

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

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

Features

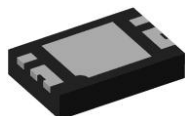
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

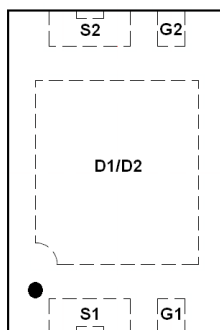
- Case: U-DFN2030-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.012 grams (Approximate)



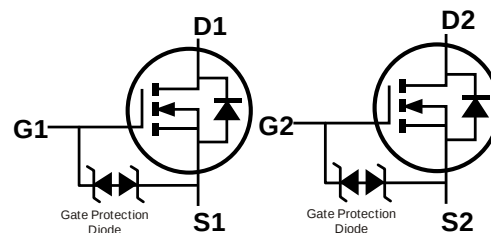
U-DFN2030-6



Bottom View



Top View

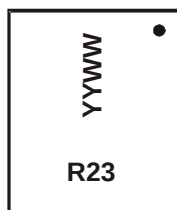


Equivalent Circuit

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:
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 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


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°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} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	7.5 6.0	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	9.9 7.9	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	40	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	12	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	8	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	144	°C/W
	t < 10s		84	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	69	°C/W
	t < 10s		40	
Thermal Resistance, Junction to Case		R _{θJC}	8.4	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°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} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	µA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.5	—	1.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	15.3	20.2	mΩ	V _{GS} = 4.5V, I _D = 4.5A
			15.4	22.5		V _{GS} = 4.0V, I _D = 4.0A
			16.7	23.0		V _{GS} = 3.1V, I _D = 4.0A
			18.3	23.5		V _{GS} = 2.5V, I _D = 3.5A
			24.2	30.0		V _{GS} = 1.8V, I _D = 3.5A
			—	—		V _{GS} = 1.8V, I _D = 3.5A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	887	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	91	—		
Reverse Transfer Capacitance	C _{rss}	—	37	—		
Gate Resistance	R _g	—	191	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	10	—	nC	V _{DS} = 10V, I _D = 6.5A
Total Gate Charge (V _{GS} = 8V)	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	—	ns	V _{DS} = 10V, V _{GS} = 4.5V, R _G = 6Ω, R _L = 10Ω, I _D = 1A
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	—	ns	I _F = 4A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	96	—	nC	I _F = 4A, di/dt = 100A/µs

- 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.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

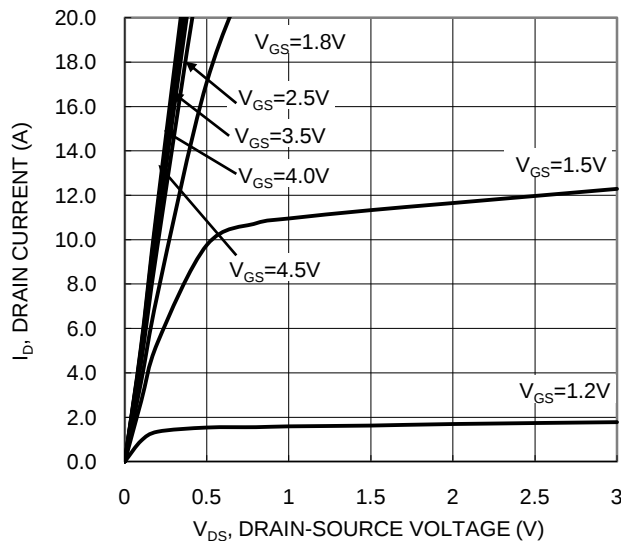


Figure 1. Typical Output Characteristic

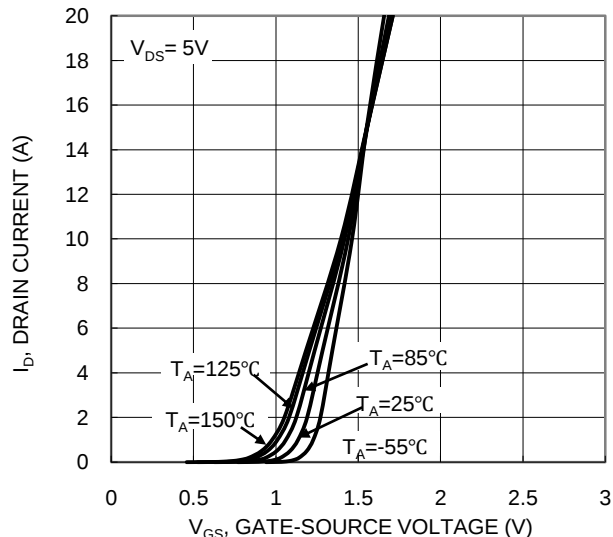


Figure 2. Typical Transfer Characteristic

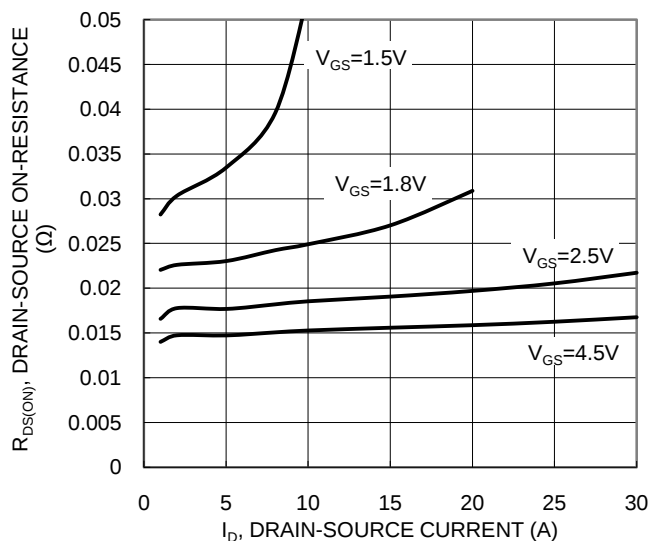


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

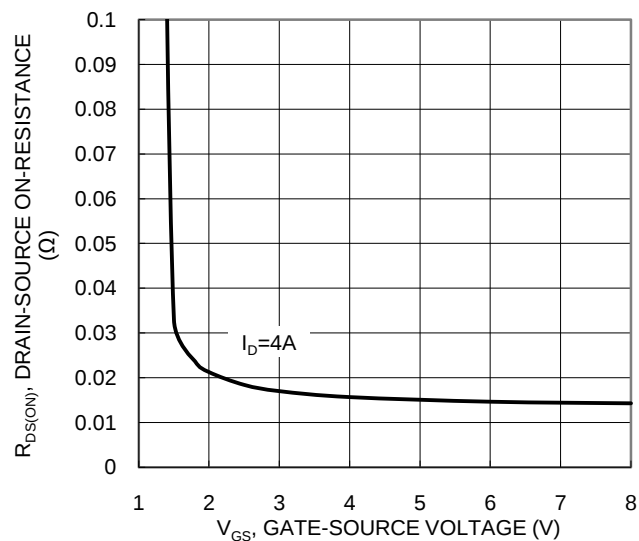


Figure 4. Typical Transfer Characteristic

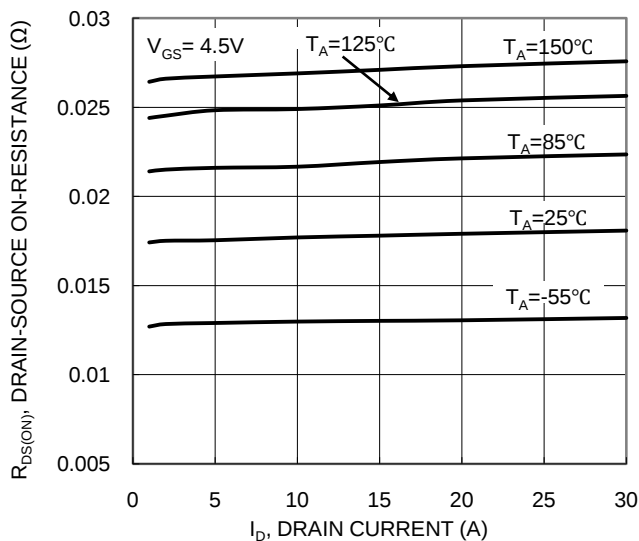


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

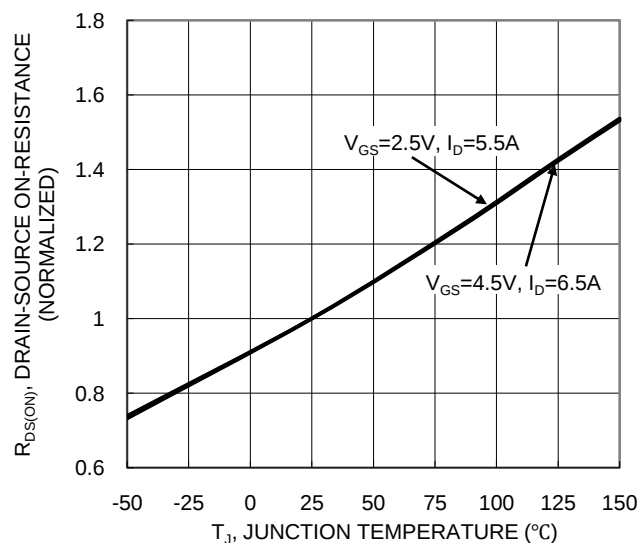
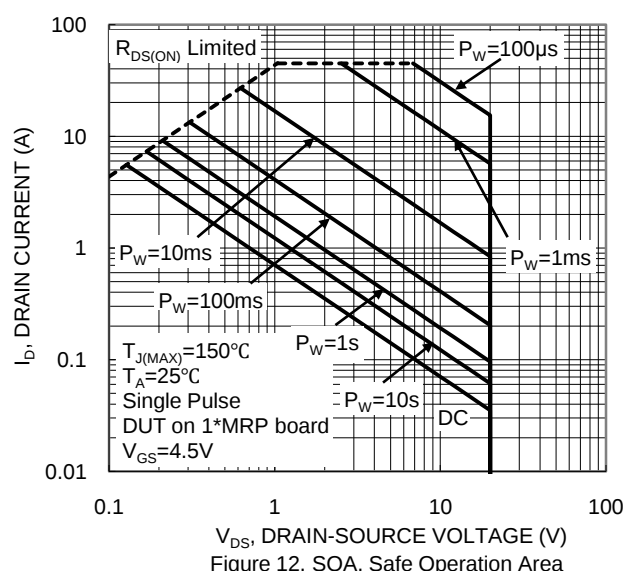
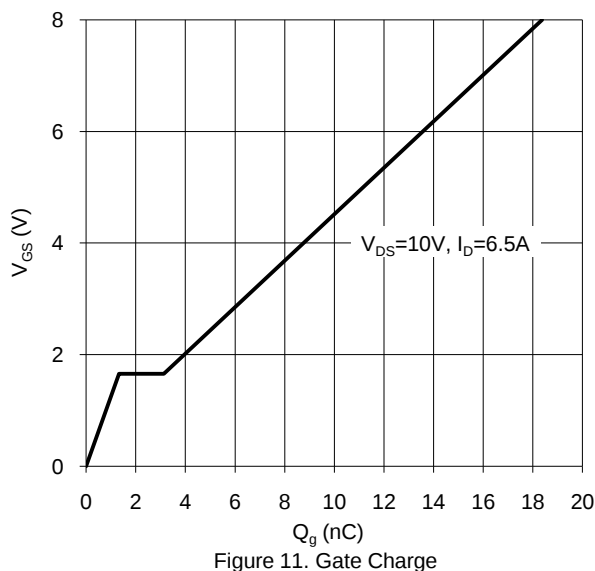
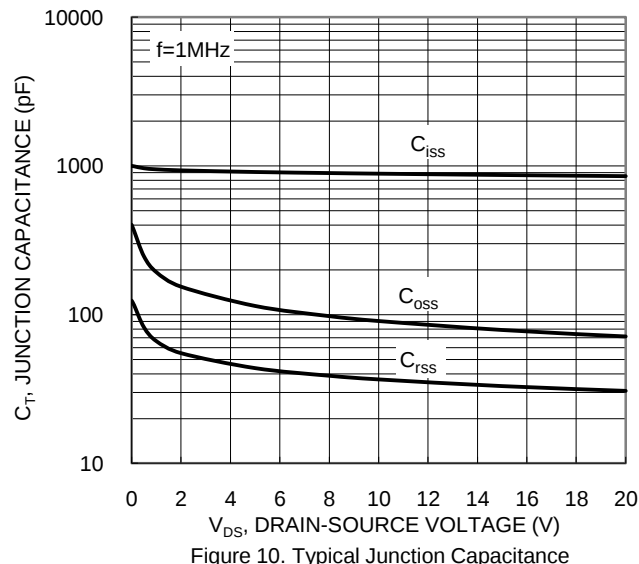
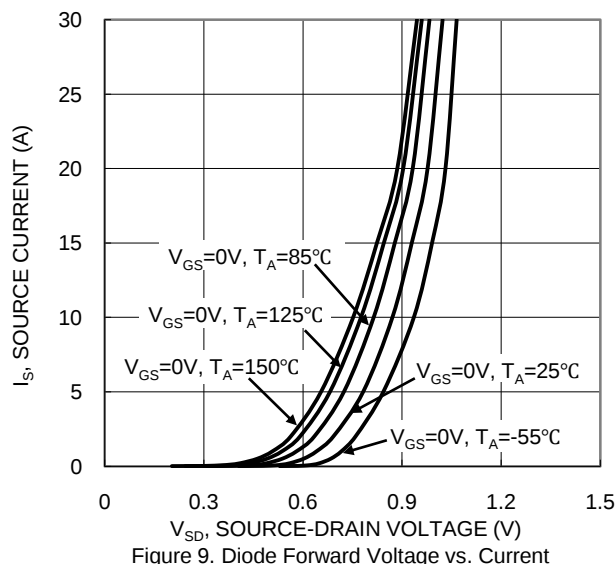
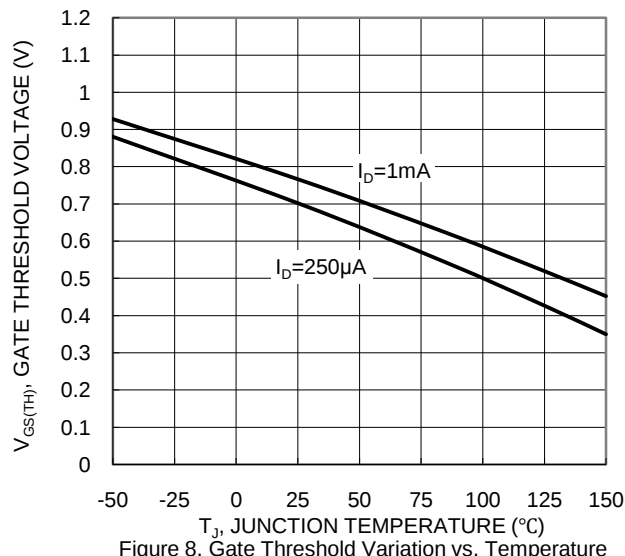
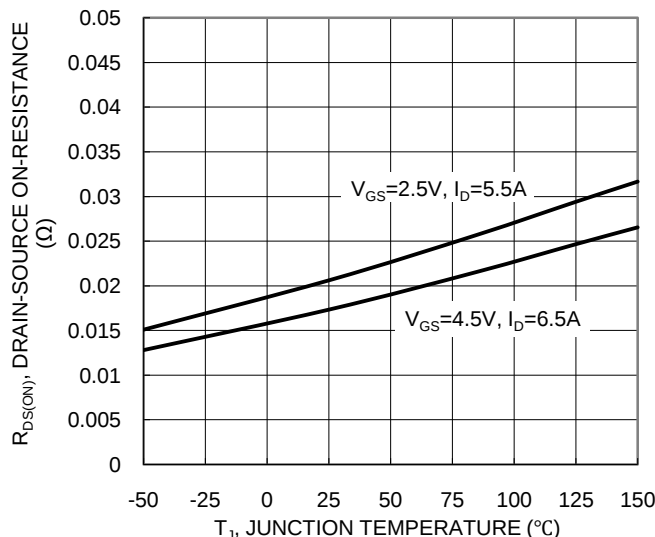
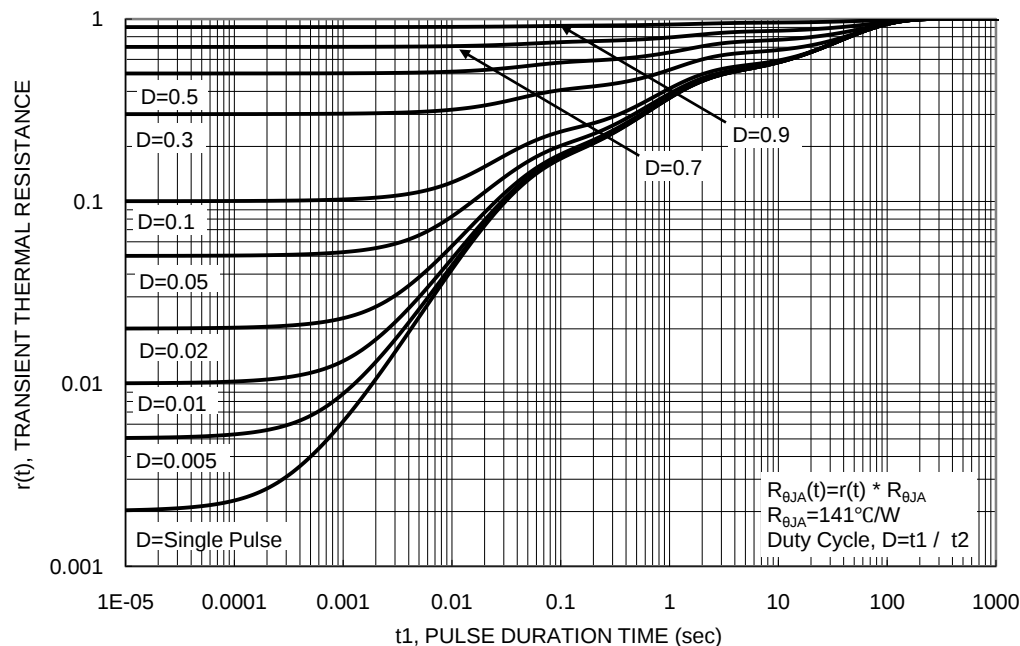


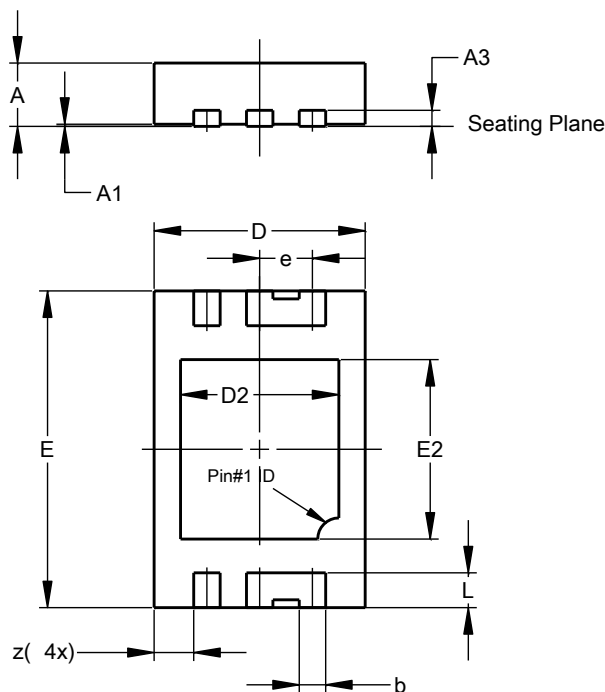
Figure 6. On-Resistance Variation with Temperature





Package Outline Dimensions

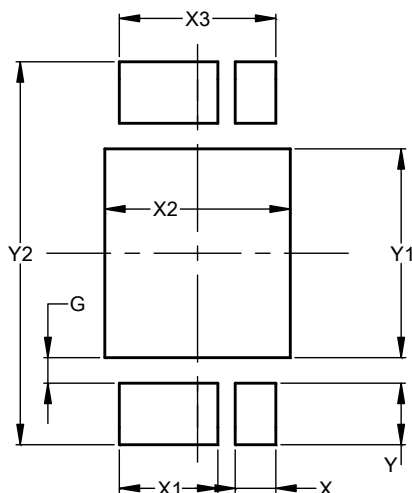
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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