25V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = +25°C
-25V	10Ω @ V_{GS} = -4.5V	-166mA
	13Ω @ V_{GS} = -2.7V	-138mA

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

- Load Switch
- Portable Applications
- Power Management Functions

Features

- 0.4mm Ultra Low Profile Package for Thin Application
- 0.48mm^2 Package Footprint, 16 Times Smaller than SOT23
- Low $V_{GS(th)}$, Can be Driven Directly From a Battery
- Low $R_{DS(on)}$
- ESD Protected Gate (>6kV Human Body Mode)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

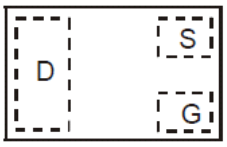
- Case: X2-DFN0806-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.00043 grams (approximate)



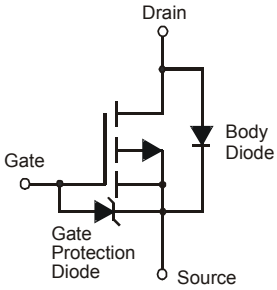
X2-DFN0806-3



Bottom View



Top View
Package Pin Configuration



Equivalent Circuit

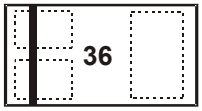
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP213DUFA-7B	X2-DFN0806-3	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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

DMN213DUFA-7B



Top View
Bar Denotes Gate and Source Side

36 = Product Type Marking Code

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-25	V
Gate-Source Voltage			V_{GSS}	-8	
Continuous Drain Current	V_{GS} = 4.5V	(Note 6)	I_D	-166	mA
		T_A = +70°C (Note 6)		-125	
		(Note 5)	I_D	-145	mA
Pulsed Drain Current		(Note 7)	I_{DM}	-500	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	360	mW
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	353	°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}	-25	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	-100	nA	V_{GS} = -8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.65	-0.9	-1.5	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	—	10	Ω	V_{GS} = -4.5V, I_D = -0.2A
		—	—	13		V_{GS} = -2.7V, I_D = -0.05A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	189	—	S	V_{DS} = -5V, I_D = -0.2A
Diode Forward Voltage	V_{SD}	—	—	-1.5	V	V_{GS} = 0V, I_S = -0.2A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	27.2	—	pF	V_{DS} = -10V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	6.1	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	1.7	—	pF	
Total Gate Charge	Q_g	—	0.35	—	nC	V_{DS} = -5V, I_D = -0.2A, V_{GS} = -4.5V
Gate-Source Charge	Q_{gs}	—	0.08	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.06	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	4.5	—	ns	V_{DS} = -6V, V_{GS} = -4.5V, I_D = -0.2A, R_G = 50Ω
Turn-On Rise Time	t_r	—	2.3	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	24.1	—	ns	
Turn-Off Fall Time	t_f	—	11	—	ns	

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
7 .Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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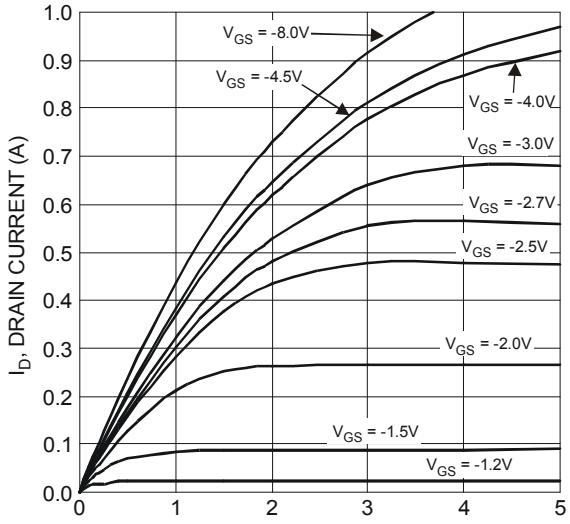

Figure 1 Typical Output Characteristics

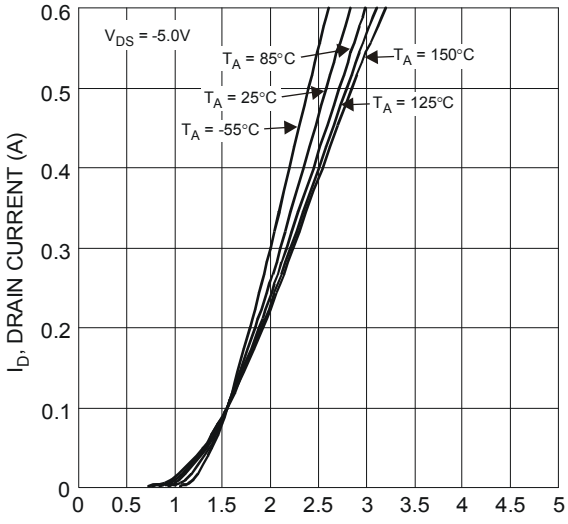

Figure 2 Typical Transfer Characteristics

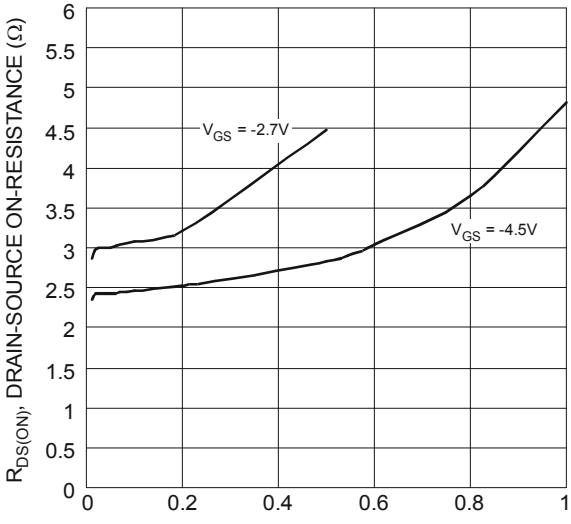

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

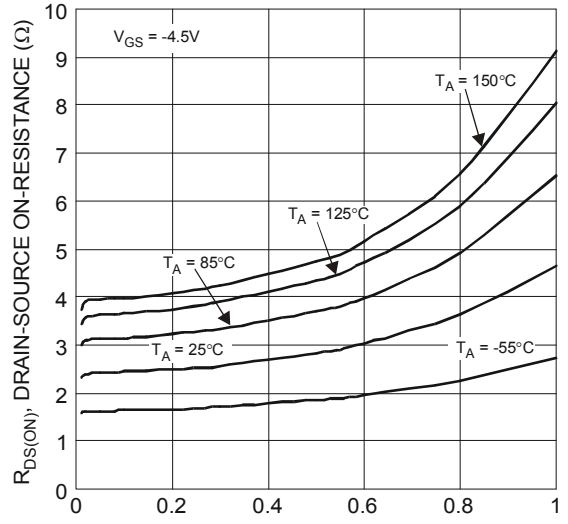

Figure 4 Typical On-Resistance vs. Drain Current and Temperature

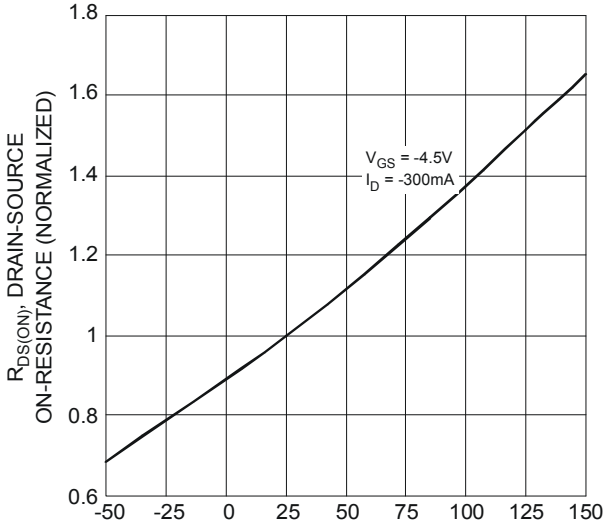

Figure 5 On-Resistance Variation with Temperature

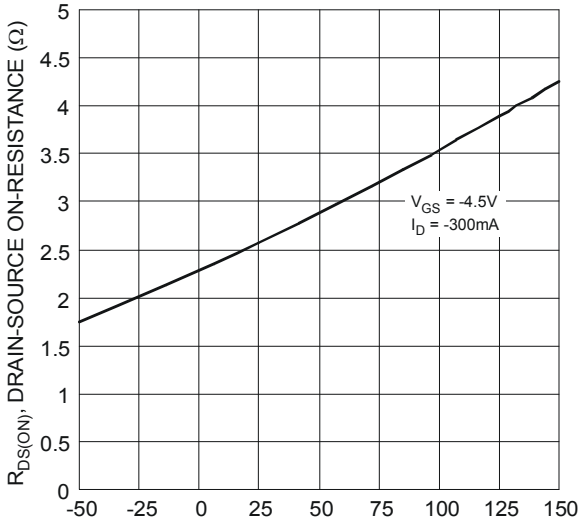

Figure 6 On-Resistance Variation with Temperature

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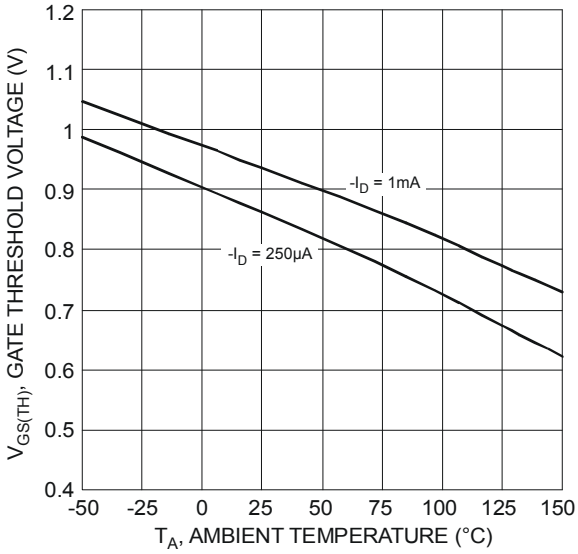

Figure 7 Gate Threshold Variation vs. Ambient Temperature

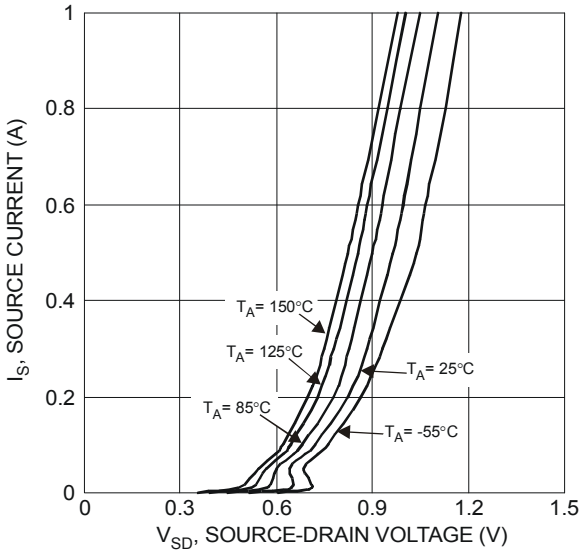

Figure 8 Diode Forward Voltage vs. Current

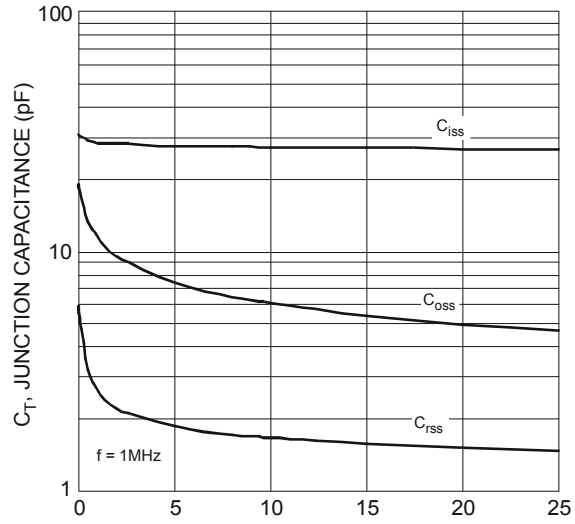

Figure 9 Typical Junction Capacitance

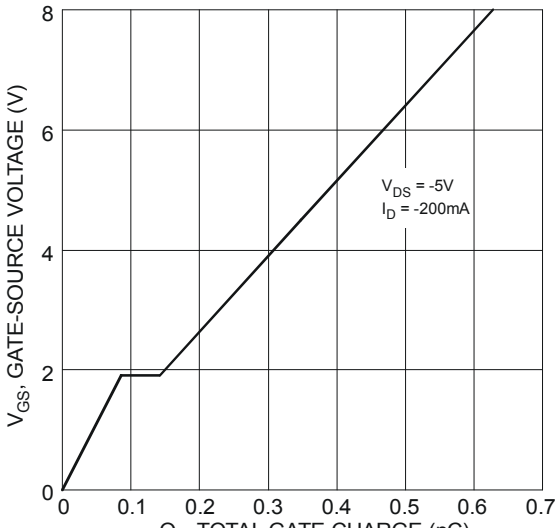

Figure 10 Gate-Charge Characteristics

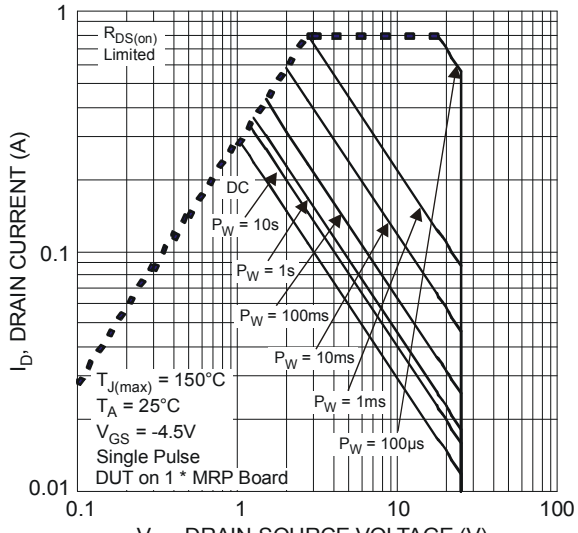

Figure 11 SOA, Safe Operation Area

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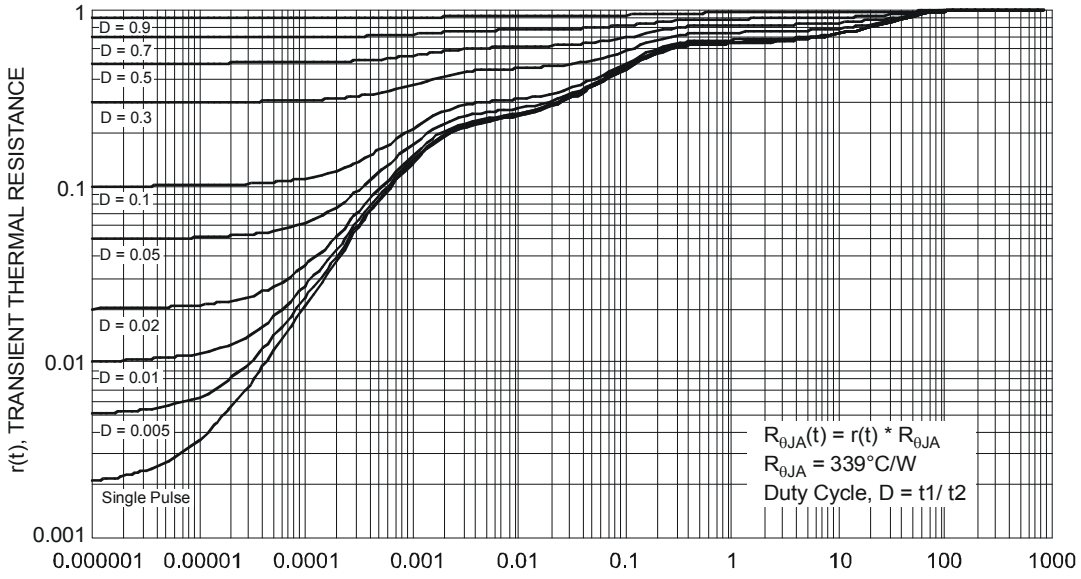
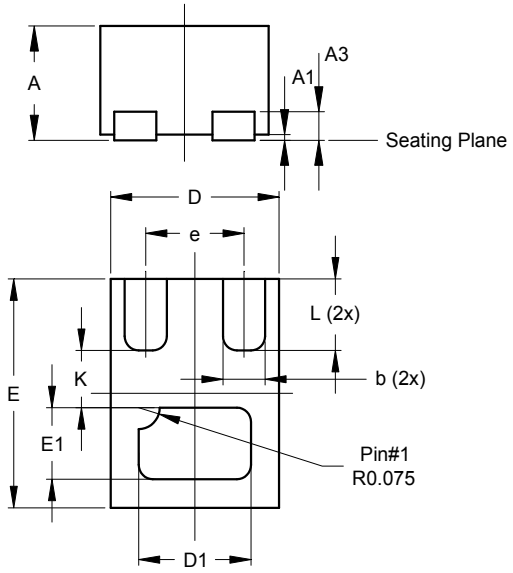


Figure 12 Transient Thermal Resistance

Package Outline Dimensions

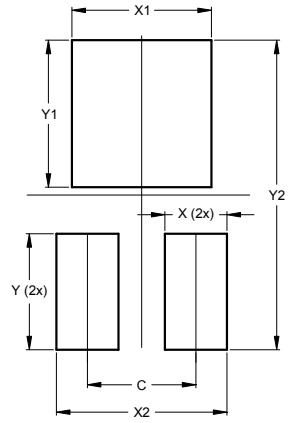
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



X2-DFN0806-3			
Dim	**Min**	**Max**	**Typ**
A	0.375	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.10
b	0.10	0.20	0.15
D	0.55	0.65	0.60
D1	0.35	0.45	0.40
E	0.75	0.85	0.80
E1	0.20	0.30	0.25
e	-	-	0.35
K	-	-	0.20
L	0.20	0.30	0.25
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	0.200
X1	0.450
X2	0.550
Y	0.375
Y1	0.475
Y2	1.000

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