

## Product Summary

$BV_{DSS}$	$R_{DS(on)}$ Max	$I_D$ $T_A = +25^\circ C$
-20V	0.75Ω @ $V_{GS} = -4.5V$	-0.99A
	1.05Ω @ $V_{GS} = -2.5V$	-0.83A

## Features and Benefits

- 0.6mm<sup>2</sup> Footprint—Thirteen Times Smaller than SOT23
- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP2900UFBQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

## Description and Applications

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

- Load Switch

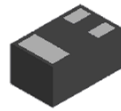
## Mechanical Data

- Package: X1-DFN1006-3
- Package 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)

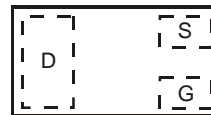


ESD Protected Gate

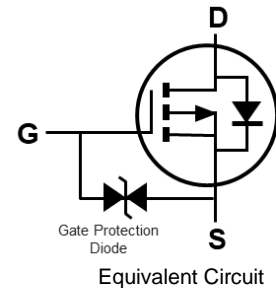
X1-DFN1006-3



Bottom View



Top View  
Internal Schematic



Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Packing
DMP2900UFBQ-7B	X1-DFN1006-3	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

DMP2900UFBQ-7B	<p>Top View Bar Denotes Gate and Source Side</p>	$\bar{B}N$ = Product Type Marking Code

**Maximum Ratings** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	-20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 6$	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-0.99	A
		$T_A = +70^\circ\text{C}$		-0.79	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	-2.6	A

**Thermal Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	0.55	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	229	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	1.11	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	113	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	-100	nA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 2.0$	$\mu\text{A}$	$V_{GS} = \pm 4.5\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	0.4	0.75	$\Omega$	$V_{GS} = -4.5\text{V}, I_D = -430\text{mA}$
		—	0.5	1.05		$V_{GS} = -2.5\text{V}, I_D = -300\text{mA}$
		—	0.67	1.5		$V_{GS} = -1.8\text{V}, I_D = -150\text{mA}$
Diode Forward Voltage	$V_{SD}$	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -150\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	49	—	pF	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	12	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	3.4	—	pF	
Total Gate Charge	$Q_g$	—	0.7	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}, I_D = -250\text{mA}$
Gate-Source Charge	$Q_{gs}$	—	0.1	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	16	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V}, R_g = 10\Omega, R_L = 47\Omega, I_D = -200\text{mA}$
Turn-On Rise Time	$t_R$	—	15	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	213	—	ns	
Turn-Off Fall Time	$t_F$	—	89	—	ns	

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 25mm x 25mm square copper plate.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

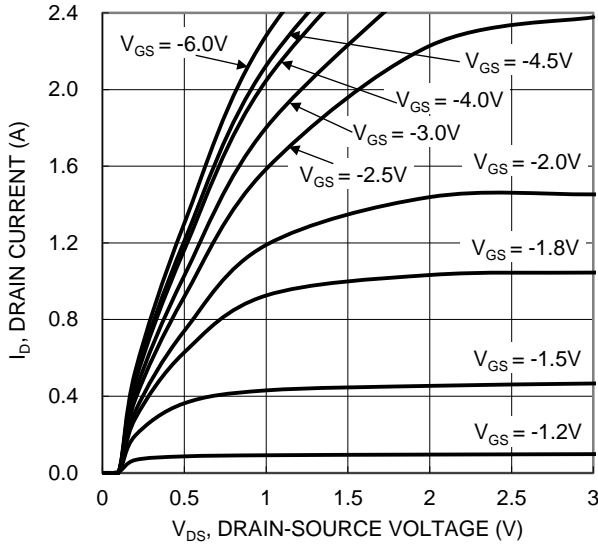


Figure 1. Typical Output Characteristic

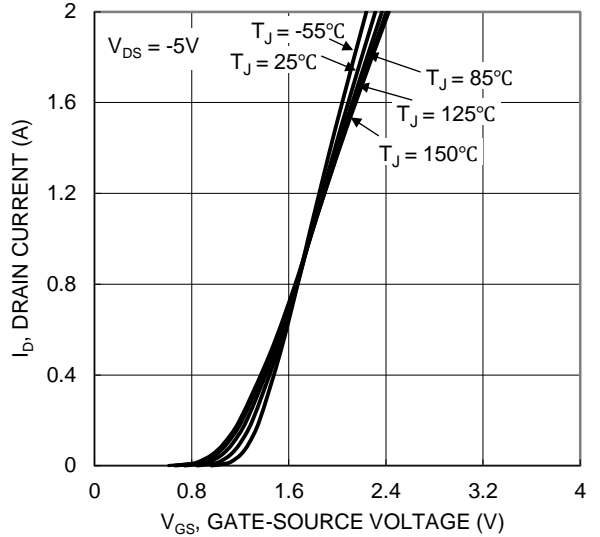


Figure 2. Typical Transfer Characteristic

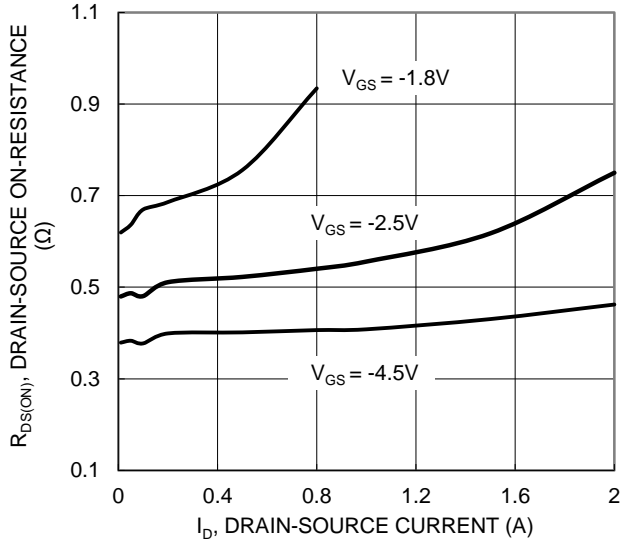


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

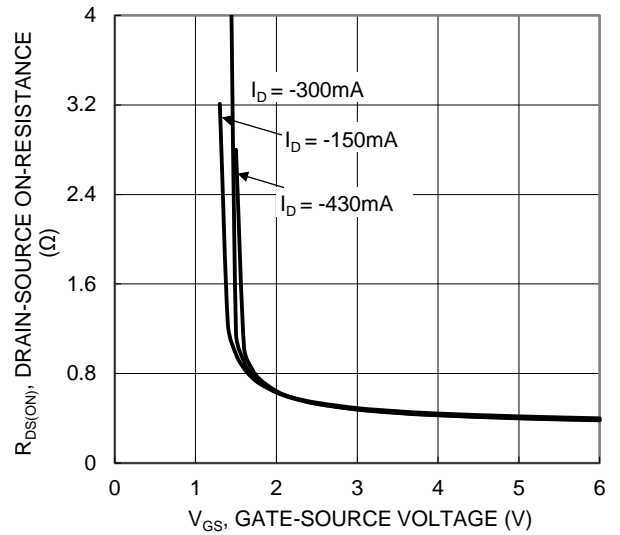


Figure 4. Typical Transfer Characteristic

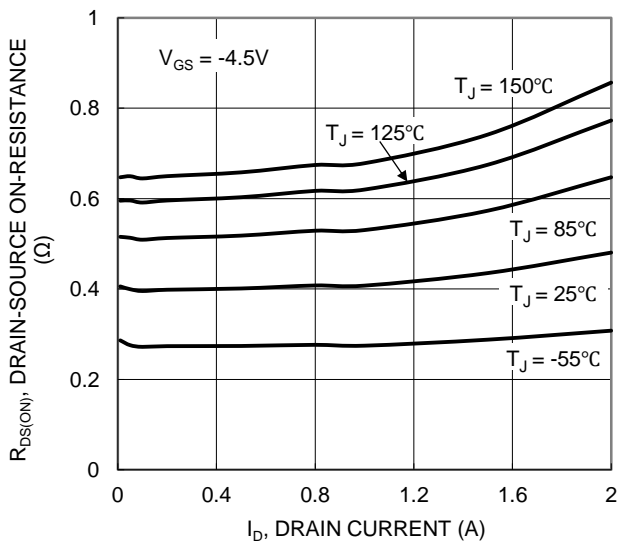


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

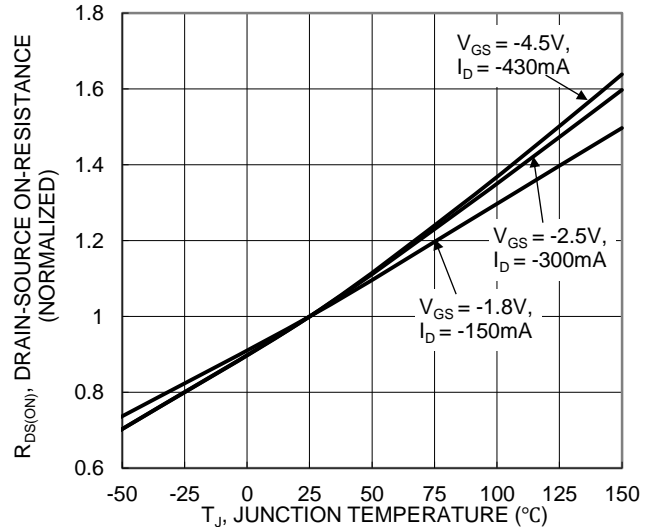


Figure 6. On-Resistance Variation with Temperature

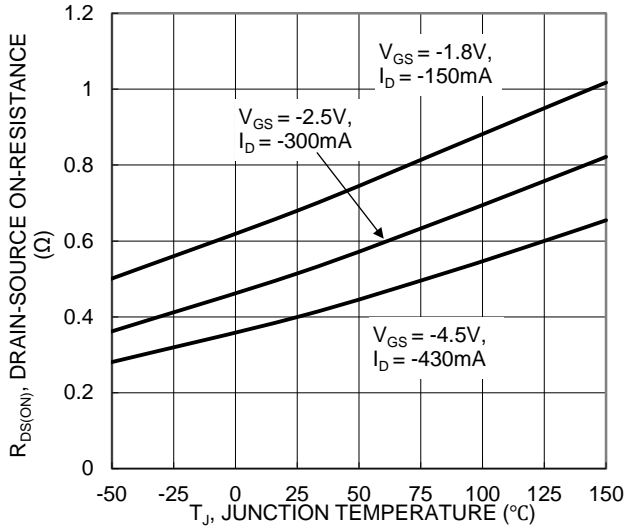


Figure 7. On-Resistance Variation with Temperature

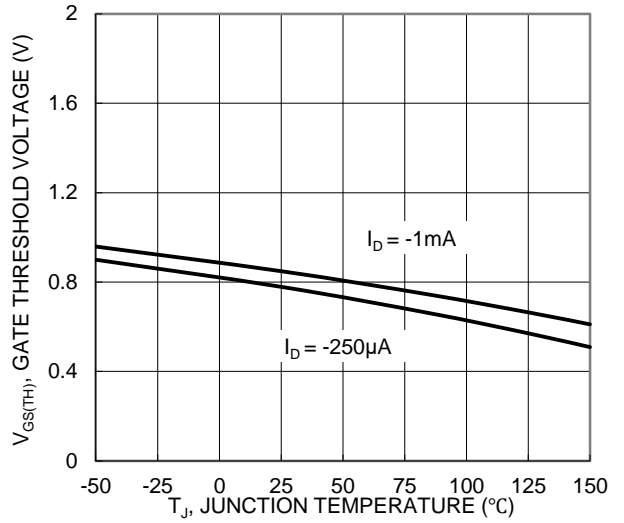


Figure 8. Gate Threshold Variation vs. Junction Temperature

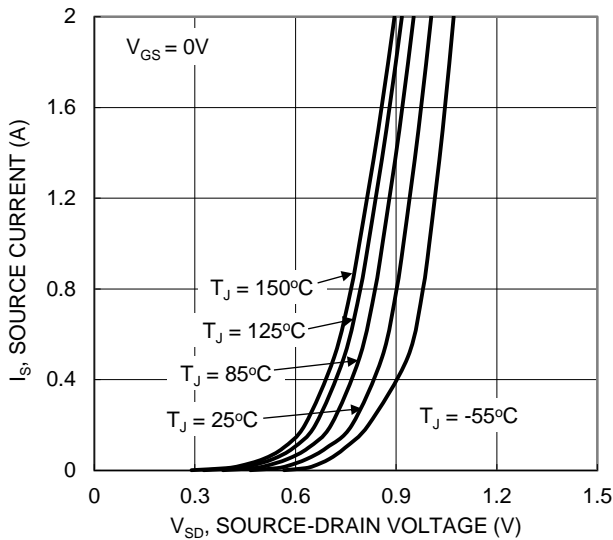


Figure 9. Diode Forward Voltage vs. Current

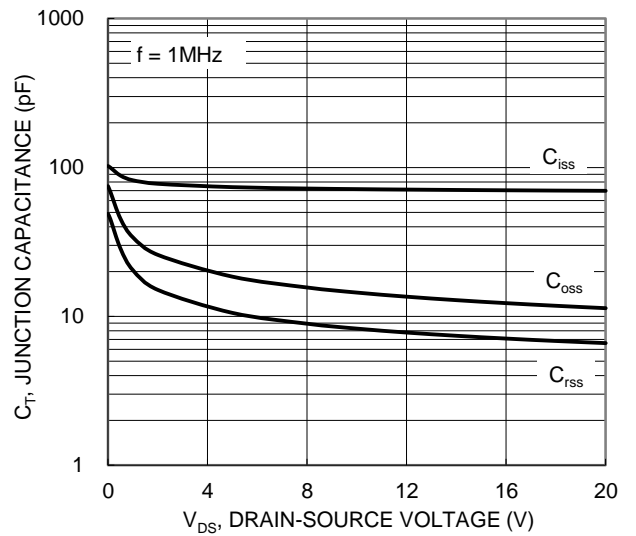


Figure 10. Typical Junction Capacitance

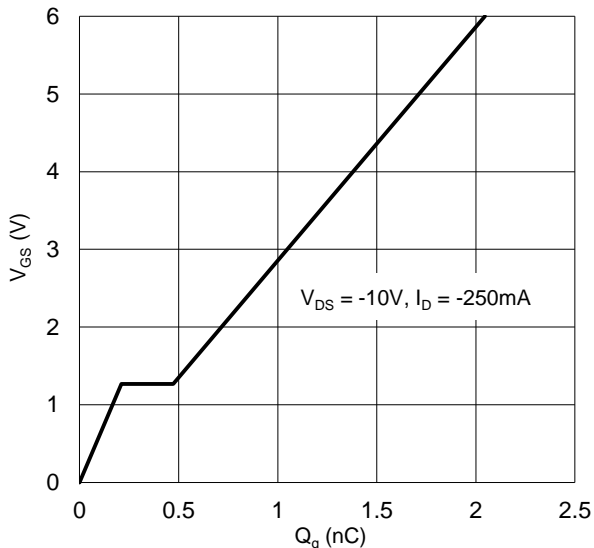


Figure 11. Gate Charge

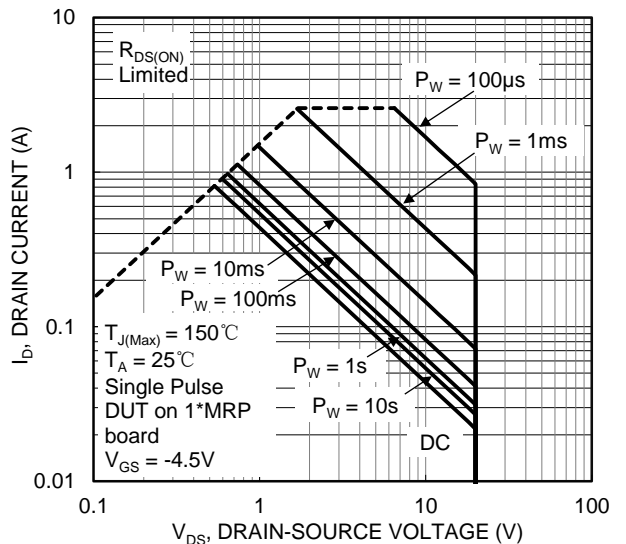


Figure 12. SOA, Safe Operation Area

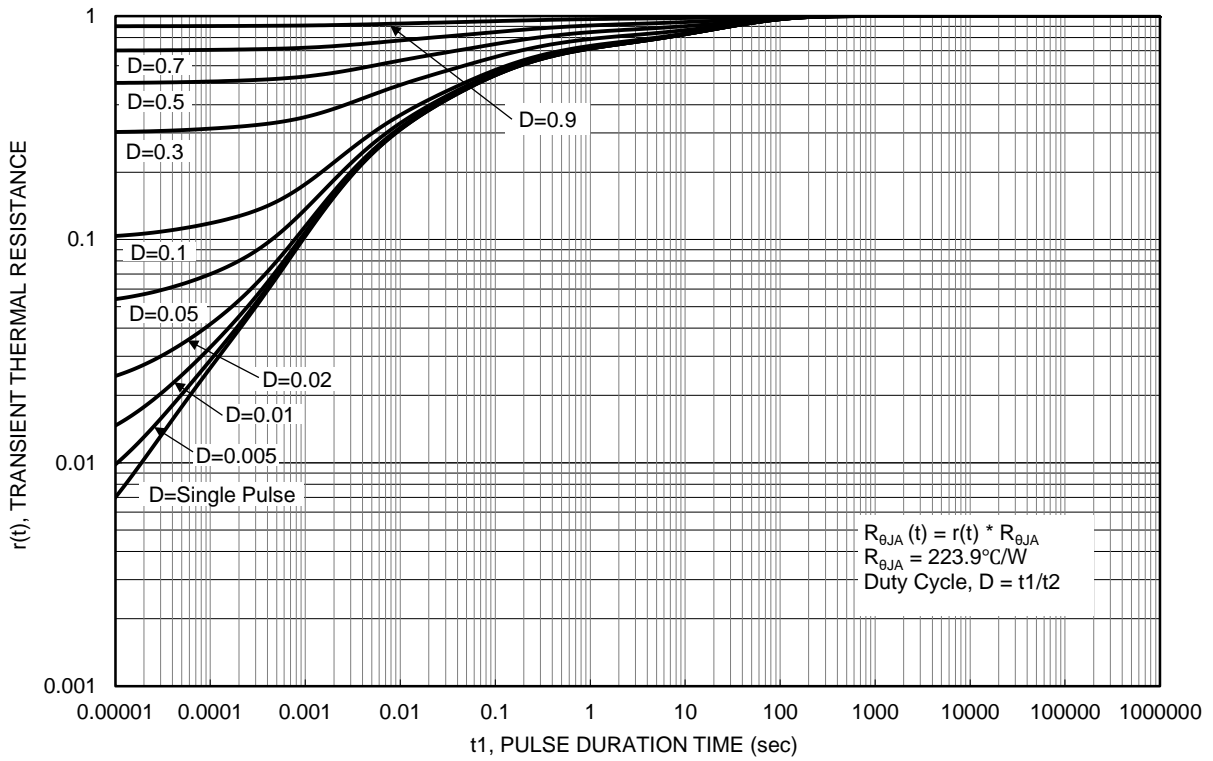


Figure 13. Transient Thermal Resistance



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