⬡TDK

SAW Components

SAW Duplexer
WCDMA/LTE Band IX

Series/type: **B8562**
Ordering code: **B39182B8562P810**

Date: October 19, 2011
Version: 2.0

⬨TDK

Data Sheet   SMD
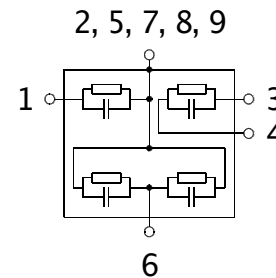
Application

- Low-loss SAW duplexer for mobile telephone WCDMA/LTE Band IX systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path
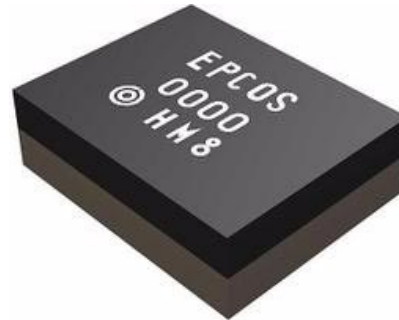
Features

- Package size 2.0 x 1.6 mm^2
- Package height 0.47 mm max.
- RoHS compatible
- Approx. weight 0.006g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni terminals, Au-plated
- Balanced Rx port, unbalanced Tx port
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitivity **L**evel (**MSL**) 3

bottom view

side view

top view
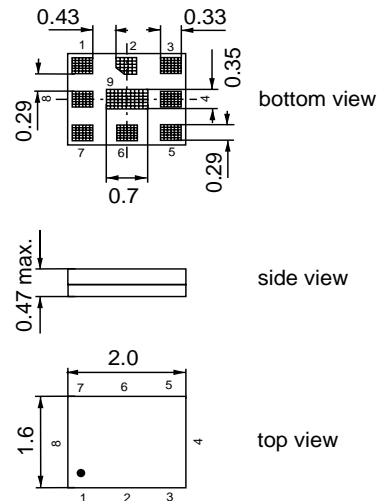
Pin configuration

- 1   Tx input, unbalanced
- 3, 4   Rx output, balanced
- 6   Antenna
- 2, 5, 7, 8, 9   To be grounded

SAW Components	B8562
SAW Duplexer	**1767.4 / 1862.4 MHz**

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Characteristics

Temperature range for specification: T =   -30°C to +85 °C
Antenna terminating impedance: Z_{ANT} =   50 Ω || 3.6 nH
RX terminating impedance: Z_{RX} =   100 Ω (balanced) || 8.2 nH
TX terminating impedance: Z_{TX} =   50 Ω

Characteristics TX - ANT			min.	typ. @ 25 °C	max.	
Center frequency		f_C	—	1767.4	—	MHz
Maximum insertion attenuation						
1749.9 ... 1784.9	MHz			1.4	1.9	dB
@$f_{carrier}$1752.4 ... 1782.4	MHz	α_{WCDMA}[1]		1.4	1.9	dB
Amplitude ripple(p-p)						
1749.9 ... 1784.9	MHz			0.4	0.8	dB
@$f_{carrier}$1752.4 ... 1782.4	MHz	α_{WCDMA}[3]		0.4	0.8	dB
Error Vector Magnitude						
@$f_{carrier}$1752.4 ... 1782.4	MHz	EVM[2]		1.3	2.0	%
Input VSWR (TX port)						
1749.9 ... 1784.9	MHz			1.4	1.8	
Output VSWR (ANT port)						
1749.9 ... 1784.9	MHz			1.5	1.8	

[1] Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

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Characteristics

Temperature range for specification: T =   -30°C to +85 °C
Antenna terminating impedance: Z_{ANT}=   50 Ω ∥ 3.6 nH
RX terminating impedance: Z_{RX} =   100 Ω (balanced) ∥ 8.2 nH
TX terminating impedance: Z_{TX} =   50 Ω

Characteristics TX - ANT				min.	typ. @ 25 °C	max.	
Attenuation			α				
10.0	...	95.0	MHz	30	80		dB
470.0	...	770.0	MHz	30	48		dB
810.0	...	828.0	MHz	30	47		dB
860.0	...	895.0	MHz	30	46		dB
921.0	...	960.0	MHz	30	45		dB
1475.9	...	1500.9	MHz	30	38		dB
1500.9	...	1565.42	MHz	30	38		dB
1565.42	...	1573.374	MHz	35	41		dB
1573.374	...	1577.466	MHz	35	41		dB
1577.466	...	1585.42	MHz	35	42		dB
1597.5515	...	1605.886	MHz	40	44		dB
1605.886	...	1680.0	MHz	25	31		dB
1805.0	...	1845.0	MHz	1	4		dB
1844.9	...	1879.9	MHz	45	49		dB
@f$_{carrier}$ 1847.4	...	1877.4	MHz α_{WCDMA}[1]	45	49		dB
1884.5	...	1919.6	MHz	40	44		dB
2110.0	...	2170.0	MHz	27	40		dB
2400.0	...	2500.0	MHz	35	40		dB
3500.0	...	3570.0	MHz	20	31		dB
5150.0	...	5355.0	MHz	20	23		dB
5725.0	...	5850.0	MHz	18	21		dB

[1] Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).

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Characteristics

Temperature range for specification: $T = -30\,°C$ to $+85\,°C$
Antenna terminating impedance: $Z_{ANT} = 50\,\Omega \parallel 3.6\,nH$
RX terminating impedance: $Z_{RX} = 100\,\Omega$ (balanced) $\parallel 8.2\,nH$
TX terminating impedance: $Z_{TX} = 50\,\Omega$

Characteristics ANT - RX		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1862.4	—	MHz
Maximum insertion attenuation					
1844.9 ... 1879.9 MHz			2.0	2.6	dB
@$f_{carrier}$1847.4 ... 1877.4 MHz α_{WCDMA}[1]			2.0	2.6	dB
Amplitude ripple(p-p)					
1844.9 ... 1879.9 MHz			0.4	0.7	dB
@$f_{carrier}$1847.4 ... 1877.4 MHz α_{WCDMA}[3]			0.3	0.7	dB
Common Mode Rejection Ratio CMRR					
1844.9 ... 1879.9 MHz		21[2]	26		dB
Input VSWR (ANT port)					
1844.9 ... 1879.9 MHz			1.4	1.8	
Output VSWR (RX port)					
1844.9 ... 1879.9 MHz			1.4	1.8	

[1] Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).
[2] A combination of 10º phase balance and 1dB amplitude balance corresponds to 19.6 dB CMRR.

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

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Characteristics

Temperature range for specification: $T = -30\,°C$ to $+85\,°C$
Antenna terminating impedance: $Z_{ANT} = 50\,\Omega \,||\, 3.6\,nH$
RX terminating impedance: $Z_{RX} = 100\,\Omega$ (balanced) $||\, 8.2\,nH$
TX terminating impedance: $Z_{TX} = 50\,\Omega$

Characteristics ANT - RX				**min.**	**typ. @ 25 °C**	**max.**	
Attenuation			α				
10.0	...	95.0	MHz	70	80		dB
614.9	...	626.7	MHz	45	80		dB
922.5	...	940.0	MHz	45	80		dB
1654.9	...	1689.9	MHz	35	56		dB
1689.9	...	1750.0	MHz	35	54		dB
1749.9	...	1784.9	MHz	48	58		dB
@$f_{carrier}$1752.4	...	1782.4	MHz α_{WCDMA}[1]	48	58		dB
1965.0	...	2400.0	MHz	15	52		dB
2400.0	...	2497.0	MHz	30	57		dB
3594.8	...	3664.8	MHz	40	60		dB
3689.8	...	3759.8	MHz	35	60		dB
5344.7	...	5449.7	MHz	40	51		dB
5534.7	...	5639.7	MHz	35	51		dB
5639.7	...	5650.0	MHz	35	51		dB
IMD Product Level Limits[2]							
at f_{TX} = 1767.4 MHz f_{RX} = 1862.4 MHz							
Blocker 1		95.0	MHz		-130	-105	dBm
Blocker 2		1672.4	MHz		-110	-105	dBm
Blocker 3		3629.8	MHz		-117	-105	dBm
Blocker 4		5397.2	MHz		-122	-105	dBm

[1] Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).
[2] IMD product level limits for power levels P_{TX}=21.5dB (antenna port output power) and $P_{BLOCKER}$=-15dBm (antenna port input power).

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Characteristics

Temperature range for specification: T = $-30\,°C$ to $+85\,°C$
Antenna terminating impedance: Z_{ANT}= $50\,\Omega \parallel 3.6\,nH$
RX terminating impedance: Z_{RX} = $100\,\Omega$ (balanced) $\parallel 8.2\,nH$
TX terminating impedance: Z_{TX} = $50\,\Omega$

Characteristics TX - RX			min.	typ. @ 25 °C	max.	
Differential Mode Isolation	α					
1749.9 ... 1784.9	MHz		54	58		dB
@$f_{carrier}$1752.4 ... 1782.4	MHz	α_{WCDMA}[1]	54	58		dB
1844.9 ... 1879.9	MHz		50	54		dB
@$f_{carrier}$1847.4 ... 1877.4	MHz	α_{WCDMA}[3]	50	54		dB
Common mode Isolation	α					
1749.9 ... 1784.9	MHz		51	55		dB
@$f_{carrier}$1752.4 ... 1782.4	MHz	α_{WCDMA}[3]	51	55		dB

[1] Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).

Maximum ratings

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	P_{IN}			source and load impedance 50 Ω
1749.9 ... 1784.9 MHz		29	dBm	} continuous wave
elsewhere		10	dBm	T = 50°C, 5.000 h

[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

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

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for WCDMA Band 9-Passband, $f_{Carrier}$ ranges from 1752.4 MHz (lowest Tx channel) to 1782.4 MHz (highest Tx 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:

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

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

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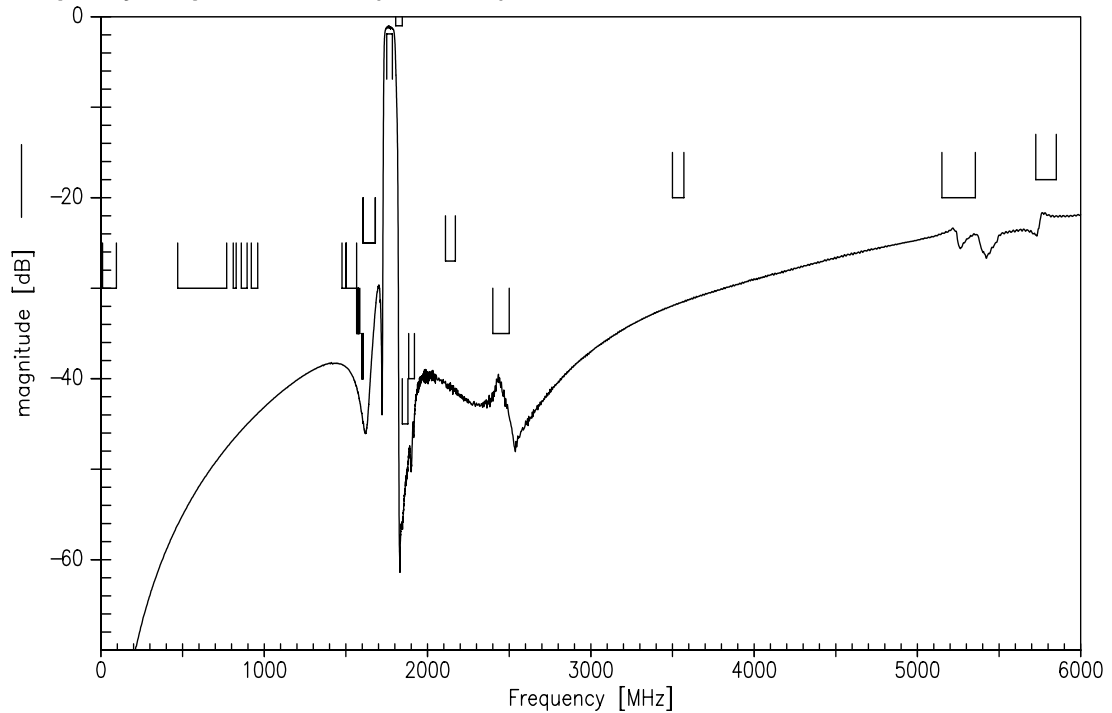| SAW Components	B8562
SAW Duplexer	**1767.4 / 1862.4 MHz**

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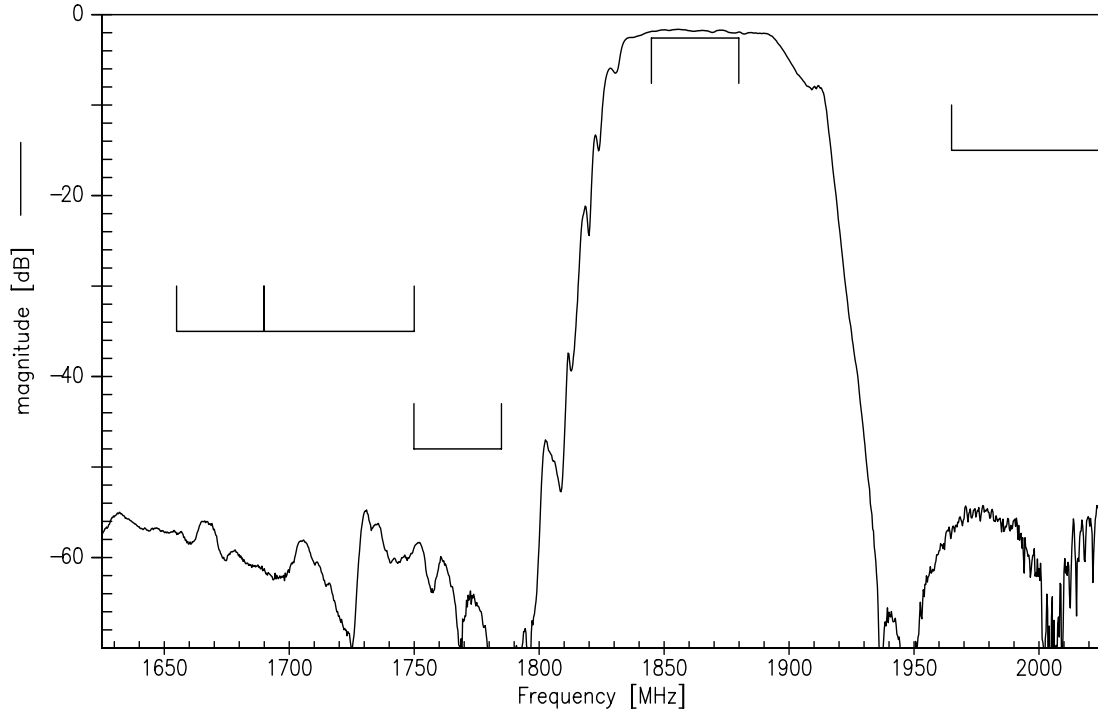**Frequency Response Tx-ANT (passband)**
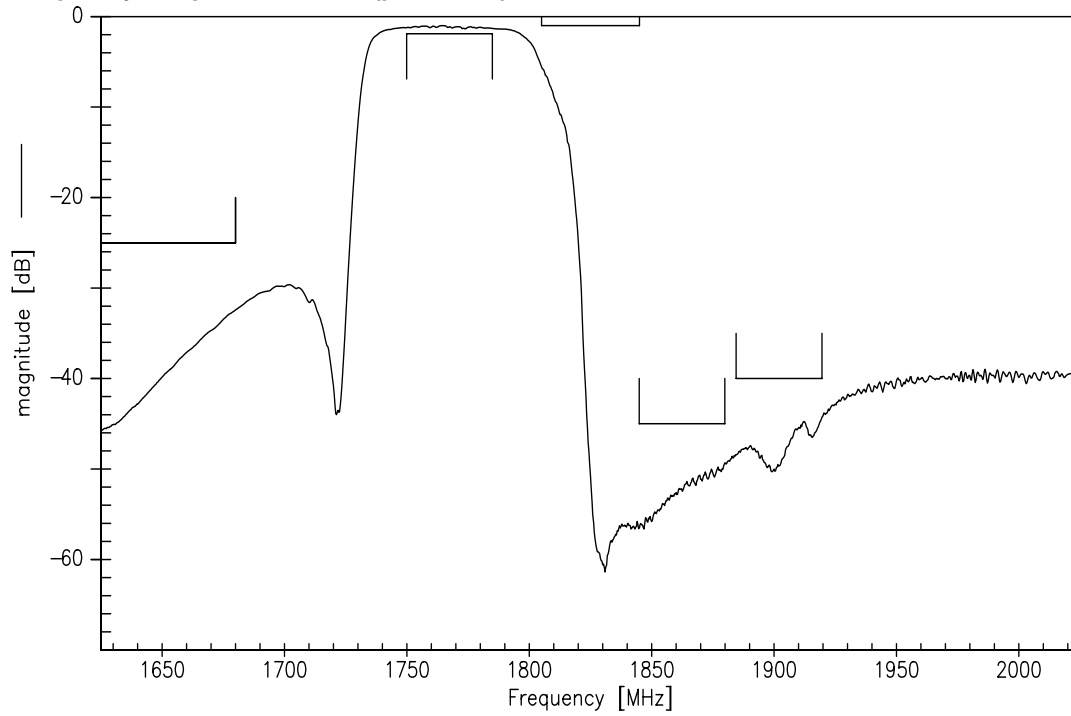
Frequency Response Tx-ANT (wideband)
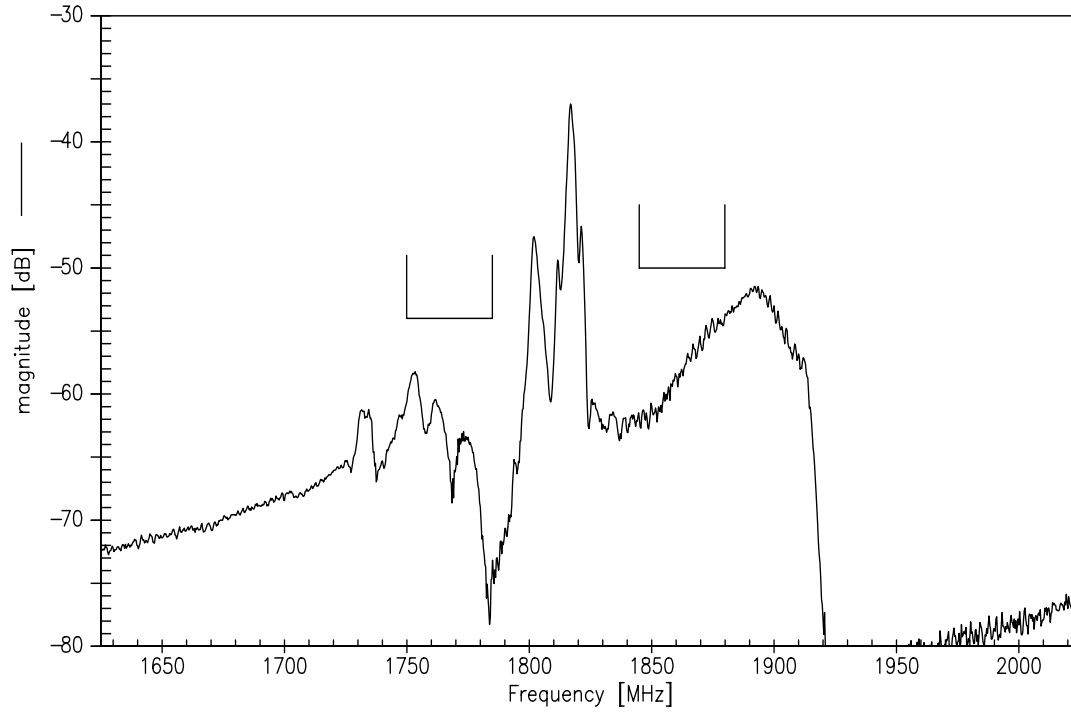
Frequency Response ANT-Rx (passband)

Frequency Response ANT-Rx (wideband)

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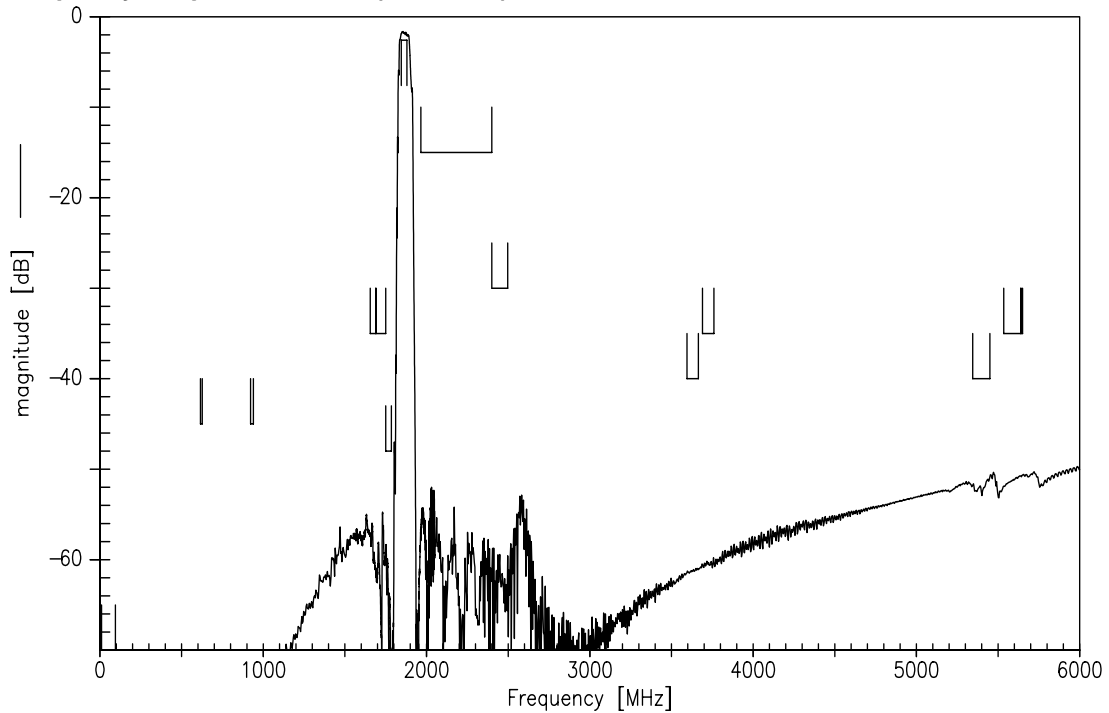
Frequency Response Tx-Rx (passband) / Differential Mode

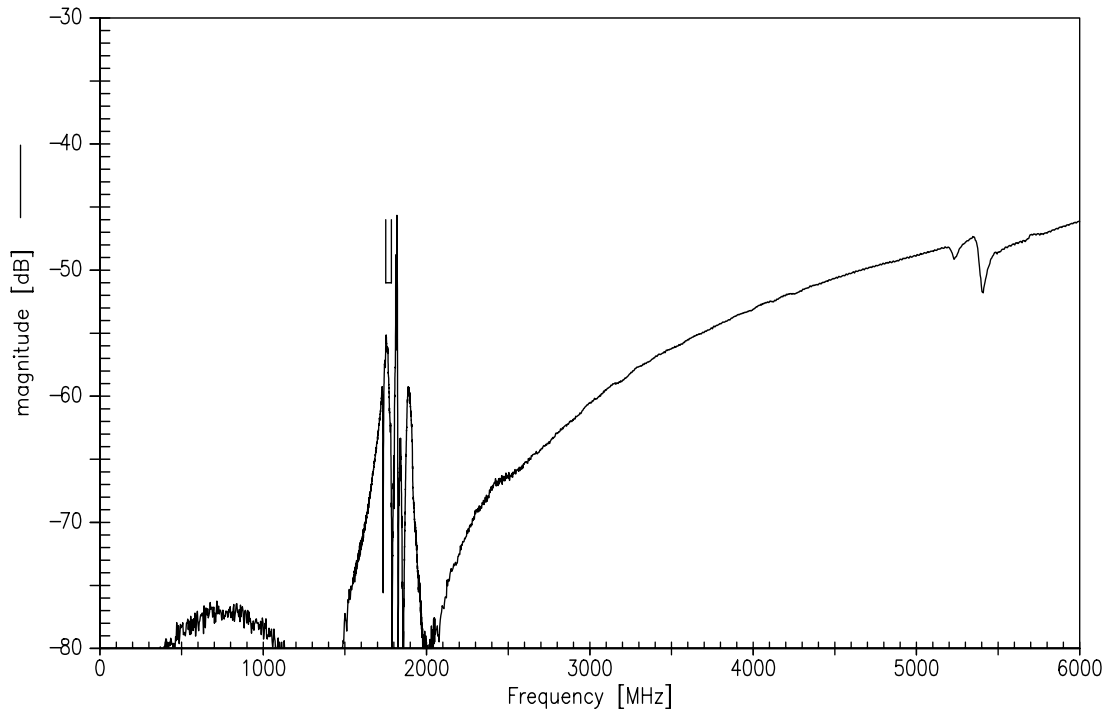**Frequency Response Tx-Rx (wideband) / Differential Mode**
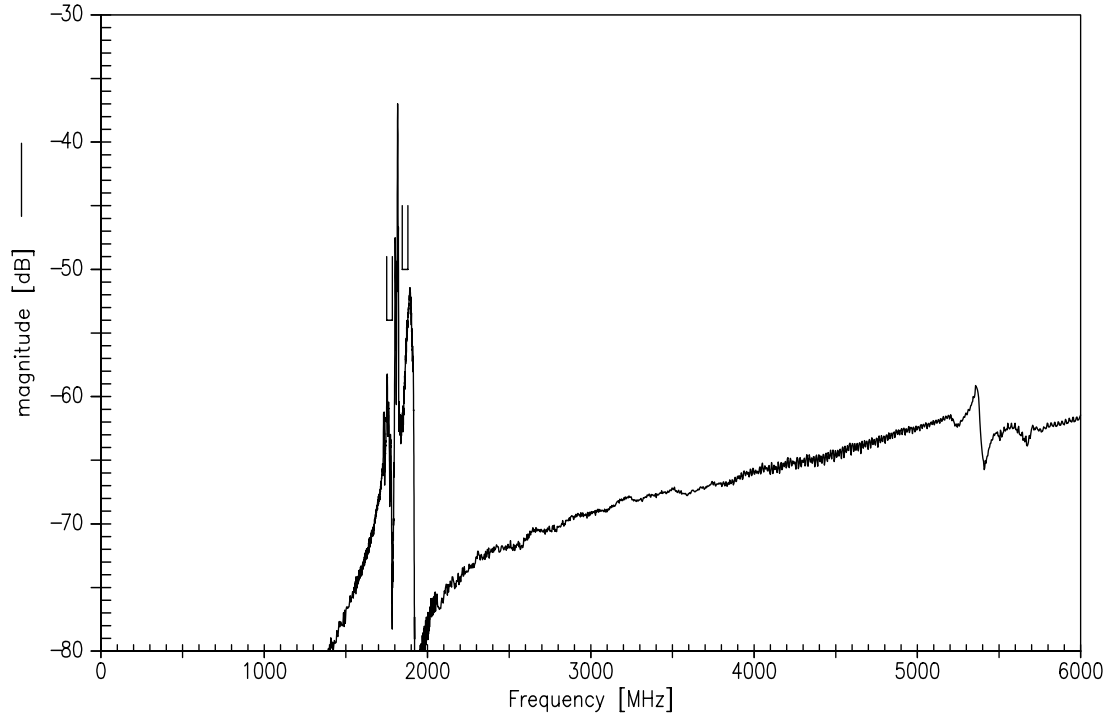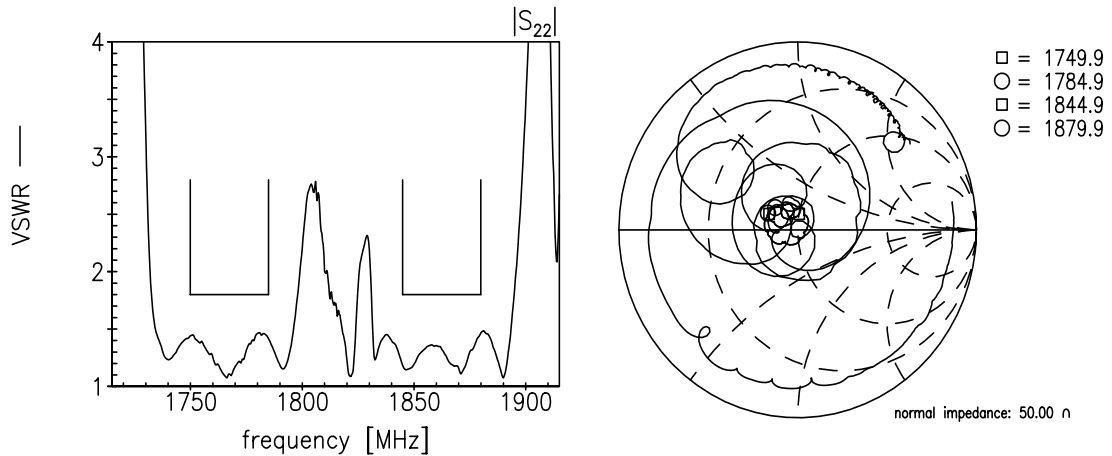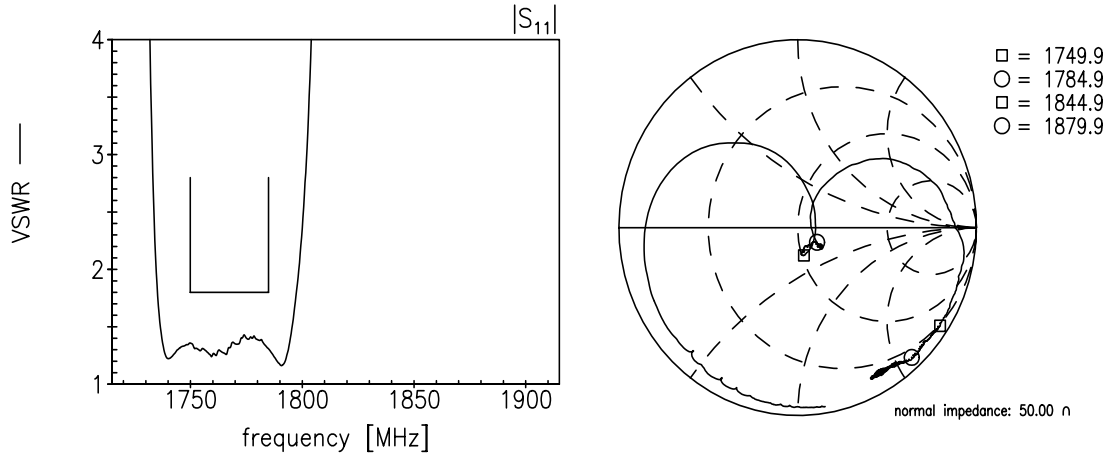
Frequency Response Tx-Rx (passband) / Common Mode
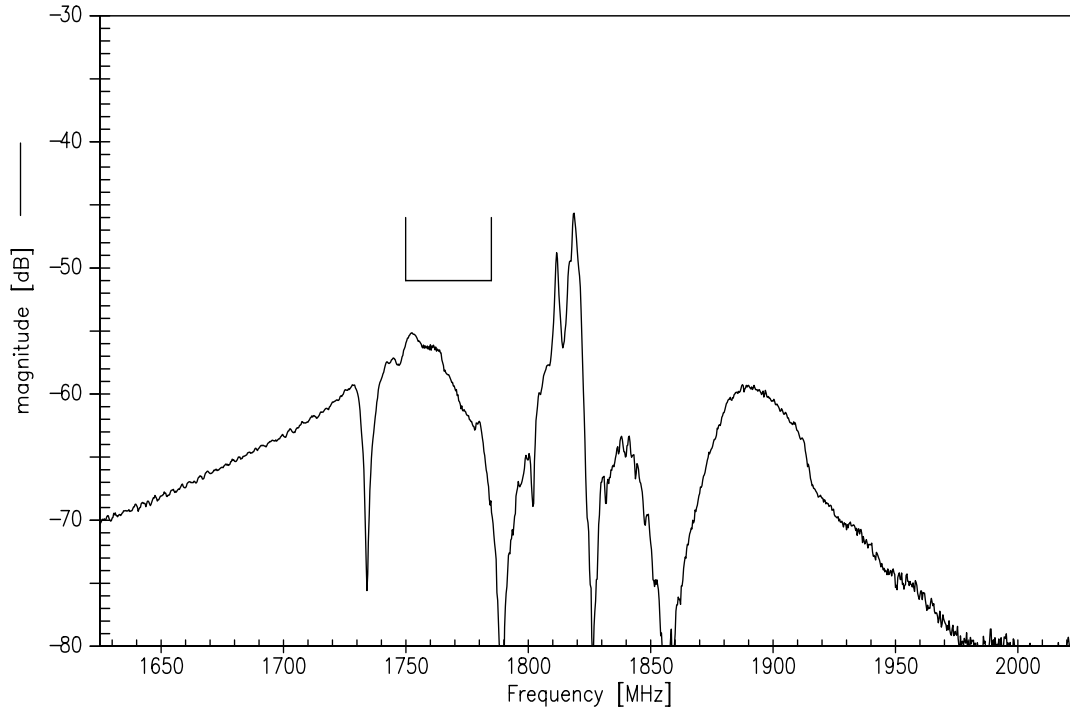
Frequency Response Tx-Rx (wideband) / Common Mode

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Return Loss   S₁₁ Tx - port   S₂₂ ANT - port   S₃₃ Rx - port

$|S_{11}|$

VSWR

frequency [MHz]

□ = 1749.9
○ = 1784.9
□ = 1844.9
○ = 1879.9

normal impedance: 50.00 Ω

$|S_{33}|$

VSWR

frequency [MHz]

□ = 1749.9
○ = 1784.9
□ = 1844.9
○ = 1879.9

normal impedance: 50.00 Ω

$|S_{22}|$

VSWR

frequency [MHz]

□ = 1749.9
○ = 1784.9
□ = 1844.9
○ = 1879.9

normal impedance: 50.00 Ω

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References

Type	B8562
Ordering code	B39182B8562P810
Marking and package	C61157-A8-A40
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8562_NB.s4p, B8562_WB.s4p 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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

Matching coils	See Inductor pdf-catalog
	    http://www.tdk.co.jp/tefe02/coil.htm#aname1
	and Data Library for circuit simulation
	    http://www.tdk.co.jp/etvcl/index.htm

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