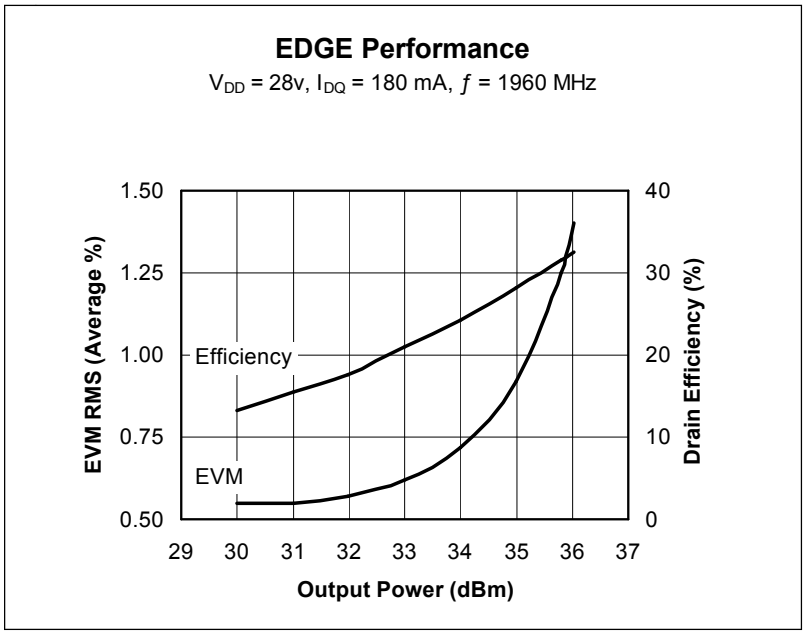
High Power RF LDMOS Field Effect Transistor
10 W, 1.0 – 2.0 GHz

Description

The PTF180101M is an unmatched 10-watt *GOLDMOS*® FET intended for class AB base station applications in the 1 to 2 GHz band. This LDMOS device offers excellent gain, efficiency and linearity performance in a small footprint.

PTF180101M
Package PG-RFP-10



Features

- Typical EDGE performance
  - Average output power = 4.0 W
  - Gain = 17 dB
  - Efficiency = 31%
  - EVM = 1.3 %
- Typical CW performance
  - Output Power at P–1dB = 10 W
  - Gain = 16 dB
  - Efficiency = 50%
- Integrated ESD protection: Human Body Model Class 1 (minimum)
- Excellent thermal stability
- Low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 10 W (CW) output power
- Pb-free and RoHS compliant

RF Characteristics

Two-Tone Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)
V_{DD} = 28 V, I_{DQ} = 180 mA, P_{OUT} = 10 W PEP, f = 1990 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	16.5	—	—	dB
Drain Efficiency	η_D	35	—	—	%
Intermodulation Distortion	IMD	—	—	–28	dBc

All published data at T_{CASE} = 25°C unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 µA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 A	$R_{DS(on)}$	—	0.83	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 180 mA	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–0.5 to +12	V
Junction Temperature	T_J	150	°C
Total Device Dissipation	P_D	18.8	W
Above 25°C derate by		0.15	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 10 W DC)	$R_{\theta JC}$	6.5	°C/W

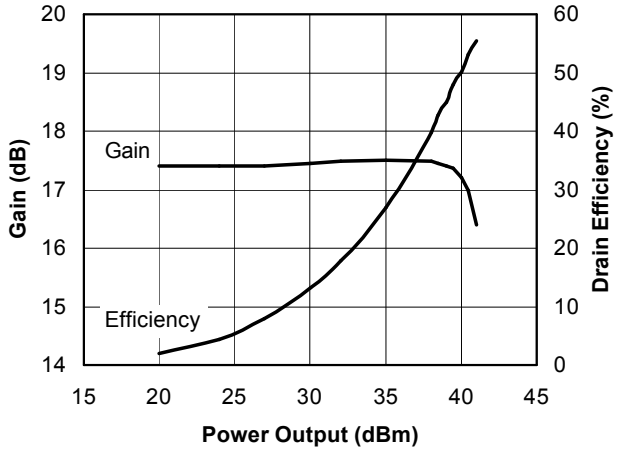
Ordering Information

Type	Package Outline	Package Description	Marking
PTF180101M	PG-RFP-10	Molded plastic, SMD	0181

Typical Performance (data taken in production test fixture)

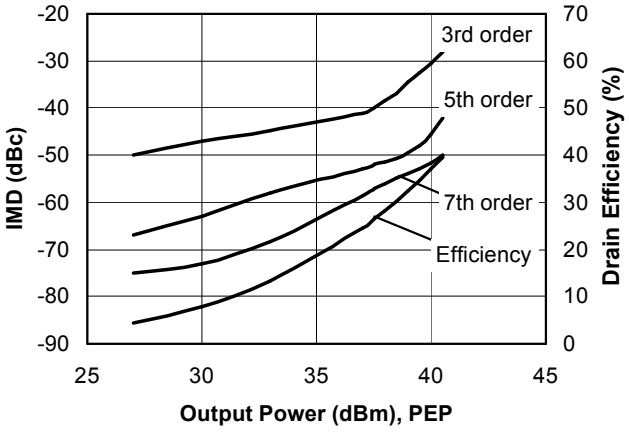
CW Performance

V_{DD} = 28 V, I_{DQ} = 180 mA, f = 1960 MHz



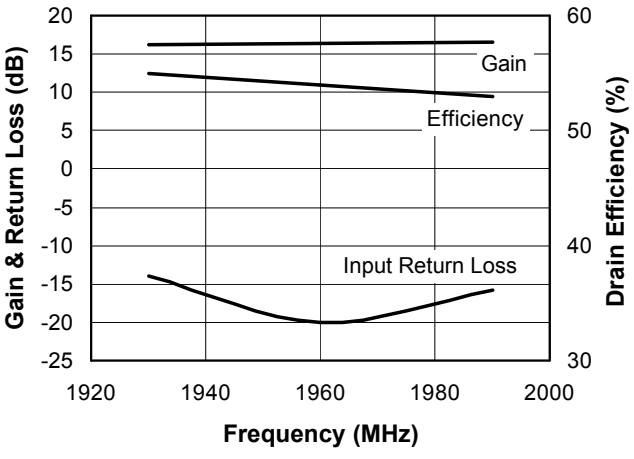
Two-Tone Performance

V_{DD} = 28 V, I_{DQ} = 180 mA, f = 1960/1961 MHz



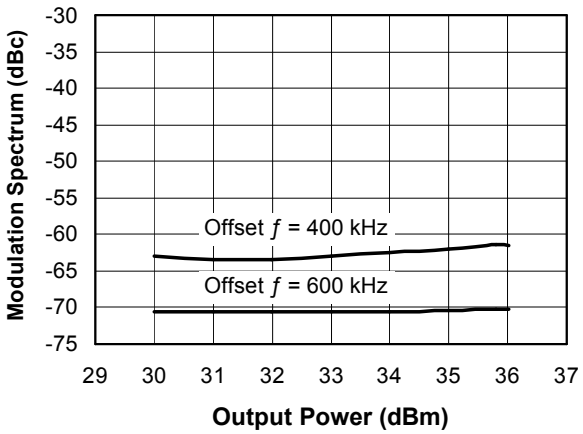
P–1dB Broadband Performance

V_{DD} = 28 V, I_{DQ} = 180 mA

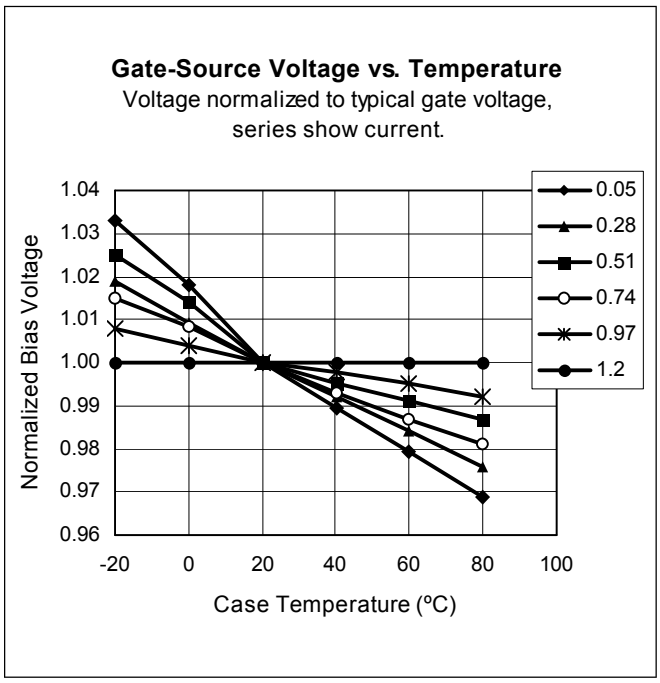


EDGE Performance

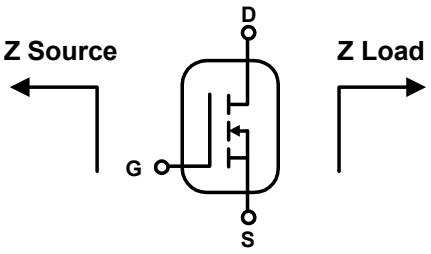
V_{DD} = 28 V, I_{DQ} = 180 mA, f = 1960 MHz



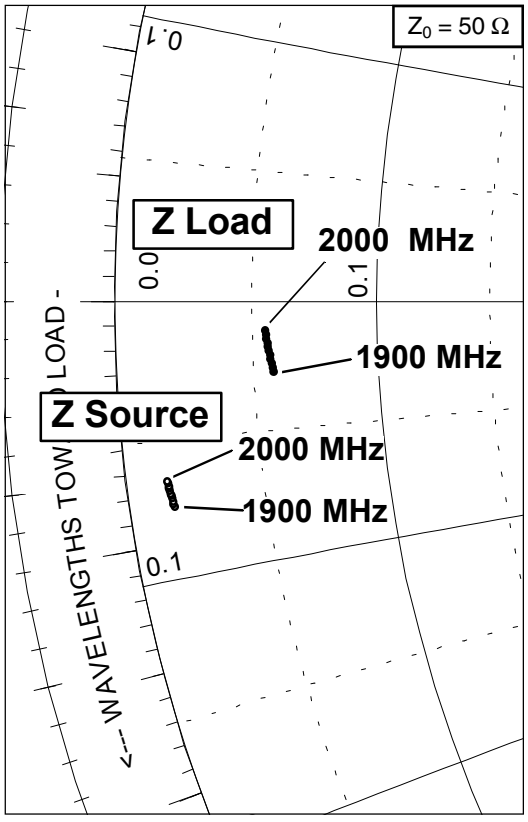
Typical Performance (cont.)



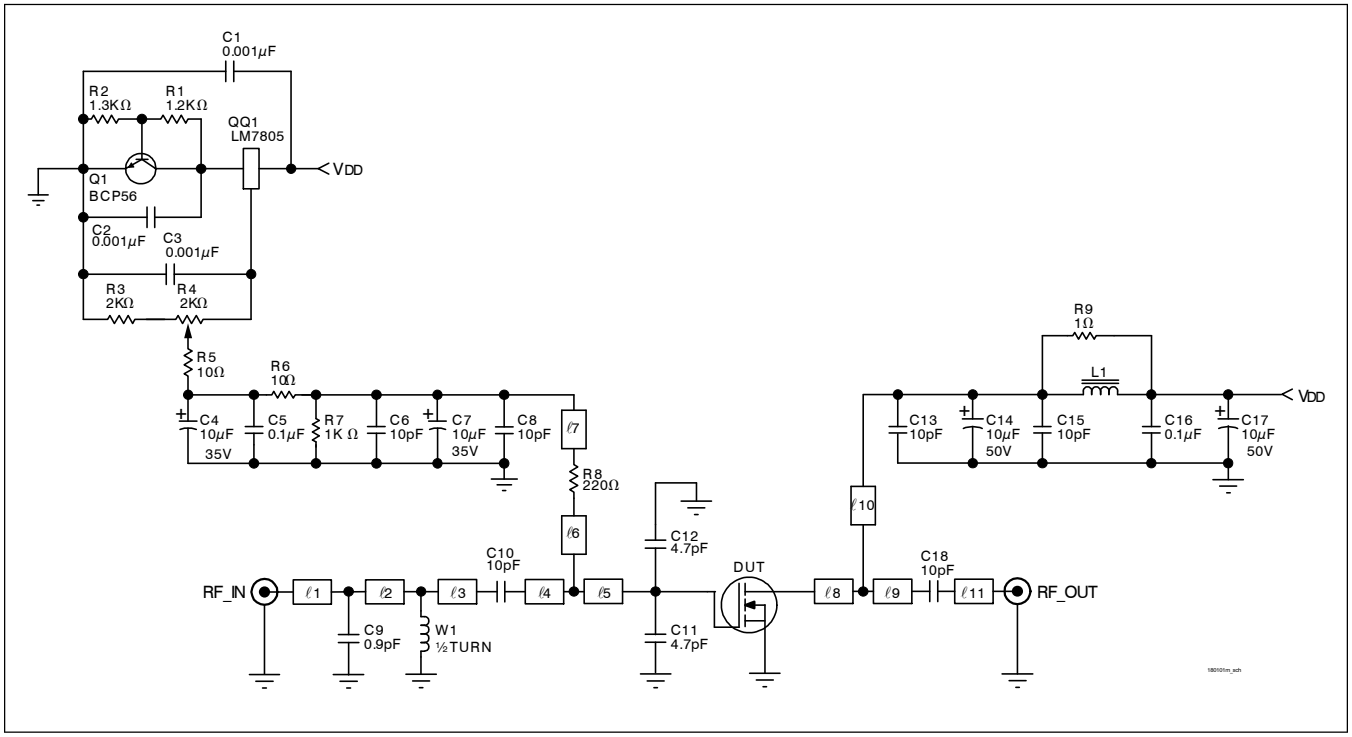
Broadband Circuit Impedance



Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
1900	0.80	-3.71	2.89	-1.38
1910	0.79	-3.66	2.88	-1.30
1920	0.79	-3.61	2.87	-1.21
1930	0.78	-3.56	2.85	-1.13
1940	0.77	-3.51	2.84	-1.05
1950	0.77	-3.47	2.82	-0.97
1960	0.76	-3.42	2.81	-0.89
1970	0.75	-3.37	2.80	-0.81
1980	0.75	-3.33	2.78	-0.73
1990	0.74	-3.28	2.77	-0.65
2000	0.74	-3.24	2.76	-0.57



Reference Circuit



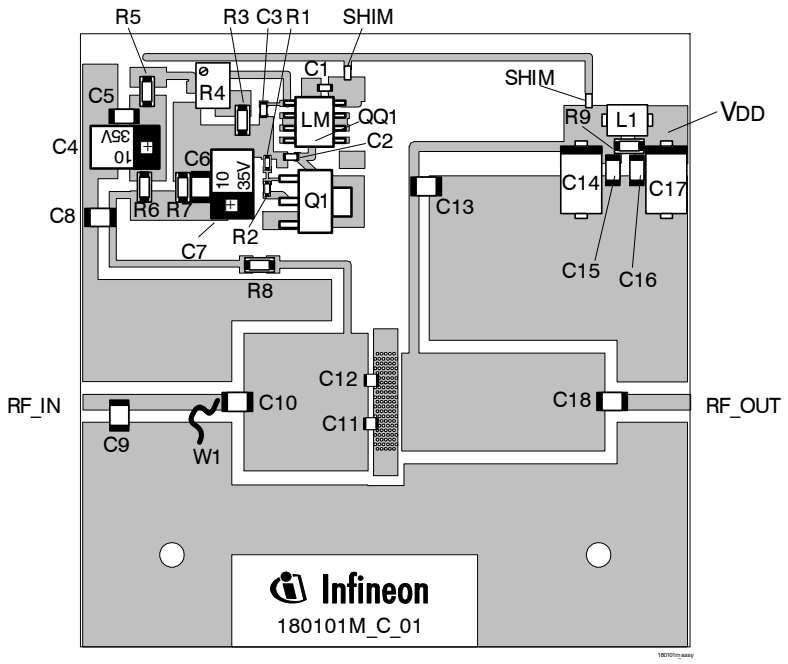
Reference circuit schematic for ƒ = 1990 MHz

Circuit Assembly Information			
DUT	PTF180101M	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, ε_r = 4.5	Rogers RO4320	2 oz. copper

Microstrip	Electrical Characteristics at 1990 MHz[1]	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.059 λ, 50.0 Ω	5.69 x 1.60	0.224 x 0.063
ℓ2	0.093 λ, 50.0 Ω	8.48 x 1.60	0.334 x 0.063
ℓ3	0.016 λ, 50.0 Ω	1.09 x 1.60	0.043 x 0.063
ℓ4	0.129 λ, 9.6 Ω	10.77 x 14.22	0.424 x 0.560
ℓ5	0.026 λ, 9.6 Ω	2.13 x 14.22	0.084 x 0.560
ℓ6	0.153 λ, 78.0 Ω	14.48 x 0.71	0.570 x 0.028
ℓ7	0.194 λ, 78.0 Ω	18.39 x 0.71	0.724 x 0.028
ℓ8	0.014 λ, 12.9 Ω	1.27 x 10.16	0.050 x 0.400
ℓ9	0.236 λ, 12.9 Ω	19.91 x 10.16	0.784 x 0.400
ℓ10	0.187 λ, 66.0 Ω	17.40 x 0.99	0.685 x 0.039
ℓ11	0.077 λ, 50.0 Ω	6.99 x 1.60	0.275 x 0.063

[1]Electrical characteristics are rounded.

Reference Circuit (cont.)



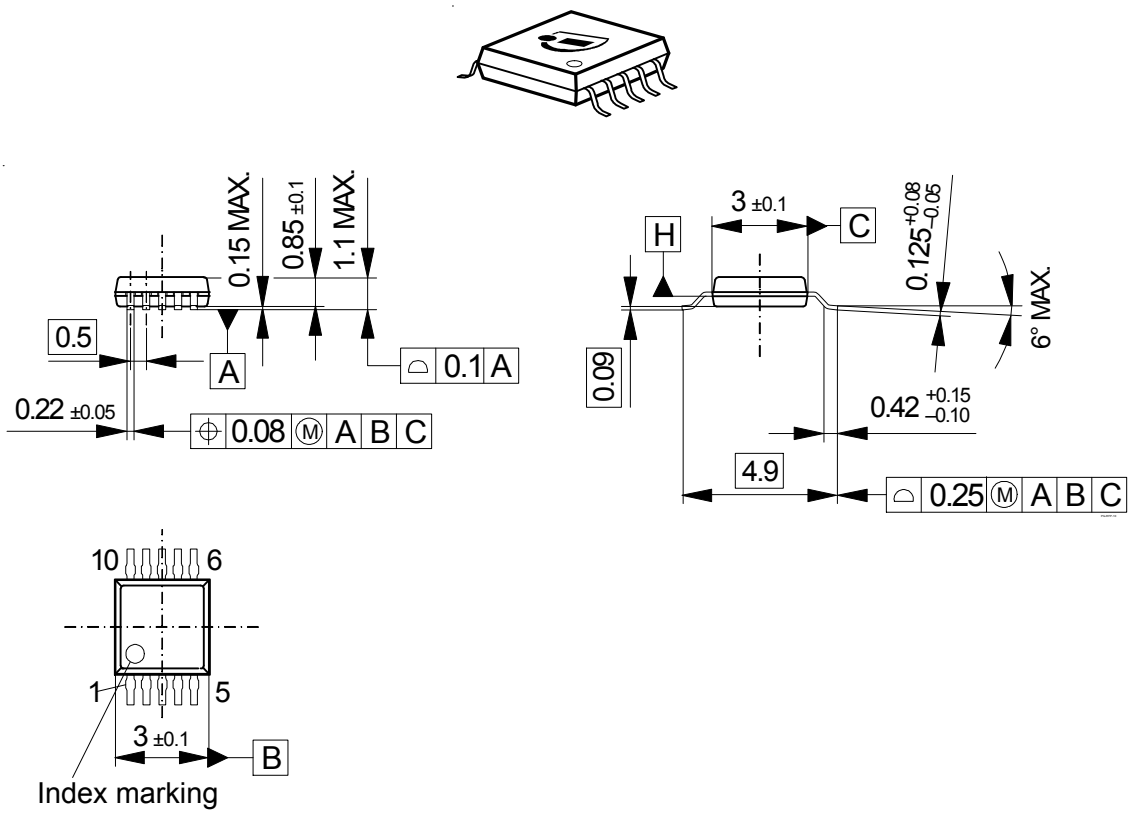
*Reference circuit assembly diagram (not to scale)**

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 µF	Digi-Key	PCC1772CT-ND
C4, C7	Tantalum capacitor, 10 µF, 35 V	Digi-Key	PCS6106TR-ND
C5, C16	Capacitor, 0.1µF	Digi-Key	PCC104BCT-ND
C6, C8, C10, C13, C15, C18	Ceramic capacitor, 10 pF	ATC	100B 100
C9	Ceramic capacitor, 0.9 pF	ATC	100B 0R9
C11, C12	Ceramic capacitor, 4.7pF	ATC	100B 4R7
C14, C17	Tantalum capacitor, 10 µF, 50 V	Digi-Key	TPSE106K050R0400
L1	Ferrite, 4mm	Elna Magnetics	BDS3/3/4.6-4S2
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip Resistor 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip Resistor 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3	Chip Resistor 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R6	Chip Resistor 10 ohms	Digi-Key	P10ECT-ND
R7	Chip Resistor 1 k-ohms	Digi-Key	P1KECT-ND
R8	Chip Resistor 220 ohms	Digi-Key	P221ECT-ND
W1	Wire 0.250”	N/A	AUG22, SOLID

**Gerber Files for this circuit available on request*

Package Outline Specifications

Package PG-RFP-10 (TSSOP-10 Outline)



Notes: Unless otherwise specified

1. Dimensions are mm
2. Lead thickness: 0.09
3. Pins: 1 – 5 = gate, underside = source, 6 – 10 = drain

Find the latest and most complete information about products and packaging at the Infineon Internet page ***http://www.infineon.com/products***

PTF180101M

Revision History:	2009-02-18	Data Sheet
Previous version:	2005-12-06, Data Sheet	

Page	Subjects (major changes since last revision)
all	Remove Preliminary designation
6	Fixed typing error

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highpowerRF@infineon.com

To request other information, contact us at:
+1 877 465 3667 (1-877-GOLDMOS) USA
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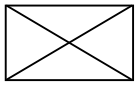

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