

Product Summary

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

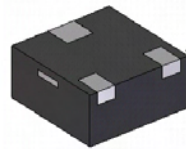
- Case: X1-DFN1212-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.005 grams (approximate)



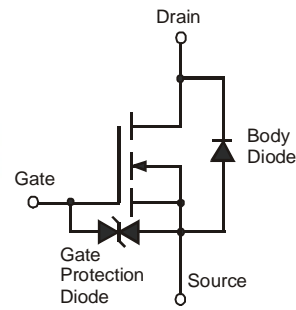
X1-DFN1212-3



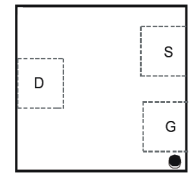
Top View



Bottom View



Equivalent Circuit



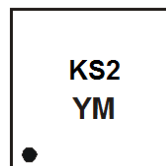
Pin-out Top view

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

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}	± 8	V
Continuous Drain Current	Steady State	I_D	$T_A = 25^\circ\text{C}$ (Note 4)	1.73
			$T_A = 85^\circ\text{C}$ (Note 4)	1.34
			$T_A = 25^\circ\text{C}$ (Note 5)	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	$^\circ\text{C/W}$
	(Note 5)		265	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
- 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.
 - Same as note 4, except the device is mounted on minimum recommended pad layout.
 - Device mounted on minimum recommended pad layout test board, 10 μs pulse duty cycle = 1%.

Thermal Characteristics

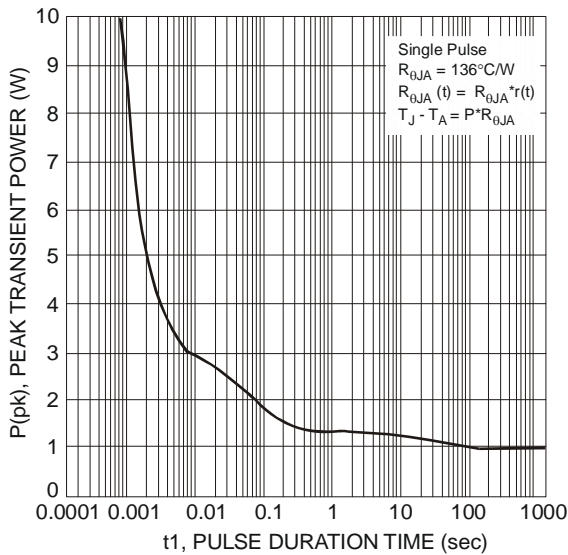


Fig. 1 Single Pulse Maximum Power Dissipation

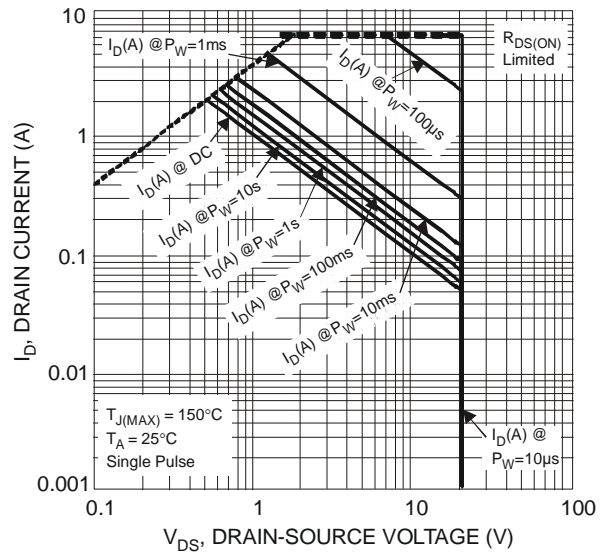
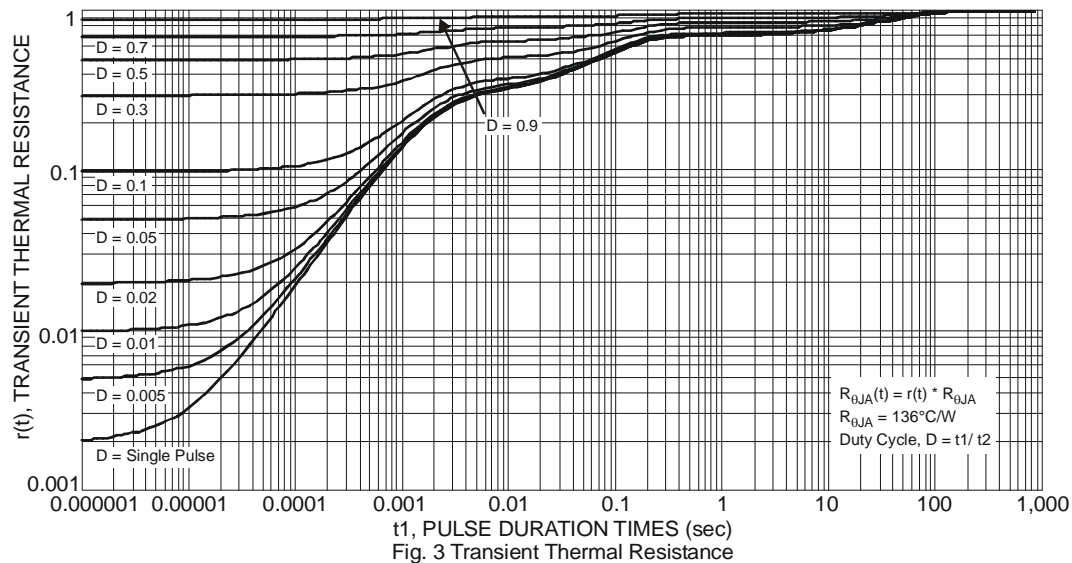


Fig. 2 SOA, Safe Operation Area



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}	20	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	I_{DSS}	-	-	1	μA	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	-	-	± 10	μA	$V_{GS} = \pm 8V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.45	-	0.95	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	-	200	m Ω	$V_{GS} = 4.5V, I_D = 900mA$
				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	$V_{DS} = 10V, I_D = 1A, V_{GS} = 10V, R_G = 6\Omega$
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.

DMN2300UFD

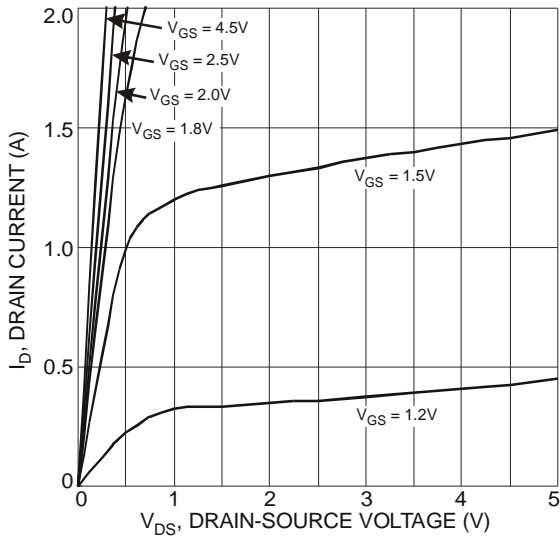


Fig. 4 Typical Output Characteristic

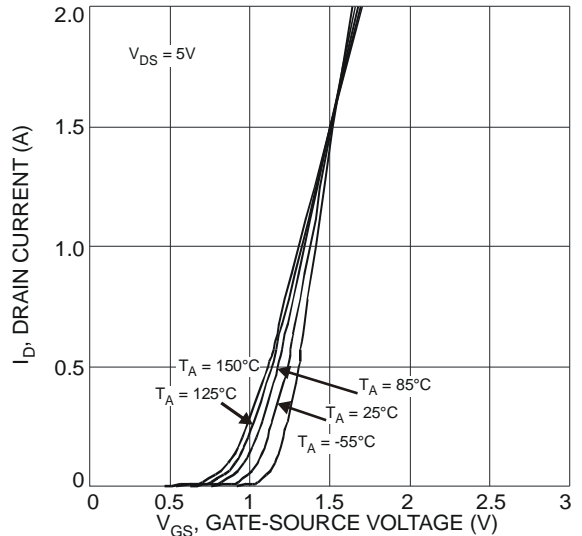


Fig. 5 Typical Transfer Characteristic

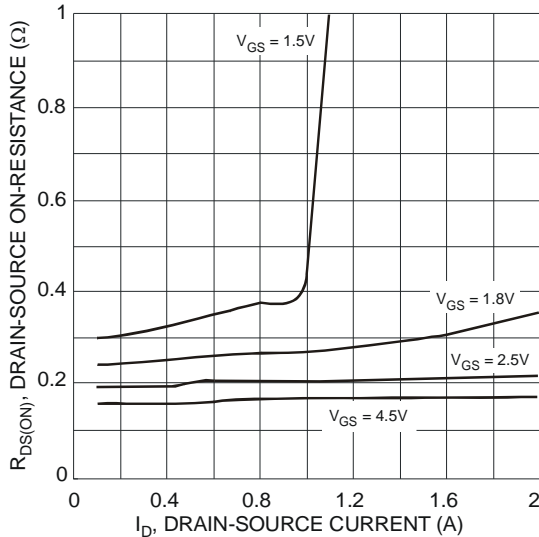


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

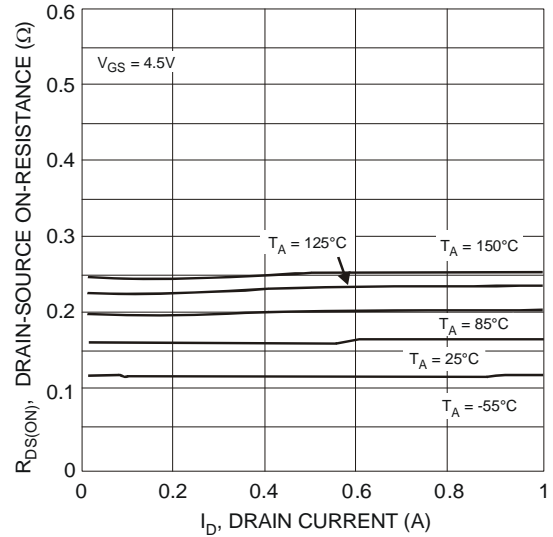


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

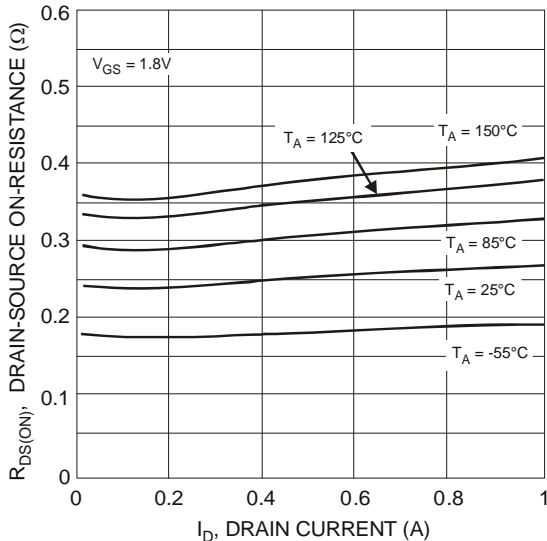


Fig. 8 Typical On-Resistance vs. Drain Current and Temperature

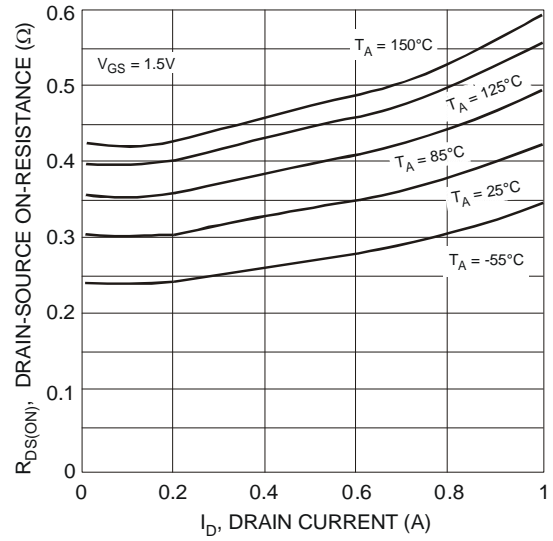


Fig. 9 Typical On-Resistance vs. Drain Current and Temperature

DMN2300UFD

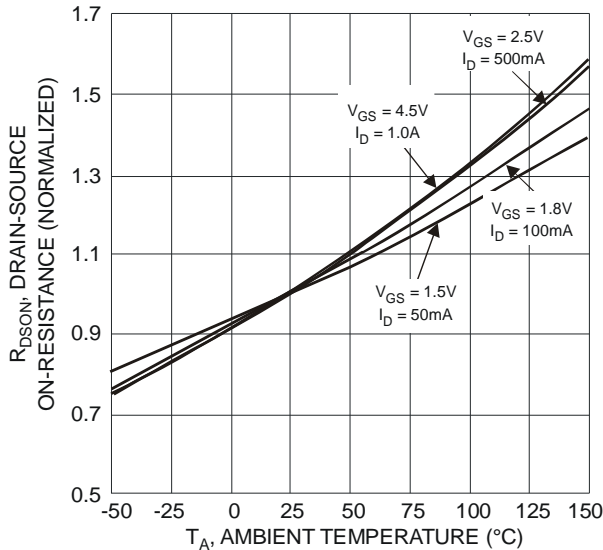


Fig. 10 On-Resistance Variation with Temperature

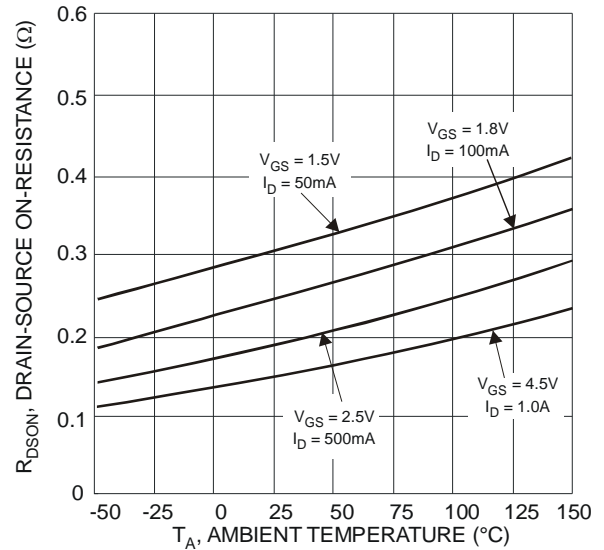


Fig. 11 On-Resistance Variation with Temperature

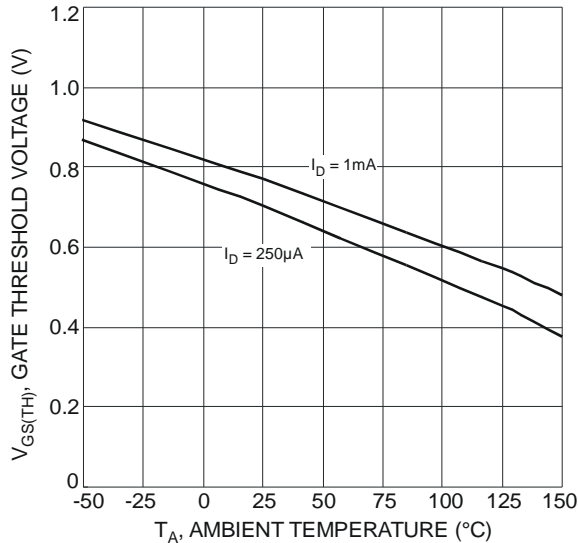


Fig. 12 Gate Threshold Variation vs. Ambient Temperature

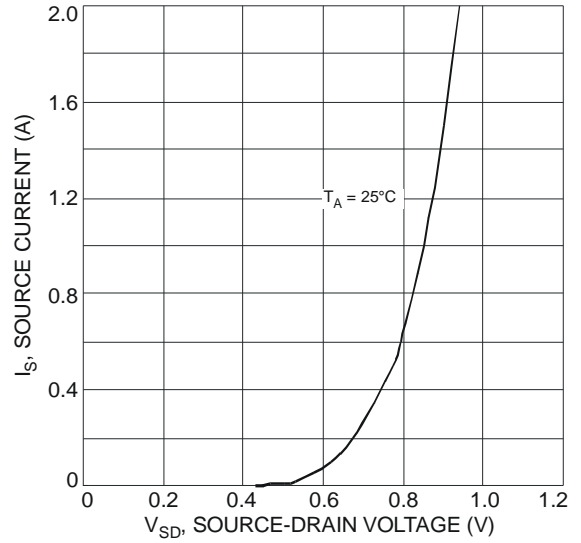


Fig. 13 Diode Forward Voltage vs. Current

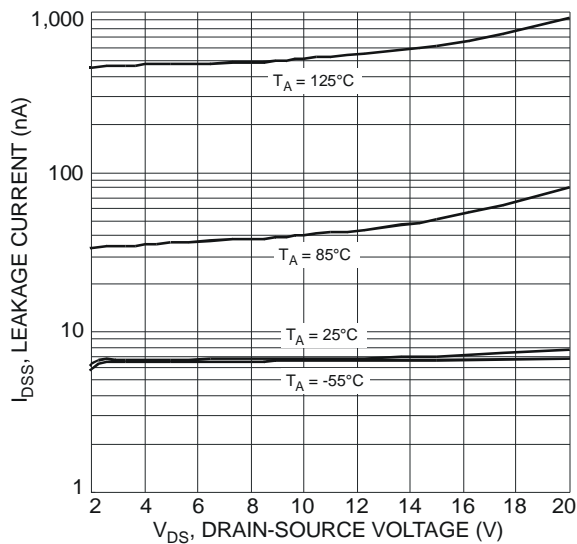


Fig. 14 Typical Leakage Current vs. Drain-Source Voltage

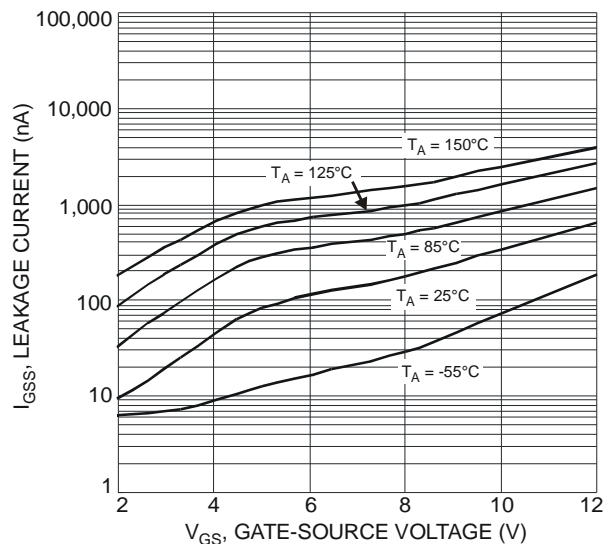


Fig. 15 Leakage Current vs. Gate-Source Voltage

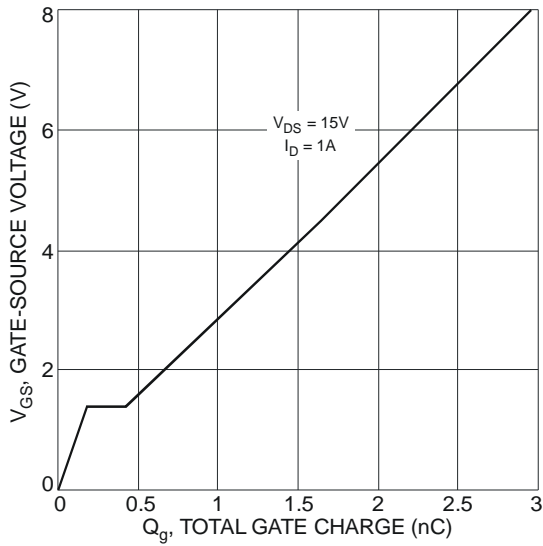
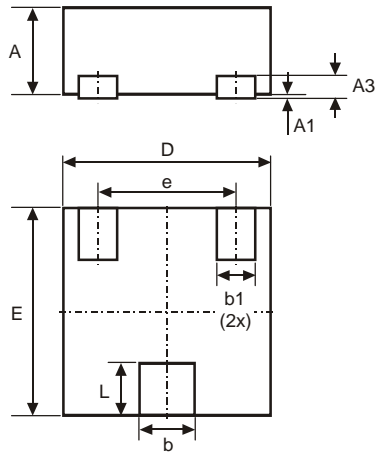


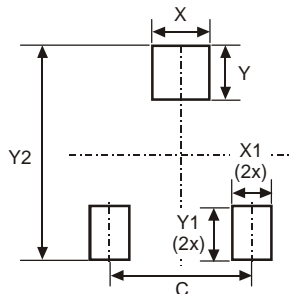
Fig. 16 Gate-Charge Characteristics

Package Outline Dimensions



X1-DFN1212-3			
Dim	Min	Max	Typ
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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