

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)max}$	$I_D$ $T_A = +25^\circ C$
20V	15.5mΩ @ $V_{GS} = 4.5V$	7.5A
	16.5mΩ @ $V_{GS} = 4.0V$	7.3A
	19mΩ @ $V_{GS} = 3.1V$	6.9A
	20mΩ @ $V_{GS} = 2.5V$	6.7A
	30mΩ @ $V_{GS} = 1.8V$	5.4A

## 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

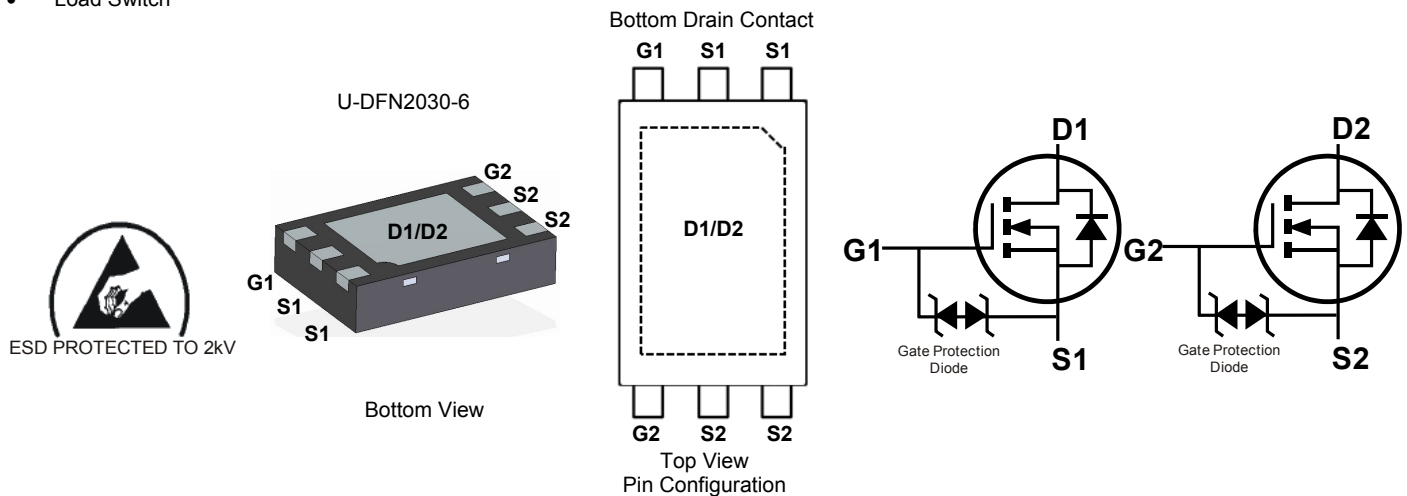
- Power Management Functions
- Battery Pack
- Load Switch

## 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
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.012 grams (approximate)

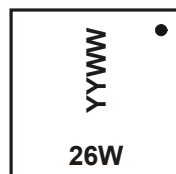
**NEW PRODUCT**


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2016LHAB-7	U-DFN2030-6	3,000 / 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](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



26W = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last digit of year (ex: 12 for 2012)  
 WW = Week code (01 to 53)

**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>	±12	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	7.5 5.8	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	7.7 6.0	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I <sub>DM</sub>	45	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.2	W
	T <sub>A</sub> = +70°C		0.75	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	106	°C/W
	t < 10s		100	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.65	W
	T <sub>A</sub> = +70°C		1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	78	°C/W
	t < 10s		72	
Thermal Resistance, Junction to Case		R <sub>θJC</sub>	11.4	
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 7)</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>	—	—	1.0	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.5	0.71	1.1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	13	15.5	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.0A
			13.5	16.5		
			14	19		
			15	20		
			21	30		
Forward Transfer Admittance	Y <sub>fs</sub>	—	25	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 6A
Diode Forward Voltage	V <sub>SD</sub>	—	0.75	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	1550	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	166	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	145	—	pF	
Gate Resistance	R <sub>g</sub>	—	1.37	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 2.5V)	Q <sub>g</sub>	—	8.4	—	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	16	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	2.3	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.5	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	6.9	—	ns	
Turn-On Rise Time	t <sub>r</sub>	—	15.5	—	ns	V <sub>DD</sub> = 10V, R <sub>L</sub> = 1.7Ω, V <sub>GS</sub> = 5.0V, R <sub>G</sub> = 3Ω
Turn-Off Delay Time	t <sub>D(off)</sub>	—	40.9	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	12	—	ns	

- 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 pad
  - Repetitive rating, pulse width limited by junction temperature
  - Guaranteed by design. Not subject to product testing

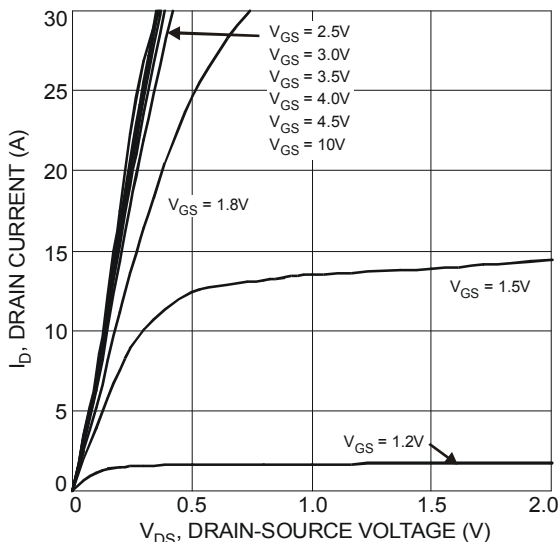


Figure 1 Typical Output Characteristic

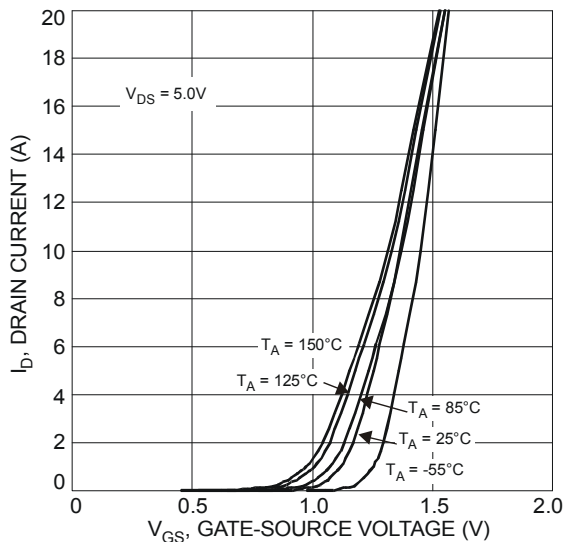


Figure 2 Typical Transfer Characteristics

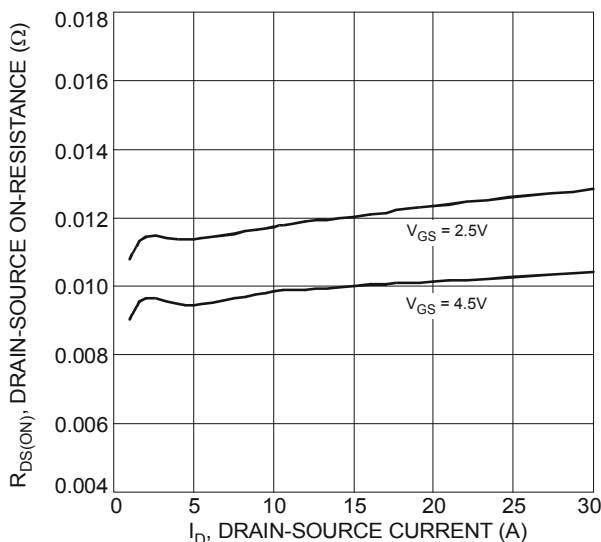


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

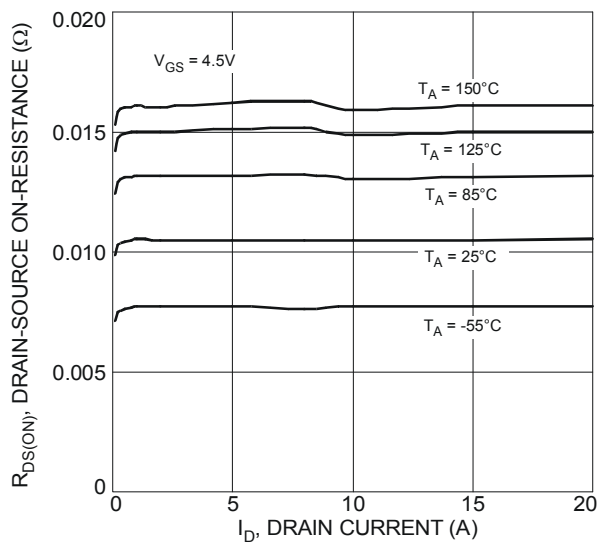


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

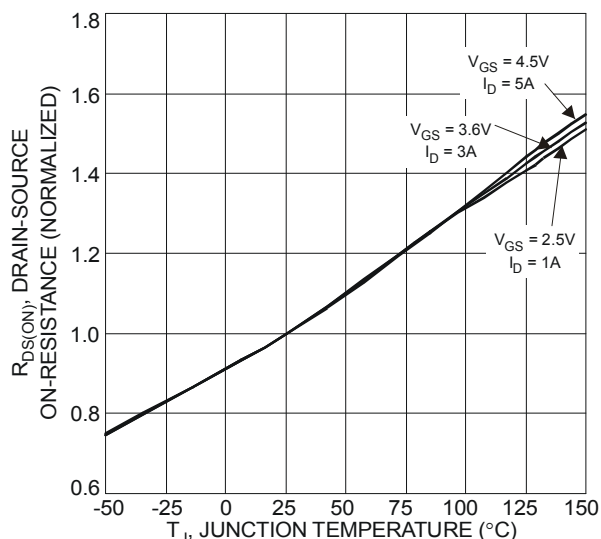


Figure 5 On-Resistance Variation with Temperature

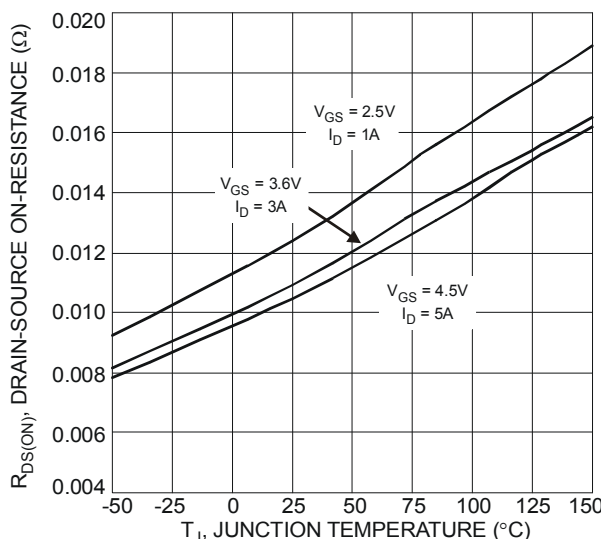


Figure 6 On-Resistance Variation with Temperature

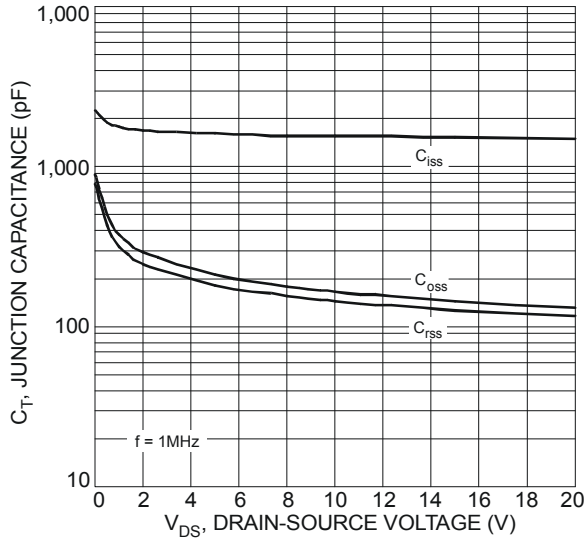


Figure 7 Typical Junction Capacitance

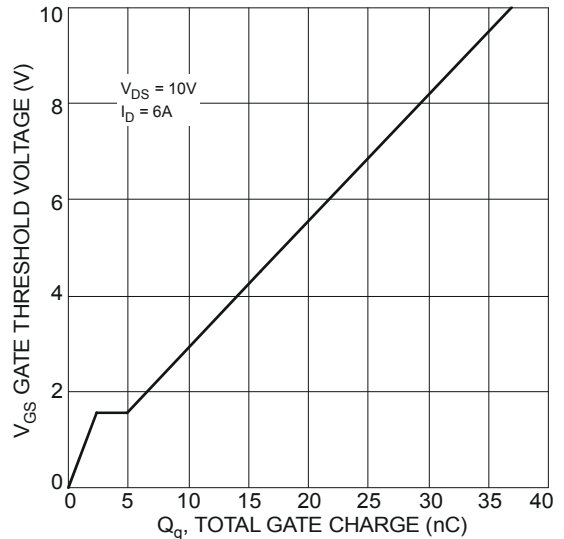


Figure 8 Gate Charge

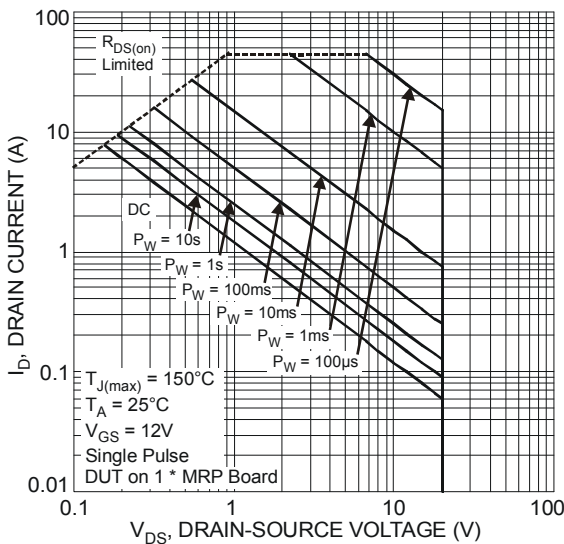


Figure 9 SOA, Safe Operation Area

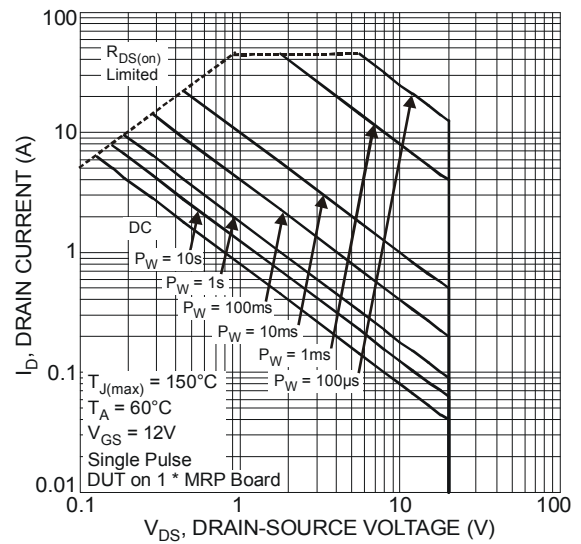


Figure 10 SOA, Safe Operation Area

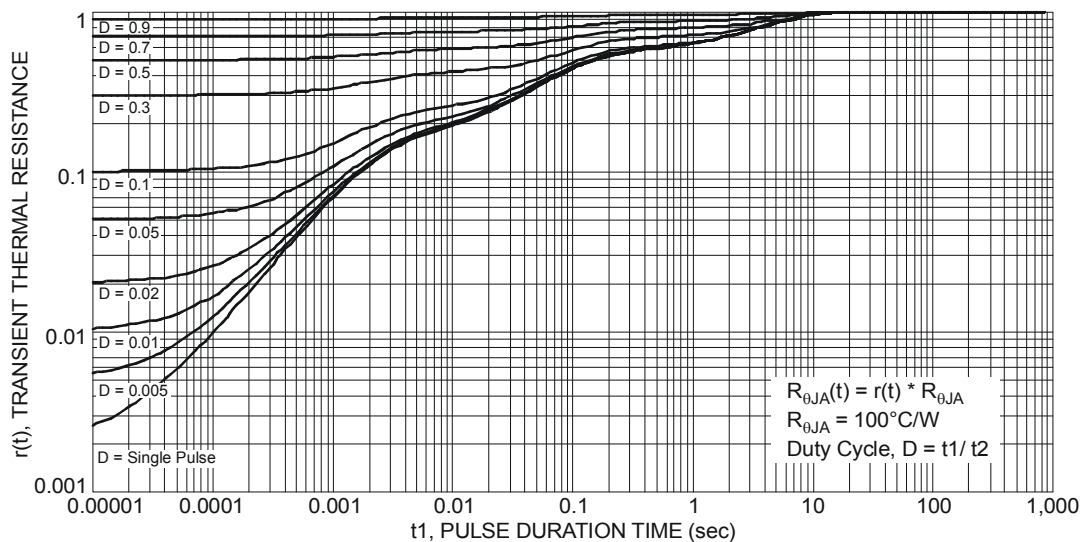
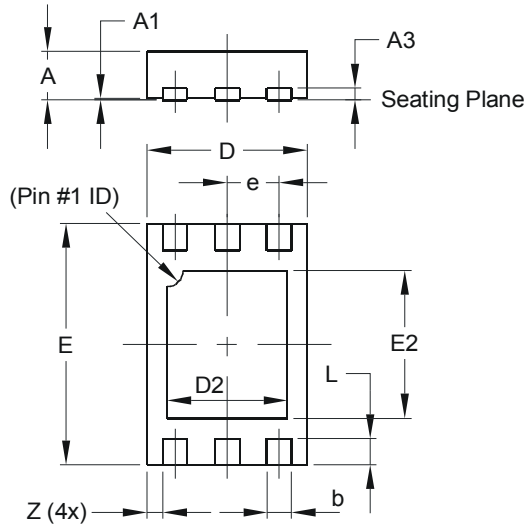


Figure 11 Transient Thermal Resistance

**Package Outline Dimensions**

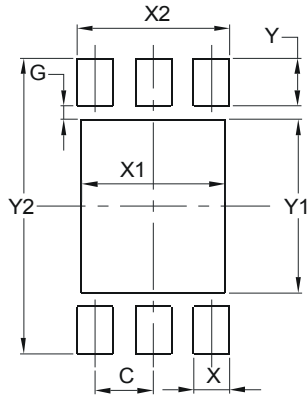
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



U-DFN2030-6 Type B			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.74	1.94	1.84
e	-	-	0.65
L	0.28	0.38	0.33
Z	-	-	0.20
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)
C	0.650
G	0.150
X	0.400
X1	1.600
X2	1.700
Y	0.530
Y1	1.940
Y2	3.300

NEW PRODUCT

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