

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max @ T <sub>A</sub> = +25°C
60V	1.4Ω @ V <sub>GS</sub> = 10V	0.41A
	1.6Ω @ V <sub>GS</sub> = 4.5V	0.38A

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Load switches
- Portable applications
- Power-management functions

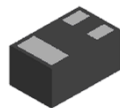
## Features and Benefits

- Footprint of just 0.6mm<sup>2</sup> – Thirteen Times Smaller than SOT23
- Low On-Resistance
- Low Gate Threshold Voltage
- Fast Switching Speed
- Ultra-Small Surface-Mount Package
- ESD Protected Gate 200V
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

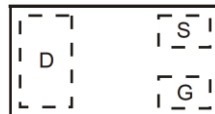
## Mechanical Data

- Package: X1-DFN1006-3
- Package 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 (e4)
- Weight: 0.001 grams (Approximate)

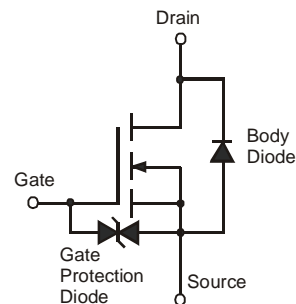
X1-DFN1006-3



Bottom View



Top View  
Internal Schematic



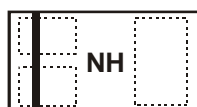
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DMN62D1SFB-7B	X1-DFN1006-3	NH	7	8	10,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



NH = Product Type Marking Code

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5)	V <sub>GS</sub> = 10V	T <sub>A</sub> = +25°C	I <sub>D</sub>	0.41	A
		T <sub>A</sub> = +85°C		0.30	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	2.64	A

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

Characteristic			Symbol	Value	Unit
Power Dissipation (Note 5)			P <sub>D</sub>	0.47	W
Thermal Resistance, Junction to Ambient		@T <sub>A</sub> = +25°C	R <sub>θJA</sub>	258	°C/W
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>	60	—	—	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>	—	—	100	nA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	10	μA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
		—	—	1		V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.3	1.6	2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	1.40	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 40mA
				1.60		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 35mA
Forward Transfer Admittance	Y <sub>fs</sub>	100	—	—	mS	V <sub>DS</sub> = 5V, I <sub>D</sub> = 40mA
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 300mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	40	80	pF	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	3.5	7	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	2.8	5.6	pF	
Gate Resistance	R <sub>g</sub>	—	81.3	200	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	0.73	1.5	nC	V <sub>GS</sub> = 4.5V V <sub>DS</sub> = 50V I <sub>D</sub> = 1A
Total Gate Charge	Q <sub>g</sub>	—	1.39	2.8	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	0.2	0.4	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.23	0.5	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.89	10	ns	V <sub>DS</sub> = 50V, I <sub>D</sub> = 1A V <sub>GS</sub> = 10V, R <sub>g</sub> = 6Ω
Turn-On Rise Time	t <sub>R</sub>	—	4.93	10	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	18.80	40	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	11.96	25	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
  - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

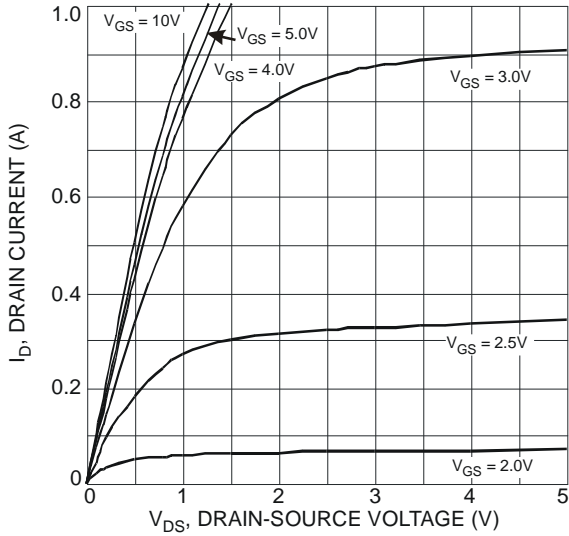


Fig. 1 Typical Output Characteristic

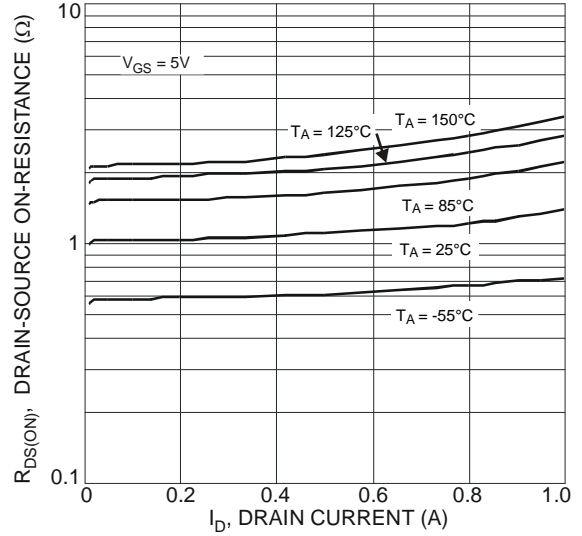


Fig. 2 Typical On-Resistance vs. Drain Current and Temperature

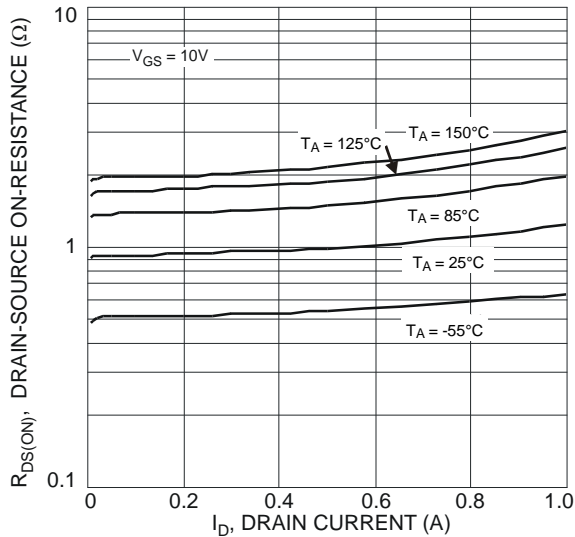


Fig. 3 Typical On-Resistance vs. Drain Current and Temperature

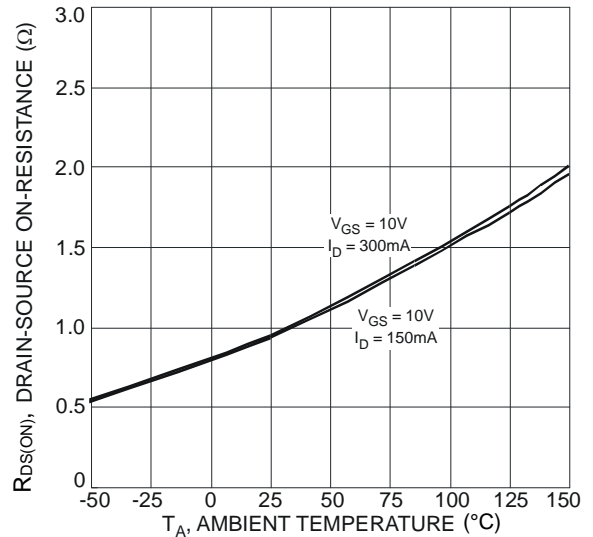


Fig. 4 On-Resistance Variation with Temperature

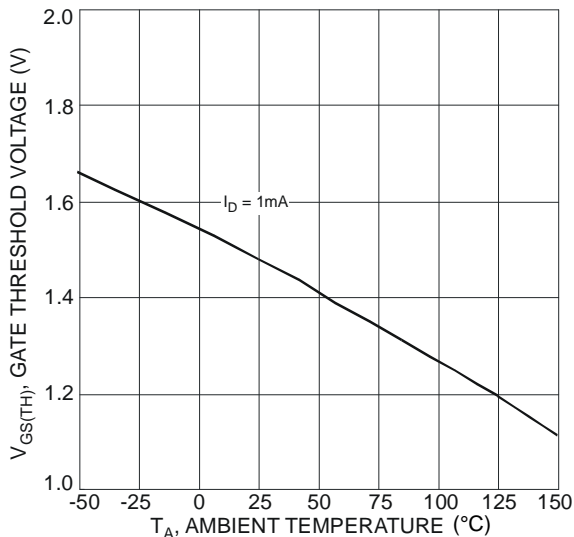


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

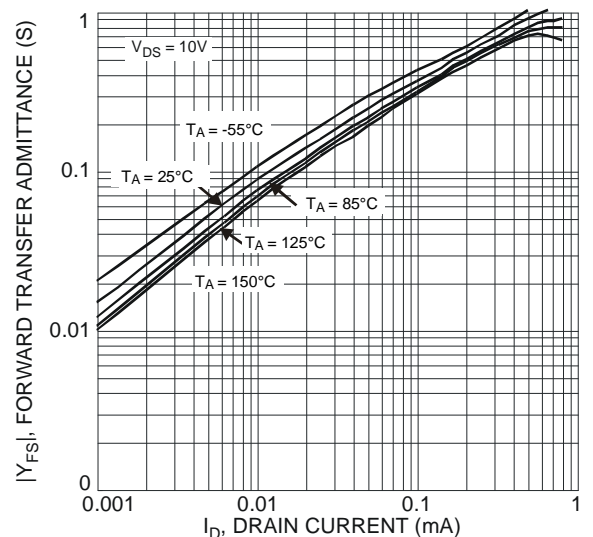


Fig. 6 Forward Transfer Admittance vs. Drain Current

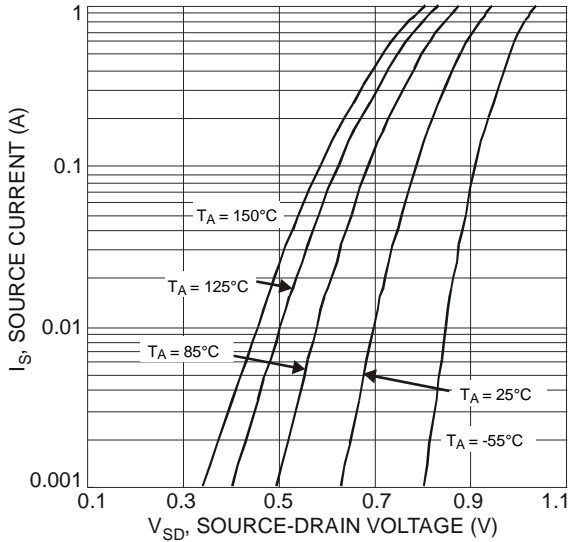


Fig. 7 Diode Forward Voltage vs. Current

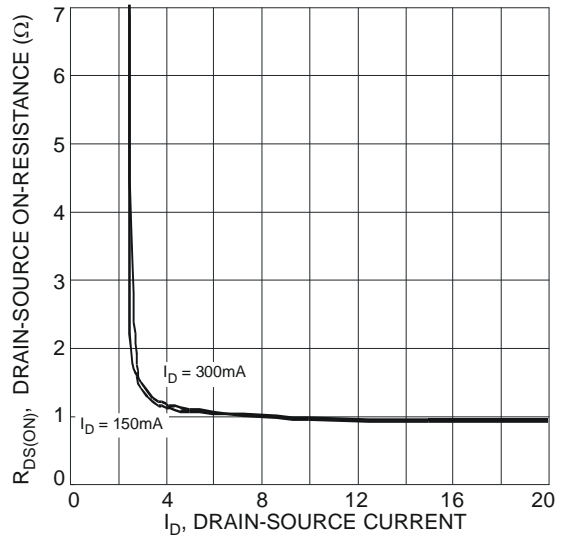


Fig. 8 On-Resistance vs. Drain-Source Current

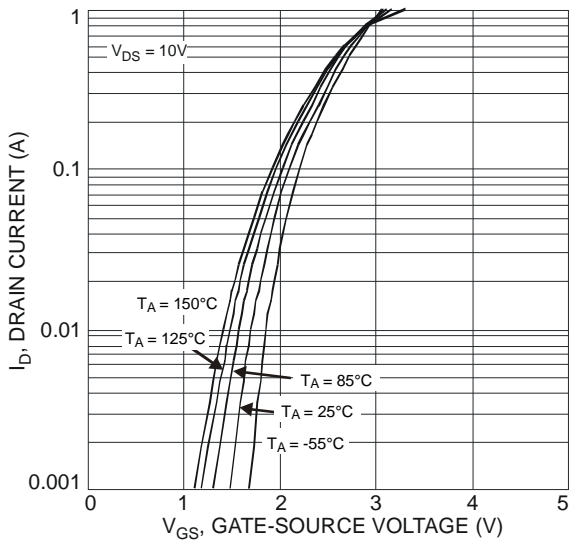


Fig. 9 Typical Transfer Characteristic

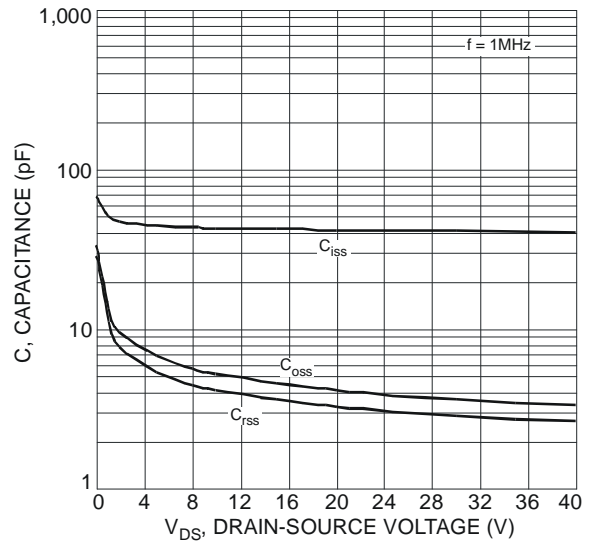


Fig. 10 Typical Total Capacitance

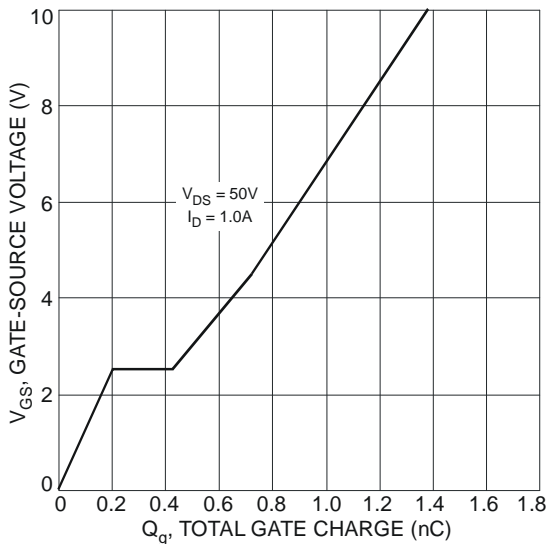


Fig. 11 Gate-Charge Characteristics

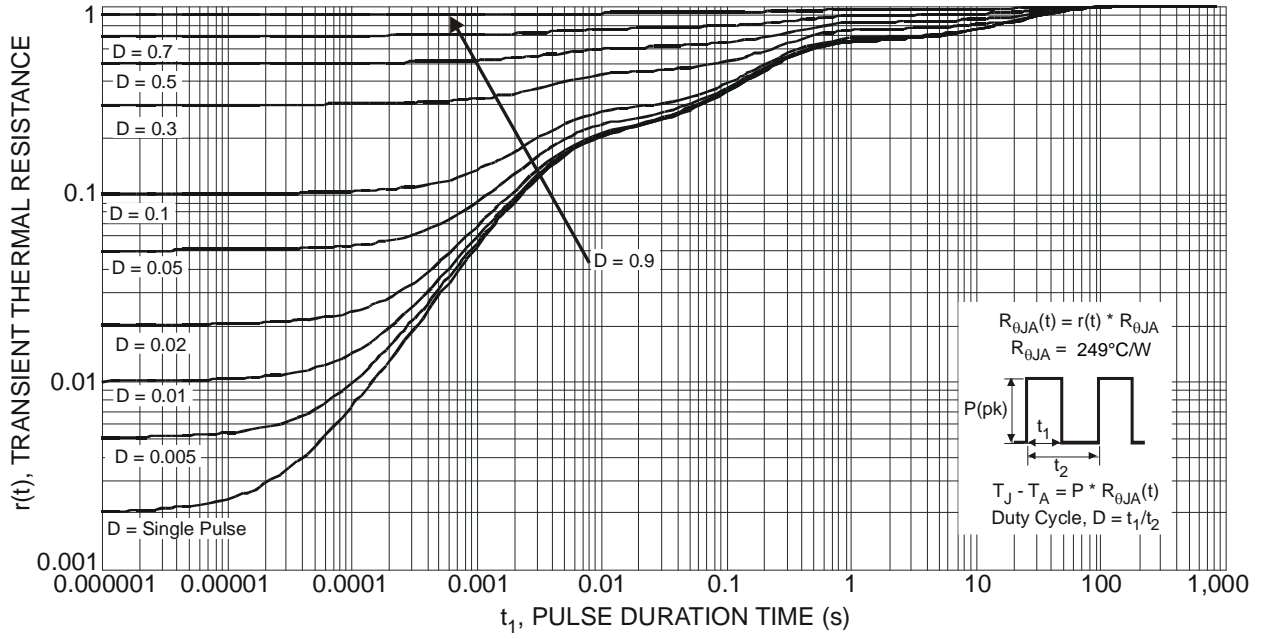
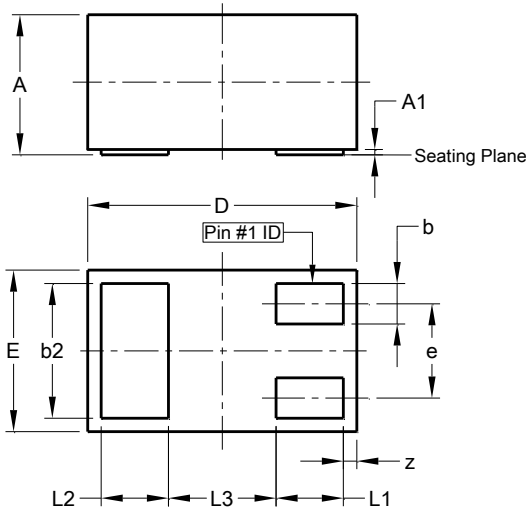


Fig. 12 Transient Thermal Response

## Package Outline Dimensions

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

### X1-DFN1006-3

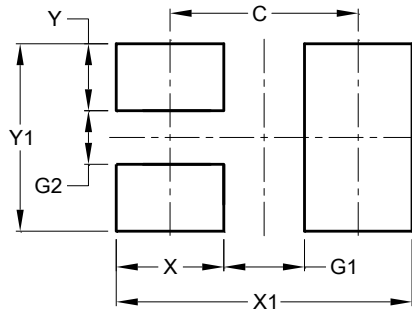


X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
<b>All Dimensions in mm</b>			

## Suggested Pad Layout

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

### X1-DFN1006-3



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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