



SAW Components

SAW Rx 2in1 input diplex filter
GSM1900 / GSM1800

Series/type:	B9513
Ordering code:	B39202B9513L310
Date:	May 27, 2010
Version:	2.0

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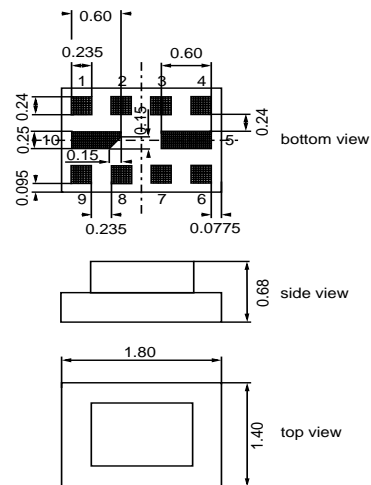
Data sheet

Application

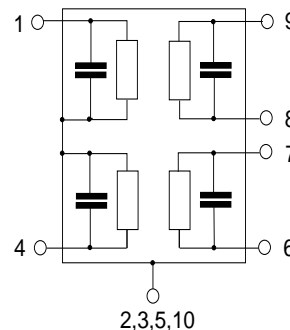
- Low-loss 2in1 RF filter for mobile telephone GSM1900 and GSM1800 systems, receive path (Rx)
- Usable passband:
Filter 1 (GSM1900): 60 MHz
Filter 2 (GSM1800): 75 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12


Features

- Package size 1.8 x 1.4 x 0.68 mm³
- Moisture Sensitive Level 3
- RoHS compatible
- Approx. weight 0.006g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **RoHS compatible**
- **Electrostatic Sensitive Device (ESD)**


Pin configuration

- 1 Input [Diplex]
- 8,9 Output balanced [Filter 1]
- 6,7 Output balanced [Filter 2]
- 2,3,4,5,10 Case-ground



Data sheet


Characteristics of Filter 1 (GSM1900)

Temperature range for specification: $T = -30\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega \parallel 3.3\text{nH}$
 Terminating load impedance: $Z_L = 150\ \Omega \parallel 18\text{nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation 1930.0 ... 1990.0 MHz	α_{\max}	—	2.2	3.0	dB
Amplitude ripple (p-p) 1930.0 ... 1990.0 MHz	$\Delta\alpha$	—	0.9	1.8	dB
Input VSWR 1930.0 ... 1990.0 MHz		—	1.5	2.0	
Output VSWR 1930.0 ... 1990.0 MHz		—	1.6	2.1	
CMRR ($ S_{21}-S_{31} / S_{21}+S_{31} $) 1930.0 ... 1990.0 MHz		22 ¹⁾	29	—	dB
Attenuation	α				
10.0 ... 1510.0 MHz		40	53	—	dB
1510.0 ... 1830.0 MHz		30	35	—	dB
1830.0 ... 1850.0 MHz		23	33	—	dB
1850.0 ... 1890.0 MHz		18	30	—	dB
1890.0 ... 1910.0 MHz		9	14	—	dB
2010.0 ... 2070.0 MHz		4	12	—	dB
2070.0 ... 2400.0 MHz		21	33	—	dB
2400.0 ... 6000.0 MHz		30	43	—	dB

1) A CMRR of 21.9dB corresponds to a phase balance of 7° together with an amplitude balance of 0.9dB

Maximum ratings of Filter 1

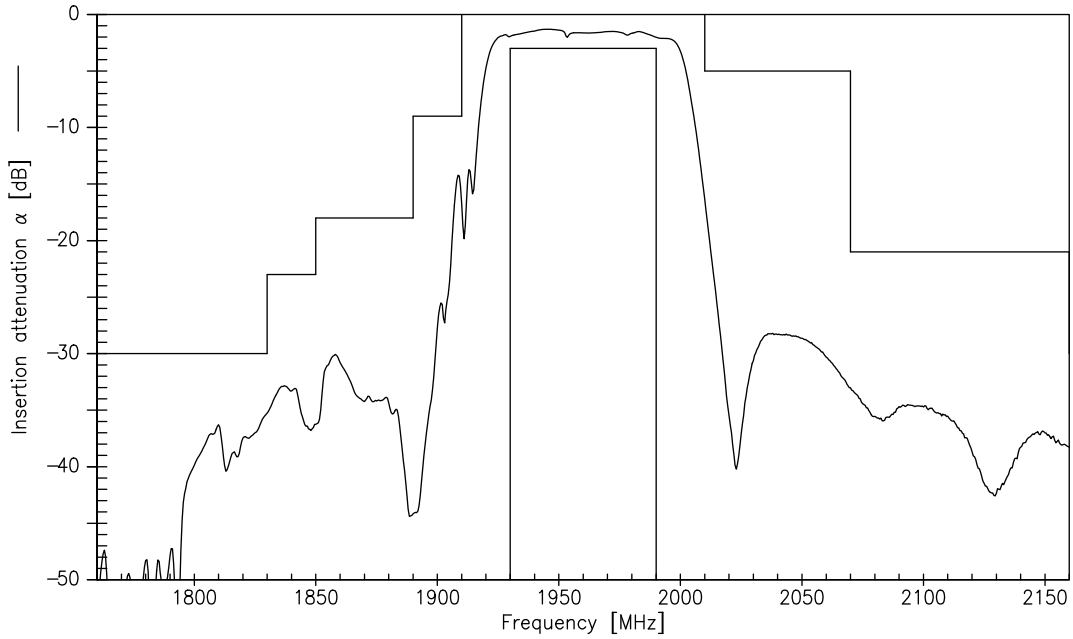
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

¹⁾ acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

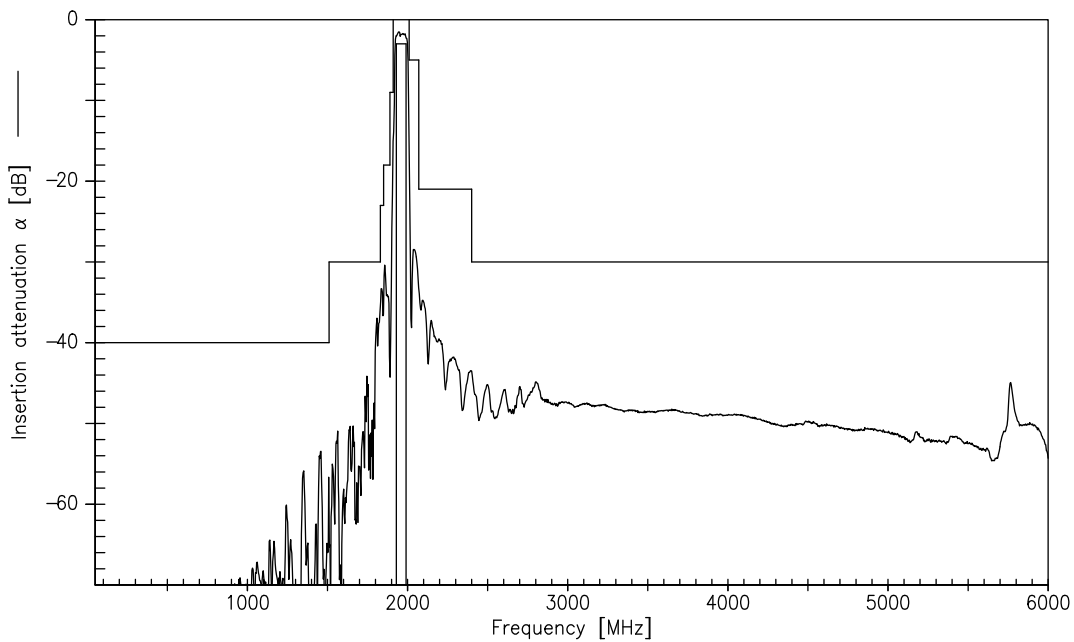
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Transfer function Filter 1 (GSM1900)



Transfer function Filter 1 (GSM1900) - Wideband

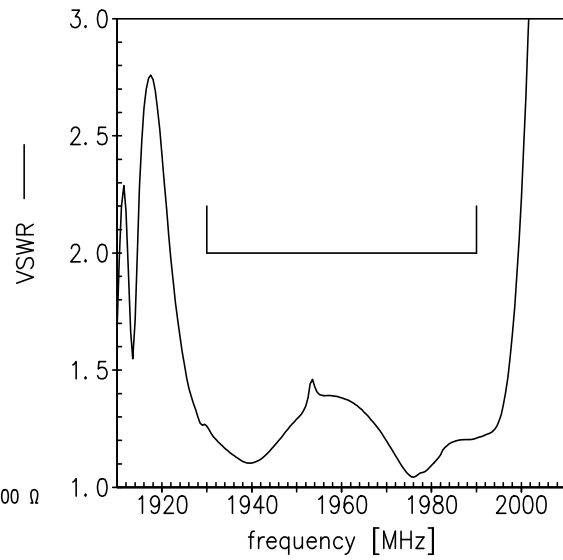
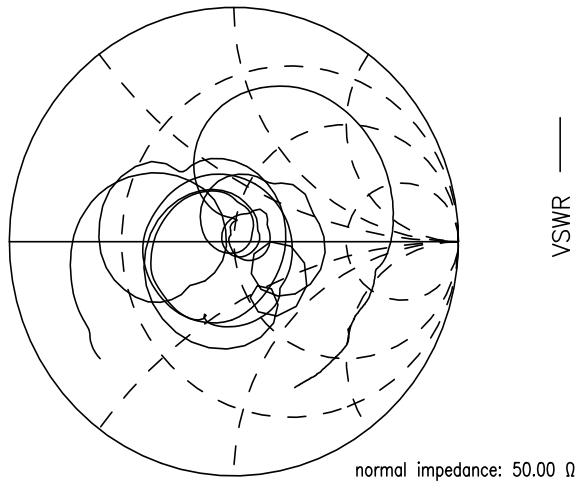


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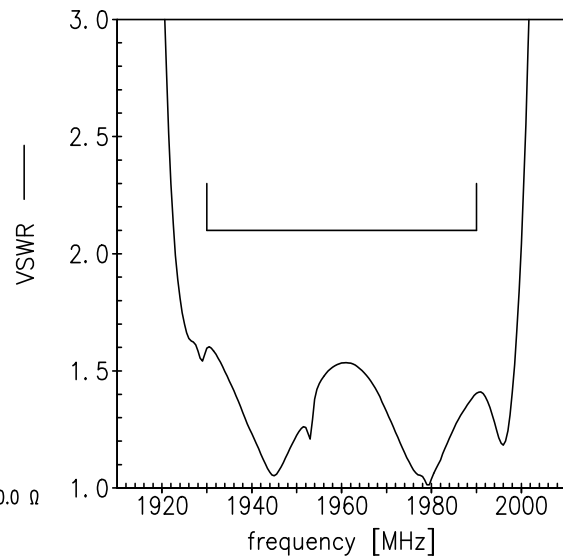
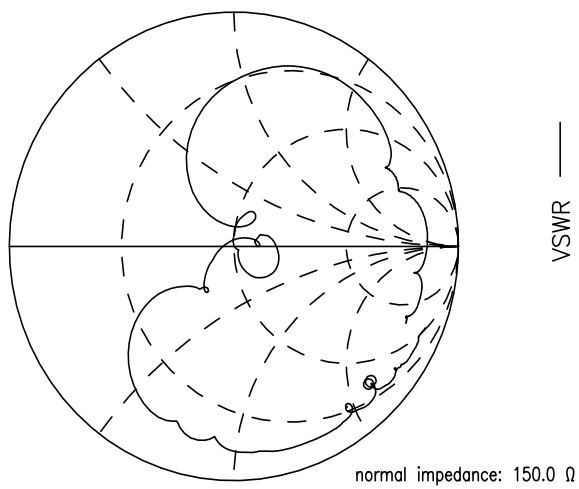


Smith charts Filter 1 (GSM1900)

S_{11} function



S_{22} function



Data sheet


Characteristics of Filter 2 (GSM1800)

Temperature range for specification: $T = -30\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega \parallel 3.3\text{nH}$
 Terminating load impedance: $Z_L = 150\ \Omega \parallel 15\text{nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation 1805.0 ... 1880.0 MHz	α_{\max}	—	2.2	2.8	dB
Amplitude ripple (p-p) 1805.0 ... 1880.0 MHz	$\Delta\alpha$	—	1.0	1.8	dB
Input VSWR 1805.0 ... 1880.0 MHz		—	1.5	2.0	
Output VSWR 1805.0 ... 1880.0 MHz		—	1.7	2.1	
CMRR ($ S_{21}-S_{31} / S_{21}+S_{31} $) 1805.0 ... 1880.0 MHz		20 ¹⁾	24	—	dB
Attenuation	α				
10.0 ... 940.0 MHz		45	62	—	dB
940.0 ... 1705.0 MHz		20	34	—	dB
1705.0 ... 1785.0 MHz		12	18	—	dB
1920.0 ... 1980.0 MHz		17	26	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2700.0 MHz		28	35	—	dB
2700.0 ... 6000.0 MHz		30	37	—	dB

1) A CMRR of 19.6dB corresponds to a phase balance of 10° together with an amplitude balance of 1.0dB


Maximum ratings of Filter 2

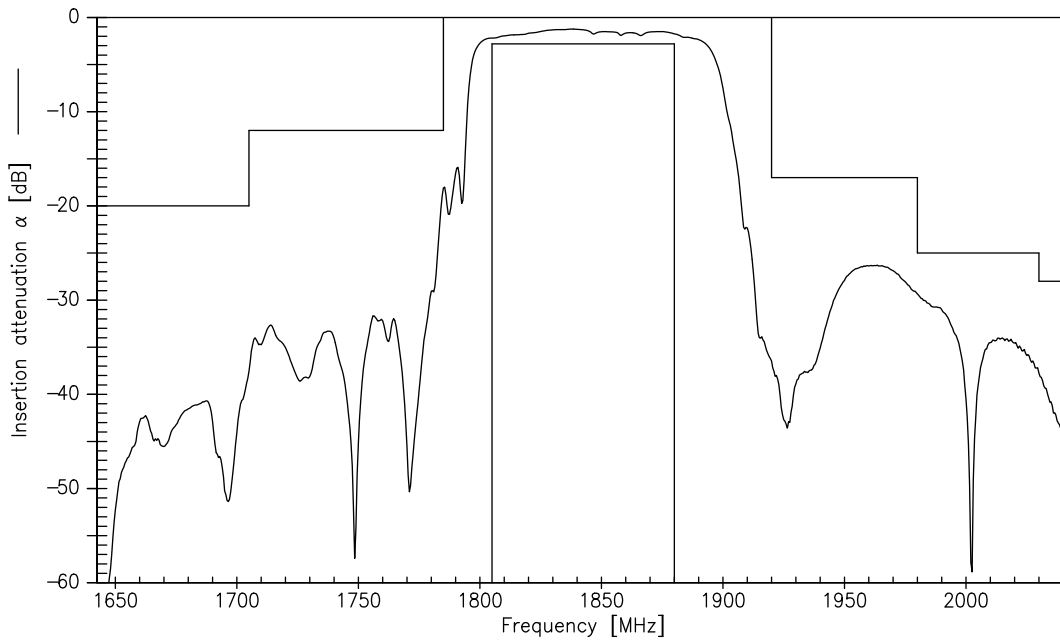
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

¹⁾ acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

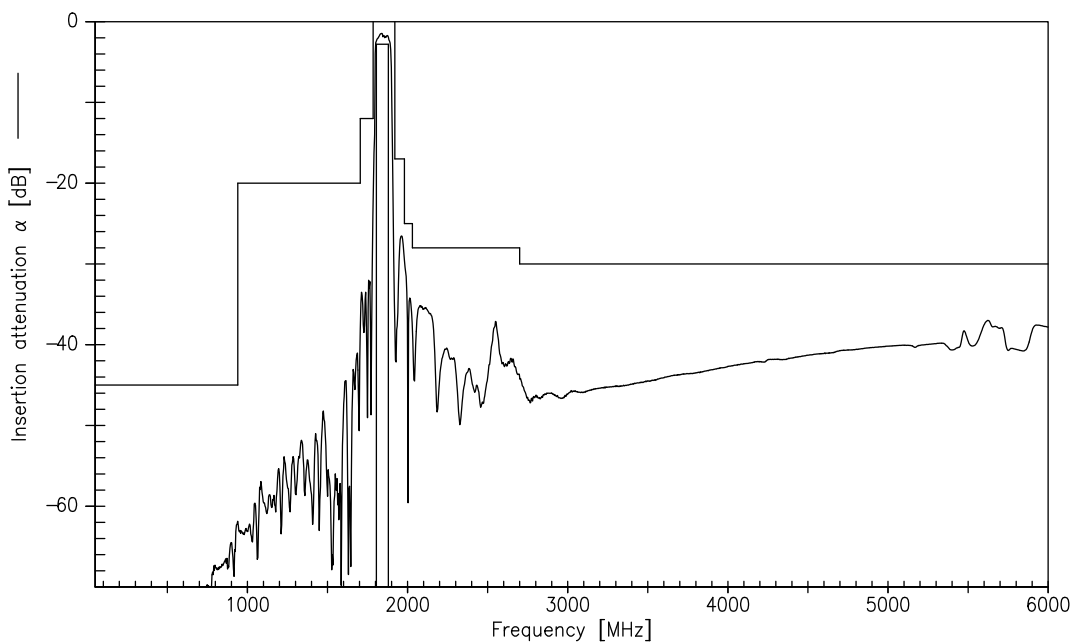
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Transfer function Filter 2 (GSM1800)



Transfer function Filter 2 (GSM1800) - Wideband

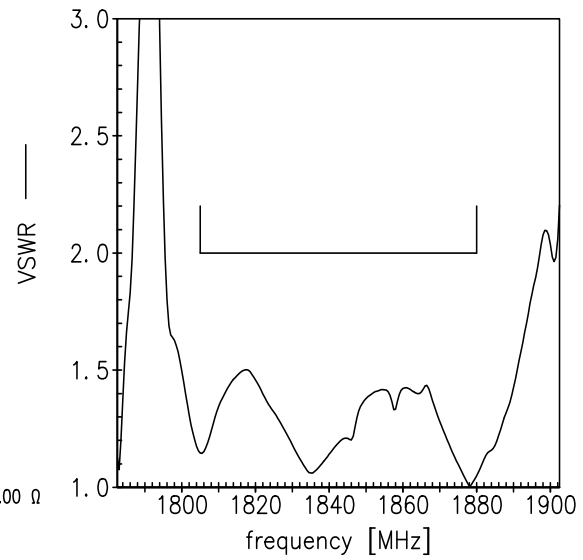
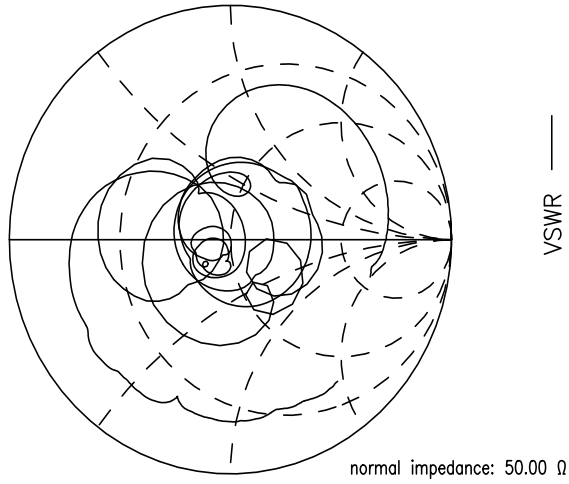


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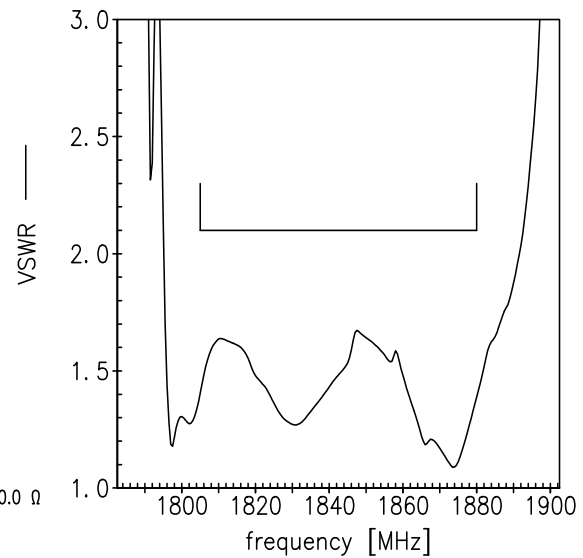
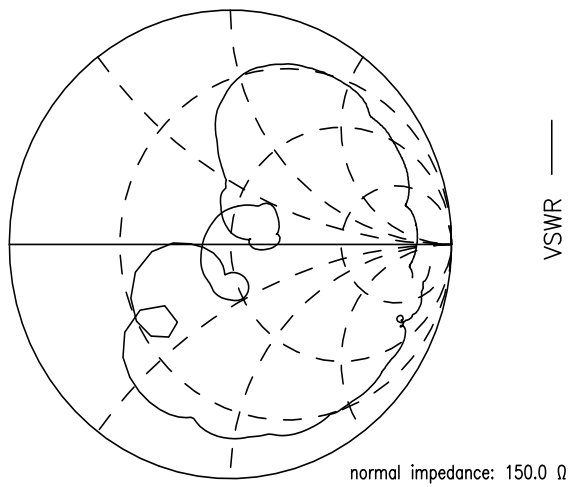


Smith charts Filter 2 (GSM1800)

S_{11} function



S_{22} function



SAW Components **B9513**

SAW Rx 2in1 input diplex filter **1960.0 / 1842.5 MHz**

Data sheet



References

Type	B9513
Ordering code	B39202B9513L310
Marking and package	C61157-A7-A153
Packaging	F61074-V8226-Z000
Date codes	L_1126
S-parameters	B9513_LB_NB.s3p B9513_LB_WB.s3p B9513_UB_NB.s3p B9513_UB_WB.s3p See file header for port/pin assignment table.
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
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