

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D$ $T_A = +25^\circ\text{C}$
20V	20.2m $\Omega$ @ $V_{GS} = 4.5\text{V}$	7.5A
	23.5m $\Omega$ @ $V_{GS} = 2.5\text{V}$	7.0A

## Description

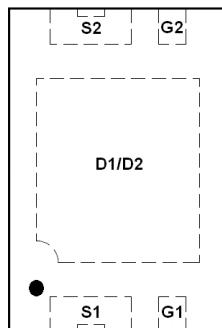
This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

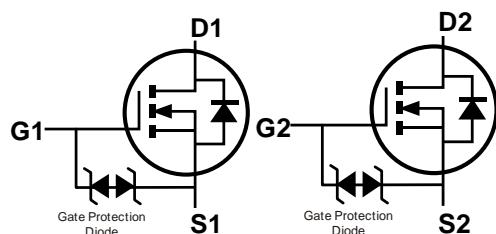
- Power Management Functions
- Battery Pack
- Load Switch



Bottom View



Top View



Equivalent Circuit

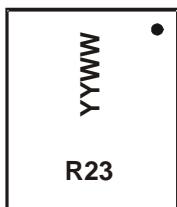
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2028UFU-7	U-DFN2030-6	3000 / Tape & Reel
DMN2028UFU-13	U-DFN2030-6	10000 / Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



R23 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 14 for 2014)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 10$	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	7.5 6.0	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	9.9 7.9	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	40	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			$I_{AS}$	12	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			$E_{AS}$	8	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	144	$^\circ\text{C/W}$
	$t < 10\text{s}$		84	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	69	$^\circ\text{C/W}$
	$t < 10\text{s}$		40	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	8.4	
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	15.3	20.2	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 4.5\text{A}$
			15.4	22.5		$V_{GS} = 4.0\text{V}, I_D = 4.0\text{A}$
			16.7	23.0		$V_{GS} = 3.1\text{V}, I_D = 4.0\text{A}$
			18.3	23.5		$V_{GS} = 2.5\text{V}, I_D = 3.5\text{A}$
			24.2	30.0		$V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	887	—	$\text{pF}$	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	91	—		
Reverse Transfer Capacitance	$C_{rss}$	—	37	—		
Gate Resistance	$R_g$	—	191	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	10	—	$\text{nC}$	$V_{DS} = 10\text{V}, I_D = 6.5\text{A}$
Total Gate Charge ( $V_{GS} = 8\text{V}$ )	$Q_g$	—	18.4	—		
Gate-Source Charge	$Q_{gs}$	—	1.3	—		
Gate-Drain Charge	$Q_{gd}$	—	1.8	—		
Turn-On Delay Time	$t_{D(ON)}$	—	53	—	$\text{ns}$	$V_{DS} = 10\text{V}, V_{GS} = 4.5\text{V}, R_G = 6\Omega, R_L = 10\Omega, I_D = 1\text{A}$
Turn-On Rise Time	$t_R$	—	66	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	619	—		
Turn-Off Fall Time	$t_F$	—	197	—		
Reverse Recovery Time	$t_{RR}$	—	119	—	$\text{ns}$	$I_F = 4\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{RR}$	—	96	—	$\text{nC}$	$I_F = 4\text{A}, di/dt = 100\text{A}/\mu\text{s}$

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 1inch square copper plate.
7.  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

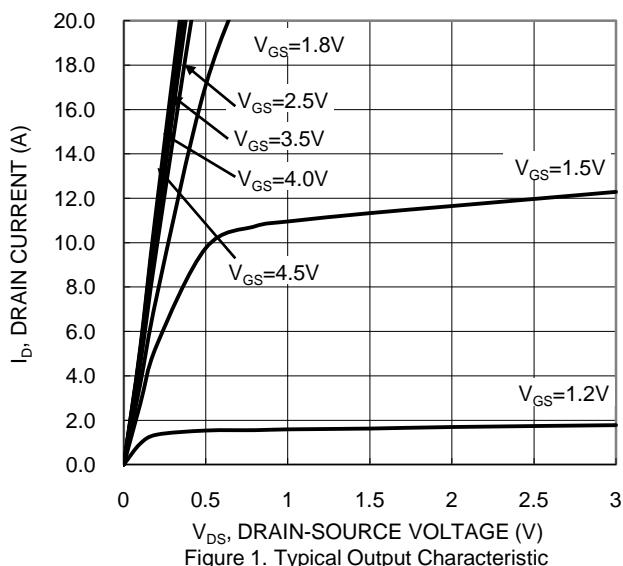


Figure 1. Typical Output Characteristic

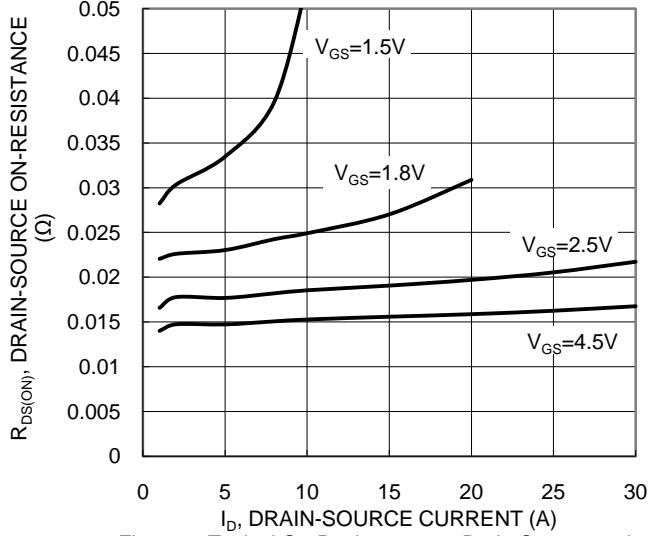


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

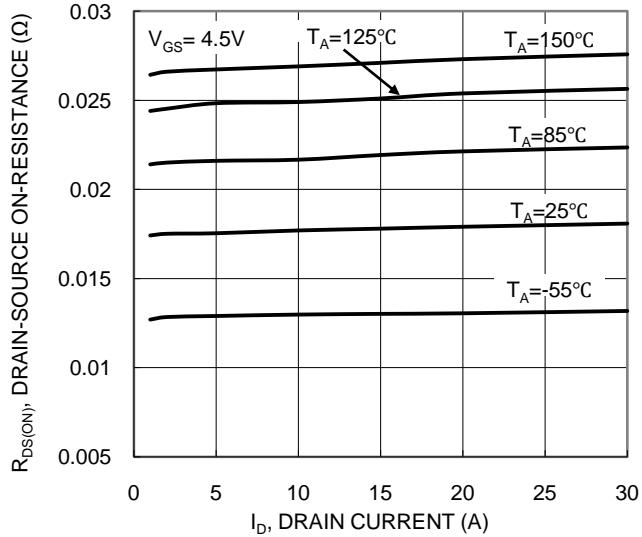


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

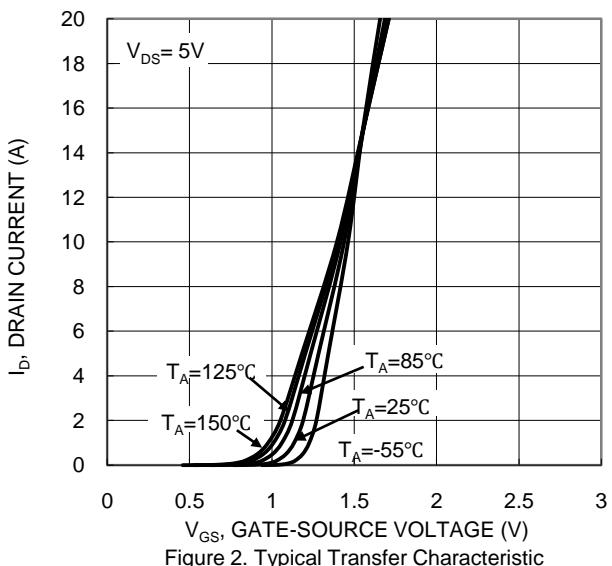


Figure 2. Typical Transfer Characteristic

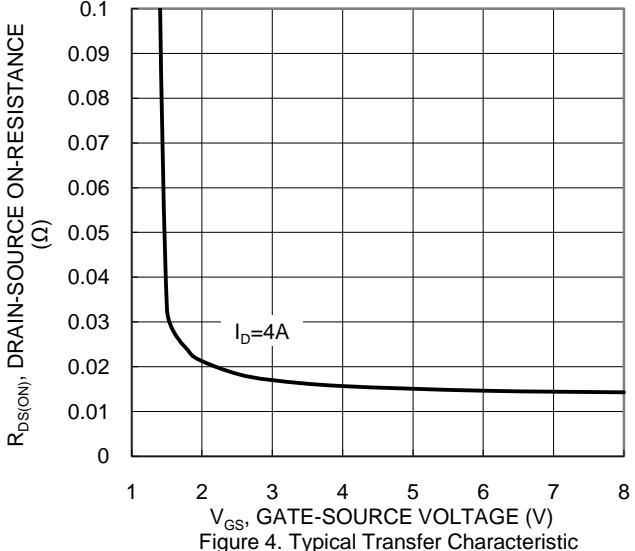


Figure 4. Typical Transfer Characteristic

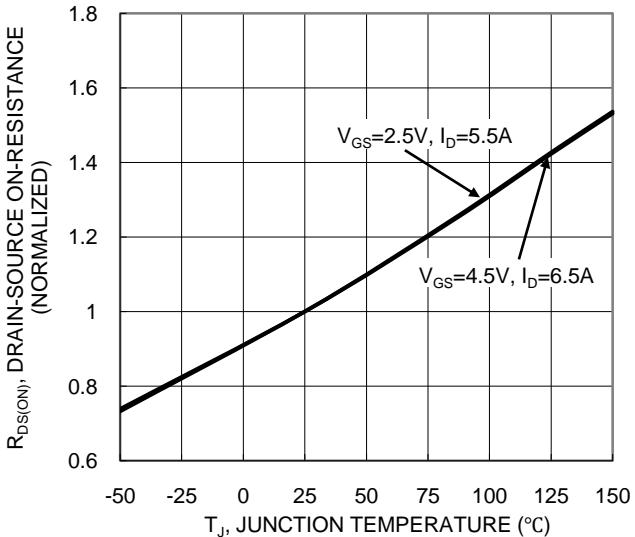
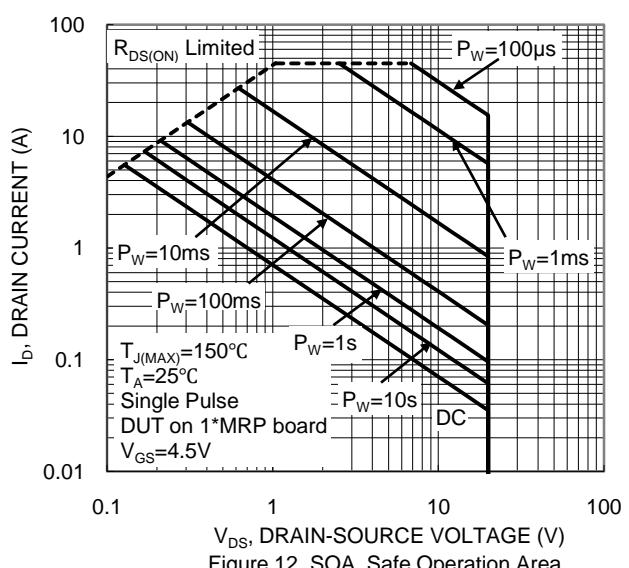
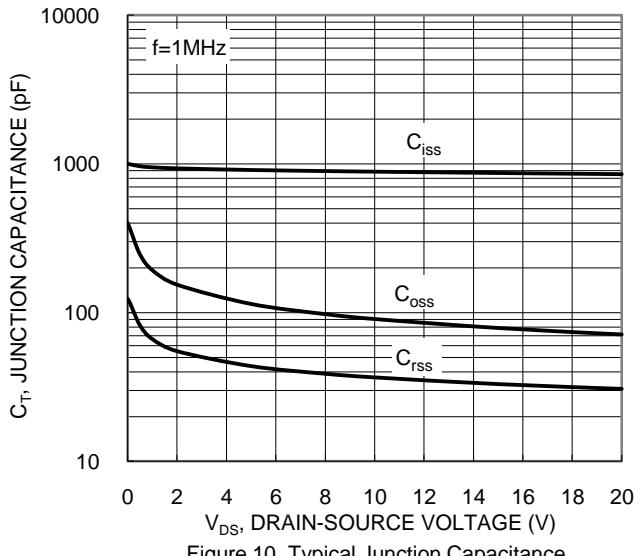
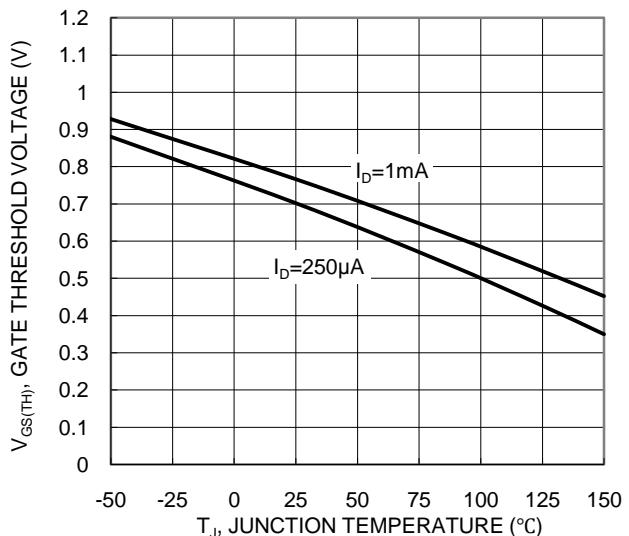
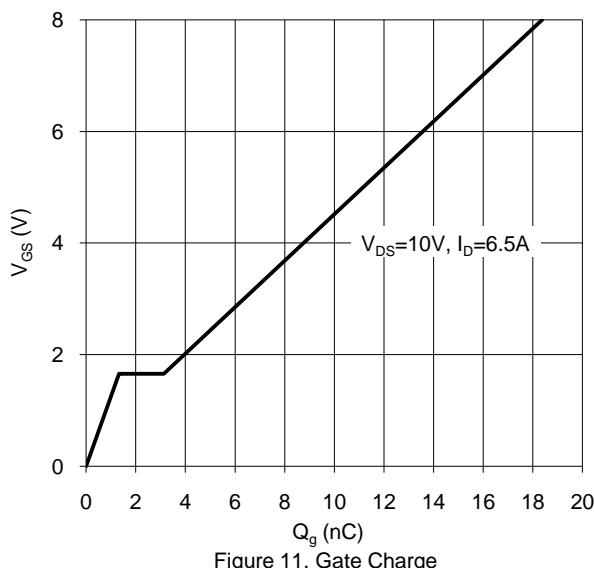
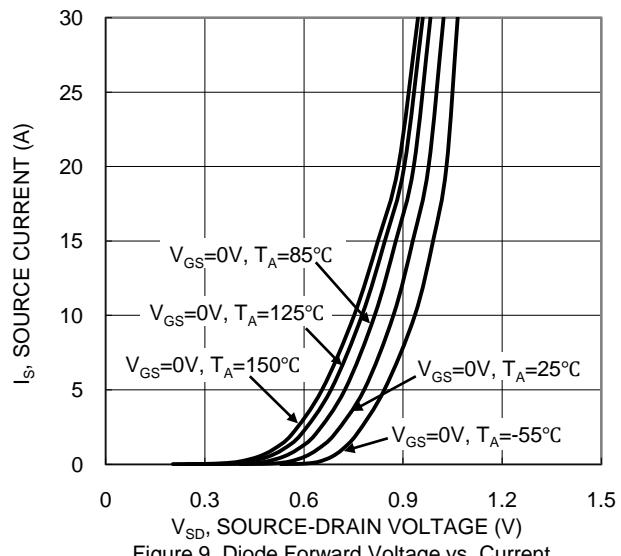
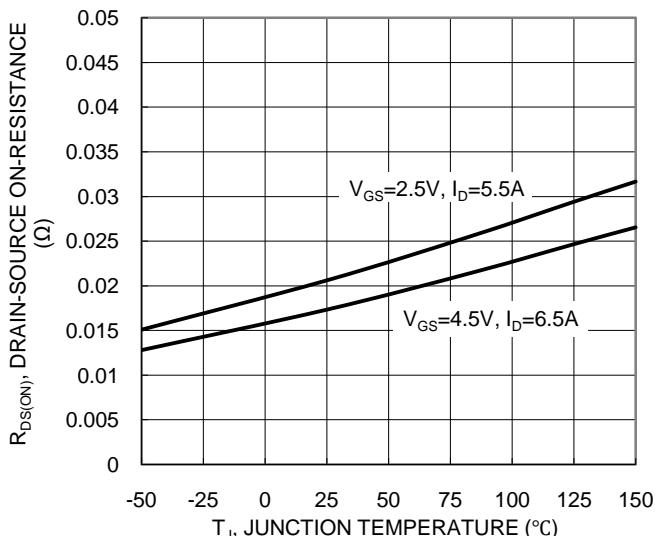


Figure 6. On-Resistance Variation with Temperature



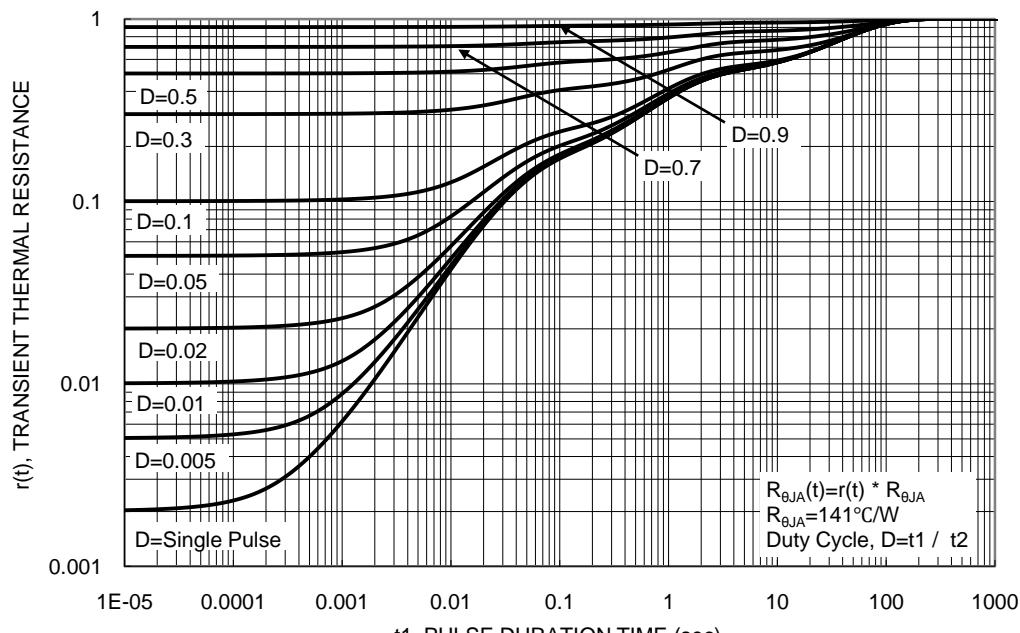
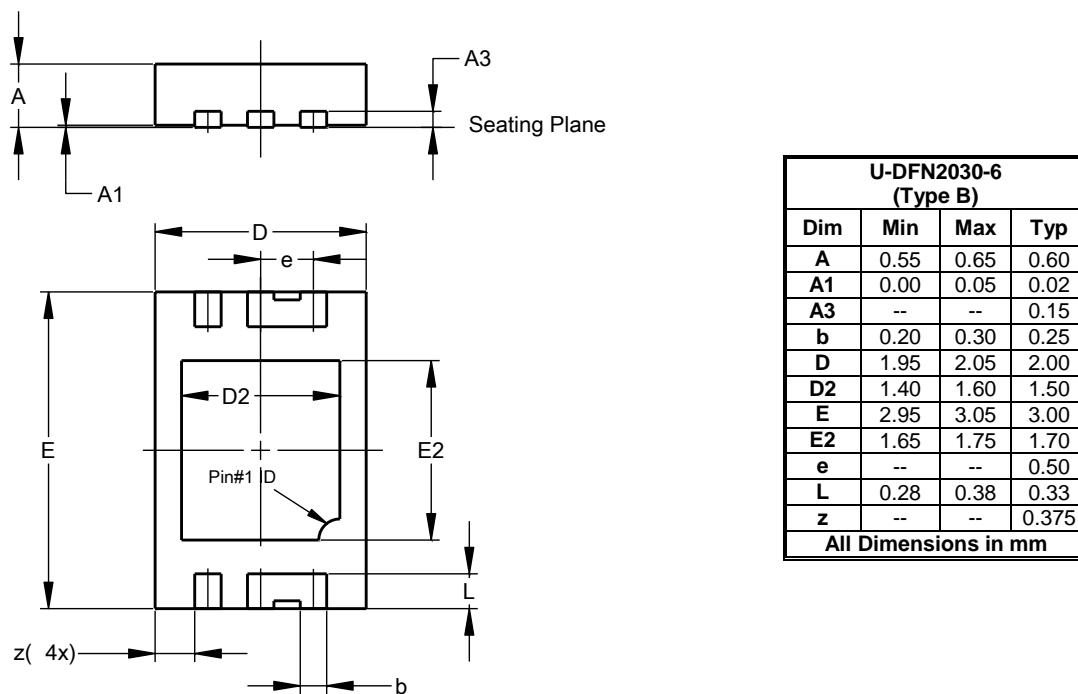


Figure 13. Transient Thermal Resistance

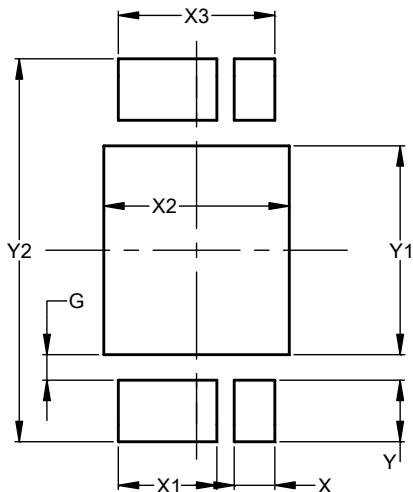
## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
<b>G</b>	0.220
<b>X</b>	0.350
<b>X1</b>	0.850
<b>X2</b>	1.600
<b>X3</b>	1.350
<b>Y</b>	0.530
<b>Y1</b>	1.800
<b>Y2</b>	3.300

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