

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
-20V	64mΩ @ V _{GS} = -4.5V	-4.4A
	80mΩ @ V _{GS} = -2.5V	-3.9A

Description

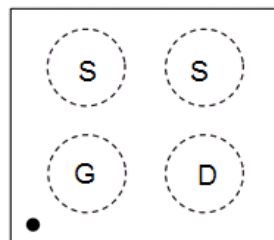
This new generation MOSFET has been designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications. It is a high-performance MOSFET in ultra-small 0.8mm x 0.8mm package.

Applications

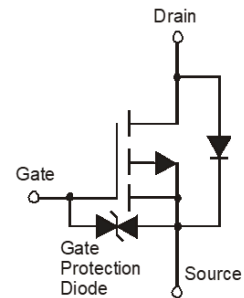
- Portable applications
- Load switches
- Power-management functions



X4-DSN0808-4



Top View



EQUIVALENT CIRCUIT

Features and Benefits

- Ultra-Small 0.8mm x 0.8mm Package
- Built-in G-S Protection Diode Against ESD
- **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@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

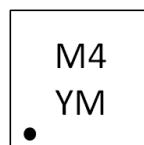
- Package: X4-DSN0808-4
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish — NiPdAu. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.293 grams (Approximate)

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2056UCA4-7	X4-DSN0808-4	3000	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



M4 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: K = 2023)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2018	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	F	-	K	L	M	N	P	R	S	T	U	V

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	-20	V	
Gate-Source Voltage	V_{GSS}	± 8	V	
Continuous Drain Current (Note 6) $V_{GS} = -4.5V$	I_D	$T_A = +25^\circ C$	-2.7	A
		$T_A = +70^\circ C$	-2.2	A
Continuous Drain Current (Note 5) $V_{GS} = -4.5V$	I_D	$T_A = +25^\circ C$	-4.4	A
		$T_A = +70^\circ C$	-3.5	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	0.74	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ C$ (Note 6)	$R_{\theta JA}$	169	$^\circ C/W$
Power Dissipation (Note 5)	P_D	1.87	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ C$ (Note 5)	$R_{\theta JA}$	67	$^\circ C/W$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -20V, V_{GS} = 0V$
Gate-Body Leakage	I_{GSS}	—	—	± 6	μA	$V_{GS} = \pm 8V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	-0.8	-1.1	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	50	64	m Ω	$V_{GS} = -4.5V, I_D = -1.0A$
		—	62	80		$V_{GS} = -2.5V, I_D = -1.0A$
		—	87	130		$V_{GS} = -1.8V, I_D = -0.5A$
		—	142	260		$V_{GS} = -1.5V, I_D = -0.5A$
Body Diode Forward Voltage	V_{SD}	—	-0.7	—	V	$V_{GS} = 0V, I_S = -1.0A$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	437	—	pF	$V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz$
Output Capacitance	C_{OSS}	—	59	—		
Reverse Transfer Capacitance	C_{RSS}	—	30	—		
Gate Resistance	R_g	—	60	—	Ω	$V_{DS} = 0V, V_{GS} = -0.1V, f = 1MHz$
Total Gate Charge	Q_g	—	8.4	—	nC	$V_{GS} = -8.0V, V_{DS} = -10V, I_D = -1A$
Total Gate Charge	Q_g	—	4.9	—		
Gate-Source Charge	Q_{gs}	—	0.3	—		
Gate-Drain Charge	Q_{gd}	—	0.7	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.5	—	ns	$V_{DD} = -10V, I_D = -1.0A$ $V_{GEN} = -8.0V, R_L = 10.0\Omega$
Turn-On Rise Time	t_r	—	9.1	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	95.5	—		
Turn-Off Fall Time	t_f	—	29.5	—		

- Notes:
- Device mounted on FR-4 material with 1inch² (6.45cm²), 2oz. (0.071mm thick) Cu.
 - Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

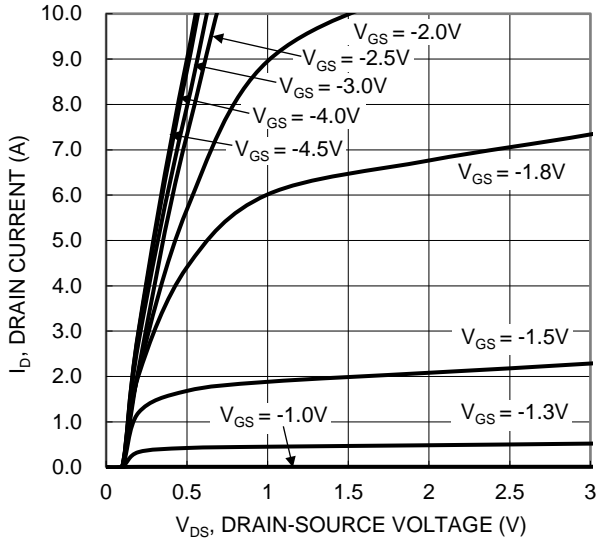


Figure 1. Typical Output Characteristic

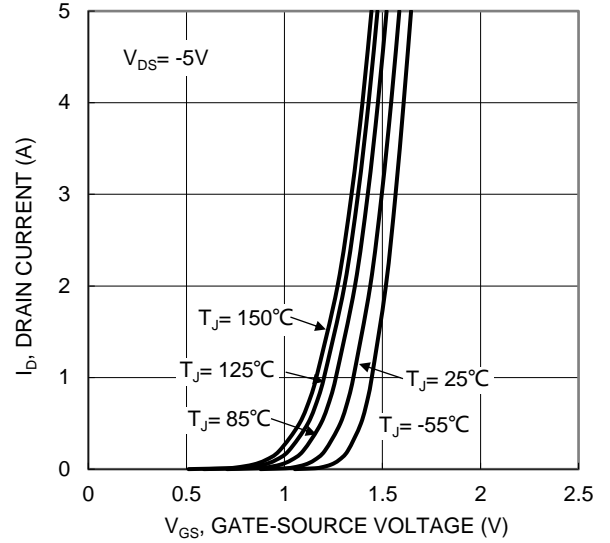


Figure 2. Typical Transfer Characteristic

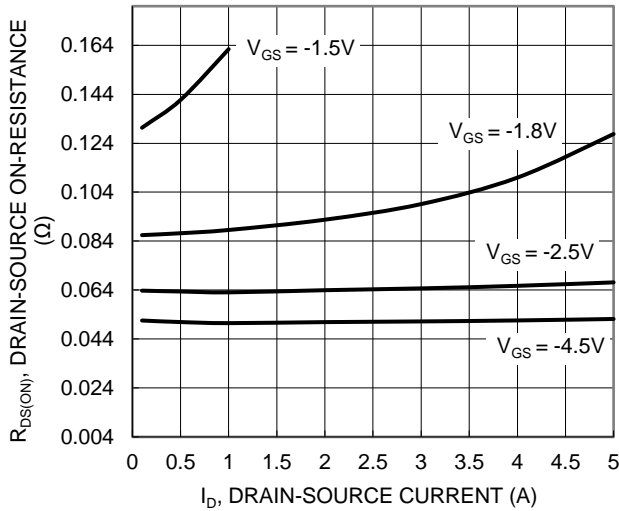


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

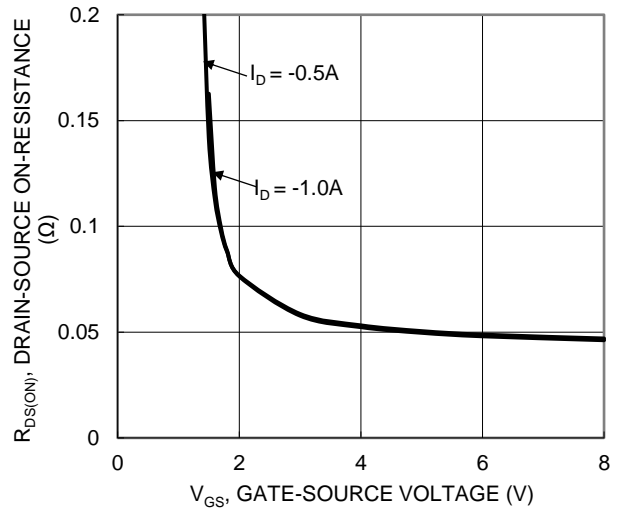


Figure 4. Typical Transfer Characteristic

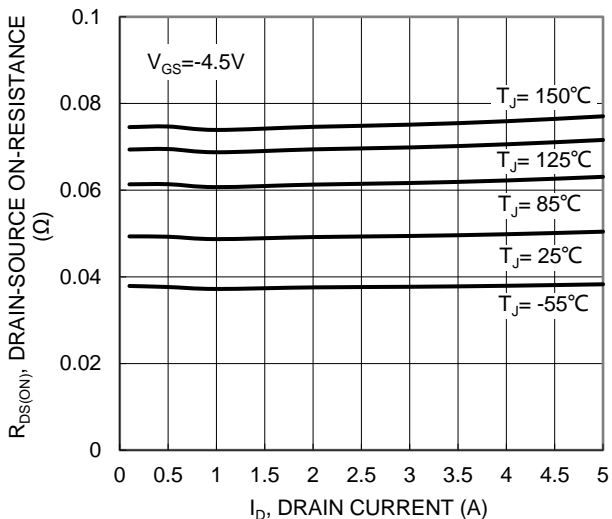


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

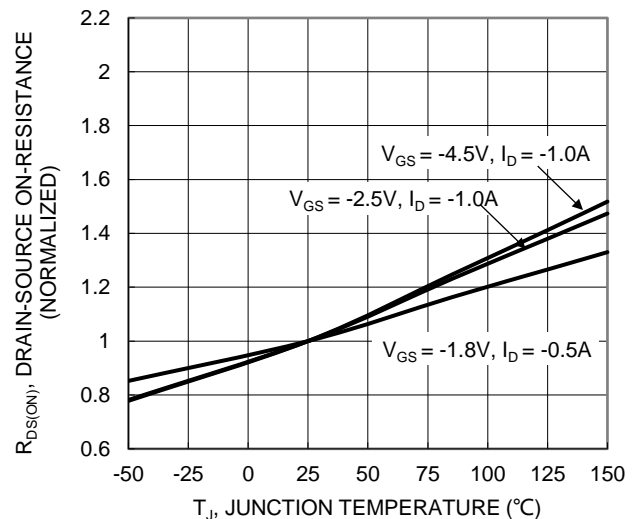


Figure 6. On-Resistance Variation with Temperature

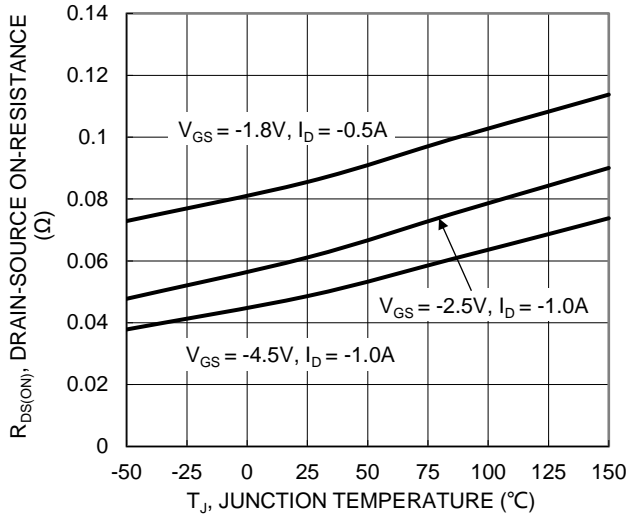


Figure 7. On-Resistance Variation with Temperature

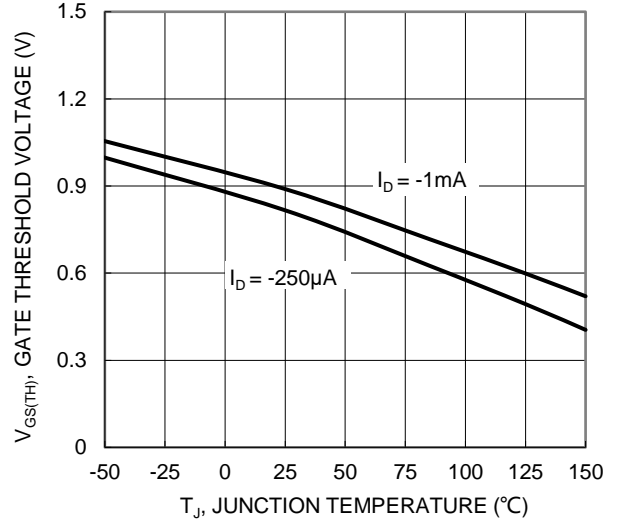


Figure 8. Gate Threshold Variation vs. Junction Temperature

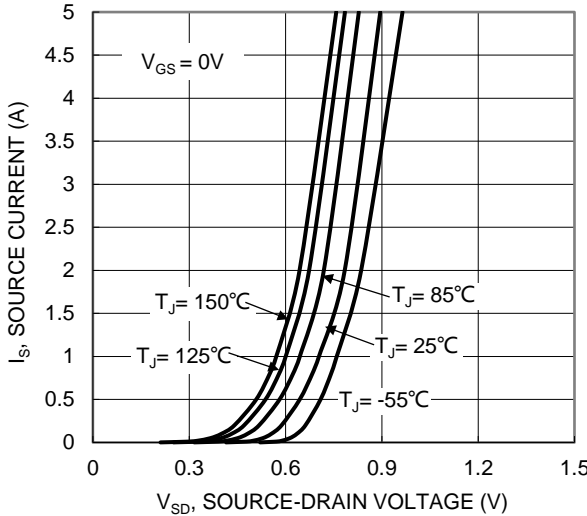


Figure 9. Diode Forward Voltage vs. Current

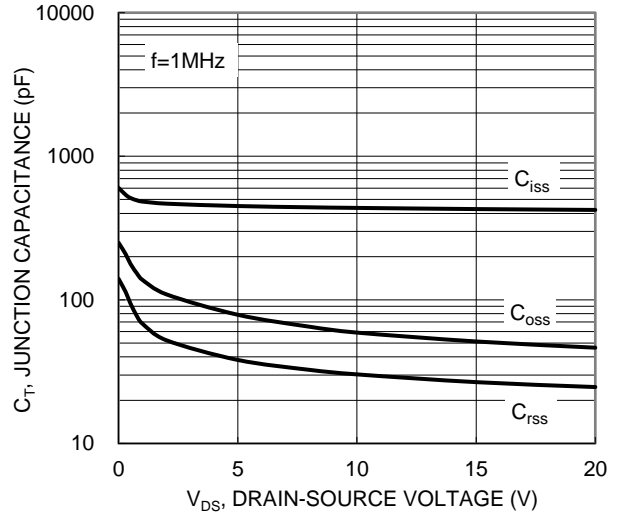


Figure 10. Typical Junction Capacitance

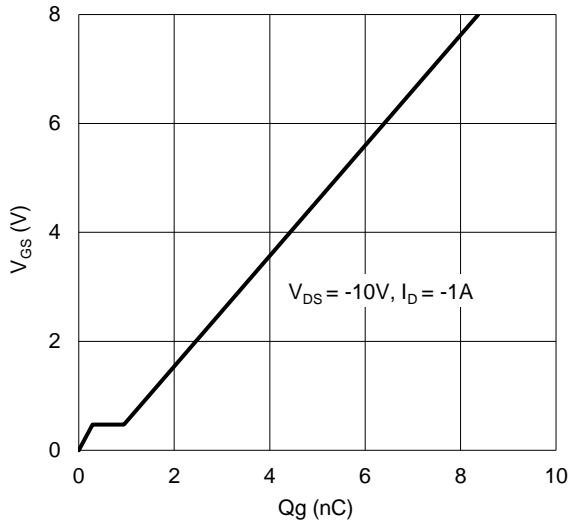


Figure 11. Gate Charge

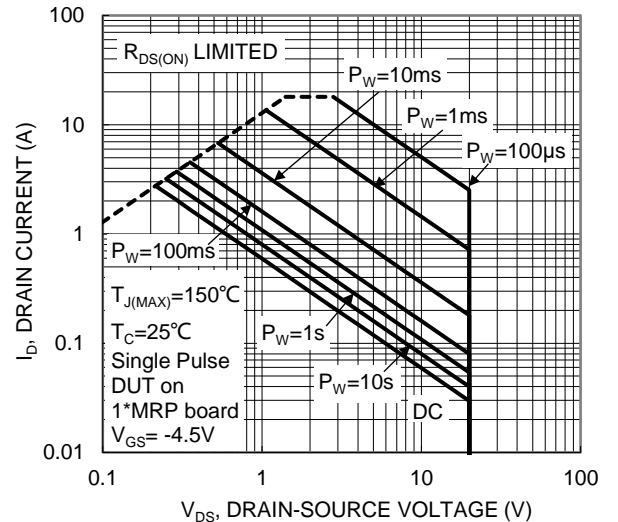


Figure 12. SOA, Safe Operation Area

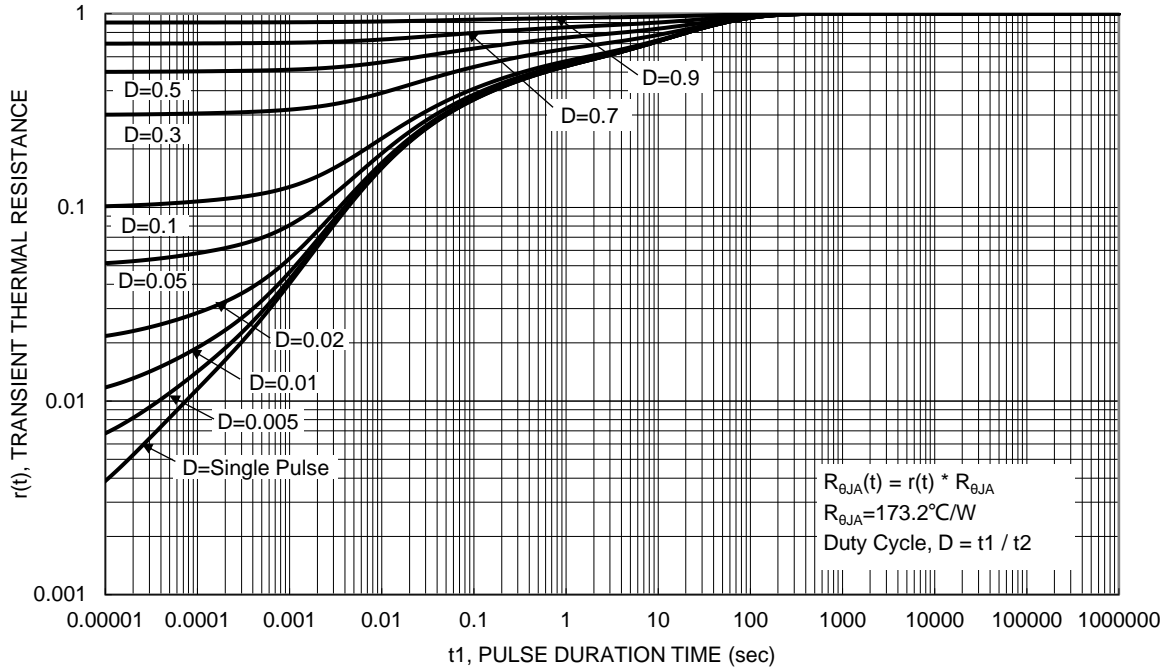
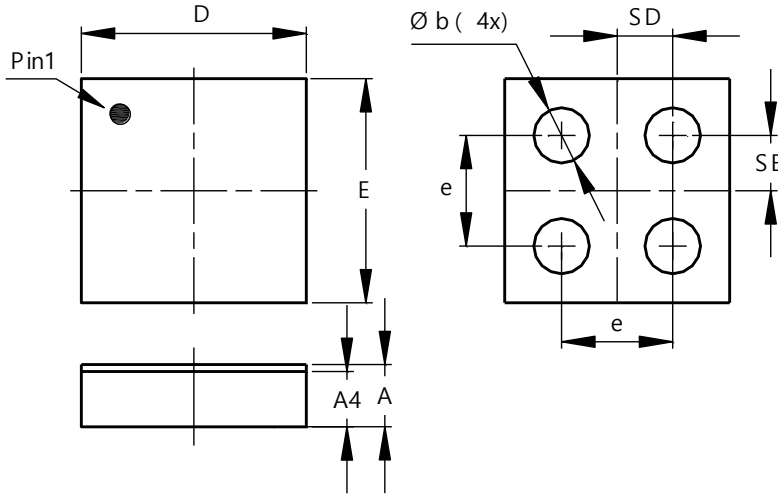


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X4-DSN0808-4

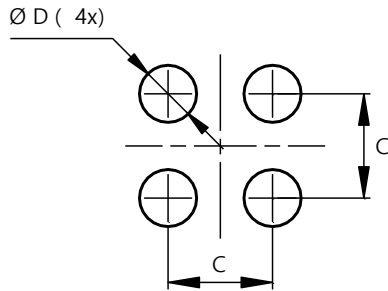


X4-DSN0808-4			
Dim	Min	Max	Typ
A	0.20	0.25	0.225
A4	0.18	0.22	0.20
b	0.16	0.24	0.20
D	0.72	0.80	0.76
E	0.72	0.80	0.76
e	-	-	0.40
SD	-	-	0.20
SE	-	-	0.20
All Dimensions in mm			

Suggested Pad Layout

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

X4-DSN0808-4



Dimensions	Value (in mm)
C	0.40
D	0.20

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