

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max @ $T_A = 25^\circ C$ (Note 4)
-20V	495m Ω @ $V_{GS} = -4.5V$	-0.77A
	690m Ω @ $V_{GS} = -2.5V$	-0.67A
	960m Ω @ $V_{GS} = -1.8V$	-0.57A

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.

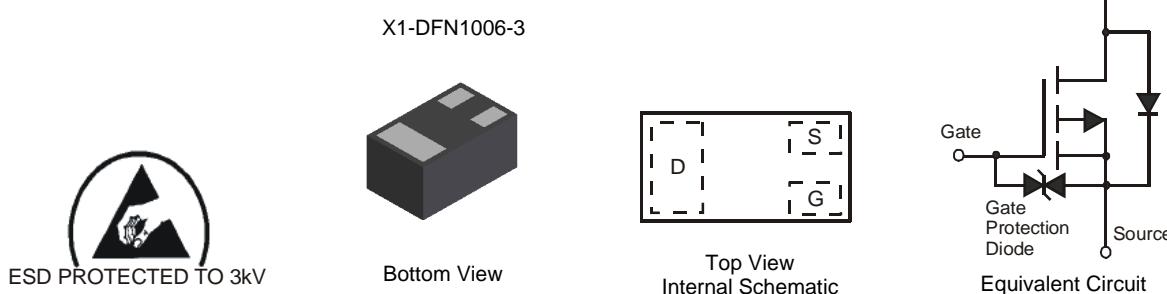
- Portable electronics

Features and Benefits

- Footprint of just 0.6mm² – thirteen times smaller than SOT23
- Low Gate Threshold Voltage
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS compliant (Note 1)**
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD Protected Gate 3kV
- Qualified to AEC-Q101 Standards for High Reliability

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
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)



Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP21D0UFB-7B	NG	7	8	10,000

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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>.

Marking Information

DMP21D0UFB-7B



NG = Product Type Marking Code

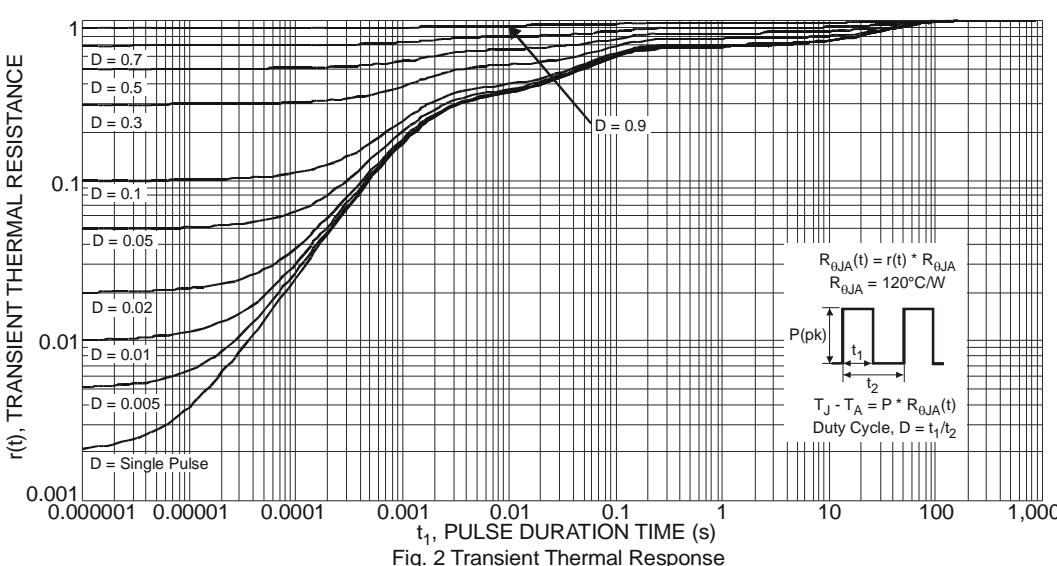
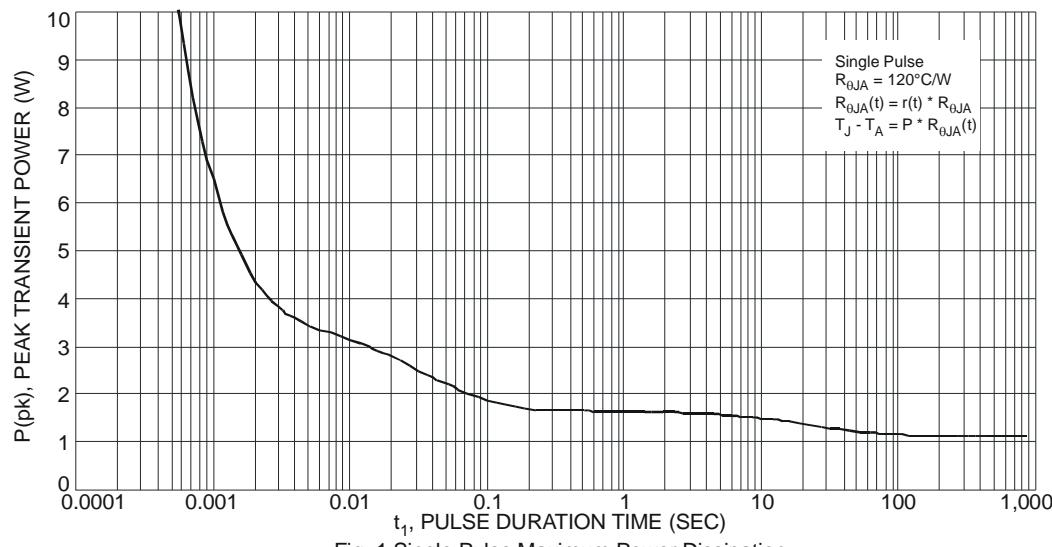
Top View
Bar Denotes Gate
and Source Side

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	$T_A = 25^\circ\text{C}$ (Note 4) $T_A = 85^\circ\text{C}$ (Note 4) $T_A = 25^\circ\text{C}$ (Note 5)	I_D	-0.77 -0.55 -1.17	A
Pulsed Drain Current (Note 6)			I_{DM}	-5.0	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	0.43	W
Power Dissipation (Note 5)	P_D	0.99	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	293	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	126	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Thermal Characteristics


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	$V_{\text{GS}} = 0\text{V}$, $I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	I_{DSS}	-	-	-1	μA	$V_{\text{DS}} = -20\text{V}$, $V_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GS}	-	-	± 10	μA	$V_{\text{GS}} = \pm 8\text{V}$, $V_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{\text{GS(th)}}$	-	-0.7	-	V	$V_{\text{DS}} = V_{\text{GS}}$, $I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{\text{DS(on)}}$	-	-	495	$\text{m}\Omega$	$V_{\text{GS}} = -4.5\text{V}$, $I_D = -400\text{mA}$
				690		$V_{\text{GS}} = -2.5\text{V}$, $I_D = -300\text{mA}$
				960		$V_{\text{GS}} = -1.8\text{V}$, $I_D = -100\text{mA}$
Forward Transfer Admittance	$ Y_{\text{fs}} $	50	-	-	mS	$V_{\text{DS}} = -3\text{V}$, $I_D = -300\text{mA}$
Diode Forward Voltage	V_{SD}	-	-	-1.2	V	$V_{\text{GS}} = 0\text{V}$, $I_S = -300\text{mA}$
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	-	76.5	-	pF	$V_{\text{DS}} = -10\text{V}$, $V_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	13.7	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	10.7	-	pF	
Gate Resistance	R_g	-	195	-	Ω	$V_{\text{DS}} = 0\text{V}$, $V_{\text{GS}} = 0\text{V}$, $f = 1\text{MHz}$
Total Gate Charge	Q_g	-	1.5	-	nC	$V_{\text{GS}} = -8\text{V}$, $V_{\text{DS}} = -15\text{V}$, $I_D = -1\text{A}$
Total Gate Charge	Q_g	-	1.0	-	nC	$V_{\text{GS}} = -4.5\text{V}$, $V_{\text{DS}} = -15\text{V}$, $I_D = -1\text{A}$
Gate-Source Charge	Q_{gs}	-	0.2	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.3	-	nC	
Turn-On Delay Time	$t_{\text{D(on)}}$	-	7.1	-	ns	$V_{\text{DS}} = -10\text{V}$, $-I_D = 1\text{A}$ $V_{\text{GS}} = -4.5\text{V}$, $R_G = 6\Omega$
Turn-On Rise Time	t_r	-	8.0	-	ns	
Turn-Off Delay Time	$t_{\text{D(off)}}$	-	31.7	-	ns	
Turn-Off Fall Time	t_f	-	18.5	-	ns	

Notes:

4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
6. Device mounted on minimum recommended pad layout test board, 10 μs pulse duty cycle = 1%
7. Short duration pulse test used to minimize self-heating effect.

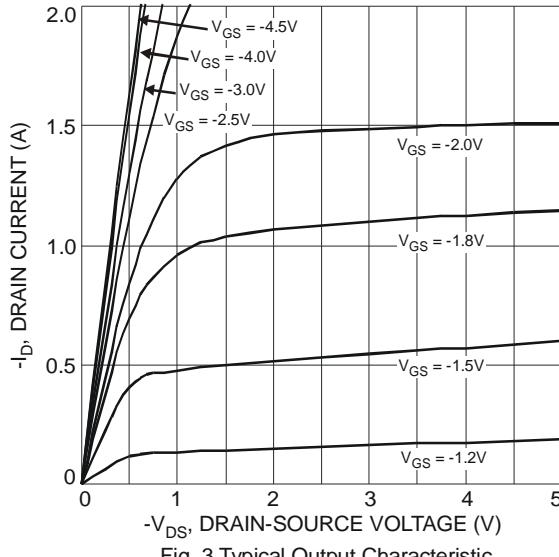
Typical Characteristics


Fig. 3 Typical Output Characteristic

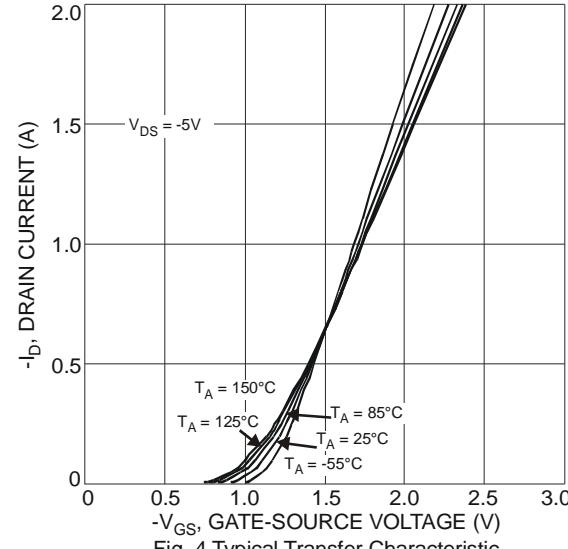


Fig. 4 Typical Transfer Characteristic

DMP21D0UFB

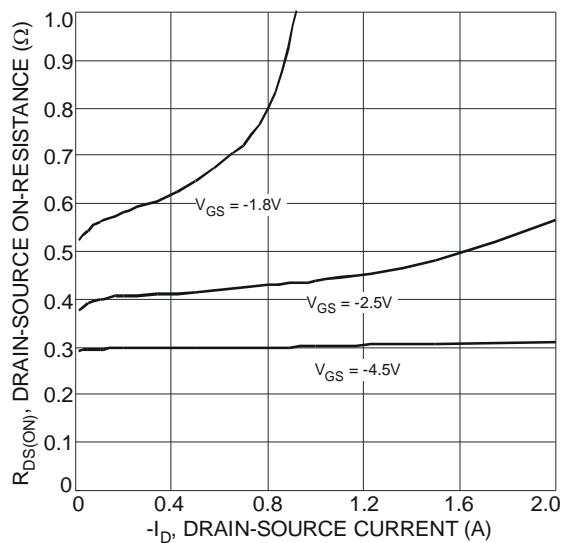


Fig. 5 Typical On-Resistance
vs. Drain Current and Gate Voltage

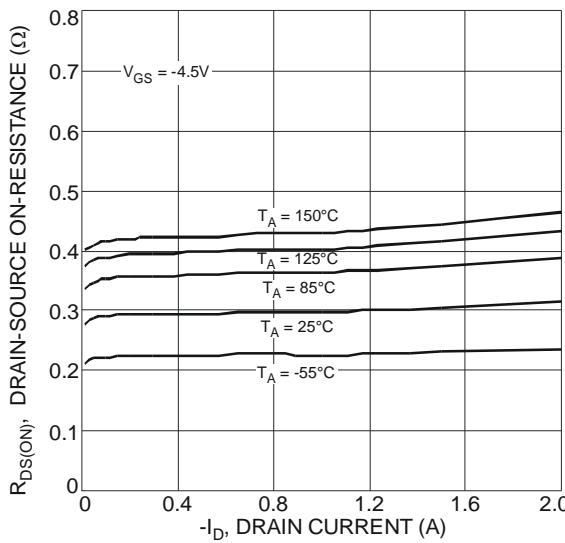


Fig. 6 Typical On-Resistance
vs. Drain Current and Temperature

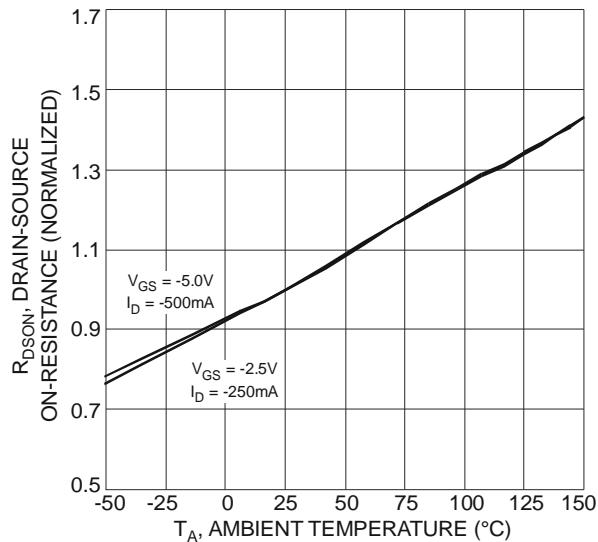


Fig. 7 On-Resistance Variation with Temperature

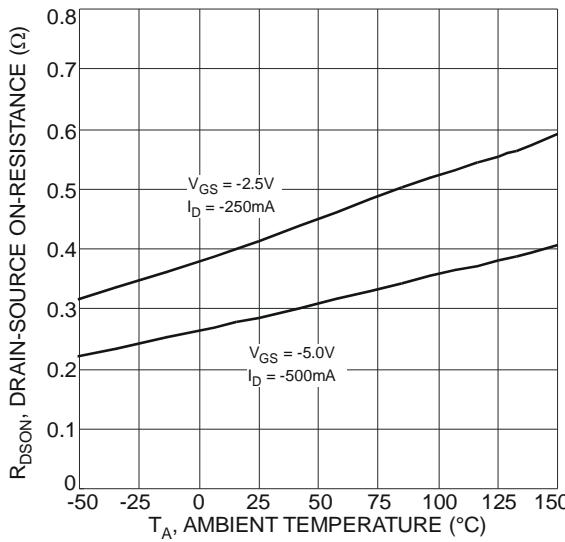


Fig. 8 On-Resistance Variation with Temperature

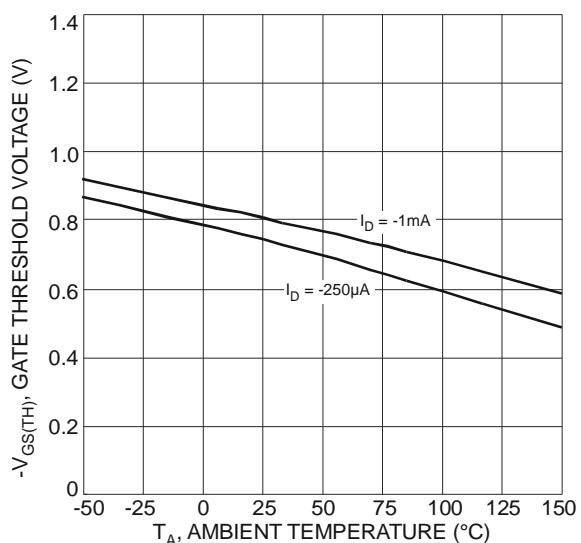


Fig. 9 Gate Threshold Variation vs. Ambient Temperature

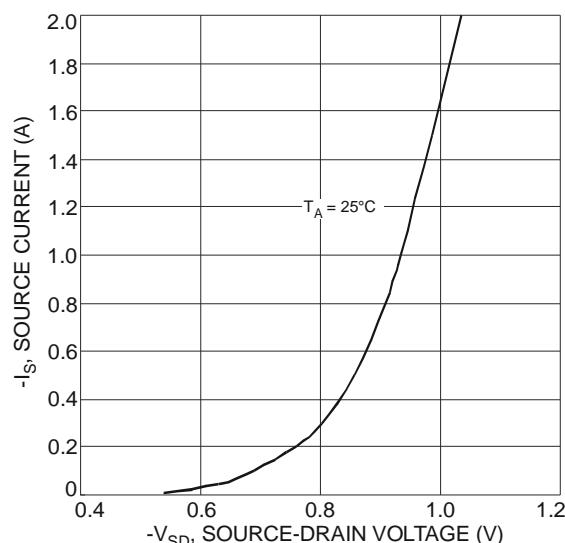


Fig. 10 Diode Forward Voltage vs. Current

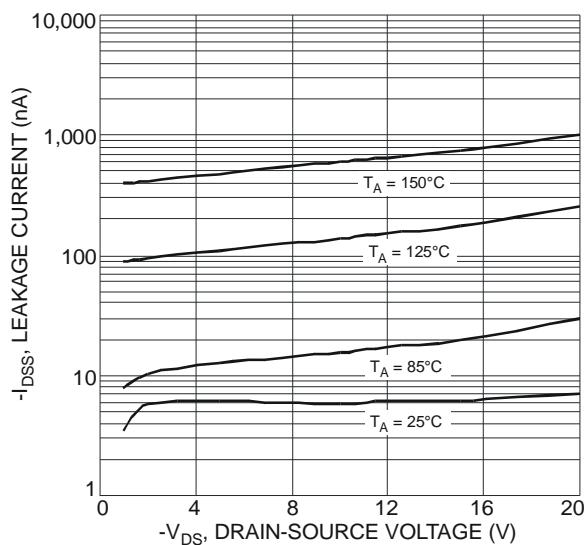


Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

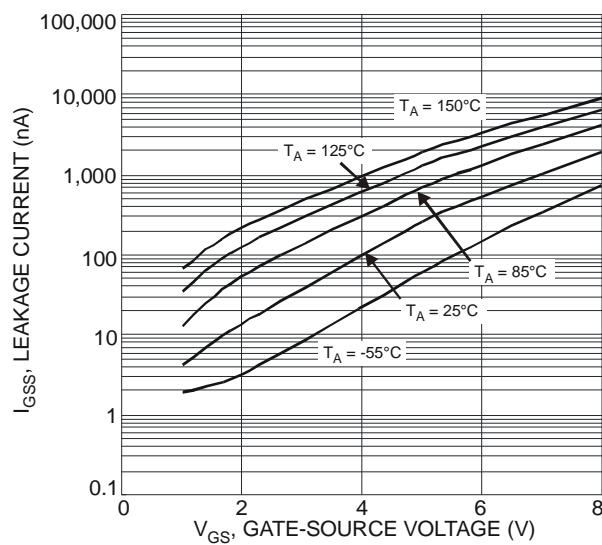


Fig. 12 Leakage Current vs. Gate-Source Voltage

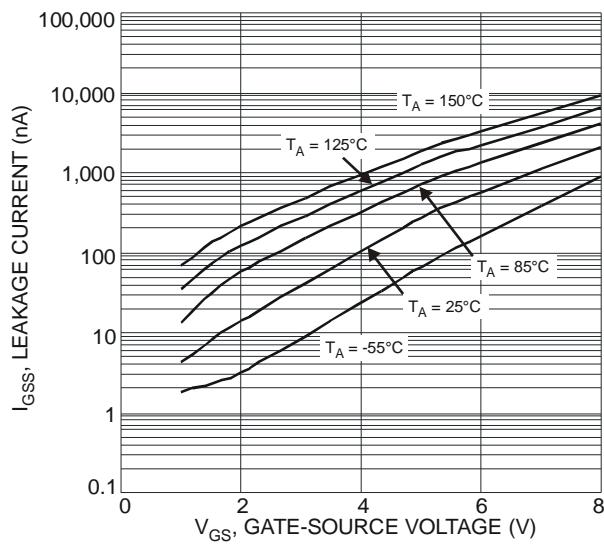


Fig. 13 Leakage Current vs. Gate-Source Voltage

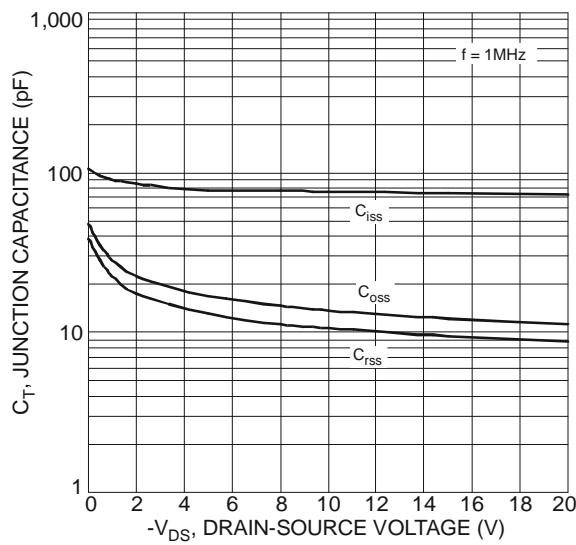


Fig. 14 Typical Junction Capacitance

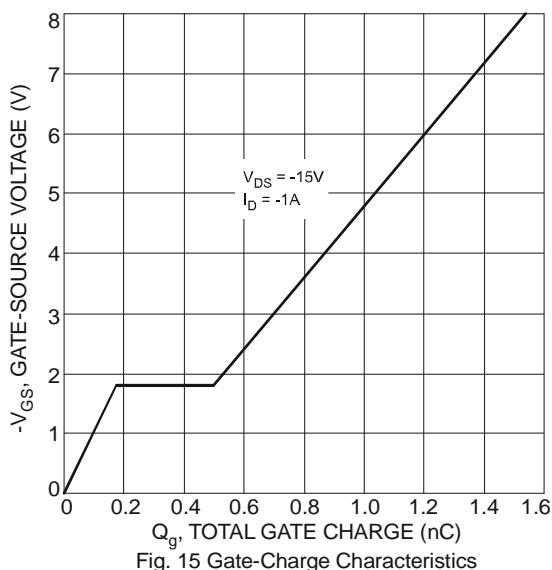
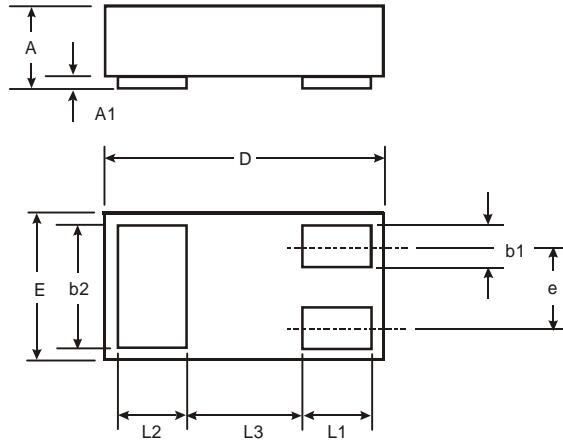


Fig. 15 Gate-Charge Characteristics

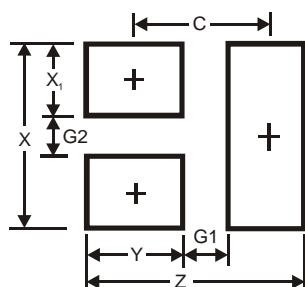
Package Outline Dimensions



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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