

Product Summary

V _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C
12V	57mΩ @ V _{GS} = 4.5V	4.6A
	69mΩ @ V _{GS} = 2.5V	4.2A

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 management
- Load switches
- Battery protections

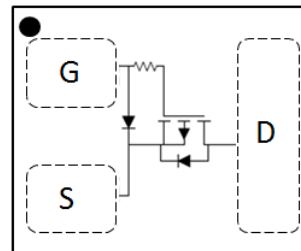
Features and Benefits

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.26mm Height
- **ESD Protected Gate**
- **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](mailto:contact_us) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: X4-DSN0607-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiAu. Solderable per MIL-STD-202, Method 208 
- Weight: 0.00019 grams (Approximate)

X4-DSN0607-3 (Type B)



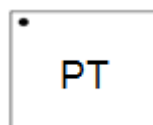
Top View
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMN1057UCA3-7	X4-DSN0607-3 (Type B)	10,000	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



PT = Product Type Marking Code

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}	8	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	I _D	T _A = +25°C 4.6	A
		T _A = +70°C 3.7	
Continuous Drain Current (Note 5) V _{GS} = 2.5V	I _D	T _A = +25°C 4.2	A
		T _A = +70°C 3.3	
Pulsed Drain Current (Note 6)	I _{DM}	21	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	0.62	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	R _{θJA}	198.6	°C/W
Power Dissipation (Note 5)	P _D	1.81	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	68.3	°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} = 0, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	μA	V _D = 9.6V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	100	nA	V _{GS} = 8V, V _{DS} = 0
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.55	0.81	1.30	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	33	57	mΩ	V _{GS} = 4.5V, I _D = 0.4A
		—	41	69		V _{GS} = 2.5V, I _D = 0.4A
		—	56	102		V _{GS} = 1.8V, I _D = 0.1A
		—	—	—		V _{GS} = 1.8V, I _D = 0.1A
Diode Forward Voltage	V _{SD}	—	0.68	1.0	V	V _{GS} = 0, I _S = 0.4A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	178	—	pF	V _{DS} = 6V, V _{GS} = 0, f = 1MHz
Output Capacitance	C _{oss}	—	95	—		
Reverse Transfer Capacitance	C _{rss}	—	9.3	—		
Series Gate Resistance	R _G	—	14.4	—	Ω	f = 1MHz, V _{GS} = 0, V _{DS} = 0
Total Gate Charge	Q _g	—	1.47	—	nC	V _{DS} = 6V, V _{GS} = 4.5V, I _D = 0.4A
Gate-Source Charge	Q _{gs}	—	0.27	—		
Gate-Drain Charge	Q _{gd}	—	0.12	—		
Gate Charge at V _{TH}	Q _{g(th)}	—	0.19	—		
Turn-On Delay Time	t _{D(ON)}	—	2.6	—	ns	V _{DS} = 6V, V _{GS} = 4.5V, R _G = 2Ω, I _D = 0.4A
Turn-On Rise Time	t _R	—	12.7	—		
Turn-Off Delay Time	t _{D(OFF)}	—	20	—		
Turn-Off Fall Time	t _F	—	9.8	—		

- Notes:
5. Device mounted on FR-4 material with 1inch² (6.45cm²), 2oz. (0.071mm 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.

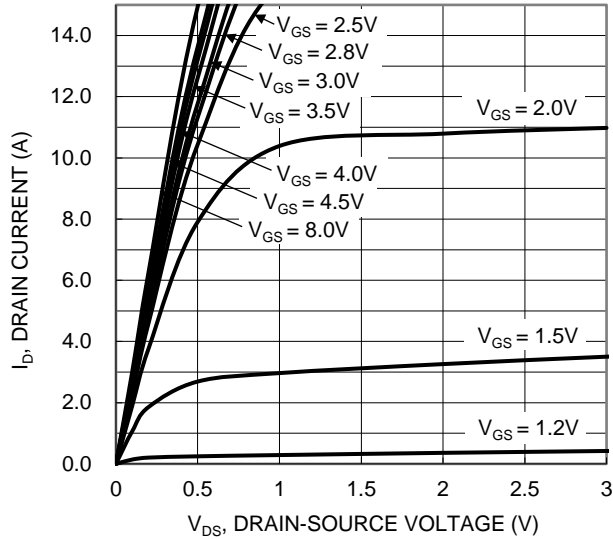


Figure 1. Typical Output Characteristic

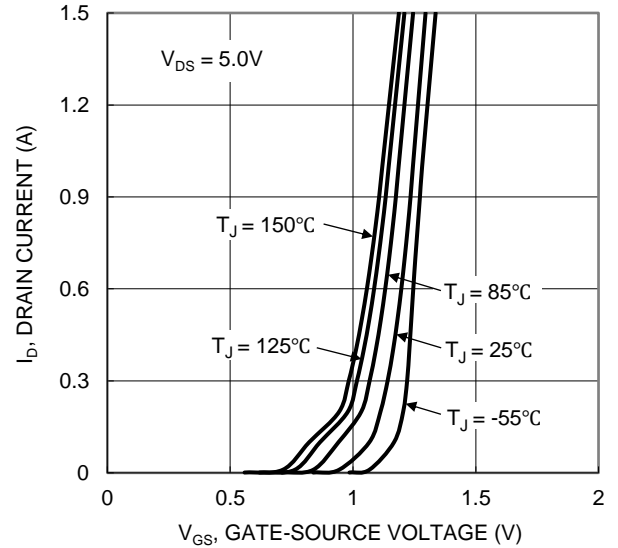


Figure 2. Typical Transfer Characteristic

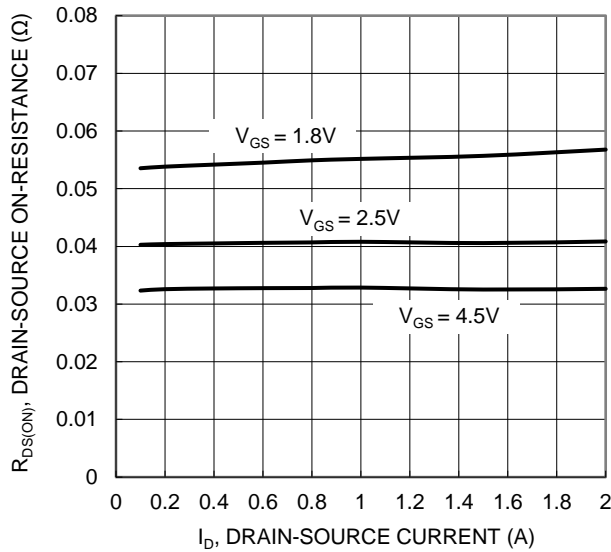


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

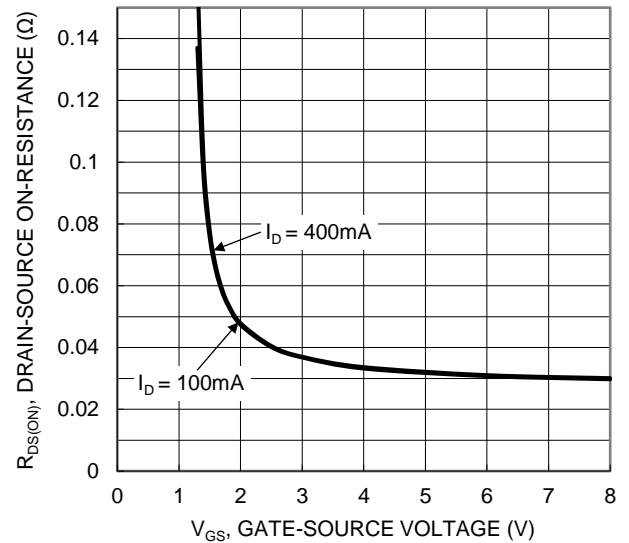


Figure 4. Typical Transfer Characteristic

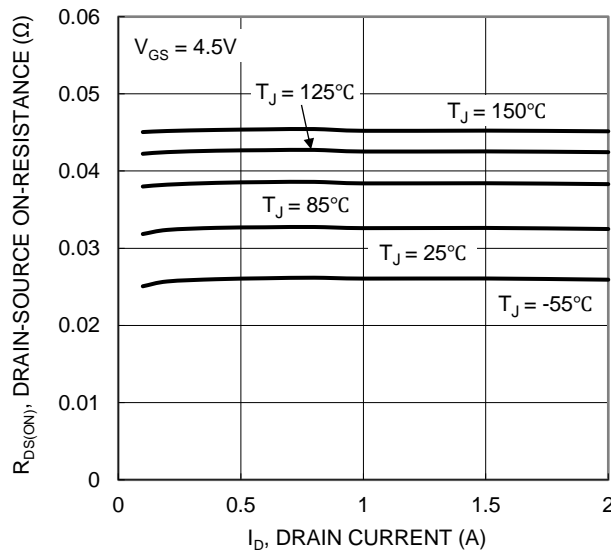


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

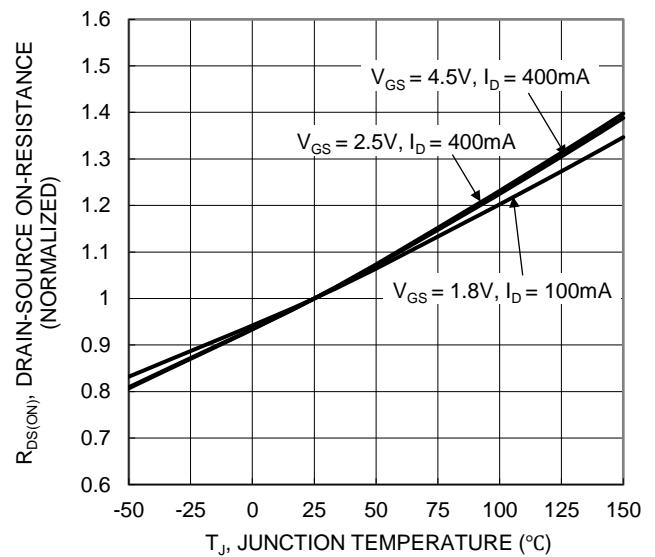
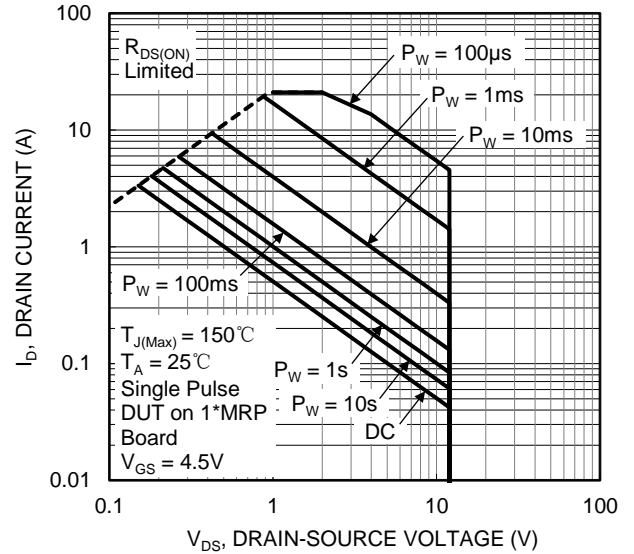
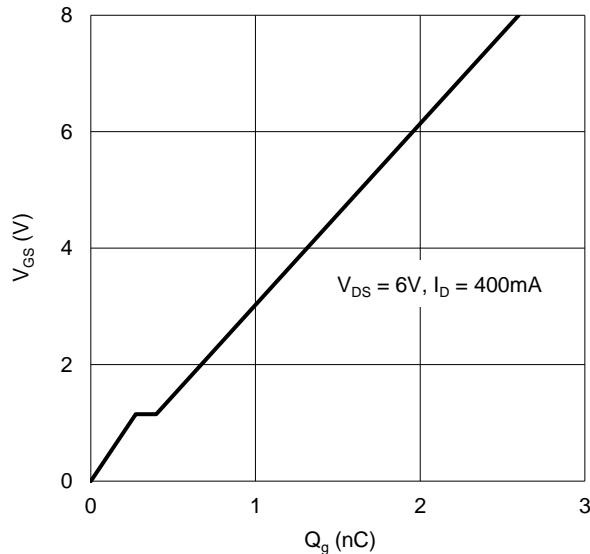
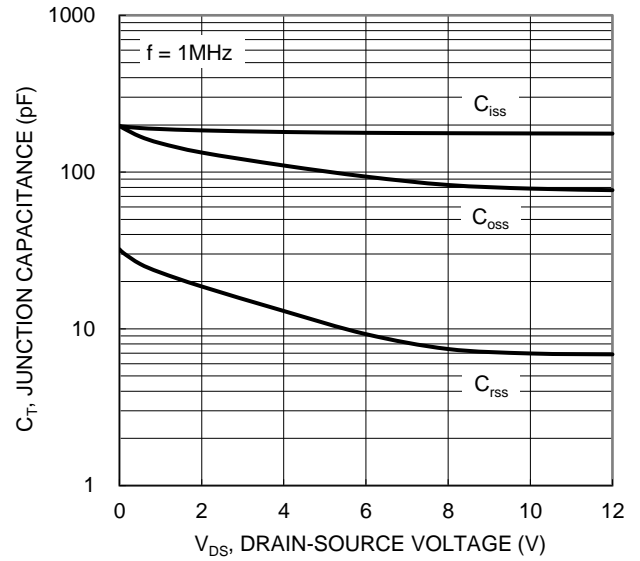
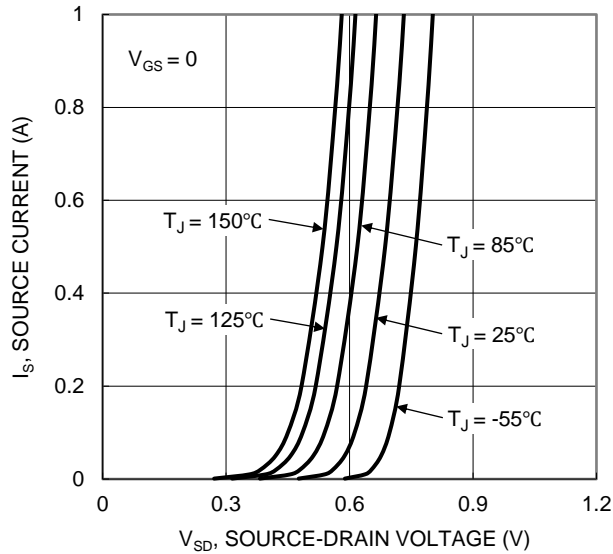
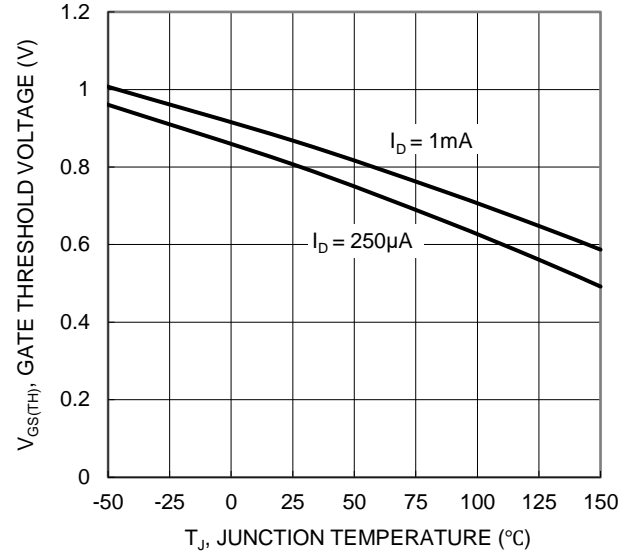
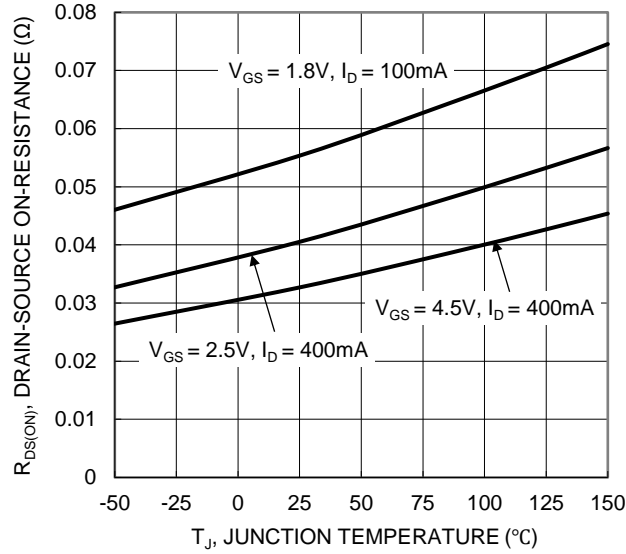


Figure 6. On-Resistance Variation with Junction Temperature



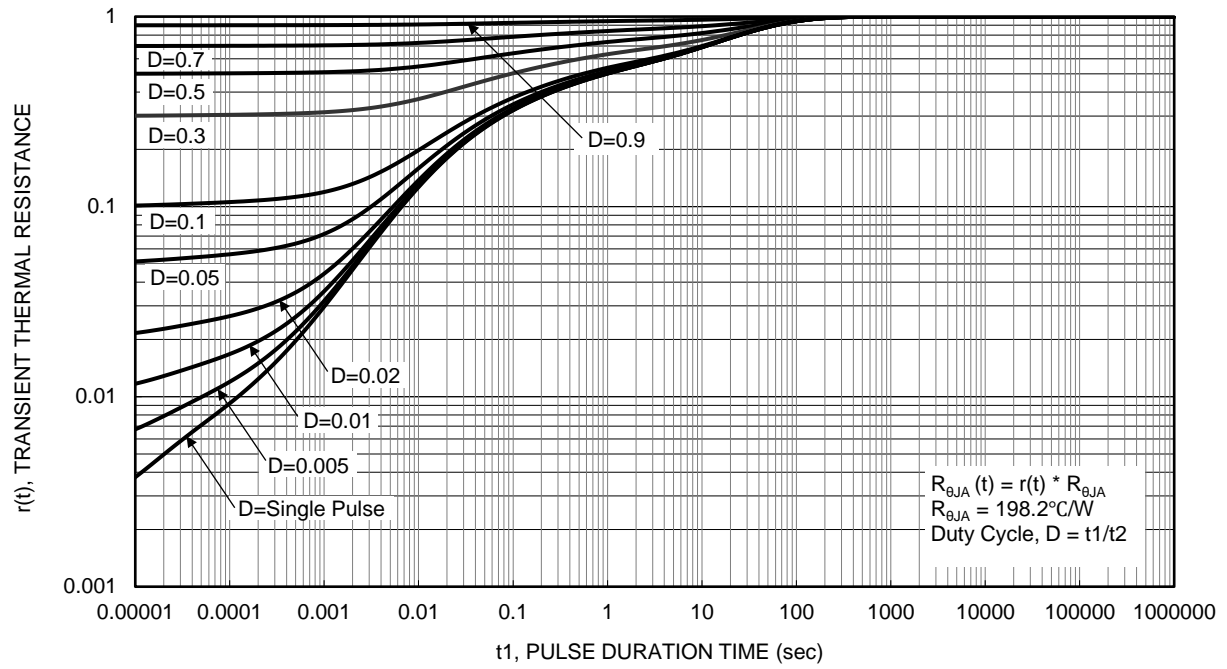
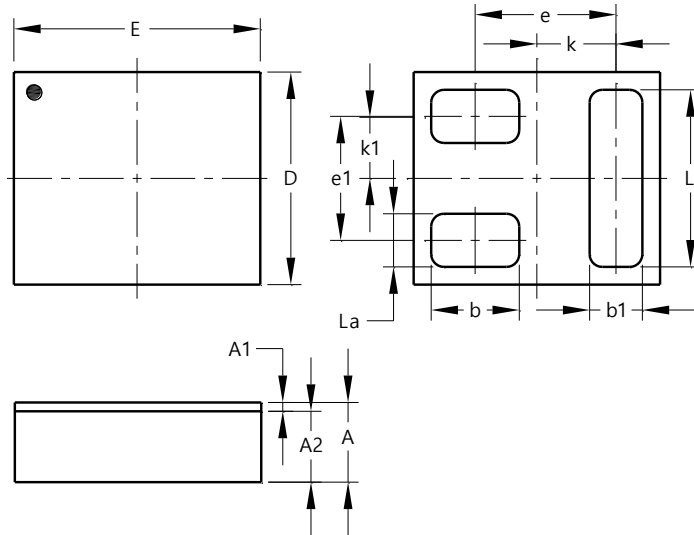


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X4-DSN0607-3 (Type B)

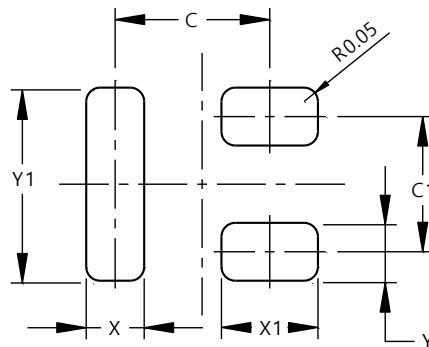


X4-DSN0607-3 (Type B)			
Dim	Min	Max	Typ
A	0.20	0.26	0.225
A1	0.022	0.028	0.025
A2	0.18	0.23	0.20
b	0.24	0.26	0.25
b1	0.14	0.16	0.15
D	0.56	0.64	0.60
E	0.66	0.74	0.70
e	--	--	0.40
e1	--	--	0.35
k	--	--	0.225
k1	--	--	0.175
L	0.49	0.51	0.50
La	0.14	0.16	0.15
All Dimensions in mm			

Suggested Pad Layout

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

X4-DSN0607-3 (Type B)



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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