



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



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B7699

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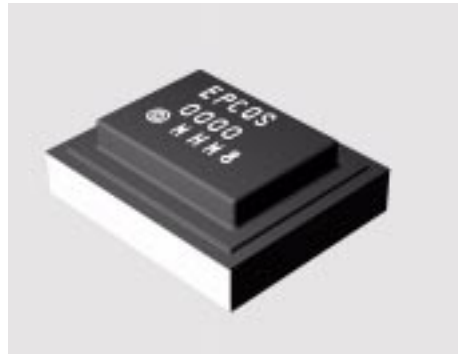
1732.5/2132.5 MHz

Data Sheet



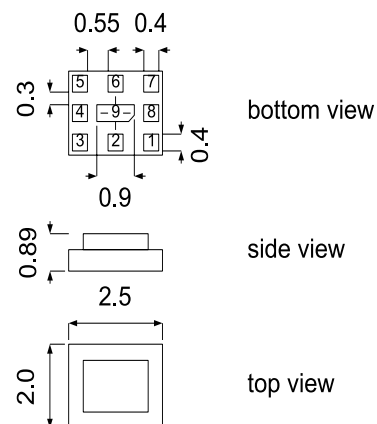
Application

- 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



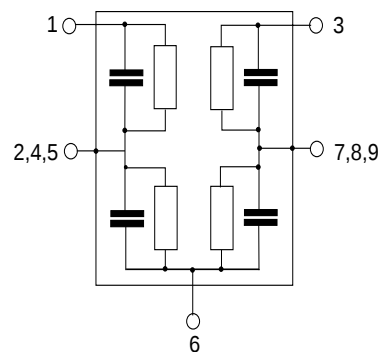
Features

- 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

Characteristics 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	α _{WCDMA} ¹⁾	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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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

Characteristics 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:	$T = -15\text{ °C to }+80\text{ °C}$
Antenna terminating impedance:	$Z_{ANT} = 50\ \Omega$
RX terminating impedance:	$Z_{RX} = 50\ \Omega$
TX terminating impedance:	$Z_{TX} = 50\ \Omega$

Characterisitcs TX - RX				min.	typ. @ 25 °C	max.	
Isolation							
@ $f_{carrier}$	1712.4	...	1752.6 MHz	52	56		dB
@ $f_{carrier}$	2112.4	...	2152.6 MHz	45	51		dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). 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: $Z_{\text{ANT}} = 50\ \Omega$

RX terminating impedance: $Z_{\text{RX}} = 50\ \Omega$

TX terminating impedance: $Z_{\text{TX}} = 50\ \Omega$

Characterisitcs ANT - RX				min.	typ. @ 25 °C	max.	
Center frequency					2132.5		MHz
Maximum insertion attenuation							
			f_c				
			α				
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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RX terminating impedance:	Z _{RX} = 50 Ω
TX terminating impedance:	Z _{TX} = 50 Ω

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



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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	P _{IN}			
1710.0 ... 1755.0 MHz		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

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

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)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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



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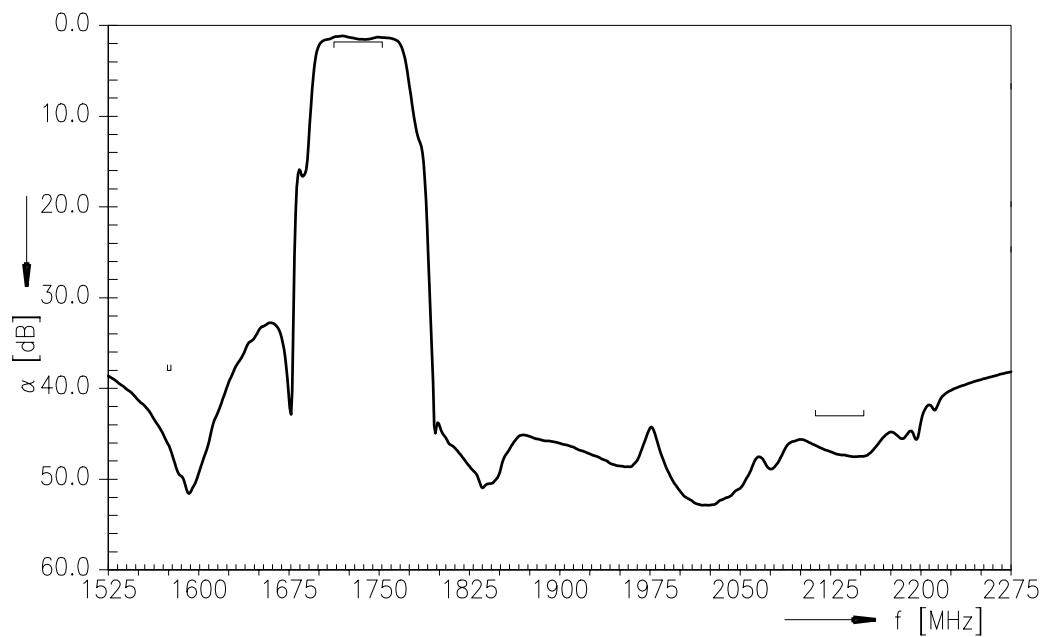
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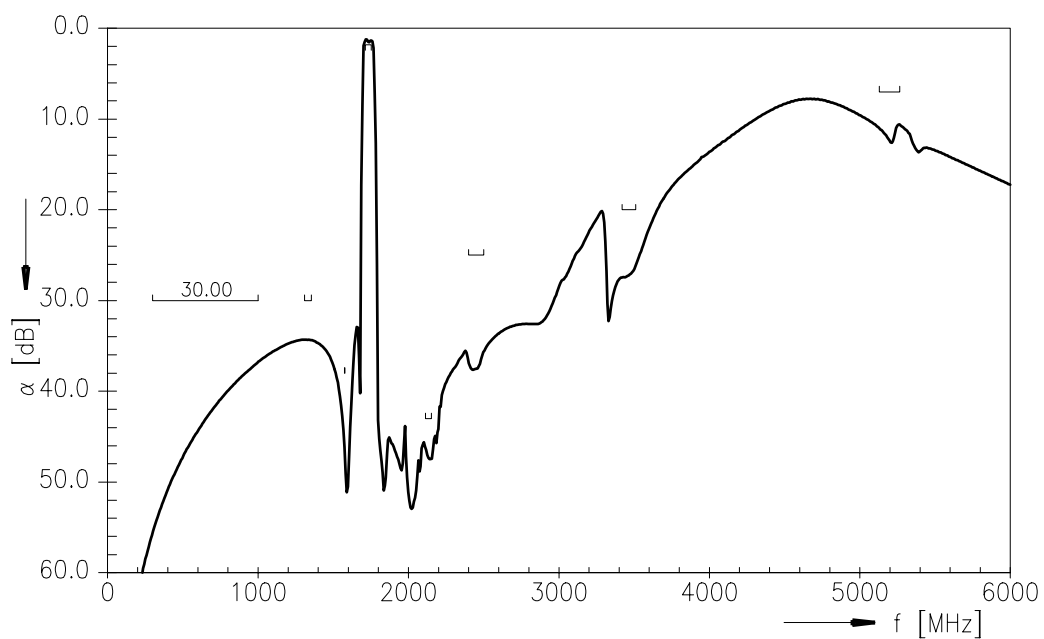
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Frequency Response TX-ANT (Power Transfer Function)



Frequency Response TX-ANT (wideband)



Please read *cautions and warnings* and *important notes* at the end of this document.



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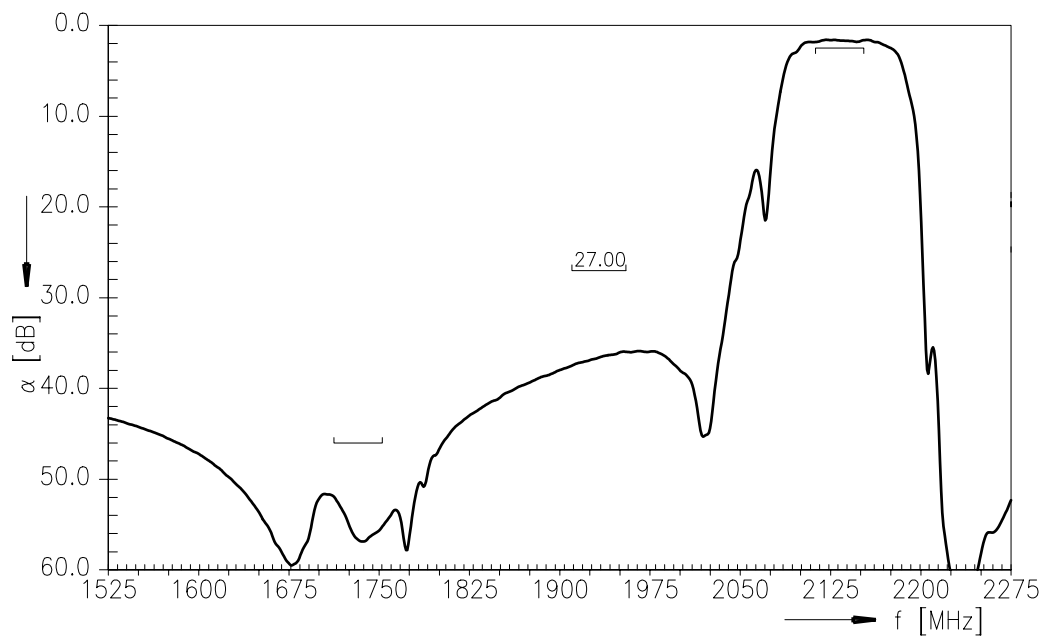
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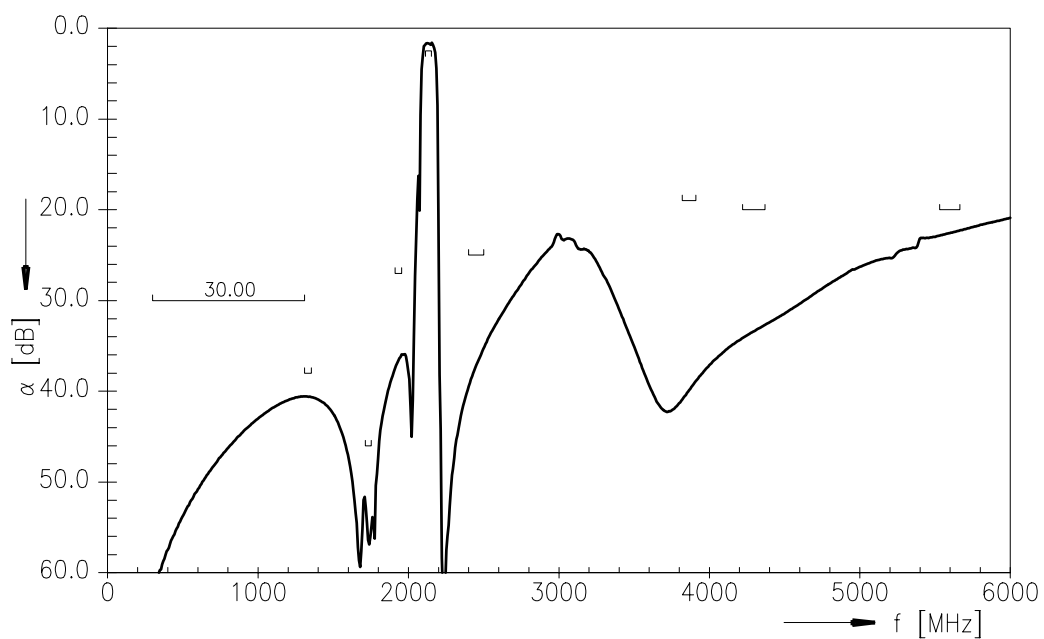
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Frequency Response RX-ANT (Power Transfer Function)



Frequency Response RX-ANT (wideband)



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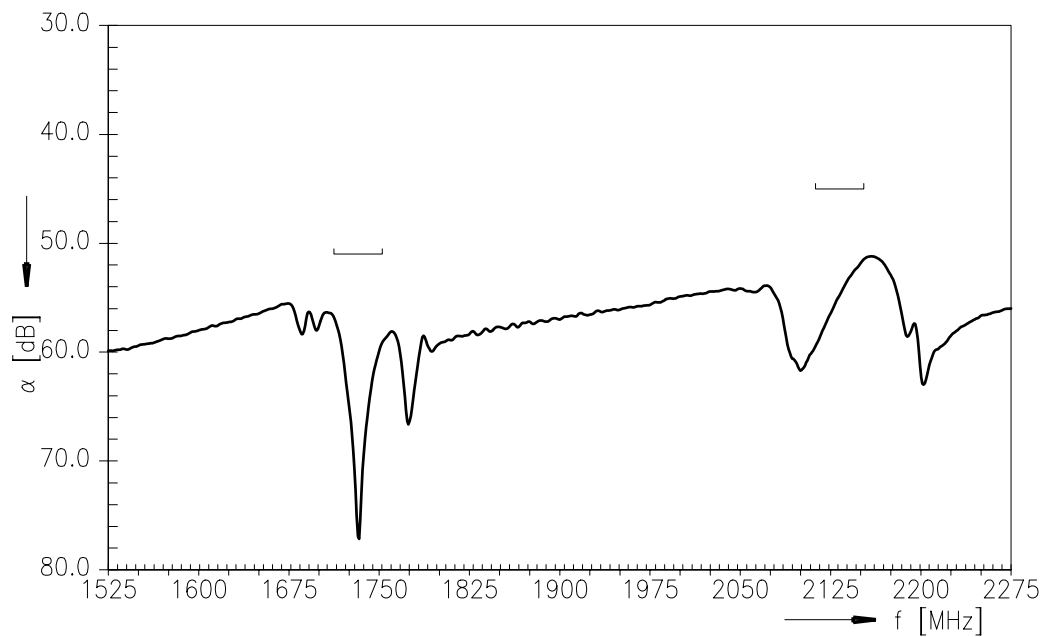
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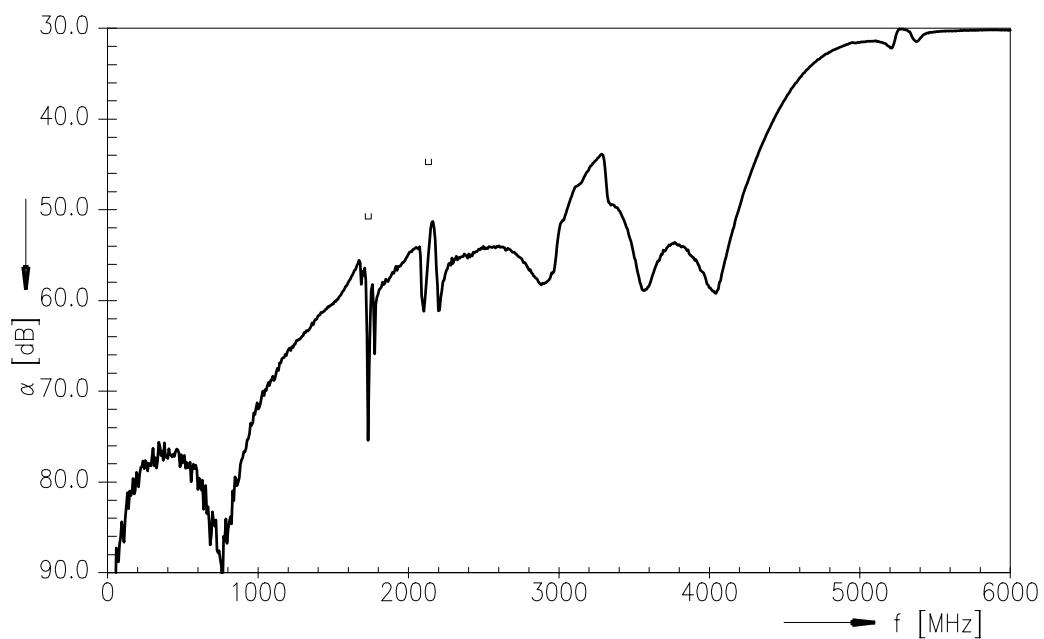
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Frequency Response TX-RX (Power Transfer Function)



Frequency Response TX-RX (wideband)



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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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Surface Acoustic Wave Components Division

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13 February 04, 2010



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