Document Number: A2T18S261W12N
Rev. 0, 11/2016

vRoHS

RF Power LDMOS Transistor

N-Channel Enhancement-Mode Lateral MOSFET

This 56 W RF power LDMOS transistor is designed for cellular base station applications requiring very wide instantaneous bandwidth capability covering the frequency range of 1805 to 1880 MHz.

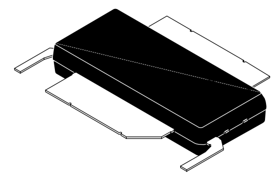
A2T18S261W12NR3

1805–1880 MHz, 56 W AVG., 28 V AIRFAST RF POWER LDMOS TRANSISTOR

1800 MHz

- Typical Single-Carrier W-CDMA Performance: V_{DD} = 28 Vdc, I_{DQ} = 1500 mA, P_{out} = 56 W Avg., Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

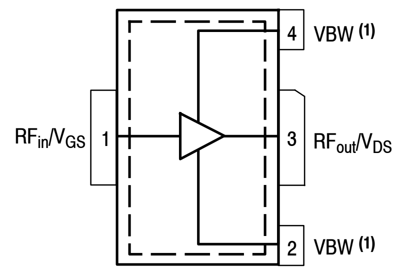
Frequency	G_{ps} (dB)	η_D (%)	Output PAR (dB)	ACPR (dBc)	IRL (dB)
1805 MHz	17.7	34.2	7.0	–35.1	–15
1840 MHz	18.1	34.1	7.1	–35.2	–13
1880 MHz	18.2	34.8	7.1	–34.6	–10



OM-880X-2L2L PLASTIC

Features

- Designed for wide instantaneous bandwidth applications
- Greater negative gate-source voltage range for improved Class C operation
- Able to withstand extremely high output VSWR and broadband operating conditions
- Optimized for Doherty applications



(Top View)

Note: Exposed backside of the package is the source terminal for the transistor.

Figure 1. Pin Connections

1. Device can operate with V_{DD} current supplied through pin 2 and pin 4 as long as the device's average output power is less than 90 watts.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	–0.5, +65	Vdc
Gate-Source Voltage	V_{GS}	–6.0, +10	Vdc
Operating Voltage	V_{DD}	32, +0	Vdc
Storage Temperature Range	T_{stg}	–65 to +150	°C
Case Operating Temperature Range	T_C	–40 to +125	°C
Operating Junction Temperature Range [1,2]	T_J	–40 to +225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value [2,3]	Unit
Thermal Resistance, Junction to Case Case Temperature 81°C, 56 W CW, 28 Vdc, I_{DQ} = 1500 mA, 1840 MHz	$R_{\theta JC}$	0.23	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22-A114)	2
Charge Device Model (per JESD22-C101)	C3

Table 4. Moisture Sensitivity Level

Test Methodology	Rating	Package Peak Temperature	Unit
Per JESD22-A113, IPC/JEDEC J-STD-020	3	260	°C

Table 5. Electrical Characteristics (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Off Characteristics					
Zero Gate Voltage Drain Leakage Current (V_{DS} = 65 Vdc, V_{GS} = 0 Vdc)	I_{DSS}	—	—	10	μAdc
Zero Gate Voltage Drain Leakage Current (V_{DS} = 32 Vdc, V_{GS} = 0 Vdc)	I_{DSS}	—	—	5	μAdc
Gate-Source Leakage Current (V_{GS} = 5 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	—	—	1	μAdc
On Characteristics					
Gate Threshold Voltage (V_{DS} = 10 Vdc, I_D = 300 μAdc)	$V_{GS(th)}$	1.4	1.8	2.2	Vdc
Gate Quiescent Voltage (V_{DD} = 28 Vdc, I_D = 1500 mAdc, Measured in Functional Test)	$V_{GS(Q)}$	2.1	2.6	2.9	Vdc
Drain-Source On-Voltage (V_{GS} = 10 Vdc, I_D = 3 Adc)	$V_{DS(on)}$	0.05	0.17	0.3	Vdc

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at http://www.nxp.com/RF/calculators.
3. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers.* Go to http://www.nxp.com/RF and search for AN1955.

(continued)

Table 5. Electrical Characteristics (T_A = 25°C unless otherwise noted) **(continued)**

Characteristic	Symbol	Min	Typ	Max	Unit
Functional Tests [1] (In NXP Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 1500 mA, P_{out} = 56 W Avg., f = 1880 MHz, Single-Carrier W-CDMA, IQ Magnitude Clipping, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @ ±5 MHz Offset.					
Power Gain	G_{ps}	17.0	18.2	19.5	dB
Drain Efficiency	η_D	31.5	34.8	—	%
Output Peak-to-Average Ratio @ 0.01% Probability on CCDF	PAR	6.5	7.1	—	dB
Adjacent Channel Power Ratio	ACPR	—	–34.6	–31.5	dBc
Input Return Loss	IRL	—	–10	–8	dB
Load Mismatch (In NXP Test Fixture, 50 ohm system) I_{DQ} = 1500 mA, f = 1840 MHz, 12 μsec(on), 10% Duty Cycle					
VSWR 10:1 at 32 Vdc, 295 W Pulsed CW Output Power (3 dB Input Overdrive from 251 W Pulsed CW Rated Power)	No Device Degradation				
Typical Performance (In NXP Test Fixture, 50 ohm system) V_{DD} = 28 Vdc, I_{DQ} = 1500 mA, 1805–1880 MHz Bandwidth					
P_{out} @ 1 dB Compression Point, Pulsed CW	P1dB	—	280	—	W
AM/PM (Maximum value measured at the P3dB compression point across the 1805–1880 MHz frequency range.)	Φ	—	–13	—	°
VBW Resonance Point (IMD Third Order Intermodulation Inflection Point)	VBW_{res}	—	100	—	MHz
Gain Flatness in 75 MHz Bandwidth @ P_{out} = 56 W Avg.	G_F	—	0.5	—	dB
Gain Variation over Temperature (–30°C to +85°C)	ΔG	—	0.011	—	dB/°C
Output Power Variation over Temperature (–30°C to +85°C)	$\Delta P1dB$	—	0.005	—	dB/°C

Table 6. Ordering Information

Device	Tape and Reel Information	Package
A2T18S261W12NR3	R3 Suffix = 250 Units, 56 mm Tape Width, 13-inch Reel	OM-880X-2L2L

1. Part internally matched both on input and output.

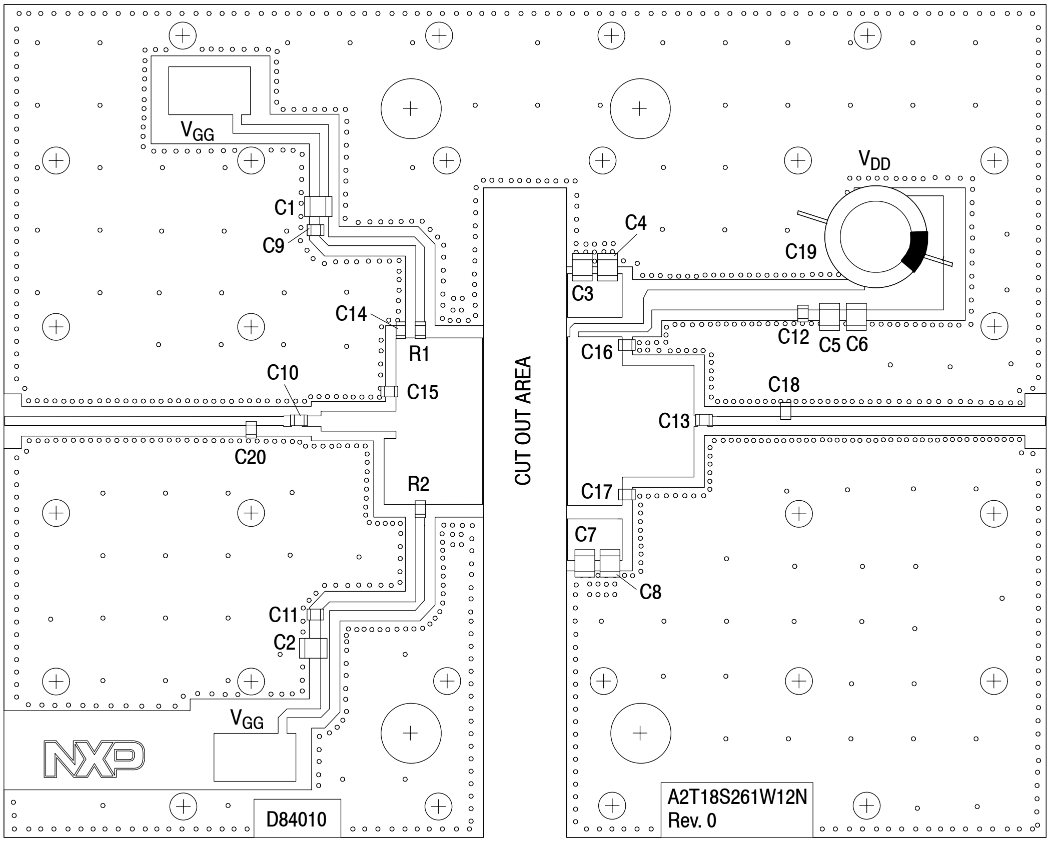
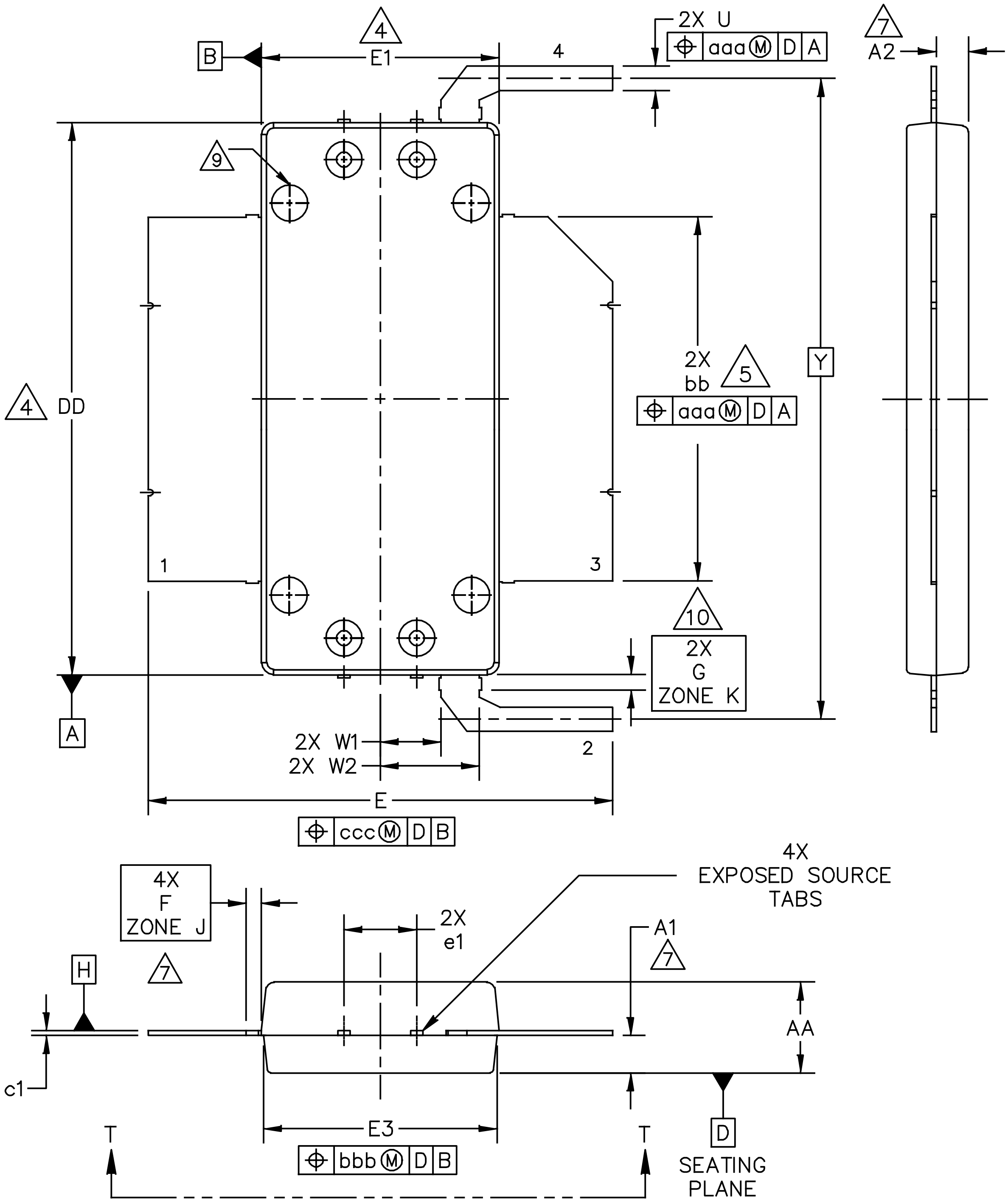


Figure 2. A2T18S261W12NR3 Test Circuit Component Layout

Table 7. A2T18S261W12NR3 Test Circuit Component Designations and Values

Part	Description	Part Number	Manufacturer
C1, C2, C3, C4, C5, C6, C7, C8	4.7 μF Chip Capacitor	C4532X7S2A475M230KB	TDK
C9, C10, C11, C12, C13	15 pF Chip Capacitor	GQM2195C2E150FB12D	Murata
C14	0.9 pF Chip Capacitor	GQM2195C2ER90BB12D	Murata
C15, C18	1 pF Chip Capacitor	GQM2195C2E1R0BB12D	Murata
C16, C17	1.3 pF Chip Capacitor	GQM2195C2E1R3BB12D	Murata
C19	470 μF, 63 V Electrolytic Capacitor	MCGPR63V477M13X26-RH	Multicomp
C20	0.5 pF Chip Capacitor	GQM2195C2ER50BB12D	Murata
R1, R2	2.2 Ω, 1/4 W Chip Resistor	WCR0805-2R2FI	Welwyn
PCB	Rogers RO4350B, 0.020″, ε_r = 3.66	D84010	MTL

PACKAGE DIMENSIONS



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		STANDARD: NON–JEDEC	
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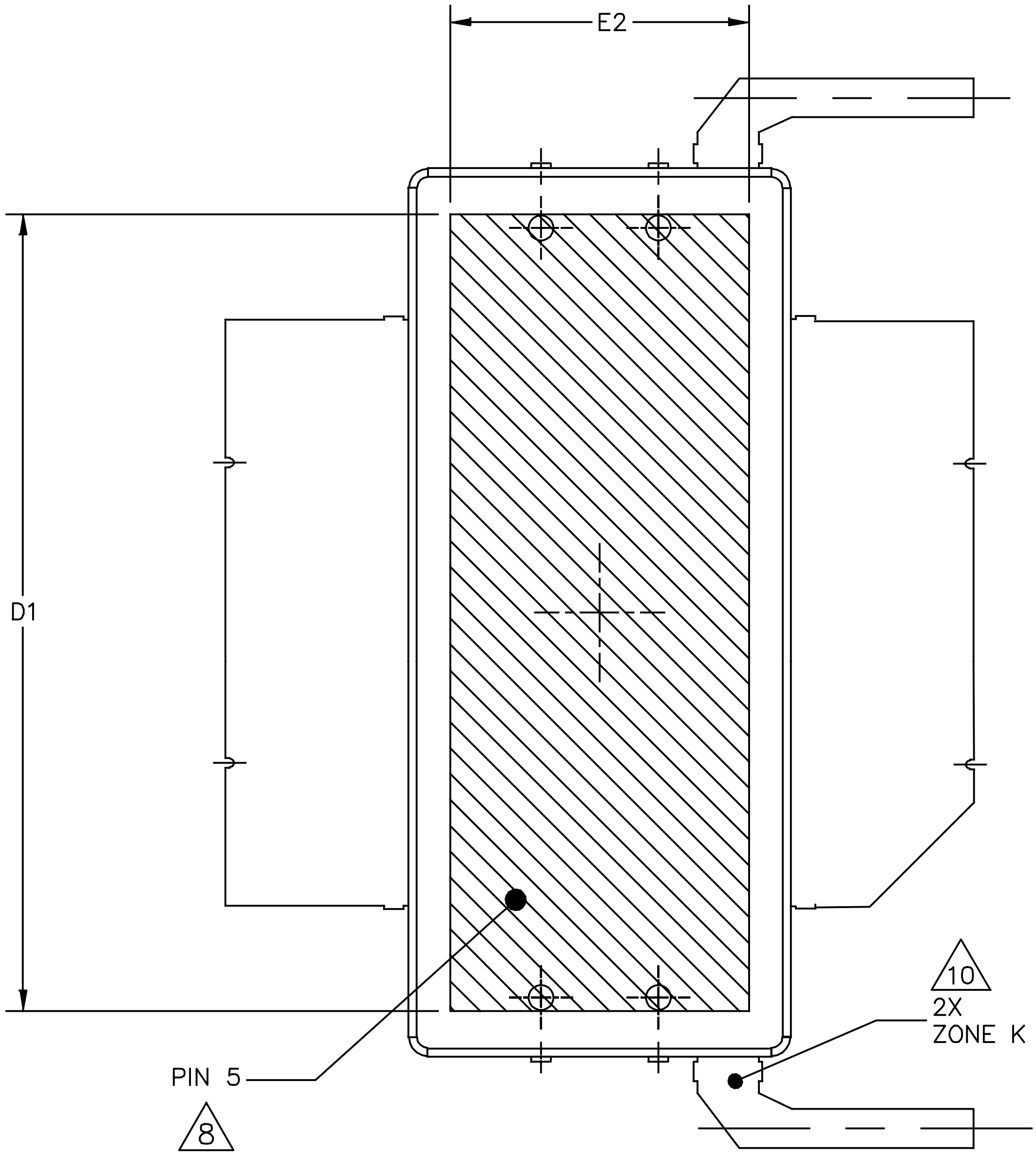

BOTTOM VIEW
VIEW T–T

	MECHANICAL OUTLINE	PRINT VERSION NOT TO SCALE
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NOTES:

1. CONTROLLING DIMENSION: INCH

2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.

3. DATUM PLANE H IS LOCATED AT TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.

4. DIMENSIONS DD AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 INCH (0.15 MM) PER SIDE. DIMENSIONS DD AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.

5. DIMENSION bb DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 INCH (0.13 MM) TOTAL IN EXCESS OF THE bb DIMENSION AT MAXIMUM MATERIAL CONDITION.

6. DATUMS A AND B TO BE DETERMINED AT DATUM PLANE H.

7. DIMENSIONS A1 AND A2 APPLIES WITHIN ZONE J ONLY. A1 APPLIES TO PINS 1 AND 3. A2 APPLIES TO PINS 2 AND 4.

8. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG. THE DIMENSIONS D1 AND E2 REPRESENT THE VALUES BETWEEN THE TWO OPPOSITE POINTS ALONG THE EDGES OF EXPOSED AREA OF HEAT SLUG.

9. DIMPLED HOLE REPRESENTS INPUT SIDE.

10. ZONE K REPRESENTS NON-SOLDERABLE REGION WHERE MOLD FLASH AND RESIN BLEED ARE PERMITTED ON BOTH SIDES OF THE LEADS.

DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX	DIM	INCH MIN	INCH MAX	MILLIMETER MIN	MILLIMETER MAX
AA	.148	.152	3.76	3.86	W1	.095	.105	2.41	2.67
A1	.059	.065	1.50	1.65	W2	.158	.168	4.01	4.27
A2	.056	.068	1.42	1.73	U	.037	.043	0.94	1.09
DD	.908	.912	23.06	23.16	Y	1.056 BSC		26.82 BSC	
D1	.816	----	20.73	----	bb	.597	.603	15.16	15.32
E	.762	.770	19.35	19.56	c1	.007	.011	0.18	0.28
E1	.390	.394	9.91	10.01	e1	.116	.124	2.95	3.15
E2	.306	----	7.77	----					
E3	.383	.387	9.73	9.83	aaa	.004		0.10	
F	.025 BSC		0.64 BSC		bbb	.006		0.15	
G	.030 BSC		0.76 BSC		ccc	.010		0.25	

MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE

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PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following resources to aid your design process.

Application Notes

- AN1907: Solder Reflow Attach Method for High Power RF Devices in Over-Molded Plastic Packages
- AN1955: Thermal Measurement Methodology of RF Power Amplifiers

Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

Software

- Electromigration MTTF Calculator

Development Tools

- Printed Circuit Boards

To Download Resources Specific to a Given Part Number:

1. Go to http://www.nxp.com/RF
2. Search by part number
3. Click part number link
4. Choose the desired resource from the drop down menu

REVISION HISTORY

The following table summarizes revisions to this document.

Revision	Date	Description
0	Nov. 2016	• Initial release of data sheet

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