DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

NEW PRODUCT

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D T_A = +25°C
-20V	38mΩ @ V_{GS} = -10V	-5.7A
	43mΩ @ V_{GS} = -4.5V	-5.4A
	75mΩ @ V_{GS} = -2.5V	-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

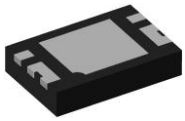
Features

- 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)**

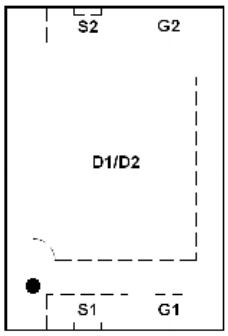
Mechanical Data

- 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)

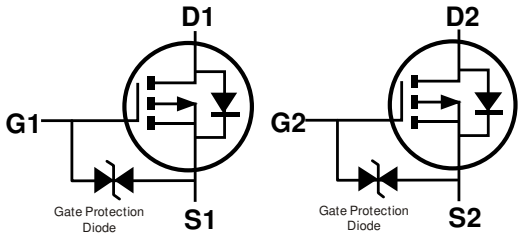
U-DFN2030-6



Bottom View



Top View



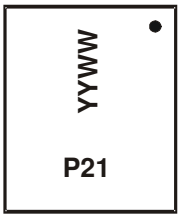
Equivalent Circuit

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)

NEW PRODUCT

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

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	138	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	66	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	9.6	
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	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	$V_{GS(TH)}$	-0.3	—	-1.4	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	25	38	mΩ	V_{GS} = -10V, I_D = -3.5A
		—	29	43		V_{GS} = -4.5V, I_D = -3A
		—	37	75		V_{GS} = -2.5V, I_D = -1A
		—	47	—		V_{GS} = -1.8V, I_D = -0.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -2.9A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	906	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	103	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	29	—	pF	
Gate Resistance	R_g	—	259	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	10.3	—	nC	V_{DS} = -10V, I_D = -4A
Total Gate Charge (V_{GS} = -10V)	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	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time	t_R	—	144	—	ns	
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 = -3.5A, di/dt = -100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	466	—	nC	I_F = -3.5A, di/dt = -100A/µs

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°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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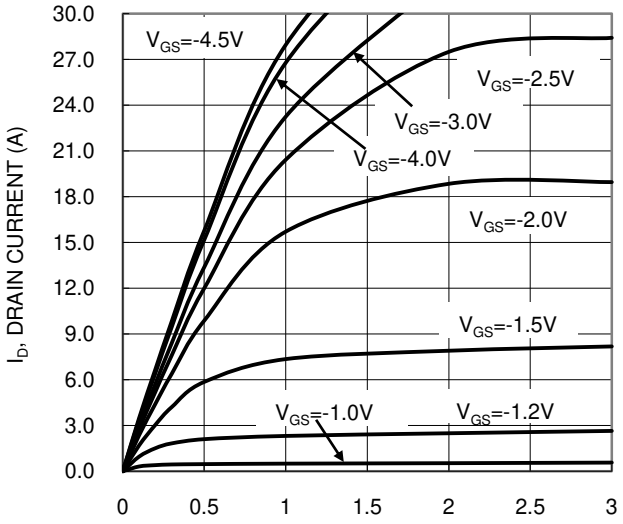

Figure 1. Typical Output Characteristic

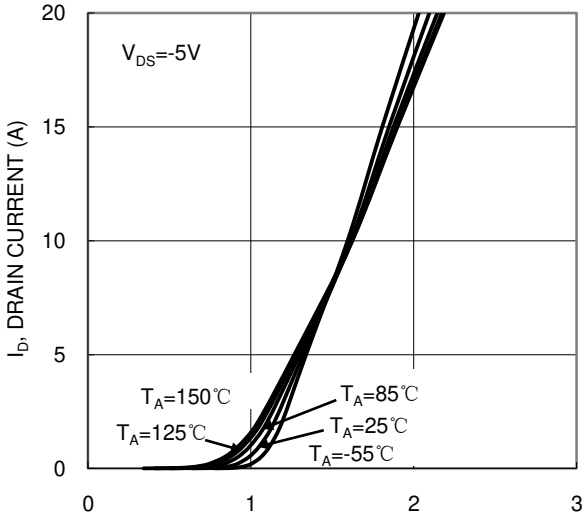

Figure 2. Typical Transfer Characteristic

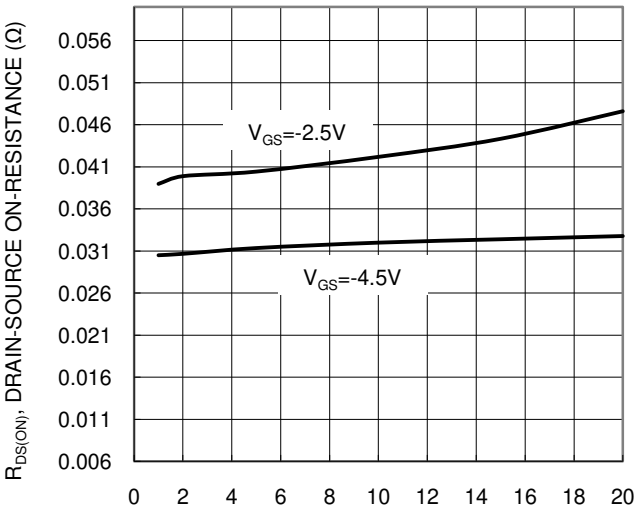

Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

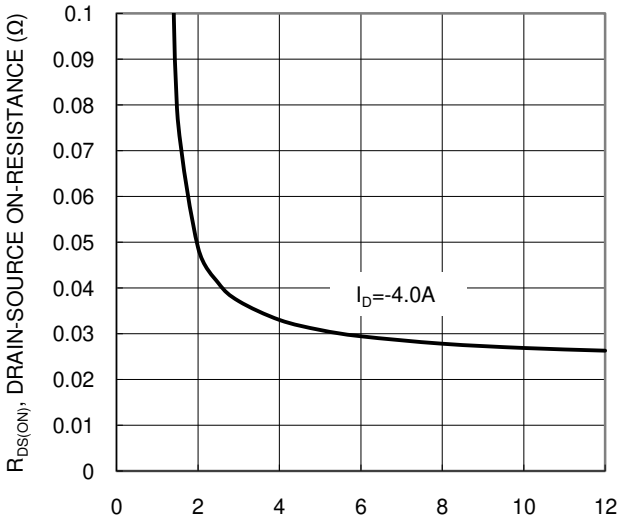

Figure 4. Typical Transfer Characteristic

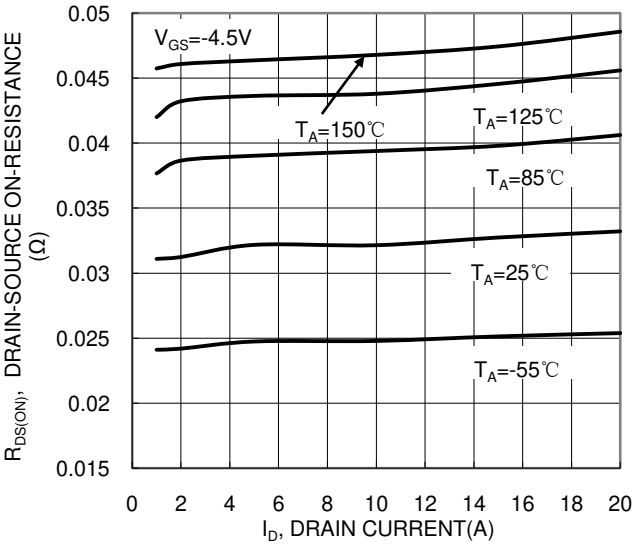

Figure 5. Typical On-Resistance vs Drain Current and Temperature

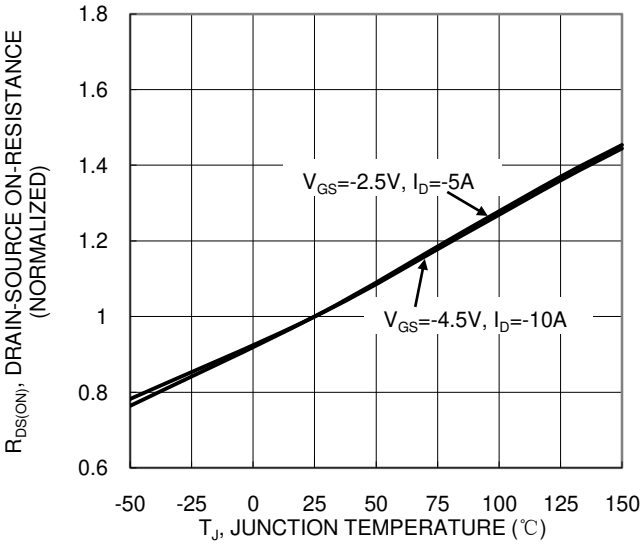

Figure 6. On-Resistance Variation with Temperature

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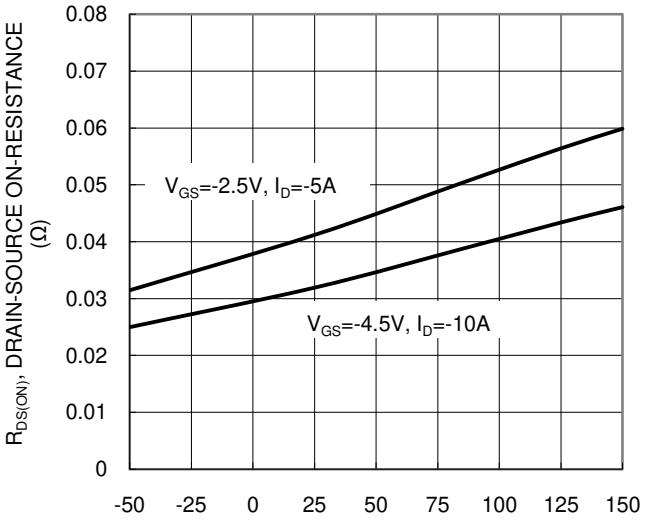

Figure 7. On-Resistance Variation with Temperature

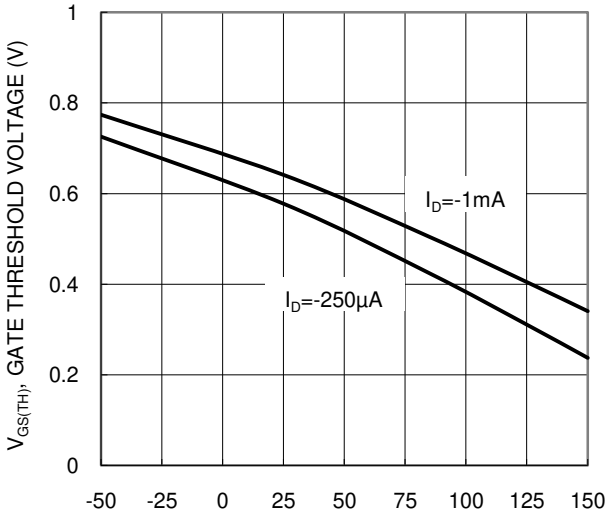

Figure 8. Gate Threshold Variation vs Temperature

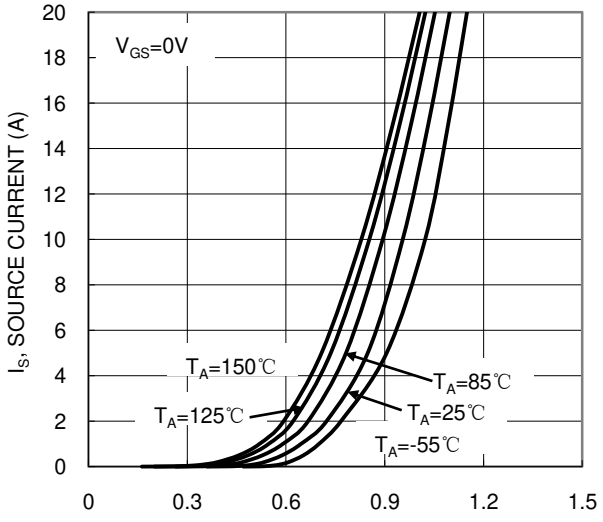

Figure 9. Diode Forward Voltage vs Current

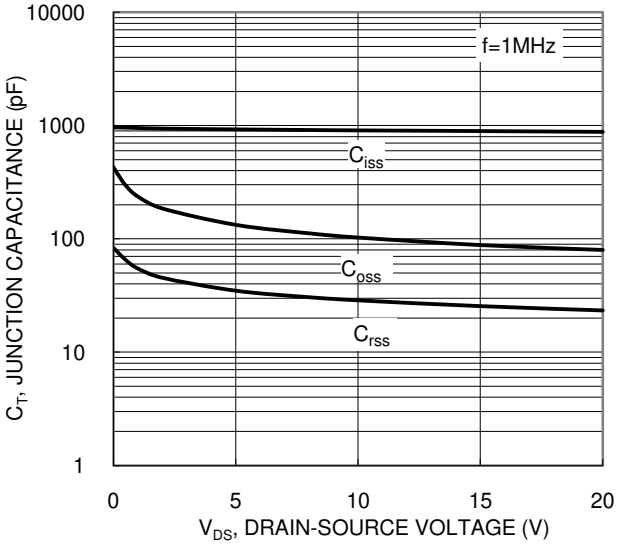

Figure 10. Typical Junction Capacitance

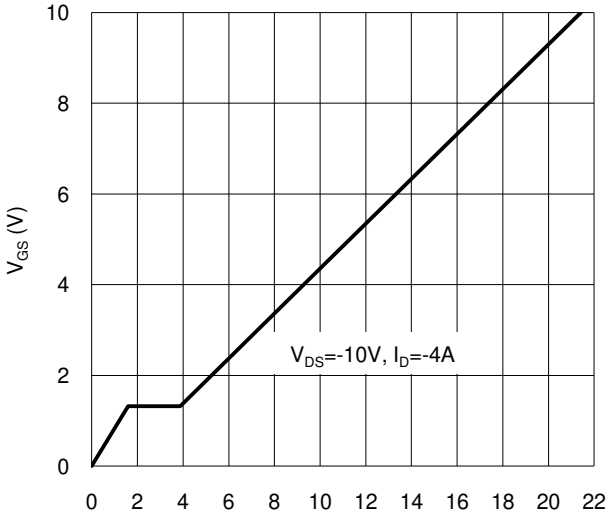

Figure 11. Gate Charge

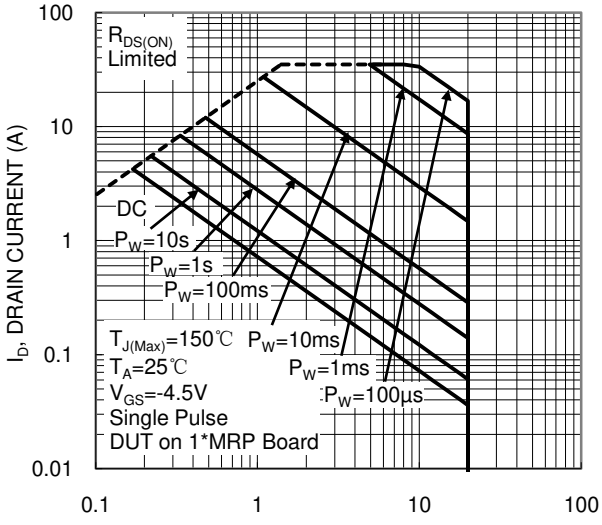

Figure 12. SOA, Safe Operation Area

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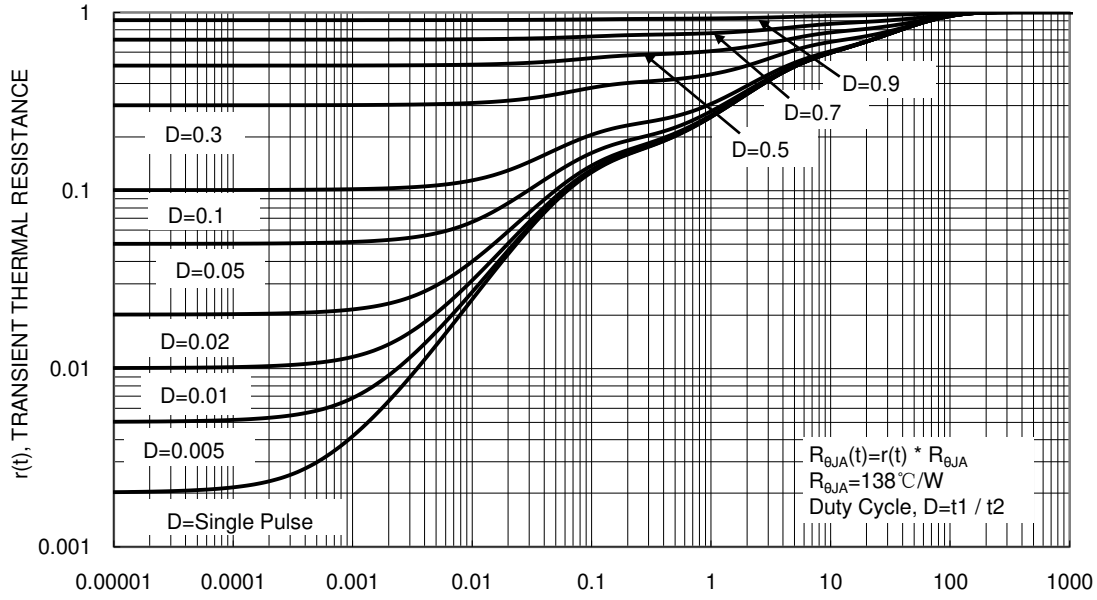

Figure 13. Transient Thermal Resistance

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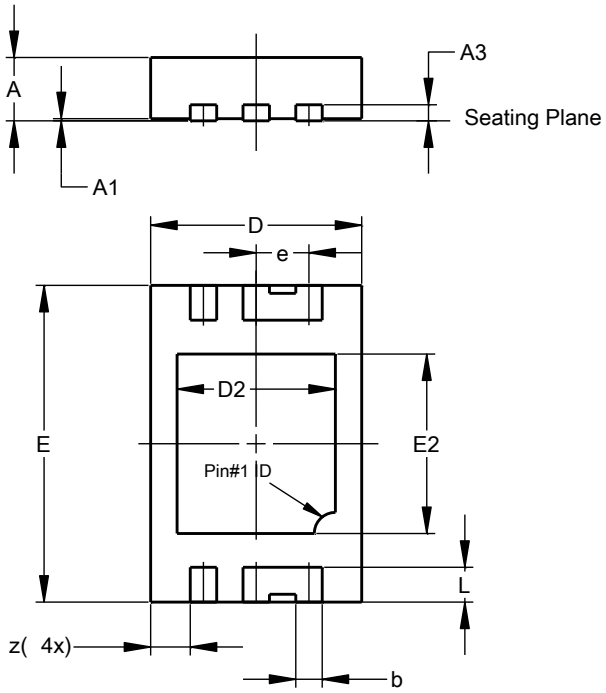
Package Outline Dimensions

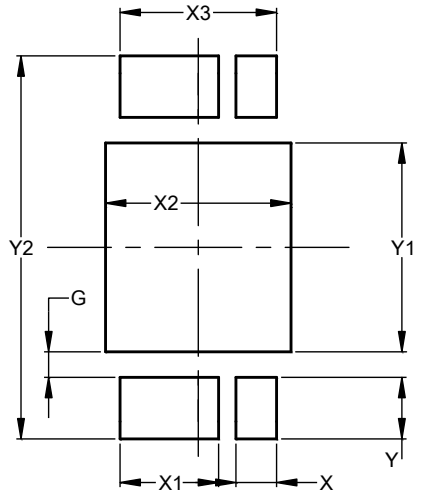
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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

NEW PRODUCT

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