

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
-50V	6Ω @ $V_{GS} = -4 V$	-200mA
	8Ω @ $V_{GS} = -2.5 V$	-160mA

Description

This new generation 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

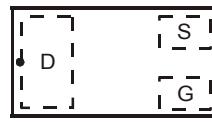
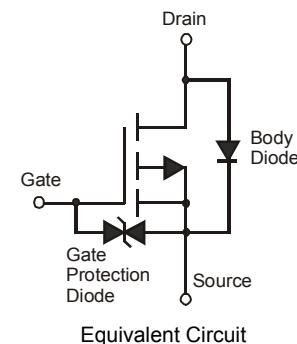
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays



X-DFN1006-3



Bottom View


 Top View
Internal Schematic


Ordering Information (Note 4)

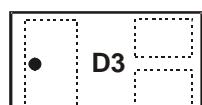
Part Number	Case	Packaging
DMP56D0UFB-7	X1-DFN1006-3	3000/Tape & Reel
DMP56D0UFB-7B	X1-DFN1006-3	10000/Tape & Reel

Notes:

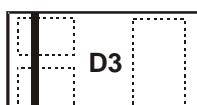
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "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

DMP56D0UFB-7


 Top View
Dot Denotes
Drain Side

DMP56D0UFB-7B


 Top View
Bar Denotes Gate
and Source Side

D3 = Product Type Marking Code

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

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	-50	V
Gate-Source Voltage		V_{GSS}	± 8	V
Drain Current (Note 5)	Steady	I_D	-200	mA
Pulsed Drain Current (Note 6)		I_{DM}	-700	mA

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	425	mW
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	275	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-50	—	—	V	$V_{GS} = 0\text{V}$, $I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-10	μA	$V_{DS} = -50\text{V}$, $V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 1	μA	$V_{GS} = \pm 8\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	-0.5	—	-1.2	V	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	4.6 6	6 8	Ω	$V_{GS} = -4.0\text{V}$, $I_D = -100\text{mA}$ $V_{GS} = -2.5\text{V}$, $I_D = -80\text{mA}$
Forward Transfer Admittance	$ Y_{fs} $	100	—	—	mS	$V_{DS} = -5\text{V}$, $I_D = -100\text{mA}$
Diode Forward Voltage (Note 7)	V_{SD}	—	—	-1.2	V	$V_{GS} = 0\text{V}$, $I_S = -100\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	50.54	—	pF	$V_{DS} = -25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	3.49	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.42	—	pF	
Gate Resistance	R_G	—	201	—	Ω	$V_{DS} = 0\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$
Total Gate Charge $V_{GS} = 4.5\text{V}$	Q_g	—	0.58	—	nC	$V_{GS} = -4\text{V}$, $V_{DS} = -25\text{V}$, $I_D = -100\text{mA}$
Gate-Source Charge	Q_{gs}	—	0.09	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.14	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	4.46	—	nS	$V_{DD} = -30\text{V}$, $I_D = -0.27\text{A}$, $V_{GEN} = -4\text{V}$, $R_{GEN} = 6\Omega$
Turn-On Rise Time	t_r	—	6.63	—	nS	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	21.9	—	nS	
Turn-Off Fall Time	t_f	—	15.0	—	nS	

Notes:

5. Device mounted on FR-4 PCB. $t \leq 5$ sec.
6. Pulse width $\leq 10\mu\text{s}$, Duty Cycle $\leq 1\%$.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

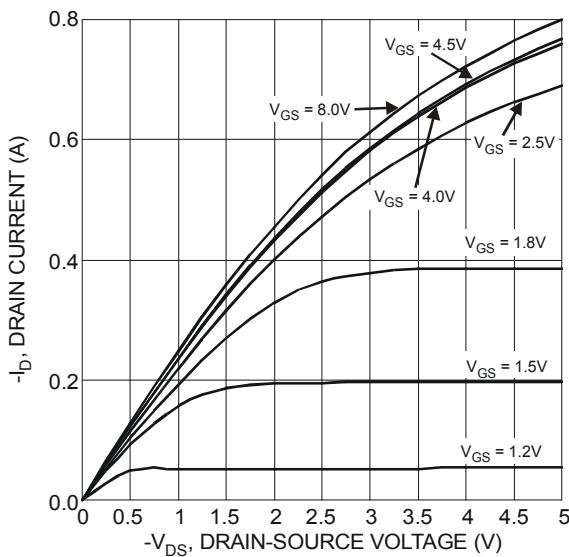


Figure 1 Typical Output Characteristics

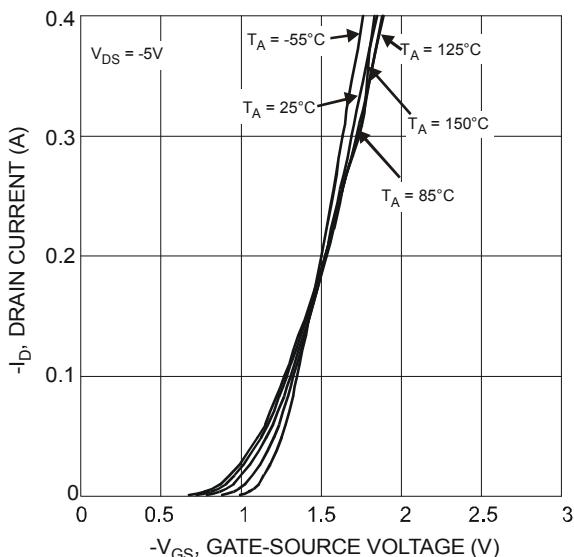


Figure 2 Typical Transfer Characteristics

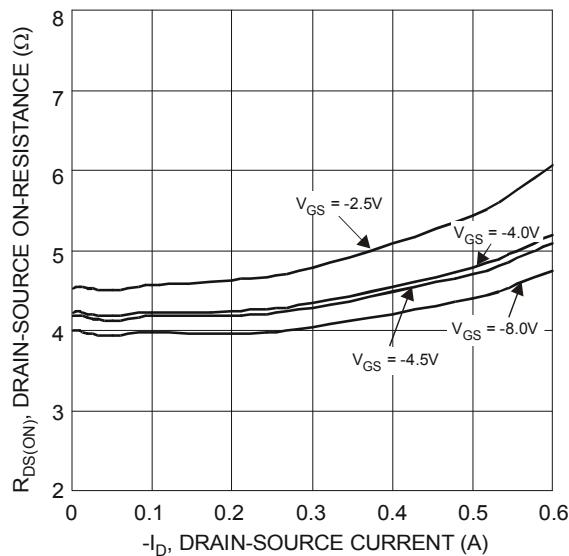


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

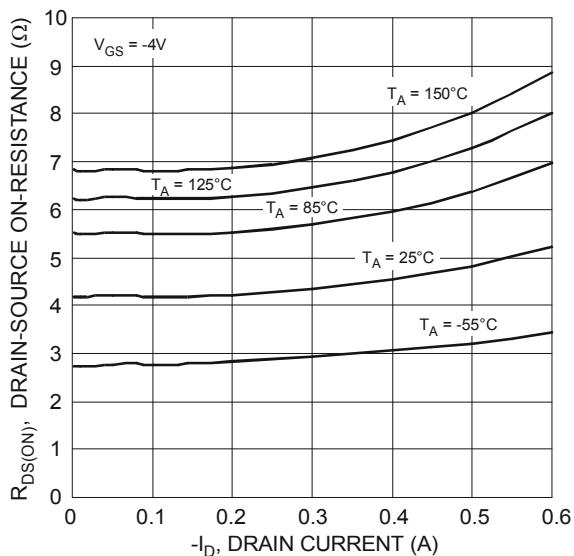


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

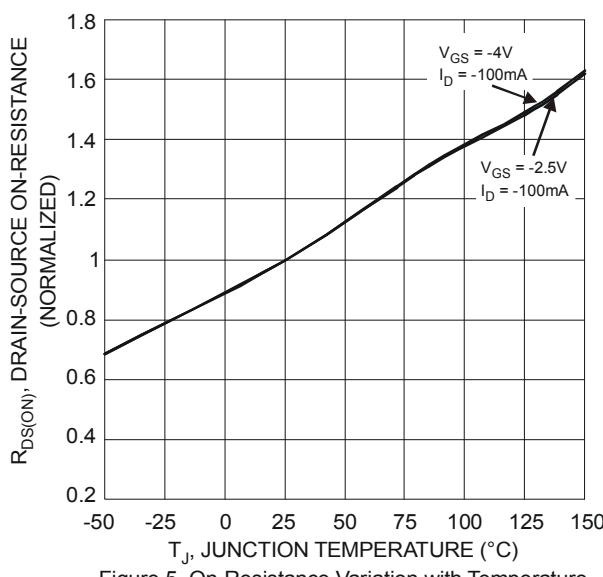


Figure 5 On-Resistance Variation with Temperature

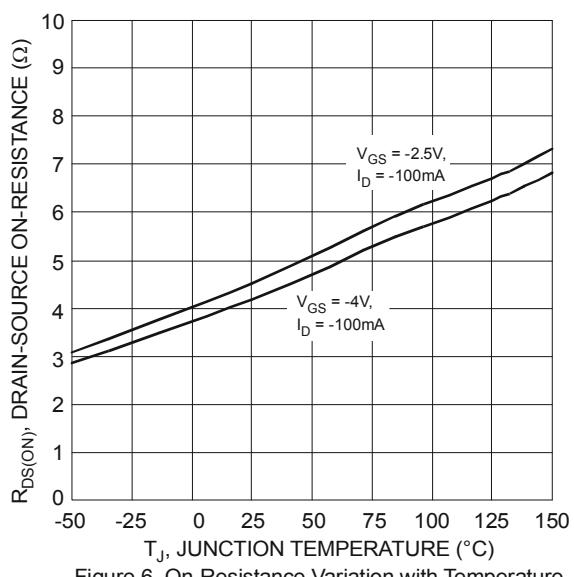


Figure 6 On-Resistance Variation with Temperature

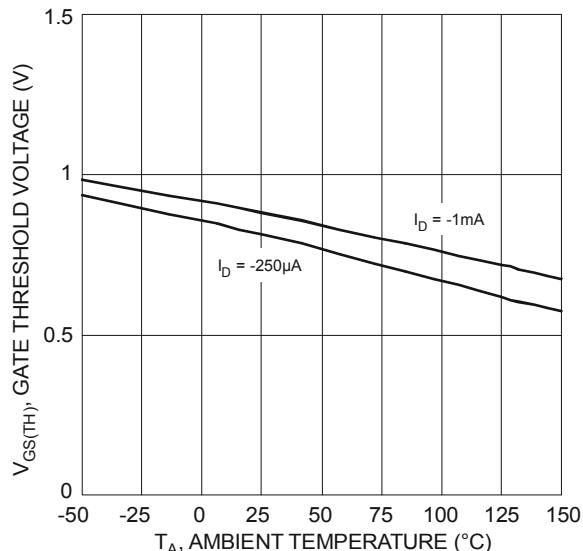


Figure 7 Gate Threshold Variation vs. Ambient Temperature

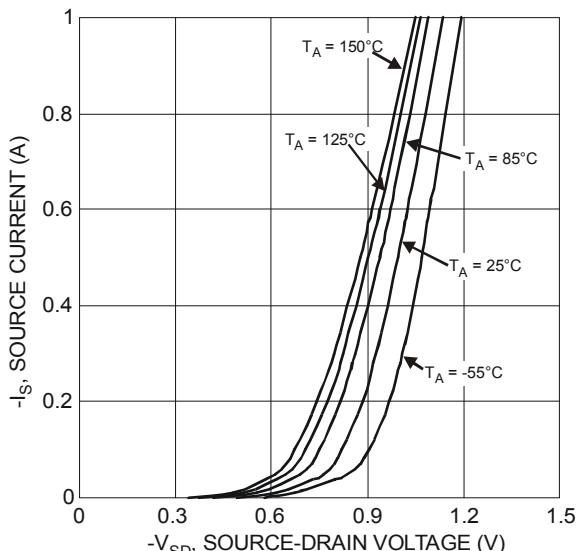


Figure 8 Diode Forward Voltage vs. Current

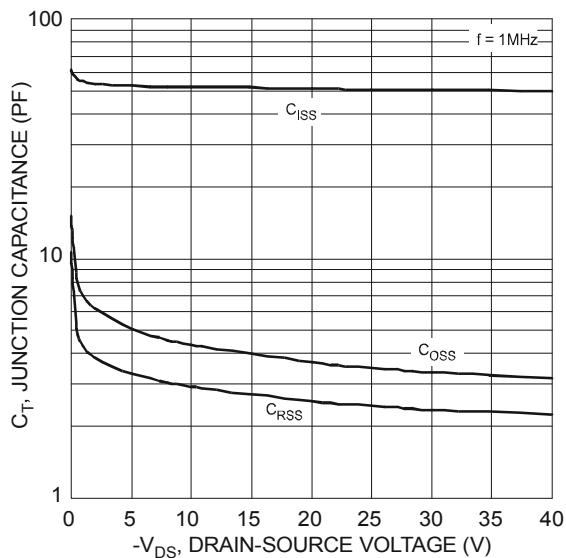


Figure 9 Typical Junction Capacitance

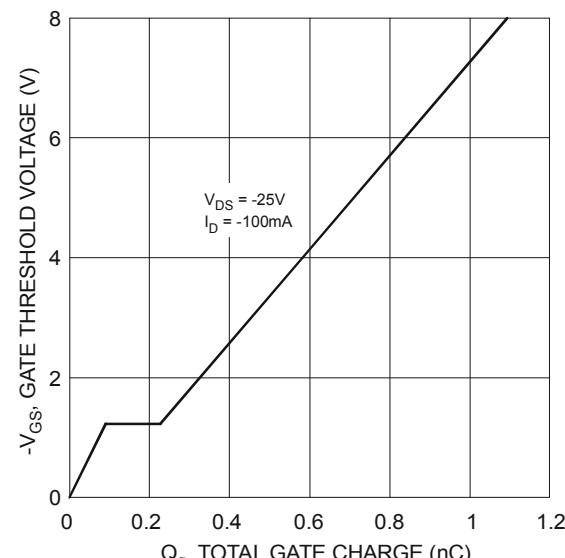
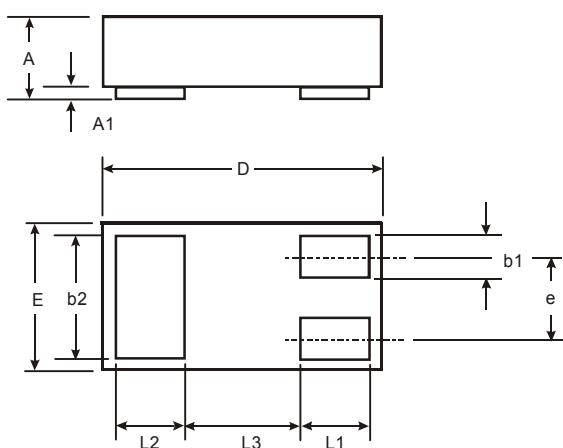


Figure 10 Gate Charge Characteristics

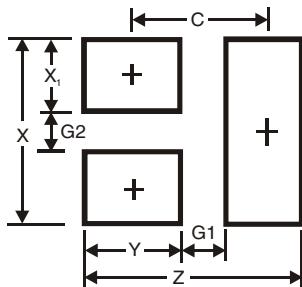
Package Outline Dimensions



X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40

All Dimensions in mm

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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