DMP1070UCA3

P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
-12V	70mΩ @ V_{GS} = -4.5V	-3.6A
	100mΩ @ V_{GS} = -2.5V	-3.0A

Features and Benefits

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.22mm Height
- **ESD Protected Gate 4kV HBM**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

This new generation 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.

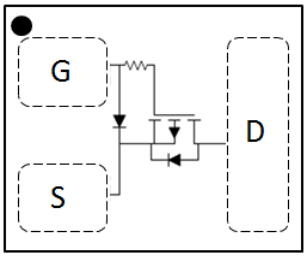
- Battery managements
- Load switches
- Battery protections

Mechanical Data

- Package: X4-DSN0607-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 e4

X4-DSN0607-3

ESD PROTECTED



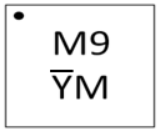
Top View
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Pitch	Packing	
			Qty.	Carrier
DMP1070UCA3-7A	X4-DSN0607-3	2mm	10000	Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) 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



M9 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: J = 2022)
M = Month (ex: 9 = September)

Date Code Key

Year	2017	…	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	E	…	J	K	L	M	N	O	P	R	S	T

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°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-12	V
Gate-Source Voltage		V_{GSS}	-6	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	T_A = +25°C T_A = +70°C	I_D	-3.6 -2.9	A
Continuous Drain Current (Note 5) V_{GS} = -2.5V	T_A = +25°C T_A = +70°C	I_D	-3.0 -2.4	A
Pulsed Drain Current (Note 6)		I_{DM}	-15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	0.71	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 7)	$R_{\theta JA}$	179.3	°C/W
Power Dissipation (Note 5)	P_D	1.36	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	92.2	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-50	nA	V_{DS} = -9.6V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	-25	nA	V_{GS} = -5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.40	-0.66	-0.95	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	52	70	mΩ	V_{GS} = -4.5V, I_D = -0.4A
		—	69	100		V_{GS} = -2.5V, I_D = -0.4A
		—	93	150		V_{GS} = -1.8V, I_D = -0.4A
		—	120	210		V_{GS} = -1.5V, I_D = -0.1A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.0	V	V_{GS} = 0V, I_S = -0.4A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	147	—	pF	V_{DS} = -6V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	79	—		
Reverse Transfer Capacitance	C_{rss}	—	30	—		
Series Gate Resistance	R_G	—	13	—	Ω	f = 1MHz, V_{GS} = 0V, V_{DS} = 0V
Total Gate Charge	Q_g	—	1.45	—	nC	V_{DS} = -6V, V_{GS} = -4.5V, I_D = -0.4A
Gate-Source Charge	Q_{gs}	—	0.14	—		
Gate-Drain Charge	Q_{gd}	—	0.28	—		
Gate Charge at V_{TH}	$Q_{g(th)}$	—	0.10	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.2	—	ns	V_{DS} = -6V, V_{GS} = -4.5V, R_G = 0Ω, I_D = -0.4A
Turn-On Rise Time	t_R	—	6.0	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	8.6	—		
Turn-Off Fall Time	t_F	—	5.8	—		

Notes:
5. Device mounted on FR-4 material with 1-inch^2 (6.45-cm^2), 2-oz. (0.071-mm thick) Cu.
6. Repetitive rating, pulse width limited by junction temperature.
7. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

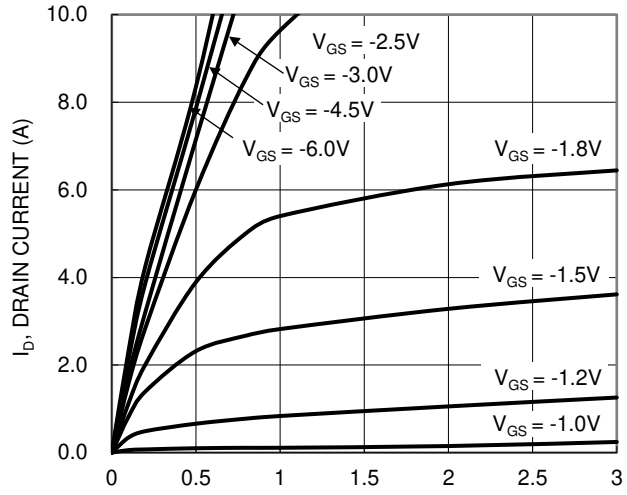


Figure 1. Typical Output Characteristic

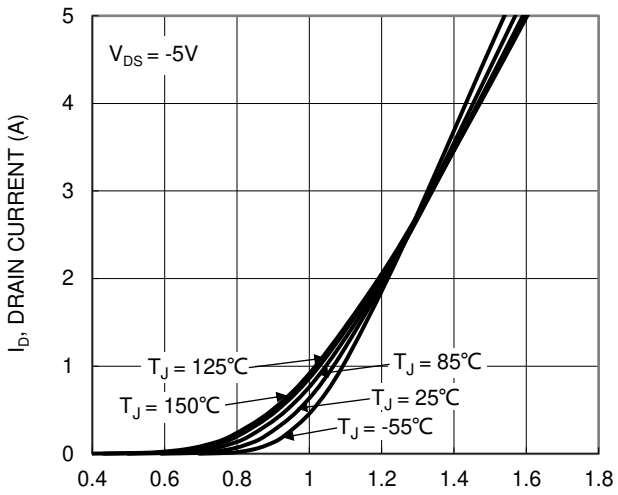


Figure 2. Typical Transfer Characteristic

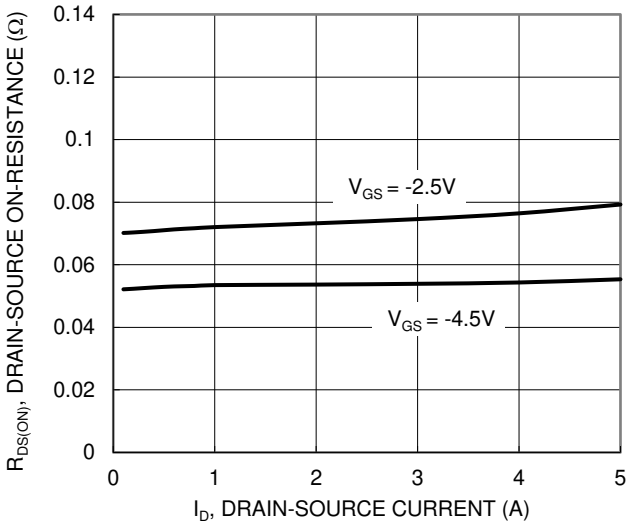


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

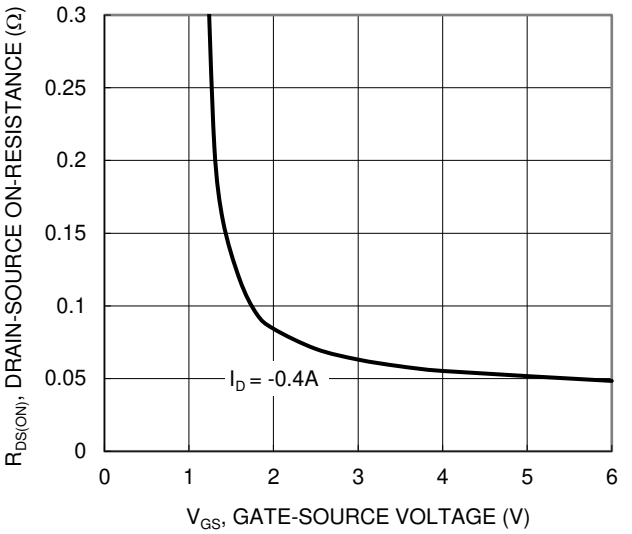


Figure 4. Typical Transfer Characteristic

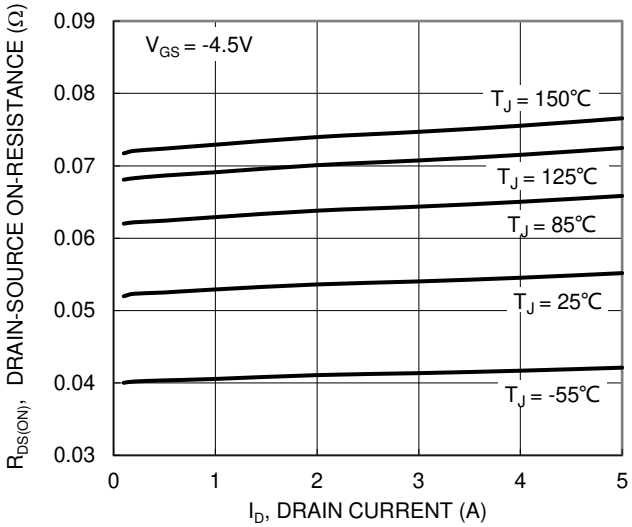


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

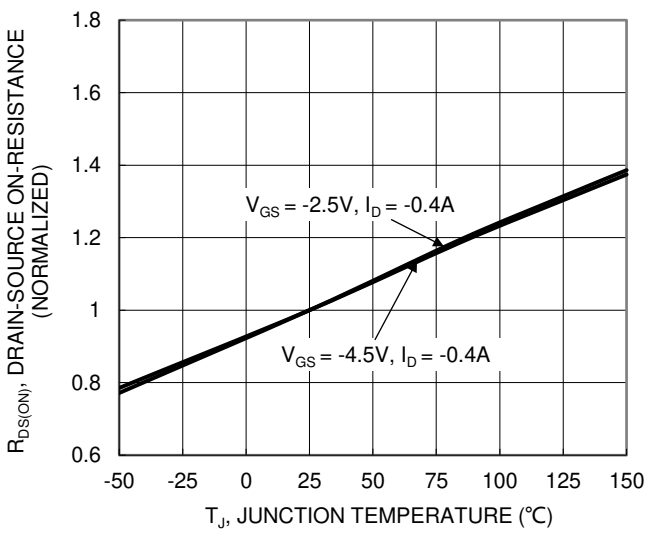


Figure 6. On-Resistance Variation with Junction Temperature

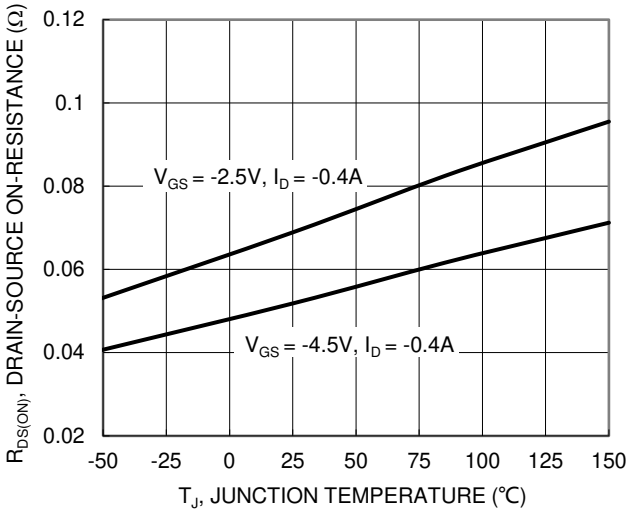


Figure 7. On-Resistance Variation with Junction Temperature

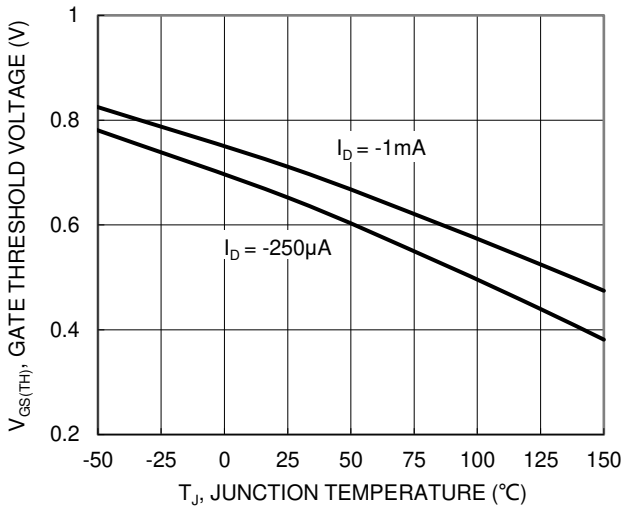


Figure 8. Gate Threshold Variation vs. Junction Temperature

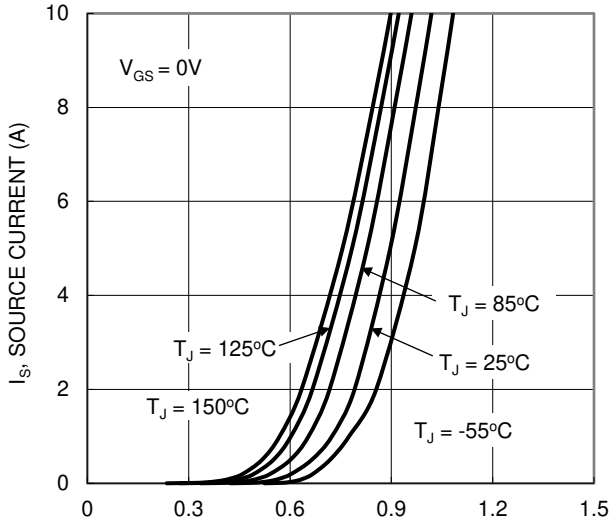


Figure 9. Diode Forward Voltage vs. Current

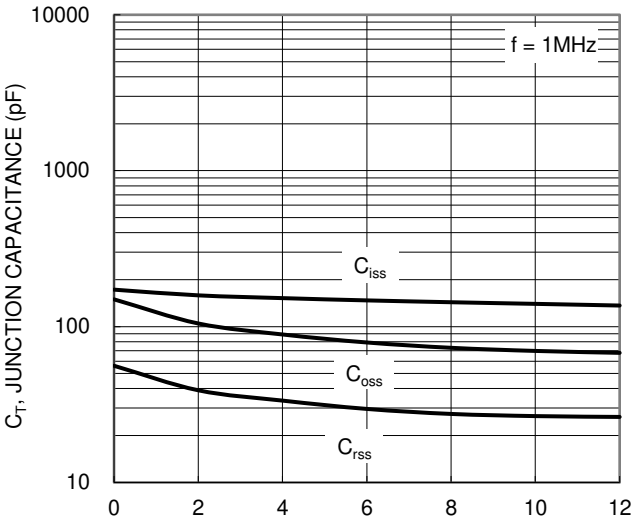


Figure 10. Typical Junction Capacitance

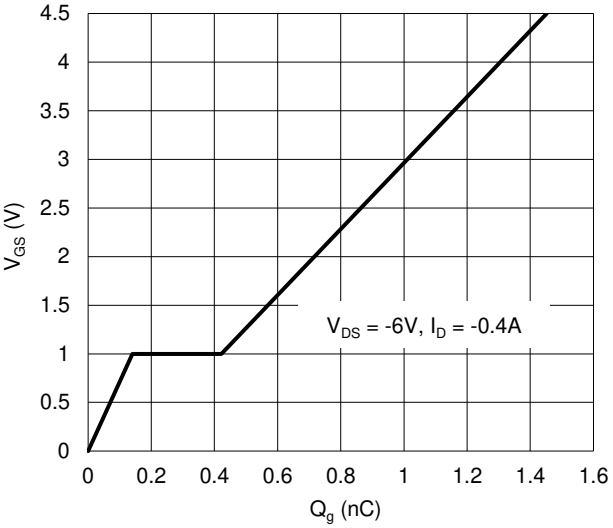


Figure 11. Gate Charge

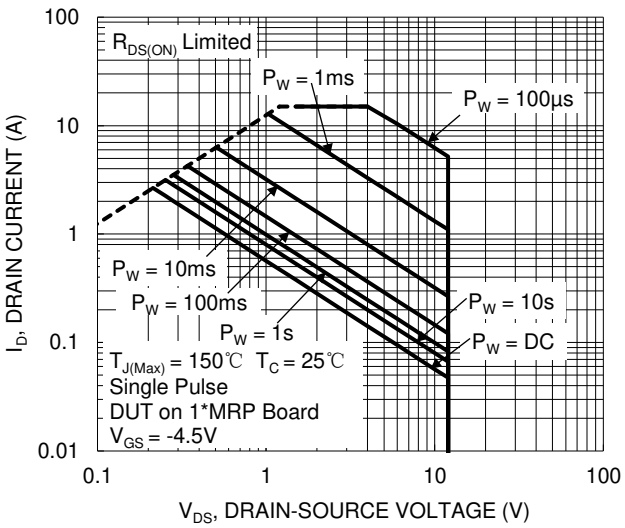


Figure 12. SOA, Safe Operation Area

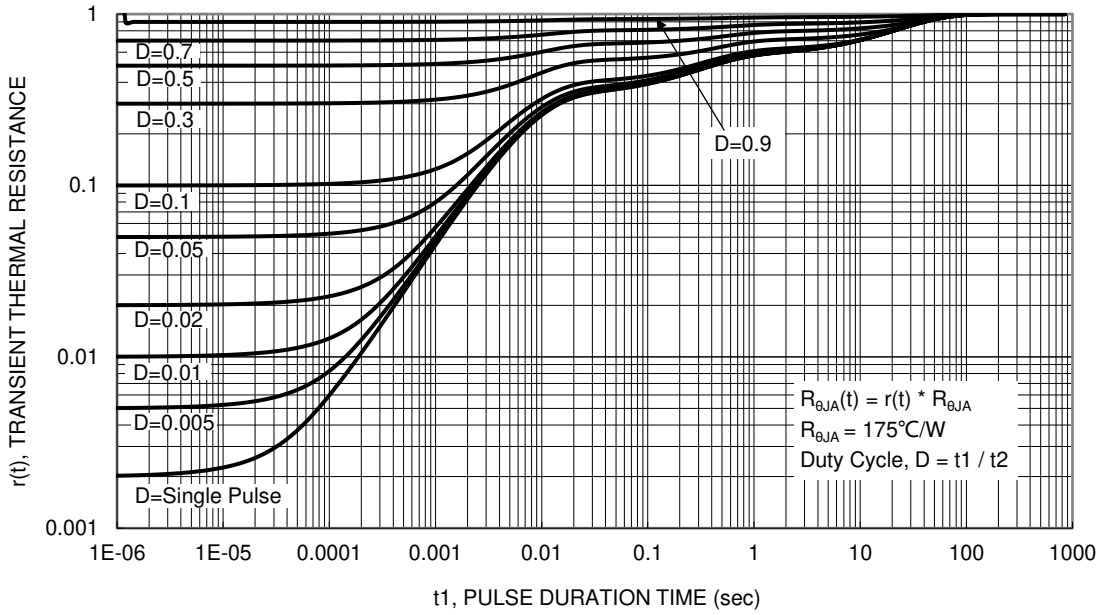
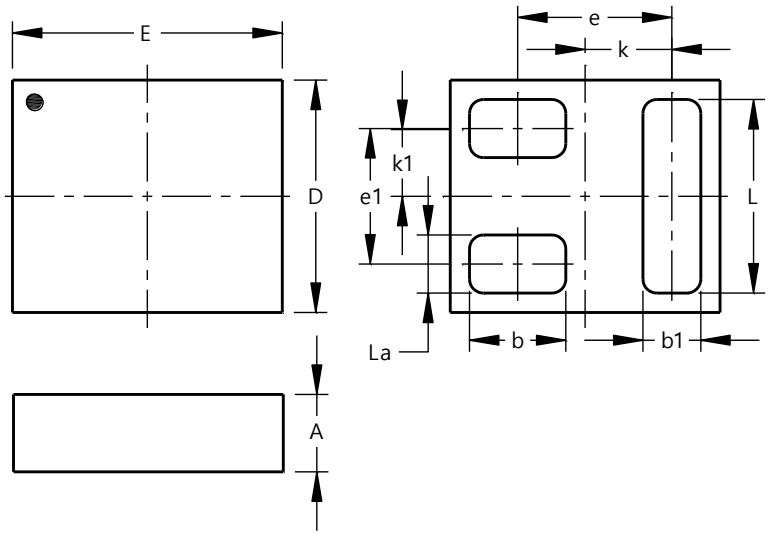


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X4-DSN0607-3

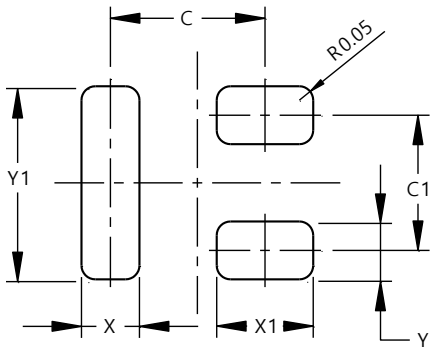


X4-DSN0607-3			
Dim	**Min**	**Max**	**Typ**
A	0.18	0.22	0.20
b	0.24	0.26	0.25
b1	0.14	0.16	0.15
D	0.56	0.64	0.60
E	0.65	0.73	0.69
e	--	--	0.40
e1	--	--	0.35
k	--	--	0.225
k1	--	--	0.175
L	0.49	0.51	0.50
La	0.14	0.16	0.15
All Dimensions in mm			

Suggested Pad Layout

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

X4-DSN0607-3



Dimensions	Value (in mm)
C	0.40
C1	0.35
X	0.15
X1	0.25
Y	0.15
Y1	0.50

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