



SAW Components

SAW Duplexer

for W-CDMA Band IV / CDMA 1x AWS Band

Series/type:	B7699
Ordering code:	B39212B7699P810
Date:	February 04, 2010
Version:	2.0

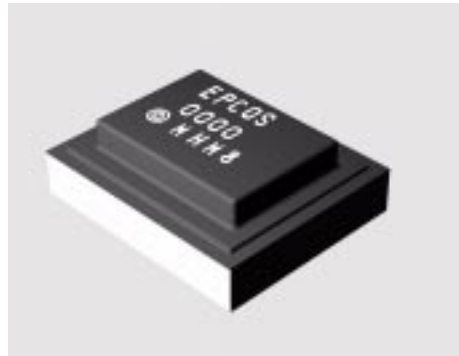


Data Sheet



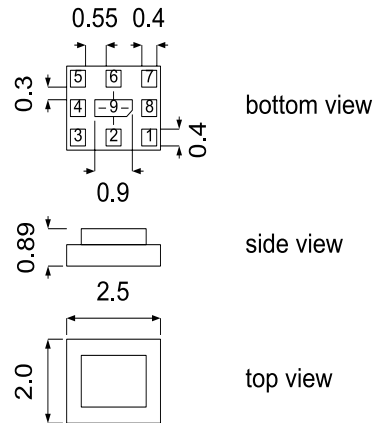
Application

- Low-loss SAW duplexer for mobile telephone W-CDMA Band IV / CDMA 1x AWS systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- Fully matched with integrated matching network



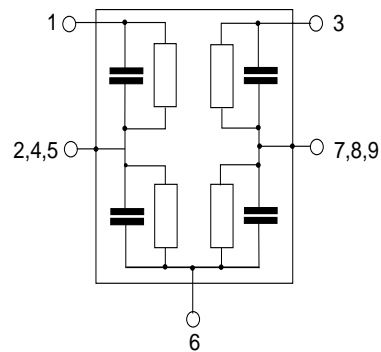
Features

- Package size 2.5 x 2.0 x 0.89 mm³
- RoHS compatible
- Approx. weight 0.035 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitive Level 3



Pin configuration

- 1 RX Output
- 3 TX Input
- 6 Antenna
- 2, 4, 5 To be grounded
- 7, 8, 9 To be grounded





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Characteristics for W-CDMA Band 4

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 50 Ω
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT					min.	typ. @ 25 °C	max.	
Center frequency					f _C	1732.5		MHz
Maximum insertion attenuation					α _{WCDMA} ¹⁾			
@f _{carrier}	1712.4	...	1752.6	MHz		1.5	1.8	dB
@f _{carrier}	1712.4	...	1752.6	MHz		1.5	1.7 ²⁾	dB
Amplitude ripple (p-p)					Δα _{WCDMA} ¹⁾			
@f _{carrier}	1712.4	...	1752.6	MHz		0.4	1.0	dB
Error Vector Magnitude					EVM ³⁾			
	1712.4	...	1752.6	MHz		0.85	2.0	%
Input VSWR (TX port)								
	1710.0	...	1755.0	MHz		1.9	2.0	
Output VSWR (ANT port)								
	1710.0	...	1755.0	MHz		1.7	2.0	
Attenuation					α			
	0.3	...	1000.0	MHz	30	38		dB
	1310.0	...	1355.0	MHz	30	36		dB
	1574.0	...	1577.0	MHz	38	45		dB
@f _{carrier}	2112.4	...	2152.6	MHz	43	46		dB
	2400.0	...	2500.0	MHz	25	37		dB
	3420.0	...	3510.0	MHz	20	25		dB
	5130.0	...	5265.0	MHz	7	12		dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (9).

2) Maximum insertion attenuation at room temperature T= +25 °C.

3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



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1732.5/2132.5 MHz

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Characteristics for W-CDMA Band 4

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 50 Ω
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX					min.	typ. @ 25 °C	max.	
Center frequency					f _C	2132.5		MHz
Maximum insertion attenuation					α _{WCDMA} ¹⁾			
@f _{carrier}	2112.4	...	2152.6	MHz		1.8	2.5	dB
@f _{carrier}	2112.4	...	2152.6	MHz		1.8	2.4 ²⁾	dB
Amplitude ripple (p-p)					Δα _{WCDMA} ¹⁾			
@f _{carrier}	2112.4	...	2152.6	MHz		0.4	1.0	dB
Error Vector Magnitude					EVM ³⁾			
	2112.4	...	2152.6	MHz		1.0	3.0	%
Input VSWR (ANT port)								
	2110.0	...	2155.0	MHz		1.65	2.0	
Output VSWR (RX port)								
	2110.0	...	2155.0	MHz		1.4	2.0	
Attenuation					α			
	0.3	...	1310.0	MHz		30	42	dB
	1310.0	...	1355.0	MHz		38	42	dB
@f _{carrier}	1712.4	...	1752.6	MHz	α _{WCDMA} ¹⁾	46	51	dB
	1910.0	...	1955.0	MHz		27	33	dB
	2400.0	...	2500.0	MHz		25	35	dB
	3820.0	...	3910.0	MHz		19	39	dB
	4220.0	...	4370.0	MHz		20	32	dB
	5530.0	...	5665.0	MHz		20	27	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (9).
 2) Maximum insertion attenuation at room temperature T= +25 °C.
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



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Characteristics for W-CDMA Band 4

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 50 Ω
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - RX				min.	typ. @ 25 °C	max.	
Isolation			$\alpha_{\text{WCDMA}}^{1)}$				
@f _{carrier}	1712.4	...	1752.6 MHz	52	56		dB
@f _{carrier}	2112.4	...	2152.6 MHz	45	51		dB

1) Attenuation of WCDMA signal ("Powertransferfunktion"). Please refer to annotation on page (9).



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Characteristics for CDMA 1x AWS Band

Temperature range for specification: T = -30 °C to +85 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 50 Ω
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT		min.	typ. @ 25 °C	max.	
Center frequency	f _C		1732.5		MHz
Maximum insertion attenuation	α				
1710.0 ... 1755.0 MHz			1.6	2.0	dB
1710.0 ... 1755.0 MHz			1.6	1.9 ¹⁾	dB
Amplitude ripple (p-p)	Δα				
1710.0 ... 1755.0 MHz			0.4	1.0	dB
Input VSWR (TX port)					
1710.0 ... 1755.0 MHz			1.9	2.0	
Output VSWR (ANT port)					
1710.0 ... 1755.0 MHz			1.7	2.0	
Attenuation	α				
0.3 ... 1000.0 MHz		30	38		dB
1310.0 ... 1355.0 MHz		30	36		dB
1574.0 ... 1577.0 MHz		38	45		dB
2110.0 ... 2155.0 MHz		43	46		dB
2400.0 ... 2500.0 MHz		25	37		dB
3420.0 ... 3510.0 MHz		20	25		dB
5130.0 ... 5265.0 MHz		7	12		dB

¹⁾ Maximum insertion attenuation at room temperature T= +25 °C



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Characteristics for CDMA 1x AWS Band

Temperature range for specification: $T = -30\text{ °C to }+85\text{ °C}$
 Antenna terminating impedance: $Z_{ANT} = 50\ \Omega$
 RX terminating impedance: $Z_{RX} = 50\ \Omega$
 TX terminating impedance: $Z_{TX} = 50\ \Omega$

Characterisitcs ANT - RX	min.	typ. @ 25 °C	max.	
Center frequency f_C		2132.5		MHz
Maximum insertion attenuation				
2110.0 ... 2155.0 MHz		1.8	2.6	dB
2110.0 ... 2155.0 MHz		1.8	2.5 ¹⁾	dB
Amplitude ripple (p-p) $\Delta\alpha$				
2110.0 ... 2155.0 MHz		0.4	1.0	dB
Input VSWR (ANT port)				
2110.0 ... 2155.0 MHz		1.65	2.0	
Output VSWR (RX port)				
2110.0 ... 2155.0 MHz		1.4	2.0	
Attenuation α				
0.3 ... 1310.0 MHz	30	42		dB
1310.0 ... 1355.0 MHz	38	42		dB
1710.0 ... 1755.0 MHz	46	51		dB
1910.0 ... 1955.0 MHz	27	33		dB
2400.0 ... 2500.0 MHz	25	35		dB
3820.0 ... 3910.0 MHz	19	39		dB
4220.0 ... 4370.0 MHz	20	32		dB
5530.0 ... 5665.0 MHz	20	27		dB

¹⁾ Maximum insertion attenuation at room temperature $T = +25\text{ °C}$



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Characteristics for CDMA 1x AWS Band

Temperature range for specification: T = -30 °C to +85 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 50 Ω
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - RX				min.	typ. @ 25 °C	max.	
Isolation	1710.0 ... 1755.0	MHz	α	52	56		dB
	2110.0 ... 2155.0	MHz		45	51		dB



SAW Components **B7699**

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Data Sheet **SMD**

Maximum ratings

Storage temperature range	T _{stg}	-40/+85	°C	machine model, 10 pulses source and load impedance 50 Ω } continuous wave T = 55° C, 5000 h
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	
Input power at 1710.0 ... 1755.0 MHz	P _{IN}	29	dBm	
elsewhere		10	dBm	

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

Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

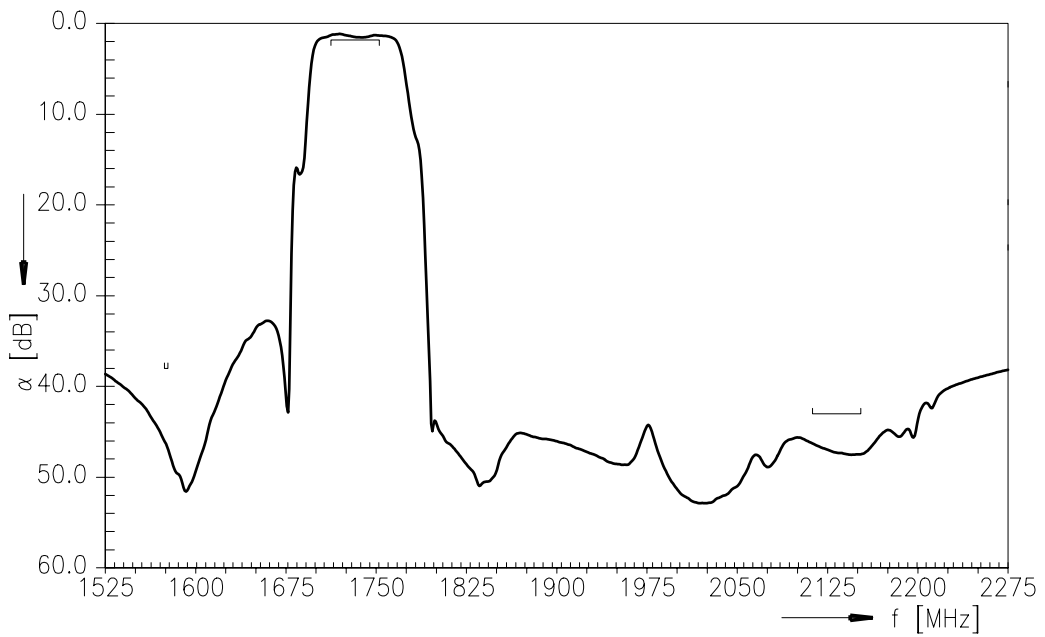
$$\int_{-\infty}^{\infty} |S_{ds21}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

f_{Carrier} according to 3GPP TS 25.101 (e.g. for UMTS-Passband, f_{Carrier} ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 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:

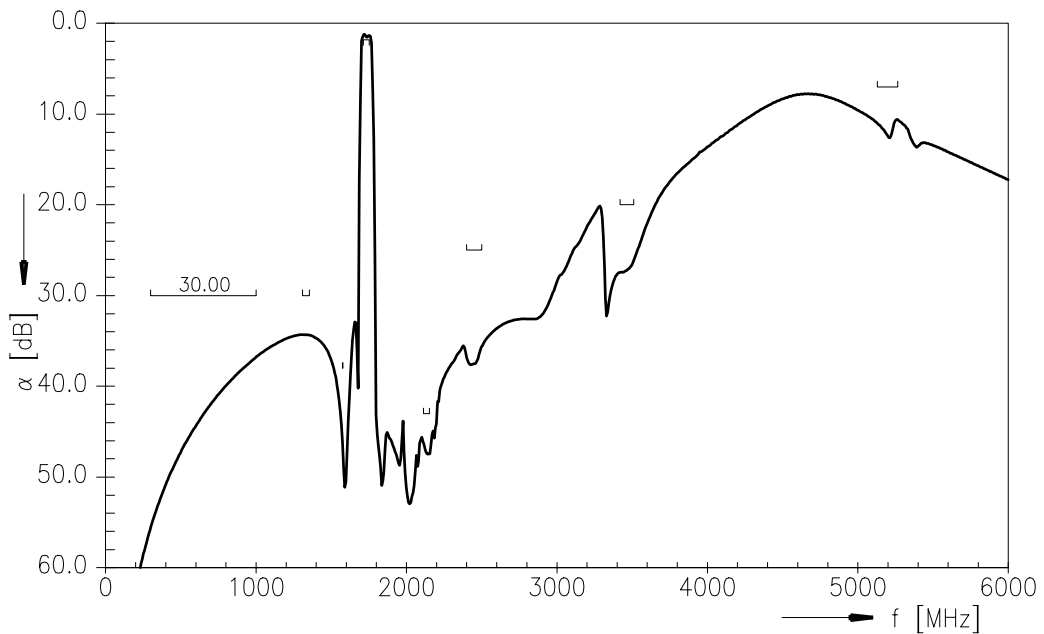
$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



Frequency Response TX-ANT (Power Transfer Function)



Frequency Response TX-ANT (wideband)





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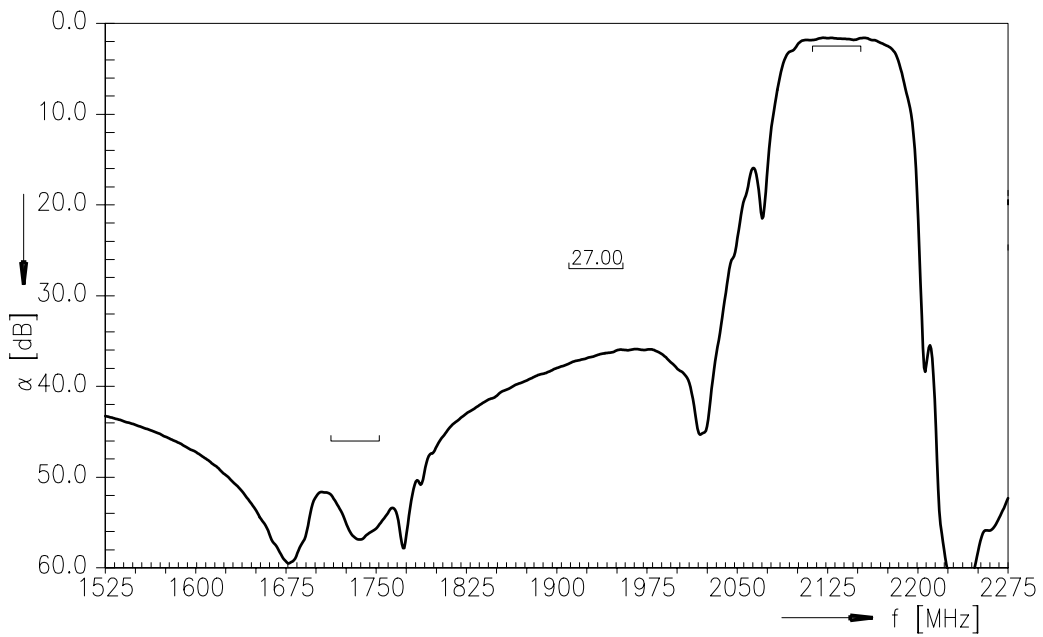
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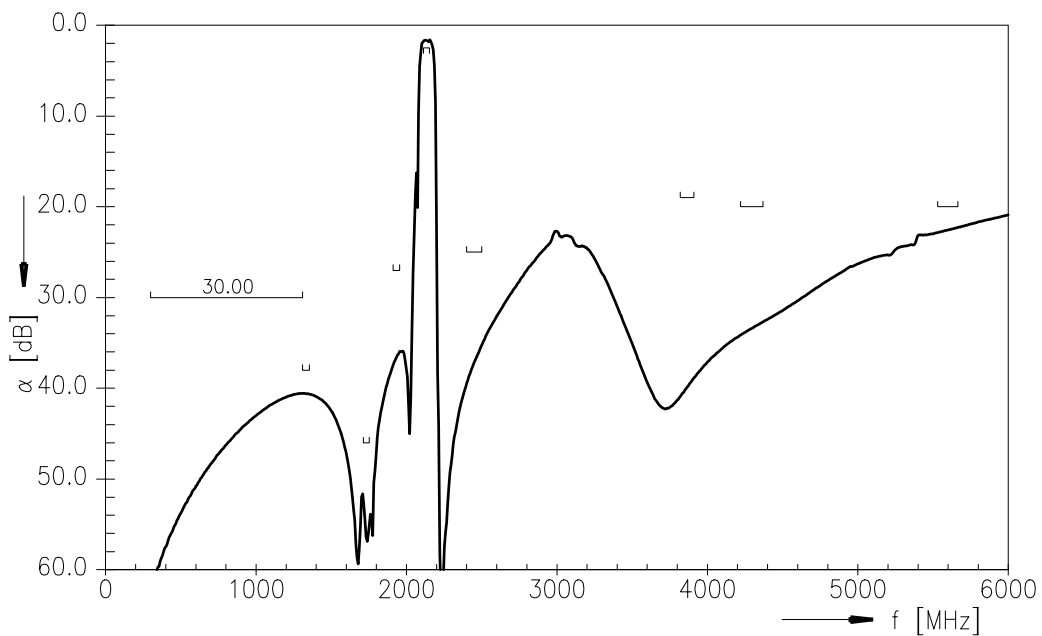
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Frequency Response RX-ANT (Power Transfer Function)



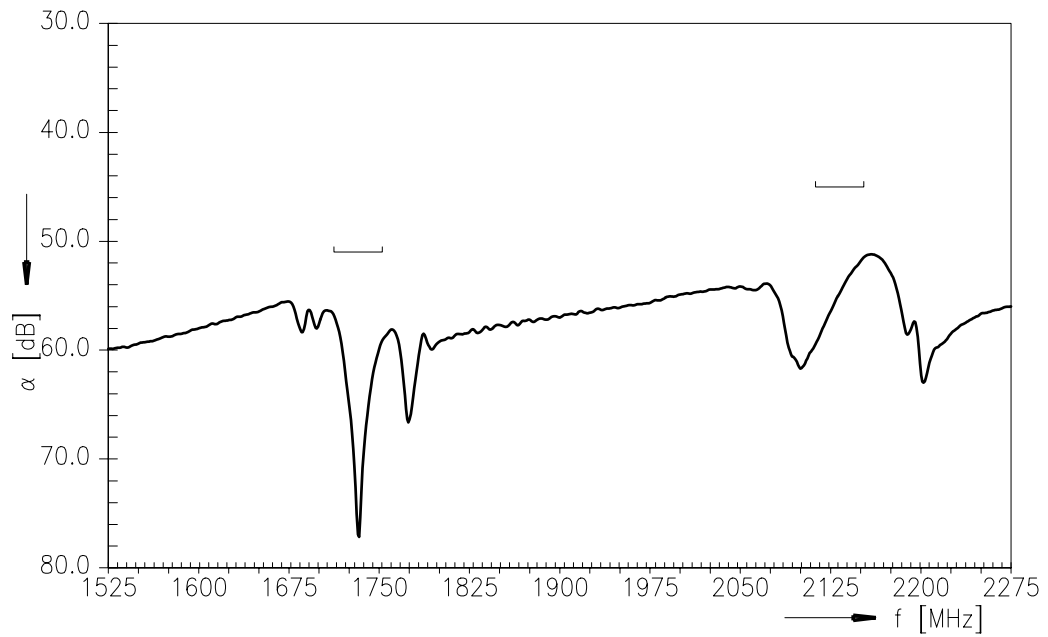
Frequency Response RX-ANT (wideband)



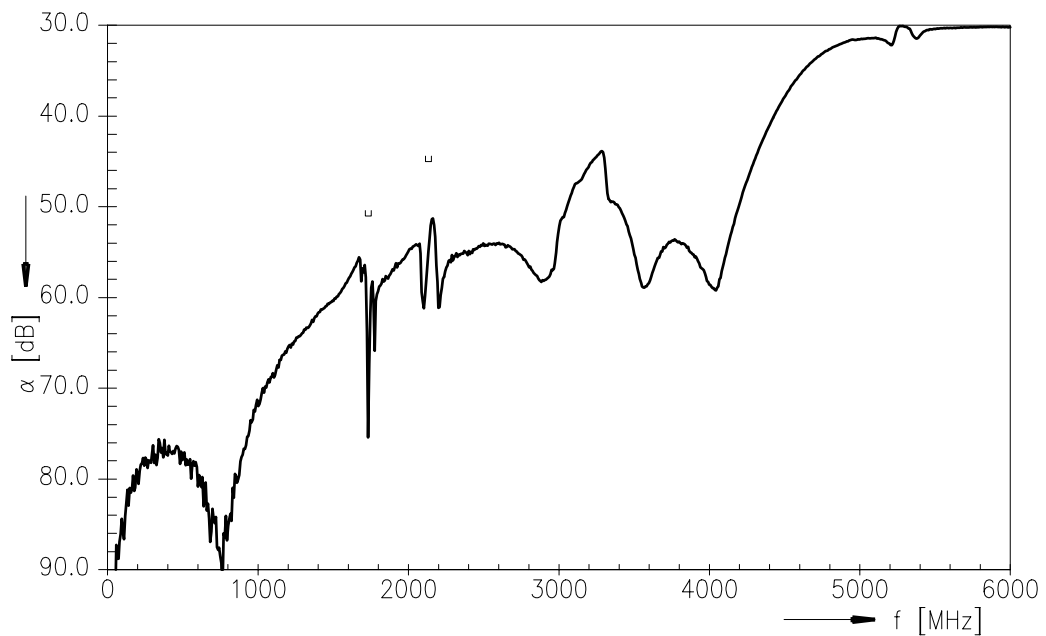
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Frequency Response TX-RX (Power Transfer Function)



Frequency Response TX-RX (wideband)



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**References**

Type	B7699
Ordering code	B39212B7699P810
Marking and package	C61157-A3-A67
Packaging	F61074-V8153-Z000
Date codes	L_1126
S-parameters	B7699_NB.s3p B7699_WB.s3p See file header for pin/port assignments
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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

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