



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



企业微信二维码



企业QQ二维码

## Product Summary

BV <sub>DSS</sub>	Max R <sub>DS(ON)</sub>	Max I <sub>D</sub> @ T <sub>A</sub> = +25°C
-30V	1Ω @ V <sub>GS</sub> = -4.5V	-0.76A
	1.5Ω @ V <sub>GS</sub> = -2.5V	-0.62A
	2Ω @ V <sub>GS</sub> = -1.8V	-0.54A

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load Switch in portable electronics

## Features and Benefits

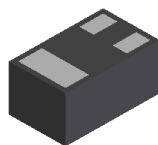
- Footprint of just 0.6mm<sup>2</sup> – Thirteen Times Smaller than SOT23
- 0.4mm Profile – Ideal for Low Profile Applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- ESD Protected Gate 2KV

## Mechanical Data

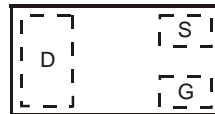
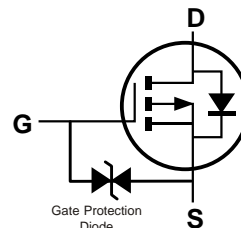
- Case: X2-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (e4)
- Terminal Connections: See Diagram
- Weight: 0.001 grams (Approximate)



X2-DFN1006-3



Bottom View


 Top View  
 Internal Schematic


Equivalent Circuit

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DS}$	-30	V
Gate-Source Voltage			$V_{GS}$	$\pm 8$	V
Continuous Drain Current	Steady State	$T_A = +25^\circ\text{C}$ (Note 6)	$I_D$	-0.76	A
		$T_A = +85^\circ\text{C}$ (Note 6)		-0.55	
		$T_A = +25^\circ\text{C}$ (Note 5)		-0.54	
Pulsed Drain Current (Note 7)			$I_{DM}$	2	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Power Dissipation	(Note 5)	$P_D$		0.46	W
	(Note 6)			0.92	
	(Note 5)			271	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$		136	$^\circ\text{C/W}$
	(Note 6)			271	
Operating and Storage Temperature Range			$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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 1 inch square copper plate.
  - Device mounted on minimum recommended pad layout test board, 10 $\mu\text{s}$  pulse duty cycle = 1%.

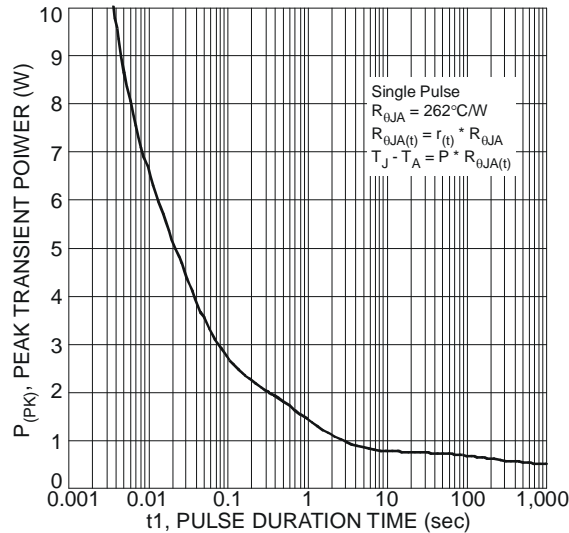


Fig. 1 Single Pulse Maximum Power Dissipation

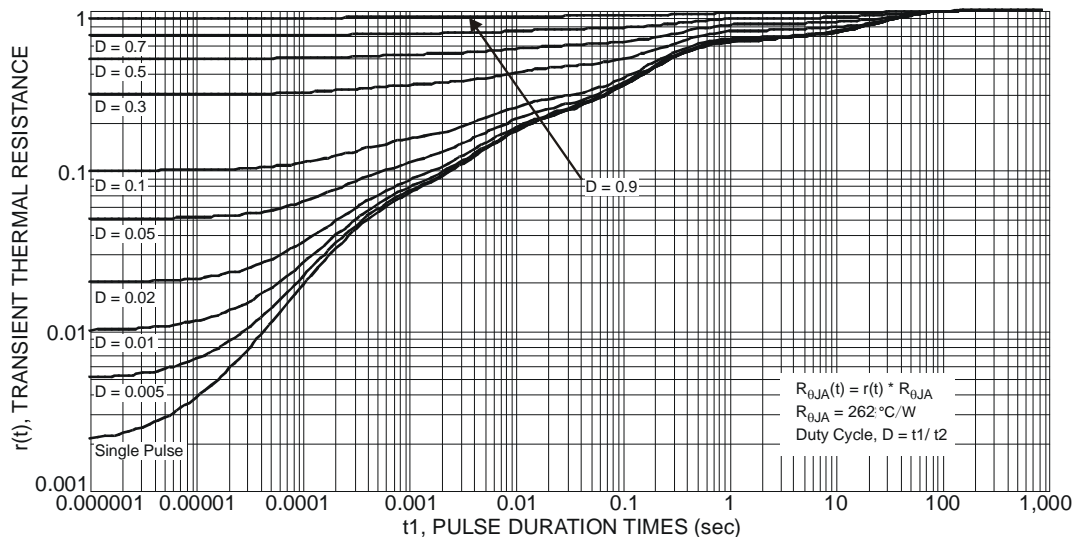
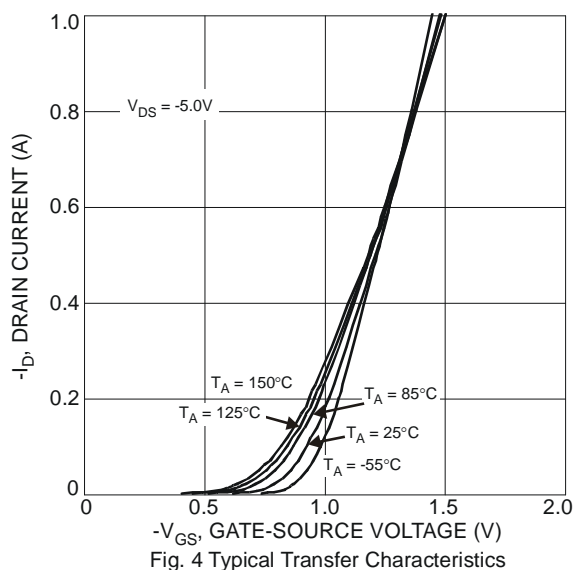
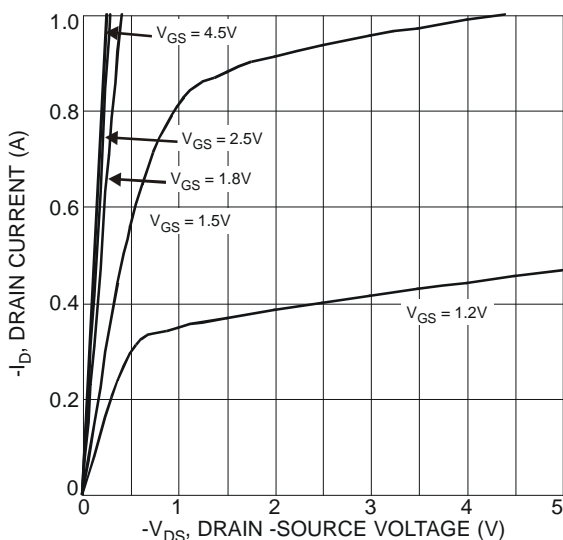


Fig. 2 Transient Thermal Resistance

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</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 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.5	-0.6	-1.1	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	0.45	1	$\Omega$	$V_{GS} = -4.5V, I_D = -400mA$
			0.54	1.5		$V_{GS} = -2.5V, I_D = -200mA$
			0.64	2		$V_{GS} = -1.8V, I_D = -100mA$
						$V_{GS} = -1.8V, I_D = -100mA$
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 (Note9)</b>						
Input Capacitance	$C_{iss}$	-	76	150	pF	$V_{DS} = -15V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	9	20	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	6.43	15	pF	
Gate Resistance	$R_g$	-	167	-	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
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	$t_{D(OFF)}$	-	35.7	-	ns	
Turn-Off Fall Time	$t_F$	-	16.6	-	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.  
 9. Guaranteed by design. Not subject to product testing.

**Typical Electrical Characteristics**


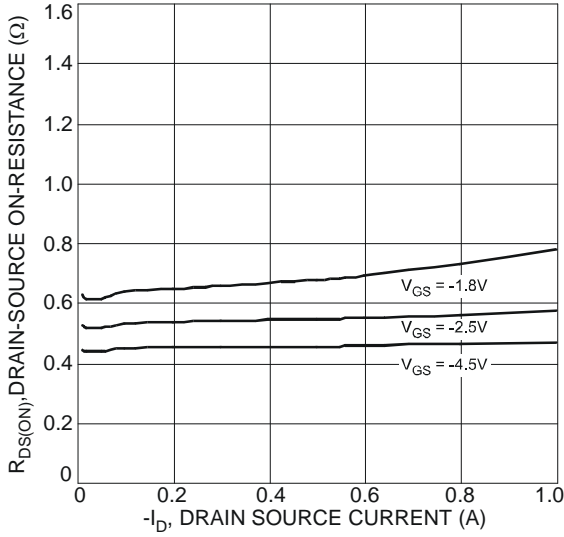


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

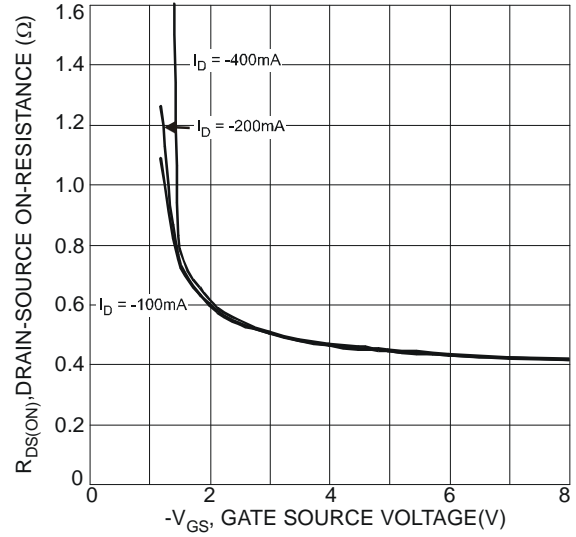


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

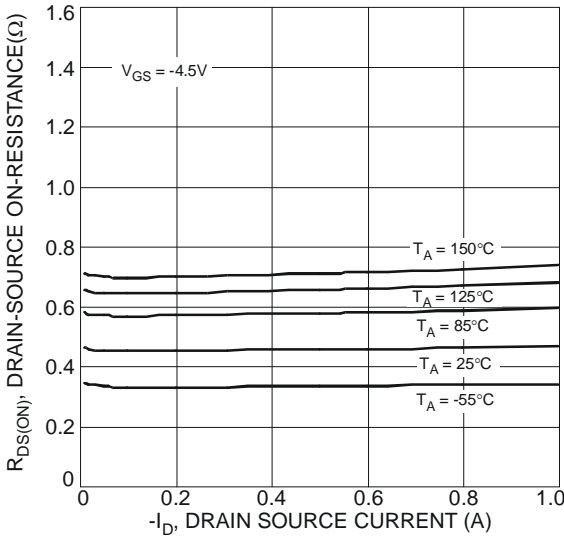


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

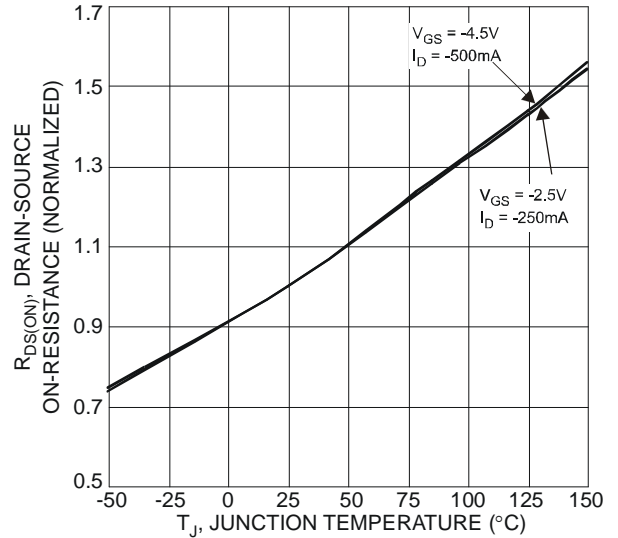


Fig. 8 On-Resistance Variation with Temperature

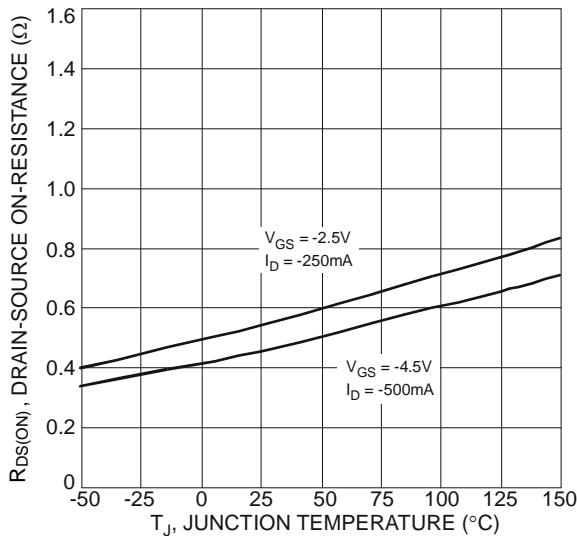


Fig. 9 On-Resistance Variation with Temperature

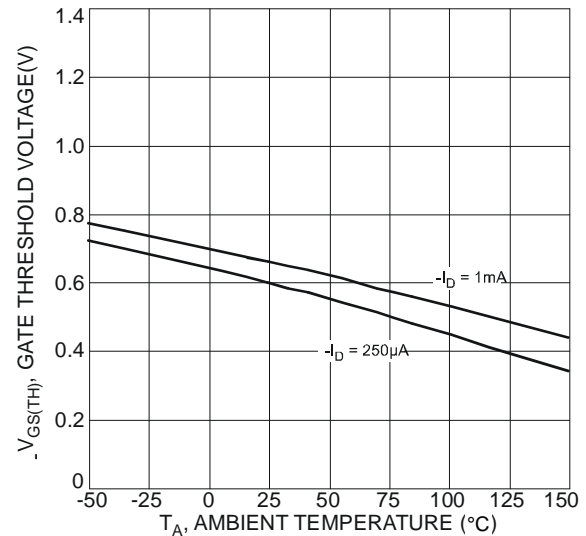


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

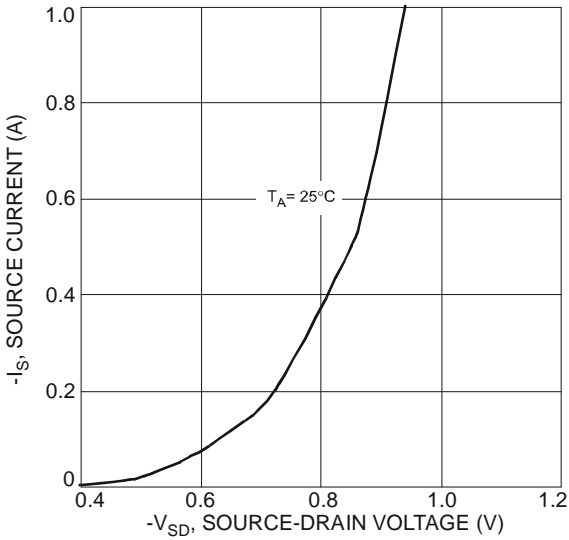


Fig. 11 Diode Forward Voltage vs. Current

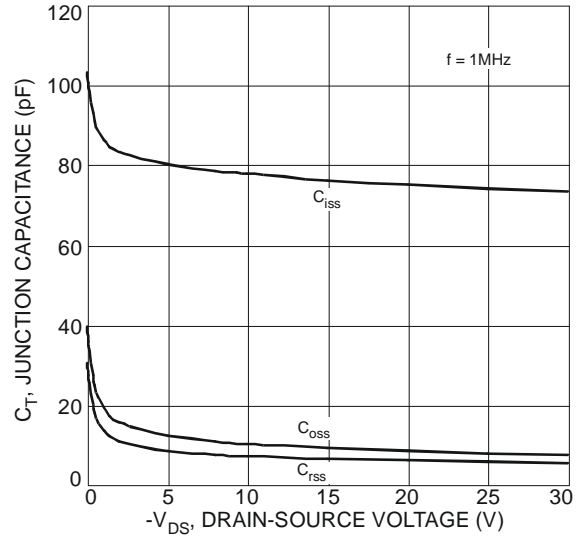


Fig. 12 Typical Junction Capacitance

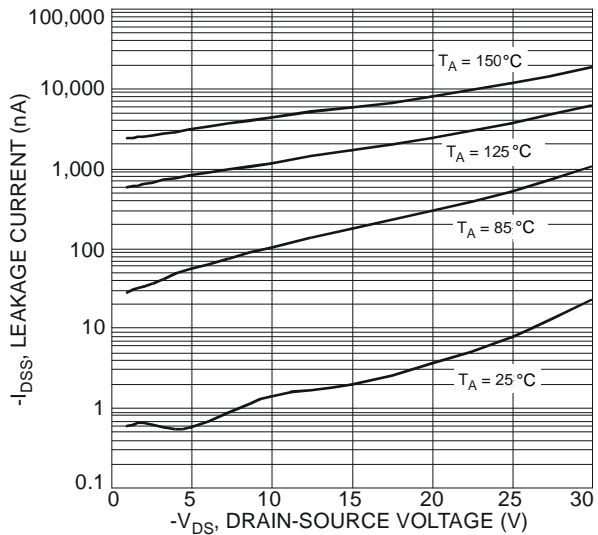


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

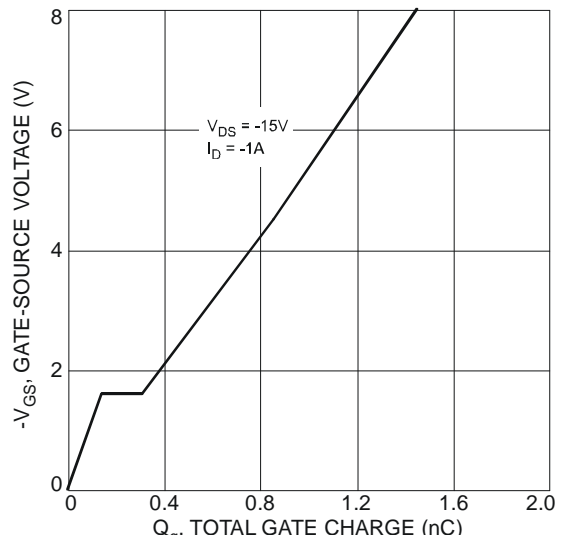
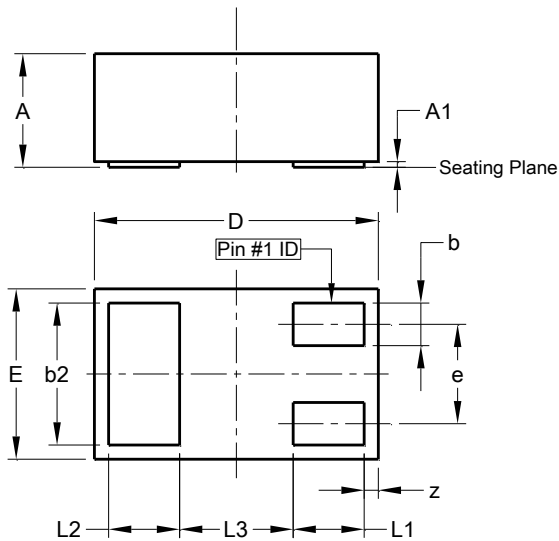


Fig. 14 Gate-Charge Characteristics

## Package Outline Dimensions

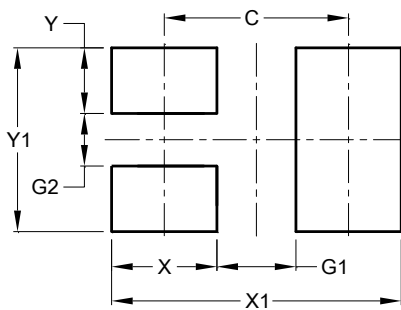
X2-DFN1006-3



X2-DFN1006-3			
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

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