

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	I_D $T_A = +25^\circ\text{C}$
-20V	38m Ω @ $V_{GS} = -10\text{V}$	-5.7A
	43m Ω @ $V_{GS} = -4.5\text{V}$	-5.4A
	75m Ω @ $V_{GS} = -2.5\text{V}$	-4.1A

Description

This new generation MOSFET has been 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

Features

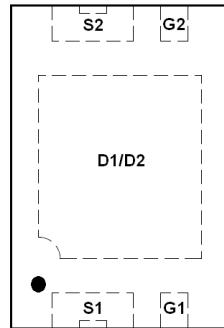
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

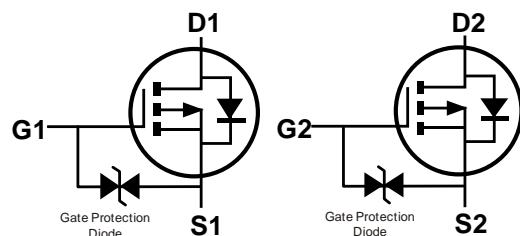
- Case: U-DFN2030-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^(e4)
- Weight: 0.012 grams (Approximate)



Bottom View



Top View



Equivalent Circuit

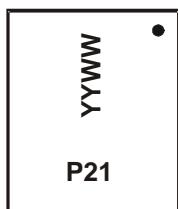
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2100UFU-7	U-DFN2030-6	3000 / Tape & Reel
DMP2100UFU-13	U-DFN2030-6	10000 / 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> 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>.

Marking Information



P21 = 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}	± 10	V
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-5.7 -4.4	A
Maximum Continuous Body Diodes Forward Current (Note 6)			I_S	-2	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	-30	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	-15	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	12	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
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	$R_{\theta JA}$	138	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	66	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	9.6	
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
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.3	—	-1.4	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	25	38	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -3.5\text{A}$
		—	29	43		$V_{GS} = -4.5\text{V}, I_D = -3\text{A}$
		—	37	75		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
		—	47	—		$V_{GS} = -1.8\text{V}, I_D = -0.5\text{A}$
		—	—	—		
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -2.9\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	906	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	103	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	29	—	pF	
Gate Resistance	R_g	—	259	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = -4.5\text{V}$)	Q_g	—	10.3	—	nC	$V_{DS} = -10\text{V}, I_D = -4\text{A}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	21.4	—	nC	
Gate-Source Charge	Q_{gs}	—	1.6	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.3	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	70	—	ns	
Turn-On Rise Time	t_R	—	144	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V}, R_L = 2.5\Omega, R_G = 3.0\Omega$
Turn-Off Delay Time	$t_{D(OFF)}$	—	626	—	ns	
Turn-Off Fall Time	t_F	—	396	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	279	—	ns	$I_F = -3.5\text{A}, di/dt = -100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{rr}	—	466	—	nC	$I_F = -3.5\text{A}, di/dt = -100\text{A}/\mu\text{s}$

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} rating 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.

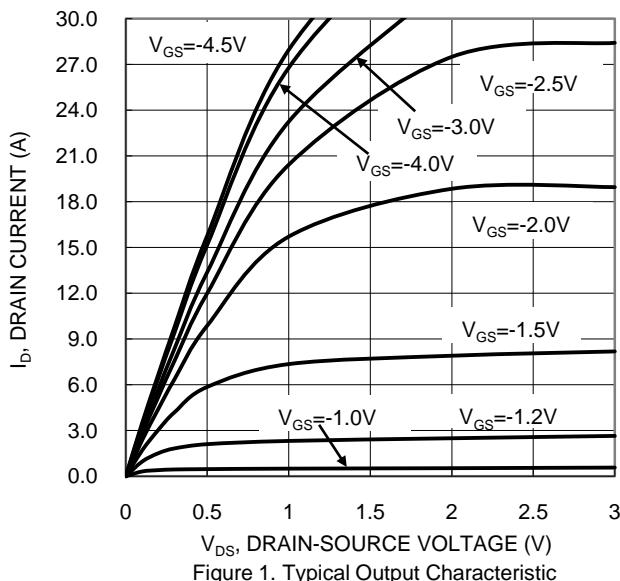


Figure 1. Typical Output Characteristic

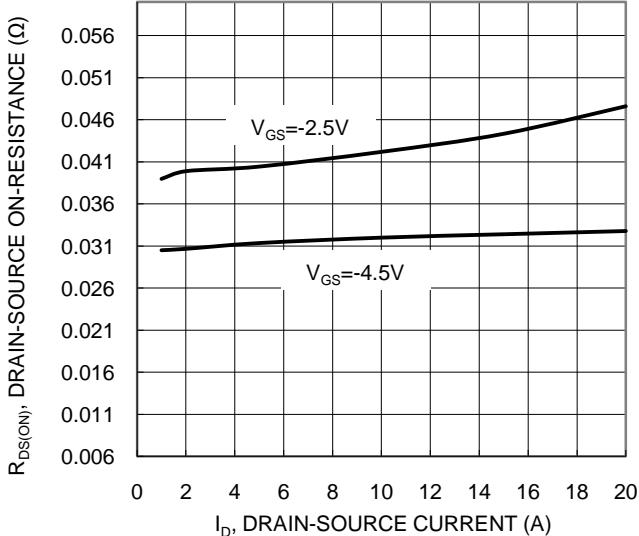


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

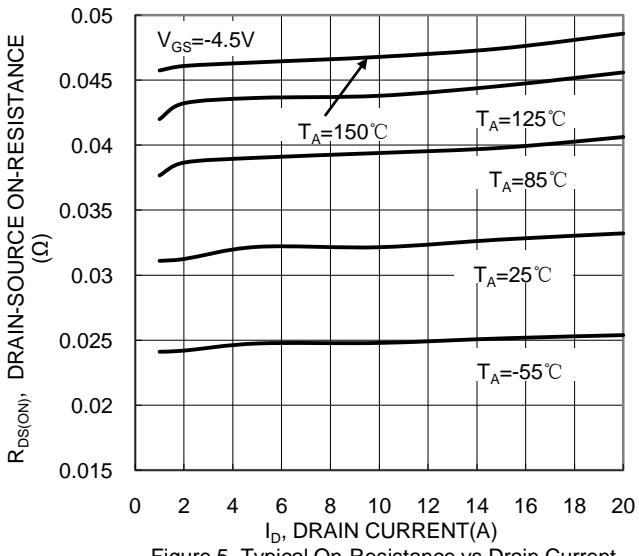


Figure 5. Typical On-Resistance vs Drain Current and Temperature

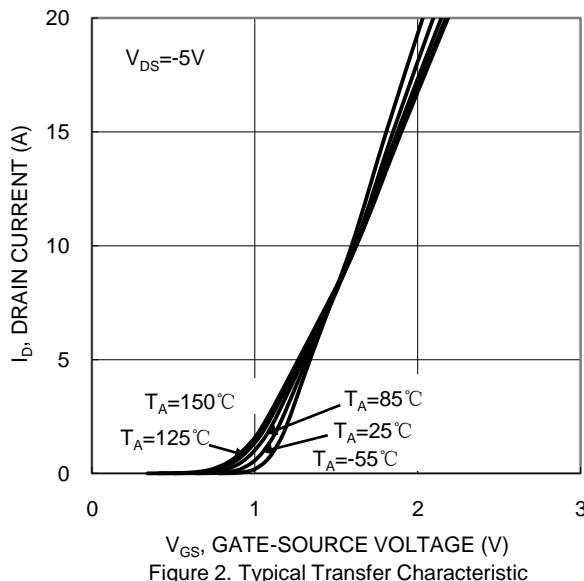


Figure 2. Typical Transfer Characteristic

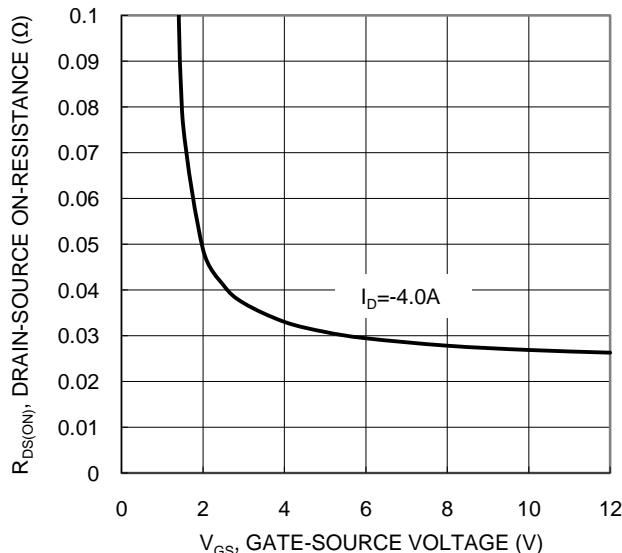


Figure 4. Typical Transfer Characteristic

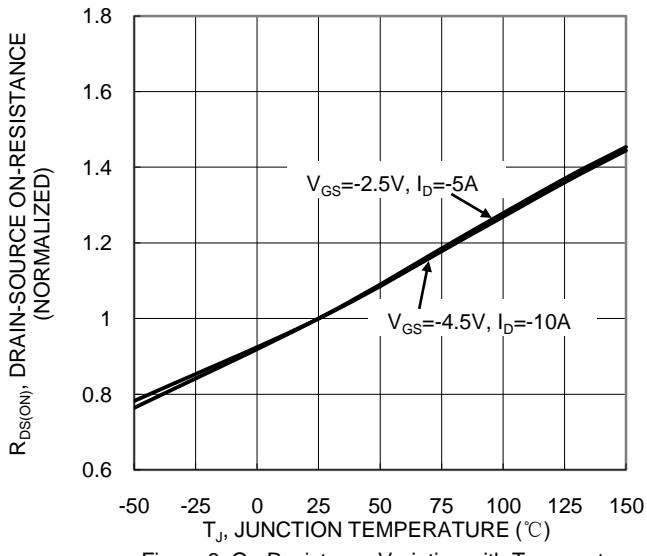
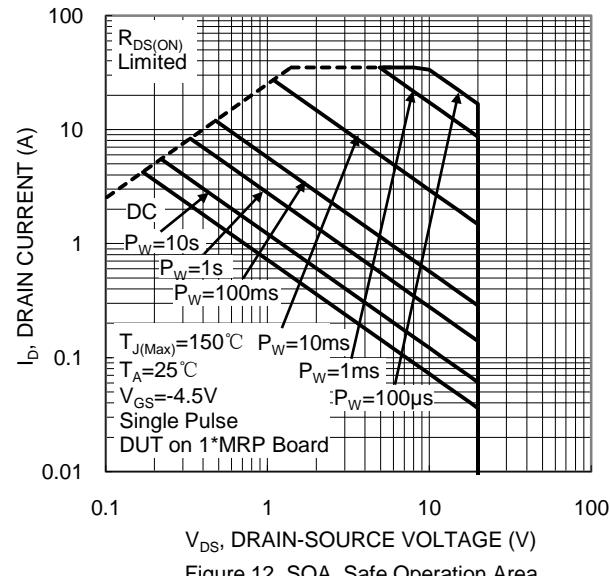
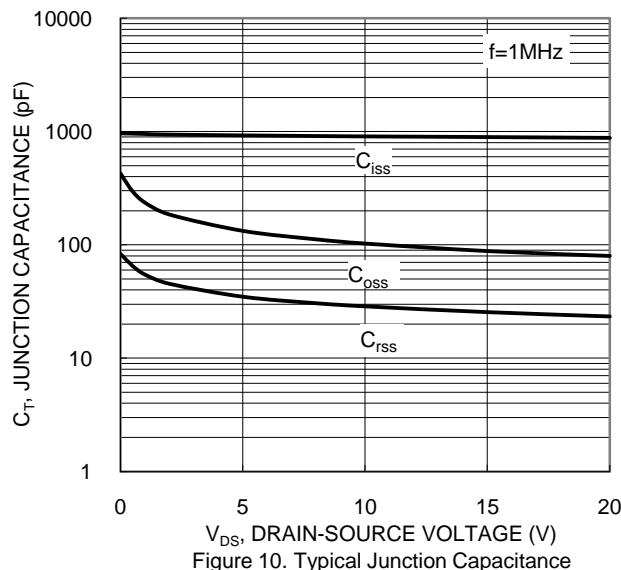
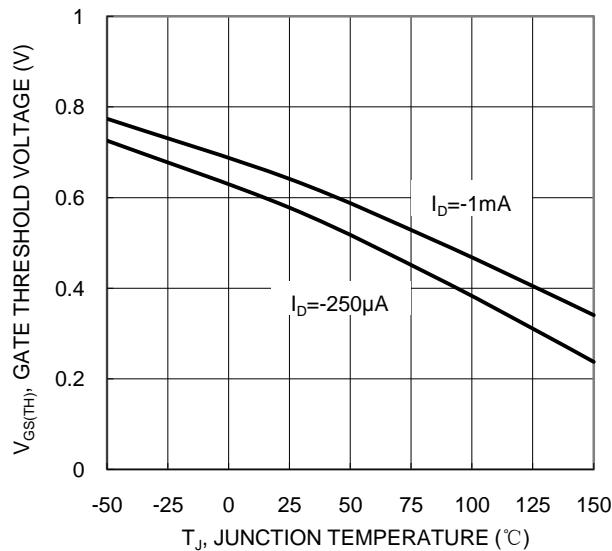
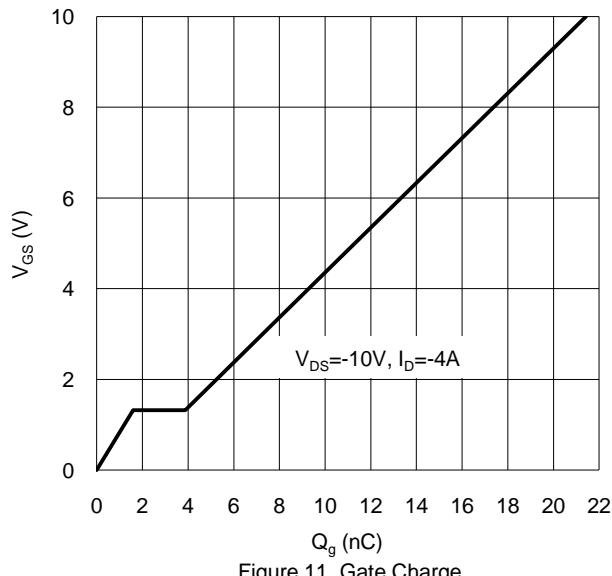
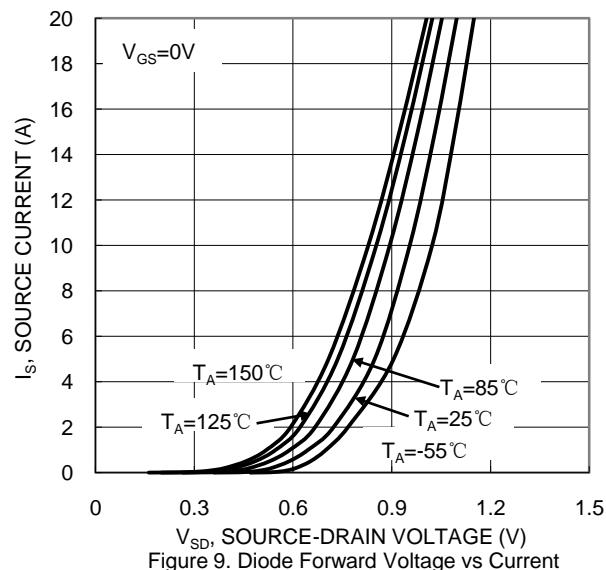
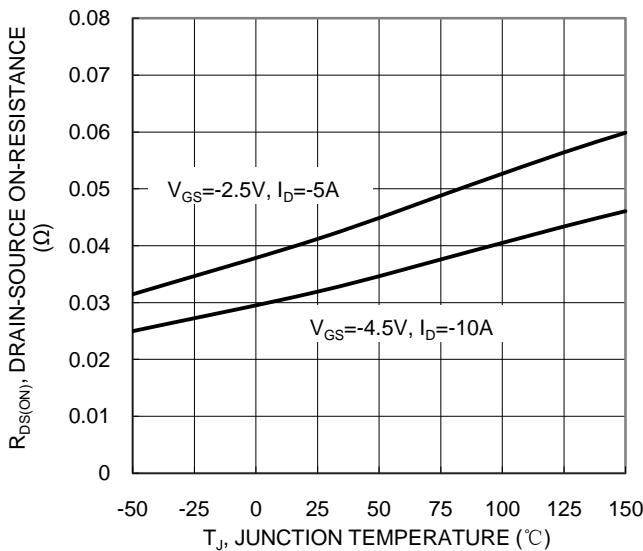
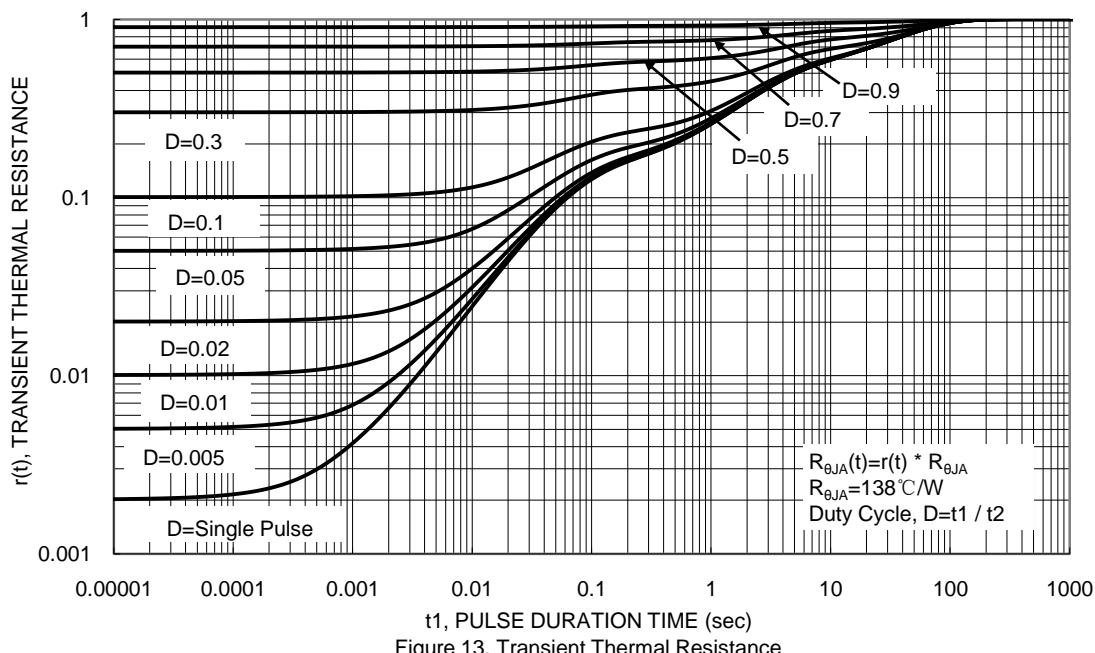


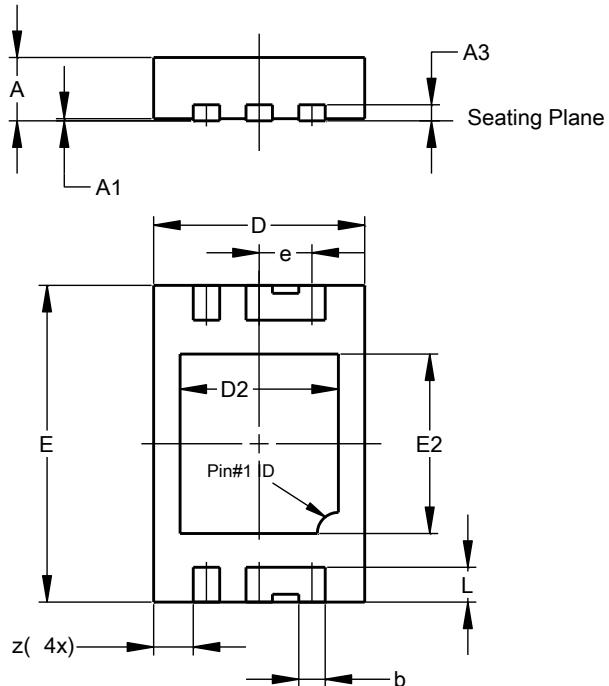
Figure 6. On-Resistance Variation with Temperature





Package Outline Dimensions

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

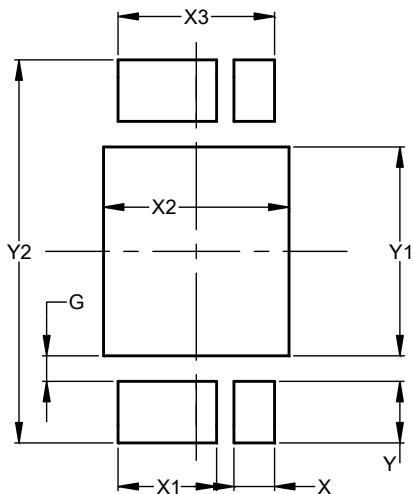


U-DFN2030-6 (Type B)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	--	--	0.15
b	0.20	0.30	0.25
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.65	1.75	1.70
e	--	--	0.50
L	0.28	0.38	0.33
z	--	--	0.375

All Dimensions in mm

Suggested Pad Layout

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



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

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