

**DMP31D0UFB4**

**30V P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max $I_D$ @ $T_A = 25^\circ C$
-30V	1Ω @ $V_{GS} = -4.5V$	-0.76A
	1.5Ω @ $V_{GS} = -2.5V$	-0.62A
	2Ω @ $V_{GS} = -1.8V$	-0.54A

**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 in portable electronics

**Features and Benefits**

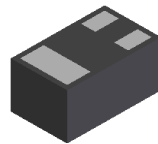
- Footprint of just 0.6mm<sup>2</sup> – thirteen times smaller than SOT23
- 0.4mm profile – ideal for low profile applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate 2KV**
- “Lead Free”, RoHS Compliant (Note 1)
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **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
- Weight: 0.001 grams (approximate)



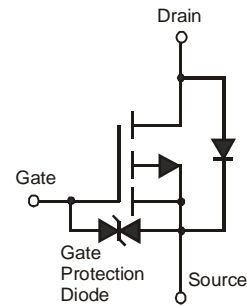
X2-DFN1006-3



Bottom View



Top View  
Internal Schematic



Equivalent Circuit

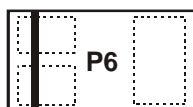
**Ordering Information** (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP31D0UFB4-7B	P6	7	8	10,000

- 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**

DMP31D0UFB4-7B



Top View  
Bar Denotes Gate  
And Source Side

P6 = Product Type Marking Code

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current	Steady State	T <sub>A</sub> = 25°C (Note 5)	I <sub>D</sub>	-0.76	A
		T <sub>A</sub> = 85°C (Note 5)		-0.55	
		T <sub>A</sub> = 25°C (Note 4)		-0.54	
Pulsed Drain Current (Note 5)			I <sub>DM</sub>	2	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	P <sub>D</sub>	0.46	W
	(Note 5)		0.92	
Thermal Resistance, Junction to Ambient	(Note 4)	R <sub>θJA</sub>	271	°C/W
	(Note 5)		136	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- 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, 10μs pulse duty cycle = 1%.

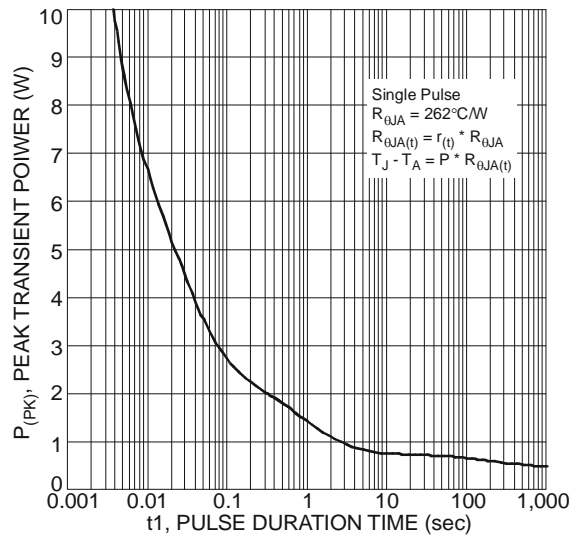


Fig. 1 Single Pulse Maximum Power Dissipation

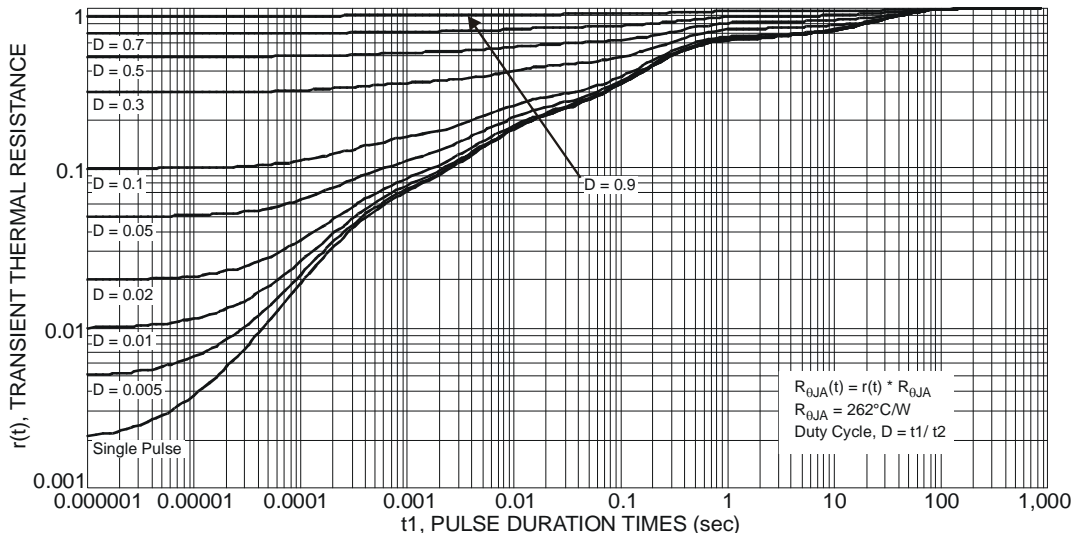


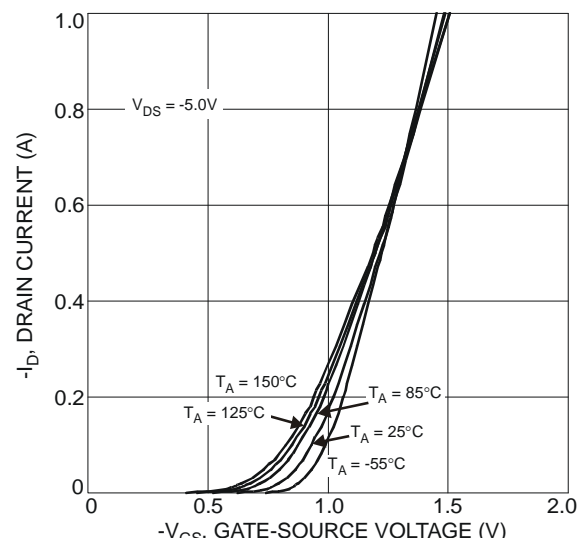
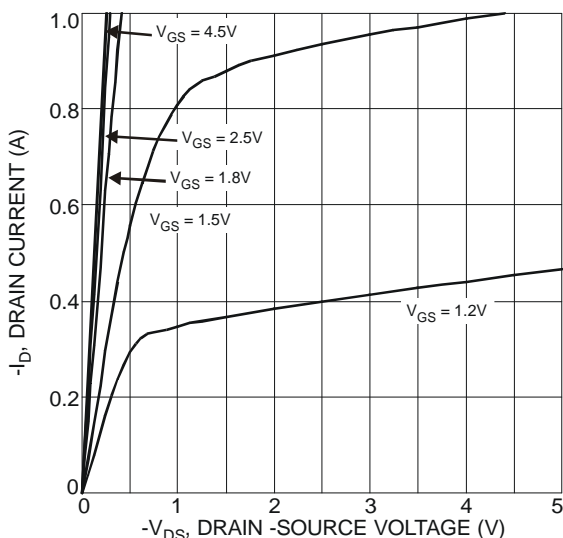
Fig. 2 Transient Thermal Resistance

**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	$BV_{DSS}$	-30	-	-	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	$I_{DSS}$	-	-	-1	$\mu A$	$V_{DS} = -30V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 3$	$\mu A$	$V_{GS} = \pm 8V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.1	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	-	1	$\Omega$	$V_{GS} = -4.5V, I_D = -400mA$
				1.5		$V_{GS} = -2.5V, I_D = -200mA$
				2		$V_{GS} = -1.8V, I_D = -100mA$
Forward Transfer Admittance	$ Y_{fs} $	50	-	-	mS	$V_{DS} = -3V, I_D = -300mA$
Diode Forward Voltage	$V_{SD}$	-	-	-1.2	V	$V_{GS} = 0V, I_S = -300mA$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	-	76	-	pF	$V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	9	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	6.43	-	pF	
Gate Resistance	$R_g$	-	166.9	-	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	$Q_g$	-	0.9	-	nC	$V_{GS} = -4.5V, V_{DS} = -15V, I_D = -1A$
Total Gate Charge	$Q_g$	-	1.5	-	nC	$V_{GS} = -8V, V_{DS} = -15V,$ $I_D = -1A$
Gate-Source Charge	$Q_{gs}$	-	0.1	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	0.2	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	4.98	-	ns	$V_{DD} = -10V, R_L = 10\Omega$ $V_{GS} = -4.5V, R_G = 6\Omega$
Turn-On Rise Time	$t_r$	-	5.85	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	35.71	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	35.71	-	ns	
Turn-Off Fall Time	$t_f$	-	16.64	-	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.

**Typical Electrical Characteristics**



**DMP31D0UFB4**

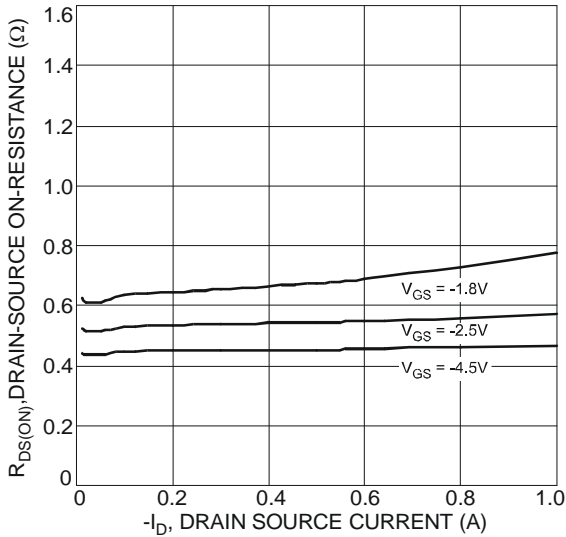


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

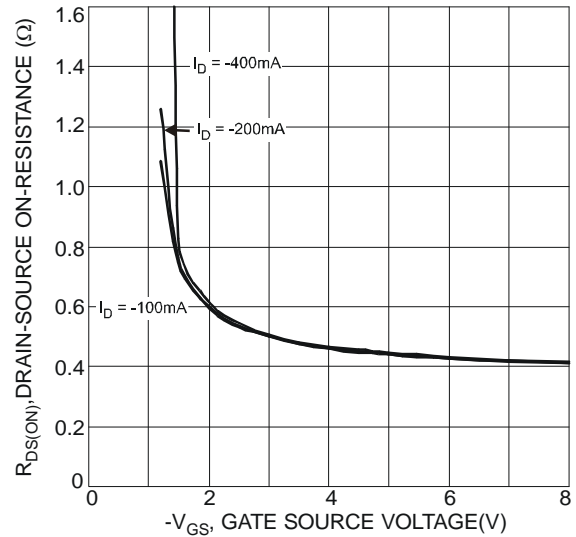


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

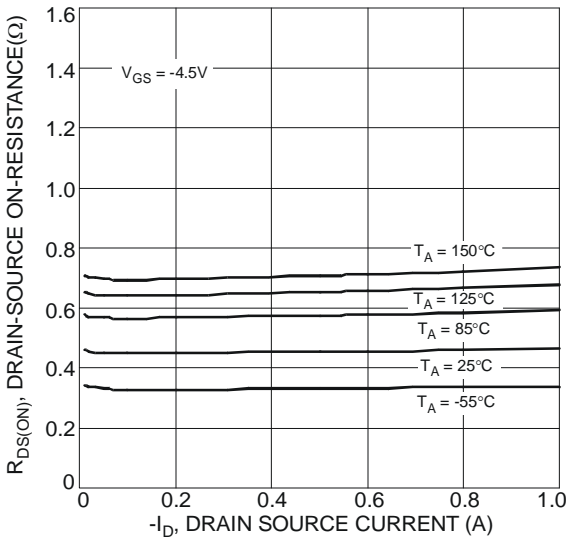


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

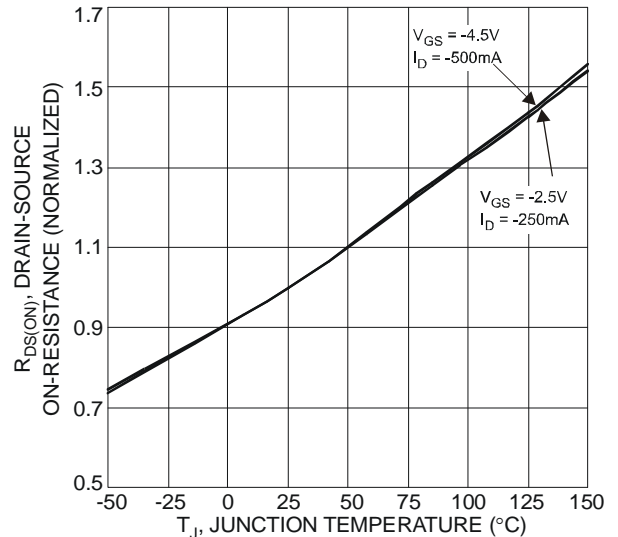


Fig. 8 On-Resistance Variation with Temperature

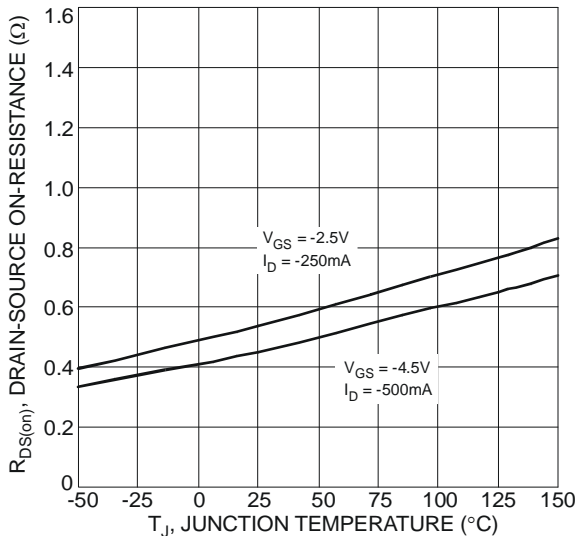


Fig. 9 On-Resistance Variation with Temperature

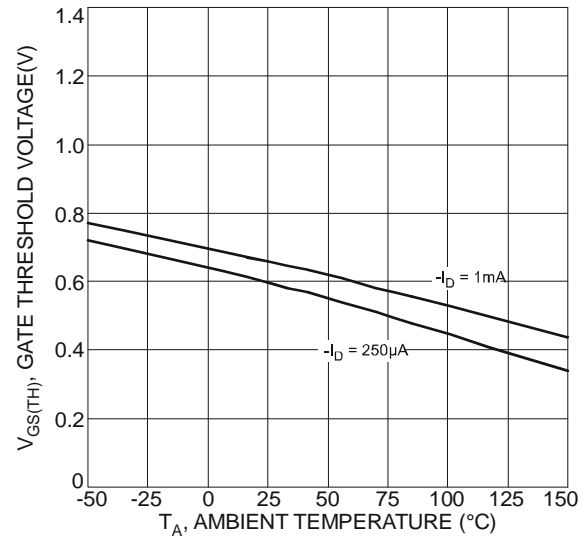


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

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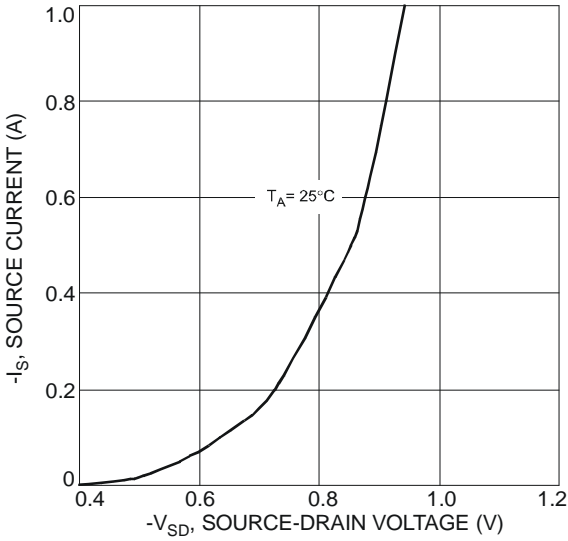


Fig. 11 Diode Forward Voltage vs. Current

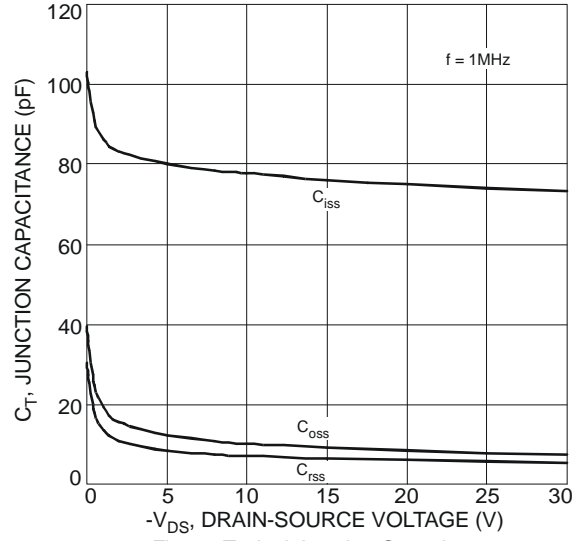


Fig. 12 Typical Junction Capacitance

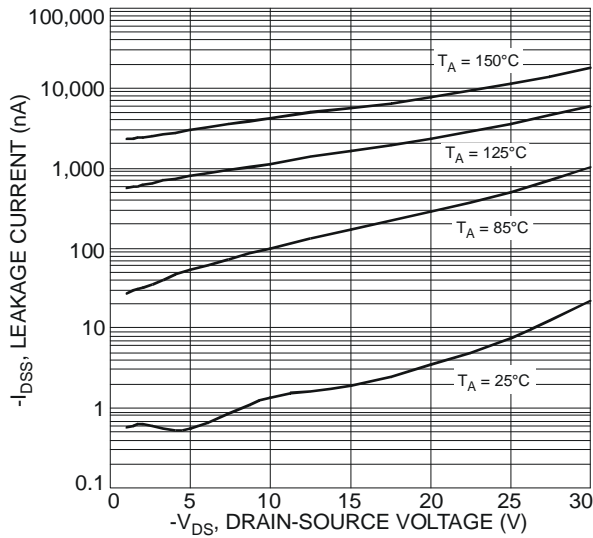


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

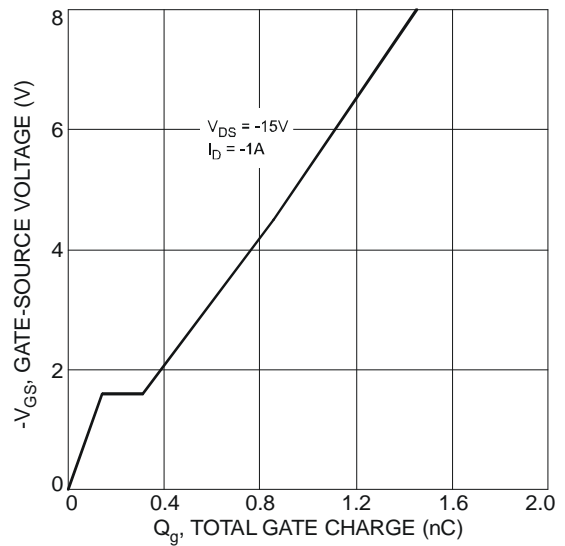
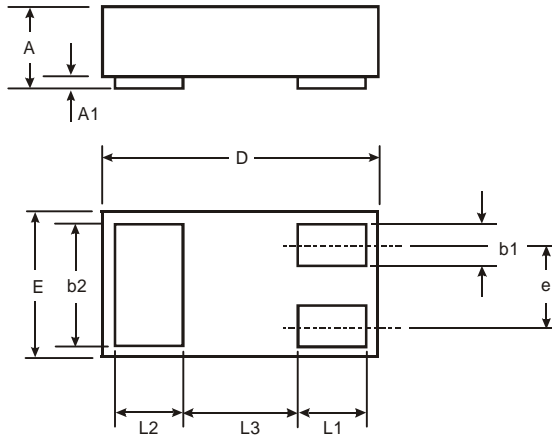


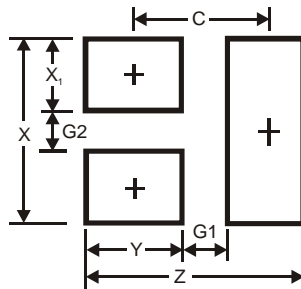
Fig. 14 Gate-Charge Characteristics

**Package Outline Dimensions**



X2-DFN1006-3			
Dim	Min	Max	Typ
A	—	0.40	—
A1	0	0.05	0.02
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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