


**DMN2300UFD**
**20V N-CHANNEL ENHANCEMENT MODE MOSFET**

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	$I_D$ max $T_A = 25^\circ C$ (Notes 4)
20V	200m $\Omega$ @ $V_{GS} = 4.5V$	1.73A
	260m $\Omega$ @ $V_{GS} = 2.5V$	1.50A
	400m $\Omega$ @ $V_{GS} = 1.8V$	1.27A
	500m $\Omega$ @ $V_{GS} = 1.5V$	1.15A

## Description and Applications

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.

- Load switch

## Features and Benefits

- Low Gate Threshold Voltage
- Fast Switching Speed
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD Protected Gate 2kV
- Qualified to AEC-Q101 Standards for High Reliability

## Mechanical Data

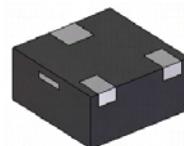
- Case: X1-DFN1212-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.005 grams (approximate)



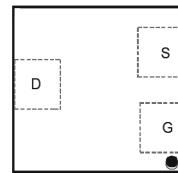
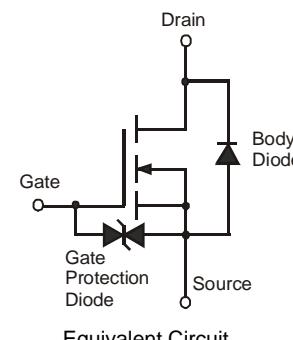
X1-DFN1212-3



Top View



Bottom View



Pin-out Top view

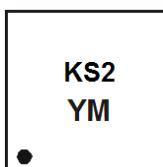
## Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMN2300UFD-7	KS2	7	8	3000

Notes:

1. No purposefully added lead
2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
3. For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information



KS2 = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: Y = 2011)  
M = Month (ex: 9 = September)

### Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017					
Code	Y	Z	A	B	C	D	E					
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

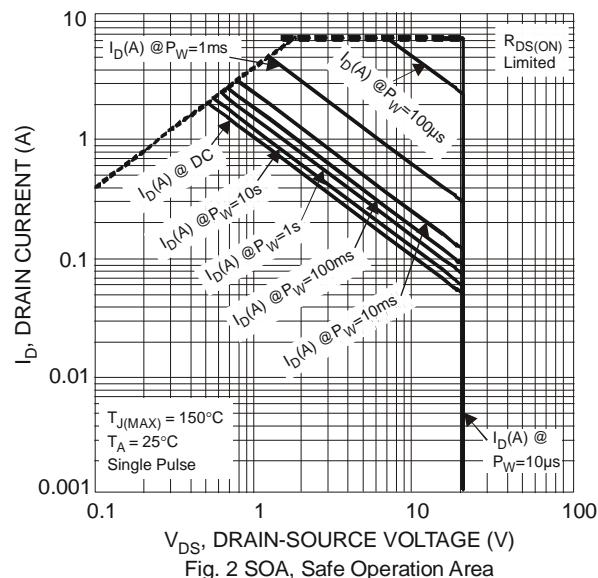
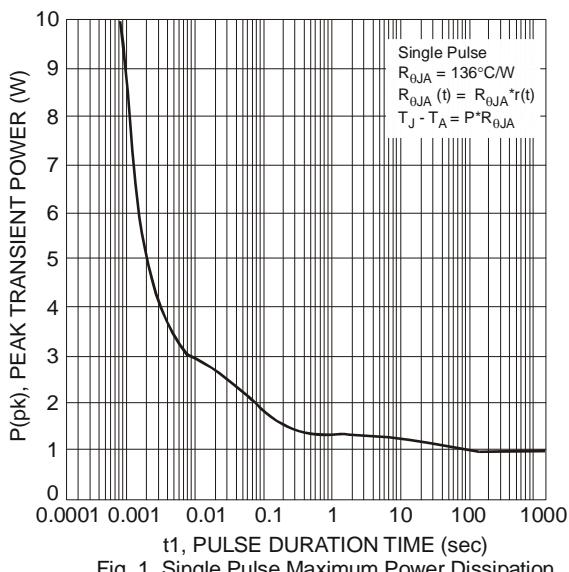
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		$V_{DSS}$	20	V
Gate-Source Voltage		$V_{GSS}$	$\pm 8$	V
Continuous Drain Current Steady State	$T_A = 25^\circ\text{C}$ (Note 4)	$I_D$	1.73	A
			1.34	
			1.21	
Pulsed Drain Current (Note 6)		$I_{DM}$	6.0	A

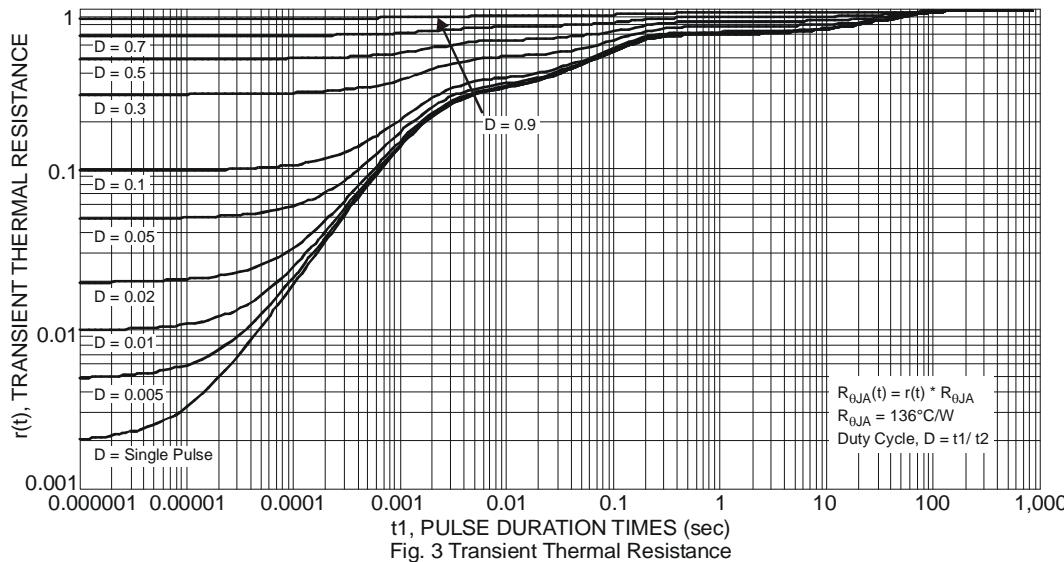
**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	$P_D$	0.96	W
	(Note 5)		0.47	W
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	130	°C/W
	(Note 5)		265	°C/W
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	°C

Notes:

4. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
5. Same as note 4, except the device is mounted on minimum recommended pad layout.
6. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

**Thermal Characteristics**




## 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	$\text{BV}_{\text{DSS}}$	20	-	-	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	$\text{I}_{\text{DSS}}$	-	-	1	$\mu\text{A}$	$\text{V}_{\text{DS}} = 20\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	$\text{I}_{\text{GSS}}$	-	-	$\pm 10$	$\mu\text{A}$	$\text{V}_{\text{GS}} = \pm 8\text{V}$ , $\text{V}_{\text{DS}} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	0.45	-	0.95	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$ , $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	-	-	200	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 4.5\text{V}$ , $\text{I}_D = 900\text{mA}$
				260		$\text{V}_{\text{GS}} = 2.5\text{V}$ , $\text{I}_D = 800\text{mA}$
				400		$\text{V}_{\text{GS}} = 1.8\text{V}$ , $\text{I}_D = 700\text{mA}$
				500		$\text{V}_{\text{GS}} = 1.5\text{V}$ , $\text{I}_D = 200\text{mA}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	40	-	-	$\text{mS}$	$\text{V}_{\text{DS}} = 3\text{V}$ , $\text{I}_D = 300\text{mA}$
Diode Forward Voltage	$\text{V}_{\text{SD}}$	-	0.7	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$ , $\text{I}_S = 300\text{mA}$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$\text{C}_{\text{iss}}$	-	67.62	-	$\text{pF}$	$\text{V}_{\text{DS}} = 25\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1.0\text{MHz}$
Output Capacitance	$\text{C}_{\text{oss}}$	-	9.74	-	$\text{pF}$	
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$	-	7.58	-	$\text{pF}$	
Gate Resistance	$\text{R}_{\text{g}}$	-	68.51	-	$\Omega$	$\text{V}_{\text{DS}} = 0\text{V}$ , $\text{V}_{\text{GS}} = 0\text{V}$ , $f = 1\text{MHz}$
Total Gate Charge (Note 8)	$\text{Q}_{\text{g}}$	-	0.89	2	$\text{nC}$	$\text{V}_{\text{GS}} = 4.5\text{V}$ , $\text{V}_{\text{DS}} = 15\text{V}$ , $\text{I}_D = 1\text{A}$
Gate-Source Charge	$\text{Q}_{\text{gs}}$	-	0.14	-	$\text{nC}$	
Gate-Drain Charge	$\text{Q}_{\text{gd}}$	-	0.16	-	$\text{nC}$	
Turn-On Delay Time	$\text{t}_{\text{D}(\text{on})}$	-	4.92	-	$\text{ns}$	$\text{V}_{\text{DS}} = 10\text{V}$ , $\text{I}_D = 1\text{A}$
Turn-On Rise Time	$\text{t}_{\text{r}}$	-	6.93	-	$\text{ns}$	
Turn-Off Delay Time	$\text{t}_{\text{D}(\text{off})}$	-	21.71	-	$\text{ns}$	
Turn-Off Fall Time	$\text{t}_{\text{f}}$	-	10.62	-	$\text{ns}$	

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
8. Guarantee by design.

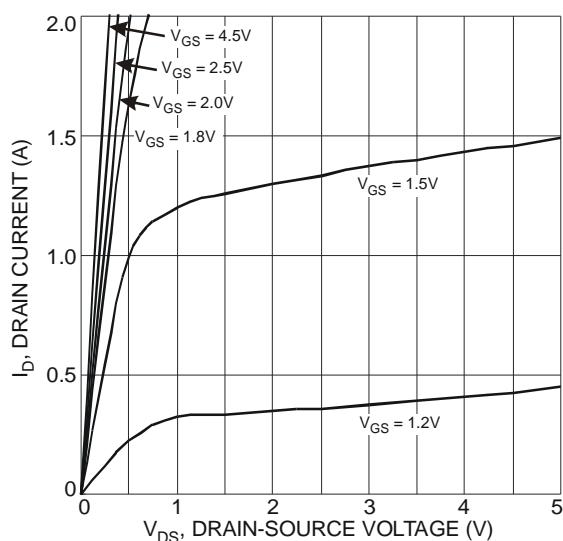


Fig. 4 Typical Output Characteristic

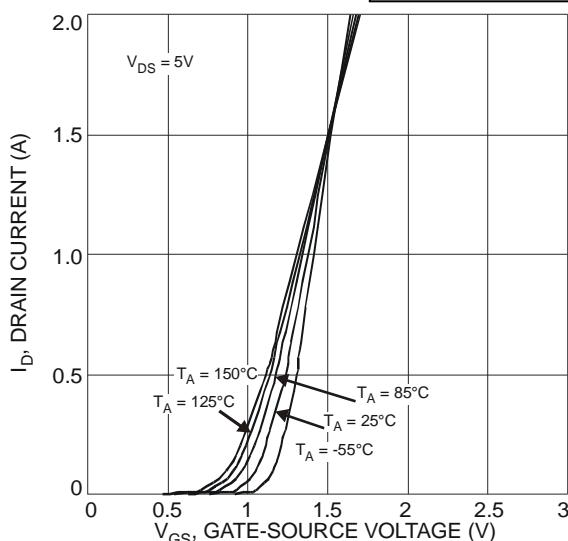


Fig. 5 Typical Transfer Characteristic

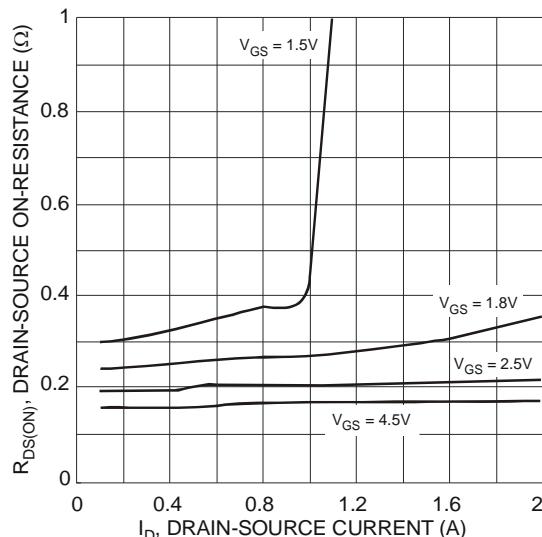


Fig. 6 Typical On-Resistance  
vs. Drain Current and Gate Voltage

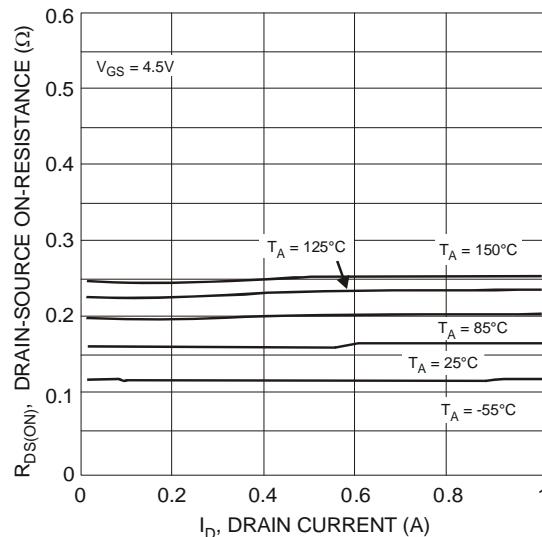


Fig. 7 Typical On-Resistance  
vs. Drain Current and Temperature

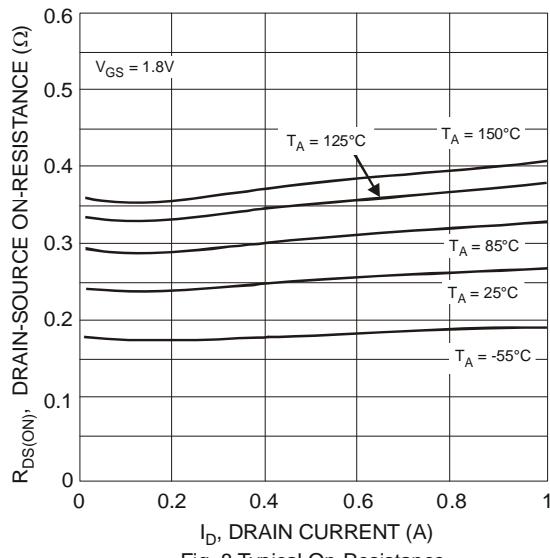


Fig. 8 Typical On-Resistance  
vs. Drain Current and Temperature

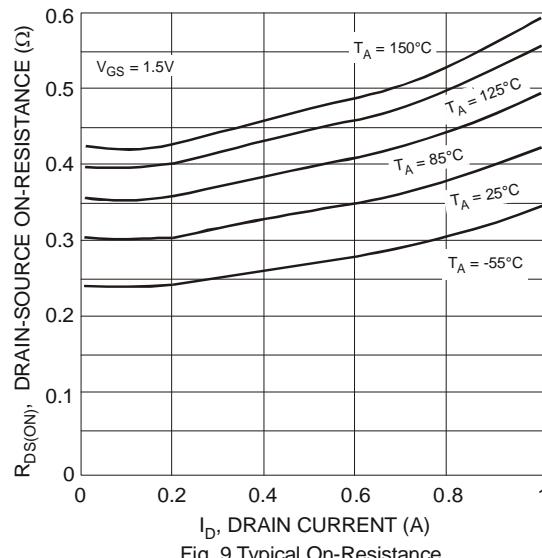


Fig. 9 Typical On-Resistance  
vs. Drain Current and Temperature

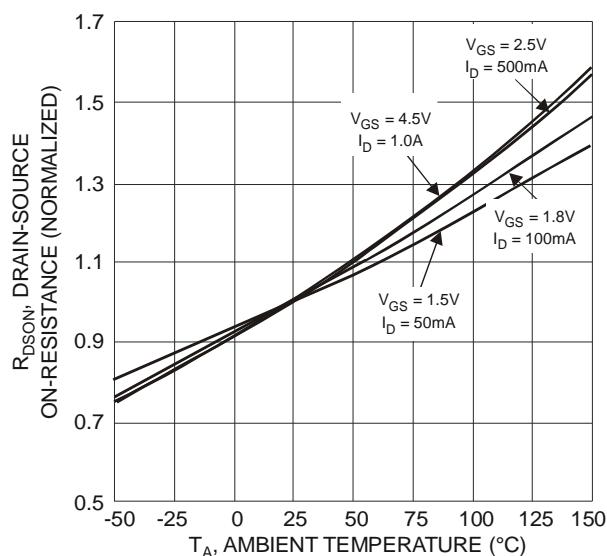


Fig. 10 On-Resistance Variation with Temperature

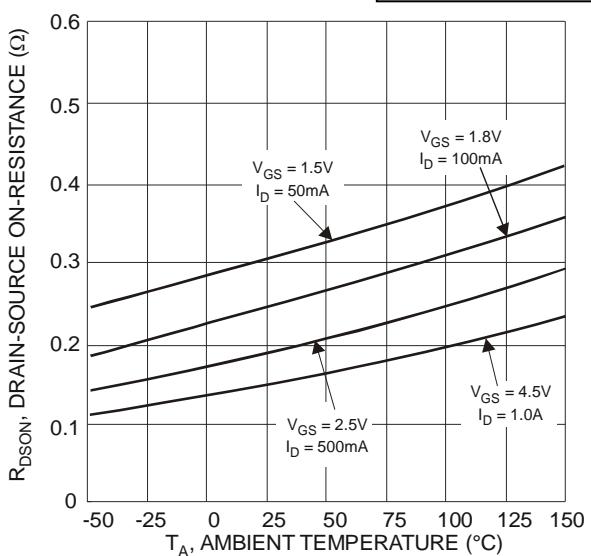


Fig. 11 On-Resistance Variation with Temperature

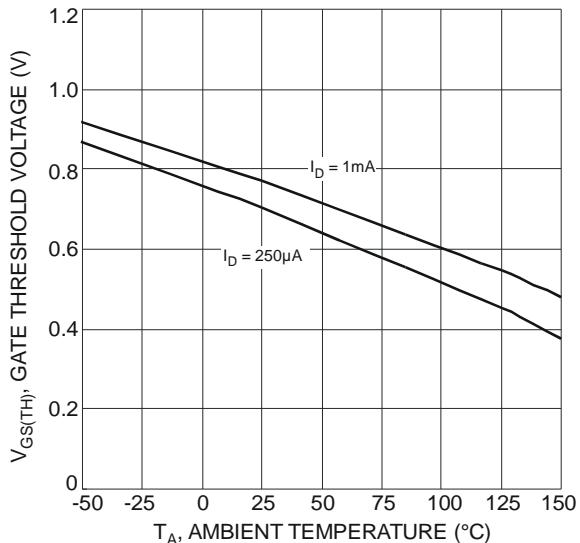


Fig. 12 Gate Threshold Variation vs. Ambient Temperature

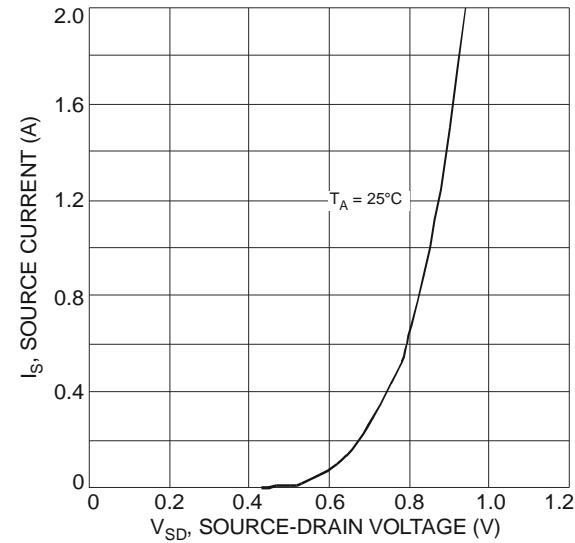


Fig. 13 Diode Forward Voltage vs. Current

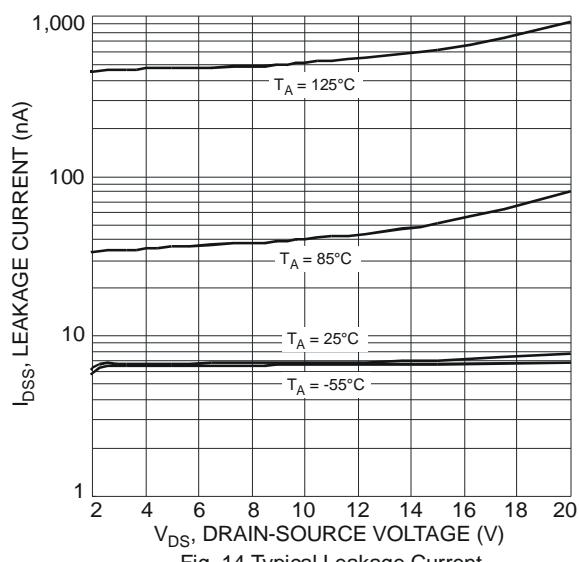


Fig. 14 Typical Leakage Current vs. Drain-Source Voltage

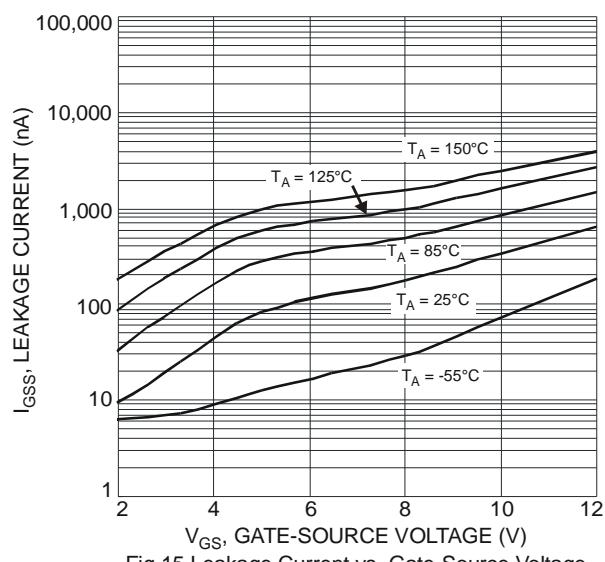


Fig. 15 Leakage Current vs. Gate-Source Voltage

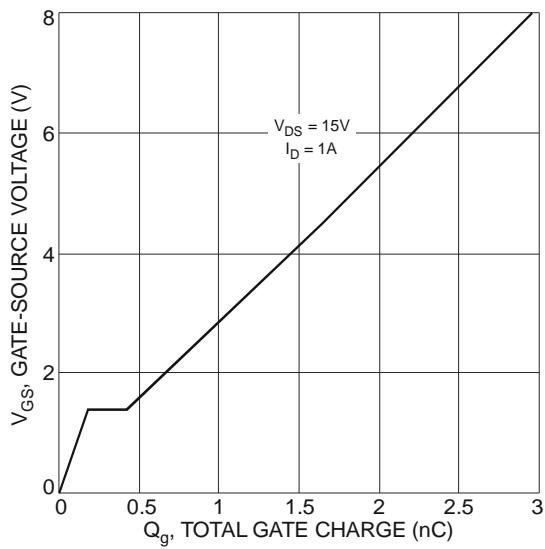
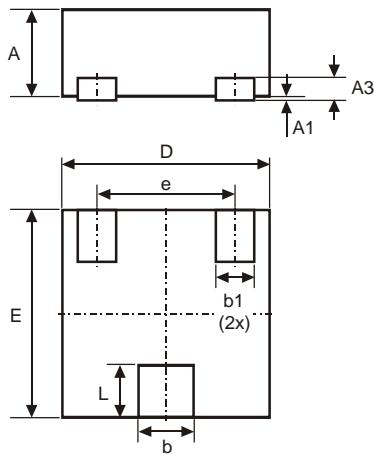


Fig. 16 Gate-Charge Characteristics

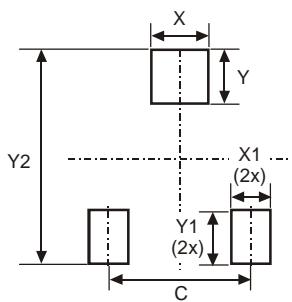
## Package Outline Dimensions



X1-DFN1212-3			
Dim	Min	Max	Typ
<b>A</b>	0.47	0.53	0.50
<b>A1</b>	0	0.05	0.02
<b>A3</b>	-	-	0.13
<b>b</b>	0.27	0.37	0.32
<b>b1</b>	0.17	0.27	0.22
<b>D</b>	1.15	1.25	1.20
<b>E</b>	1.15	1.25	1.20
<b>e</b>	-	-	0.80
<b>L</b>	0.25	0.35	0.30

All Dimensions in mm

## Suggested Pad Layout



Dimensions	Value (in mm)
<b>C</b>	0.80
<b>X</b>	0.42
<b>X1</b>	0.32
<b>Y</b>	0.50
<b>Y1</b>	0.50
<b>Y2</b>	1.50

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