DMP31D0U

30V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D @ T_A = 25°C
-30V	1Ω @ V_{GS} = -4.5V	-0.67A
	1.5Ω @ V_{GS} = -2.5V	-0.54A
	2Ω @ V_{GS} = -1.8V	-0.47A

Features and Benefits

- Low Gate Threshold Voltage
- Fast Switching Speed
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **ESD Protected Gate 2KV**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

This 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.

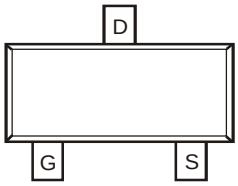
- Load Switch in portable electronics

Mechanical Data

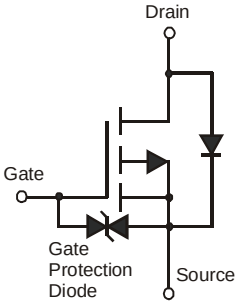
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin
- Weight: 0.08 grams (approximate)

SOT23

Top View



Top View
Internal Schematic



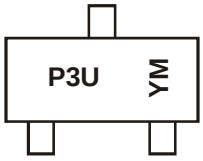
Equivalent Circuit

Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP31D0U-7	P3U	7	8	3,000

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

Marking Information



P3U = 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_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current	Steady State	T_A = 25°C (Note 5) T_A = 85°C (Note 5) T_A = 25°C (Note 4)	I_D	-0.67 -0.48 -0.53	A
Pulsed Drain Current (Note 6)			I_{DM}	2.5	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	P_D	0.45	W
	(Note 5)		0.71	W
Thermal Resistance, Junction to Ambient	(Note 4)	$R_{\theta JA}$	275	°C/W
	(Note 5)		177	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
5. Device mounted on 25mm X 25mm square copper plate with FR-4 substrate PC board, 2oz copper
6. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.

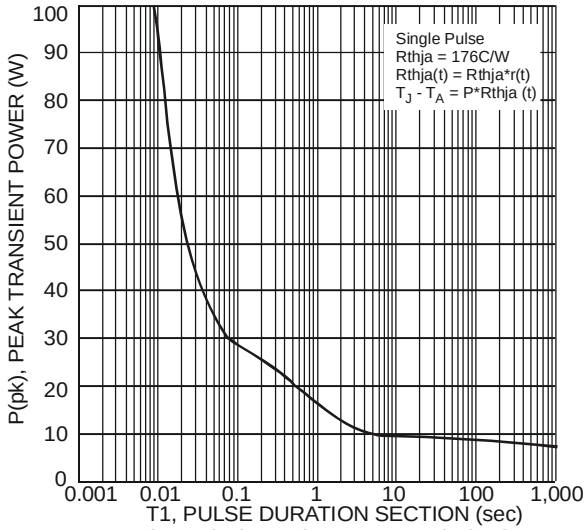


Fig. 1 Single Maximum Power Dissipation

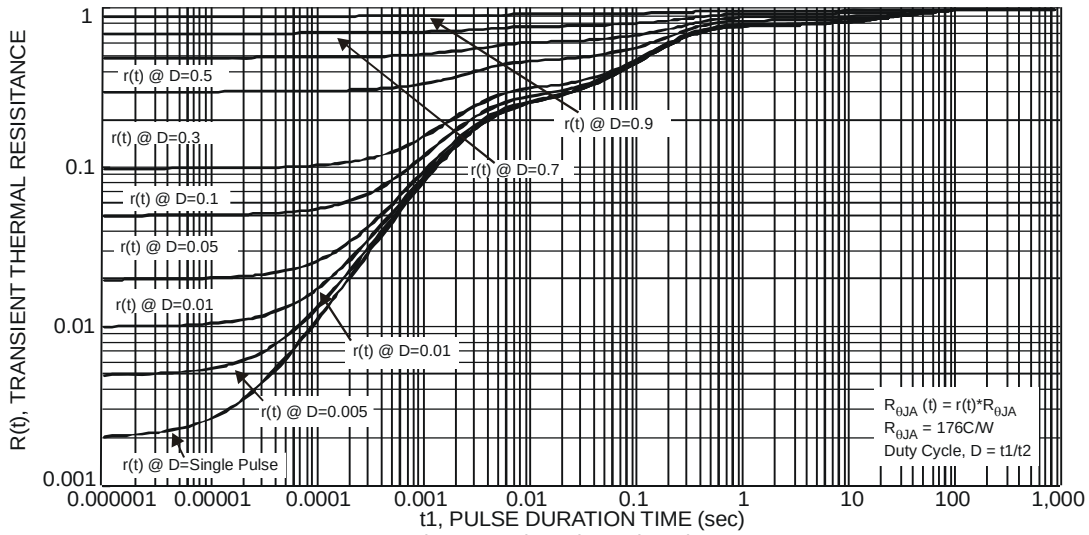


Fig. 2 Transient Thermal Resistance

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 = -250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	-1	µA	V_{DS} = -30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±3	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	-	1	Ω	V_{GS} = -4.5V, I_D = -400mA
				1.5		V_{GS} = -2.5V, I_D = -200mA
				2		V_{GS} = -1.8V, I_D = -100mA
Forward Transfer Admittance	$\|Y_{fs}\|$	50	-	-	mS	V_{DS} = -3V, I_D = -300mA
Diode Forward Voltage	V_{SD}	-	-	-1.2	V	V_{GS} = 0V, I_S = -300mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	-	76	-	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	9	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	6.43	-	pF	
Gate Resistance	R_g	-	166.9	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g		0.9	-	nC	V_{GS} = -4.5V, V_{DS} = -15V, I_D = -1A
Total Gate Charge	Q_g	-	1.5	-	nC	V_{GS} = -8V, V_{DS} = -15V, I_D = -1A
Gate-Source Charge	Q_{gs}	-	0.1	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.2	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	4.98	-	ns	V_{DD} = -10V, R_L = 10Ω, V_{GS} = -4.5V, R_G = 6Ω
Turn-On Rise Time	t_r	-	5.85	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	35.71	-	ns	
Turn-Off Fall Time	t_f	-	16.64	-	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.

Typical Electrical Characteristics

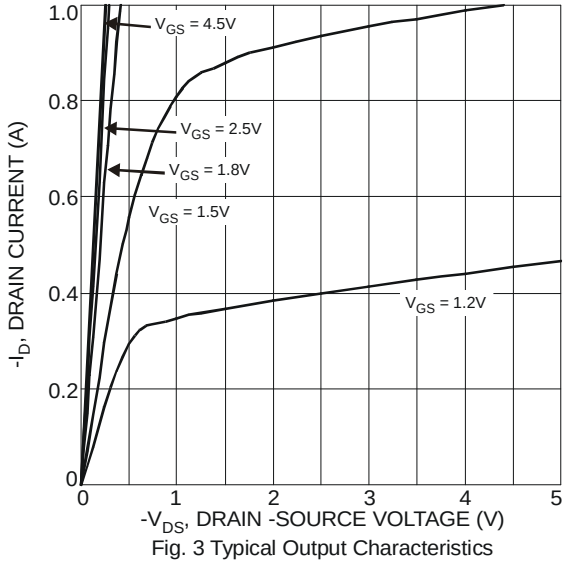


Fig. 3 Typical Output Characteristics

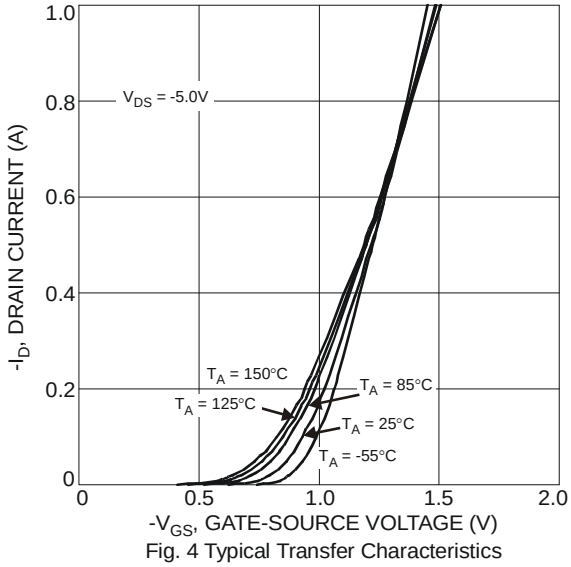


Fig. 4 Typical Transfer Characteristics

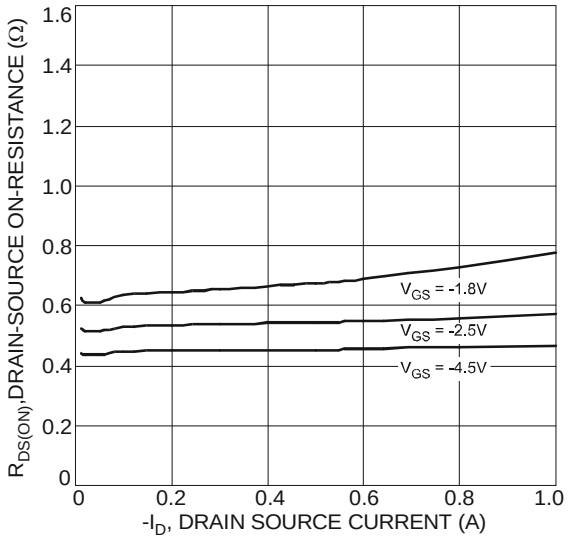


Fig. 5 Typical On-Resistance vs.
Drain Current and Gate Voltage

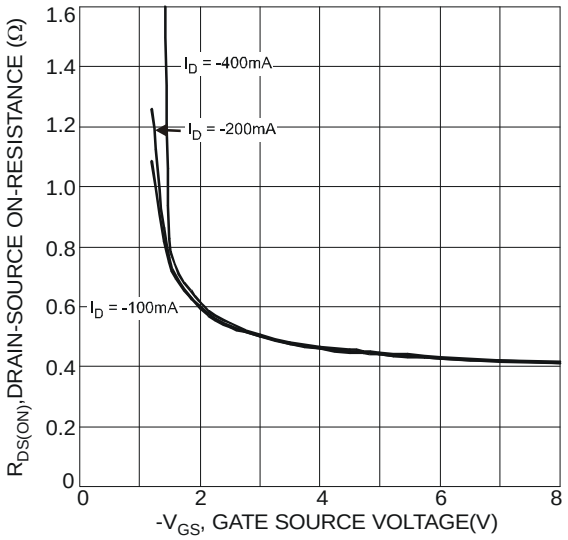


Fig. 6 Typical On-Resistance vs.
Drain Current and Gate Voltage

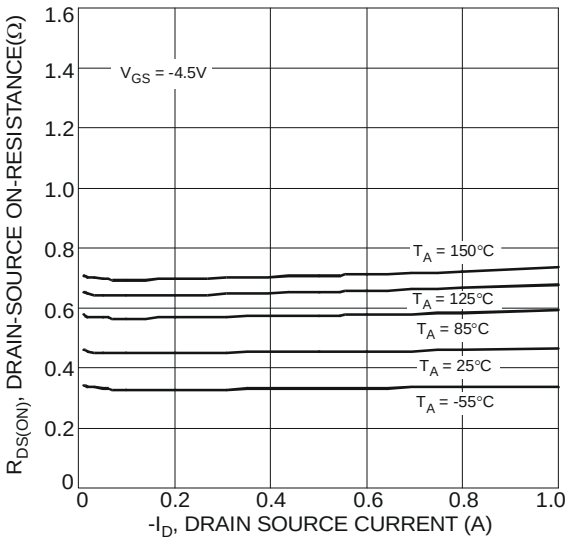


Fig. 7 Typical On-Resistance vs.
Drain Current and Temperature

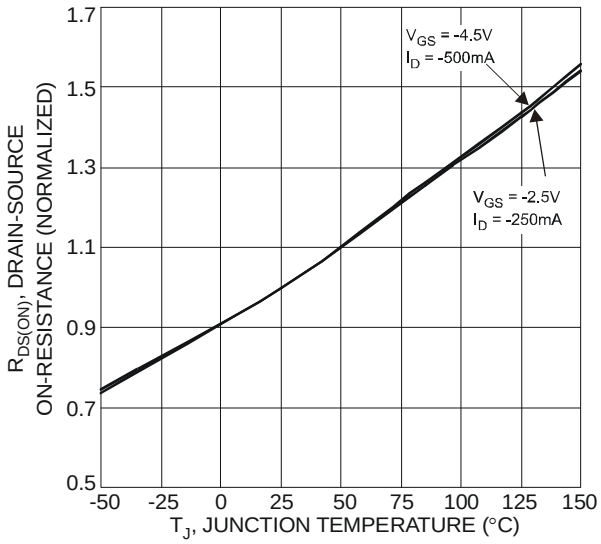


Fig. 8 On-Resistance Variation with Temperature

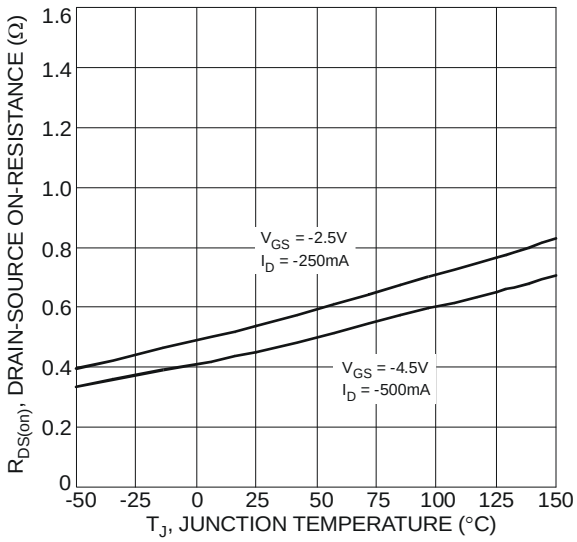


Fig. 9 On-Resistance Variation with Temperature

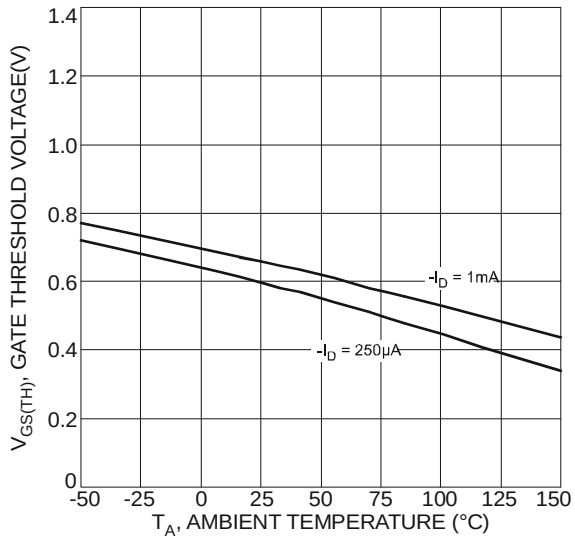


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

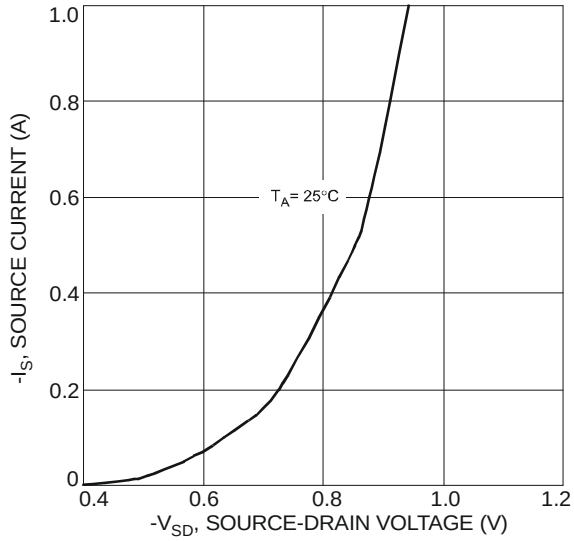


Fig. 11 Diode Forward Voltage vs. Current

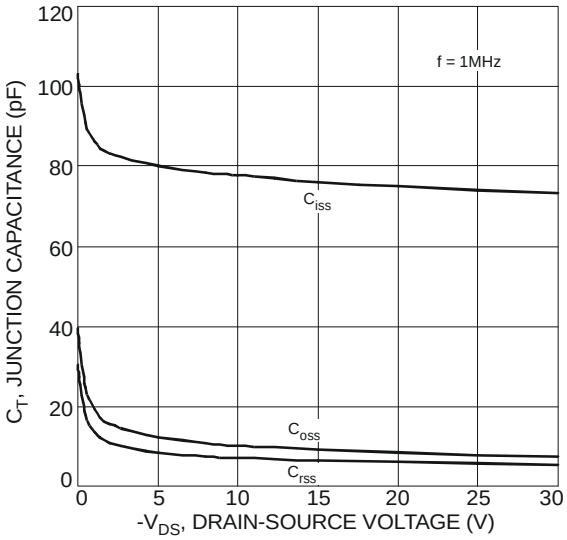


Fig. 12 Typical Junction Capacitance

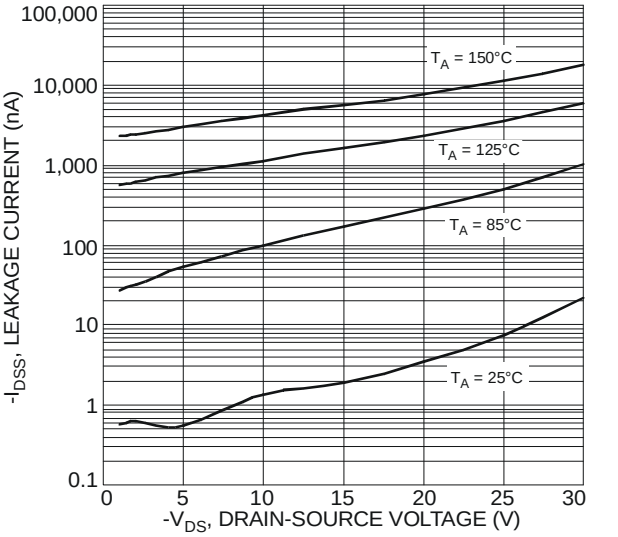


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

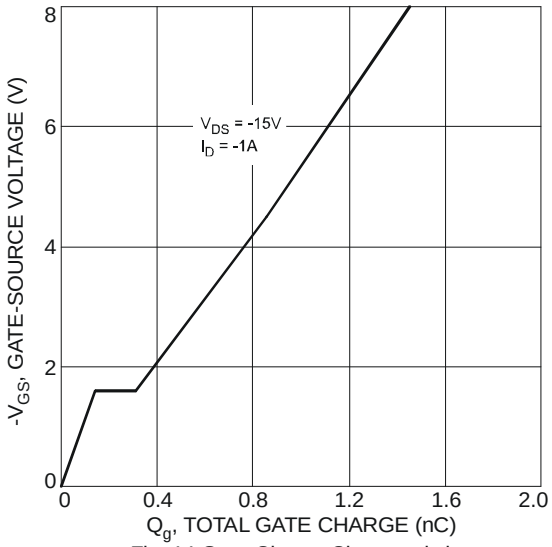
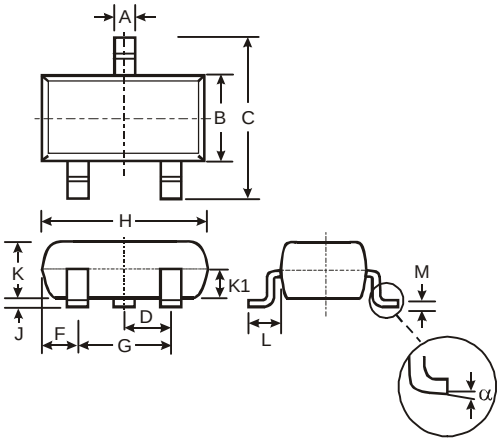


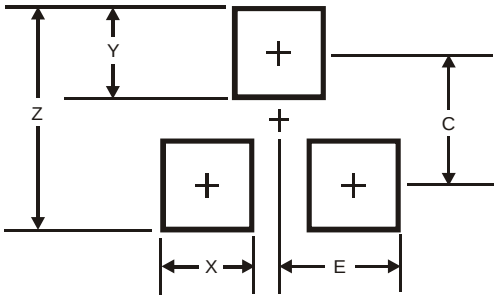
Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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