

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

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

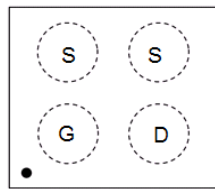
## Description

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.

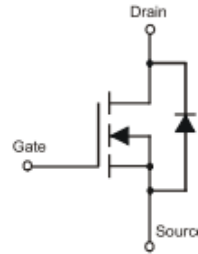
## Applications

- DC-DC Converters
- Battery Management
- Load Switch

X1-WLB0808-4



Top-View  
Pin Configuration



Equivalent Circuit

## Features

- Trench-CSP Technology with the Lowest on Resistance:
  - $R_{DS(ON)} = 35m\Omega$  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 x 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

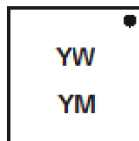
- Case: X1-WLB0808-4
- Terminal Connections: See Diagram Below

## 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](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  $\bar{Y}$  = Year (ex: D = 2016)  
 M or  $\bar{M}$  = 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

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	8	V
Gate-Source Voltage	V <sub>GSS</sub>	±5	V
Continuous Source Current @ V <sub>GS</sub> = 4.5V (Note 5)	I <sub>D</sub>	T <sub>A</sub> = +25°C 2.7	A
		T <sub>A</sub> = +70°C 2.2	
Continuous Source Current @ V <sub>GS</sub> = 4.5V (Note 6)	I <sub>D</sub>	T <sub>A</sub> = +25°C 4.0	A
		T <sub>A</sub> = +70°C 3.2	
Pulsed Drain Current (Pulse duration 10μs, duty cycle ≤1%)	I <sub>DM</sub>	8	A
Continuous Source-Drain Diode Current	I <sub>S</sub>	0.74	A
Pulse Diode Forward Current	I <sub>SM</sub>	15	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	169	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	1.34	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	93	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	8	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 8V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.35	—	0.7	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	35 38.5 46.4 53.3 64.7	42 50 65 80 110	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.0A V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 1.0A V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 0.5A V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 0.2A V <sub>GS</sub> = 1.2V, I <sub>D</sub> = 0.1A
Forward Transfer Admittance	Y <sub>fs</sub>	—	6.0	—	S	V <sub>DS</sub> = 6V, I <sub>S</sub> = 1.0A
Body Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.0A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	—	698	908	pF	V <sub>DS</sub> = 6V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	97	127	pF	
Reverse Transfer Capacitance	C <sub>ISS</sub>	—	90	126	pF	
Gate Resistance	R <sub>g</sub>	—	1.3	2.6	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	9.6	15	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 6V, I <sub>D</sub> = 1.0A
Gate-Source Charge	Q <sub>gs</sub>	—	0.9	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.9	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.2	10	ns	V <sub>DD</sub> = 6V, I <sub>D</sub> = 1.0A V <sub>GEN</sub> = 4.5V, R <sub>G</sub> = 1Ω, R <sub>L</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	6.7	14	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	16.6	32	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	2	4	ns	
Reverse Recovery Charge	Q <sub>RR</sub>	—	0.7	1.5	nC	I <sub>F</sub> = 1A, di/dt = 100A/μs
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	6.9	14	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 1-inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

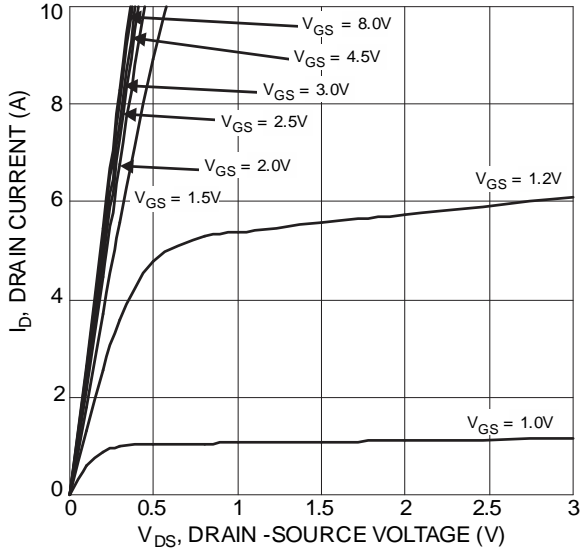


Figure 1 Typical Output Characteristics

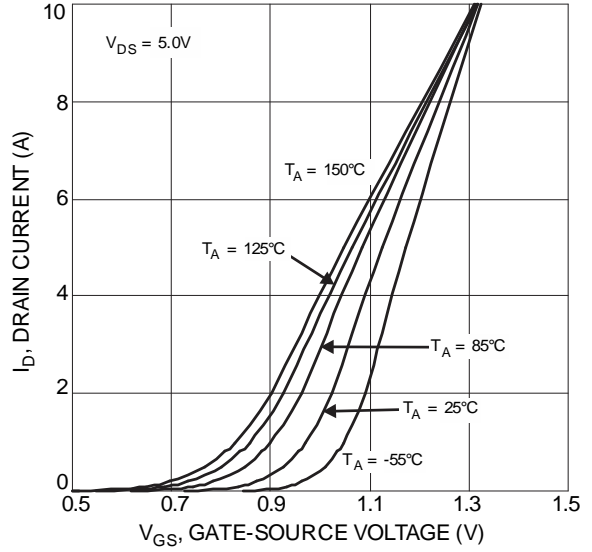


Figure 2 Typical Transfer Characteristics

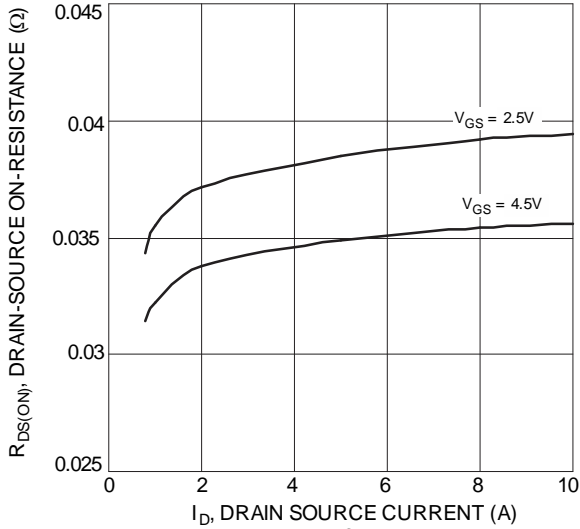


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

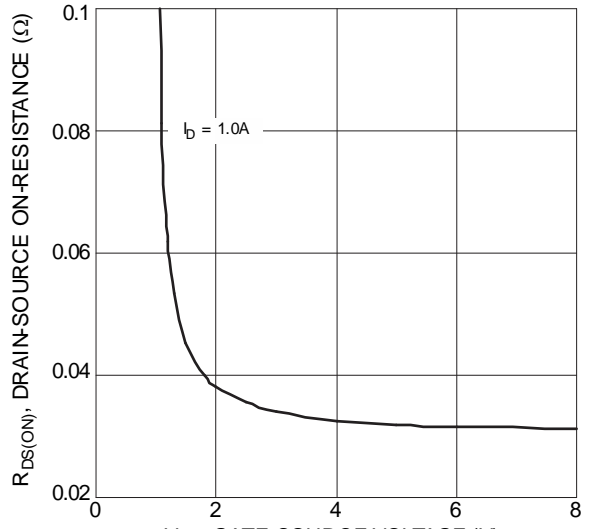


Figure 4 Typical Transfer Characteristic

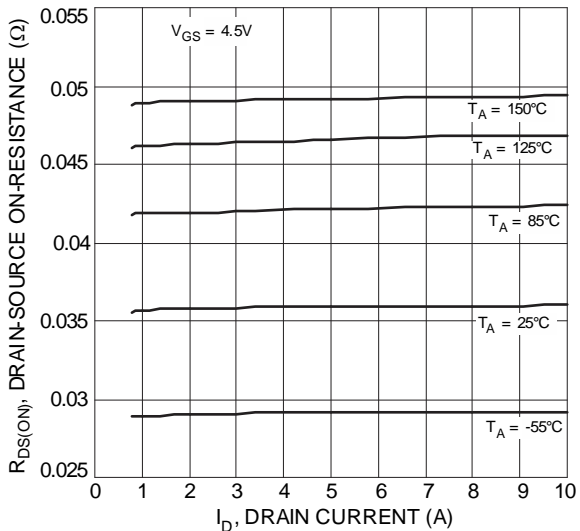


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

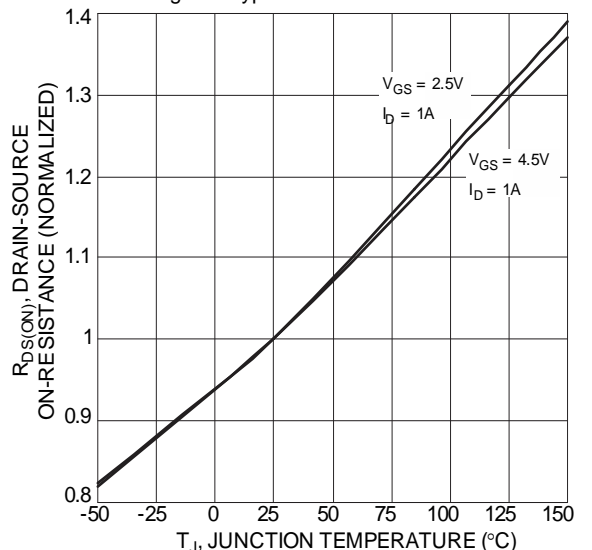
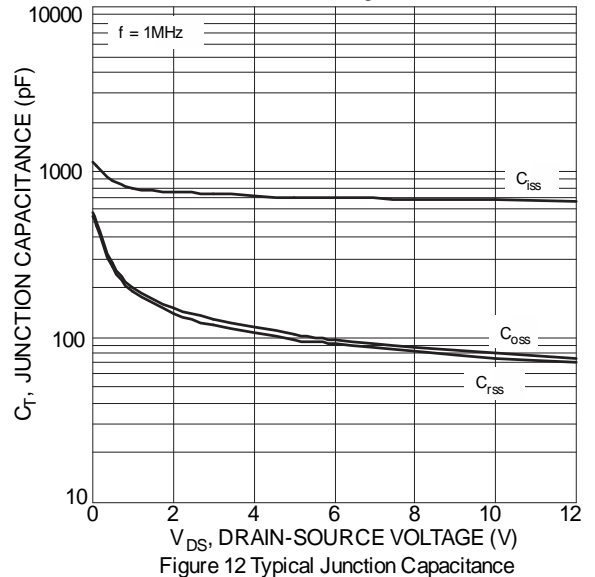
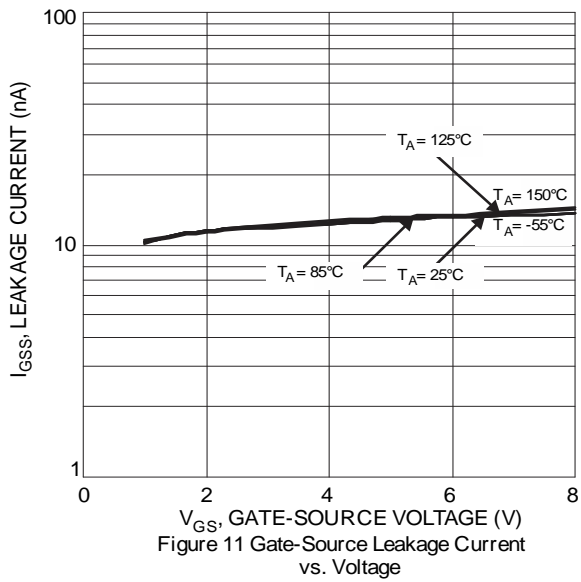
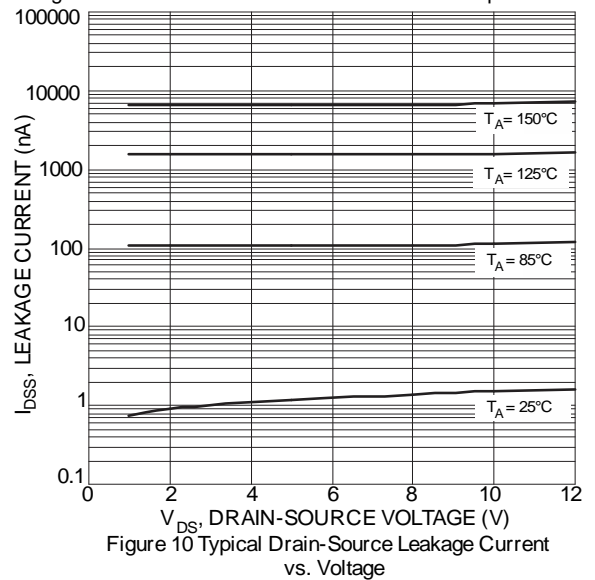
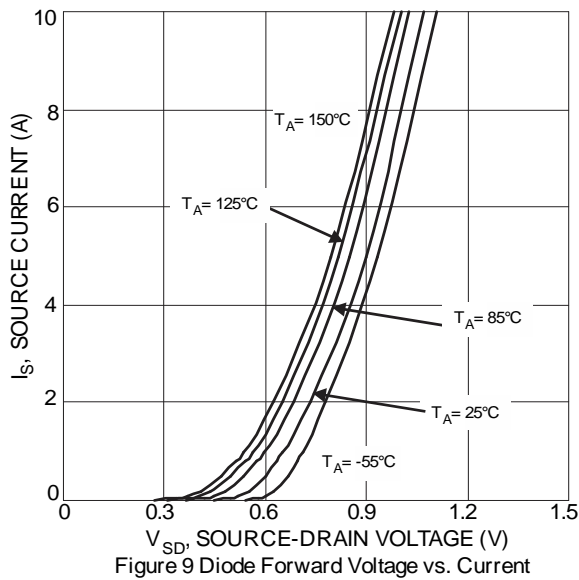
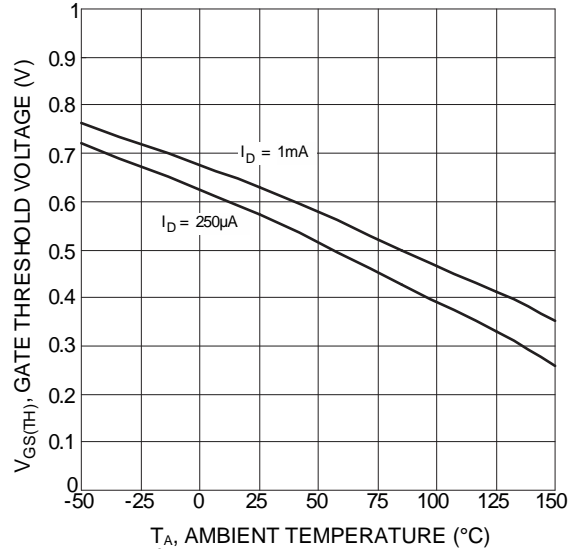
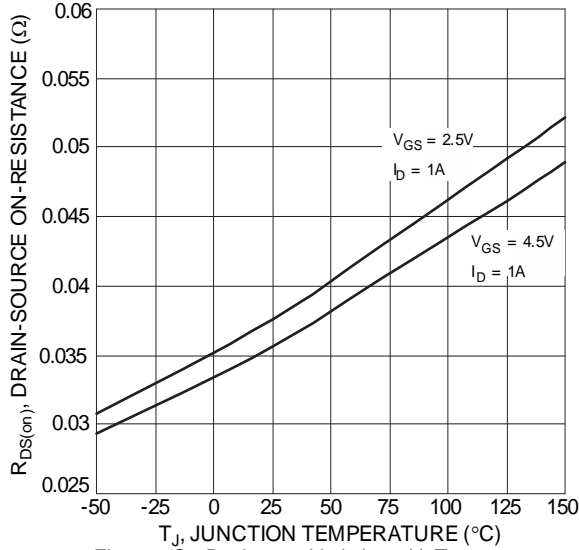
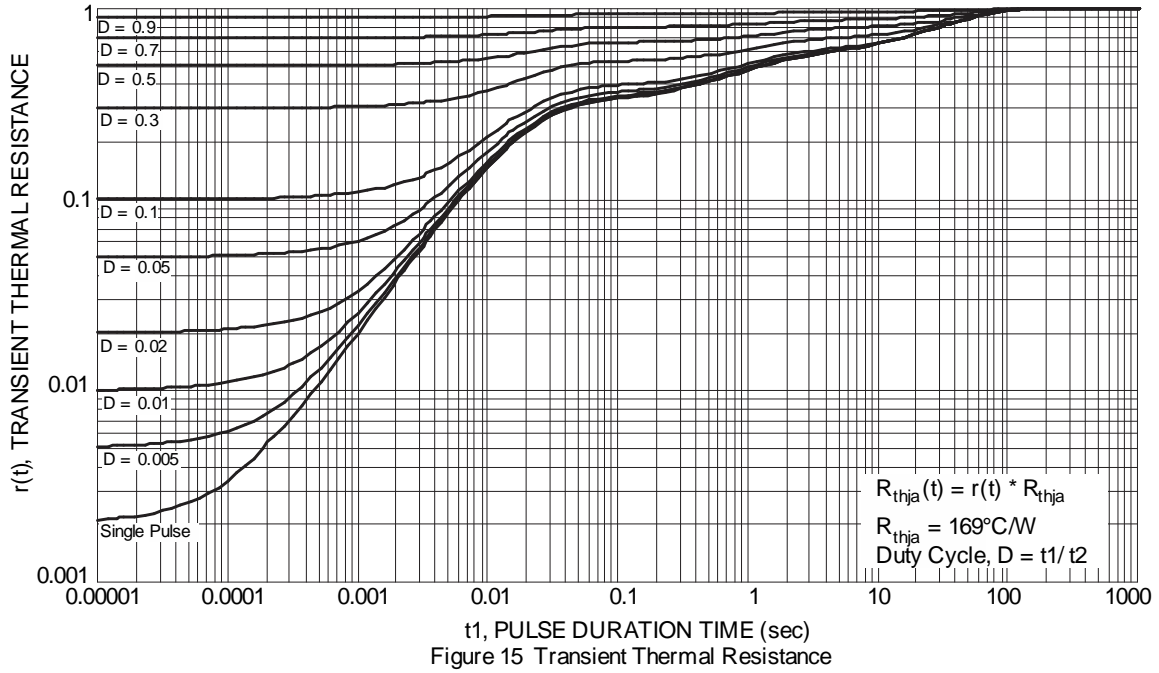
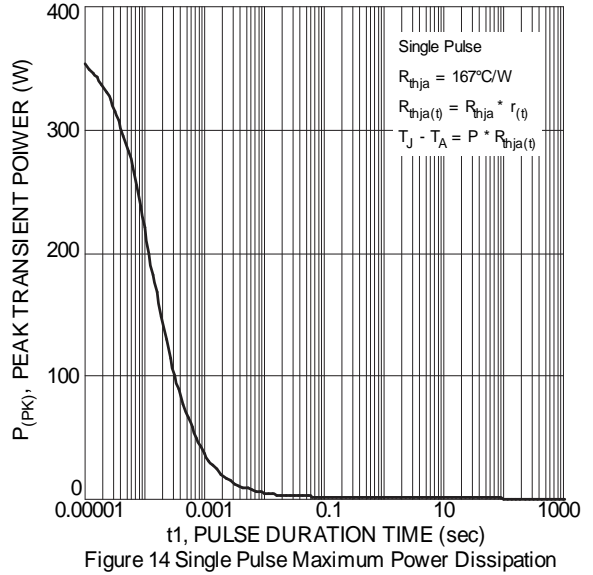
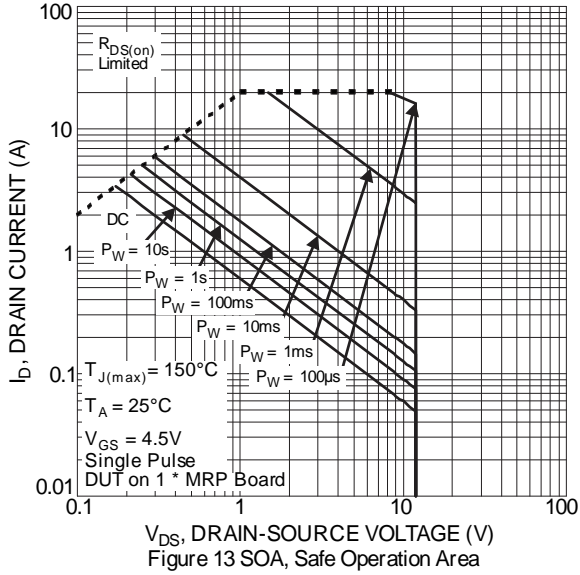


Figure 6 On-Resistance Variation with Temperature

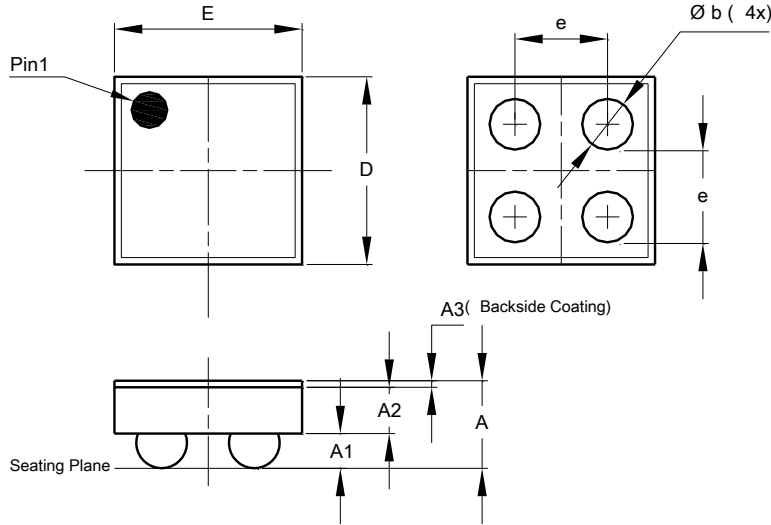




**Package Outline Dimensions**

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

**X1-WLB0808-4**

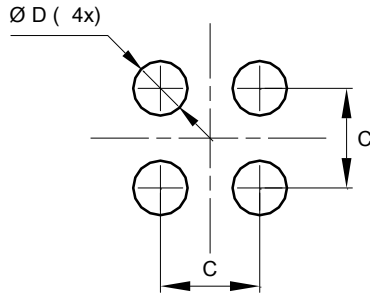


X1-WLB0808-4			
Dim	Min	Max	Typ
A	0.3320	0.4180	0.3750
A1	0.1350	0.1650	0.1500
A2	0.1750	0.2250	0.2000
A3	0.0220	0.0280	0.0250
b	0.1971	0.2409	0.2190
D	0.7900	0.8300	0.8100
E	0.7900	0.8300	0.8100
e	0.400 BSC		
All Dimensions in mm			

**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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