SAW Components

SAW Tx 2in1 Filter

WCDMA band V / WCDMA band II

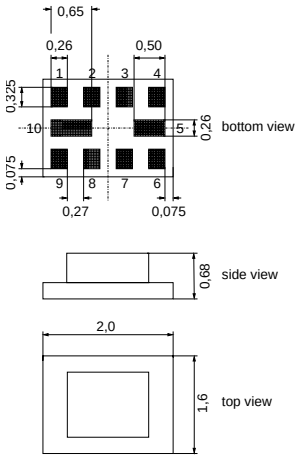
Series/type:	**B9312**
Ordering code:	**B39192B9312N410**
Date:	May 31, 2006
Version:	2.0

Application

- Low-loss RF filter for mobile telephone WCDMA band V / band II systems, transmit path (Tx)
- Usable passband:
  Filter 1 (band V): 25 MHz
  Filter 2 (band II): 60 MHz
- Impedance transformation from:
  Filter 1 (band V): 100 Ω to 50 Ω
  Filter 2 (band II): 100 Ω to 50 Ω
- Balanced to unbalanced operation

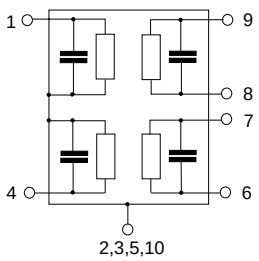
Features

- Package size 2.0 x1.6 x 0.68 mm^3
- Package code QCS10I
- RoHS compatible
- Approximate weight 0.008 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

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



Characteristics filter 1 (WCDMA band V)

Temperature range for specification: T = –15 ˚C to +80 ˚C
Terminating source impedance: Z_S = 100 Ω (balanced)
Terminating load impedance: Z_L = 50 Ω (unbalanced)

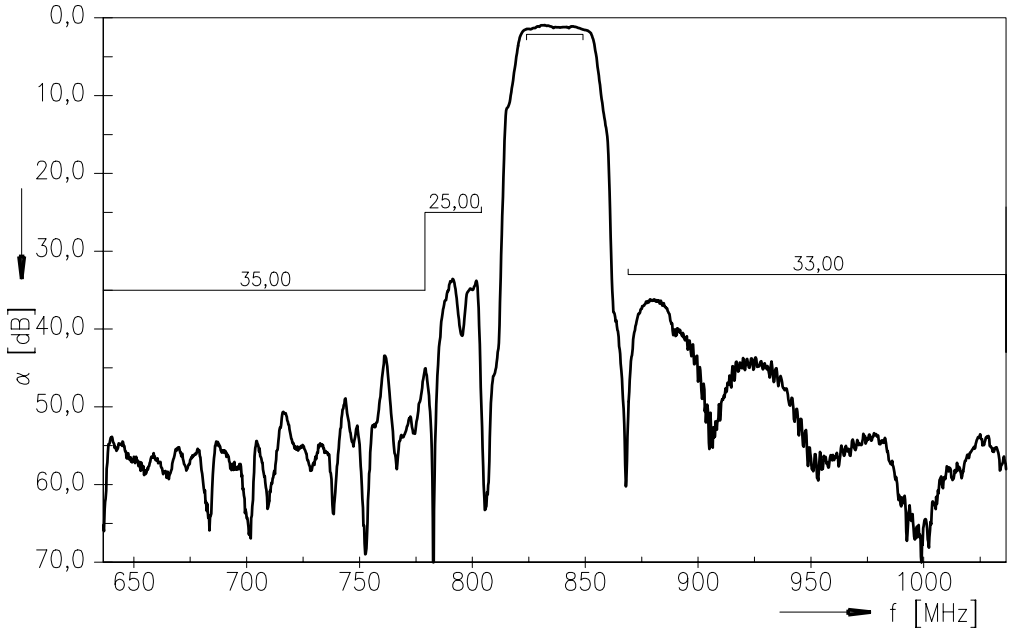
		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	836.5	—	MHz
Maximum insertion attenuation	α_{max}				
824.0 ... 849.0 MHz		—	1.6	2.2	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
824.0 ... 849.0 MHz		—	0.7	1.5	dB
Input VSWR					
824.0 ... 849.0 MHz		—	1.7	2.0	
Output VSWR					
824.0 ... 849.0 MHz		—	1.7	2.0	
Input amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
824.0 ... 849.0 MHz		–1.0	–0.6/0.7	1.0	dB
Input phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
824.0 ... 849.0 MHz		–10.0	–2/+1	10.0	°
Common mode suppression	S_{cs21}				
824.0 ... 849.0 MHz		23.0	28.0	—	dB
Attenuation	α				
0.0 ... 779.0 MHz		35.0	42.0	—	dB
779.0 ... 804.0 MHz		25.0	31.0	—	dB
869.0 ... 1570.0 MHz		33.0	36.0	—	dB
1570.0 ... 1580.0 MHz		43.0	48.0	—	dB
1580.0 ... 2547.0 MHz		35.0	43.0	—	dB
2547.0 ... 6000.0 MHz		25.0	34.0	—	dB

Maximum ratings

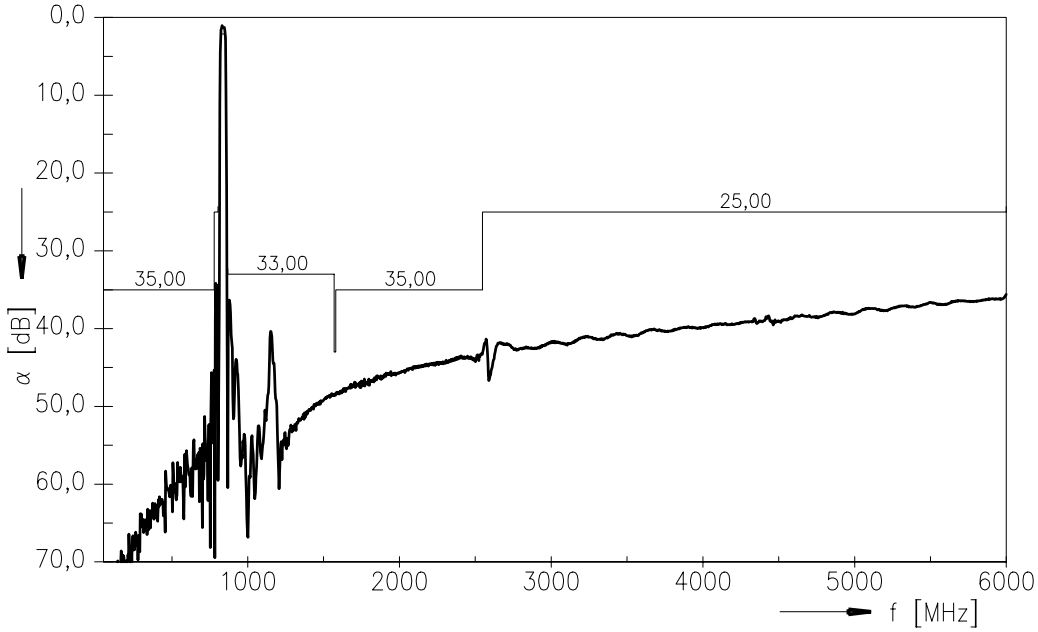
Operable temperature range	T	–30/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power at WCDMA band V Tx band	P_{IN}	10	dBm	continuous wave @ +55˚C ambient

1) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Transfer function filter 1 (WCDMA band V)

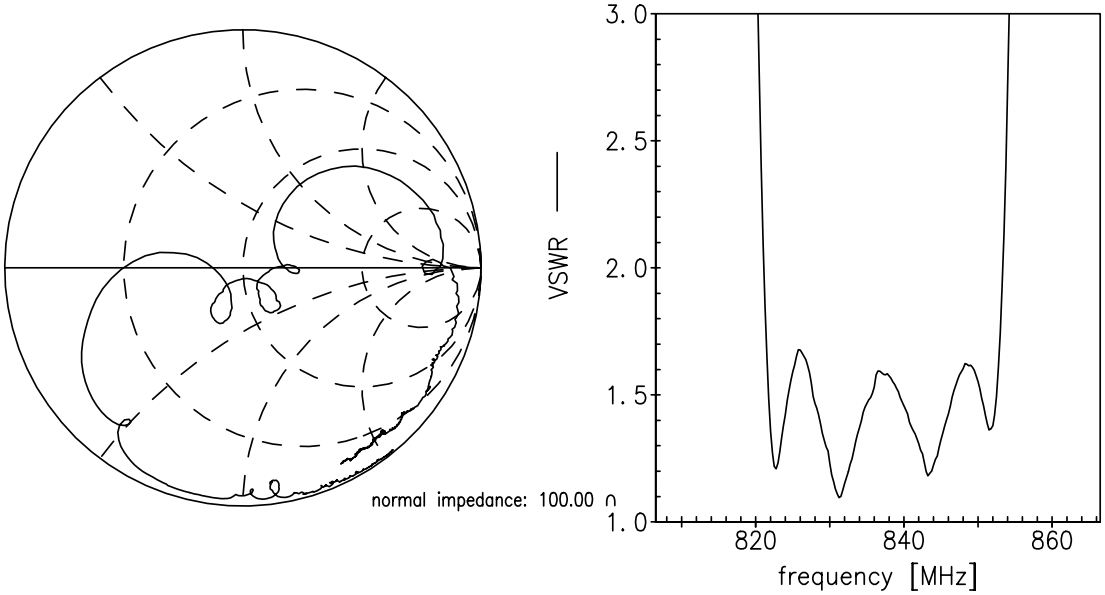


Transfer function filter 1 (WCDMA band V) - wideband

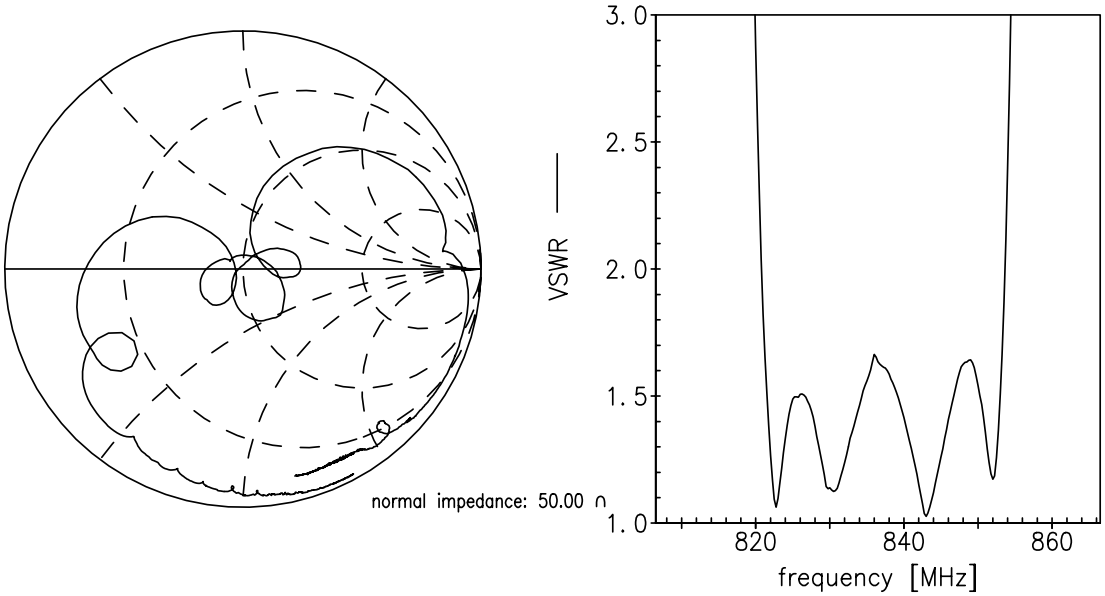


Smith charts filter 1 (WCDMA band V)

S_{11} function



S_{22} function



Characteristics filter 2 (WCDMA band II)

Temperature range for specification: T = –15 ˚C to +80 ˚C
Terminating source impedance: Z_S = 100 Ω (balanced) || 18nH
Terminating load impedance: Z_L = 50 Ω (unbalanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1880.0	—	MHz
Maximum insertion attenuation	α_{max}				
1850.0 ... 1910.0 MHz		—	2.4	3.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1850.0 ... 1910.0 MHz		—	1.0	2.4	dB
Input VSWR					
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Output VSWR					
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Input amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
1850.0 ... 1910.0 MHz		–1.1	–0.7/0.7	1.1	dB
Input phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
1850.0 ... 1910.0 MHz		–10.0	–3/+3	10.0	°
Common mode suppression	S_{cs21}				
1850.0 ... 1910.0 MHz		23.0	29.0	—	dB
Attenuation	α				
0.0 ... 1580.0 MHz		45.0	54.0	—	dB
1580.0 ... 1770.0 MHz		30.0	42.0	—	dB
1770.0 ... 1830.0 MHz		18.0	36.0	—	dB
1930.6 ... 1990.0 MHz		33.0[1)]	35.7	—	dB
1990.0 ... 2500.0 MHz		30.0	35.5	—	dB
2500.0 ... 6000.0 MHz		30.0	40.0	—	dB

1) Attenuation of WCDMA signal determined by

$$\int_{\infty}^{\infty} \left| S_{ds21}(f) H_{RRC}(f - f_C) \right|^2 df$$

with f_C ranging from 1932.4 MHz (lowest Rx channel) to 1987.6 MHz (highest Rx channel). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

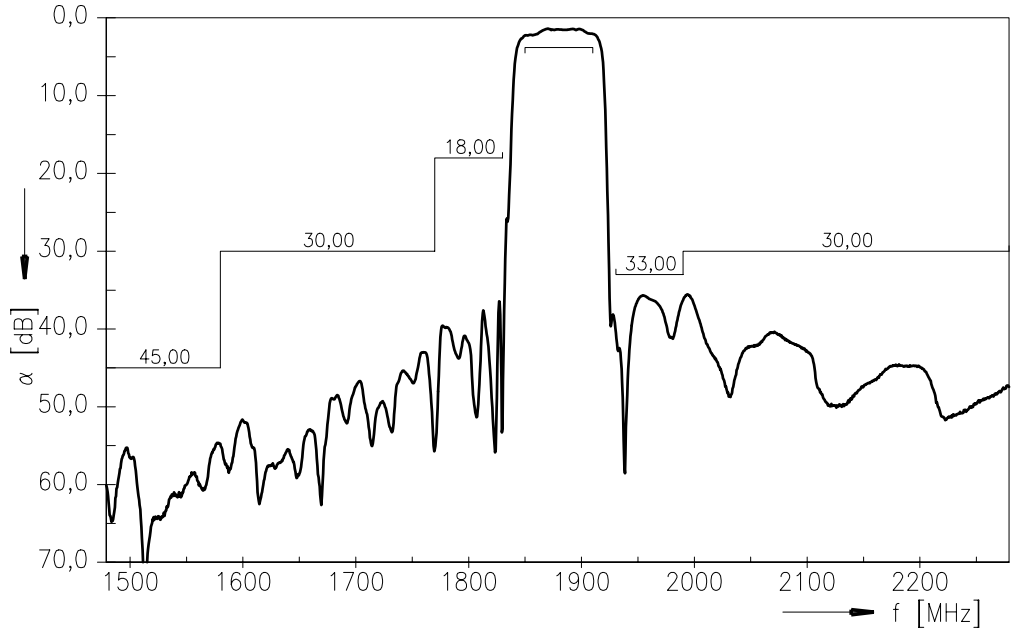
$$\int_{\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum ratings

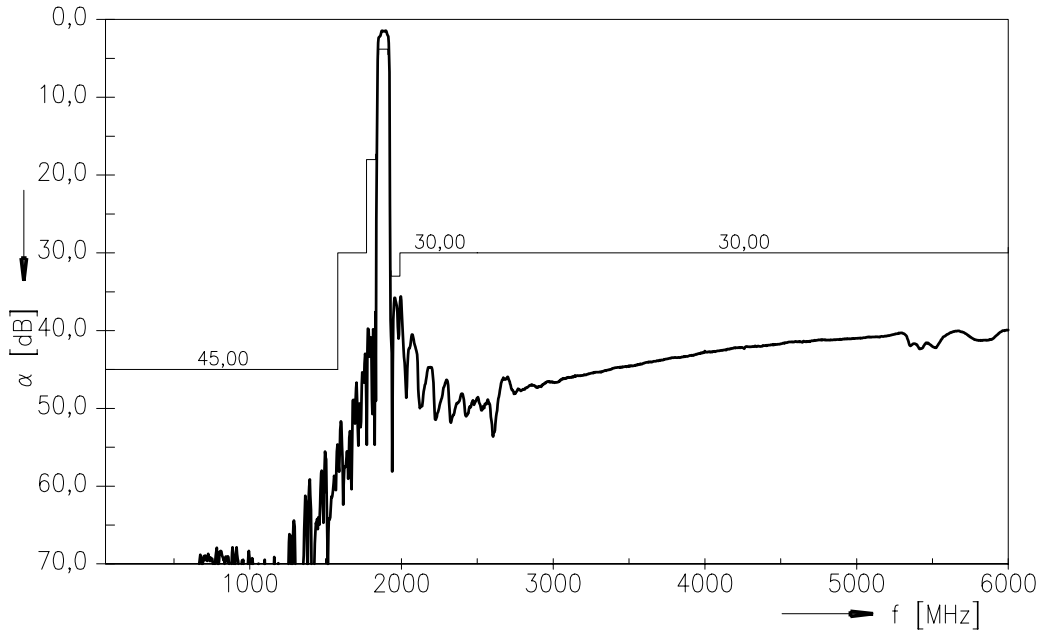
Operable temperature range	T	–30/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at WCDMA band II Tx band	P_{IN}	10	dBm	continuous wave @ +55˚C ambient

1) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Transfer function filter 2 (WCDMA band II)

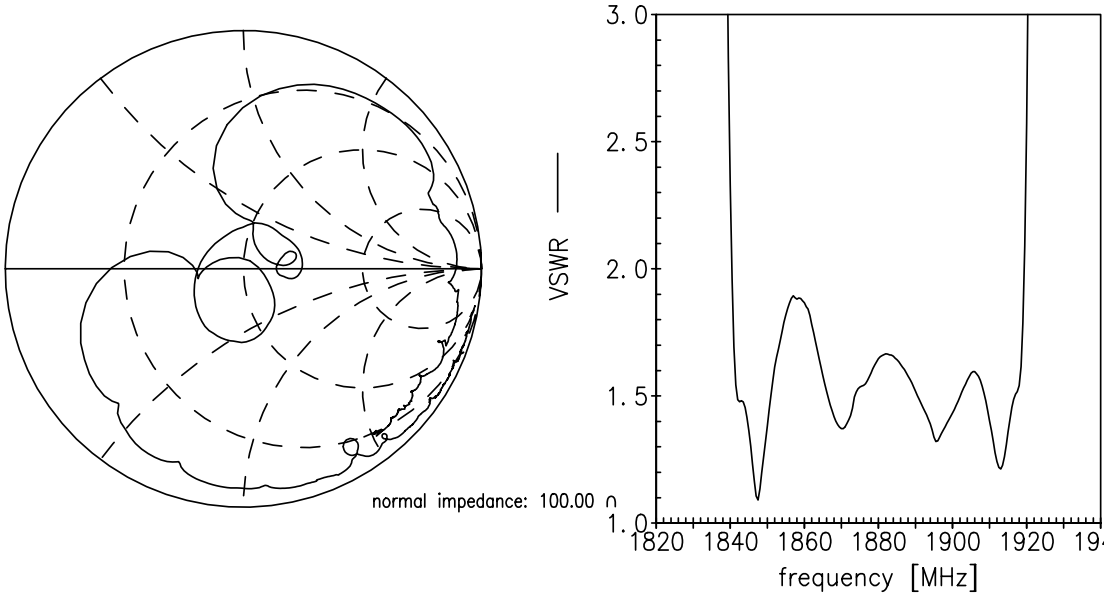


Transfer function filter 2 (WCDMA band II) - wideband

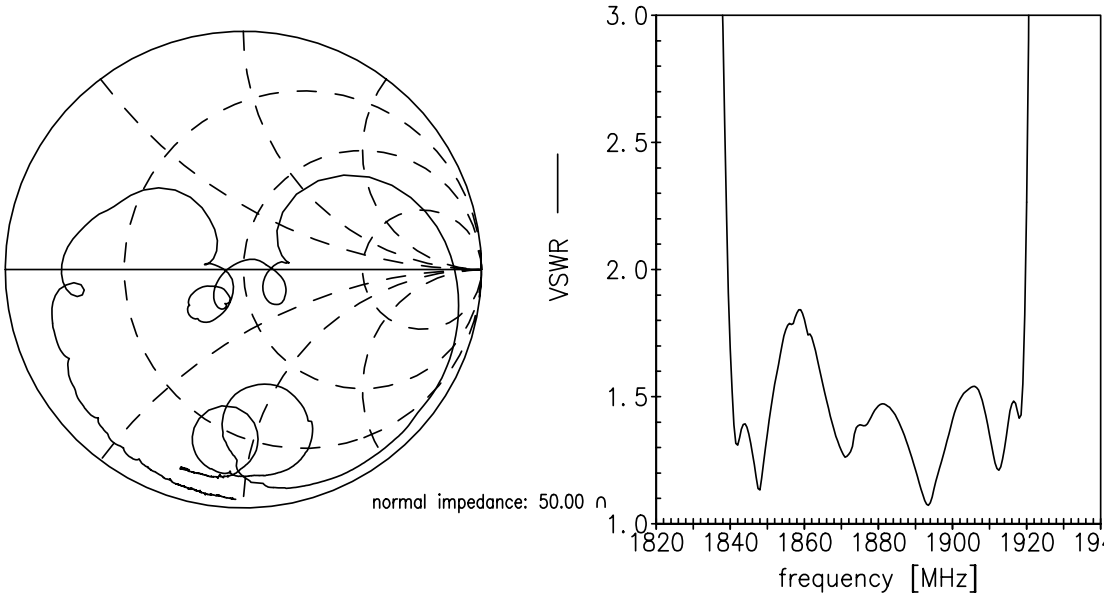


Smith charts filter 2 (WCDMA band II)

S_{11} function



S_{22} function



References

Type	B9312
Ordering code	B39192B9312N410
Marking and package	C61157-A7-A146
Packaging	F61074-V8152-Z000
Date codes	L_1126
S-parameters	LN55D_band5_NB.s3p, LN55D_band5_WB.s3p LN55D_band2_NB.s3p, LN55D_band2_WB.s3p
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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