# SAW Components

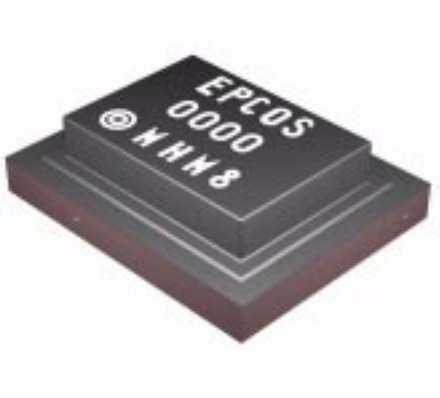
## SAW Duplexer

LTE Band 17

| | |
|---|---|
| **Series/type:** | **B7924** |
| **Ordering code:** | **B39741B7924P810** |
| Date: | October 06, 2011 |
| Version: | 2.0 |

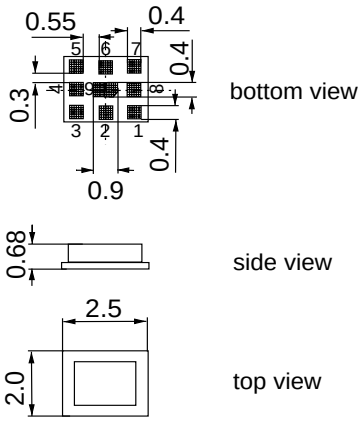
## Application

- Low-loss SAW duplexer for mobile telephone LTE Band 17 systems
- High attenuation
- High Isolation
- Low amplitude ripple
- Usable passband 12 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path
- Very small size and low height



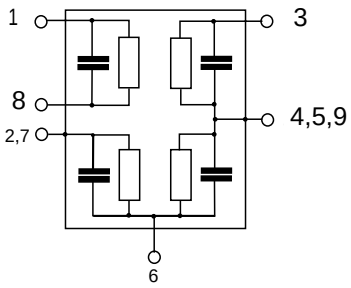

## Features

- Package size 2.5 * 2.0 * 0.68 mm$^3$
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, Au-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitivity **L**evel 3




## Pin configuration

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



## Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: $Z_{Tx}$ = 50 Ω
ANT terminating impedance: $Z_{Ant}$ = 50 Ω || 10 nH
RX teminating impedance: $Z_{Rx}$ = 100 Ω (balanced)

| **Characteristics Tx-Antenna** | | | **min.** | **typ. @ 25 ˚C** | **max.** | |
|---|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | | | 710.0 | | MHz |
| **Maximum insertion attenuation** | α | | | | | |
| 704.0 ... 716.0 MHz | | | | 1.6 | 2.5 | dB |
| **Amplitude ripple** (p-p) | Δα | | | | | |
| 704.0 ... 716.0 MHz | | | | 0.6 | 1.6 | dB |
| **Error Vector Magnitude** | | | | | | |
| @ $f_{Carrier}$ 706.4 ... 712.0 MHz | EVM[1)] | | | 1.4 | 3.5 | % |
| @ $f_{Carrier}$ 712.0 ... 713.6 MHz | EVM[1)] | | | 1.3 | 4.0 | % |
| **Input VSWR (Tx port)** | | | | | | |
| 704.0 ... 716.0 MHz | | | | 1.5 | 2.0 | |
| **Output VSWR (Ant Port)** | | | | | | |
| 704.0 ... 716.0 MHz | | | | 1.5 | 2.0 | |

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

## Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: $Z_{Tx}$ = 50 Ω
ANT terminating impedance: $Z_{Ant}$ = 50 Ω || 10 nH
RX teminating impedance: $Z_{Rx}$ = 100 Ω (balanced)

| Characteristics Tx-Antenna | | | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|---|---|
| **Absolute attenuation** | | | α | | | | |
| 10.0 | ... | 692.0 | MHz | 30 | 46 | | dB |
| 692.0 | ... | 698.0 | MHz | 4 | 10 | | dB |
| 722.0 | ... | 728.0 | MHz | 4 | 13 | | dB |
| 728.0 | ... | 734.0 | MHz | 26 | 37 | | dB |
| 734.0 | ... | 746.0 | MHz | 50 | 57 | | dB |
| 746.0 | ... | 768.0 | MHz | 30 | 48 | | dB |
| 768.0 | ... | 805.0 | MHz | 25 | 44 | | dB |
| 869.0 | ... | 894.0 | MHz | 30 | 44 | | dB |
| 1408.0 | ... | 1432.0 | MHz | 30 | 57 | | dB |
| 1565.0 | ... | 1607.0 | MHz | 45 | 50 | | dB |
| 1930.0 | ... | 1990.0 | MHz | 35 | 43 | | dB |
| 2110.0 | ... | 2130.0 | MHz | 27 | 35 | | dB |
| 2130.0 | ... | 2170.0 | MHz | 35 | 42 | | dB |
| 2300.0 | ... | 2400.0 | MHz | 30 | 40 | | dB |
| 2400.0 | ... | 2497.0 | MHz | 32 | 40 | | dB |
| 2497.0 | ... | 2690.0 | MHz | 20 | 39 | | dB |
| 2816.0 | ... | 2864.0 | MHz | 20 | 38 | | dB |
| 3300.0 | ... | 3800.0 | MHz | 20 | 38 | | dB |
| 4224.0 | ... | 4296.0 | MHz | 20 | 25 | | dB |
| 4928.0 | ... | 5012.0 | MHz | 12 | 18 | | dB |
| 5150.0 | ... | 5632.0 | MHz | 12 | 18 | | dB |
| 5632.0 | ... | 5728.0 | MHz | 14 | 19 | | dB |
| 5728.0 | ... | 5850.0 | MHz | 14 | 21 | | dB |
| 5850.0 | ... | 6000.0 | MHz | 14 | 21 | | dB |

## Characteristics

Temperature range for specification: T = –30˚C to +85 ˚C
TX terminating impedance: $Z_{Tx}$ = 50 Ω
ANT terminating impedance: $Z_{Ant}$ = 50 Ω || 10nH
RX teminating impedance: $Z_{Rx}$ = 100 Ω (balanced)

| Characteristics Antenna-Rx | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | | 740 | | MHz |
| **Maximum insertion attenuation** | α | | | | |
| 734.0 ... 746.0 MHz | | | 2.2 | 2.7 | dB |
| **Amplitude ripple** (p-p) | Δα | | | | |
| 734.0 ... 746.0 MHz | | | 0.4 | 1.6 | dB |
| **Input VSWR (Ant port)** | | | | | |
| 734.0 ... 746.0 MHz | | | 1.6 | 2.0 | |
| **Output VSWR (Rx Port)** | | | | | |
| 734.0 ... 746.0 MHz | | | 1.8 | 2.0 | |
| **Common mode rejection ratio** | | | | | |
| 734.0 ... 746.0 MHz | | 23 | 29 | | dB |
| **Absolute attenuation** | α | | | | |
| 10.0 ... 674.0 MHz | | 35 | 72 | | dB |
| 674.0 ... 686.0 MHz | | 53 | 72 | | dB |
| 686.0 ... 704.0 MHz | | 35 | 70 | | dB |
| 704.0 ... 716.0 MHz | | 55 | 60 | | dB |
| 716.0 ... 722.0 MHz | | 40 | 65 | | dB |
| 722.0 ... 724.0 MHz | | 30 | 48 | | dB |
| 724.0 ... 727.0 MHz | | 15 | 30 | | dB |
| 727.0 ... 728.0 MHz | | 10 | 24 | | dB |
| 776.0 ... 805.0 MHz | | 35 | 42 | | dB |
| 1000.0 ... 2300.0 MHz | | 40 | 69 | | dB |
| 2300.0 ... 2690.0 MHz | | 50 | 64 | | dB |
| 2690.0 ... 3300.0 MHz | | 40 | 60 | | dB |
| 3300.0 ... 3800.0 MHz | | 48 | 59 | | dB |
| 3800.0 ... 5150.0 MHz | | 40 | 58 | | dB |
| 5150.0 ... 5850.0 MHz | | 41 | 59 | | dB |
| 5850.0 ... 6000.0 MHz | | 40 | 58 | | dB |

## Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: $Z_{Tx}$ = 50 Ω
ANT terminating impedance: $Z_{Ant}$ = 50 Ω || 10nH
RX teminating impedance: $Z_{Rx}$ = 100 Ω (balanced)

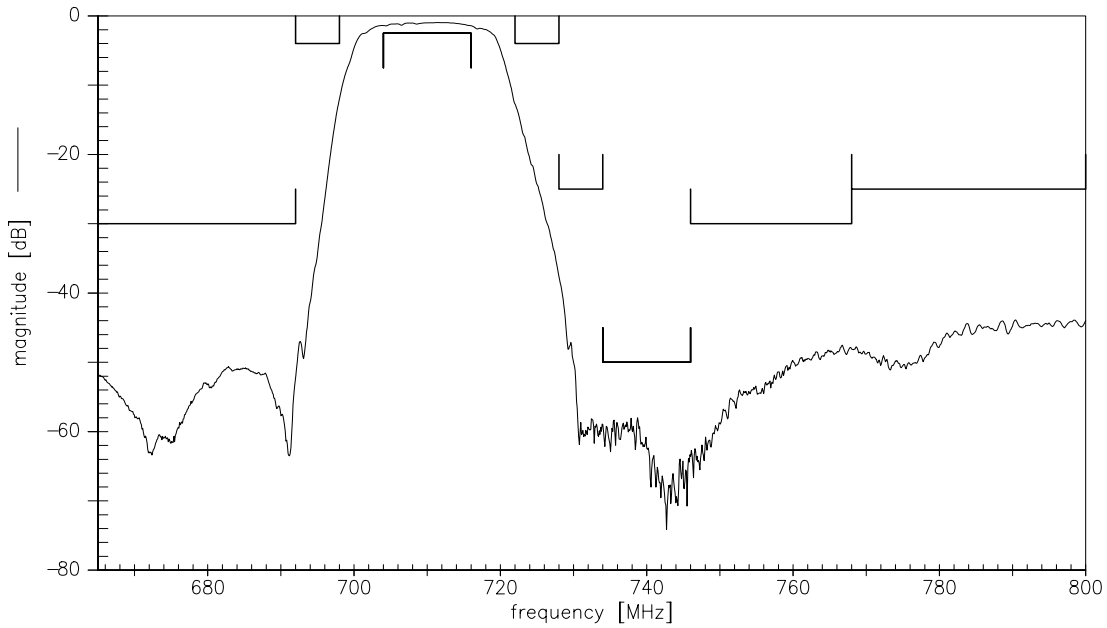
| Characteristics Tx-Rx | | min. | typ. @ 25 ˚C | max. | |
|---|---|---|---|---|---|
| **Differential mode isolation** | α | | | | |
| 704.0 ... 716.0 MHz | | 60 | 65 | | dB |
| 734.0 ... 738.0 MHz | | 55 | 61 | | dB |
| 738.0 ... 742.0 MHz | | 55 | 63 | | dB |
| 742.0 ... 748.0 MHz | | 55 | 61 | | dB |
| 1408.0 ... 1432.0 MHz | | 30 | 74 | | dB |
| 2112.0 ... 2148.0 MHz | | 30 | 64 | | dB |
| 2816.0 ... 2864.0 MHz | | 30 | 62 | | dB |
| **Common mode isolation** | α | | | | |
| 704.0 ... 712.0 MHz | | 48 | 53 | | dB |
| 712.0 ... 716.0 MHz | | 46 | 51 | | dB |

## Maximum Ratings

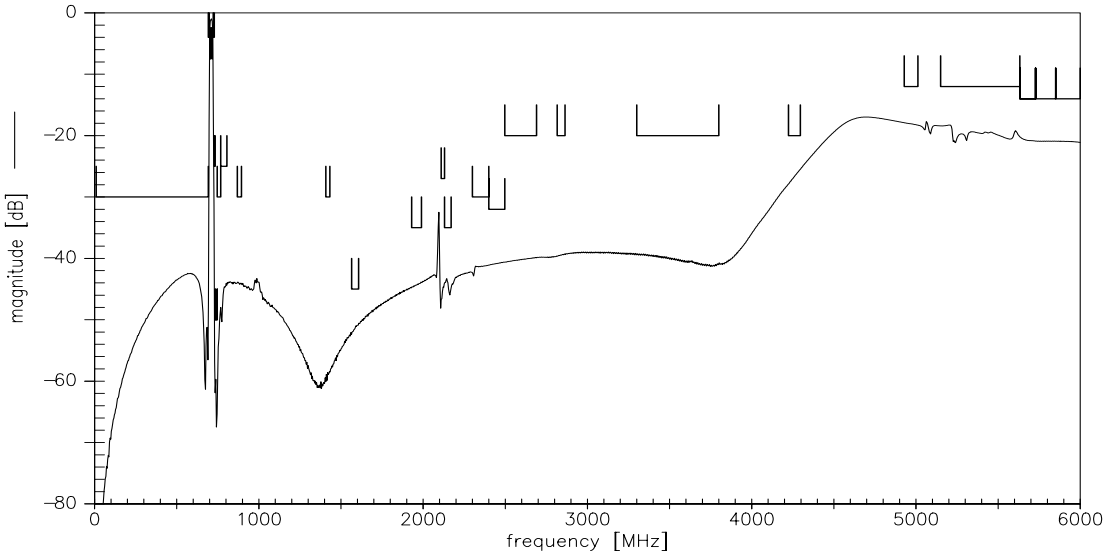
| | | | | |
|---|---|---|---|---|
| Storage temperature range | $T_{stg}$ | –40/+85 | ˚C | |
| DC voltage | $V_{DC}$ | 5 | V | |
| ESD voltage | $V_{ESD}$ | 100[1)] | V | machine model, 1 pulse |
| Input power at Tx Port | | | | |
| 706.5 ...713.5 MHz | $P_{in}$ | 28 | dBm | } LTE Up Link Signal |
| elsewhere | $P_{in}$ | 10 | dBm | 55 ˚C, 50000h |

1) According to JESD22-A115A (machine model), 1 negative and 1 positive pulses.

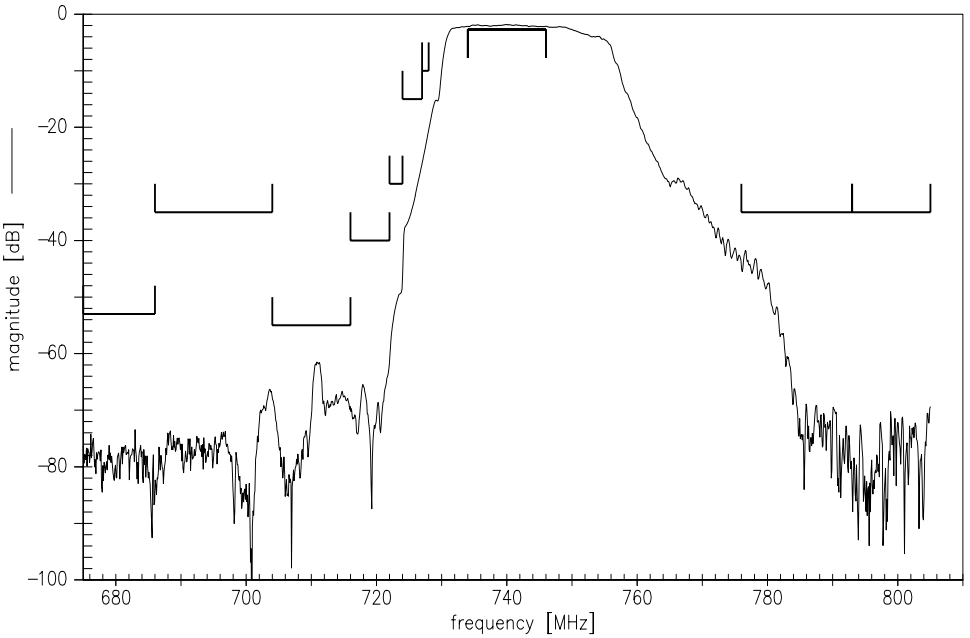
**Frequency Response TX-ANT**



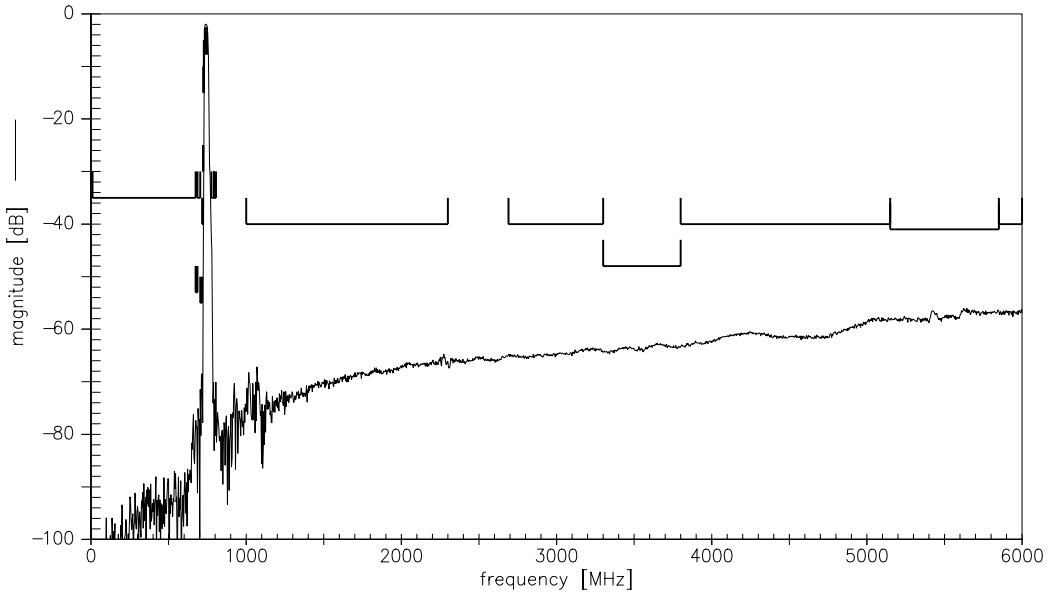

**Frequency Response TX-ANT**



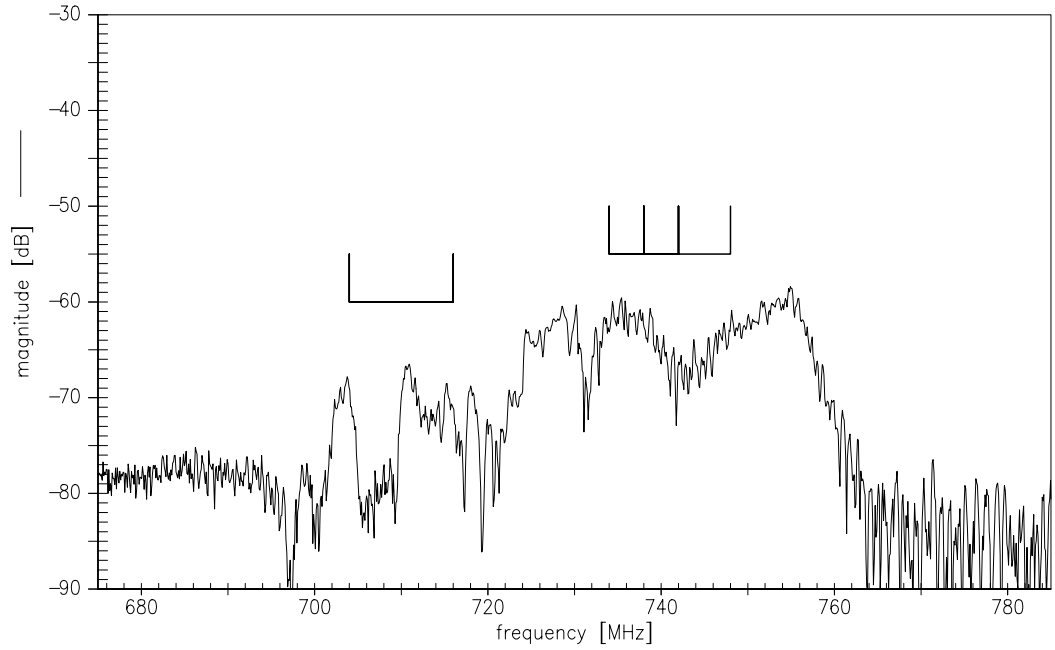
**Frequency Response ANT-RX**



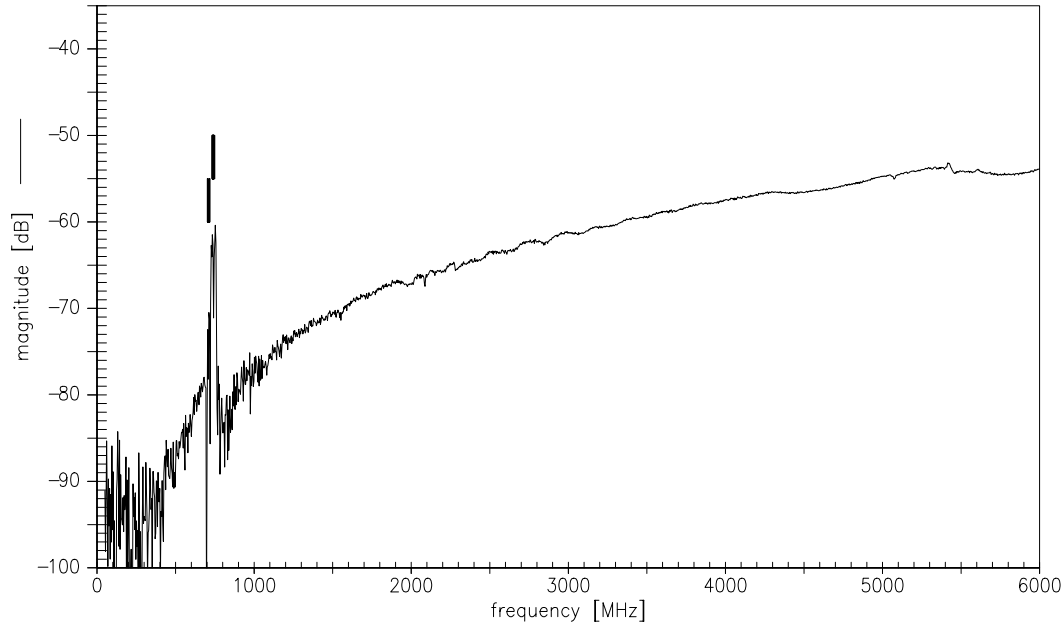

**Frequency Response ANT-RX**



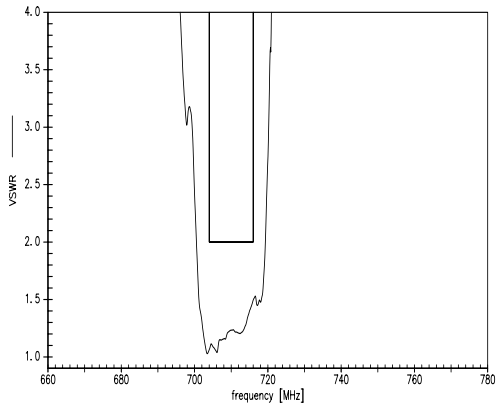
**Frequency Response TX-RX**

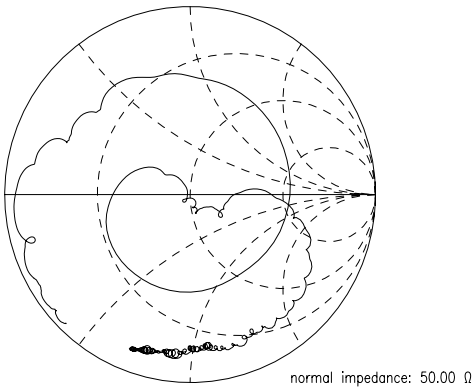



**Frequency Response TX-RX**

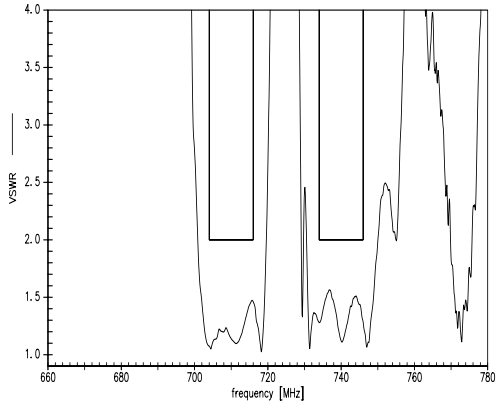


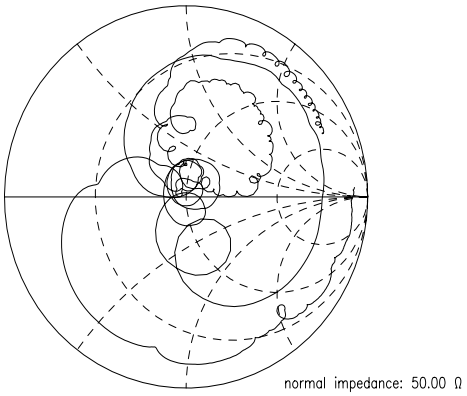
### S11 VSWR (TX)



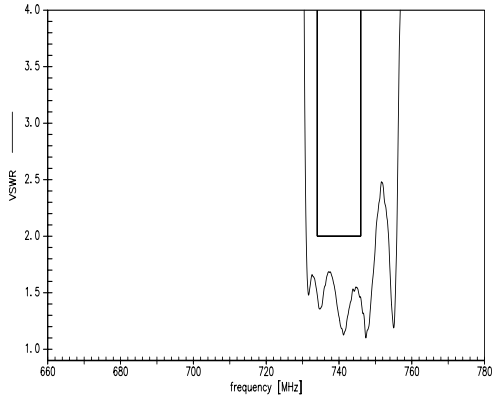



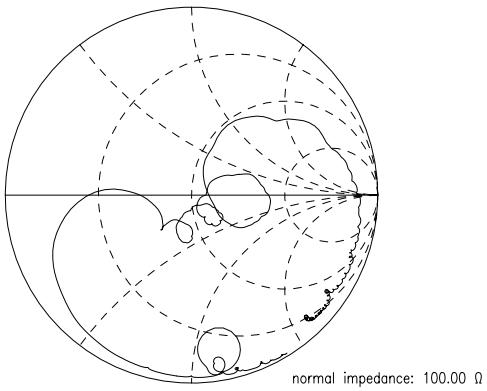

### S22 VSWR (ANT)




### S33 VSWR (RX)



## References

| | |
|---|---|
| **Type** | B7924 |
| **Ordering code** | B39741B7924P810 |
| **Marking and package** | C61157-A3-A61 |
| **Packaging** | F61074-V8153-Z000 |
| **Date codes** | L_1126 |
| **S-parameters** | B7924_NB.s4p<br>B7924_WB.s4p |
| **Soldering profile** | S_6001 |
| **RoHS compatible** | Defined as compatible with the following documents:<br>"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." |
| **Matching coils** | See<br>http://www.tdk.co.jp/tefe02/coil.htm#aname1<br>http://www.tdk.co.jp/etvcl/index.htm<br>for a large variety of matching coils. |

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