DMN2300U

20V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT23

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D Max (Note 5)
20V	175mΩ @ V_{GS} = 4.5V	1.40A @ T_A = 25°C
	240mΩ @ V_{GS} = 2.5V	1.20A @ T_A = 25°C
	360mΩ @ V_{GS} = 1.8V	1.0A @ T_A = 25°C

Features and Benefits

- On resistance <200mΩ
- Low Gate Threshold Voltage
- Fast Switching Speed
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **ESD Protected Gate 2kV**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

This MOSFET has been 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.

- Load switch

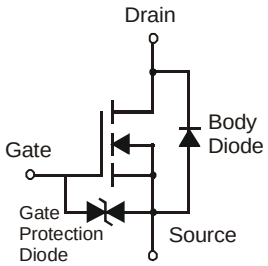
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin
- Weight: 0.08 grams (approximate)

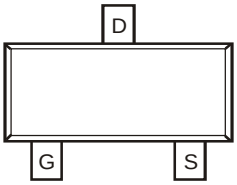
ESD PROTECTED TO 2kV

SOT23

Top View



Equivalent Circuit



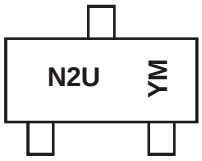
Top View

Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN2300U-7	N2U	7	8	3000

Notes:
1. No purposefully added lead
2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



N2U = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: Y = 2011)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	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

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}	±8	V
Continuous Drain Current	Steady State	T_A = 25°C (Note 5) T_A = 85°C (Note 5) T_A = 25°C (Note 4)	I_D	1.40 1.01 1.24	A
Pulsed Drain Current (Note 6)			I_{DM}	11	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	P_D	0.43	W
	(Note 5)		0.55	W
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	288	°C/W
	(Note 5)		228	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
5. Device mounted on 25mm X 25mm square copper plate with FR-4 substrate PC board, 2oz copper
6. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

Thermal Characteristics

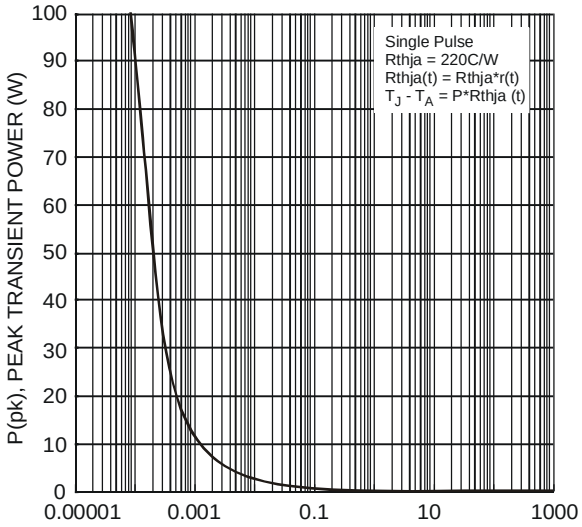


Fig. 1 Single Maximum Power Dissipation

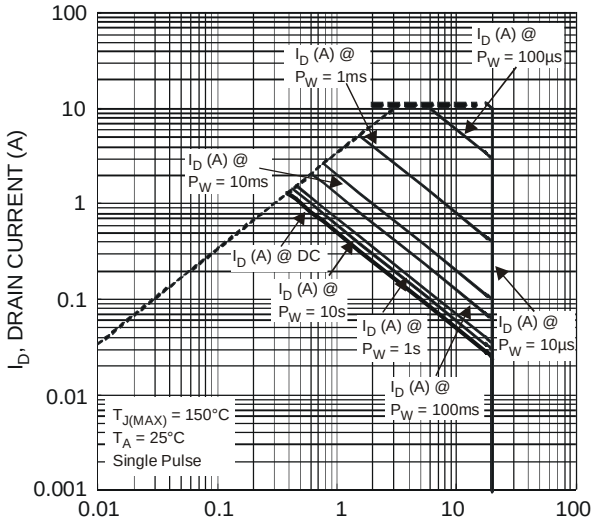


Fig. 2 SOA, Safe Operation Area

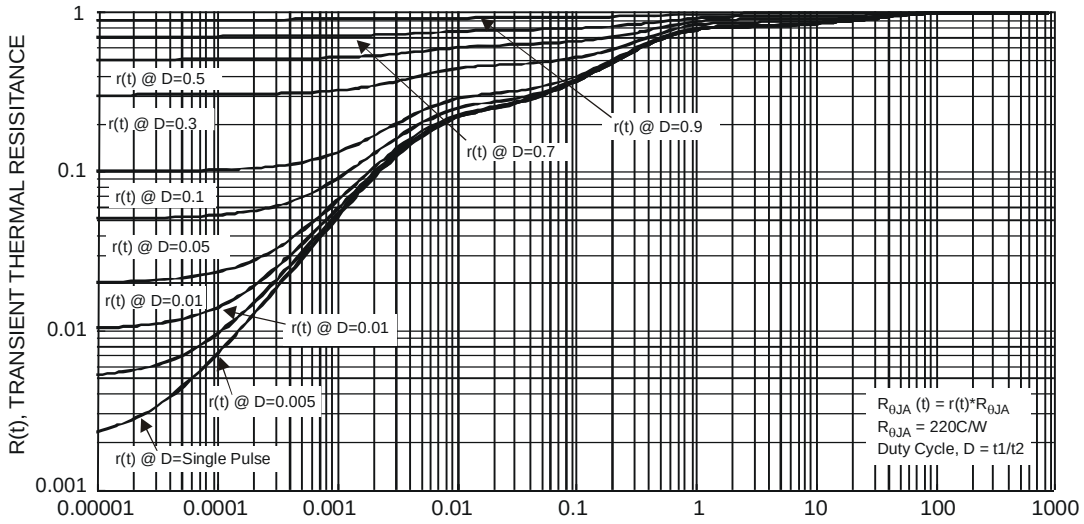


Fig. 3 Transient Thermal Resistance

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 = 10μA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	10	μA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	-	0.95	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-		175	mΩ	V_{GS} = 4.5V, I_D = 300mA
				240		V_{GS} = 2.5V, I_D = 250mA
				360		V_{GS} = 1.8V, I_D = 100mA
Forward Transfer Admittance	$\|Y_{fs}\|$	40	-	-	mS	V_{DS} = 3V, I_D = 30mA
Diode Forward Voltage	V_{SD}	-	0.7	1.2	V	V_{GS} = 0V, I_S = 300mA
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	64.3	-	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	6.1	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	4.5	-	pF	
Gate Resistance	R_g	-	70	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	-	1.6	-	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A
Gate-Source Charge	Q_{gs}	-	0.2	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.2	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	3.5	-	ns	V_{DS} = 10V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω
Turn-On Rise Time	t_r	-	2.8	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	38	-	ns	
Turn-Off Fall Time	t_f	-	13	-	ns	

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

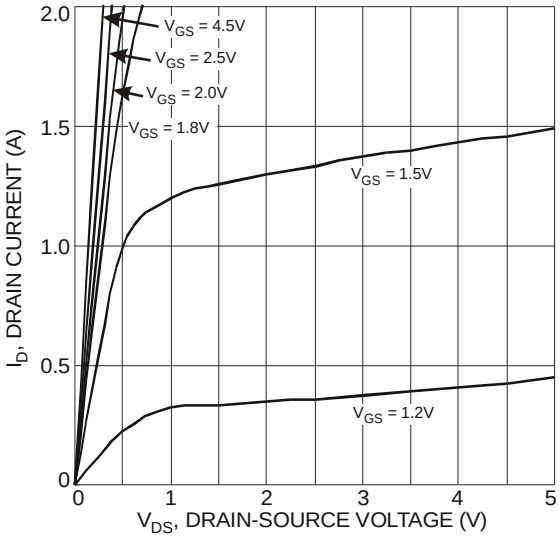


Fig. 4 Typical Output Characteristic

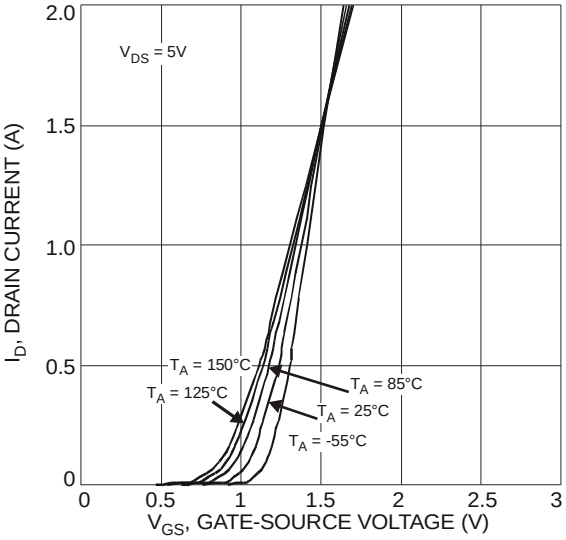


Fig. 5 Typical Transfer Characteristic

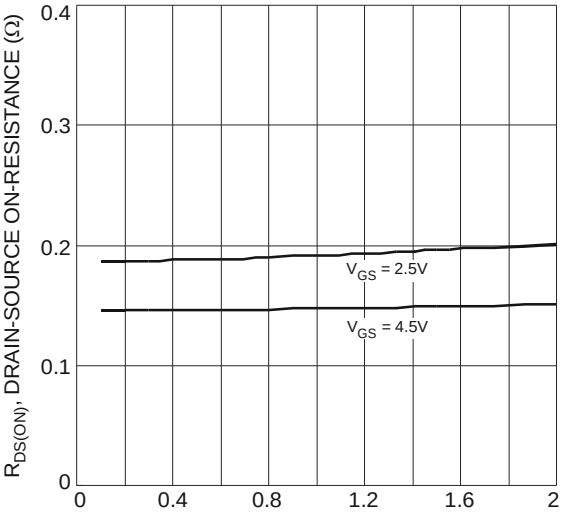


Fig. 6 Typical On-Resistance
vs. Drain Current and Gate Voltage

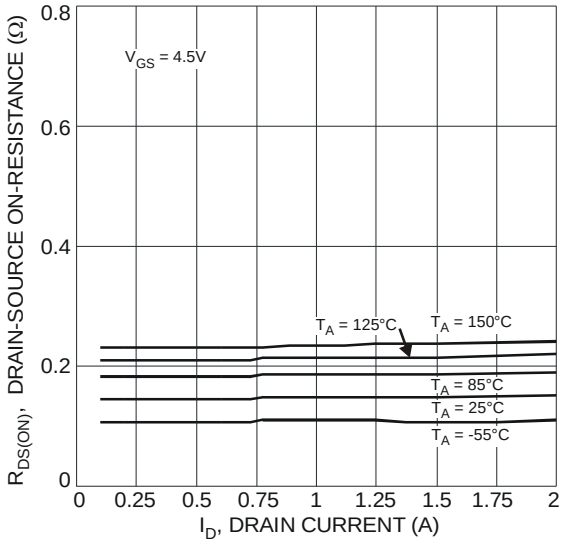


Fig. 7 Typical On-Resistance
vs. Drain Current and Temperature

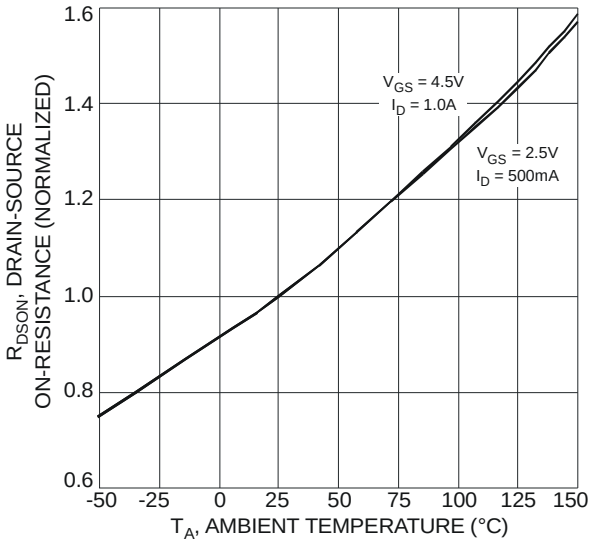


Fig. 8 On-Resistance Variation with Temperature

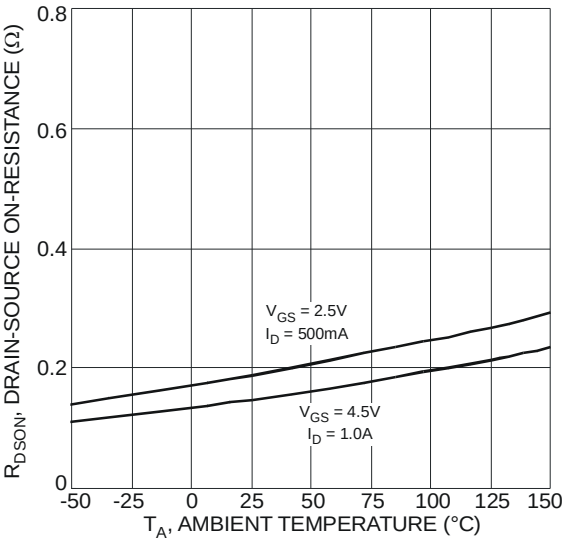


Fig. 9 On-Resistance Variation with Temperature

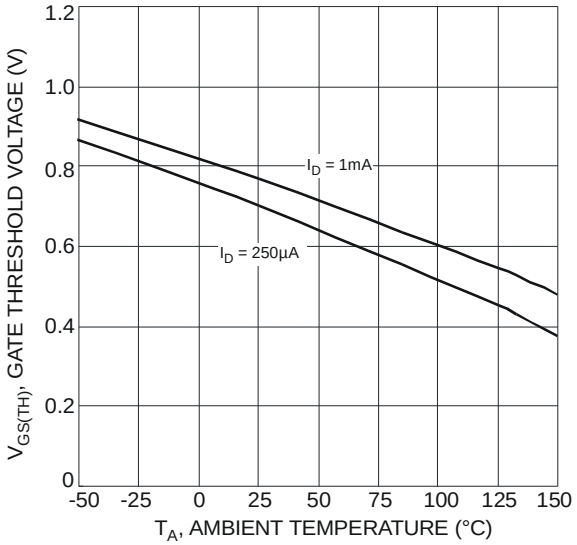


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

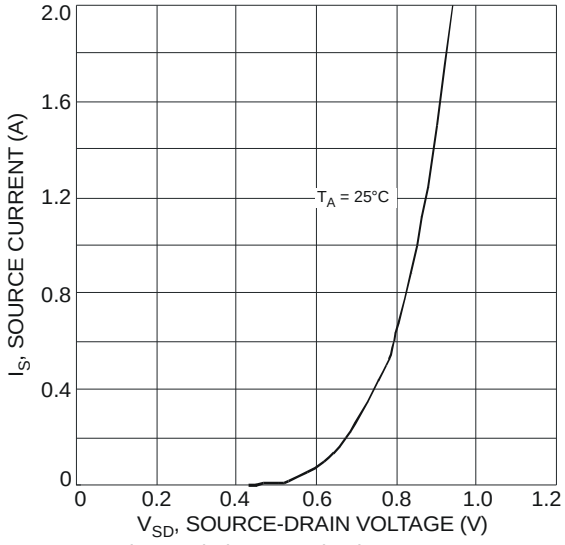


Fig. 11 Diode Forward Voltage vs. Current

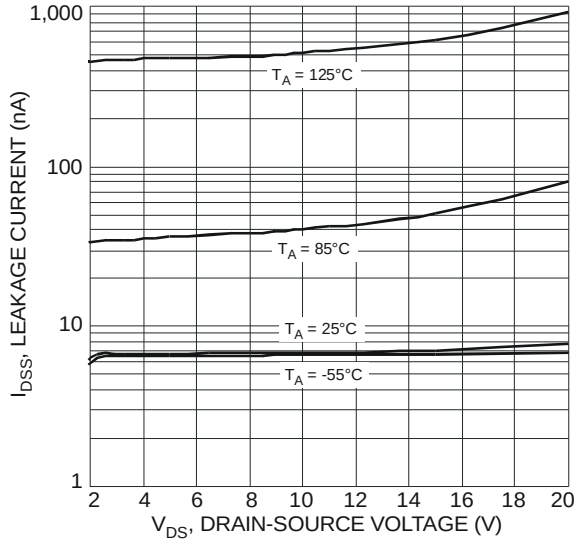


Fig. 12 Typical Leakage Current
vs. Drain-Source Voltage

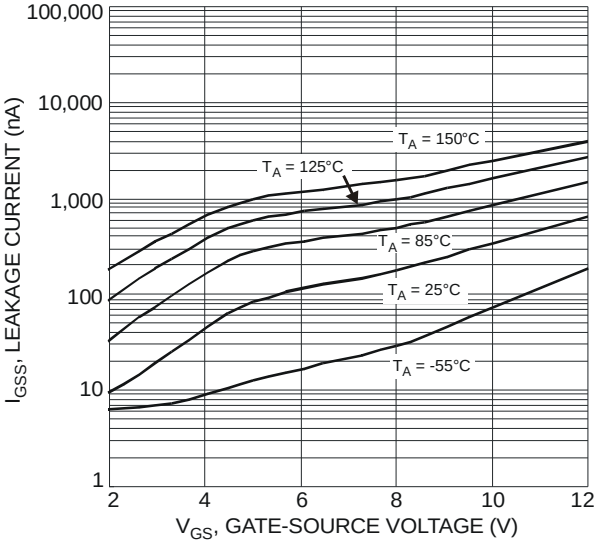


Fig.13 Leakage Current vs. Gate-Source Voltage

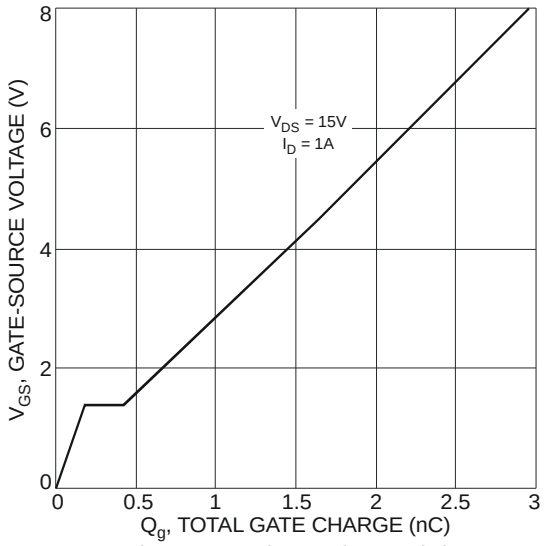
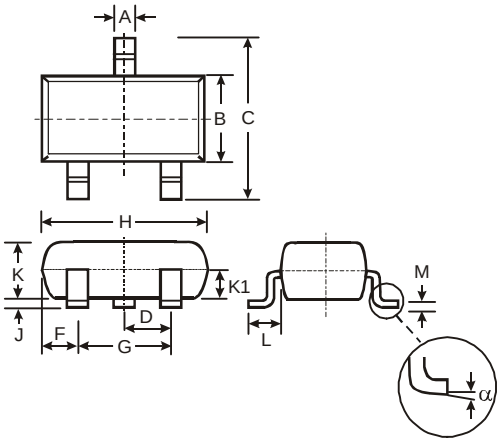


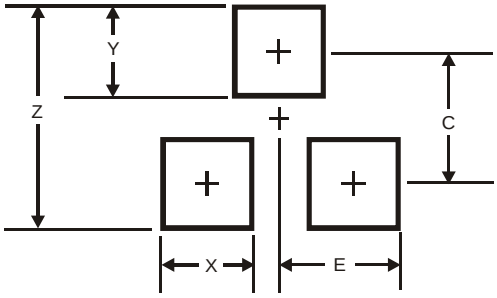
Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



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

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