS} = 4.5V	2A
	145mΩ @ V_{GS} = 2.5V	1.7A
	230mΩ @ V_{GS} = 1.8V	1.3A

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **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)**

Description and Applications

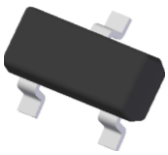
This MOSFET is designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- General Purpose Interfacing Switch
- Power Management Functions
- Boost Application
- Analog Switch

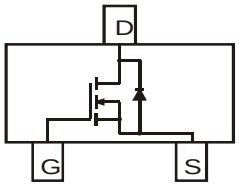
Mechanical Data

- 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
- Weight: 0.008 grams (Approximate)

SOT23



Top View



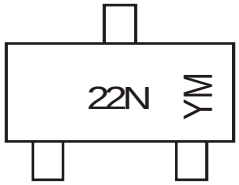
Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2230UQ-7	SOT23	3,000/Tape & Reel
DMN2230UQ-13	SOT23	10,000/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



22N = Marking Code
YM = Date Code Marking
Y = Year (ex: U = 2007)
M = Month (ex: 9 = September)

Date Code Key

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	U	V	W	X	Y	Z	A	B	C	D	E

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	Units
Drain-Source Voltage	V_{DSS}	20	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current (Note 6)	I_D	2.0	A
Pulsed Drain Current (Note 7)	I_{DM}	7	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	P_D	600	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	208	°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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	1.0	V	V_{DS} = V_{CS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	81	110	mΩ	V_{GS} = 4.5V, I_D = 2.5A
			113	145		V_{GS} = 2.5V, I_D = 1.5A
			170	230		V_{GS} = 1.8V, I_D = 1.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	5	—	S	V_{DS} = 5V, I_D = 2.4A
Diode Forward Voltage (Note 8)	V_{SD}	—	0.8	1.1	V	V_{GS} = 0V, I_S = 1.05A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	188	—	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	44	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	30	—	pF	
Total Gate Charge	Q_g	—	2.3	—	nC	V_{DS} = 10V, I_D = 11.6A
Gate-Source Charge	Q_{gs}	—	0.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.5	—	nC	
Turn-On Delay Time	$t_{d(on)}$	—	8	—	ns	V_{DD} = 10V, R_L = 10Ω I_D = 1A, V_{GEN} = 4.5V, R_G = 6Ω
Rise Time	t_r	—	3.8	—		
Turn-Off Delay Time	$t_{d(off)}$	—	19.6	—		
Fall Time	t_f	—	8.3	—		

Notes: 6. Device mounted on FR-4 PCB, or minimum recommended pad layout.
7. Repetitive rating, pulse width limited by junction temperature.
8. Short duration pulse test used to minimize self-heating effect.

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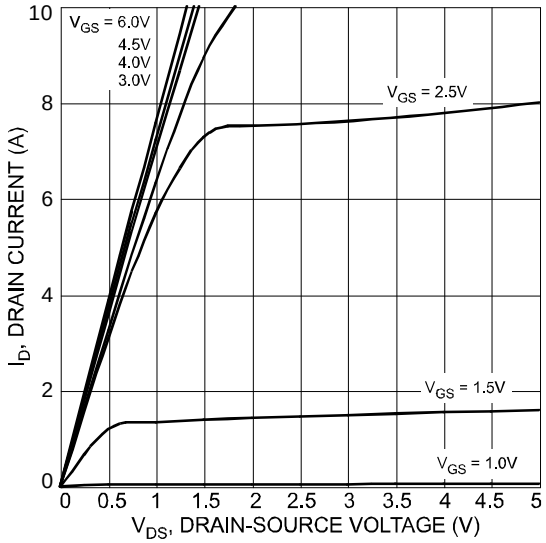

Fig. 1 Typical Output Characteristic

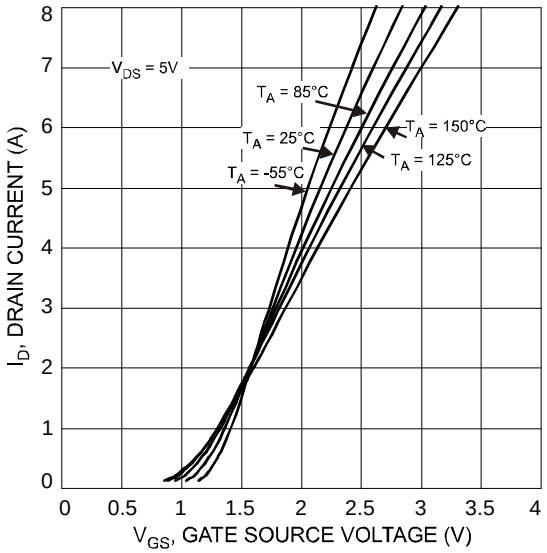

Fig. 2 Typical Transfer Characteristics

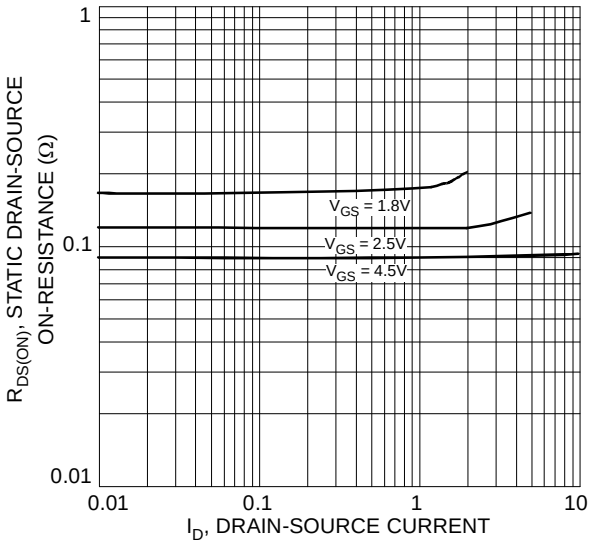

Fig. 3 On-Resistance vs. Drain-Source Current & Gate Voltage

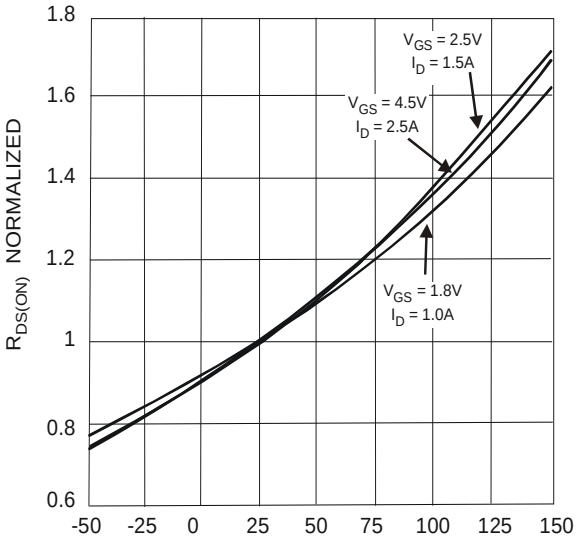

Fig. 4 Normalized Static Drain-Source On-Resistance vs. Ambient Temperature

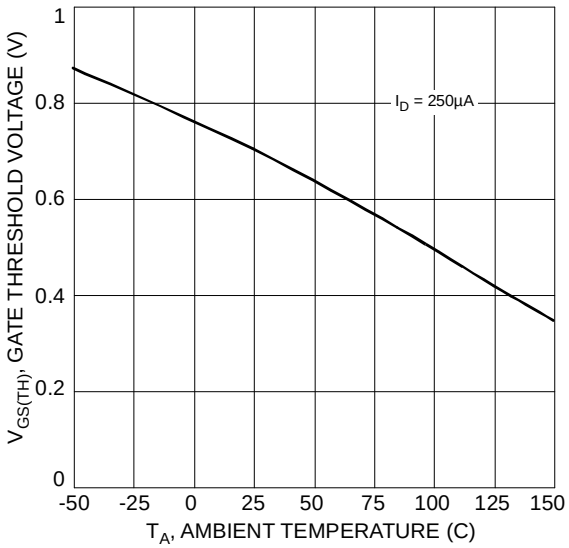

Fig. 5 Gate Threshold Variation with Temperature

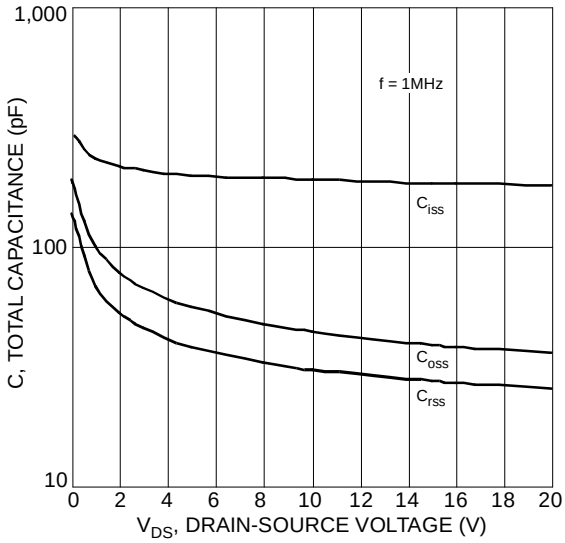

Fig. 6 Typical Total Capacitance

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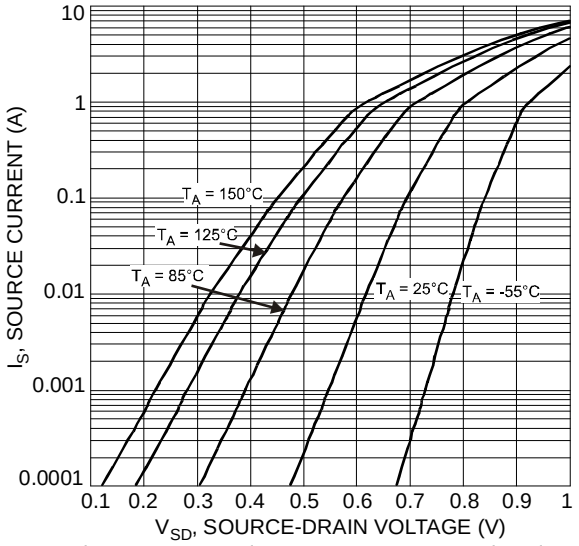


Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

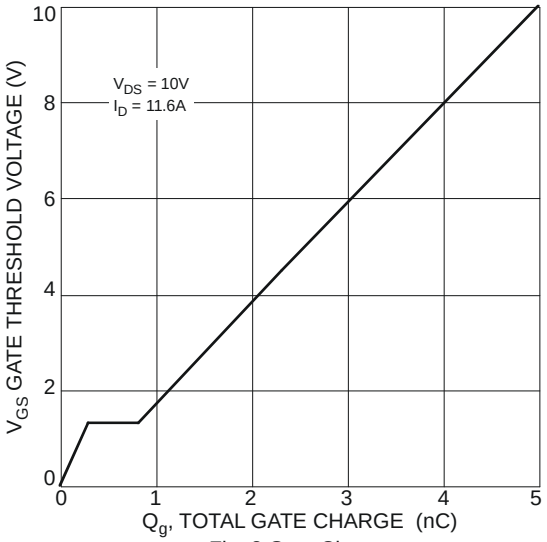


Fig. 8 Gate Charge

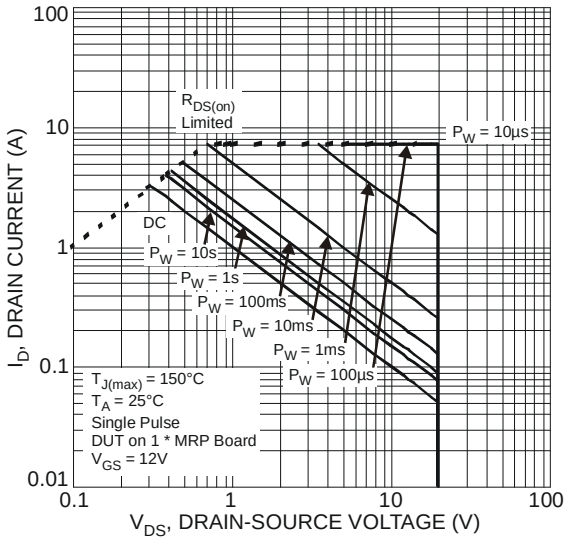
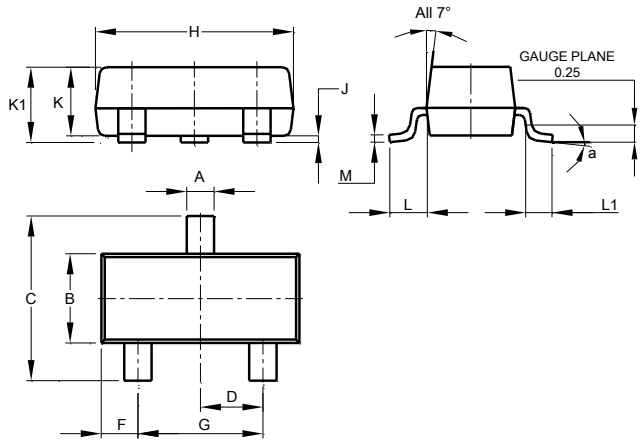


Fig. 9 SOA, Safe Operation Area

Package Outline Dimensions

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



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	8°		
All Dimensions in mm			

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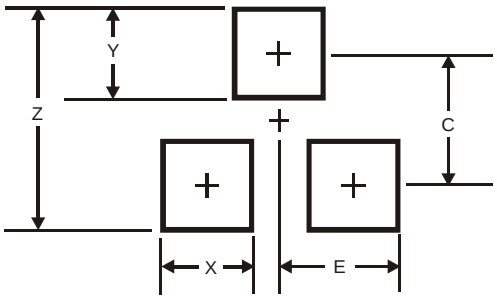
Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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