DMN2300UFD

20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

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**

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

Mechanical Data

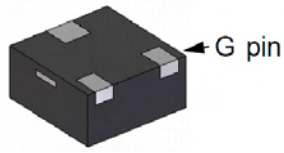
- Case: X1-DFN1212-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.005 grams (approximate)



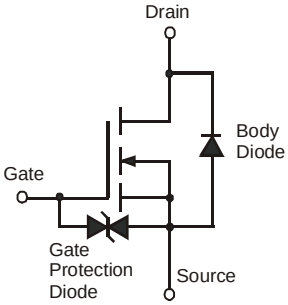
X1-DFN1212-3



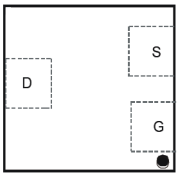
Top View



Bottom View



Equivalent Circuit



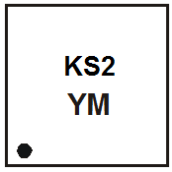
Pin-out Top view

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

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current	Steady State	T_A = 25°C (Note 4)	I_D	1.73	A
		T_A = 85°C (Note 4)		1.34	
		T_A = 25°C (Note 5)		1.21	
Pulsed Drain Current (Note 6)			I_{DM}	6.0	A

Thermal Characteristics @T_A = 25°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

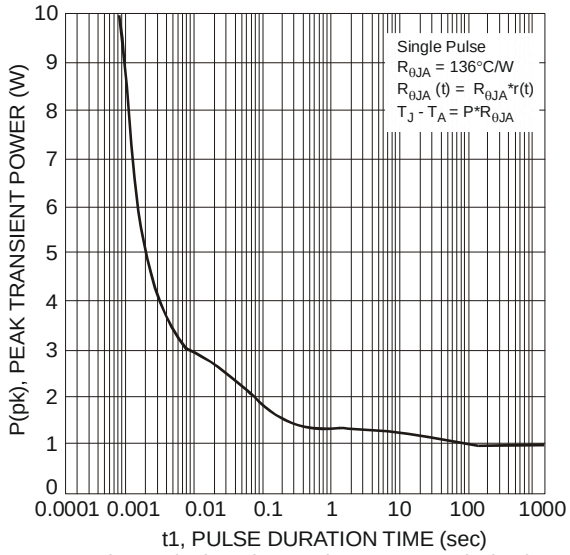


Fig. 1 Single Pulse Maximum Power Dissipation

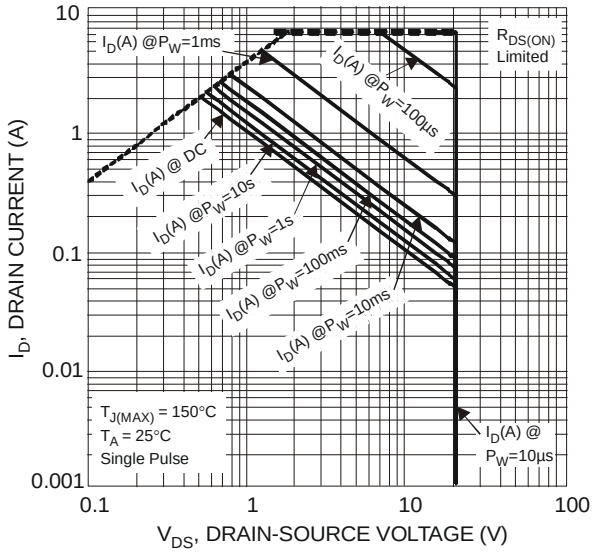


Fig. 2 SOA, Safe Operation Area

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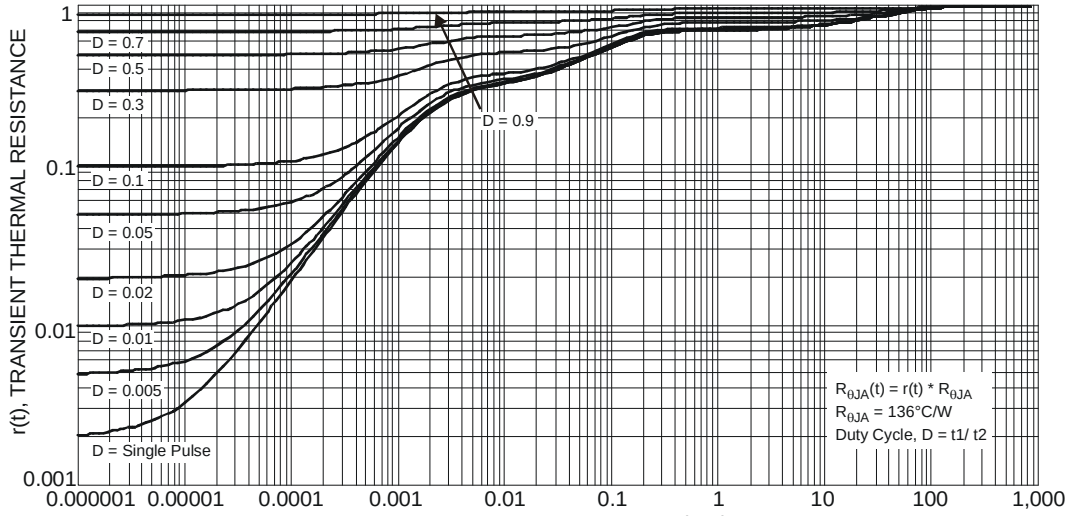


Fig. 3 Transient Thermal Resistance

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}	20	-	-	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	-	0.95	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	-	200	mΩ	V_{GS} = 4.5V, I_D = 900mA
				260		V_{GS} = 2.5V, I_D = 800mA
				400		V_{GS} = 1.8V, I_D = 700mA
				500		V_{GS} = 1.5V, I_D = 200mA
Forward Transfer Admittance	$\|Y_{fs}\|$	40	-	-	mS	V_{DS} = 3V, I_D = 300mA
Diode Forward Voltage	V_{SD}	-	0.7	1.2	V	V_{GS} = 0V, I_S = 300mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	-	67.62	-	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	9.74	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	7.58	-	pF	
Gate Resistance	R_g	-	68.51	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (Note 8)	Q_g	-	0.89	2	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A
Gate-Source Charge	Q_{gs}	-	0.14	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.16	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	4.92	-	ns	V_{DS} = 10V, I_D = 1A V_{GS} = 10V, R_G = 6Ω
Turn-On Rise Time	t_r	-	6.93	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	21.71	-	ns	
Turn-Off Fall Time	t_f	-	10.62	-	ns	

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

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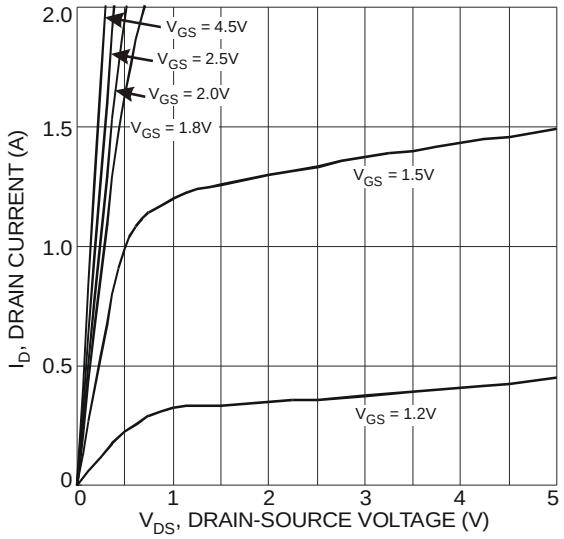


Fig. 4 Typical Output Characteristic

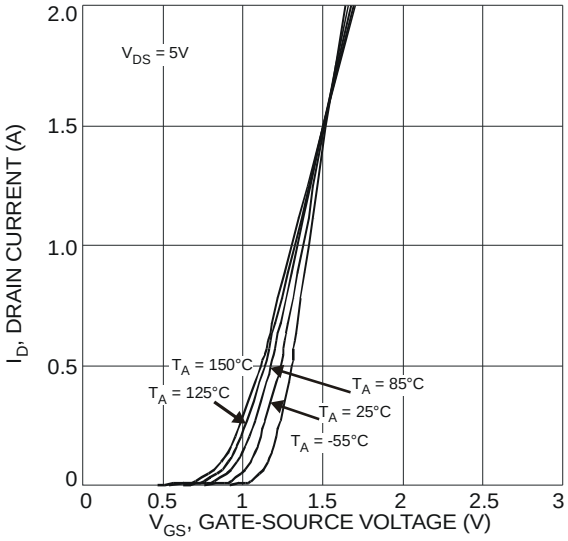


Fig. 5 Typical Transfer Characteristic

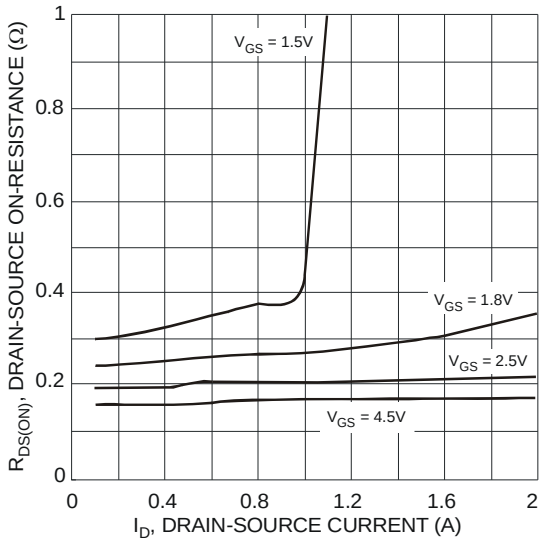


Fig. 6 Typical On-Resistance
vs. Drain Current and Gate Voltage

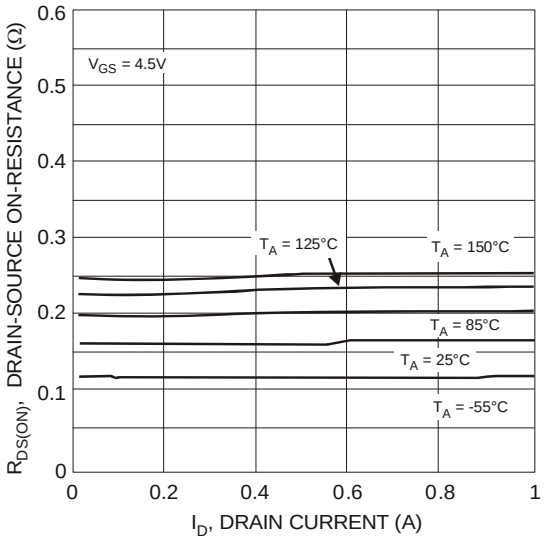


Fig. 7 Typical On-Resistance
vs. Drain Current and Temperature

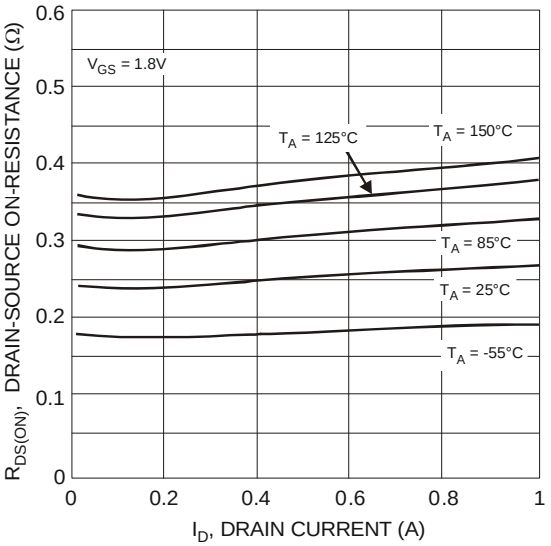


Fig. 8 Typical On-Resistance
vs. Drain Current and Temperature

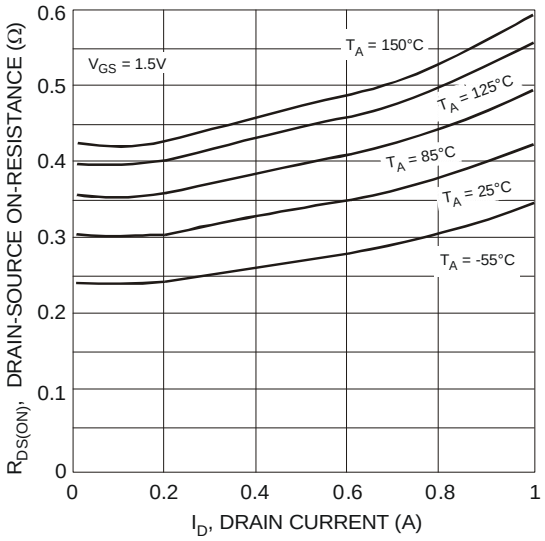


Fig. 9 Typical On-Resistance
vs. Drain Current and Temperature

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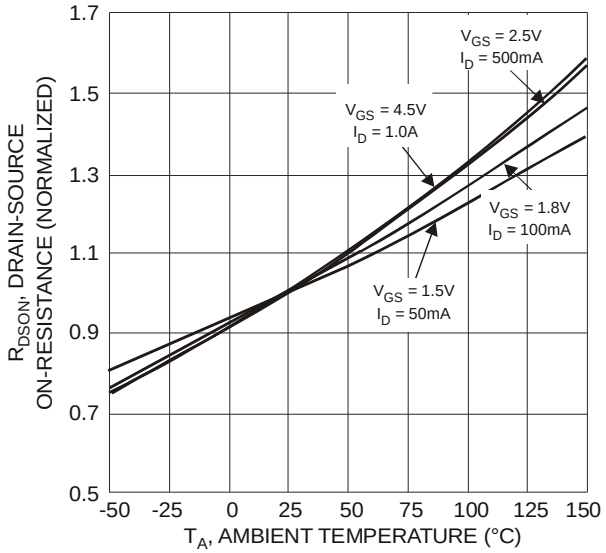


Fig. 10 On-Resistance Variation with Temperature

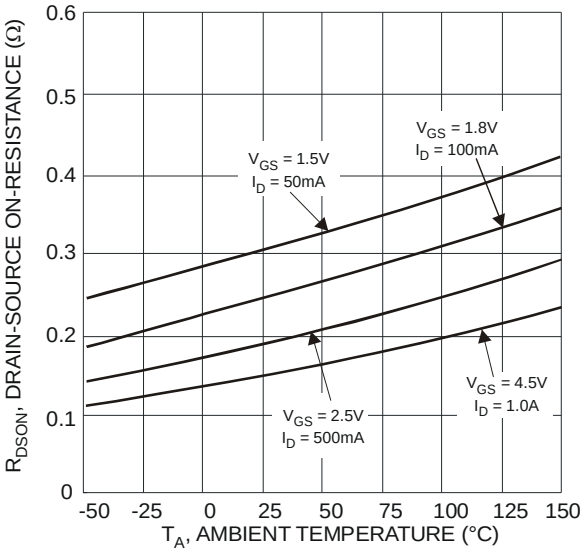


Fig. 11 On-Resistance Variation with Temperature

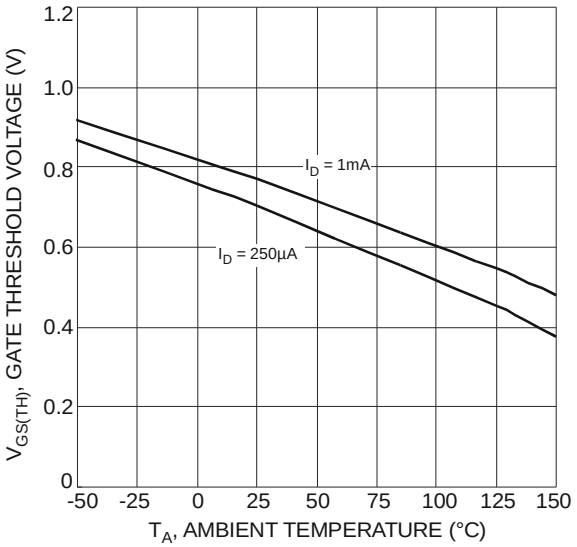


Fig. 12 Gate Threshold Variation vs. Ambient Temperature

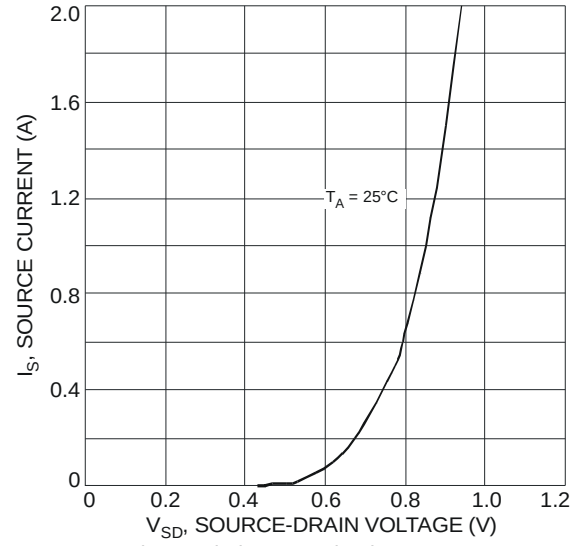


Fig. 13 Diode Forward Voltage vs. Current

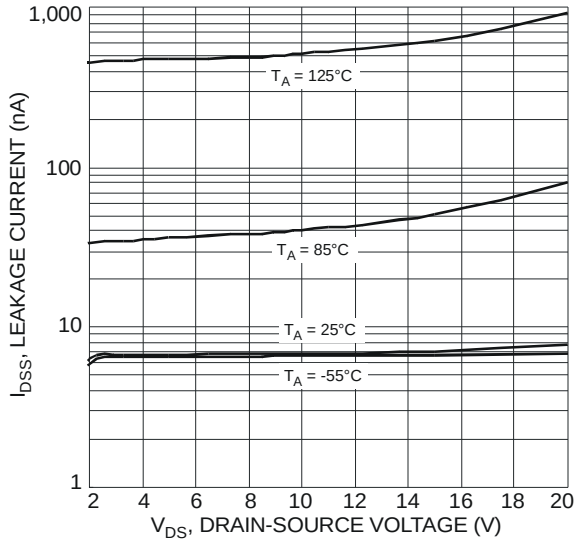


Fig. 14 Typical Leakage Current
vs. Drain-Source Voltage

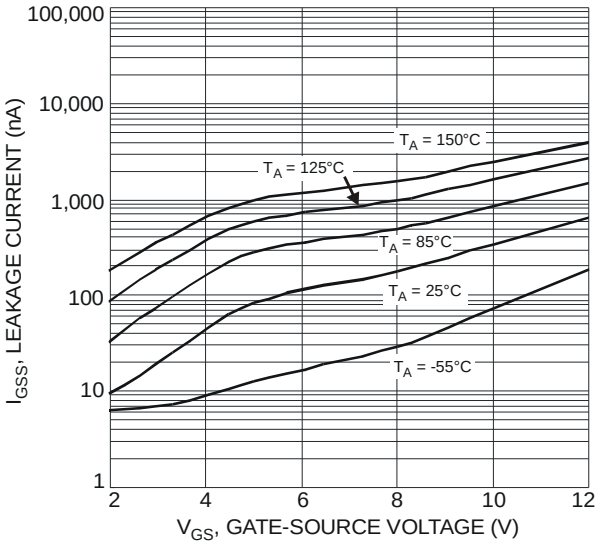


Fig.15 Leakage Current vs. Gate-Source Voltage

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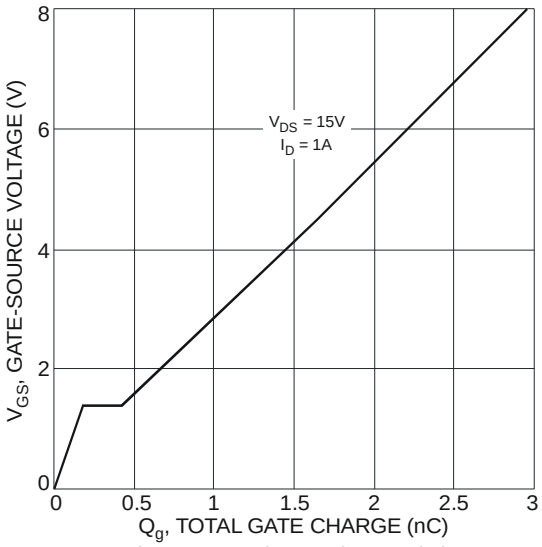
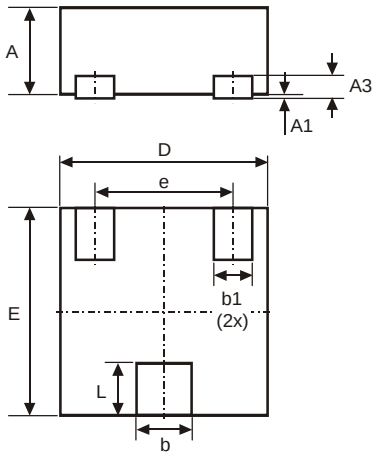


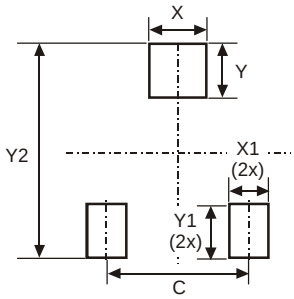
Fig. 16 Gate-Charge Characteristics

Package Outline Dimensions



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

Suggested Pad Layout



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

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