

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ max                       | $I_D$<br>$T_A = 25^\circ\text{C}$ |
|---------------|----------------------------------------|-----------------------------------|
| -30V          | 25m $\Omega$ @ $V_{GS} = -10\text{V}$  | -6.8A                             |
|               | 38m $\Omega$ @ $V_{GS} = -4.5\text{V}$ | -5.0A                             |

## 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

- DC-DC Converters
- Power management functions
- Load Switch

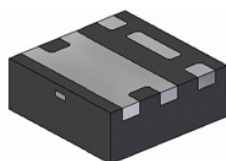
## Features

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

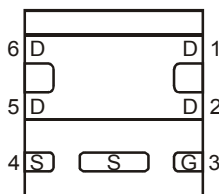
## Mechanical Data

- Case: U-DFN2020-6
- 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
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.0065 grams (approximate)

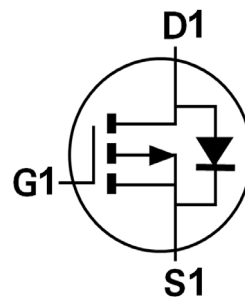
U-DFN2020-6



Bottom View



Pin Out



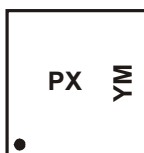
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number    | Case        | Packaging          |
|----------------|-------------|--------------------|
| DMP3028LFDE-7  | U-DFN2020-6 | 3,000/Tape & Reel  |
| DMP3028LFDE-13 | U-DFN2020-6 | 10,000/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> 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



PX = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|
| Code | Y    | Z    | A    | B    | C    | D    | E    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                          |              |                                                  | Symbol           | Value        | Units |
|---------------------------------------------------------|--------------|--------------------------------------------------|------------------|--------------|-------|
| Drain-Source Voltage                                    |              |                                                  | V <sub>DSS</sub> | -30          | V     |
| Gate-Source Voltage                                     |              |                                                  | V <sub>GSS</sub> | ±20          | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -6.8<br>-5.3 | A     |
|                                                         | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -8.2<br>-6.6 | A     |
| Maximum Body Diode Forward Current (Note 6)             |              |                                                  | I <sub>S</sub>   | -2.5         | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)      |              |                                                  | I <sub>DM</sub>  | -40          | A     |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                   |                        | Symbol                            | Value       | Units |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 0.66        | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 0.42        |       |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state           | R <sub>θJA</sub>                  | 189         | °C/W  |
|                                                  | t < 10s                |                                   | 125         |       |
| Total Power Dissipation (Note 6)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.03        | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 1.3         |       |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state           | R <sub>θJA</sub>                  | 61          | °C/W  |
|                                                  | t < 10s                |                                   | 41          |       |
| Thermal Resistance, Junction to Case (Note 6)    |                        | R <sub>θJC</sub>                  | 9.3         |       |
| 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>   | -30 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                  |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —    | -1   | μA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V                                                   |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                   |
| <b>ON CHARACTERISTICS (Note 7)</b>         |                     |     |      |      |      |                                                                                                |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub> | -1  | —    | -2.4 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                    |
| Static Drain-Source On-Resistance          | R <sub>DS(on)</sub> | —   | 20   | 25   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -7A                                                   |
|                                            |                     | —   | 29   | 38   |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -6.2A                                                |
| Forward Transfer Admittance                | Y <sub>fs</sub>     | —   | 4.5  | —    | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -7A                                                    |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.7  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -2.1A                                                   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>    |                     |     |      |      |      |                                                                                                |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 1241 | —    | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                     |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 147  | —    |      |                                                                                                |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 110  | —    |      |                                                                                                |
| Gate Resistance                            | R <sub>G</sub>      | —   | 15   | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                         |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 22   | —    | nC   | V <sub>DS</sub> = -15V, I <sub>D</sub> = -7A                                                   |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 10.9 | —    |      |                                                                                                |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 3.5  | —    |      |                                                                                                |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 4.7  | —    |      |                                                                                                |
| Turn-On Delay Time                         | t <sub>D(on)</sub>  | —   | 9.7  | —    | nS   | V <sub>GS</sub> = -10V, V <sub>DD</sub> = -15V, R <sub>GEN</sub> = 6Ω,<br>I <sub>D</sub> = -7A |
| Turn-On Rise Time                          | t <sub>r</sub>      | —   | 17.1 | —    |      |                                                                                                |
| Turn-Off Delay Time                        | t <sub>D(off)</sub> | —   | 60.5 | —    |      |                                                                                                |
| Turn-Off Fall Time                         | t <sub>f</sub>      | —   | 40.4 | —    |      |                                                                                                |

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

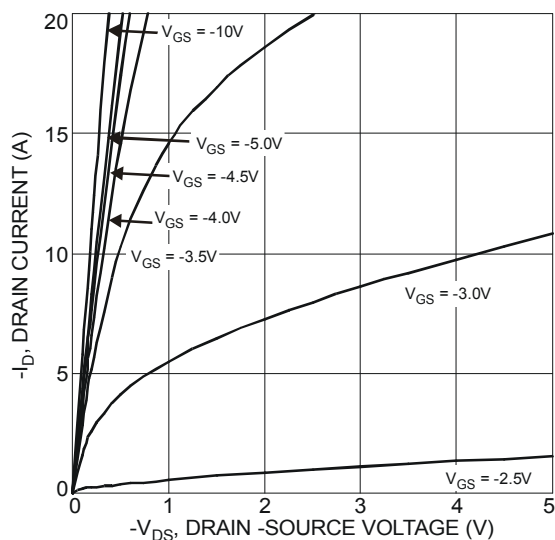


Figure 1 Typical Output Characteristics

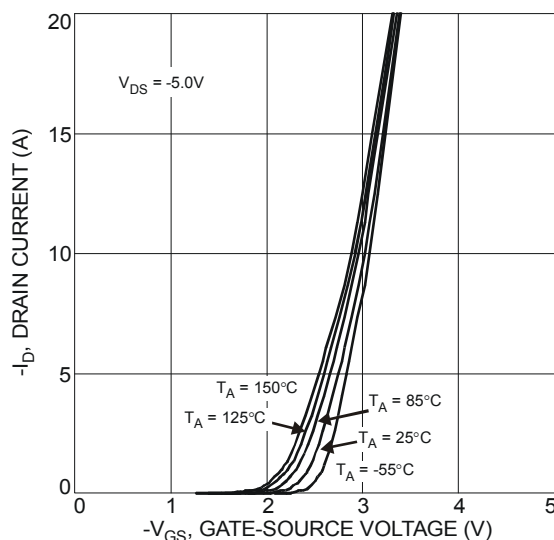


Figure 2 Typical Transfer Characteristics

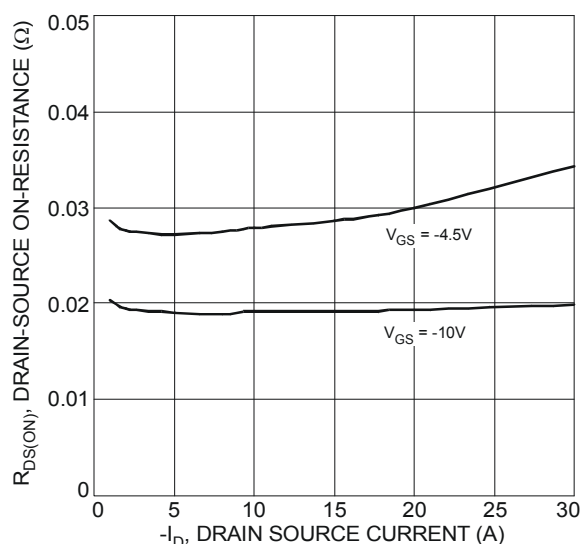


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

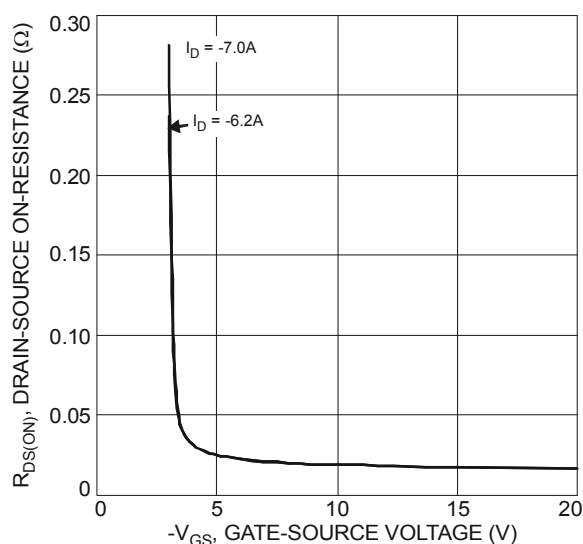


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

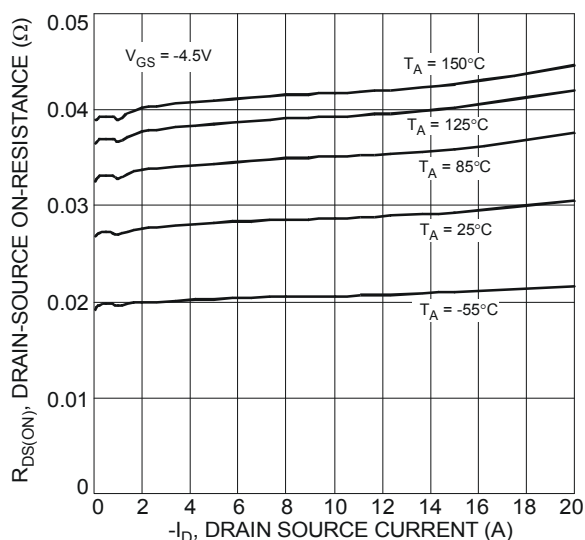


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

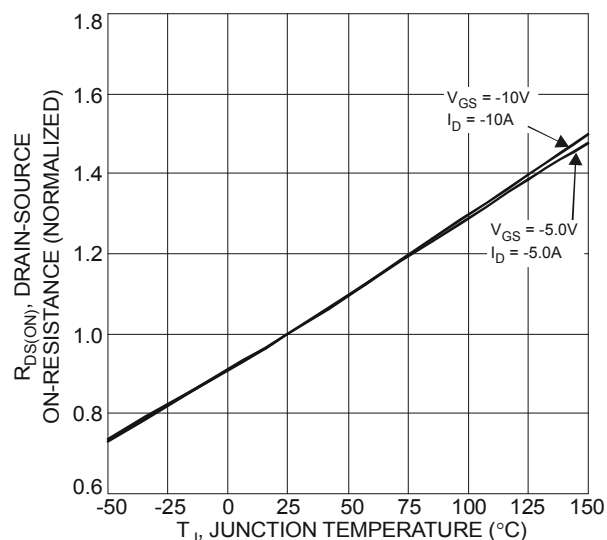
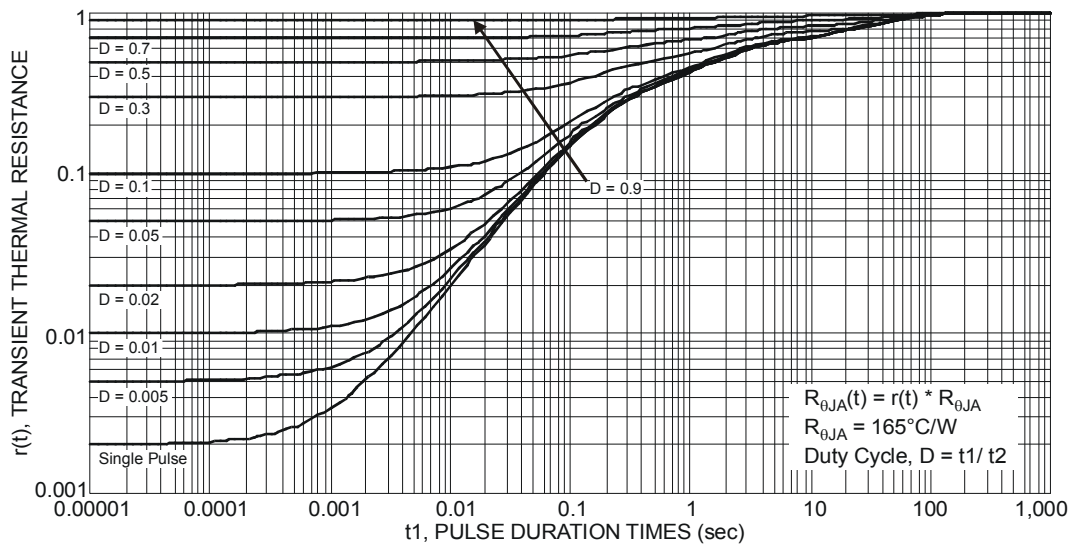
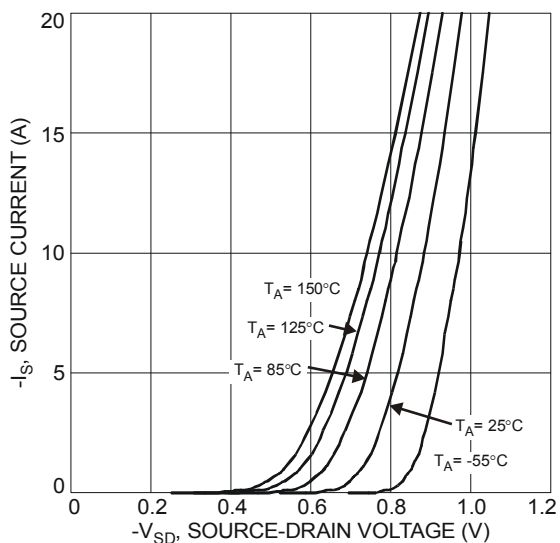
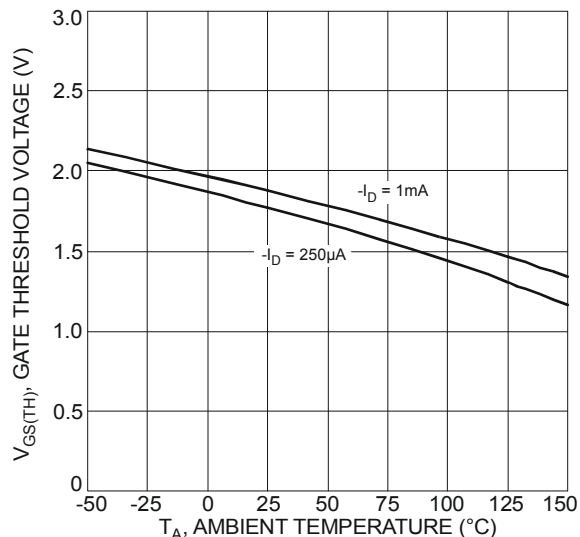
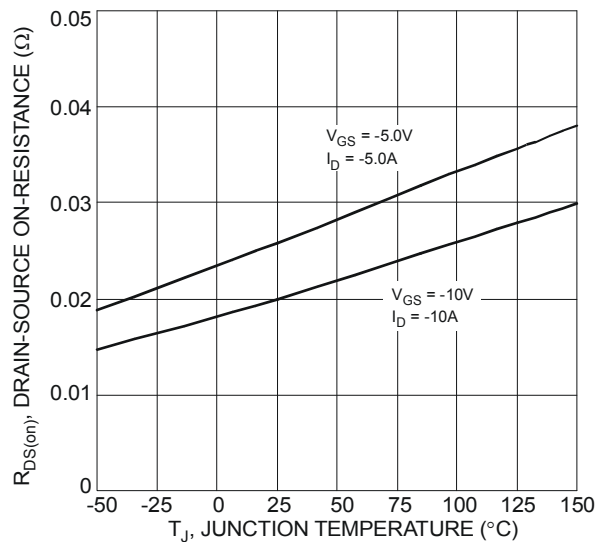
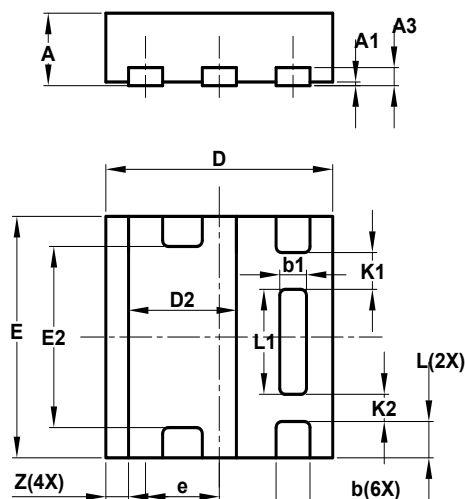


Figure 6 On-Resistance Variation with Temperature



## Package Outline Dimensions

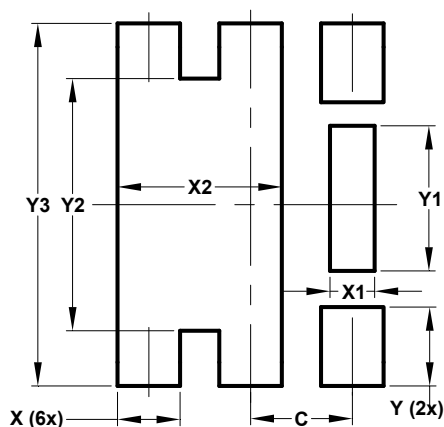
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| U-DFN2020-6<br>Type E |       |       |       |
|-----------------------|-------|-------|-------|
| Dim                   | Min   | Max   | Typ   |
| A                     | 0.57  | 0.63  | 0.60  |
| A1                    | 0     | 0.05  | 0.03  |
| A3                    | —     | —     | 0.15  |
| b                     | 0.25  | 0.35  | 0.30  |
| b1                    | 0.185 | 0.285 | 0.235 |
| D                     | 1.95  | 2.05  | 2.00  |
| D2                    | 0.85  | 1.05  | 0.95  |
| E                     | 1.95  | 2.05  | 2.00  |
| E2                    | 1.40  | 1.60  | 1.50  |
| e                     | —     | —     | 0.65  |
| L                     | 0.25  | 0.35  | 0.30  |
| L1                    | 0.82  | 0.92  | 0.87  |
| K1                    | —     | —     | 0.305 |
| K2                    | —     | —     | 0.225 |
| 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<br>(in mm) |
|------------|------------------|
| C          | 0.650            |
| X          | 0.400            |
| X1         | 0.285            |
| X2         | 1.050            |
| Y          | 0.500            |
| Y1         | 0.920            |
| Y2         | 1.600            |
| Y3         | 2.300            |

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