

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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-20V	37m $\Omega$ @ $V_{GS} = -4.5V$	-4.6A
	49m $\Omega$ @ $V_{GS} = -2.5V$	-3.7A

**Features and Benefits**

- Low  $Q_g$  &  $Q_{gd}$
- Small Footprint
- Low Profile 0.62mm Height
- ESD Protected Up To 3kV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Description and Applications**

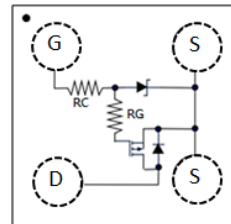
This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Battery Management
- Load Switch
- Battery Protection

**Mechanical Data**

- Case: U-WLB1010-4 (Type C)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish - SnAgCu. Solderable per MIL-STD-202 Method 208 (e1)
- Terminal Connections: See Diagram Below

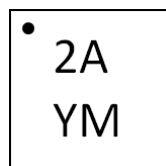
U-WLB1010-4 (Type C)


 Top View  
Equivalent Circuit

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMP2042UCB4-7	U-WLB1010-4 (Type C)	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**


2A = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 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** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	-6	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V	I <sub>D</sub>	-4.6	A
Continuous Drain Current (Note 5) V <sub>GS</sub> = -2.5V	I <sub>D</sub>	-3.7	A
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	-16	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P <sub>D</sub>	0.75	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 7)	R <sub>θJA</sub>	165	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	87	°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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	-100	nA	V <sub>GS</sub> = -6V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	-0.8	-1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	37	45	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1A
		—	49	65		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A
Forward Transfer Admittance	Y <sub>FS</sub>	—	6.6	-	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	218	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	148	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	11	—		
Series Gate Resistance	R <sub>g</sub>	—	20	—	Ω	f = 1MHz, V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V
Series Clamp Resistance	R <sub>C</sub>	—	5,000	—		
Total Gate Charge	Q <sub>g</sub>	—	2.5	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -1A
Gate-Source Charge	Q <sub>gs</sub>	—	0.4	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.4	—		
Gate Charge at V <sub>TH</sub>	Q <sub>g(TH)</sub>	—	0.2	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	0.6	—	μs	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -2.5V, R <sub>G</sub> = 10Ω, I <sub>D</sub> = -1A
Turn-On Rise Time	t <sub>R</sub>	—	0.8	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	1.4	—		
Turn-Off Fall Time	t <sub>F</sub>	—	0.8	—		
Reverse Recovery Charge	Q <sub>RR</sub>	—	2.2	—	nC	V <sub>DD</sub> = -10V, I <sub>F</sub> = -1.0A, di/dt = 100A/μs
Reverse Recovery Time	t <sub>RR</sub>	—	10	—	ns	

- Notes:
- Device mounted on FR-4 material with 1-inch<sup>2</sup> (6.45-cm<sup>2</sup>), 2-oz. (0.071-mm thick) Cu.
  - Repetitive rating, pulse width limited by junction temperature.
  - 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.

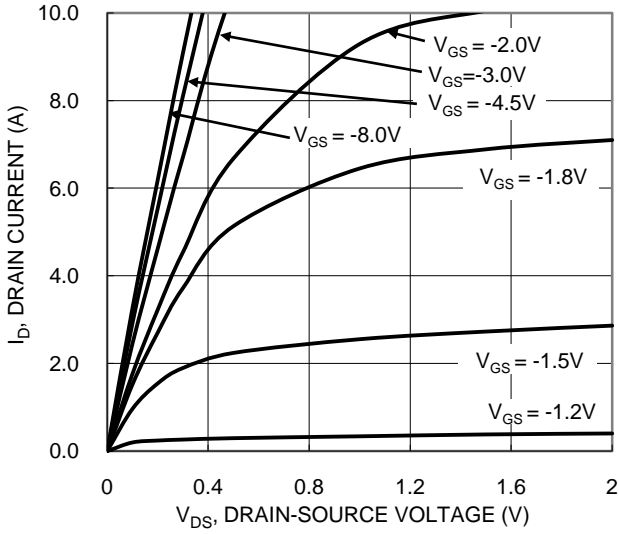


Figure 1. Typical Output Characteristic

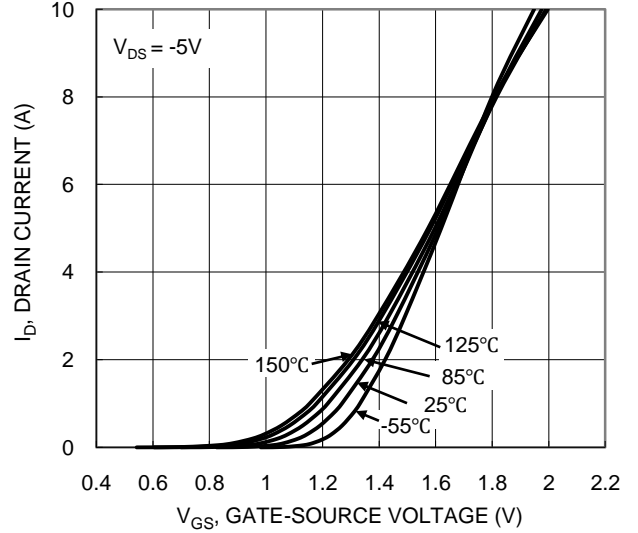


Figure 2. Typical Transfer Characteristic

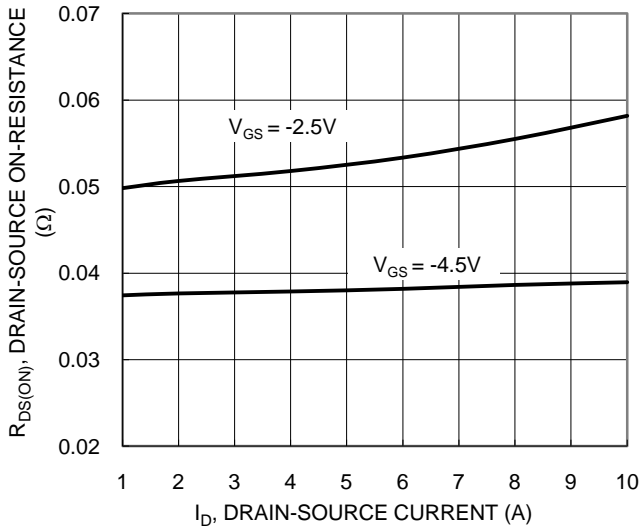


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

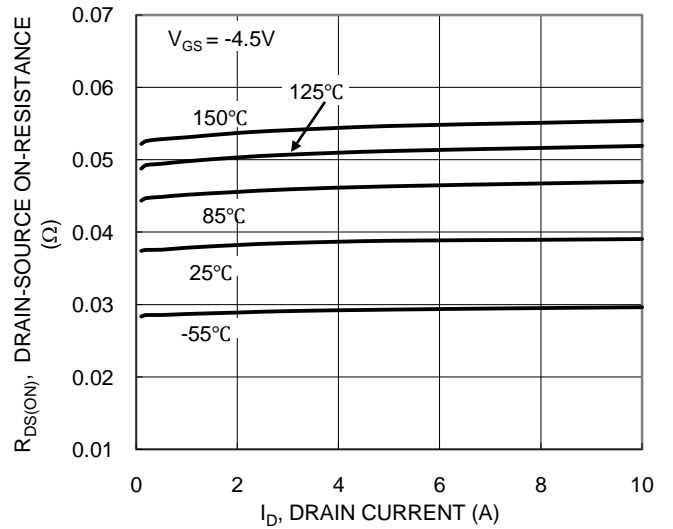


Figure 4. Typical On-Resistance vs. Drain Current and Junction Temperature

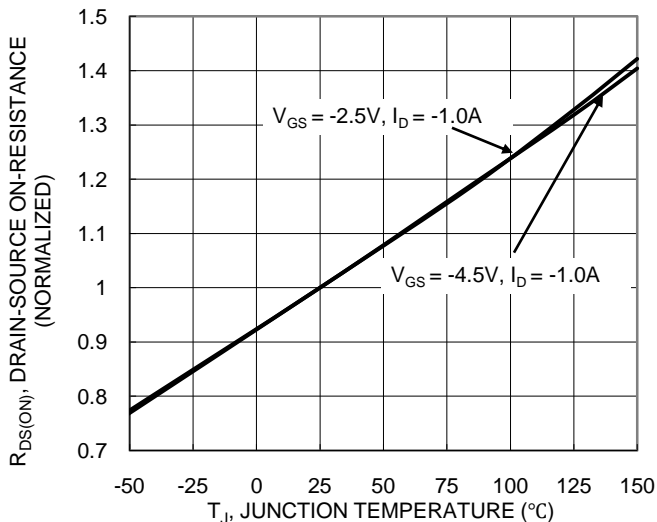


Figure 5. On-Resistance Variation with Junction Temperature

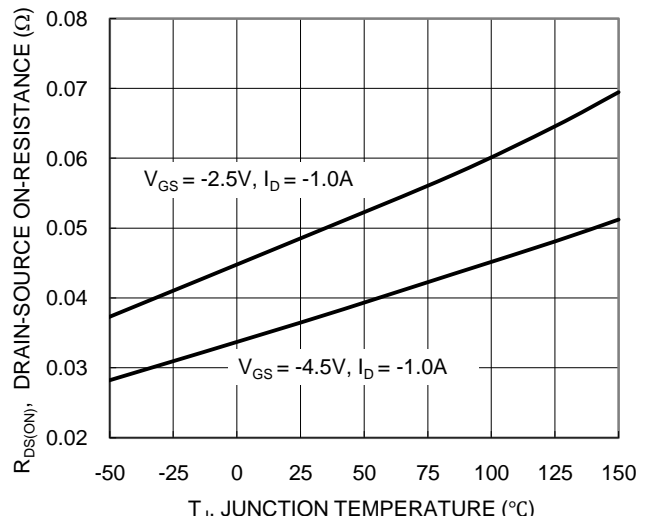
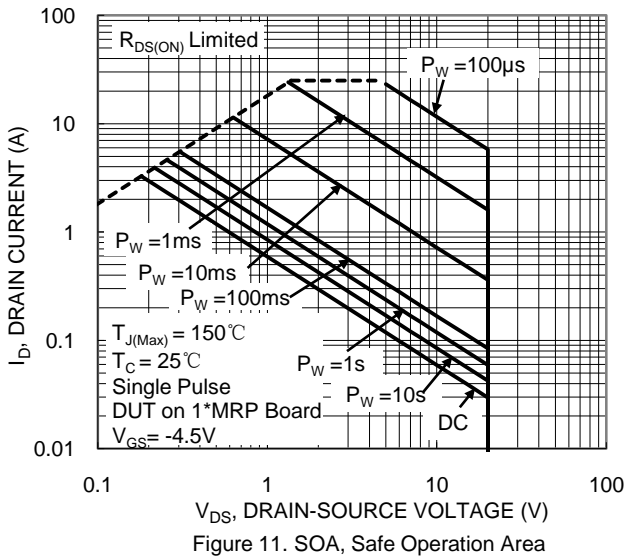
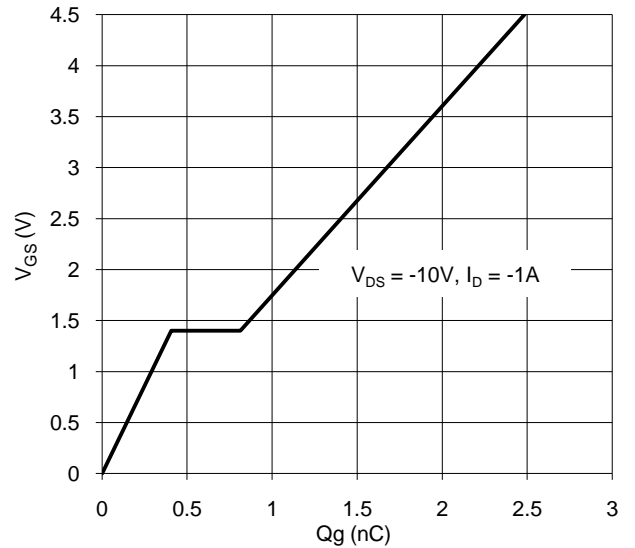
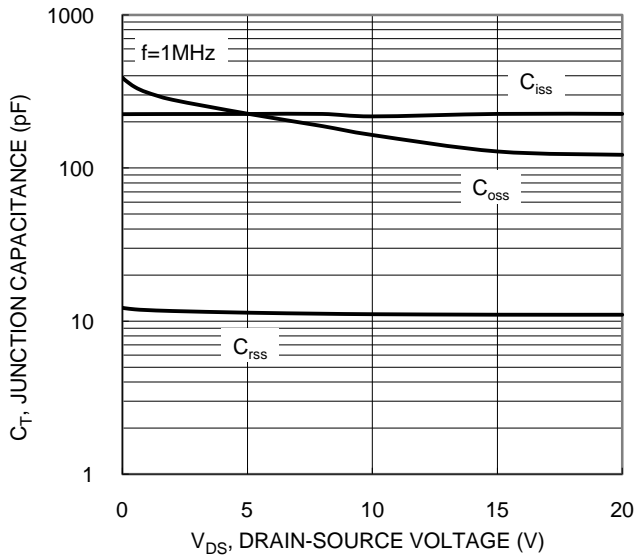
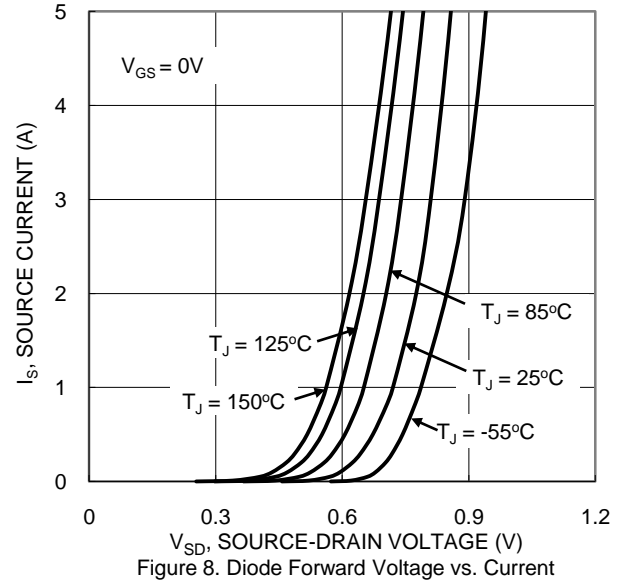
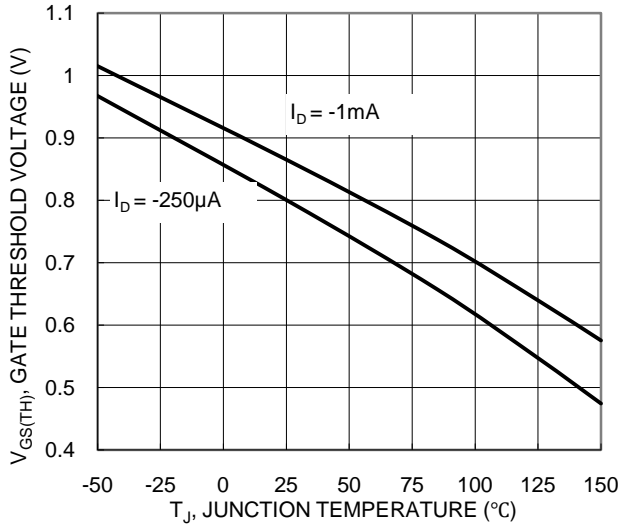


Figure 6. On-Resistance Variation with Junction Temperature



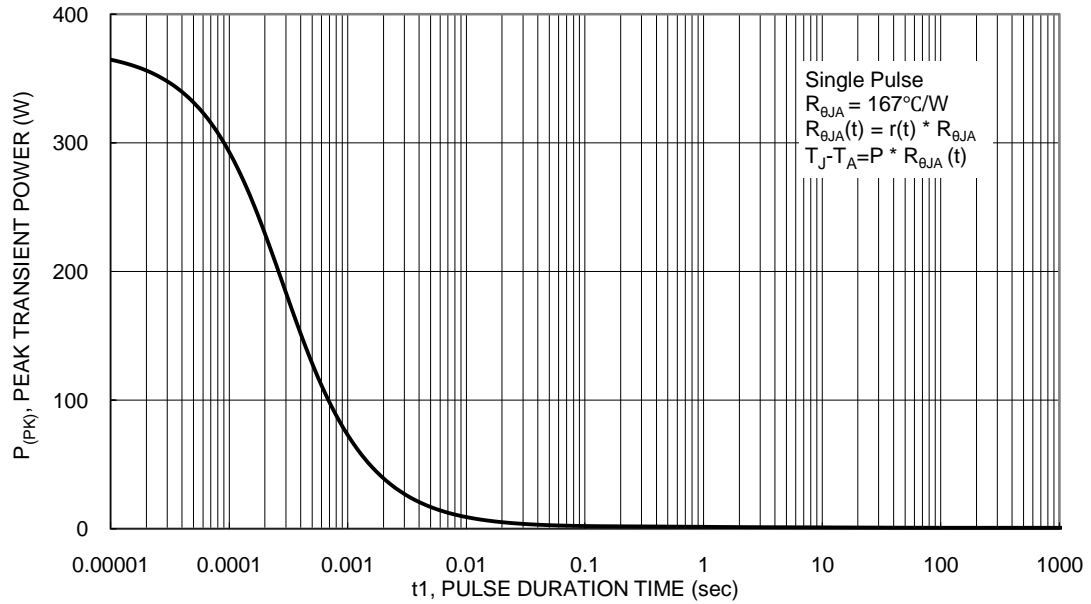


Figure 12. Single Pulse Maximum Power Dissipation

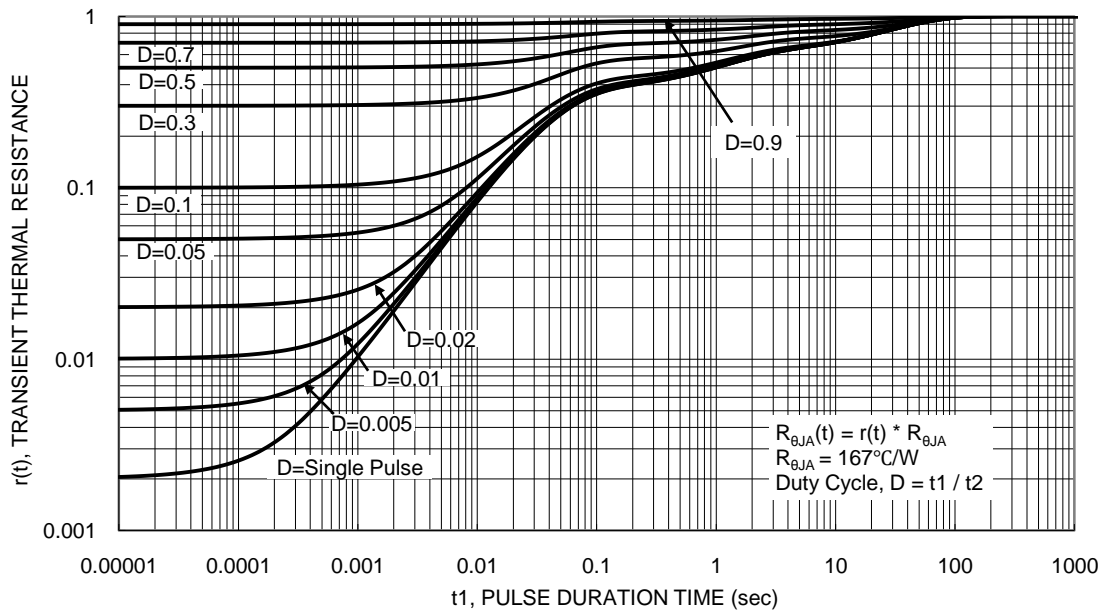
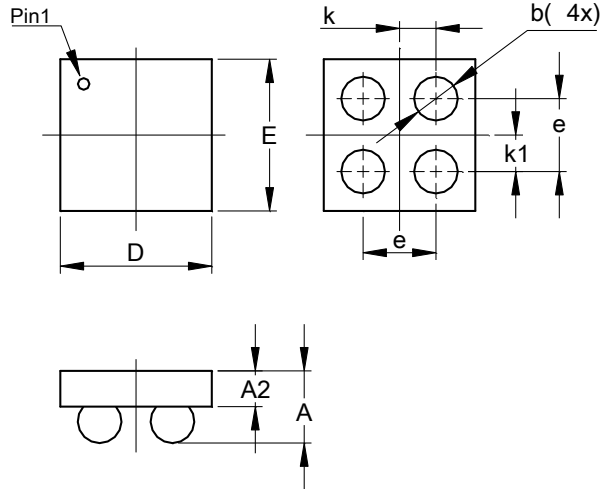


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**U-WLB1010-4 (Type C)**

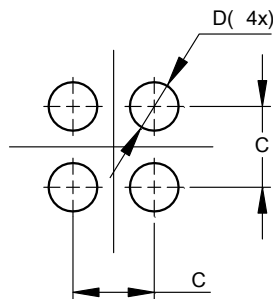


U-WLB1010-4 (Type C)			
Dim	Min	Max	Typ
A	--	0.62	--
A2	--	--	0.38
b	0.25	0.35	0.30
D	0.92	1.00	0.96
E	0.92	1.00	0.96
e	--	--	0.50
k	--	--	0.25
k1	--	--	0.25
All Dimensions in mm			

**Suggested Pad Layout**

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

**U-WLB1010-4 (Type C)**



Dimensions	Value (in mm)
C	0.500
D	0.300

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