Lead-free Green

P-CHANNEL ENHANCEMENT MODE MOSFET WITH INTEGRATED SBR

NEW PRODUCT

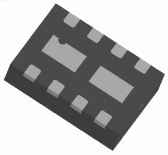
Features

- Low On-Resistance
  - 95mΩ @V_{GS} = -4.5V
  - 120mΩ @V_{GS} = -2.5V
  - 150mΩ (typ) @V_{GS} = -1.8V
- Low Gate Threshold Voltage, -1.3V Max
- Fast Switching Speed
- Low Input/Output Leakage
- Incorporates Low V_F Super Barrier Rectifier (SBR)
- Low Profile, 0.5mm Max Height
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

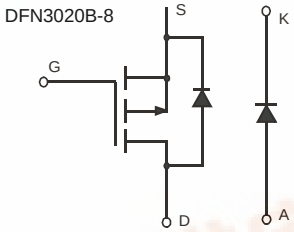
Mechanical Data

- Case: DFN3020B-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 5
- Ordering Information: See Page 5
- Weight: 0.011 grams (approximate)

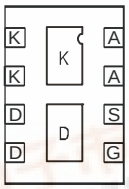
Top View



Bottom View



Equivalent Circuit



Bottom View
Pin Configuration

Maximum Ratings – TOTAL DEVICE @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P_D	1.5	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	85	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Maximum Ratings – P-CHANNEL MOSFET – Q1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	±12	V
Drain Current (Note 1)	I_D	-2.9	A
Pulsed Drain Current (Note 4)	I_{DM}	-10	A

Maximum Ratings – SBR – D1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	40	V
RMS Reverse Voltage	$V_{R(RMS)}$	28	V
Average Rectified Output Current	I_O	1	A
Non-Repetitive Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load	I_{FSM}	3	A

Notes:
1. Device mounted on FR-4 PCB, on minimum recommended, 2oz Copper pad layout.
2. No purposefully added lead.
3. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
4. Repetitive rating, pulse width limited by junction temperature.

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Electrical Characteristics – P-CHANNEL MOSFET – Q1 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
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}	— —	— —	±100 ±800	nA	V_{GS} = ±8V, V_{DS} = 0V V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.45	—	-1.3	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— — —	70 84 100	95 120 150	mΩ	V_{GS} = -4.5V, I_D = -2.8A V_{GS} = -2.5V, I_D = -2.0A V_{GS} = -1.8V, I_D = -1.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	8	—	S	V_{DS} = -5V, I_D = -2.8A
Diode Forward Voltage (Note 5)	V_{SD}	—	0.42	-1.2	V	V_{GS} = 0V, I_S = -1.0A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	632	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	65	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	54	—	pF	

Electrical Characteristics – SBR – D1 @ T_A = 25ºC unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage (Note 5)	$V_{(BR)R}$	40	—	—	V	I_R = 1mA
Forward Voltage	V_F	— —	— —	0.42 0.49	V	I_F = 0.5A I_F = 1.0A
Reverse Current (Note 5)	I_R	—	—	30	μA	V_R = 20V

Notes: 5. Short duration pulse test used to minimize self-heating effect.

Q1, P-CHANNEL MOSFET

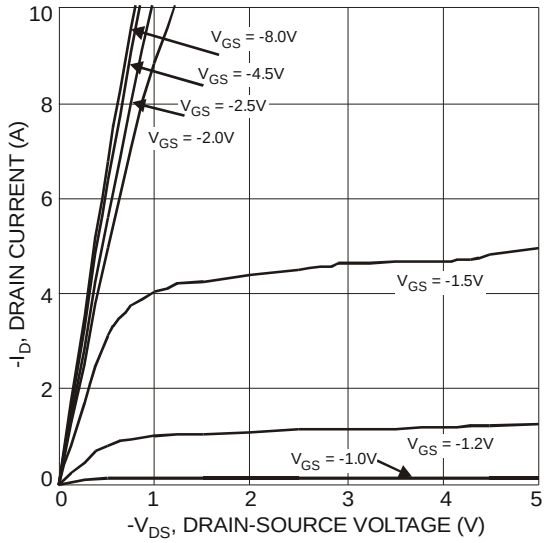

Fig. 1 Typical Output Characteristics

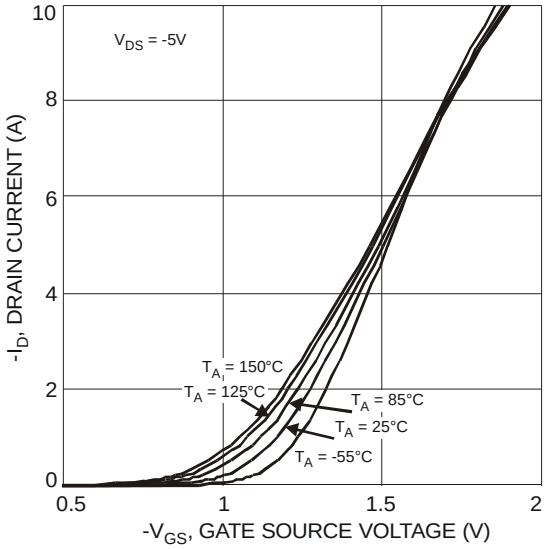

Fig. 2 Typical Transfer Characteristics

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Q1, P-CHANNEL MOSFET - Continued

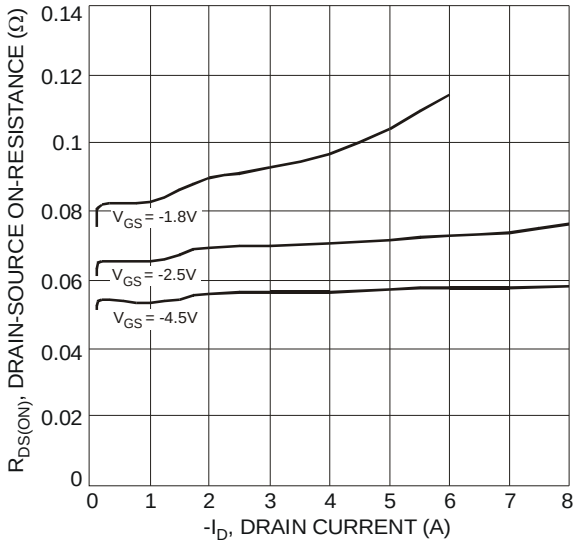

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

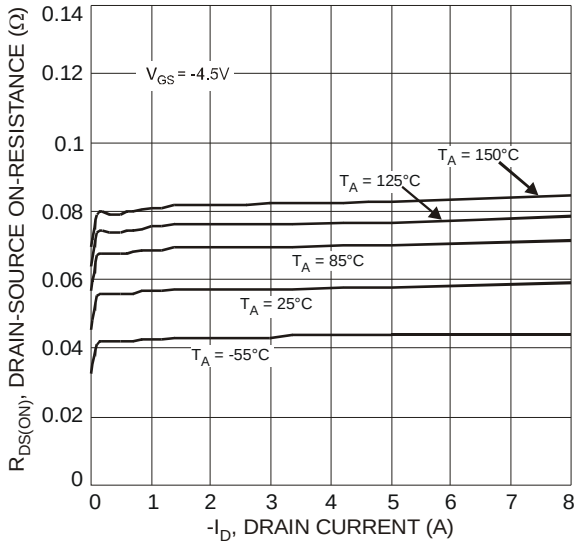

Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

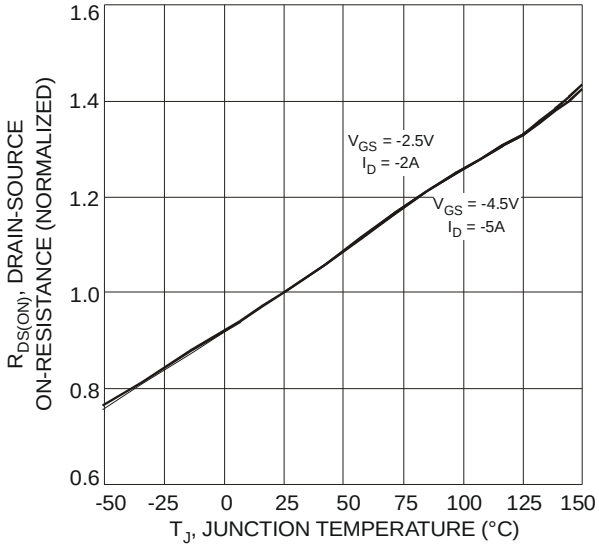

Fig. 5 On-Resistance Variation with Temperature

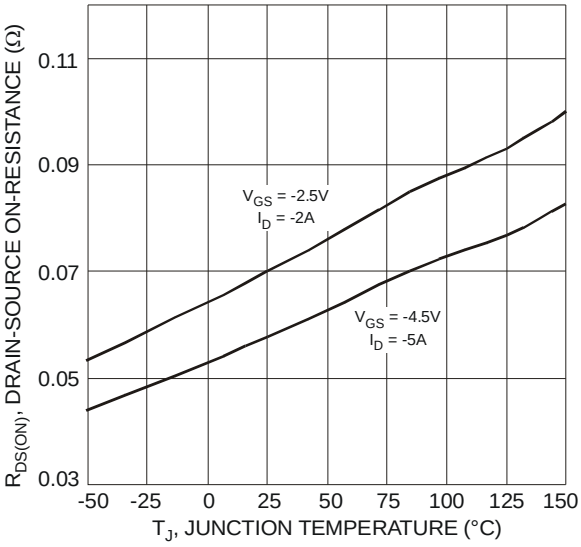

Fig. 6 On-Resistance Variation with Temperature

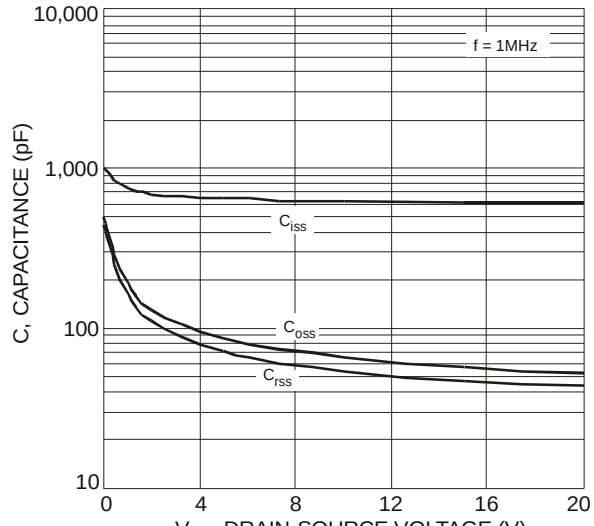

Fig. 7 Typical Capacitance

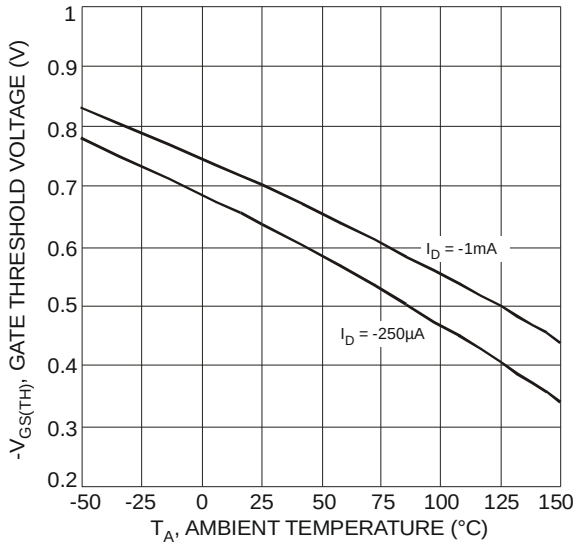

Fig. 8 Gate Threshold Variation vs. Ambient Temperature

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Q1, P-CHANNEL MOSFET - Continued

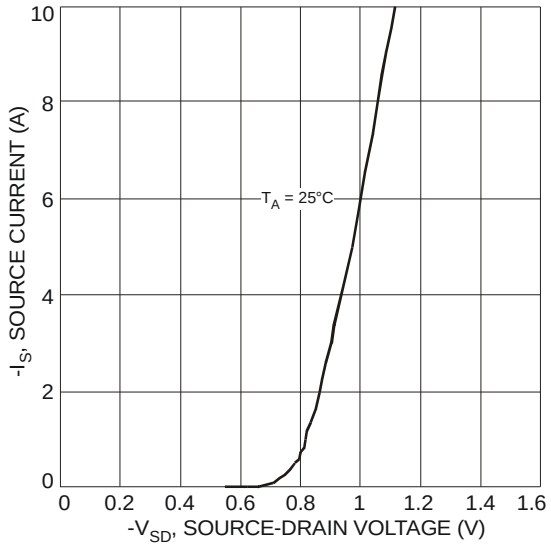

Fig. 9 Diode Forward Voltage vs. Current

D1, SBR

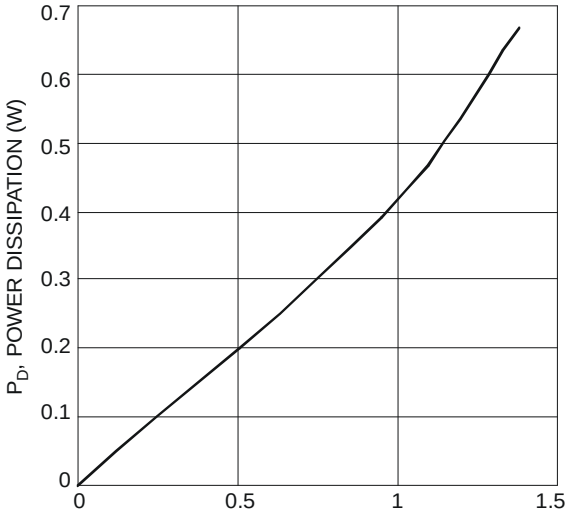

Fig. 10 Forward Power Dissipation

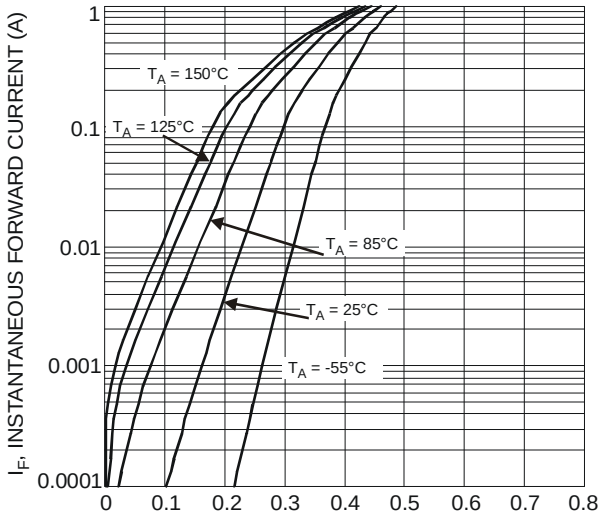

Fig. 11 Typical Forward Characteristics

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D1, SBR - Continued

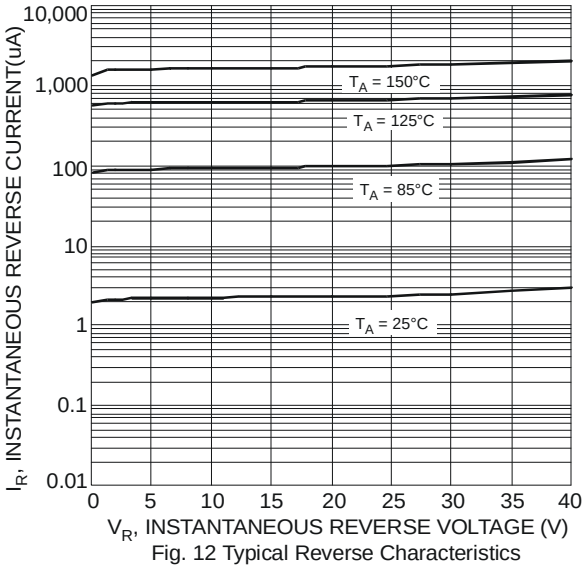

Fig. 12 Typical Reverse Characteristics

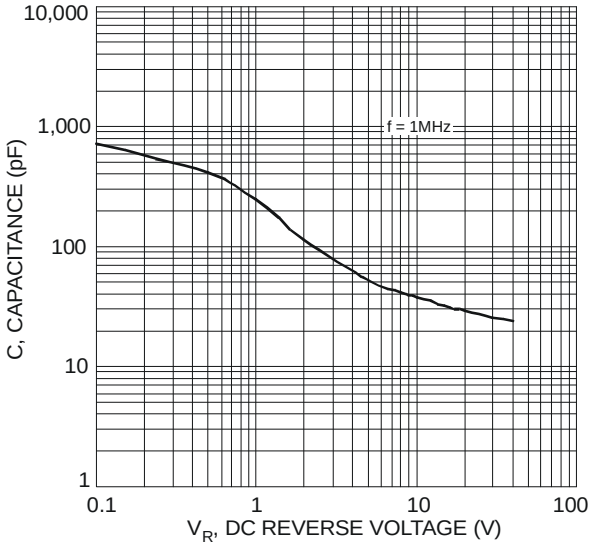

Fig. 13 Total Capacitance vs. Reverse Voltage

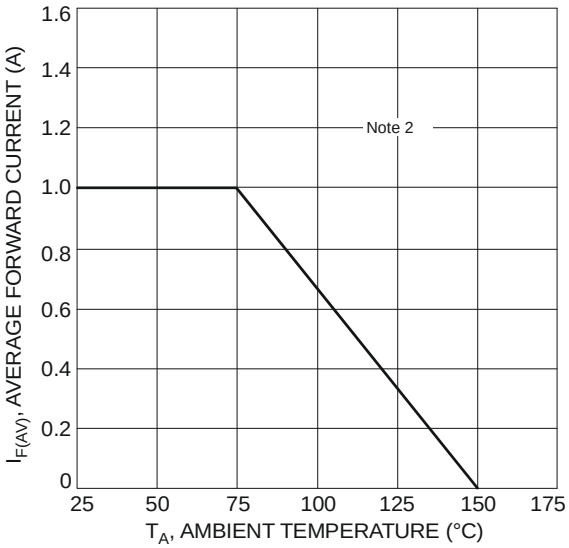

Fig. 14 Forward Current Derating Curve

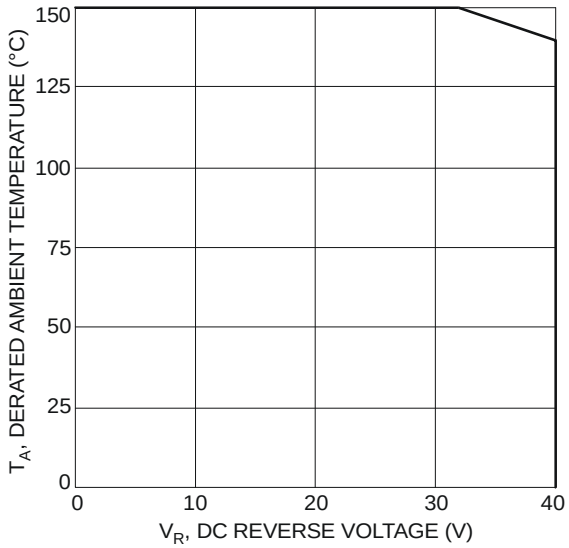

Fig. 15 Operating Temperature Derating

Ordering Information (Note 6)

Part Number	Case	Packaging
DMS2120LFWB-7	DFN3020B-8	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information

MF = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: V = 2008)
M = Month (ex: 9 = September)

Date Code Key

Year	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	W	X	Y	Z	A	B	C

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

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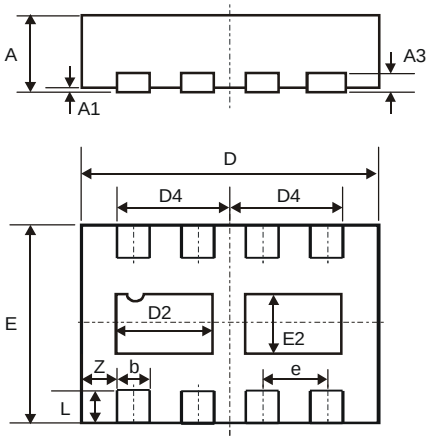
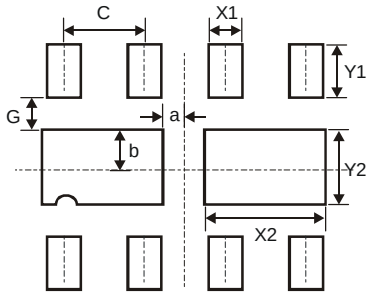
Package Outline Dimensions



DFN3020B-8			
Dim	**Min**	**Max**	**Typ**
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
a	0.09
b	0.365
C	0.65
G	0.285
X1	0.4
X2	1.12
Y1	0.5
Y2	0.73

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