Product Summary (Typ. @ V_{GS} = 4.5V, T_A = +25°C)

V_{DSS}	$R_{DS(ON)}$	Q_g	Q_{gd}	I_D
8V	35mΩ	9.6nC	0.9nC	4.0A

Description

The DMN1054UCB4 is a Trench MOSFET, engineered to minimize on-state losses and switch ultra-fast, making it ideal for high-efficiency power transfer. Using Chip-Scale Package (CSP) to increase power density by combining low thermal impedance with minimal $R_{DS(ON)}$ per footprint area.

Applications

- DC-DC Converters
- Battery Management
- Load Switch

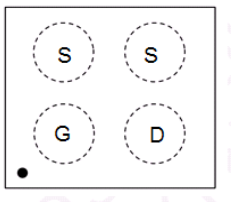
Features

- Trench-CSP Technology with the Lowest on Resistance:
  - $R_{DS(ON)}$ = 35mΩ to Minimize On-State Losses
  - Q_g = 9.6nC for Ultra-Fast Switching
- $V_{GS(TH)}$ = 0.6V Typ. for a Low Turn-On Potential
- CSP with Footprint 0.8mm × 0.8mm
- Height = 0.375mm for Low Profile
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

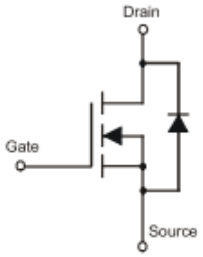
Mechanical Data

- Case: X1-WLB0808-4
- Terminal Connections: See Diagram Below

X1-WLB0808-4



Top-View
Pin Configuration



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1054UCB4-7	X1-WLB0808-4	3000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information



YW = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: D = 2016)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

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

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	8	V
Gate-Source Voltage		V_{GSS}	±5	V
Continuous Source Current @ V_{GS} = 4.5V (Note 5)	T_A = +25°C T_A = +70°C	I_D	2.7 2.2	A
Continuous Source Current @ V_{GS} = 4.5V (Note 6)	T_A = +25°C T_A = +70°C	I_D	4.0 3.2	A
Pulsed Drain Current (Pulse duration 10µs, duty cycle ≤1%)		I_{DM}	8	A
Continuous Source-Drain Diode Current		I_S	0.74	A
Pulse Diode Forward Current		I_{SM}	15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	169	°C/W
Total Power Dissipation (Note 6)	P_D	1.34	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	93	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	8	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 8V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.35	—	0.7	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	35 38.5 46.4 53.3 64.7	42 50 65 80 110	mΩ	V_{GS} = 4.5V, I_D = 1.0A V_{GS} = 2.5V, I_D = 1.0A V_{GS} = 1.8V, I_D = 0.5A V_{GS} = 1.5V, I_D = 0.2A V_{GS} = 1.2V, I_D = 0.1A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	6.0	—	S	V_{DS} = 6V, I_S = 1.0A
Body Diode Forward Voltage	V_{SD}	—	0.7	1	V	V_{GS} = 0V, I_S = 1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	698	908	pF	V_{DS} = 6V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	97	127	pF	
Reverse Transfer Capacitance	C_{rss}	—	90	126	pF	
Gate Resistance	R_g	—	1.3	2.6	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	9.6	15	nC	V_{GS} = 4.5V, V_{DS} = 6V, I_D = 1.0A
Gate-Source Charge	Q_{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.9	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.2	10	ns	V_{DD} = 6V, I_D = 1.0A, V_{GEN} = 4.5V, R_G = 1Ω, R_L = 6Ω
Turn-On Rise Time	t_R	—	6.7	14	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	16.6	32	ns	
Turn-Off Fall Time	t_F	—	2	4	ns	
Reverse Recovery Charge	Q_{RR}	—	0.7	1.5	nC	I_F = 1A, di/dt = 100A/µs
Body Diode Reverse Recovery Time	t_{RR}	—	6.9	14	ns	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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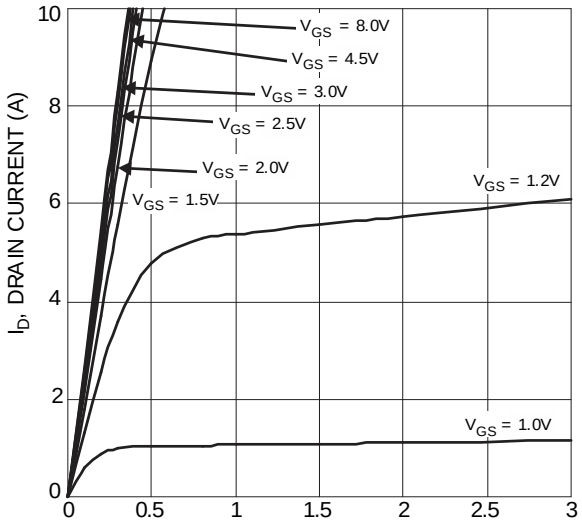


Figure 1 Typical Output Characteristics

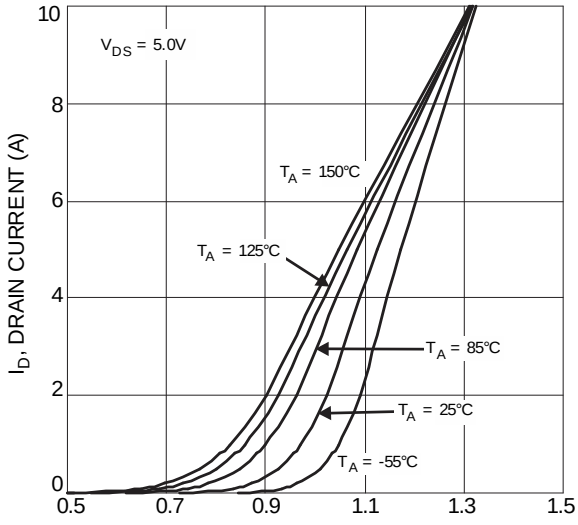


Figure 2 Typical Transfer Characteristics

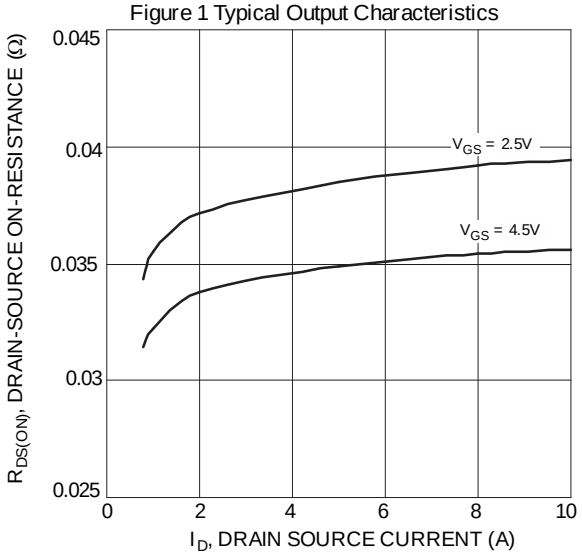


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

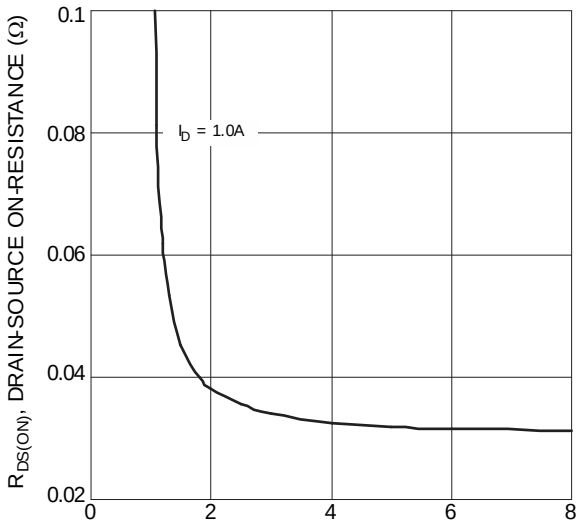


Figure 4 Typical Transfer Characteristic

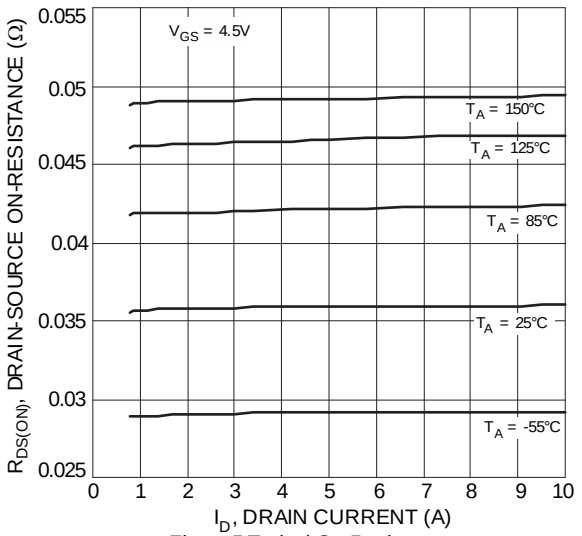


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

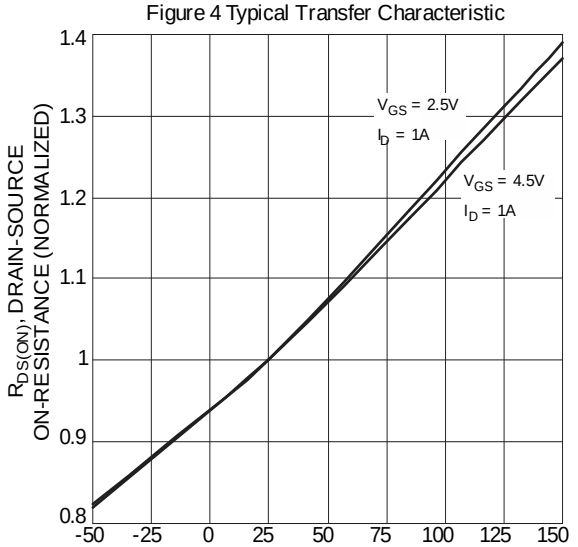


Figure 6 On-Resistance Variation with Temperature

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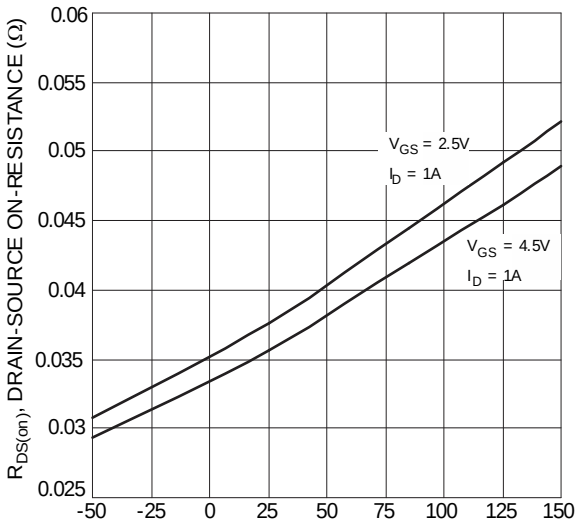


Figure 7 On-Resistance Variation with Temperature

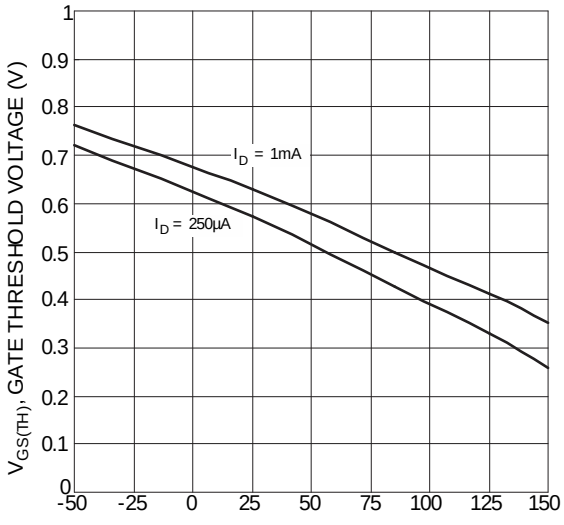


Figure 8 Gate Threshold Variation vs. Ambient Temperature

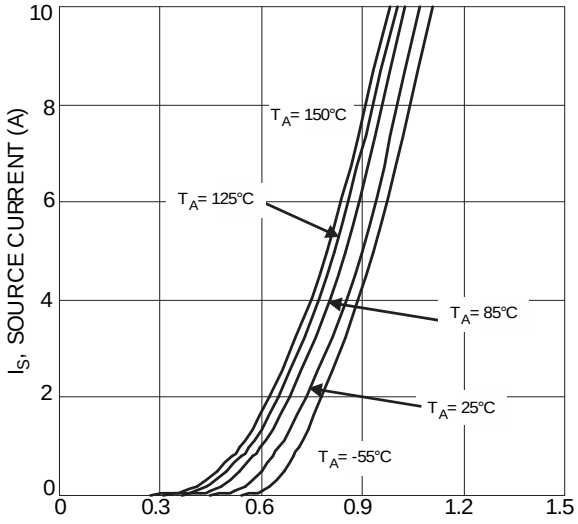


Figure 9 Diode Forward Voltage vs. Current

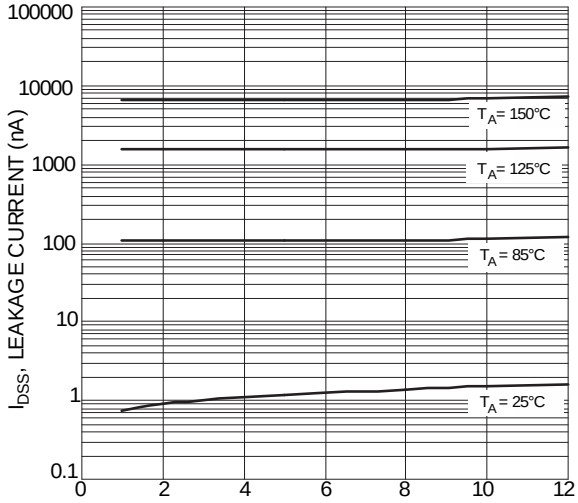


Figure 10 Typical Drain-Source Leakage Current vs. Voltage

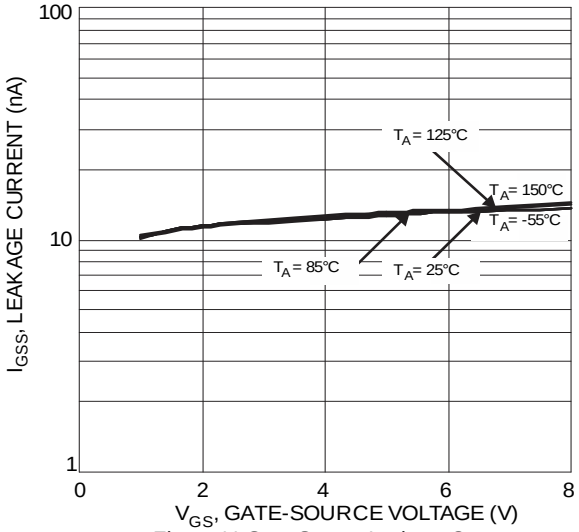


Figure 11 Gate-Source Leakage Current vs. Voltage

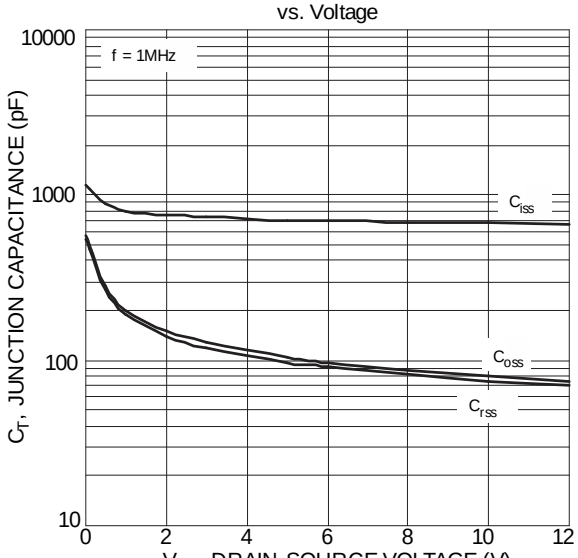


Figure 12 Typical Junction Capacitance

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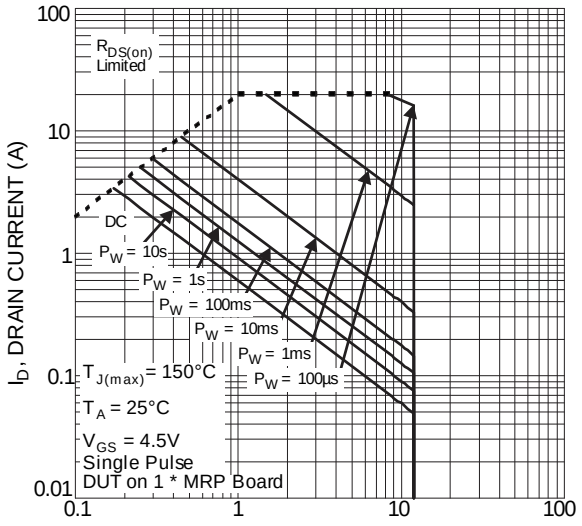


Figure 13 SOA, Safe Operation Area

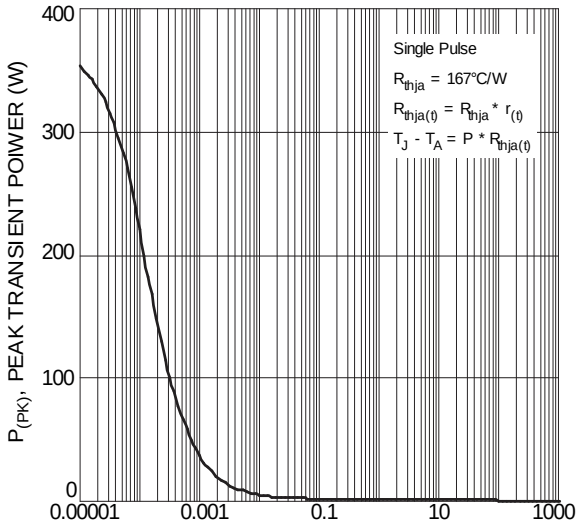


Figure 14 Single Pulse Maximum Power Dissipation

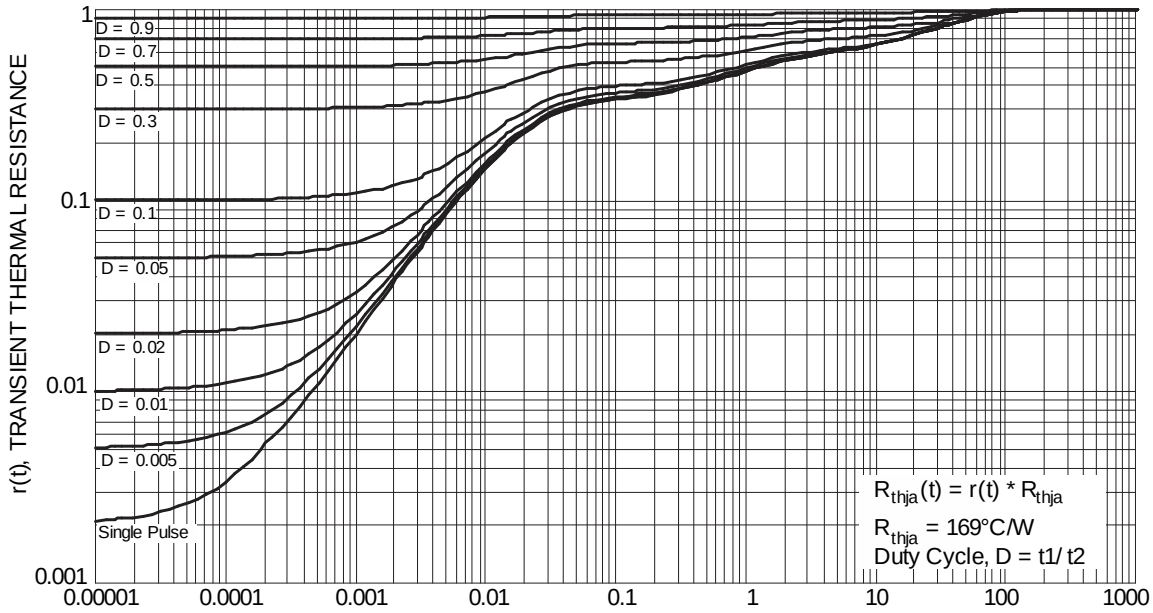


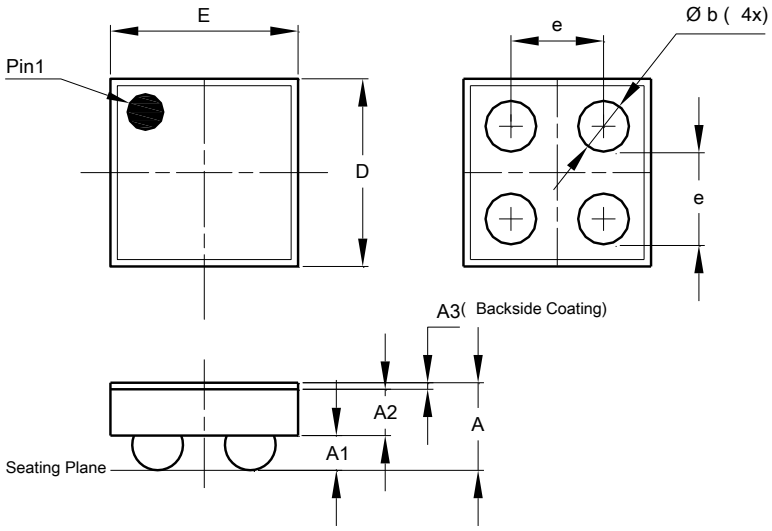
Figure 15 Transient Thermal Resistance

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Package Outline Dimensions

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

X1-WLB0808-4

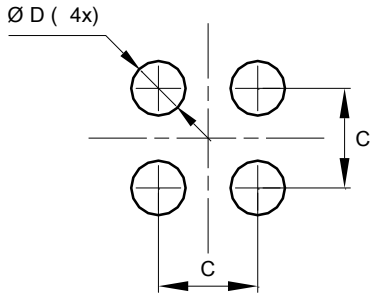


X1-WLB0808-4			
Dim	**Min**	**Max**	**Typ**
A	0.3320	0.4180	0.3750
A1	0.1350	0.1650	0.1500
A2	0.1750	0.2250	0.2000
A3	0.0220	0.0280	0.0250
b	0.1971	0.2409	0.2190
D	0.7900	0.8300	0.8100
E	0.7900	0.8300	0.8100
e	0.400 BSC		
All Dimensions in mm			

Suggested Pad Layout

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

X1-WLB0808-4



Dimensions	Value (in mm)
C	0.4000
D	0.2190

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