

20V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D @ T_A = +25^{\circ}C$
-20V	495mΩ @ $V_{GS} = -4.5V$	-0.77A
	690mΩ @ $V_{GS} = -2.5V$	-0.67A
	960mΩ @ $V_{GS} = -1.8V$	-0.57A

Description and Applications

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

- Portable Electronics

Features and Benefits

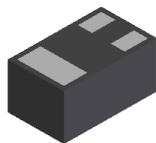
- Footprint of just 0.6mm² – 13 times smaller than SOT23
- 0.4mm Profile – Ideal for Low Profile Applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate 3KV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

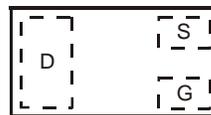
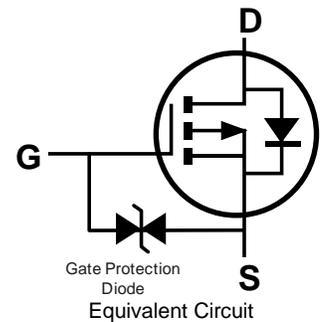
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.001 grams (Approximate)



X2-DFN1006-3



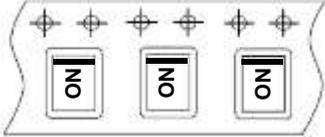
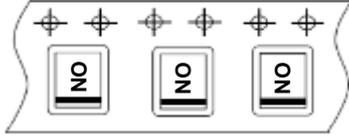
Bottom View


 Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Tape Pitch (mm)	Quantity per Reel
DMP21D0UFB4-7R	NO	7	8	4	3,000
DMP21D0UFB4-7B	NO	7	8	2	10,000

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

<p>DMP21D0UFB4-7R</p>	<div style="text-align: center;">  <p>Top View Bar Denotes Gate and Source Side</p> </div> <div style="text-align: center;">  </div> <p style="text-align: right;">NO = Part Marking Code</p>
<p>DMP21D0UFB4-7B</p>	<div style="text-align: center;">  <p>Top View Bar Denotes Gate and Source Side</p> </div> <div style="text-align: center;">  </div> <p style="text-align: right;">NO = Part Marking Code</p>

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 5)	-0.77	A
		T _A = +85°C (Note 5)	-0.55	
		T _A = +25°C (Note 6)	-1.17	
Pulsed Drain Current (Note 7)		I _{DM}	-5.0	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.43	W
Power Dissipation (Note 6)	P _D	0.99	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	293	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	126	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

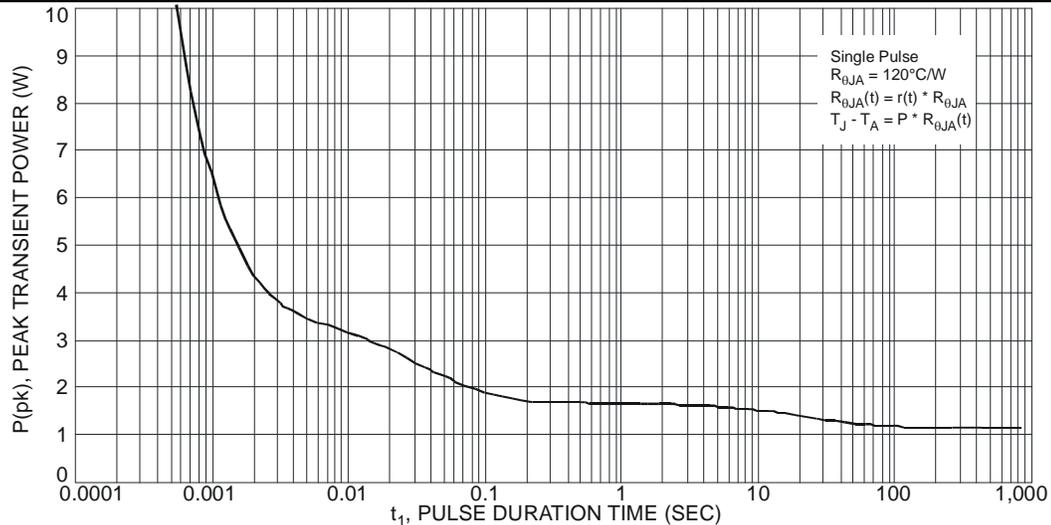
Thermal Characteristics


Fig. 1 Single Pulse Maximum Power Dissipation

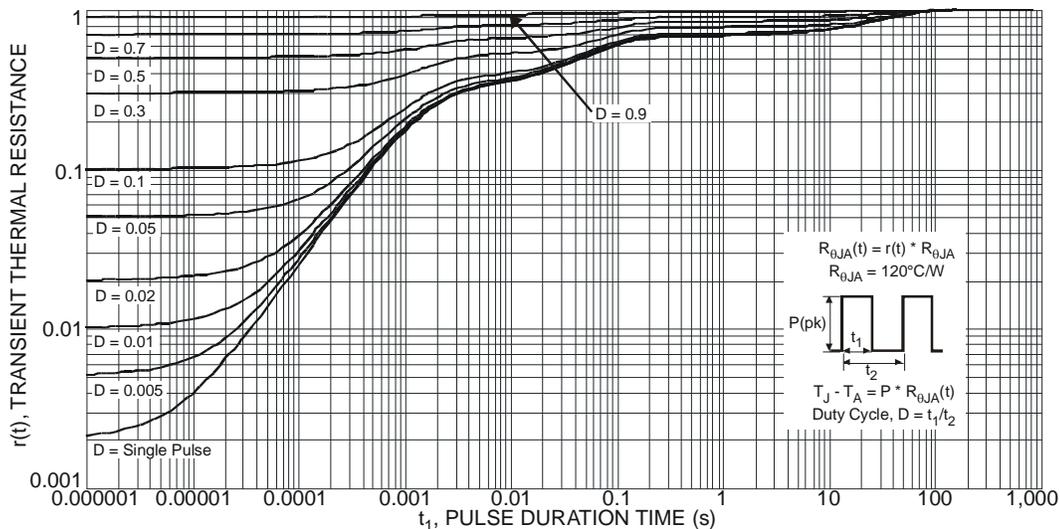


Fig. 2 Transient Thermal Response

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	—	-0.7	—	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	495	m Ω	$V_{GS} = -4.5V, I_D = -400mA$
				690		$V_{GS} = -2.5V, I_D = -300mA$
				960		$V_{GS} = -1.8V, I_D = -100mA$
Forward Transfer Admittance	$ Y_{FS} $	50	—	—	mS	$V_{DS} = -3V, I_D = -300mA$
Diode Forward Voltage	V_{SD}	—	—	-1.2	V	$V_{GS} = 0V, I_S = -300mA$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	76.5	—	pF	$V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	C_{OSS}	—	13.7	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	10.7	—	pF	
Gate Resistance	R_G	—	195	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	Q_G	—	1.5	—	nC	$V_{GS} = -8V, V_{DS} = -15V, I_D = -1A$
Total Gate Charge	Q_G	—	1.0	—	nC	$V_{GS} = -4.5V, V_{DS} = -15V, I_D = -1A$
Gate-Source Charge	Q_{GS}	—	0.2	—	nC	
Gate-Drain Charge	Q_{GD}	—	0.3	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	7.1	—	ns	$V_{DS} = -10V, -I_D = 1A, V_{GS} = -4.5V, R_G = 6\Omega$
Turn-On Rise Time	t_R	—	8.0	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	31.7	—	ns	
Turn-Off Fall Time	t_F	—	18.5	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 - Device mounted on minimum recommended pad layout test board, 10 μs pulse duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

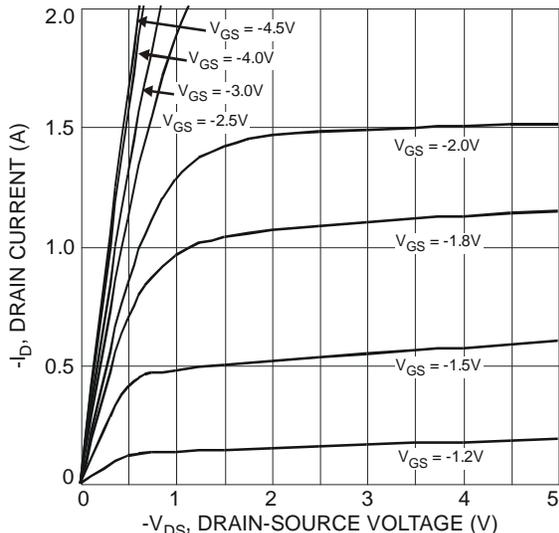
Typical Characteristics


Fig. 3 Typical Output Characteristic

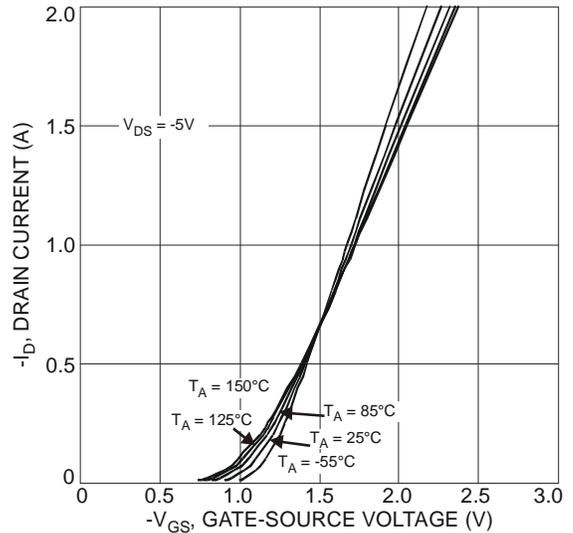
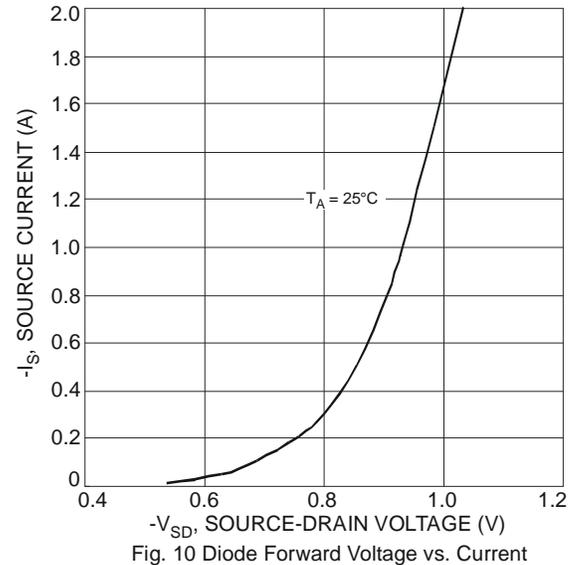
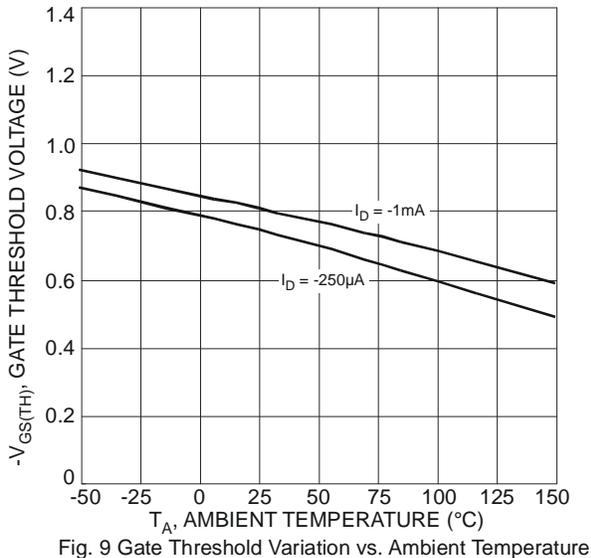
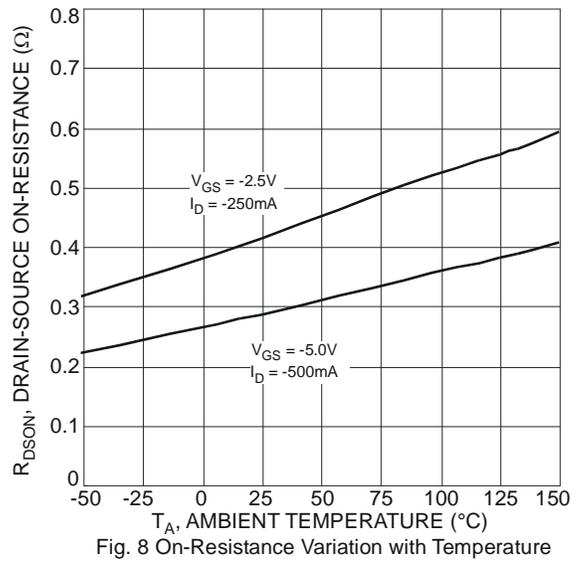
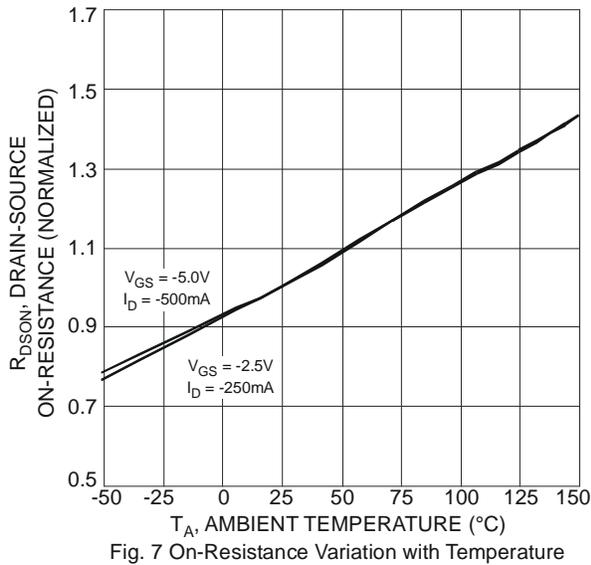
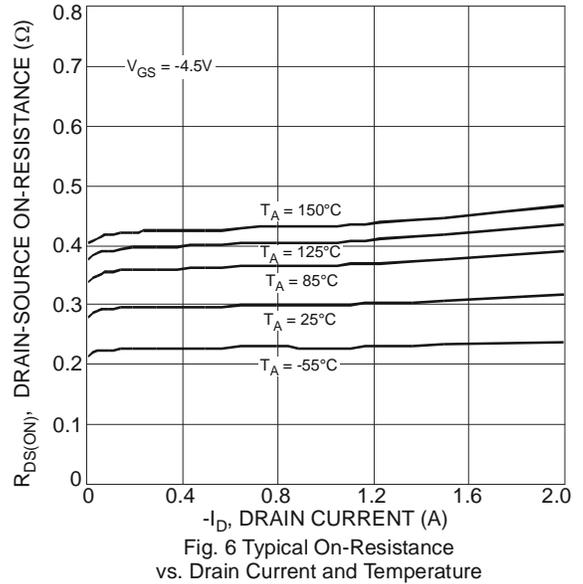
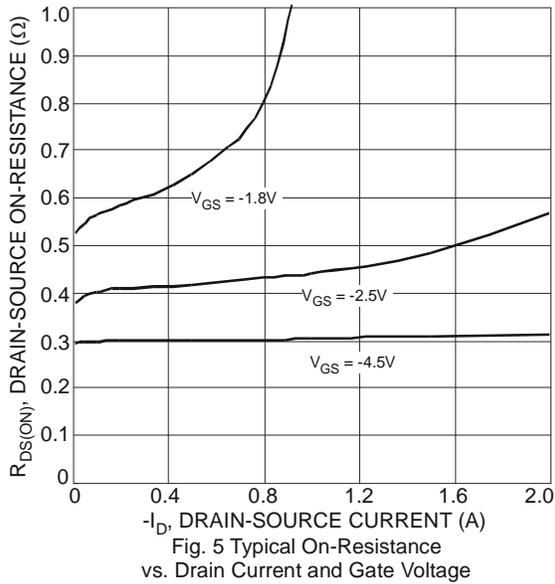


Fig. 4 Typical Transfer Characteristic

Typical Characteristics (Continued)



Typical Characteristics (Cont.)

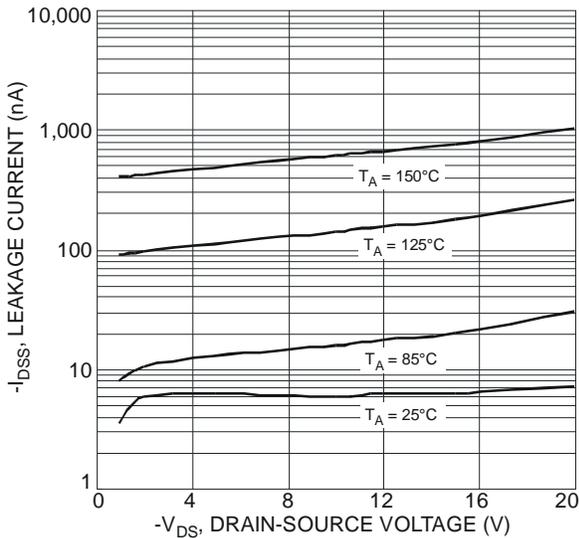


Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

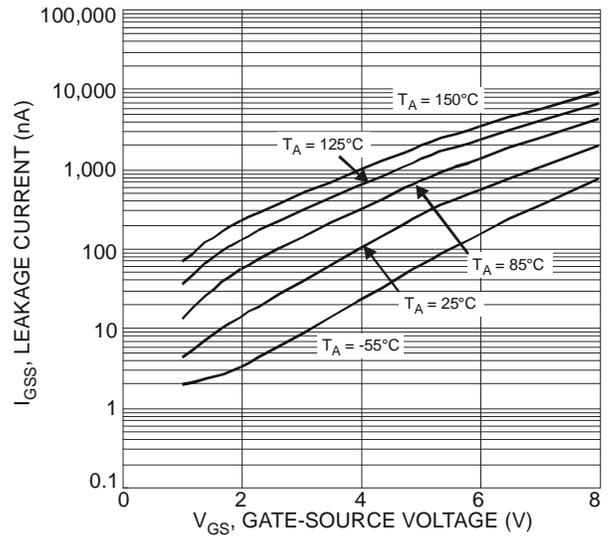


Fig. 12 Leakage Current vs. Gate-Source Voltage

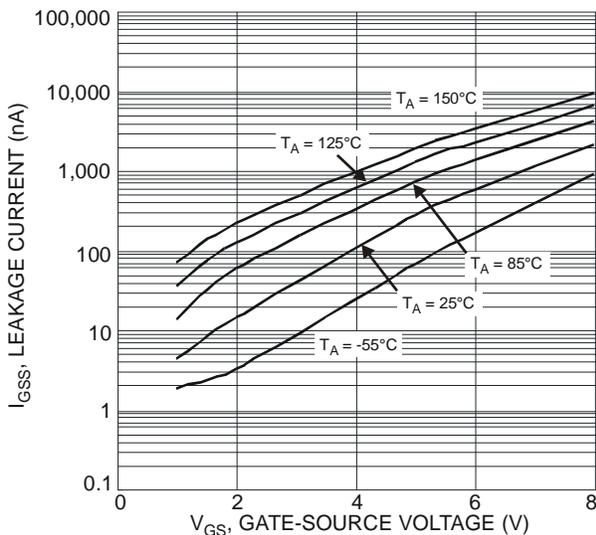


Fig. 13 Leakage Current vs. Gate-Source Voltage

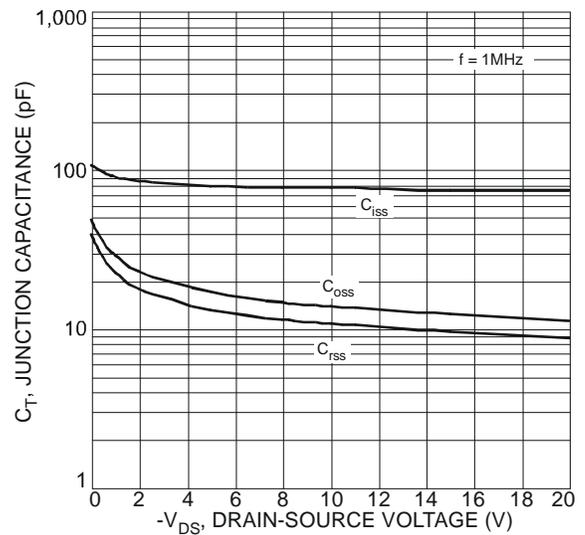


Fig. 14 Typical Junction Capacitance

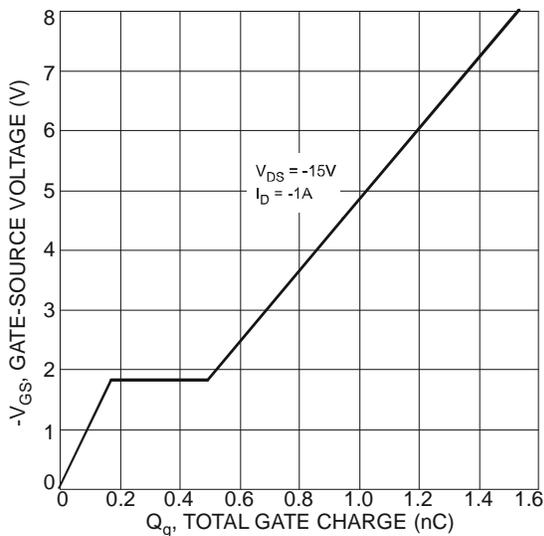
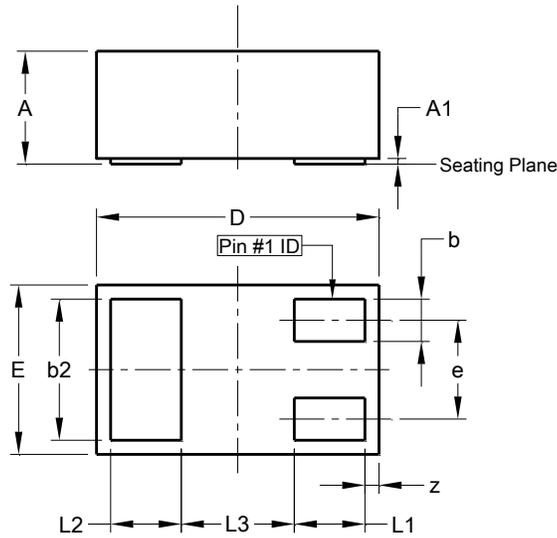


Fig. 15 Gate-Charge Characteristics

Package Outline Dimensions

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

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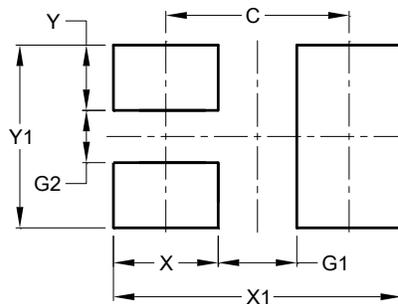


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Dim	Min	Max	Typ
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	—	—	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	—	—	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1006-3

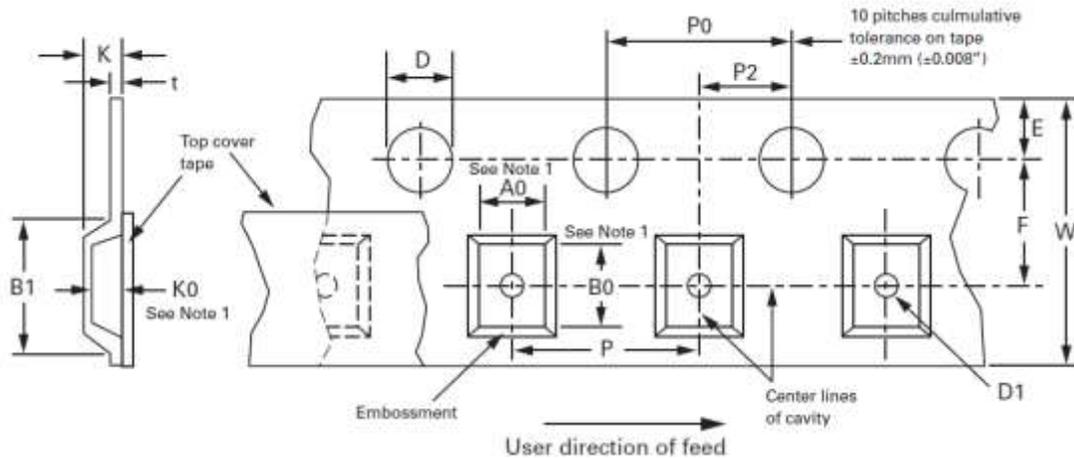


Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

Tape and Reel Information

Please see <http://www.diodes.com/packages.html> for the latest version.

EMBOSSED CARRIER TAPE SPECIFICATIONS



8, 12, 16, 24mm EMBOSSED TAPE DIMENSIONS IN mm						
Tape Size	D	E	P ₀	t _{max}	A ₀ B ₀ K ₀	Constant Dimensions
8mm	1.50 +0.10 -0.0	1.75 ± 0.10	4.0 ± 0.10	0.400	See Note 10	

Tape Size	B ₁ max	D ₁ min	F	K max	P ₂	R min	W	Package Type
8mm	4.5	0.35	3.5 ± 0.05	2.4	2.0 ± 0.05	25	8.0 ± 0.30	Refer to 8mm Device Tape Orientation Table

P					
Tape Size	2.0 ± 0.05	4.0 ± 0.10	8.0 ± 0.10	12.0 ± 0.10	16.0 ± 0.10
8mm	DFN1006 (-7B)	DFN1006 (-7R)	—	—	—

Note: 10. A₀ B₀ K₀ are determined by component size.

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