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

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 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 management
- Load switches
- Battery protections

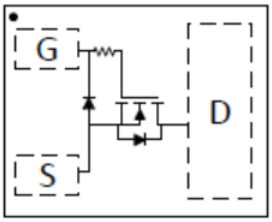
Mechanical Data

- Package: X4-DSN0607-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiAu. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.00019 grams (Approximate)

X4-DSN0607-3 (Type B)



ESD PROTECTED



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

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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	T_A = +25°C T_A = +70°C	I_D	4.6 3.7	A
Continuous Drain Current (Note 5) V_{GS} = 2.5V	T_A = +25°C T_A = +70°C	I_D	4.2 3.3	A
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)	$R_{\theta JA}$	198.6	°C/W
Power Dissipation (Note 5)	P_D	1.81	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	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_{DS} = 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
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 1inch^2 (6.45cm^2), 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.

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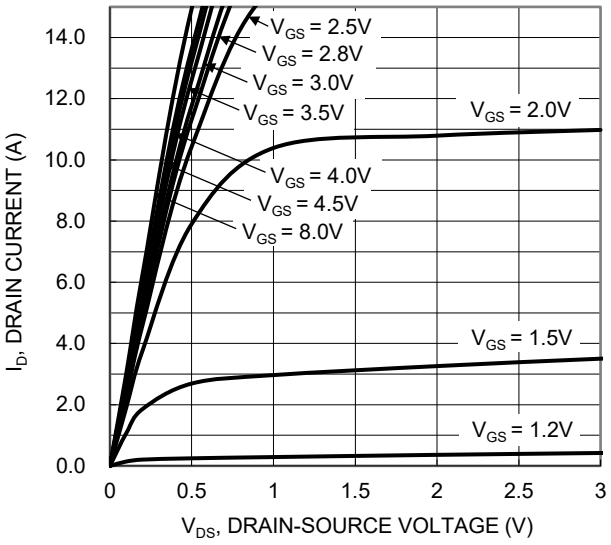


Figure 1. Typical Output Characteristic

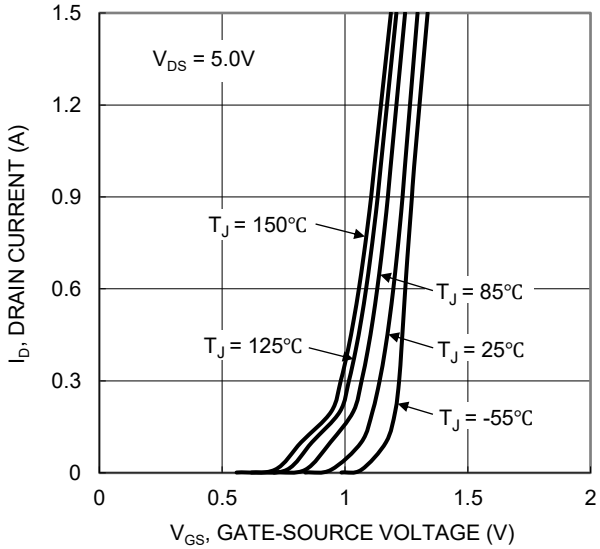


Figure 2. Typical Transfer Characteristic

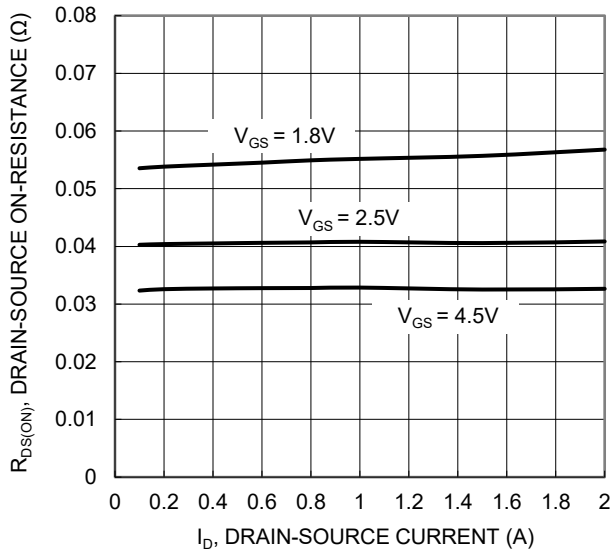


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

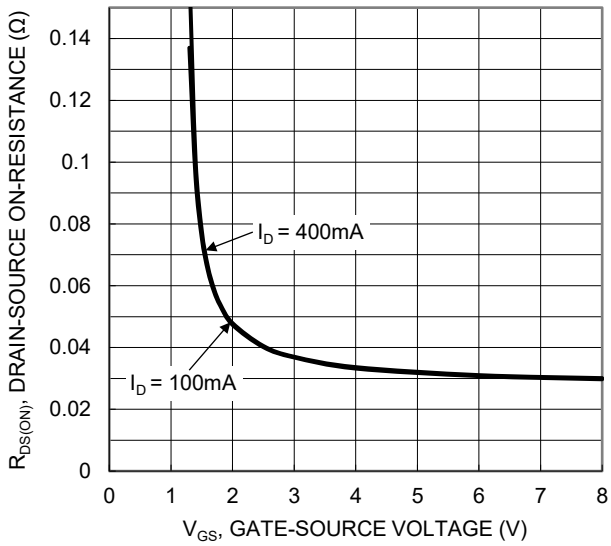


Figure 4. Typical Transfer Characteristic

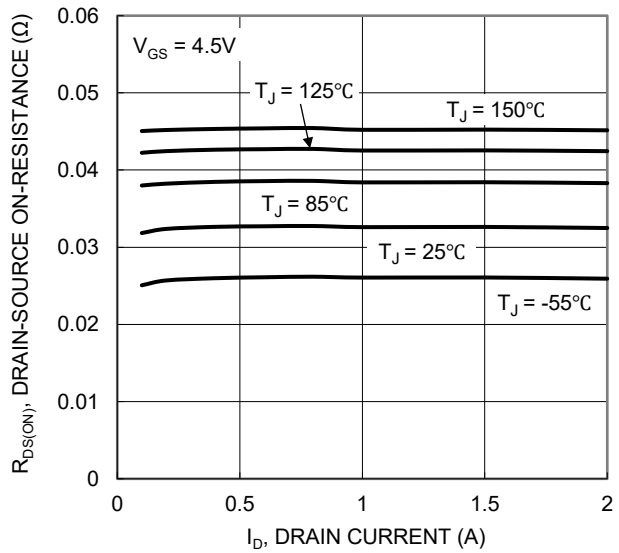


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

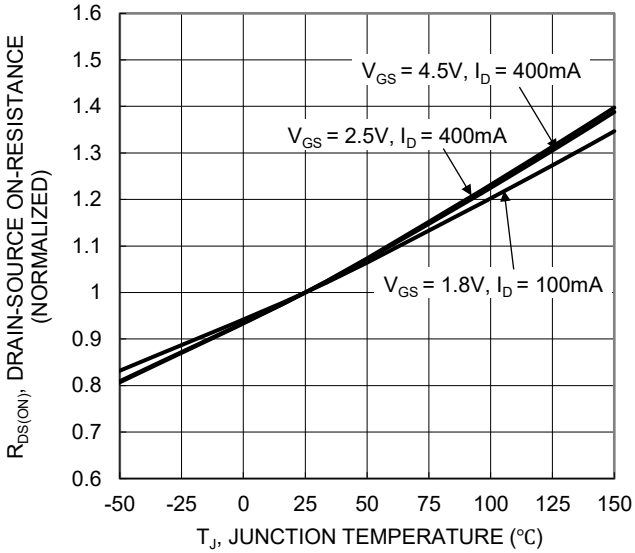


Figure 6. On-Resistance Variation with Junction Temperature

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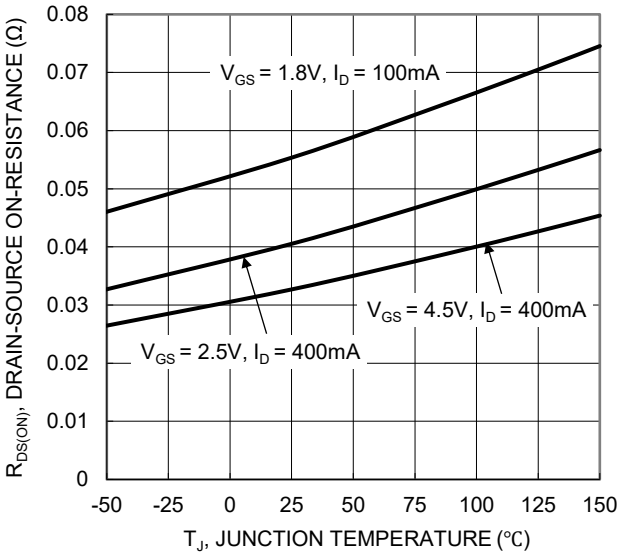


Figure 7. On-Resistance Variation with Junction Temperature

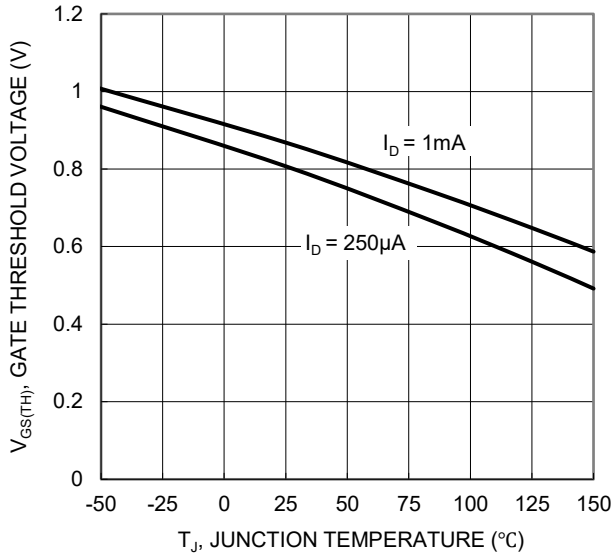


Figure 8. Gate Threshold Variation vs. Junction Temperature

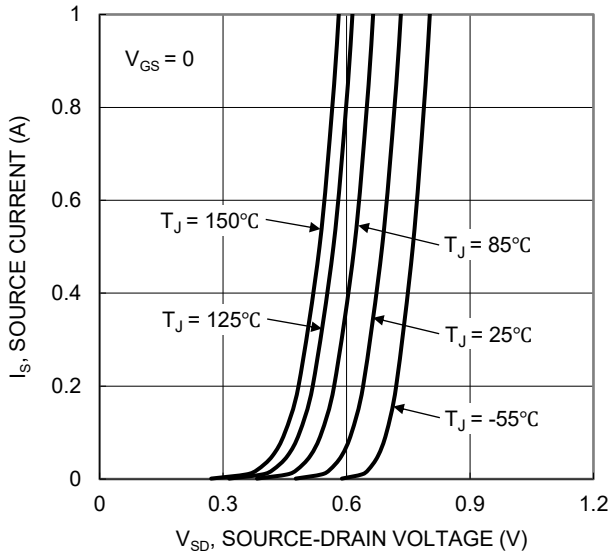


Figure 9. Diode Forward Voltage vs. Current

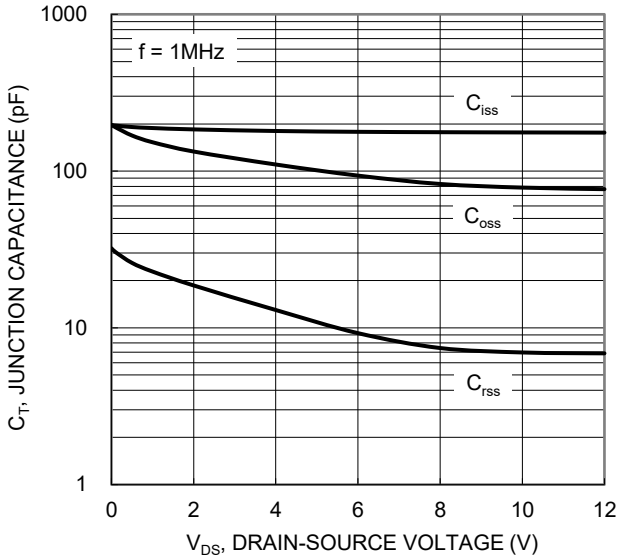


Figure 10. Typical Junction Capacitance

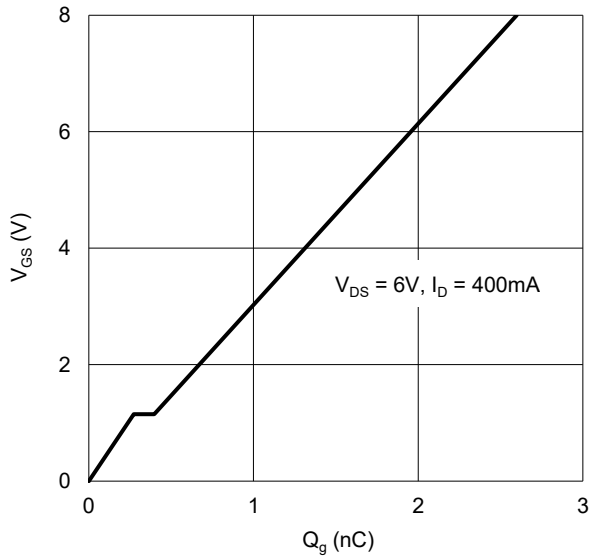


Figure 11. Gate Charge

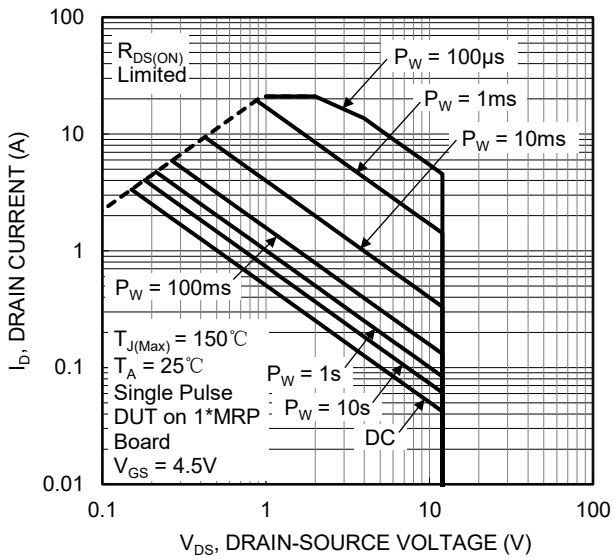


Figure 12. SOA, Safe Operation Area

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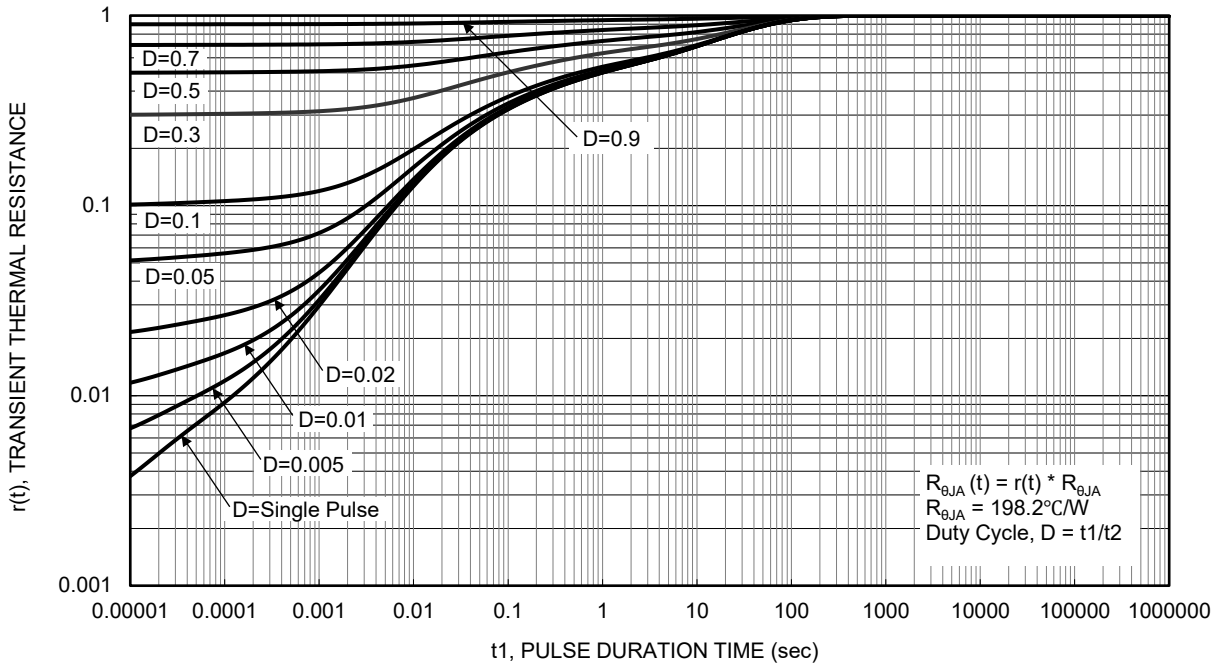


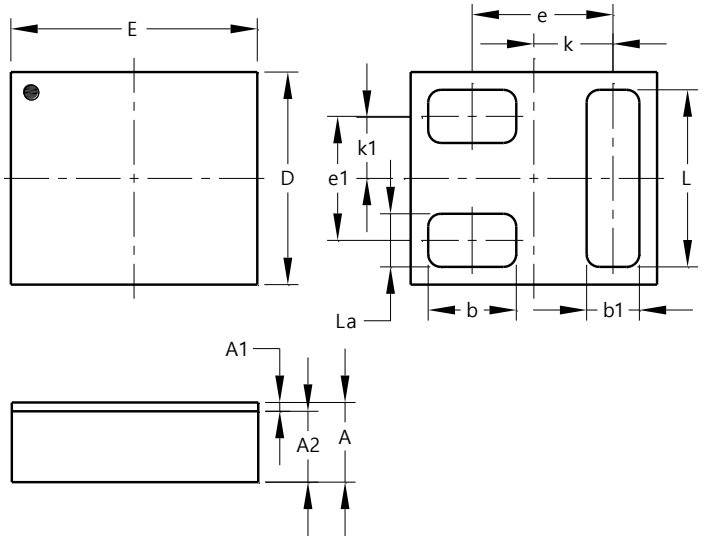
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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X4-DSN0607-3 (Type B)

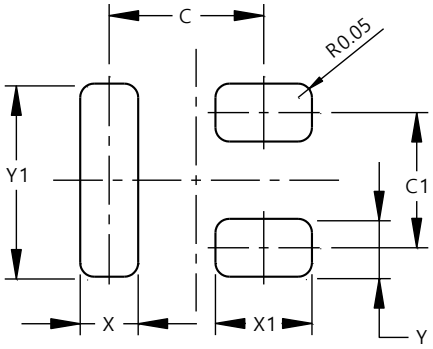


X4-DSN0607-3 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	0.20	0.26	0.225
A1	0.022	0.028	0.025
A2	0.18	0.23	0.20
b	0.24	0.26	0.25
b1	0.14	0.16	0.15
D	0.56	0.64	0.60
E	0.66	0.74	0.70
e	--	--	0.40
e1	--	--	0.35
k	--	--	0.225
k1	--	--	0.175
L	0.49	0.51	0.50
La	0.14	0.16	0.15
All Dimensions in mm			

Suggested Pad Layout

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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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