30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max @ T_A = +25°C
-30V	2.4Ω @ V_{GS} = -10V	-400mA
	4Ω @ V_{GS} = -4.5V	-300mA

Description

This 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

- Load Switch
- Portable Applications
- Power Management Functions

Features

- Low On-Resistance
- Ultra-Small Surfaced Mount Package
- ESD Protected Gate
- **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**

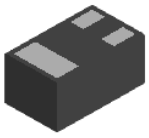
Mechanical Data

- Case: X1-DFN1006-3
- 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 – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.001 grams (Approximate)

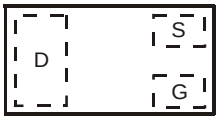


ESD PROTECTED

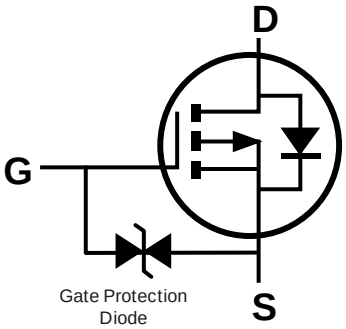
X1-DFN1006-3



Bottom View



Top View



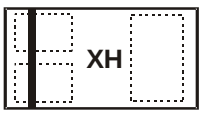
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Reel Size (inches)	Quantity per Reel
DMP32D5SFB-7B	7	10,000

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



Top View
Bar Denotes Gate and Source Side

XH = Product Type Marking Code

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 5)	V_{GS} = -10V	T_A = +25°C T_A = +70°C	I_D	-400 -300	mA
Continuous Drain Current (Note 6)	V_{GS} = -10V	T_A = +25°C T_A = +70°C	I_D	-500 -400	mA
Pulsed Drain Current (Note 5)			I_{DM}	-1	A
Maximum Body Diode Continuous Current (Note 6)			I_S	-800	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation	(Note 5)	P_D	0.5	W
	(Note 6)		1.2	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	255	°C/W
	(Note 6)		108	
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	V_{GS} = 0V, I_D = -1mA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	-	-	-1	µA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.3	-	-2.3	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	-	2.4	Ω	V_{GS} = -10V, I_D = -200mA
				4		V_{GS} = -4.5V, I_D = -200mA
Diode Forward Voltage	V_{SD}	-	0.8	1.2	V	V_{GS} = 0V, I_S = -300mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	51	100	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	11	20	pF	
Reverse Transfer Capacitance	C_{rss}	-	9	20	pF	
Total Gate Charge	Q_g	-	0.62	2	nC	V_{GS} = -4.5V; V_{DS} = -10V, I_D = -200mA
Total Gate Charge	Q_g	-	1.25	4	nC	V_{GS} = -10V; V_{DS} = -10V, I_D = -200mA
Gate-Source Charge	Q_{gs}	-	0.16	0.5	nC	V_{GS} = -10V; V_{DS} = -10V, I_D = -200mA
Gate-Drain Charge	Q_{gd}	-	0.21	0.5	nC	V_{GS} = -10V; V_{DS} = -10V, I_D = -200mA
Turn-On Delay Time	$t_{D(ON)}$	-	4.3	10	ns	V_{DS} = -15V, I_D = -500mA, V_{GS} = -10V, R_G = 1Ω
Turn-On Rise Time	t_R	-	7.7	15	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	31.9	60	ns	
Turn-Off Fall Time	t_F	-	17.8	40	ns	

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
7 .Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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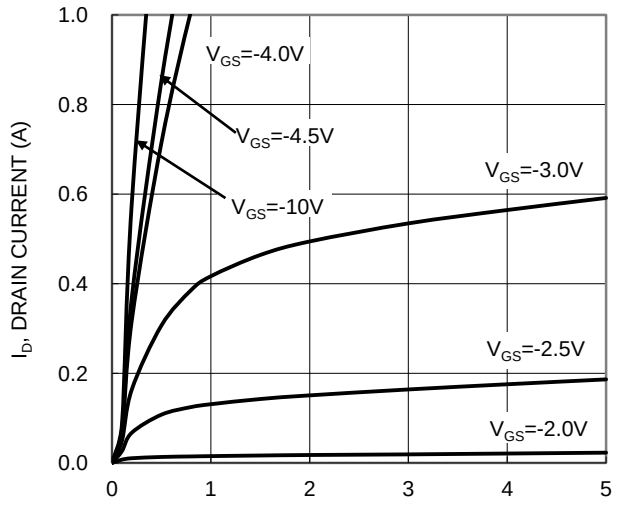

Figure 1. Typical Output Characteristic

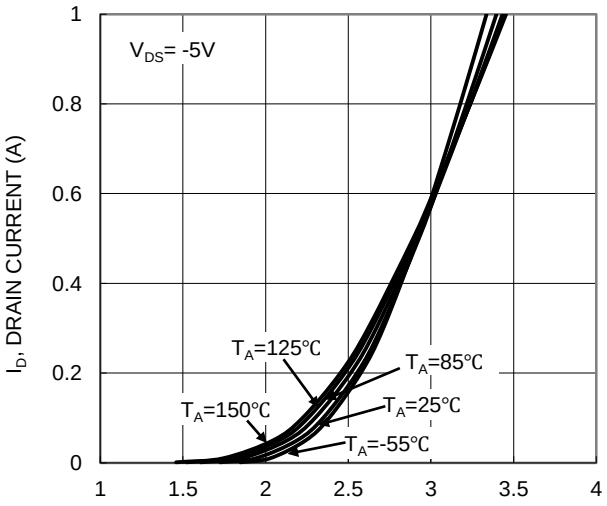

Figure 2. Typical Transfer Characteristic

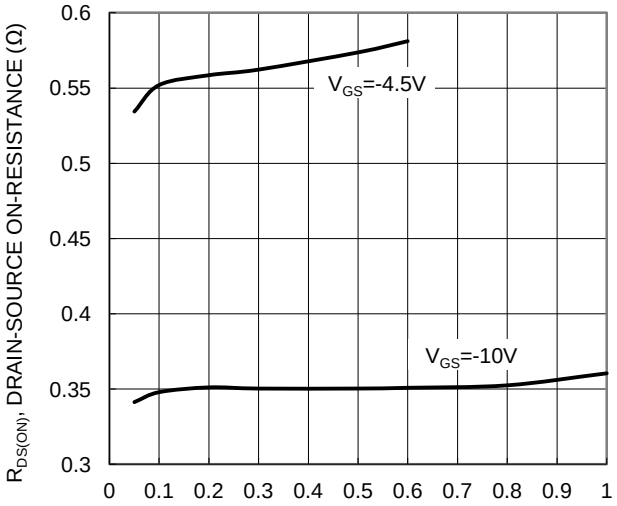

Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

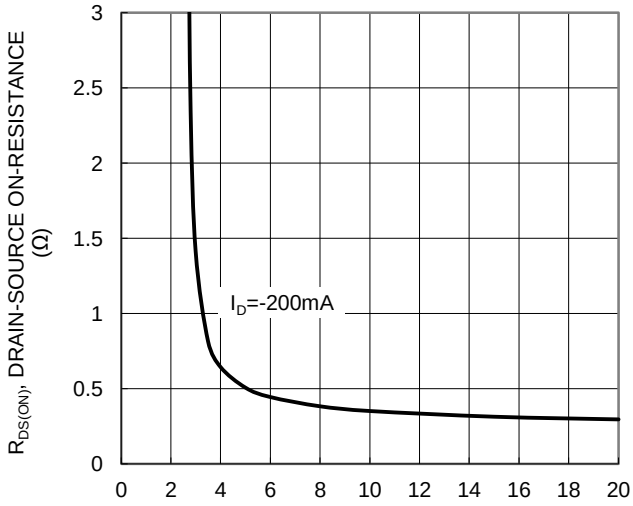

Figure 4. Typical Transfer Characteristic

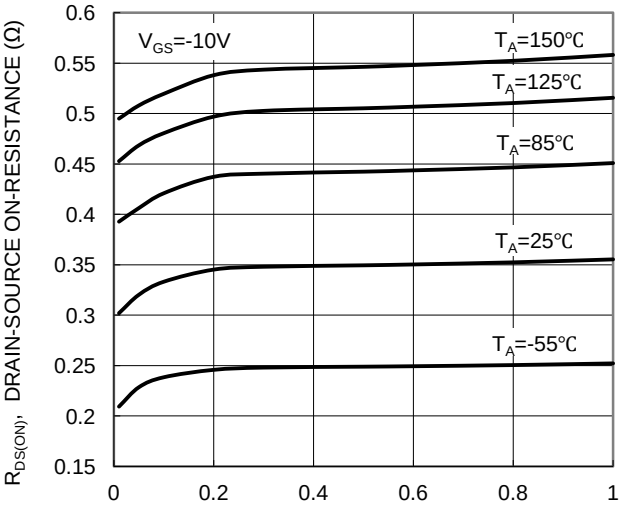

Figure 5. Typical On-Resistance vs. Drain Current and Temperature

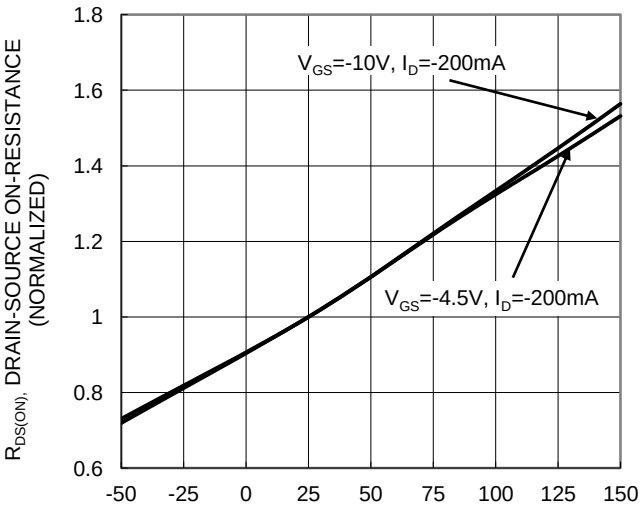

Figure 6. On-Resistance Variation with Temperature

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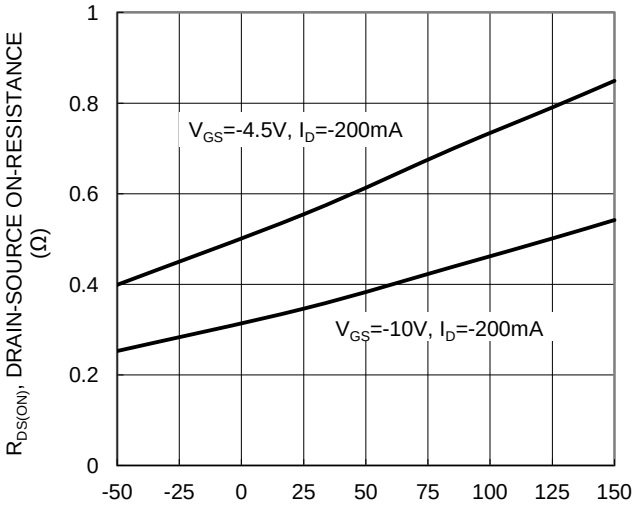

Figure 7. On-Resistance Variation with Temperature

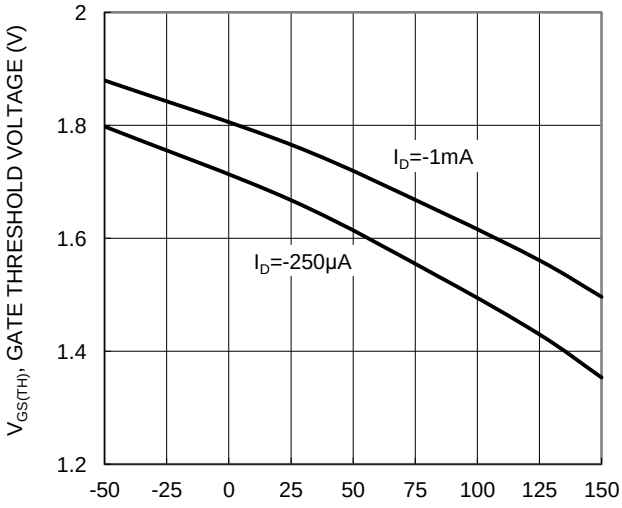

Figure 8. Gate Threshold Variation vs. Temperature

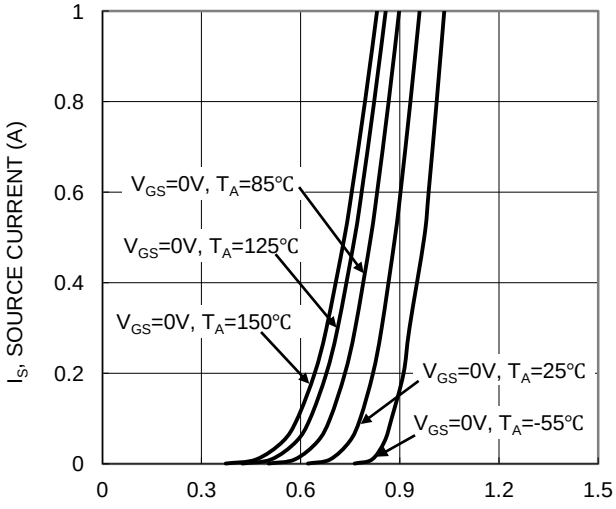

Figure 9. Diode Forward Voltage vs. Current

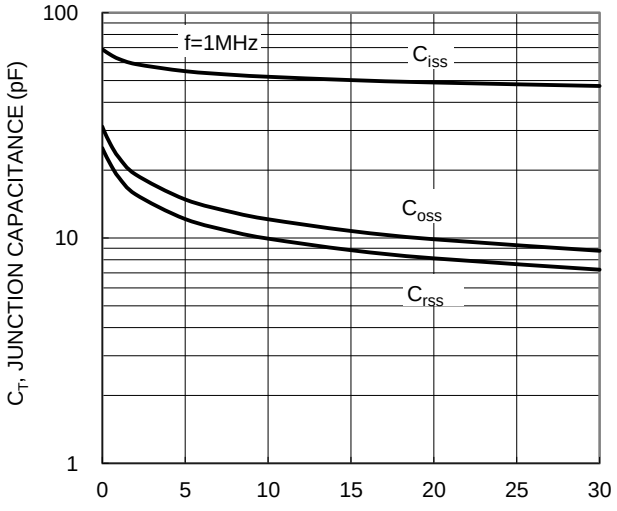

Figure 10. Typical Junction Capacitance

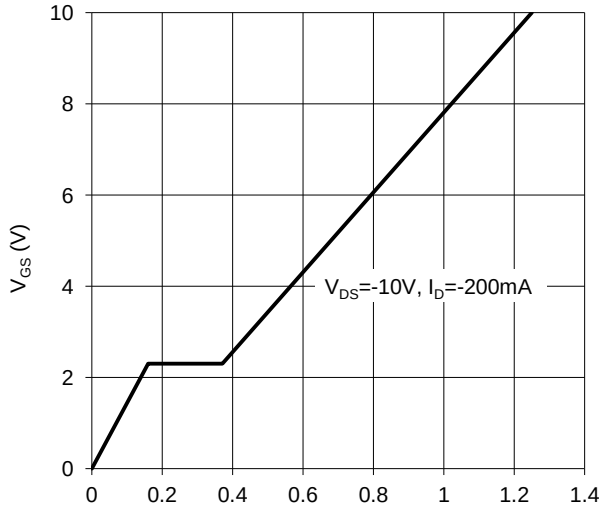

Figure 11. Gate Charge

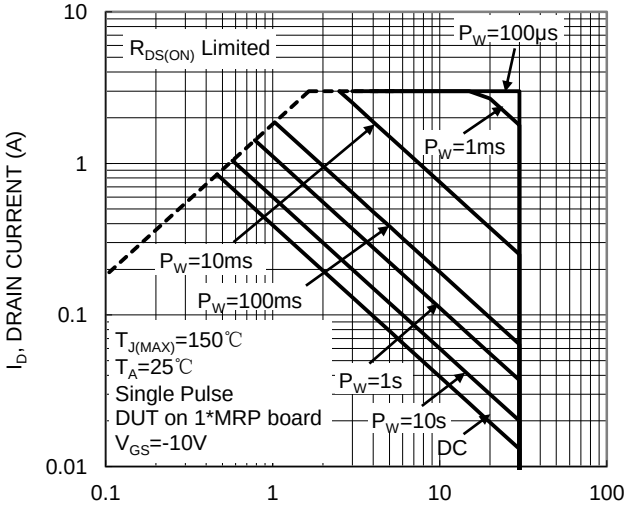

Figure 12. SOA, Safe Operation Area

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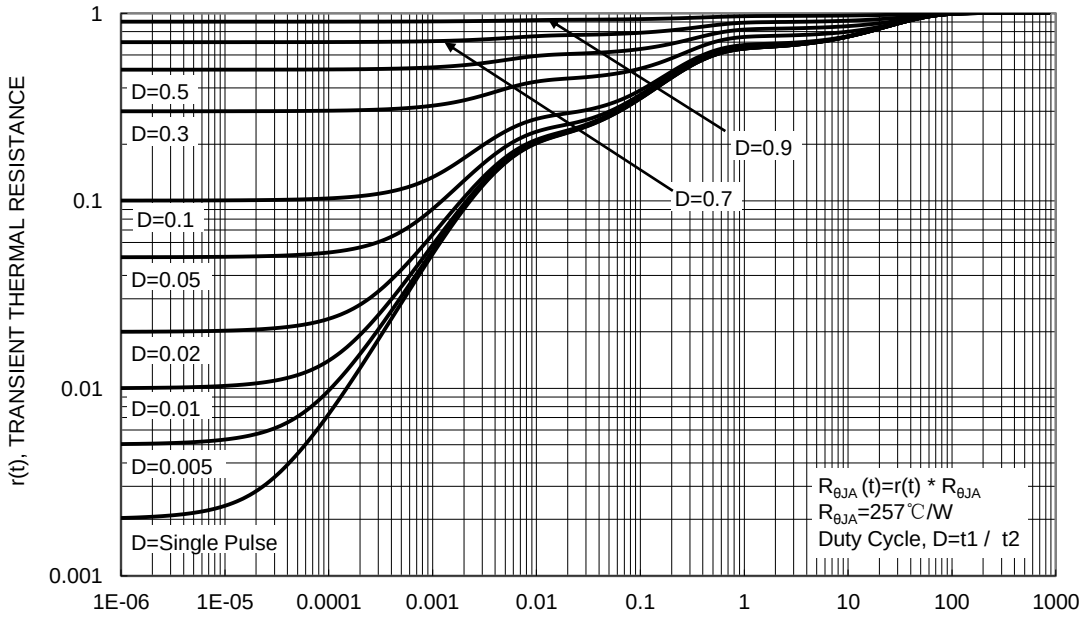
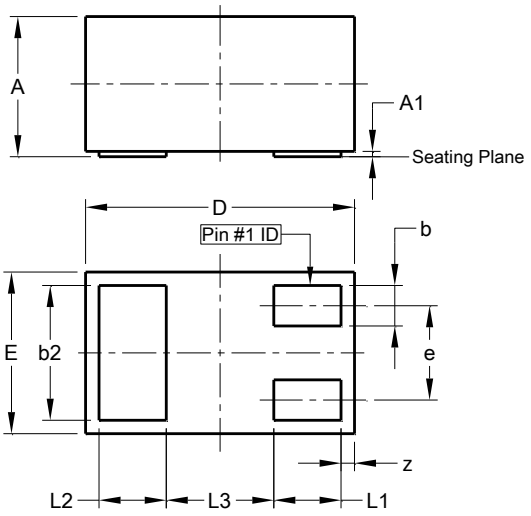


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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



X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

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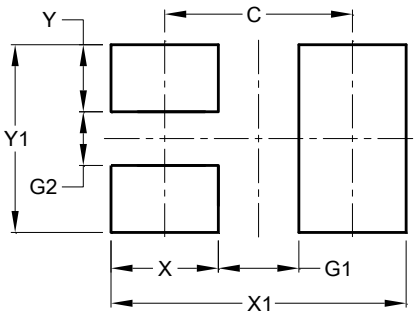
Suggested Pad Layout

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



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

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