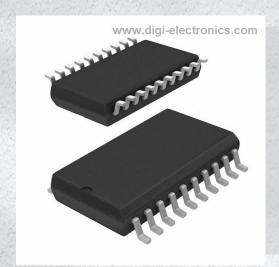


MC100EP17DWR2G Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number MC100EP17DWR2G-DG

Manufacturer onsemi

Manufacturer Product Number MC100EP17DWR2G

Description IC RCVR/DRV ECL QUAD DIFF 20SOIC

Detailed Description Differential Receiver/Driver IC 20-SOIC



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.



Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MC100EP17DWR2G	onsemi
Series:	Product Status:
100EP	Obsolete
Logic Type:	Supply Voltage:
Differential Receiver/Driver	3V ~ 5.5V
Number of Bits:	Operating Temperature:
4	-40°C ~ 85°C
Mounting Type:	Package / Case:
Surface Mount	20-SOIC (0.295", 7.50mm Width)
Supplier Device Package:	Base Product Number:
20-SOIC	100EP17

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
3 (168 Hours)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8542.39.0001



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3.3 V/5 V ECL Quad Differential Driver/Receiver MC10EP17, MC100EP17

Description

The MC10/100EP17 is a 4-bit differential line receiver based on the EP17 device. The > 3.0 GHz maximum frequency provided by the high frequency outputs makes the device ideal for buffering of very high speed oscillators.

The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

The design incorporates two stages of gain, internal to the device, making it an excellent choice for use in high bandwidth amplifier applications.

Inputs of unused gates can be left open and will not affect the operation of the rest of the device. All V_{CC} and V_{EE} pins must be externally connected to power supply to guarantee proper operation.

The 100 Series contains temperature compensation.

Features

- 220 ps Typical Propagation Delay
- Maximum Frequency > 3.0 GHz Typical
- PECL Mode Operating Range:
 - $V_{CC} = 3.0 \text{ V}$ to 5.5 V with $V_{EE} = 0 \text{ V}$
- NECL Mode Operating Range:
 - $V_{CC} = 0 \text{ V}$ with $V_{EE} = -3.0 \text{ V}$ to -5.5 V
- Open Input Default State
- Safety Clamp on Inputs
- Q Output Will Default LOW with Inputs Open or at V_{EE}
- V_{BB} Output
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



TSSOP-20 DT SUFFIX CASE 948E

MARKING DIAGRAM*

yyy = 10 or 100

A = Assembly Location

WL = Wafer Lot
 YY = Year
 WW = Work Week
 G = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
MC100EP17DTG	TSSOP-20 WB (Pb-Free)	75 Units / Tube

DISCONTINUED (Note 1)

MC10EP17DTG	TSSOP-20 WB	75 Units /
	(Pb-Free)	Tube

 DISCONTINUED: This device is not recommended for new design. Please contact your onsemi representative for information. The most current information on this device may be available on www.onsemi.com.

^{*}For additional marking information, refer to Application Note <u>AND8002/D</u>.

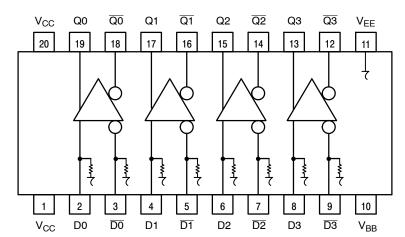


Table 1. PIN DESCRIPTION

PIN	FUNCTION
D[0:3]*, D[0:3]*	ECL Differential Data Inputs
Q[0:3], Q[0:3]	ECL Differential Data Outputs
V_{BB}	Reference Voltage Output
V _{CC}	Positive Supply
V _{EE}	Negative Supply

^{*} Pins will default LOW when left open.

Figure 1. 20-Lead Pinout (Top View) and Logic Diagram

Table 2. ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 kΩ
Internal Input Pullup Resistor	N/A
ESD Protection Human Body Model Machine Model Charged Device Model	> 2 kV > 100 V > 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Pb-Free Pkg
TSSOP-20 WB	Level 3
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	259 Devices
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

^{1.} For additional information, see Application Note AND8003/D.

Table 3. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V _{CC}	PECL Mode Power Supply	V _{EE} = 0 V		6	V
V _{EE}	NECL Mode Power Supply	V _{CC} = 0 V		-6	V
VI	PECL Mode Input Voltage NECL Mode Input Voltage	V _{EE} = 0 V V _{CC} = 0 V	$\begin{array}{c} V_I \leq V_{CC} \\ V_I \geq V_{EE} \end{array}$	6 -6	٧
l _{out}	Output Current	Continuous Surge		50 100	mA
I _{BB}	V _{BB} Sink/Source			± 0.5	mA
T _A	Operating Temperature Range			-40 to +85	°C
T _{stg}	Storage Temperature Range			-65 to +150	°C
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	TSSOP-20 WB	140 100	°C/W
θJC	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-20 WB	23 to 41	°C/W
T _{sol}	Wave Solder (Pb-Free)			265	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 4. 10EP DC CHARACTERISTICS, PECL ($V_{CC} = 3.3 \text{ V}$, $V_{EE} = 0 \text{ V}$ (Note 1))

		−40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	42	50	65	44	52	66	46	54	68	mA
V _{OH}	Output HIGH Voltage (Note 2)	2165	2290	2415	2230	2355	2480	2290	2415	2540	mV
V _{OL}	Output LOW Voltage (Note 2)	1365	1490	1615	1430	1555	1680	1490	1615	1740	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	2090		2415	2155		2480	2215		2540	mV
V_{IL}	Input LOW Voltage (Single-Ended)	365		1690	1430		1755	1490		1815	mV
V_{BB}	Output Voltage Reference	1790	1890	1990	1855	1955	2055	1915	2015	2115	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.0		3.3	2.0		3.3	2.0		3.3	٧
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.3 V to -2.2 V.
- All loading with 50 Ω to V_{CC} 2.0 V.
 V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 5. 10EP DC CHARACTERISTICS, PECL (V_{CC} = 5.0 V, V_{EE} = 0 V (Note 1))

		-40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	42	50	65	44	52	66	46	54	68	mA
V _{OH}	Output HIGH Voltage (Note 2)	3865	3990	4115	3930	4055	4180	3990	4115	4240	mV
V _{OL}	Output LOW Voltage (Note 2)	3065	3190	3315	3130	3255	3380	3190	3315	3440	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3790		4115	3855		4180	3915		4240	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3065		3390	3130		3455	3190		3515	mV
V_{BB}	Output Voltage Reference	3490	3590	3690	3555	3655	3755	3615	3715	3815	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.0		5.0	2.0		5.0	2.0		5.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.
- 2. All loading with 50 Ω to V_{CC} 2.0 V.

 3. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 6. 10EP DC CHARACTERISTICS, NECL ($V_{CC} = 0 \text{ V}$; $V_{EE} = -5.5 \text{ V}$ to -3.0 V (Note 1))

			-40°C		25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	42	50	65	44	52	66	46	54	68	mA
VOH	Output HIGH Voltage (Note 2)	-1135	-1010	-885	-1070	-945	-820	-1010	-885	-760	mV
V _{OL}	Output LOW Voltage (Note 2)	-1935	-1810	-1685	-1870	-1745	-1620	-1810	-1685	-1560	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1210		-885	-1145		-820	-1085		-760	mV
V _{IL}	Input LOW Voltage (Single-Ended)	-1935		-1610	-1870		-1545	-1810		-1485	mV
V_{BB}	Output Voltage Reference	-1510	-1410	-1310	-1445	-1345	-1245	-1385	-1285	-1185	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	V _{EE} + 2.0		0.0	V _{EE} + 2.0		0.0 V _{EE}		+ 2.0 0.0		V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC}.
- All loading with 50 Ω to V_{CC} 2.0 V.
 V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 7. 100EP DC CHARACTERISTICS, PECL (V_{CC} = 3.3 V, V_{EE} = 0 V (Note 1))

		−40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	47	55	63	50	58	66	54	62	70	mA
V _{OH}	Output HIGH Voltage (Note 2)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V _{OL}	Output LOW Voltage (Note 2)	1355	1480	1605	1355	1480	1605	1355	1480	1605	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	2075		2420	2075		2420	2075		2420	mV
V_{IL}	Input LOW Voltage (Single-Ended)	1355		1675	1355		1675	1355		1675	mV
V_{BB}	Output Voltage Reference	1775	1875	1975	1775	1875	1975	1775	1875	1975	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.0		3.3	2.0		3.3	2.0		3.3	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.3 V to -2.2 V.
- 2. All loading with 50 Ω to V_{CC} 2.0 V.
- 3. VIHCMR min varies 1:1 with VEE, VIHCMR max varies 1:1 with VCC. The VIHCMR range is referenced to the most positive side of the differential

Table 8. 100EP DC CHARACTERISTICS, PECL ($V_{CC} = 5.0 \text{ V}$, $V_{EE} = 0 \text{ V}$ (Note 1))

		−40°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	47	55	63	50	58	66	54	62	70	mA
V _{OH}	Output HIGH Voltage (Note 2)	3855	3980	4105	3855	3980	4105	3855	3980	4105	mV
V_{OL}	Output LOW Voltage (Note 2)	3055	3180	3305	3055	3180	3305	3055	3180	3305	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3775		4120	3775		4120	3775		4120	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3055		3375	3055		3375	3055		3375	mV
V_{BB}	Output Voltage Reference	3475	3575	3675	3475	3575	3675	3475	3575	3675	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	2.0		5.0	2.0		5.0	2.0		5.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.
- All loading with 50 Ω to V_{CC} 2.0 V.
 V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 9. 100EP DC CHARACTERISTICS, NECL (V_{CC} = 0 V; V_{EE} = -5.5 V to -3.0 V (Note 1))

		-40°C 25°C			85°C						
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	47	55	63	50	58	66	54	62	70	mA
V _{OH}	Output HIGH Voltage (Note 2)	-1145	-1020	-895	-1145	-1020	-895	-1145	-1020	-895	mV
V _{OL}	Output LOW Voltage (Note 2)	-1945	-1820	-1695	-1945	-1820	-1695	-1945	-1820	-1695	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1225		-880	-1225		-880	-1225		-880	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1945		-1625	-1945		-1625	-1945		-1625	mV
V_{BB}	Output Voltage Reference	-1525	-1425	-1325	-1525	-1425	-1325	-1525	-1425	-1325	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 3)	V _{EE}	+ 2.0	0.0	V _{EE}	+ 2.0	0.0	V _{EE}	+ 2.0	0.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current	0.5			0.5			0.5			μΑ

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

- 1. Input and output parameters vary 1:1 with V $_{CC}$. 2. All loading with 50 Ω to V $_{CC}$ 2.0 V.
- 3. V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

 $\textbf{Table 10. AC CHARACTERISTICS ($V_{CC}=0$ V; $V_{EE}=-3.0$ V to -5.5 V or $V_{CC}=3.0$ V to 5.5 V; $V_{EE}=0$ V (Note 1)$}$

		−40°C		25°C			85°C				
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
f _{max}	Maximum Frequency (Figure 2)		> 3			> 3			> 3		GHz
t _{PLH} , t _{PHL}	Propagation Delay to Output Differential 10 Series 100 Series	125 150	200 220	275 300	150 180	220 250	300 320	200 200	260 290	350 360	ps
UITTER	CLOCK Random Jitter (RMS) @ ≤ 1.0 GHz @ ≤ 1.5 GHz @ ≤ 2.0 GHz @ ≤ 2.5 GHz @ ≤ 3.0 GHz		0.132 0.143 0.148 0.129 0.129	0.2 0.3 0.3 0.3 0.3		0.147 0.159 0.146 0.131 0.142	0.2 0.3 0.3 0.3 0.3		0.154 0.156 0.169 0.147 0.168	0.3 0.3 0.3 0.3 0.3	ps
V _{PP}	Input Voltage Swing (Differential Configuration)	150	800	1200	150	800	1200	150	800	1200	mV
t _r t _f	Output Rise/Fall Times Q, (20% – 80%)	100	160	220	100	170	230	120	190	250	ps

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

1. Measured using a 750 mV source, 50% duty cycle clock source. All loading with 50 Ω to V_{CC} – 2.0 V.

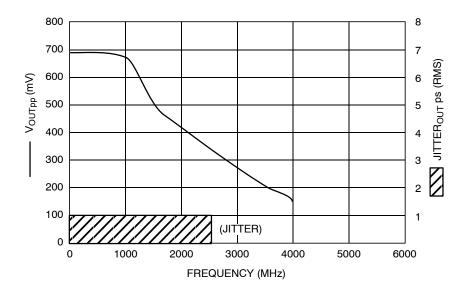


Figure 2. F_{max}/Jitter

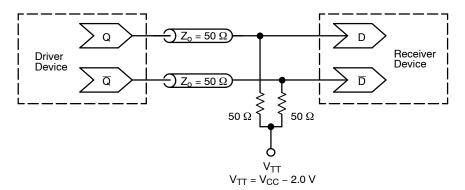


Figure 3. Typical Termination for Output Driver and Device Evaluation (See Application Note <u>AND8020/D</u> – Termination of ECL Logic Devices.)

Resource Reference of Application Notes

AN1405/D - ECL Clock Distribution Techniques

AN1406/D - Designing with PECL (ECL at +5.0 V)

AN1503/D - ECLinPS™ I/O SPiCE Modeling Kit

AN1504/D - Metastability and the ECLinPS Family

AN1568/D - Interfacing Between LVDS and ECL

AND8001/D - The ECL Translator Guide

AND8001/D - Odd Number Counters Design

AND8002/D - Marking and Date Codes

AND8020/D - Termination of ECL Logic Devices

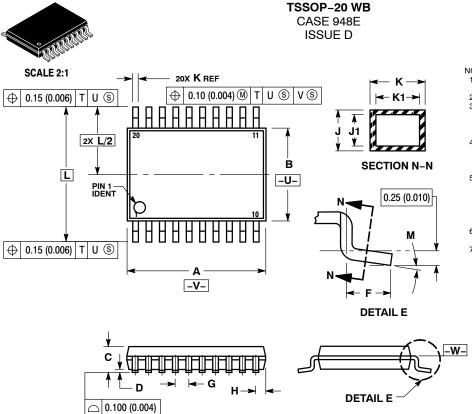
AND8066/D - Interfacing with ECLinPS

AND8090/D - AC Characteristics of ECL Devices



MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS



DATE 17 FEB 2016

NOTES:

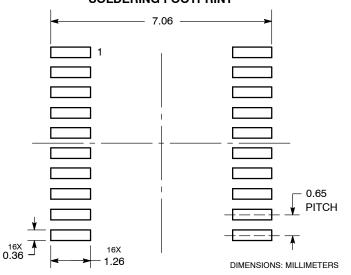
- NOTES:
 DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 CONTROLLING DIMENSION: MILLIMETER.
 DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT
- EXCEED 0.15 (0.006) PER SIDE.

 4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION.
 INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
 DIMENSION K DOES NOT INCLUDE
- DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K
 DIMENSION AT MAXIMUM MATERIAL CONDITION.
 TERMINAL NUMBERS ARE SHOWN FOR
- REFERENCE ONLY.
 DIMENSION A AND B ARE TO BE
 DETERMINED AT DATUM PLANE –W-.

	MILLIN	IETERS	INCHES			
DIM	MIN	MAX	MIN	MAX		
Α	6.40	6.60	0.252	0.260		
В	4.30	4.50	0.169	0.177		
С		1.20		0.047		
D	0.05	0.15	0.002	0.006		
F	0.50	0.75	0.020	0.030		
G	0.65 BSC		0.026 BSC			
Н	0.27	0.37	0.011	0.015		
7	0.09	0.20	0.004	0.008		
J1	0.09	0.16	0.004	0.006		
K	0.19	0.30	0.007	0.012		
K1	0.19	0.25	0.007	0.010		
L	6.40	BSC	0.252 BSC			
М	n°	ο ο	n٥	00		

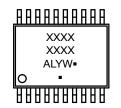
RECOMMENDED SOLDERING FOOTPRINT*

-T- SEATING



^{*}For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



= Assembly Location

= Wafer Lot

= Year

= Work Week

= Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ", may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	TSSOP-20 WB		PAGE 1 OF 1			

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