Product Summary

BV_{DSS}	$R_{DS(ON)\ max}$	I_D T_A = +25°C
-12V	31mΩ@ V_{GS} = -4.5V	-5.2A
	45mΩ@ V_{GS} = -2.5V	-4.3A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC Converters
- BLDC Motors
- Load Switch

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **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**
- **PPAP Capable (Note 4)**

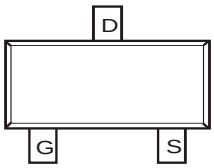
Mechanical Data

- Case: SOT23
- 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 e3
- Weight: 0.009 grams (Approximate)

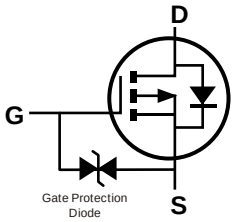
ESD Protected Gate

SOT23

Top View



Pin Configuration



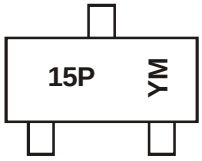
Internal Schematic

Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMP1045UQ-7	Automotive	SOT23	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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to https://www.diodes.com/quality/product-compliance-definitions/.
5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



15P = Marking Code
YM = Date Code Marking
Y = Year (ex: E = 2017)
M = Month (ex: 9 = September)

Date Code Key

Year	2013	~	2017	2018	2019	2020
Code	A	~	E	F	G	H

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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-4.0 -3.1	A
Continuous Drain Current (Note 6) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-3.3 -2.6	A
Continuous Drain Current (Note 7) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-5.2 -4.2	A
Continuous Drain Current (Note 7) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-4.3 -3.4	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	-2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) (Note 6)			I_{DM}	-40	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	168	°C/W
Total Power Dissipation (Note 7)	P_D	1.3	W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	99	°C/W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	14.8	°C/W
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}	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -12V, 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	-0.55	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance		$R_{DS(ON)}$	—	26	31	mΩ	V_{GS} = -4.5V, I_D = -4.0A
				31	45		V_{GS} = -2.5V, I_D = -3.5A
				45	75		V_{GS} = -1.8V, I_D = -2.7A
Forward Transfer Admittance		$\|Y_{fs}\|$	—	12	—	S	V_{DS} = -5V, I_D = -4A
Diode Forward Voltage		V_{SD}	—	-0.6	—	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance		C_{iss}	—	1357	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	504	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	235	—	pF	
Gate Resistance		R_g	—	14.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 9)							
Total Gate Charge		Q_g	—	15.8	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -4A
Gate-Source Charge		Q_{gs}	—	2.0	—	nC	
Gate-Drain Charge		Q_{gd}	—	3.9	—	nC	
Turn-On Delay Time		$t_{D(ON)}$	—	15.7	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time		t_R	—	23.3	—	ns	
Turn-Off Delay Time		$t_{D(OFF)}$	—	91.2	—	ns	
Turn-Off Fall Time		t_F	—	106.9	—	ns	

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

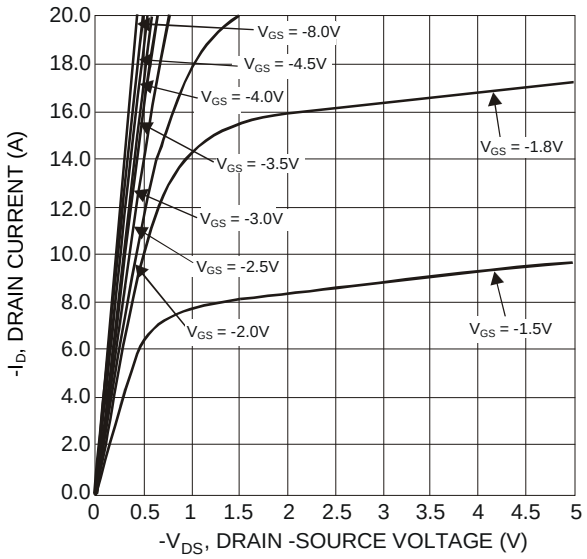


Fig. 1 Typical Output Characteristics

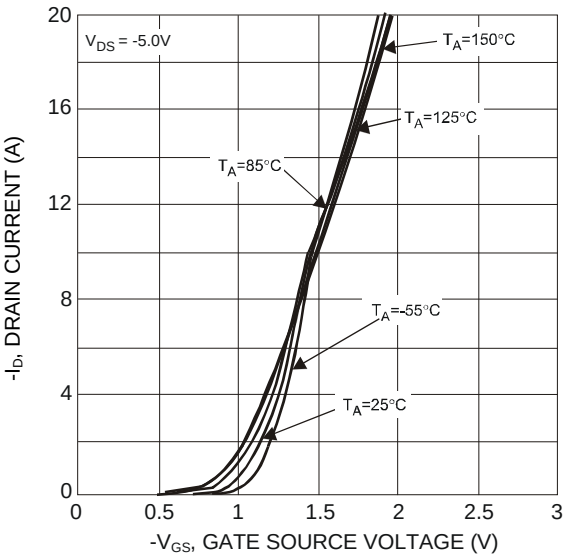


Fig. 2 Typical Transfer Characteristics

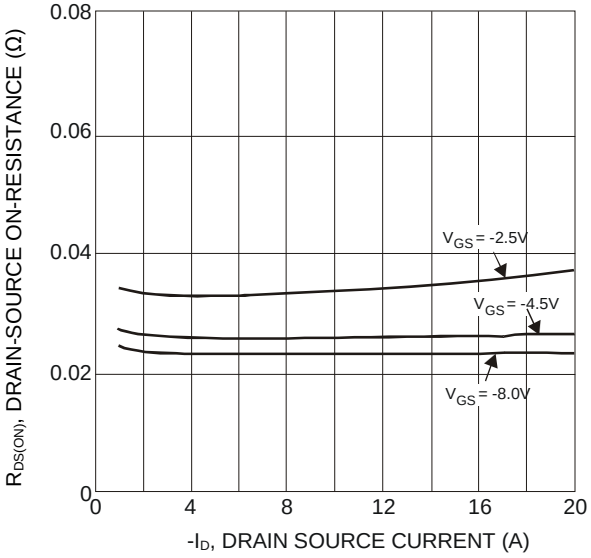


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

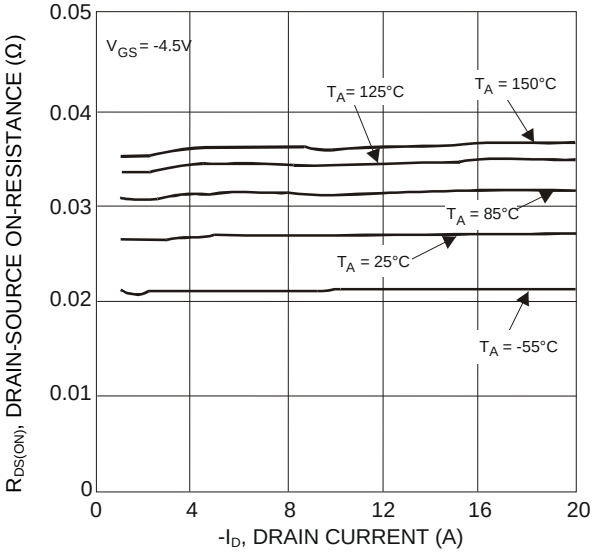


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

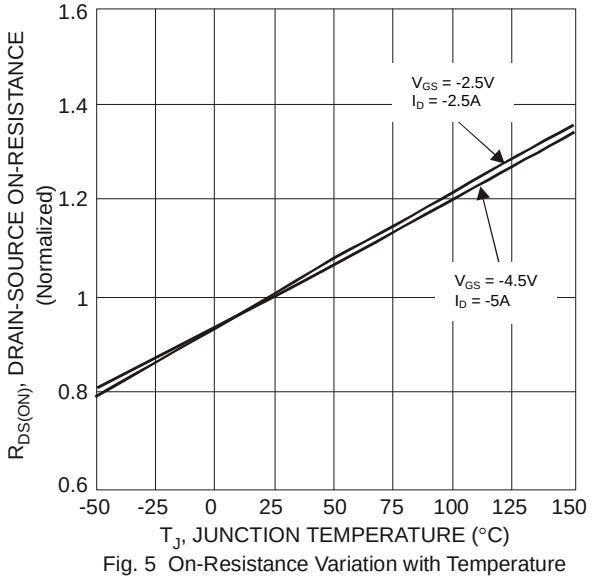


Fig. 5 On-Resistance Variation with Temperature

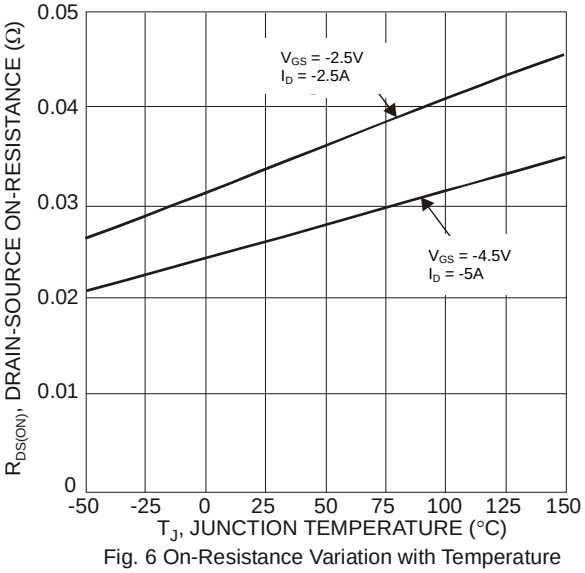


Fig. 6 On-Resistance Variation with Temperature

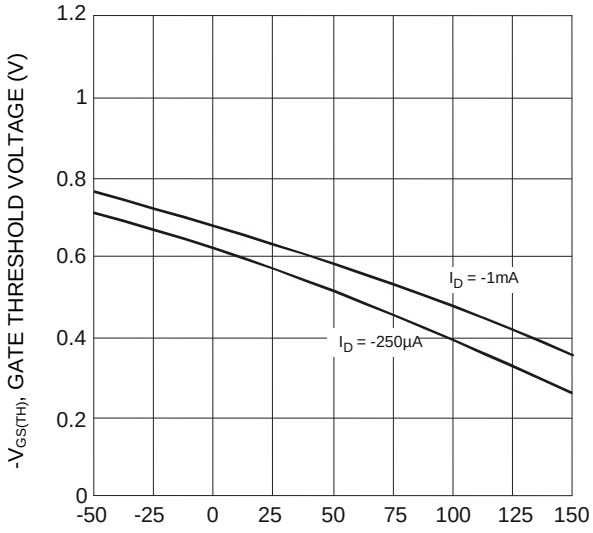


Fig. 7 Gate Threshold Variation vs. Junction Temperature

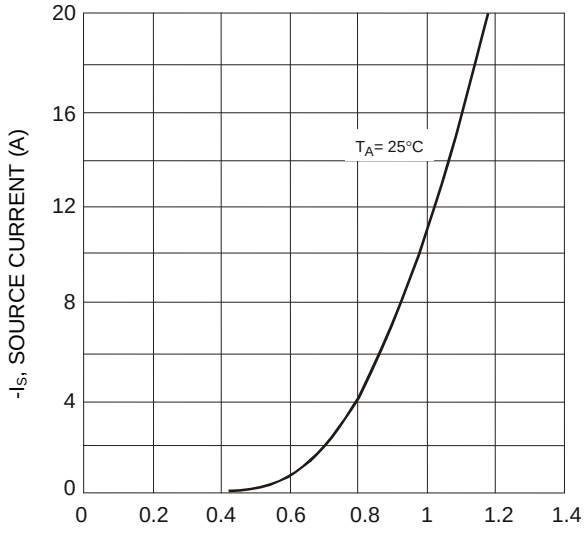


Fig. 8 Diode Forward Voltage vs. Current

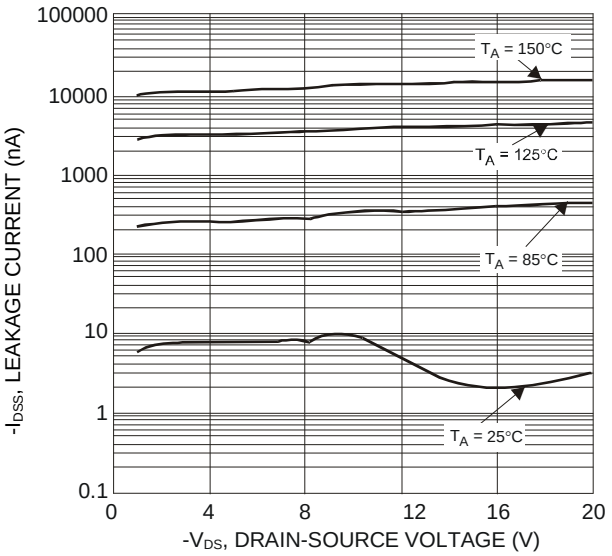


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

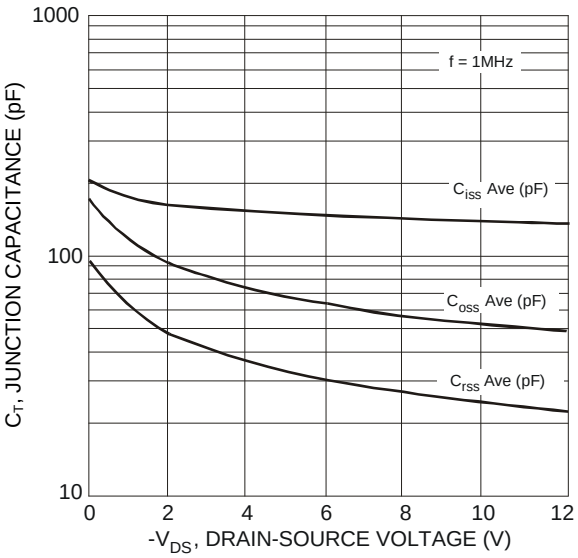


Fig. 10 Typical Junction Capacitance

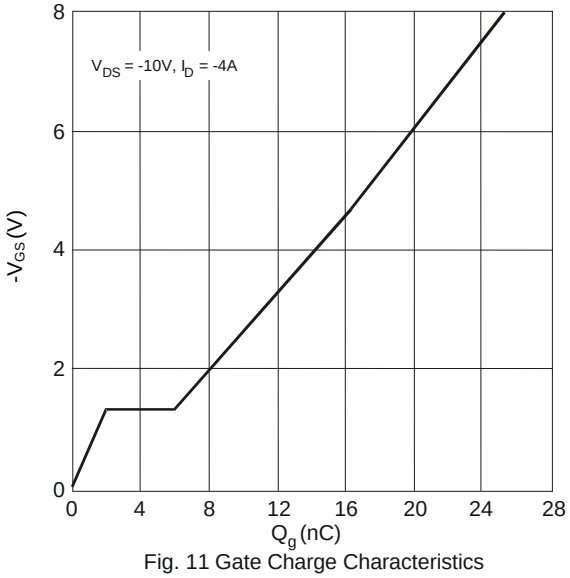


Fig. 11 Gate Charge Characteristics

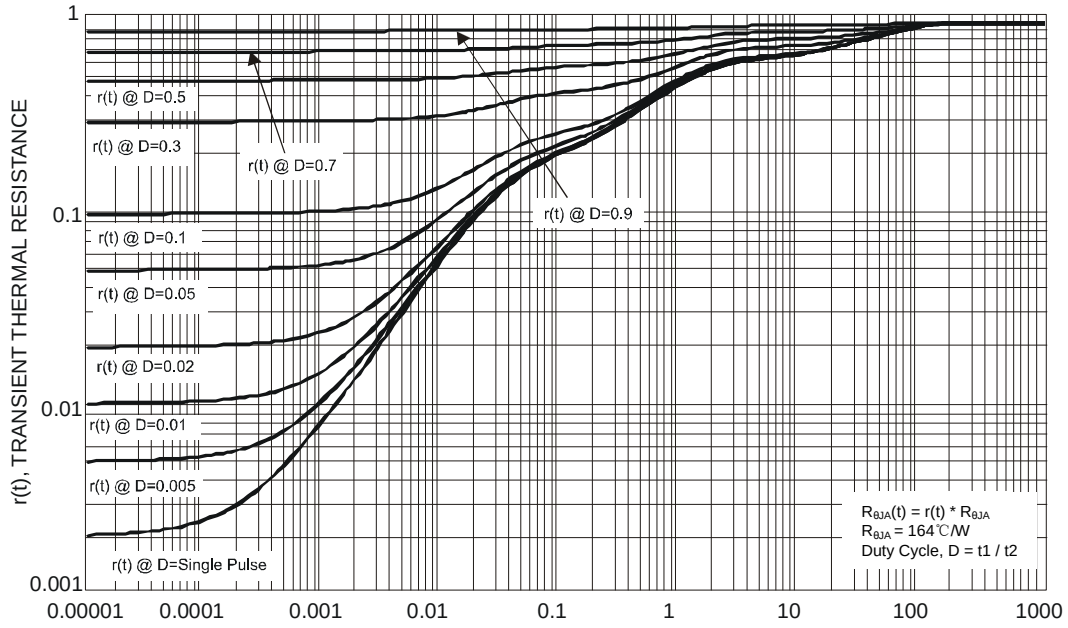
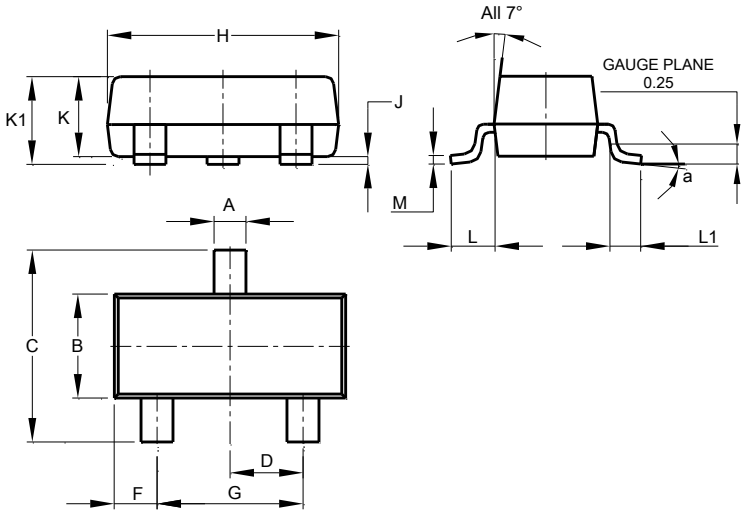


Fig. 12 Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23

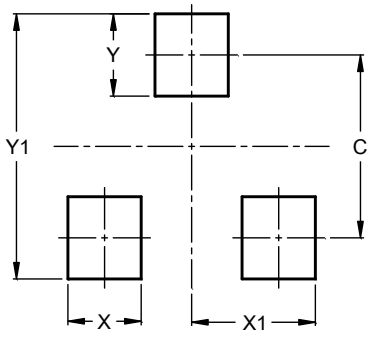


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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