N-CHANNEL ENHANCEMENT MODE FIELD MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
60V	3.0Ω @ V_{GS} = 10V	400mA
	4.0Ω @ V_{GS} = 5V	330mA

Features and Benefits

- N-Channel MOSFET
- Low On-Resistance
- Low Gate-Threshold Voltage
- Low-Input Capacitance
- Fast Switching Speed
- Small-Surface Mount Package
- **ESD Protected Gate, 1.2kV HBM**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

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

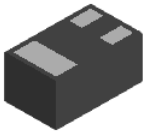
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
  Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

Mechanical Data

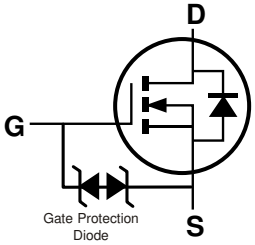
- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

ESD PROTECTED TO 1.2kV

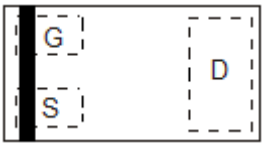
X1-DFN1006-3



Bottom View



Equivalent Circuit



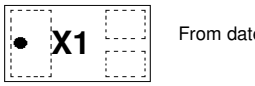
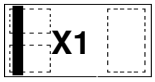
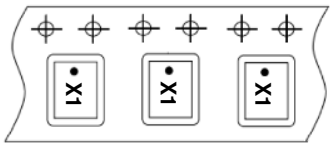
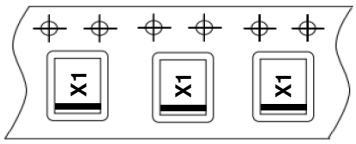
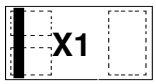
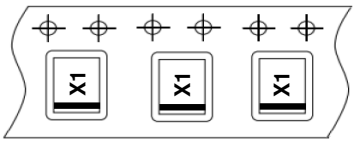
Top View
Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN65D8LFB-7	X1-DFN1006-3	3,000/Tape & Reel
DMN65D8LFB-7B	X1-DFN1006-3	10,000/Tape & Reel

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

DMN65D8LFB-7	 Top View Dot Denotes Drain Side From date code 1527 (YYWW), this changes to:  Top View Bar Denotes Gate and Source Side  
DMN65D8LFB-7B	 Top View Bar Denotes Gate and Source Side X1 = Part Marking Code 

Maximum Ratings

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	260 210	mA
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	400 310	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	430	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\Theta JA}$	290	°C/W
Power Dissipation (Note 6)	P_D	840	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\Theta JA}$	147	°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}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	0.1	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.2	—	2.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.9 2.2	3.0 4.0	Ω	V_{GS} = 10V, I_D = 0.115A V_{GS} = 5V, I_D = 0.115A
Forward Transfer Admittance	$\|Y_{fs}\|$	80	320	—	mS	V_{DS} = 10V, I_D = 0.115A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 0.115A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	25	—	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	4.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.5	—	pF	
Gate Resistance	R_G	—	88	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	0.87	—	nC	V_{GS} = 10V, V_{DS} = 30V, I_D = 0.15A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	0.43	—		
Gate-Source Charge	Q_{gs}	—	0.11	—		
Gate-Drain Charge	Q_{gd}	—	0.11	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.27	—	ns	V_{DD} = 30V, V_{GEN} = 10V, R_{GEN} = 25Ω, I_D = 0.115A
Turn-On Rise Time	t_R	—	3.15	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	12.025	—	ns	
Turn-Off Fall Time	t_F	—	6.29	—	ns	

Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single-sided.
6. Device mounted on 2" × 2" FR-4 PCB with high coverage 2oz. copper, single-sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

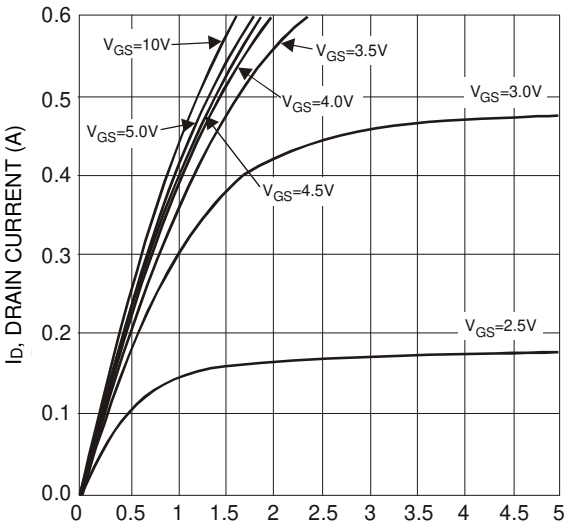


Fig.1 Typical Output Characteristics

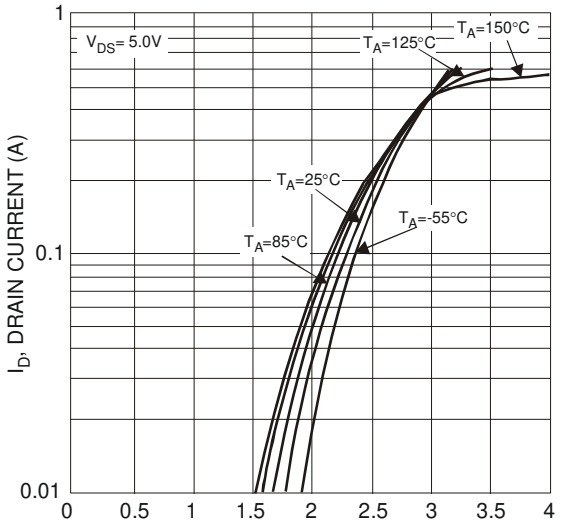


Fig. 2 Typical Transfer Characteristics

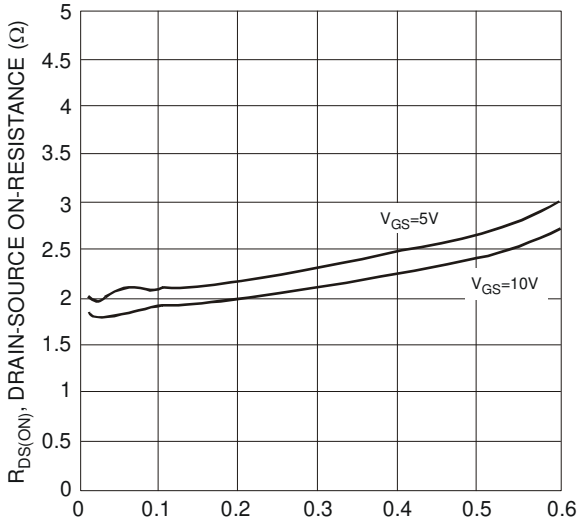


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Charge

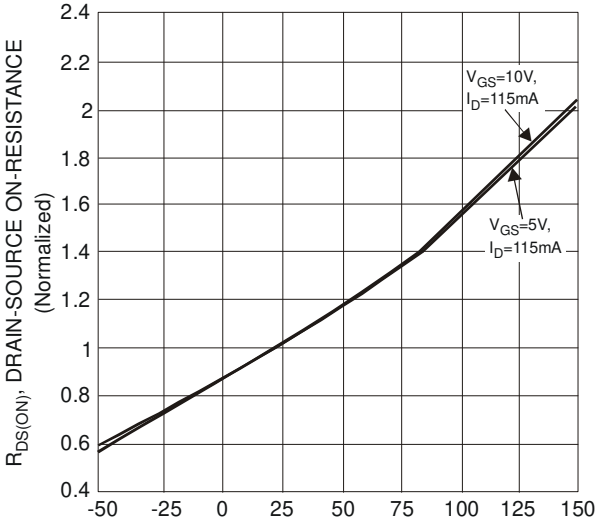


Fig. 4 On-Resistance Variation with Temperature

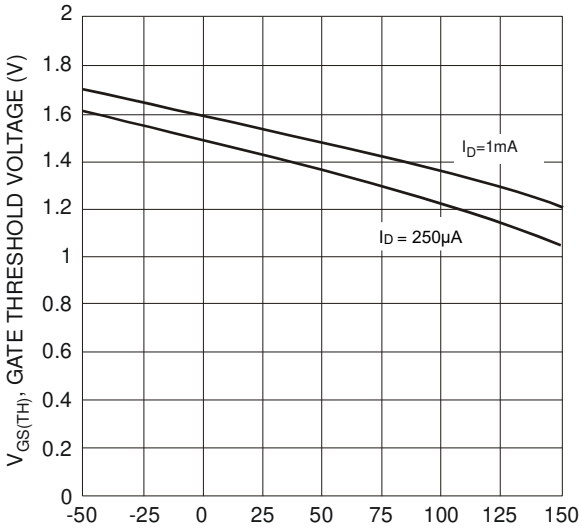


Fig. 5 Gate Threshold Variation vs. Junction Temperature

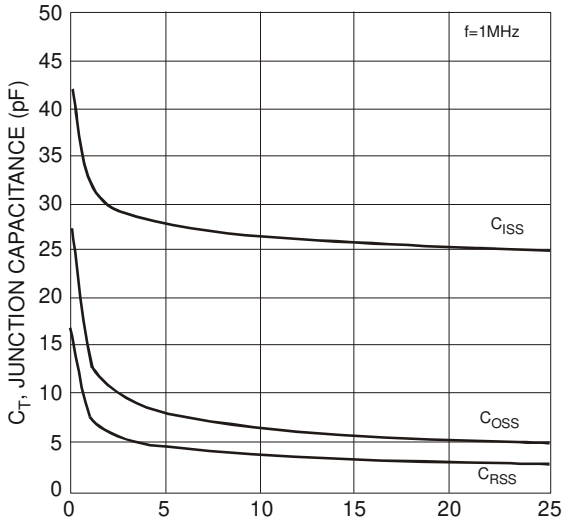


Fig. 6 Typical Junction Capacitance

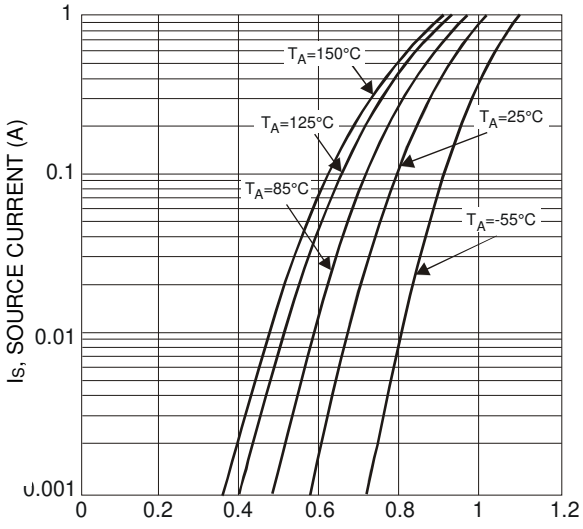
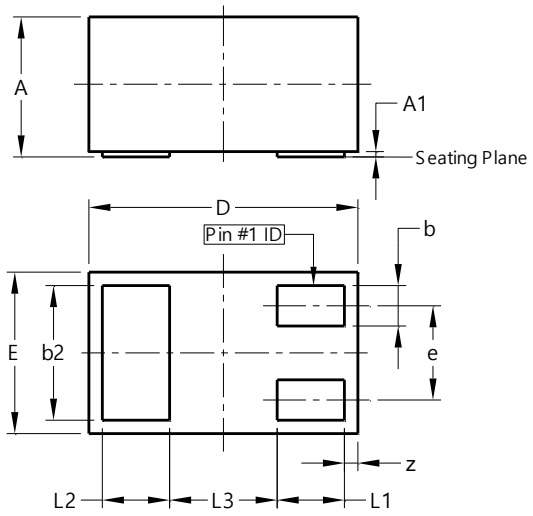


Fig. 7 Diode Forward Voltage vs. Current

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1006-3

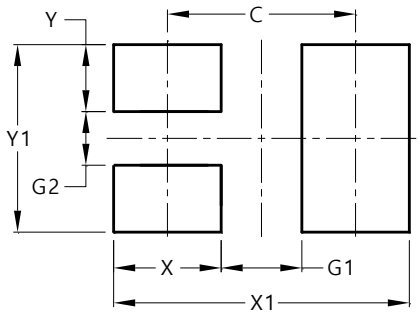


X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1006-3



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

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