

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = +25^\circ\text{C}$
30V	1.5Ω @ $V_{GS} = 4.5\text{V}$	0.22A
	2.0Ω @ $V_{GS} = 2.5\text{V}$	
	3.0Ω @ $V_{GS} = 1.8\text{V}$	
	4.5Ω @ $V_{GS} = 1.5\text{V}$	

Description

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.

Applications

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

Features and Benefits

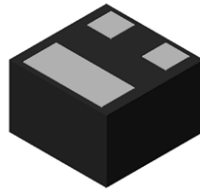
- Low Package Profile, 0.42mm Maximum Package Height
- 0.62mm x 0.62mm Package Footprint
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V max
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

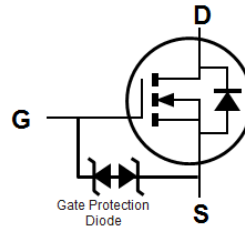
- Case: X2-DFN0606-3
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe
Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.001 grams (approximate)



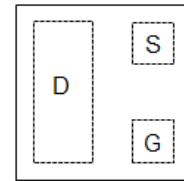
ESD PROTECTED



Bottom View



Equivalent Circuit

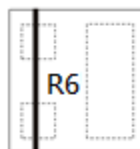

 Top View
 Package Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN31D5UFZ-7B	X2-DFN0606-3	10K/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



R6 = Product Type Marking Code

 Top View
 Bar Denotes Gate
 and Source Side

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5)	Steady State	T _A = +25°C T _A = +85°C	I _D	220 150	mA
Pulsed Drain Current (Note 6)			I _{DM}	500	mA

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	Steady state	P _D	393	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	318	°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}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	—	—	100	nA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	0.4	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	—	1.5	Ω	V _{GS} = 4.5V, I _D = 100mA
		—	—	2.0		V _{GS} = 2.5V, I _D = 50mA
		—	—	3.0		V _{GS} = 1.8V, I _D = 20mA
		—	—	4.5		V _{GS} = 1.5V, I _D = 10mA
		—	2.8	—		V _{GS} = 1.2V, I _D = 1mA
Diode Forward Voltage	V _{SD}	—	0.75	1.0	V	V _{GS} = 0V, I _S = 10mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	22.2	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	2.9	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	2.2	—	pF	
Total Gate Charge	Q _g	—	0.35	—	nC	V _{GS} = 4.5V, V _{DS} = 15V, I _D = 200mA
Gate-Source Charge	Q _{gs}	—	0.05	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.02	—	nC	
Turn-On Delay Time	t _{D(on)}	—	3.1	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _G = 6Ω, I _D = 200mA
Turn-On Rise Time	t _r	—	2.0	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	20	—	ns	
Turn-Off Fall Time	t _f	—	6.9	—	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
 - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

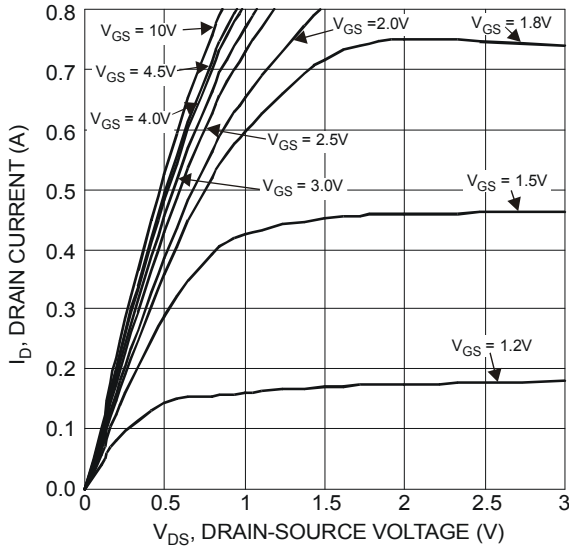


Figure 1 Typical Output Characteristics

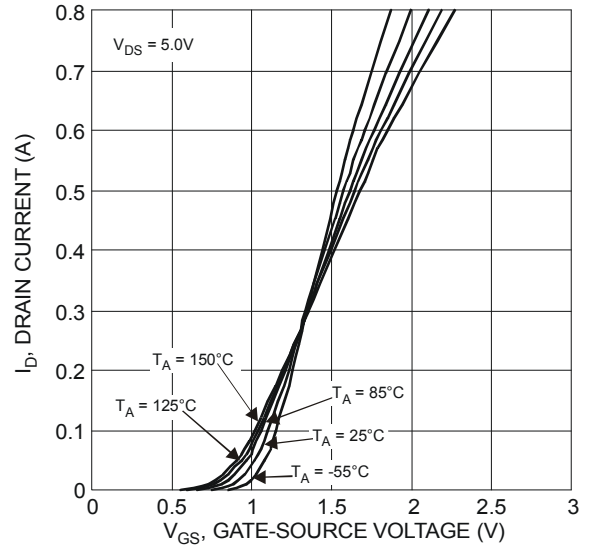


Figure 2 Typical Transfer Characteristics

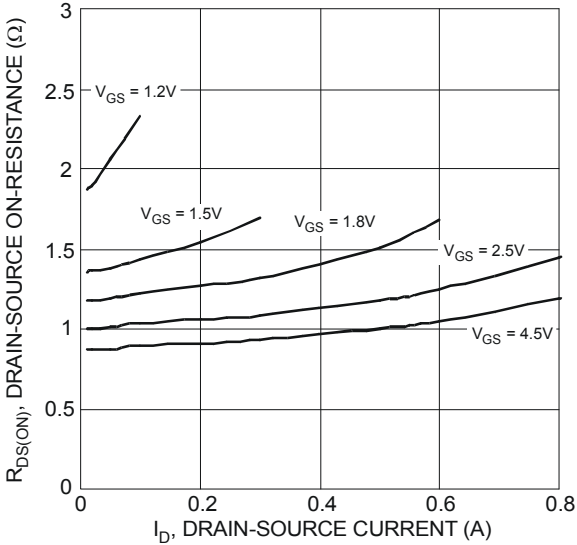


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

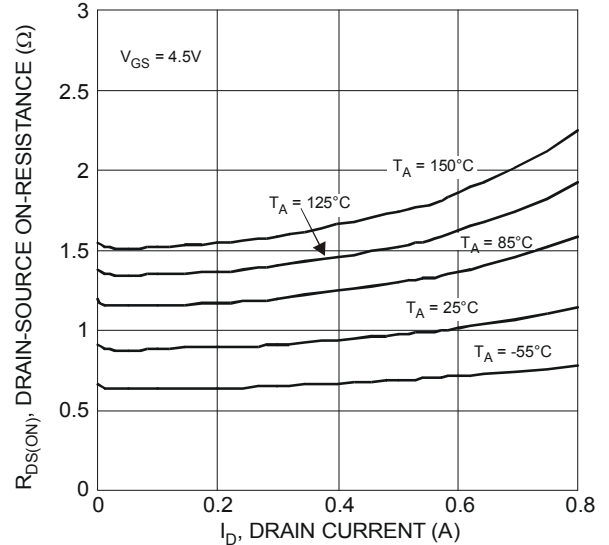


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

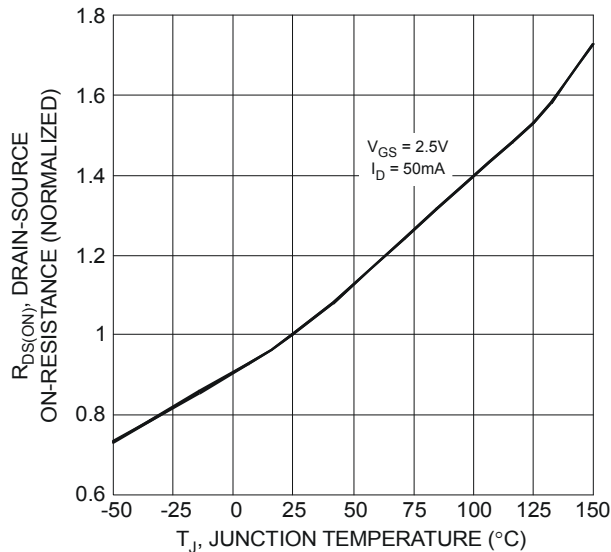


Figure 5 On-Resistance Variation with Temperature

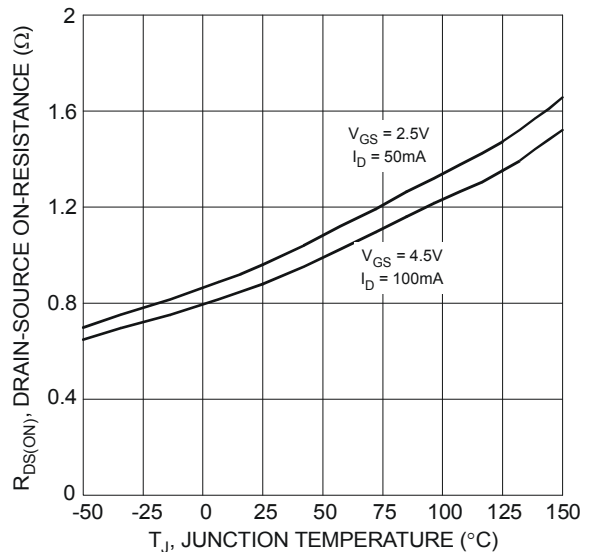


Figure 6 On-Resistance Variation with Temperature

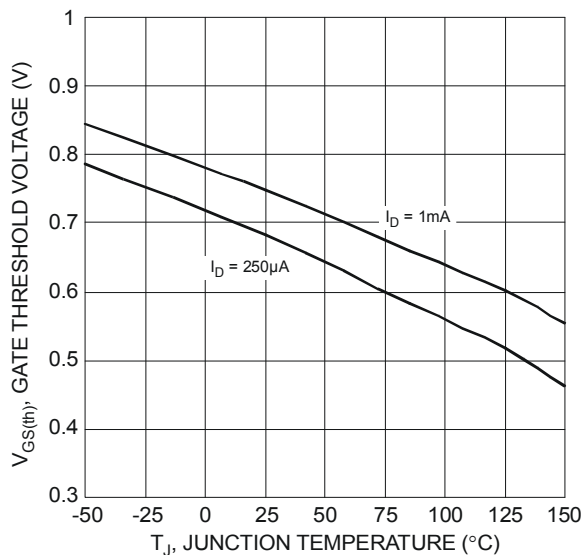


Figure 7 Gate Threshold Variation vs. Ambient Temperature

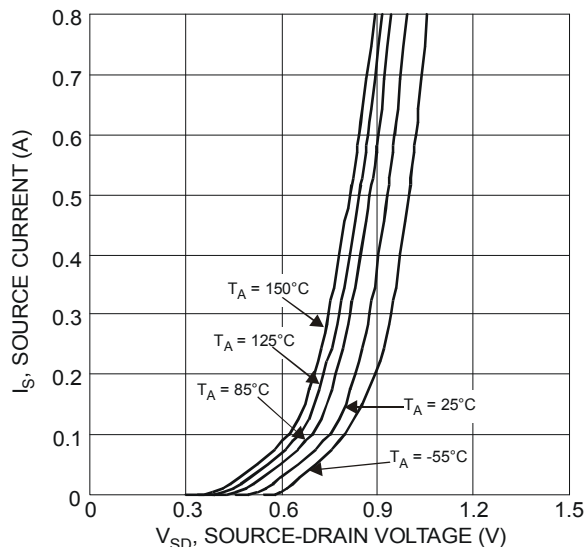


Figure 8 Diode Forward Voltage vs. Current

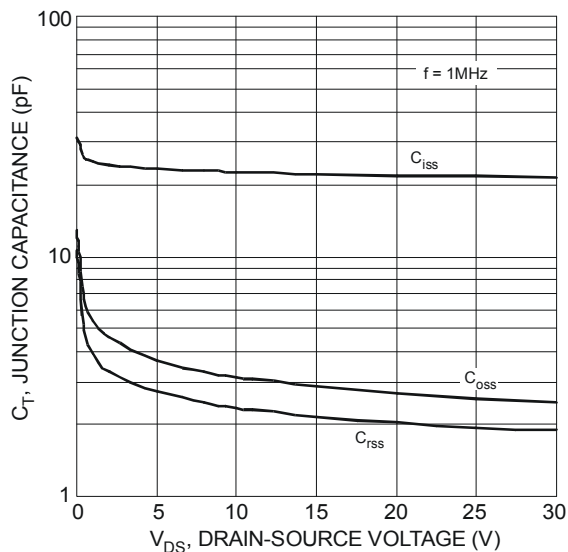


Figure 9 Typical Junction Capacitance

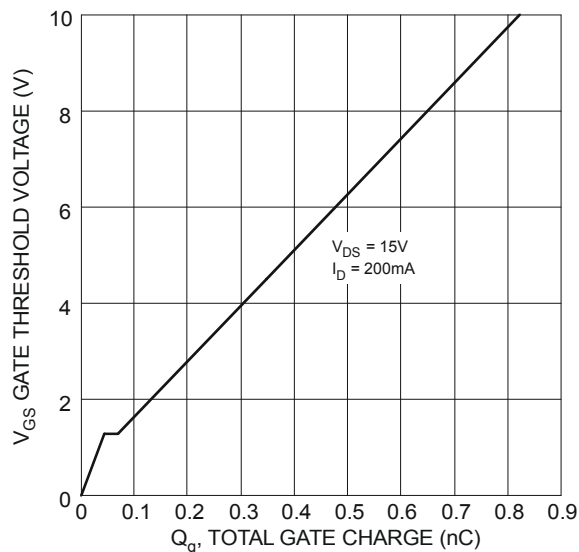


Figure 10 Gate Charge

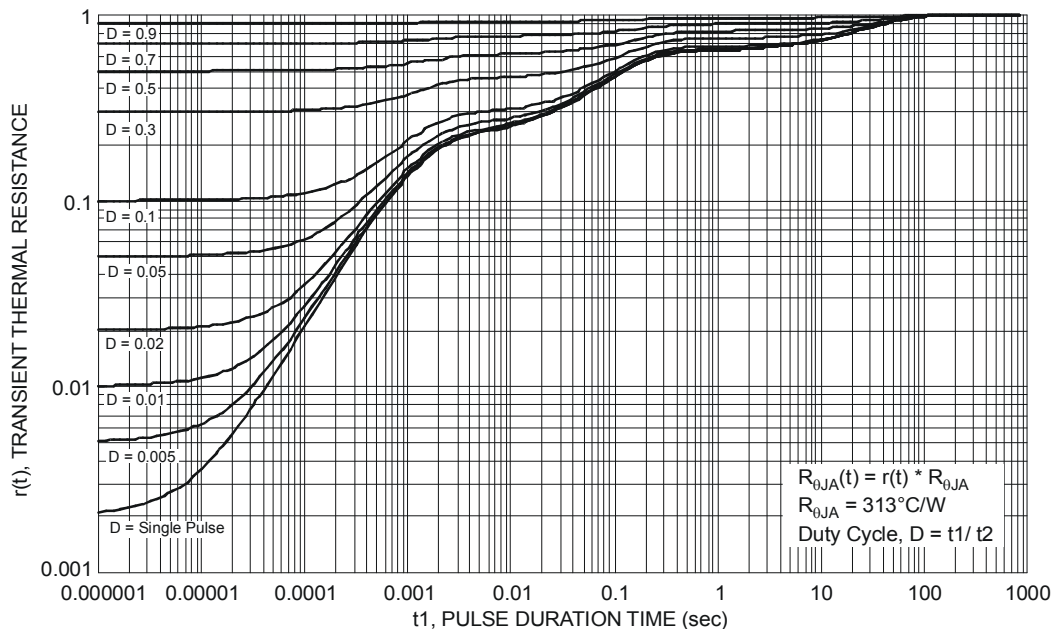
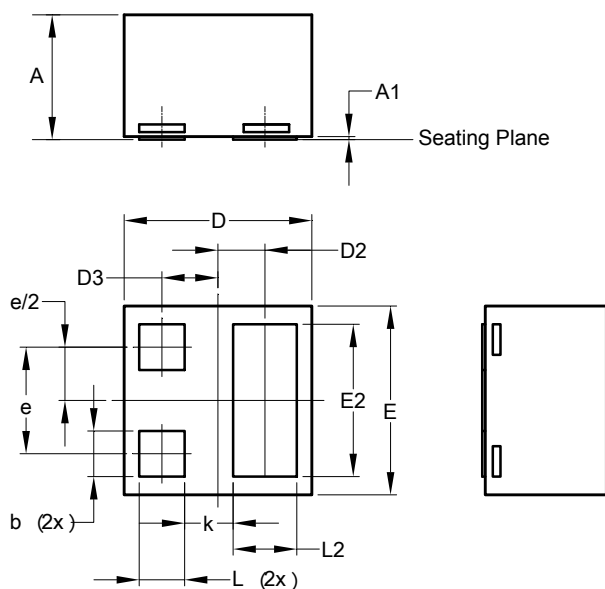


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

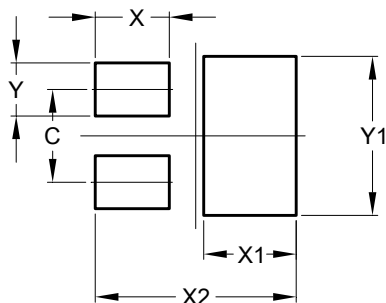
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



X2-DFN0606-3			
Dim	Min	Max	Typ
A	0.36	0.42	0.39
A1	0	0.05	0.02
b	0.10	0.20	0.15
D	0.57	0.67	0.62
D2	0.155 BSC		
D3	0.185 BSC		
E	0.57	0.67	0.62
E2	0.40	0.60	0.50
e	0.35 BSC		
k	0.16 REF		
L	0.09	0.21	0.15
L2	0.11	0.31	0.21
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)
C	0.350
X	0.280
X1	0.350
X2	0.760
Y	0.200
Y1	0.600

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