



SAW Components

SAW Duplexer

Cellular / WCDMA Band 5

Series/type:	B8547
Ordering code:	B39881B8547P810
Date:	September 1, 2014
Version:	2.0

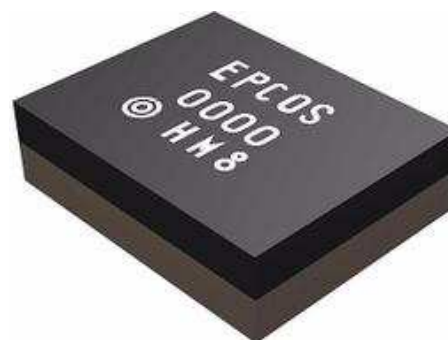
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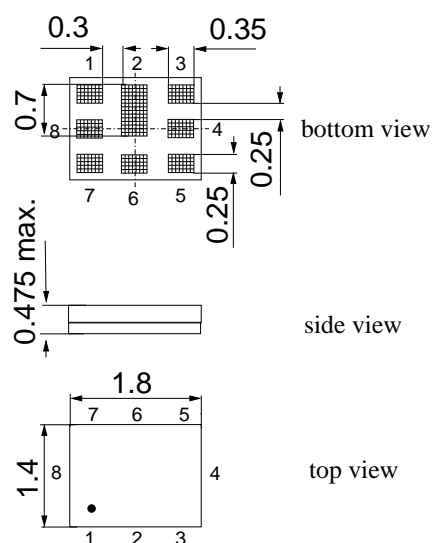
Data sheet

Application

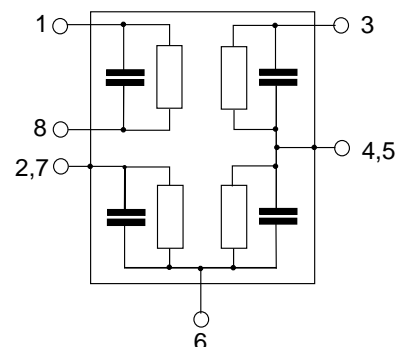
- Multimode SAW duplexer for mobile telephone Cellular / WCDMA Band 5 systems
- Low insertion attenuation
- Low amplitude ripple
- High Tx band isolation
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation from 50 Ω to 100 Ω in Antenna - RX path


Features

- Package size 1.8 x 1.4 mm²
- Max. package height 0.475 mm
- Approx. weight 0.0042g
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 3**


Pin configuration

- 3 Tx Input
- 1,8 Rx Output (balanced)
- 6 Antenna
- 2, 4, 5, 7 To be grounded



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Characteristics

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

Characteristics TX - ANT		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	836.5	—	MHz
Maximum insertion attenuation	α _{max}	—	1.5	2.0	dB
824.0 ... 849.0 MHz					
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾	—	1.5	1.8	dB
Amplitude ripple	Δα	—	0.5	1.1	dB
824.0 ... 849.0 MHz					
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ²⁾	—	0.5	0.9	dB
Amplitude ripple over any 5MHz channel	Δα _{ch}	—	0.4	1.0	dB
824.0 ... 849.0 MHz					
Error Vector Magnitude	EVM ²⁾	—	1.0	2.5	%
@f _{Carrier} 826.4 ... 846.6 MHz					
Input VSWR (TX port)		—	1.6	2.0	dB
824.0 ... 849.0 MHz					
Output VSWR (ANT port)		—	1.5	2.0	dB
824.0 ... 849.0 MHz					

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.

Data sheet

Characteristics

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

Characterisitcs TX - ANT				min.	typ. @ 25 °C	max.	
Absolute attenuation							
			α				
	10.0	... 420.0	MHz	38	43	—	dB
	420.0	... 494.0	MHz	35	40	—	dB
	494.0	... 701.0	MHz	32	35	—	dB
	701.0	... 728.0	MHz	32	35	—	dB
	728.0	... 764.0	MHz	32	35	—	dB
	764.0	... 804.0	MHz	30	37	—	dB
	860.0	... 864.0	MHz	3	11	—	dB
	864.0	... 869.0	MHz	13	50	—	dB
	869.0	... 894.0	MHz	45	49	—	dB
@f _{Carrier}	871.4	... 891.6	MHz α _{WCDMA} ¹⁾	46	51	—	dB
	1559.0	... 1563.0	MHz	38	41	—	dB
	1565.420	... 1573.374	MHz	38	41	—	dB
	1573.374	... 1577.466	MHz	38	41	—	dB
	1577.466	... 1585.420	MHz	38	41	—	dB
	1597.5515	... 1605.886	MHz	39	42	—	dB
	1638.0	... 1708.0	MHz	39	43	—	dB
	1844.9	... 1879.9	MHz	40	45	—	dB
	1884.5	... 1919.6	MHz	42	47	—	dB
	1930.0	... 1990.0	MHz	44	47	—	dB
	2110.0	... 2170.0	MHz	44	47	—	dB
	2400.0	... 2547.0	MHz	36	41	—	dB
	3286.0	... 3406.0	MHz	31	36	—	dB
	4110.0	... 4255.0	MHz	29	34	—	dB
	4900.0	... 5950.0	MHz	20	25	—	dB

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

Data sheet

Characteristics

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

Characteristics ANT - RX		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	881.5	—	MHz
Maximum insertion attenuation	α _{max}				
869.0 ... 894.0 MHz		—	1.6	2.2	dB
@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ¹⁾	—	1.6	1.9	dB
Amplitude ripple (p-p)	Δα				
869.0 ... 894.0 MHz		—	0.8	1.1	dB
@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ²⁾	—	0.3	0.6	dB
Amplitude ripple over any 5MHz channel	Δα _{ch}				
869.0 ... 894.0 MHz		—	0.4	0.8	dB
Error Vector Magnitude					
@f _{Carrier} 871.4 ... 891.6 MHz	EVM ²⁾	—	1.9	3.0	%
Input VSWR (ANT port)					
869.0 ... 894.0 MHz		—	1.6	2.1	
Output VSWR (RX port)					
869.0 ... 894.0 MHz		—	1.8	2.1	
Common mode rejection ratio					
869.0 ... 894.0 MHz	CMRR	18 ³⁾	21	—	dB
IMD product level limits⁴⁾					
at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz					
Blocker 1	45.0 MHz	—	-128	-109	dBm
Blocker 2	791.5 MHz	—	-112	-102	dBm
Blocker 3	1718.0 MHz	—	-109	-99	dBm
Blocker 4	2554.5 MHz	—	-126	-109	dBm

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.

3) A combination of 10° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

4) Power levels: 21.5 dBm Tx signal, -15dBm blocker at antenna port.

Data sheet

Characteristics

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

Characterisitcs ANT - RX				min.	typ. @ 25 °C	max.	
Attenuation			α				
	10.0	...	477.0 MHz	50	75	—	dB
			45.0 MHz	50	61	—	dB
	477.0	...	824.0 MHz	50	60	—	dB
	779.0	...	804.0 MHz	55	61	—	dB
	824.0	...	849.0 MHz	50	60	—	dB
@f _{Carrier}	826.4	...	846.6 MHz $\alpha_{\text{WCDMA}}^{1)}$	51	62	—	dB
	849.0	...	854.0 MHz	27	40	—	dB
	909.0	...	920.0 MHz	10	18	—	dB
	920.0	...	979.0 MHz	24	49	—	dB
	979.0	...	1710.0 MHz	48	53	—	dB
	1693.0	...	1743.0 MHz	48	54	—	dB
	1710.0	...	1785.0 MHz	47	54	—	dB
	1785.0	...	1788.0 MHz	47	54	—	dB
	1850.0	...	1920.0 MHz	45	54	—	dB
	1920.0	...	1980.0 MHz	45	54	—	dB
	1980.0	...	2400.0 MHz	45	52	—	dB
	2400.0	...	2500.0 MHz	42	51	—	dB
	2517.0	...	2592.0 MHz	42	50	—	dB
	2607.0	...	2682.0 MHz	42	50	—	dB
	3476.0	...	3576.0 MHz	40	48	—	dB
	4345.0	...	4470.0 MHz	40	47	—	dB
	4900.0	...	5950.0 MHz	36	44	—	dB
	5214.0	...	5364.0 MHz	36	45	—	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 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs TX - RX		min.	typ. @ 25 °C	max.	
Differential mode isolation					
	α				
	824.0 ... 849.0 MHz	55	61	—	dB
@f _{Carrier}	826.4 ... 846.6 MHz	57	61	—	dB
	869.0 ... 894.0 MHz	50	53	—	dB
@f _{Carrier}	871.4 ... 891.6 MHz	51	54	—	dB
	1574.0 ... 1577.0 MHz	50	65	—	dB
	1638.0 ... 1708.0 MHz	50	65	—	dB
	2462.0 ... 2557.0 MHz	45	59	—	dB
Common mode isolation					
	α				
	824.0 ... 849.0 MHz	53	56	—	dB
@f _{Carrier}	826.4 ... 846.6 MHz	54	57	—	dB

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

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 WCDMA Band V TX passband, f_{Carrier} ranges from 826.4 MHz (lowest TX channel) to 846.6 MHz (highest TX 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:

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

Maximum ratings

Storage temperature range	T_{stg}	-40/+85	°C	Machine Model source and load impedance 50 Ω } continuous wave } $T = 50^\circ\text{C}, 5000\text{ h}$
DC voltage	V_{DC}	5 ¹⁾	V	
ESD voltage	V_{ESD}	100 ²⁾	V	
Input power	P_{IN}			
824.0 ... 849.0 MHz elsewhere		29 10	dBm dBm	

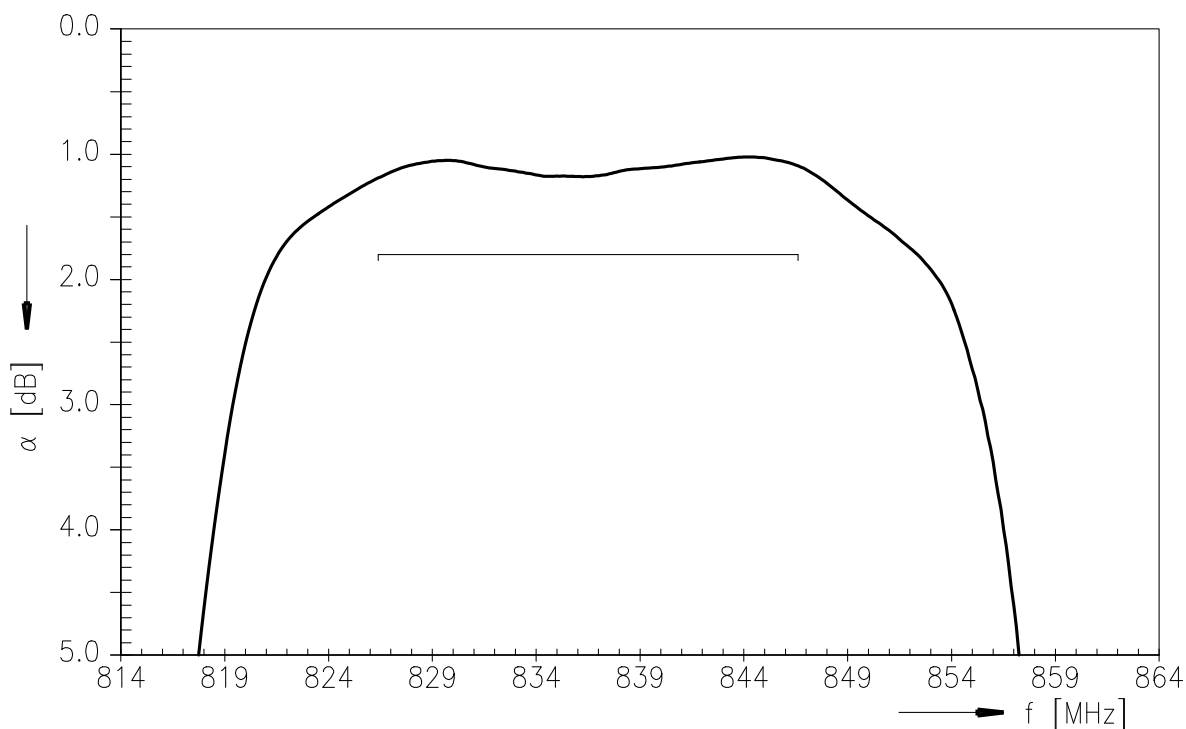
¹⁾ 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

²⁾ acc. to JESD22-A115B (MM - Machine Model), 10 negative and 10 positive pulses.

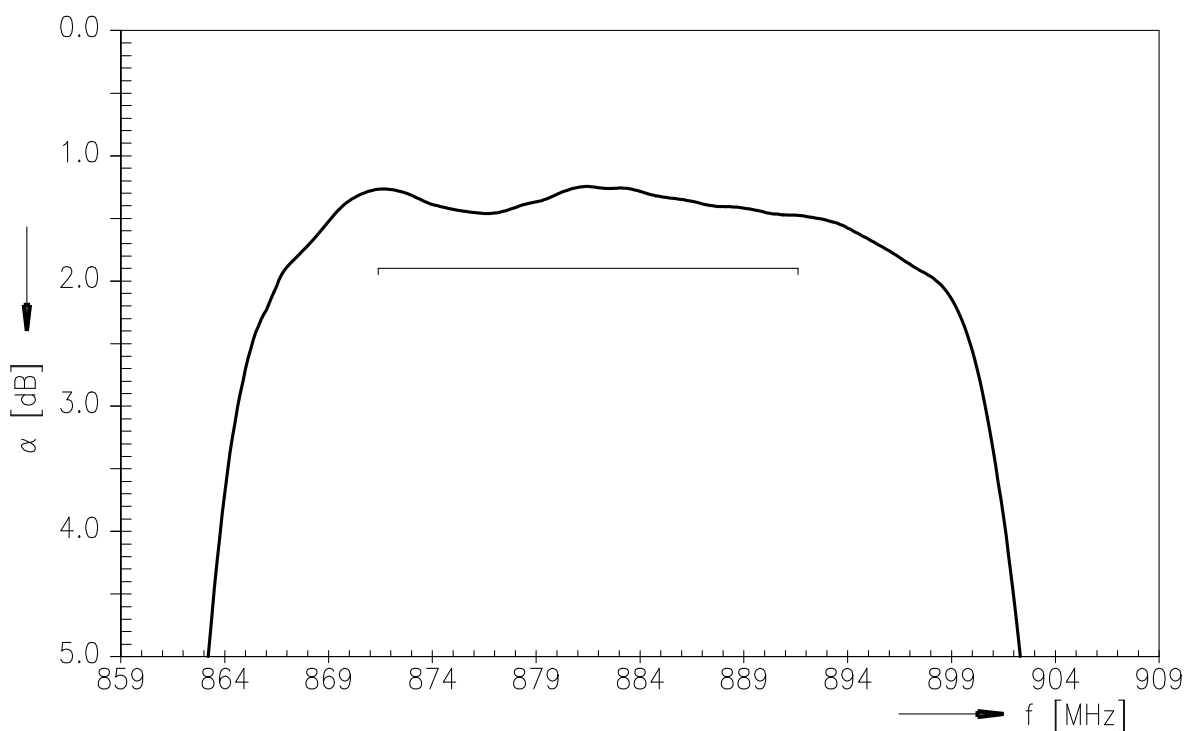
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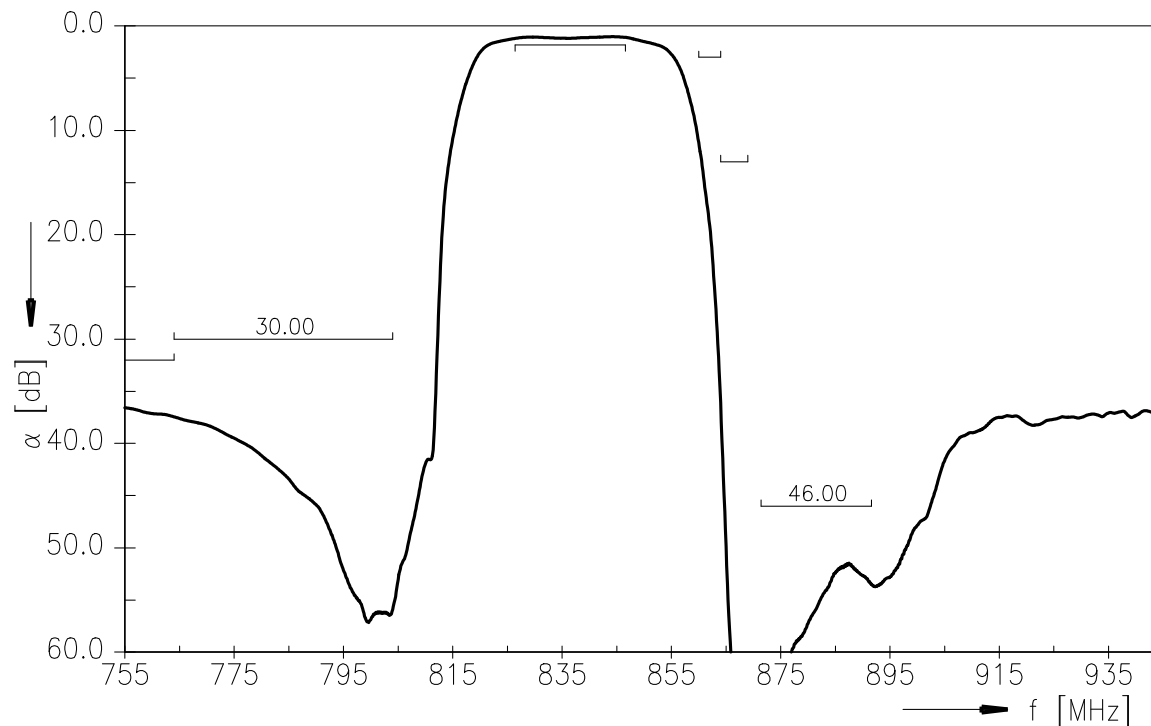
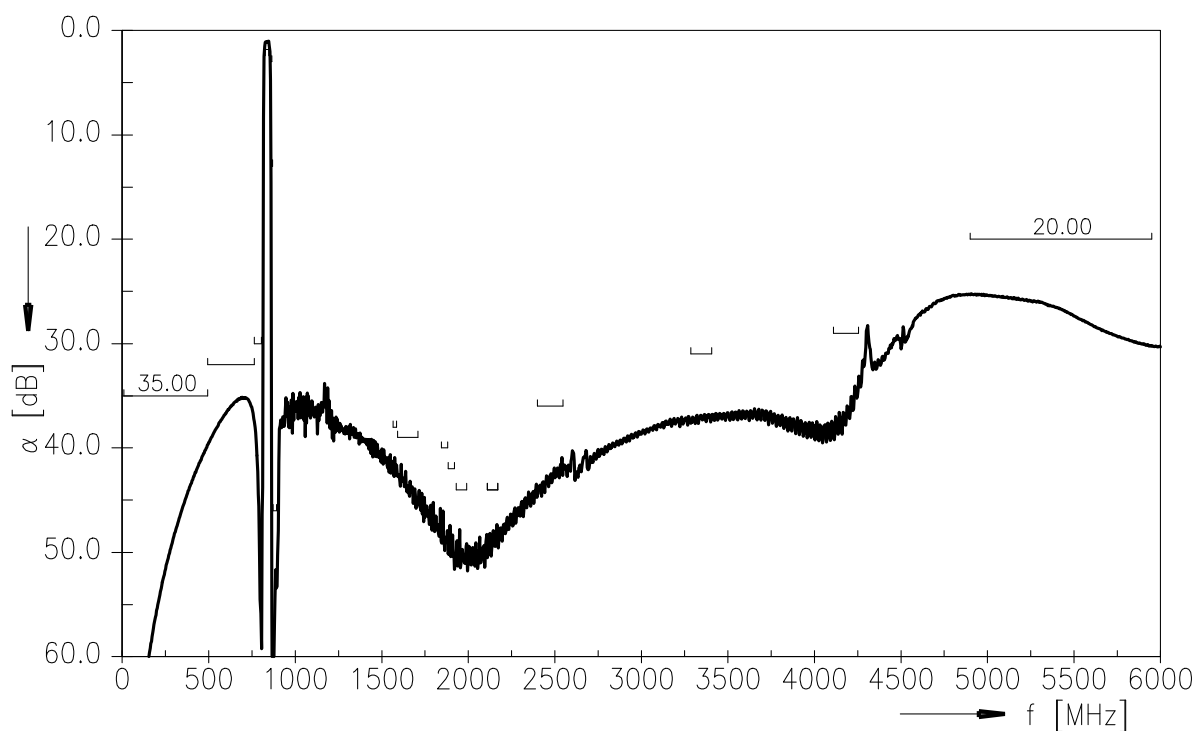
Frequency Response TX-ANT (Power transfer function)



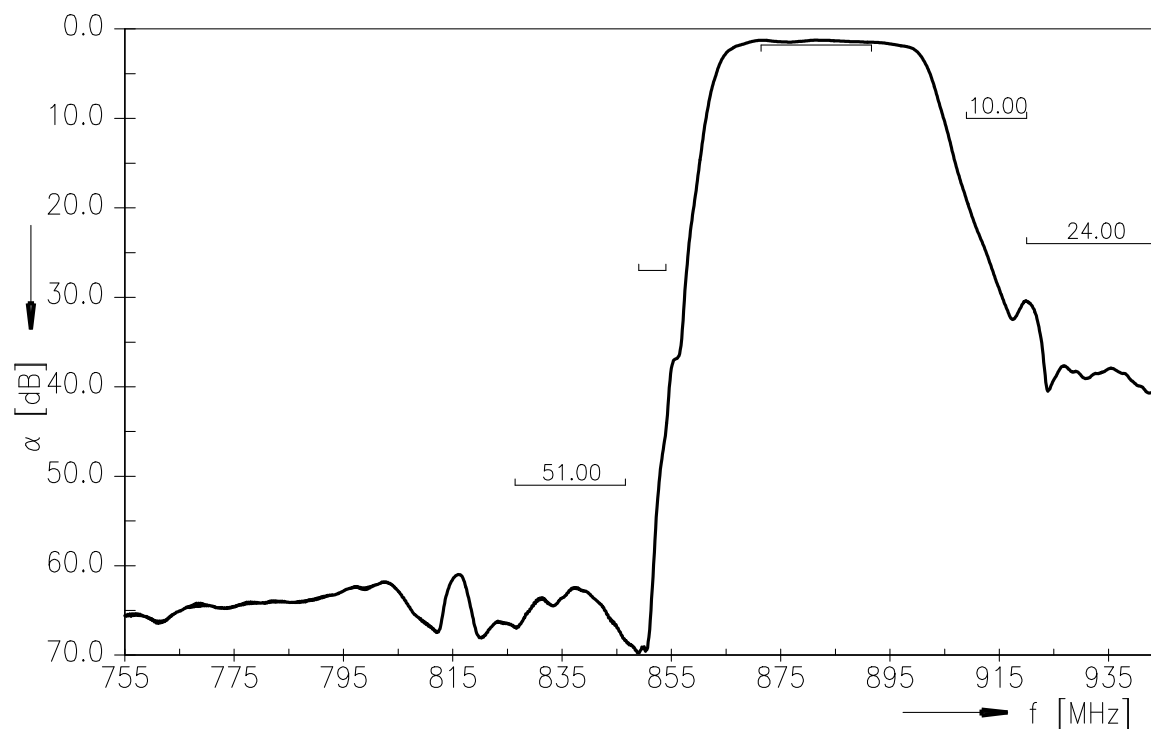
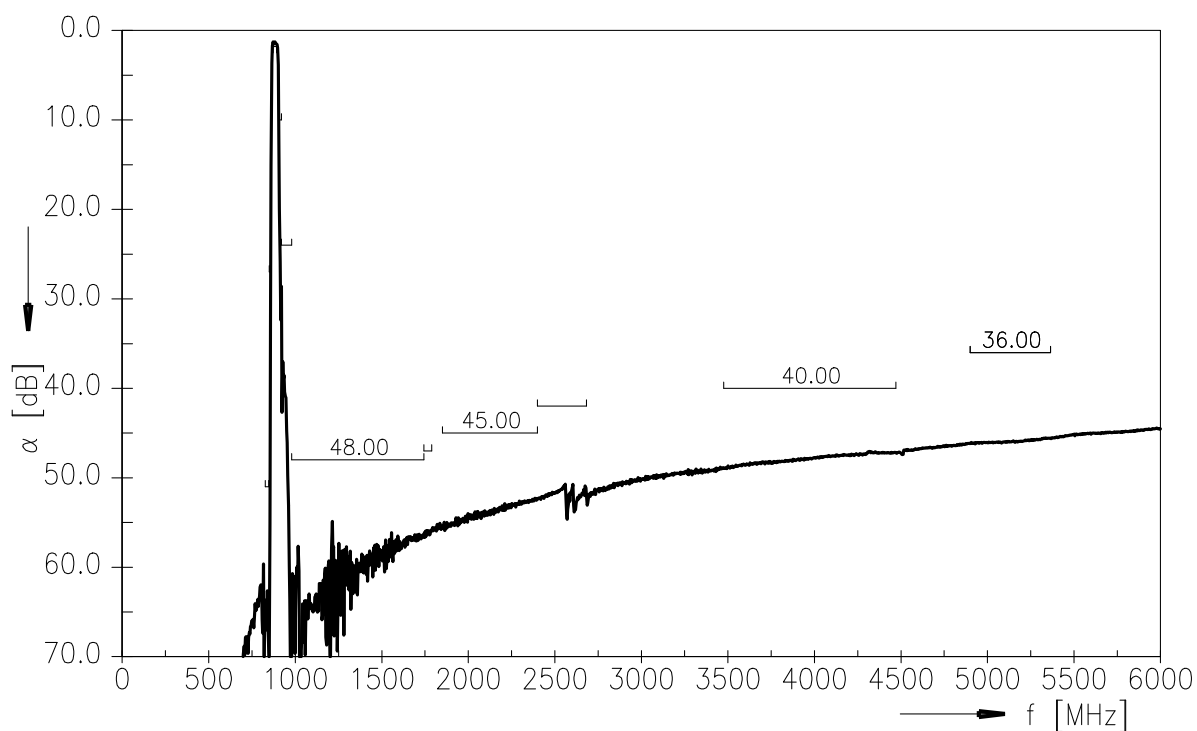
Frequency Response ANT-RX (Power transfer function)



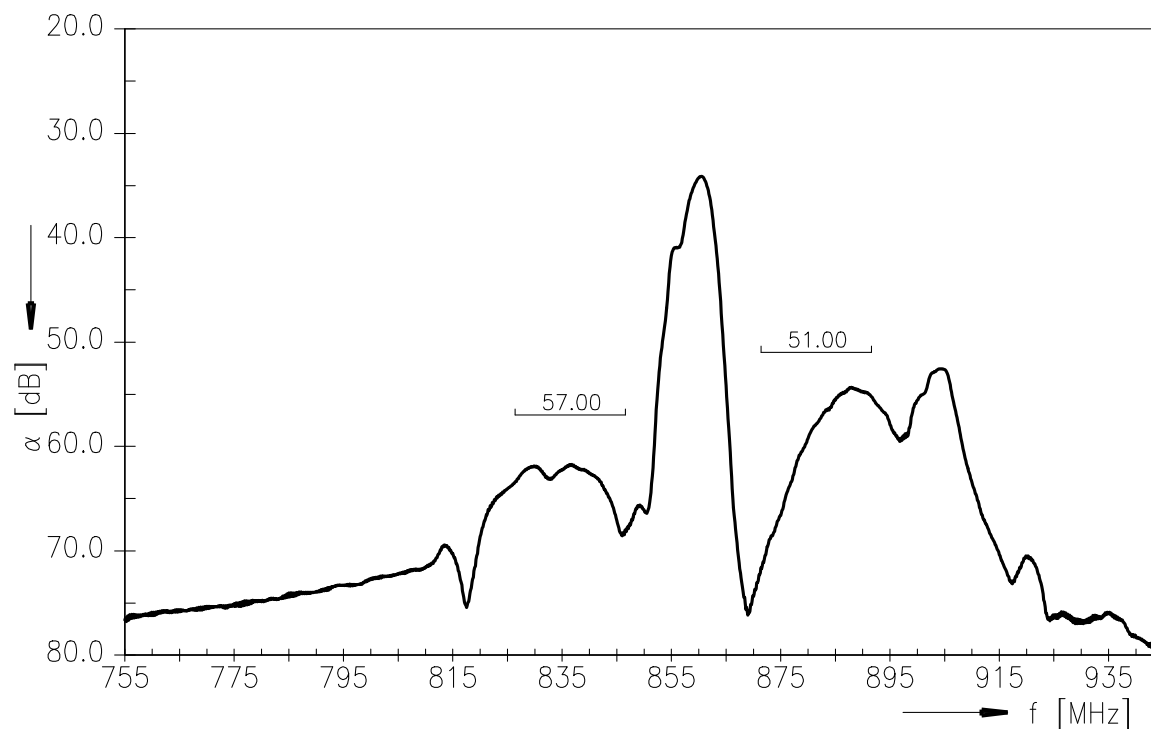
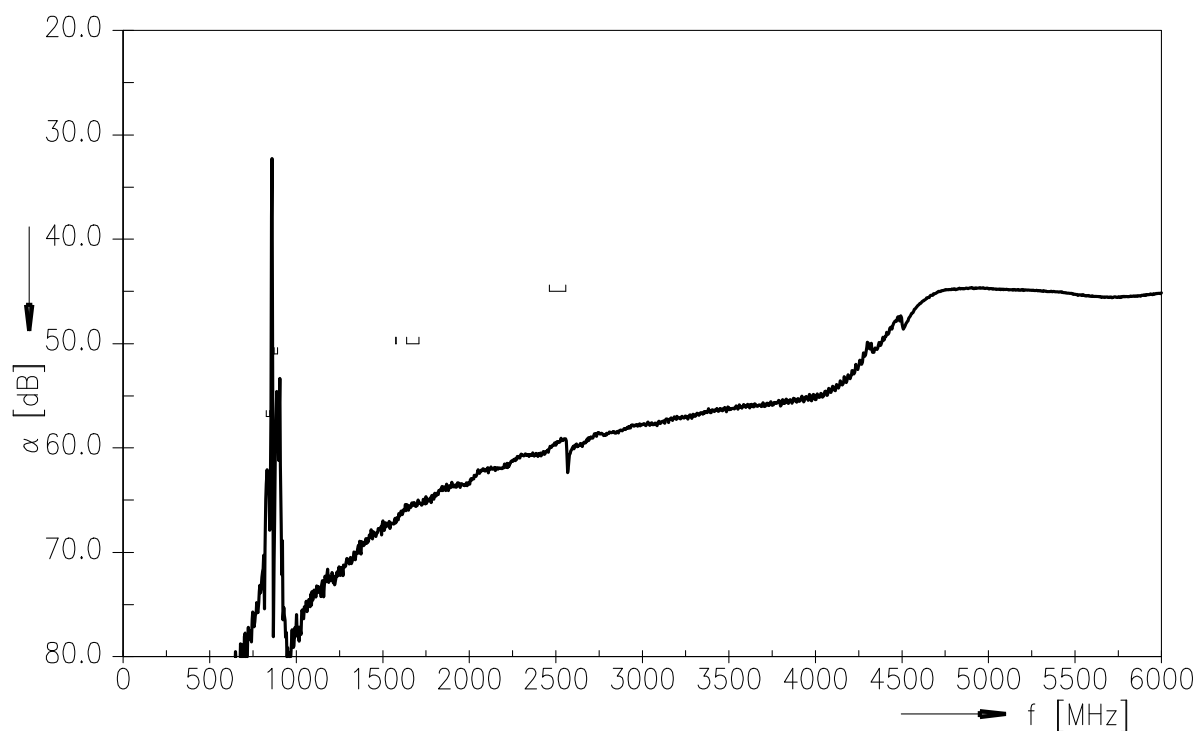
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Frequency Response TX-ANT (Power transfer function)

Frequency Response TX-ANT (wideband)


Data sheet


Frequency Response ANT-RX (Power transfer function)

Frequency Response ANT-RX (wideband)


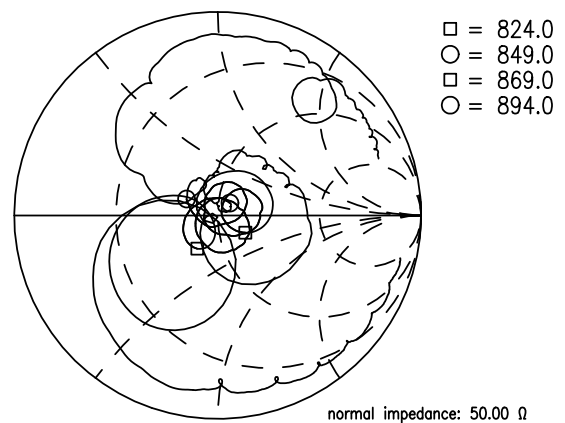
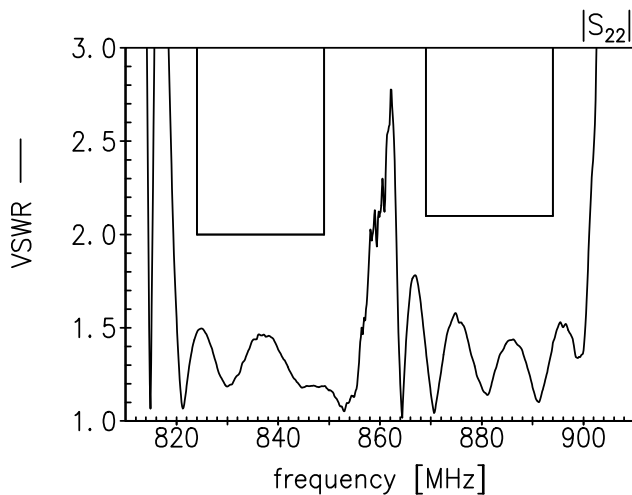
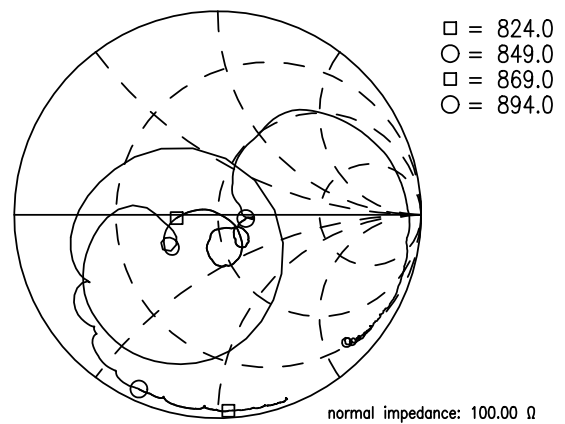
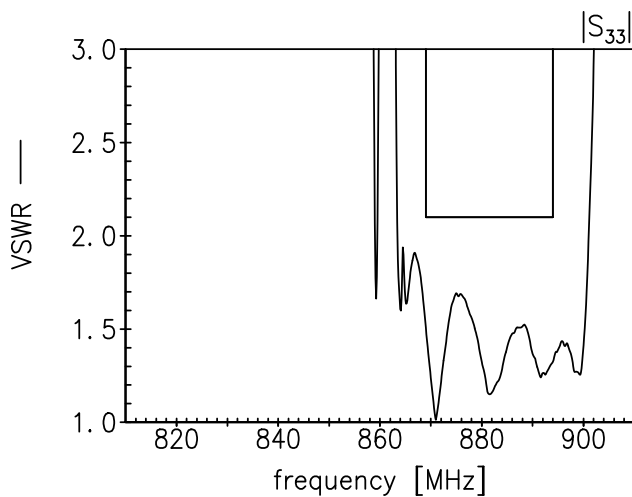
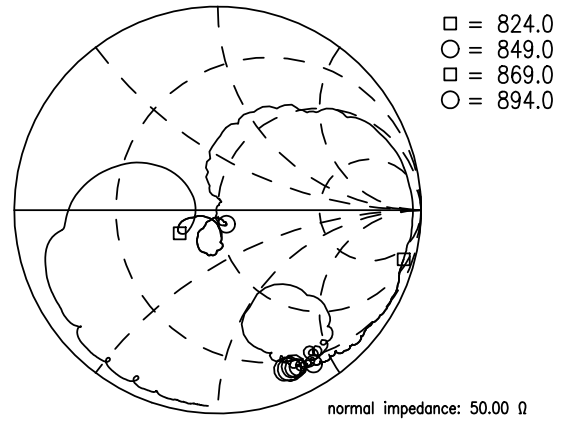
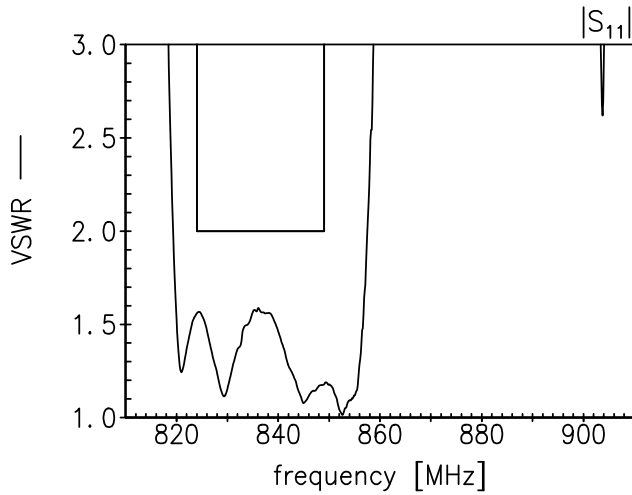
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Differential mode isolation TX-RX (Power transfer function)

Differential mode isolation TX-RX (wideband)


Data sheet



VSWR **S₁₁ TX-port** **S₂₂ ANT-port** **S₃₃ RX-port**



References

Type	B8547
Ordering code	B39881B8547P810
Marking and package	C61157-A8-A68
Packaging	F61074-V8259-Z000
Date codes	L_1126
S-parameters	B8547_NB_UN.s4p, B8547_WB_UN.s4p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8 th , 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
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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