

## Product Summary (Typ. @ $V_{GS} = 4.5V$ , $T_A = +25^\circ C$ )

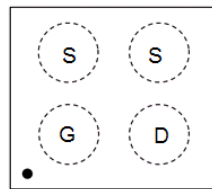
$BV_{DSS}$	$R_{DS(ON)}$	$Q_g$	$Q_{gd}$	$I_D$
20V	43m $\Omega$	7.4nC	1.5nC	4.0A

## Description

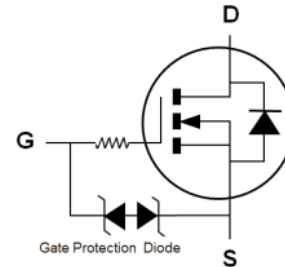
This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) with thin WLCSP packaging process and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- DC-DC Converters
- Battery Management
- Load Switch



Top-View  
Pin Configuration



Equivalent Circuit

## Features

- Built-in G-S Protection Diode Against ESD 2kV HBM
- Trench-MOS Technology with The Lowest  $R_{DS(ON)}$ :  $R_{DS(ON)} = 43m\Omega$  to Minimize On-State Losses
- $V_{GS(TH)} = 0.7V$  Typ. for A Low Turn-On Potential
- CSP with Footprint 0.8mm x 0.8mm
- Height = 0.35mm for Low Profile
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

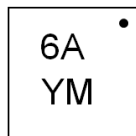
- Case: X2-WLB0808-4 (Type B)
- Terminal Connections: See Diagram Below

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2080UCB4-7	X2-WLB0808-4 (Type B)	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](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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



6A = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: E = 2017)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022
Code	D	E	F	G	H	I	J

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	$V_{GSS}$	$\pm 8$	V	
Continuous Source Current @ $V_{GS} = 4.5V$ (Note 5)	$I_D$	$T_A = +25^\circ C$	3.0	A
		$T_A = +70^\circ C$	2.4	A
Continuous Source Current @ $V_{GS} = 4.5V$ (Note 6)	$I_D$	$T_A = +25^\circ C$	4.0	A
		$T_A = +70^\circ C$	3.2	A
Pulsed Drain Current (Pulse Duration 10 $\mu s$ , Duty Cycle $\leq 1\%$ )	$I_{DM}$	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)	$P_D$	0.71	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	176	$^\circ C/W$
Total Power Dissipation (Note 6)	$P_D$	1.25	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	99	$^\circ C/W$
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
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1.0	$\mu A$	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 0.5$	$\mu A$	$V_{GS} = \pm 4.5V, V_{DS} = 0V$
		-	-	$\pm 6$		$V_{GS} = \pm 8V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	0.7	1	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	43	56	$m\Omega$	$V_{GS} = 4.5V, I_D = 1.0A$
		-	49	68		$V_{GS} = 2.5V, I_D = 1.0A$
		-	60	90		$V_{GS} = 1.8V, I_D = 1.0A$
		-	72	115		$V_{GS} = 1.5V, I_D = 0.5A$
Forward Transfer Admittance	$ Y_{fs} $	-	4	-	S	$V_{DS} = 10V, I_S = 1.0A$
Body Diode Forward Voltage	$V_{SD}$	-	0.7	1.2	V	$V_{GS} = 0V, I_S = 1.0A$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	-	540	-	pF	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	-	70	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	33	-	pF	
Gate Resistance	$R_g$	-	1	-	k $\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge	$Q_g$	-	7.4	-	nC	$V_{GS} = 4.5V, V_{DS} = 10V,$ $I_D = 1.0A$
Gate-Source Charge	$Q_{gs}$	-	0.8	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	1.5	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	152	-	ns	$V_{DD} = 10V, I_D = 1.0A$ $V_{GEN} = 4.5V, R_G = 1\Omega, R_L = 10\Omega$
Turn-On Rise Time	$t_R$	-	268	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	1245	-	ns	
Turn-Off Fall Time	$t_F$	-	816	-	ns	
Reverse Recovery Charge	$Q_{RR}$	-	13	-	nC	$I_F = 1A, di/dt = 100A/\mu s$
Body Diode Reverse Recovery Time	$t_{RR}$	-	5	-	ns	

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

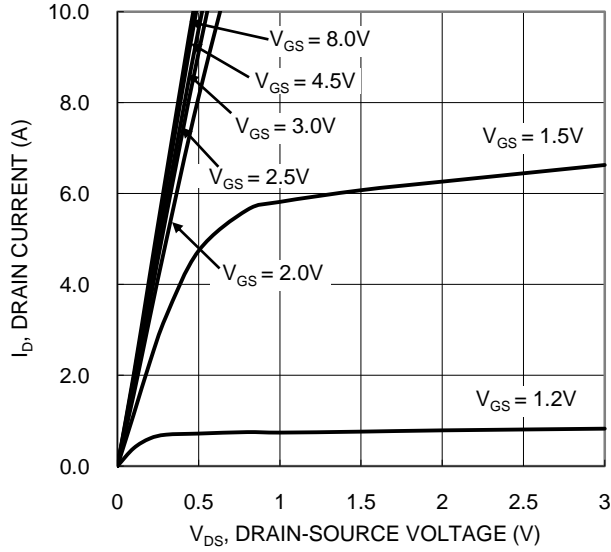


Figure 1. Typical Output Characteristic

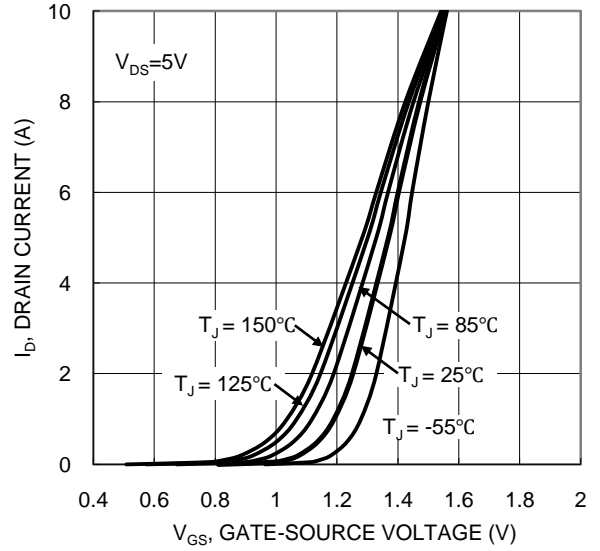


Figure 2. Typical Transfer Characteristic

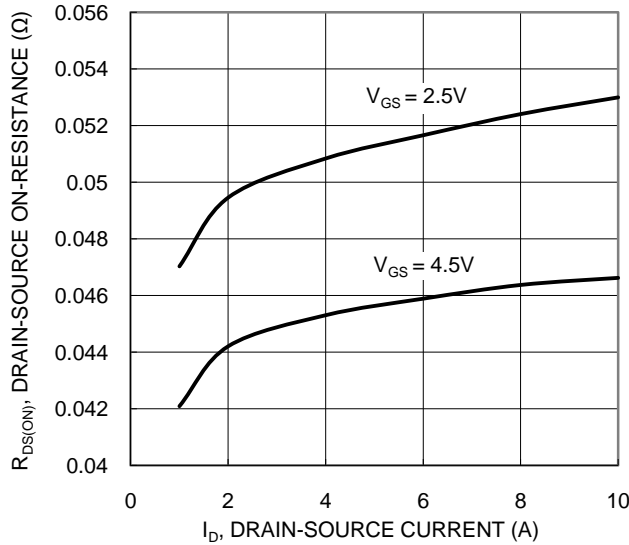


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

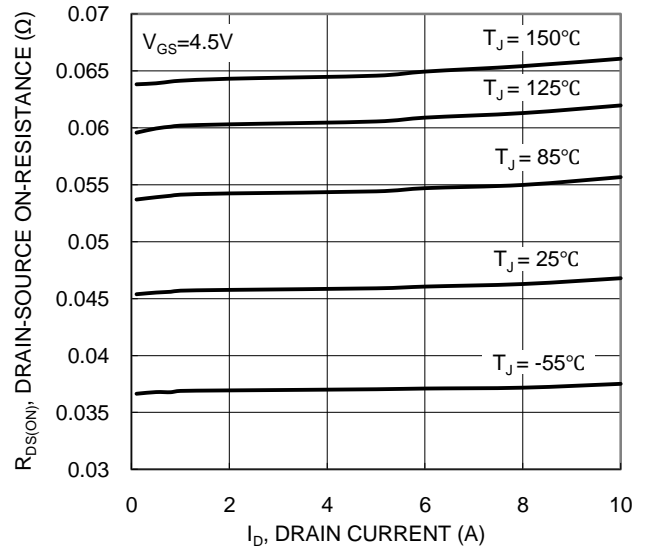


Figure 4. Typical On-Resistance vs. Drain Current and Junction Temperature

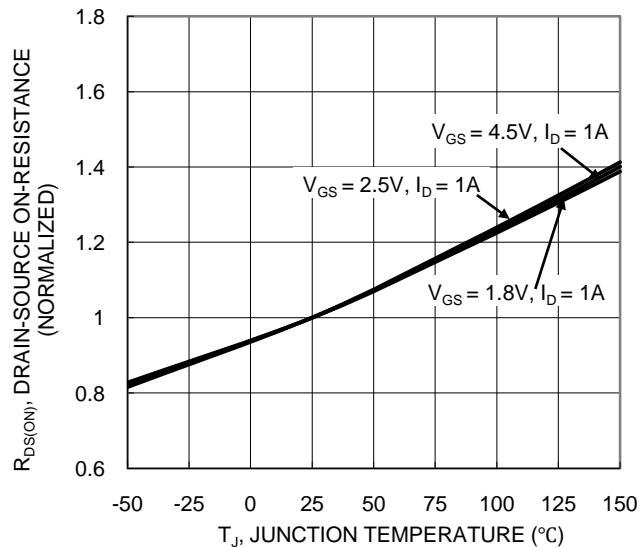


Figure 5. On-Resistance Variation with Junction Temperature

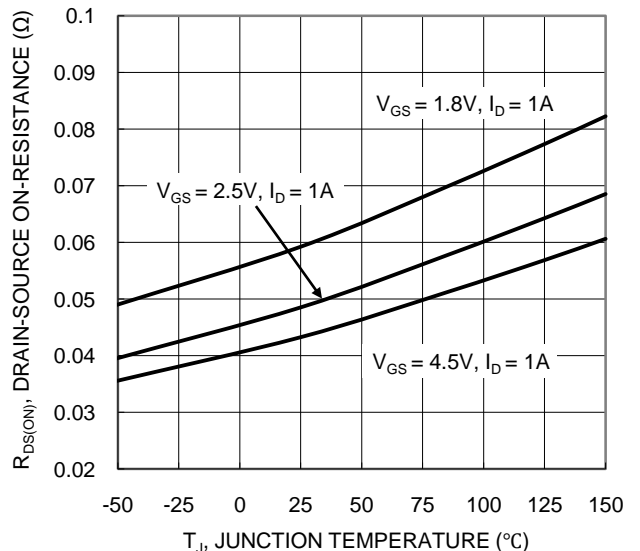


Figure 6. On-Resistance Variation with Junction Temperature

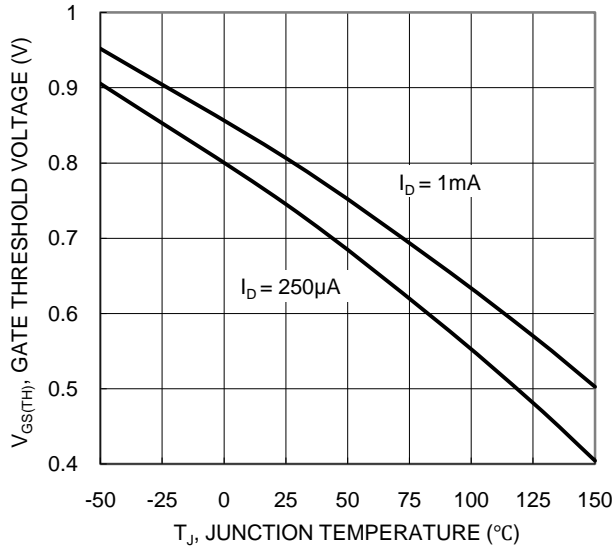


Figure 7. Gate Threshold Variation vs. Junction Temperature

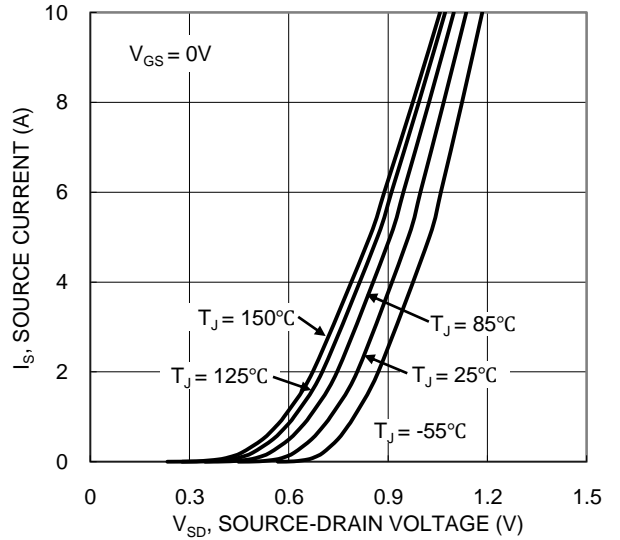


Figure 8. Diode Forward Voltage vs. Current

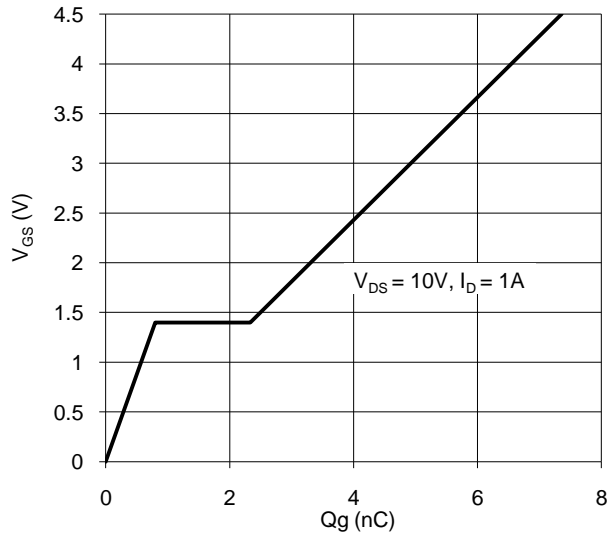


Figure 9. Gate Charge

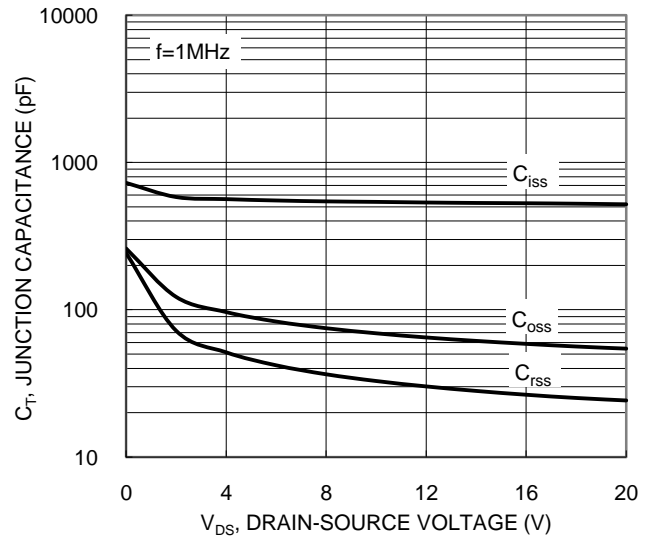


Figure 10. Typical Junction Capacitance

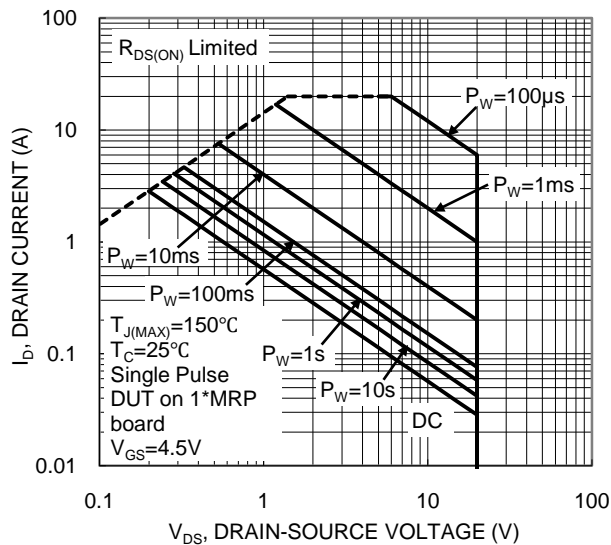


Figure 11. SOA, Safe Operation Area

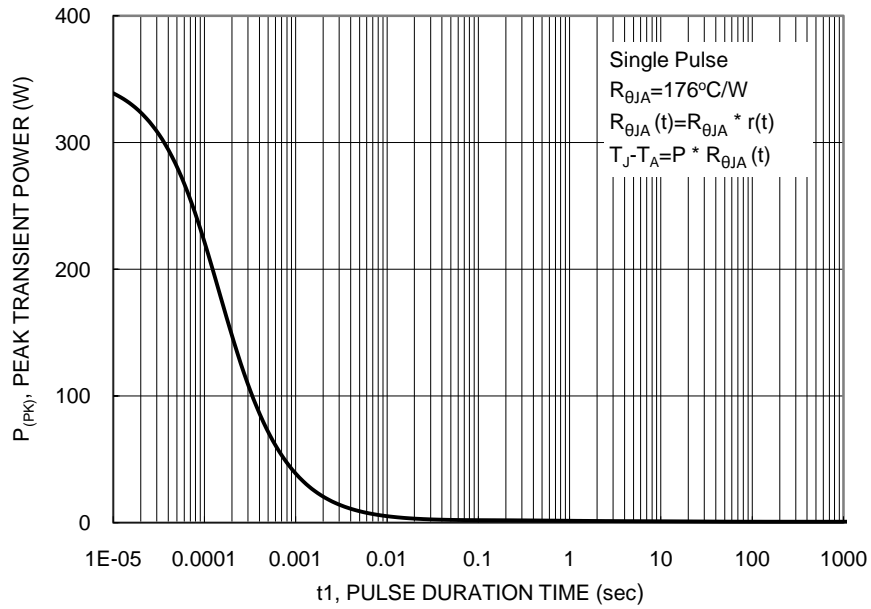


Figure 12. Single Pulse Maximum Power Dissipation

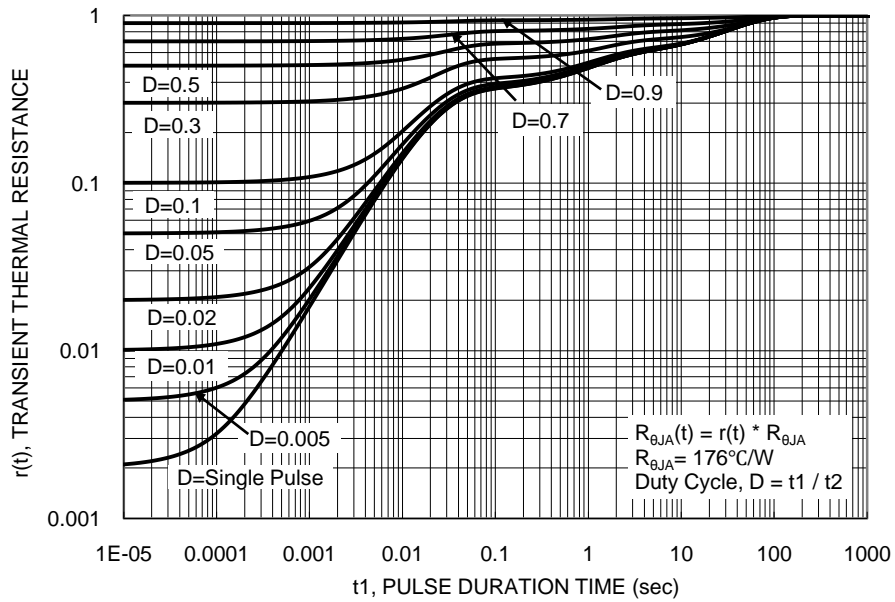
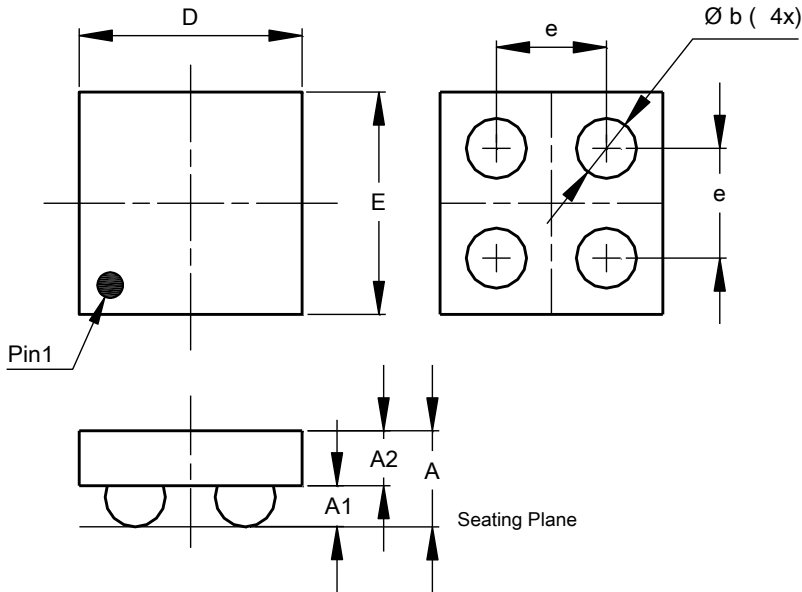


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**X2-WLB0808-4 (Type B)**

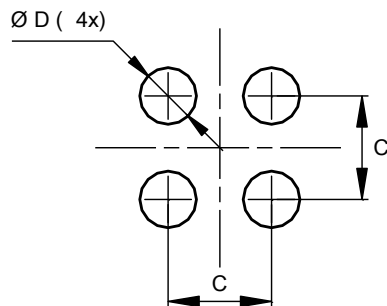


X2-WLB0808-4 (Type B)			
Dim	Min	Max	Typ
A	0.3100	0.3900	0.3500
A1	0.1350	0.1650	0.1500
A2	0.1750	0.2250	0.2000
b	0.1971	0.2409	0.2190
D	0.7900	0.8300	0.8100
E	0.7900	0.8300	0.8100
e	-	-	0.400
All Dimensions in mm			

**Suggested Pad Layout**

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

**X2-WLB0808-4 (Type B)**



Dimensions	Value (in mm)
C	0.400
D	0.219

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