

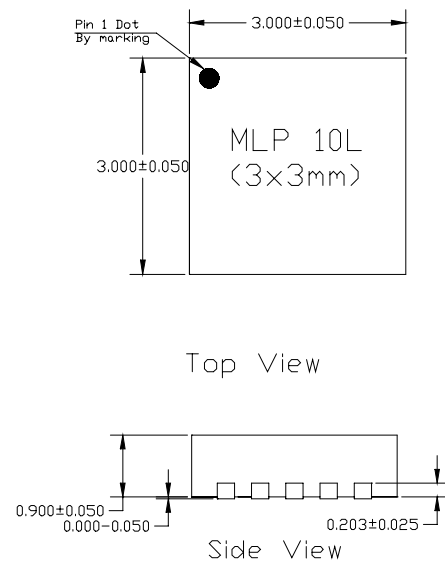
## GSM850/900 and DCS1800/PCS1900 Tx – Bandpass Filter

### Features:

- Low insertion loss
- High suppression of 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> harmonics
- High selectivity
- Balanced to single-ended operation
- GSM Input: 310 Ohm balanced  
PCN/PCS Input: 80 Ohm balanced
- 50  $\Omega$  single-ended output impedances.
- Integrated DC-biasing to input
- MLP 10L 3x3 package (3x3mm<sup>2</sup>)

### Package Outline:

Dimensions in mm



### Application:

TX H2,H3,H4-Bandpass Filter / Balun for GSM850/900 and DCS/PCS systems

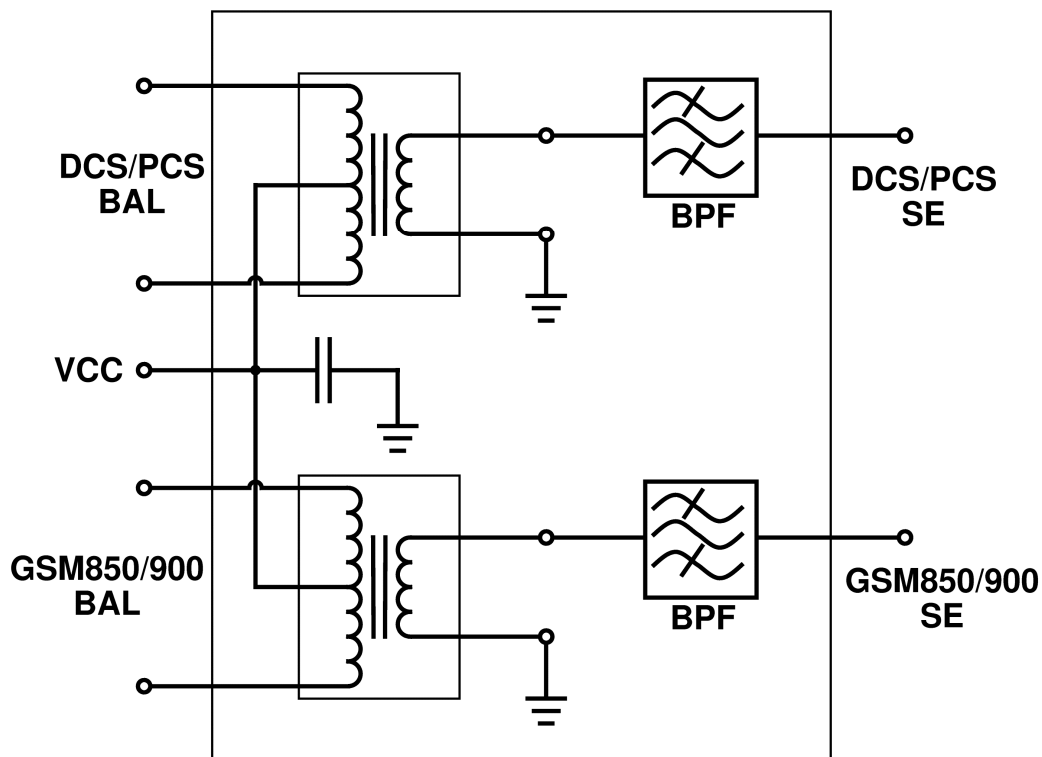
### Description:

TQ1422 is a quadband capable TX bandpass filter for GSM850/E-GSM/DCS1800/PCS1900 applications. The integrated passive filter provides an optimum interface between the TQM7M4011/4012/4014 Power Amplifier Modules and direct conversion transceiver with balanced outputs. TQ1422 replaces up to 17 surface-mount components [including 2 Baluns and/or SAW filter] typically required on the phone board to provide similar functionality. High value inductors to supply open collector modulators are integrated.

## Absolute Maximum Ratings:

| Parameter                    | Min | Max                          | Unit |
|------------------------------|-----|------------------------------|------|
| Maximum input power          |     | 25                           | dBm  |
| Maximum bias current GSM     |     | 50mA( $R_{max}=20\Omega$ )   | mA   |
| Maximum bias current PCN/PCS |     | 50mA( $R_{max}=1.50\Omega$ ) | mA   |
| Operation temperate range    | -40 | +85                          | °C   |
| Storage temperature range    | -60 | +150                         | °C   |

## Schematic:



## Electrical Specifications Low Band GSM850 / E-GSM

(T= 25°C)

| Passband Parameter                | Min. | Typ.    | Max. | Unit |
|-----------------------------------|------|---------|------|------|
| Passband                          |      | 824-915 |      | MHz  |
| Insertion attenuation             |      | 1.90    | 2.1  | dB   |
| Insertion attenuation T= 85°C     |      |         | 2.25 | dB   |
| Ripple in Passband<br>[any 40MHz] |      | 0.075   | 0.20 | dB   |
| Differential input conductance    |      | 1 / 310 |      | S    |
| Differential input susceptance    |      | -0.85   |      | pF   |
| Single ended output impedance     |      | 50      |      | Ω    |
| Amplitude balance                 |      | 0.15    |      | dB   |
| Phase balance                     |      | 180     |      | deg  |
| Inband VSWR Input                 |      | 1.2     | 1.4  |      |
| Inband VSWR Output                |      | 1.6     | 1.8  |      |

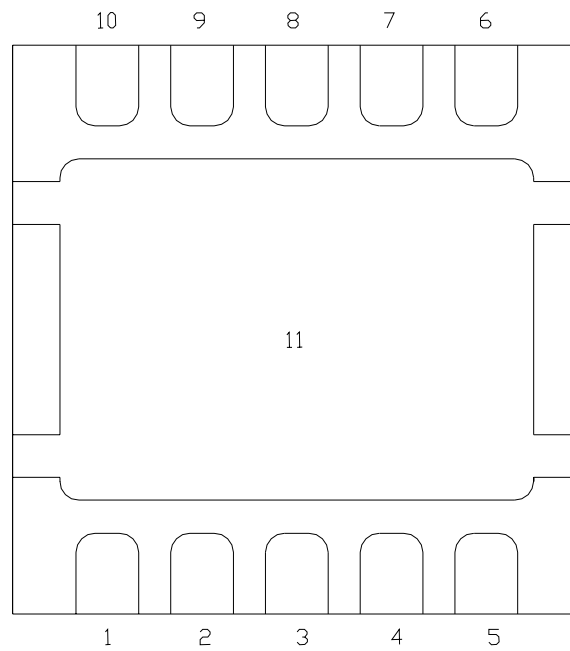
| Stopband Parameter ( $Z_{DIFF}=310\Omega  -0.85pF; Z_{COMMON}=50\Omega; Z_{OUTPUT}=50\Omega$ ) |      |      |      |      |
|--|------|------|------|------|
| Attenuation Differential Mode  | Min. | Typ. | Max. | Unit |
| Dc ... 300 MHz   | 5    | 10   |      | dB   |
| 1648 ... 1668 MHz  | 10   | 15   |      | dB   |
| 1760 ... 1850 MHz  | 17   | 22   |      | dB   |
| 2472 ... 2547 MHz [ 3x850 ]  | 40   | 45   |      | dB   |
| 2640 ... 2775 MHz [ 3x900 ]  | 40   | 45   |      | dB   |
| 3296 ... 3770 MHz [ 4xfc ]   | 30   | 35   |      | dB   |
| 2775 ... 8000 MHz  | 20   | 25   |      | dB   |
| Attenuation Common Mode  | Min. | Typ. | Max. | Unit |
| 100 ... 1400 MHz   | 30   | 35   |      | dB   |
| 1648 ... 1668 MHz  | 30   | 35   |      | dB   |
| 1760 ... 1850 MHz  | 30   | 35   |      | dB   |
| 2472 ... 2547 MHz [ 3x850 ]  | 30   | 35   |      | dB   |
| 2640 ... 2775 MHz [ 3x900 ]  | 25   | 30   |      | dB   |
| 3296 ... 3770 MHz [ 4xfc ]   | 17   | 22   |      | dB   |
| 2775 ... 5000 MHz  | 17   | 22   |      | dB   |
| 5000 ... 8000 MHz  | 5    | 10   |      | dB   |

(T= 25°C)

| Passband Parameter                | Min. | Typ.      | Max. | Unit |
|-----------------------------------|------|-----------|------|------|
| Passband                          |      | 1710-1910 |      | MHz  |
| Insertion attenuation             |      | 2.6       | 3.1  | dB   |
| Insertion attenuation T= 85°C     |      |           | 3.3  | dB   |
| Ripple in Passband<br>[any 80MHz] |      | 0.25      | 0.35 | dB   |
| Differential input conductance    |      | 1 / 80    |      | S    |
| Differential input susceptance    |      | -0.8      |      | pF   |
| Single ended output impedance     |      | 50        |      | Ω    |
| Amplitude balance                 |      | 0.8       |      | dB   |
| Phase balance                     |      | 175       |      | deg  |
| Inband VSWR Input                 |      | 1.2       | 1.4  |      |
| Inband VSWR Output                |      | 1.4       | 1.6  |      |

| Stopband Parameter ( $Z_{DIFF}=80\Omega  -0.80pF;Z_{COMMON}=50\Omega;Z_{OUTPUT}=50\Omega$ ) |      |      |      |      |
|---|------|------|------|------|
| Attenuation Differential Mode   | Min. | Typ. | Max. | Unit |
| Dc ... 600 MHz  | 5    | 7    |      | dB   |
| 3420 ... 5130 MHz   | 20   | 25   |      | dB   |
| 5130 ... 5730 MHz [ 3xfc ]  | 33   | 40   |      | dB   |
| 5730 ... 10000 MHz  | 25   | 32   |      | dB   |
| Attenuation Common Mode   | Min. | Typ. | Max. | Unit |
| 100 ... 1710 MHz  | 8    | 13   |      | dB   |
| 1710 ... 1910 MHz   | 15   | 20   |      | dB   |
| 1910 ... 3420 MHz   | 25   | 30   |      | dB   |
| 3420 ... 3820 MHz [ 2xfc ]  | 28   | 33   |      | dB   |
| 3820 ... 6840 MHz   | 28   | 33   |      | dB   |
| 6840 ... 7640 MHz [ 4xfc ]  | 18   | 25   |      | dB   |
| 7640 ... 10000 MHz  | 5    | 10   |      | dB   |

**Pin Out:**



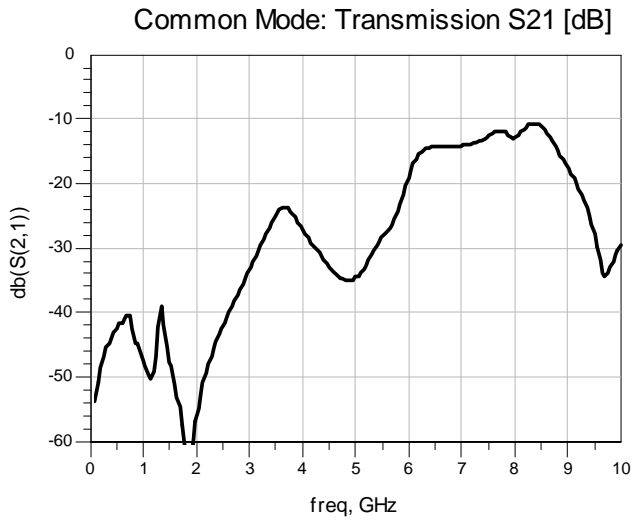
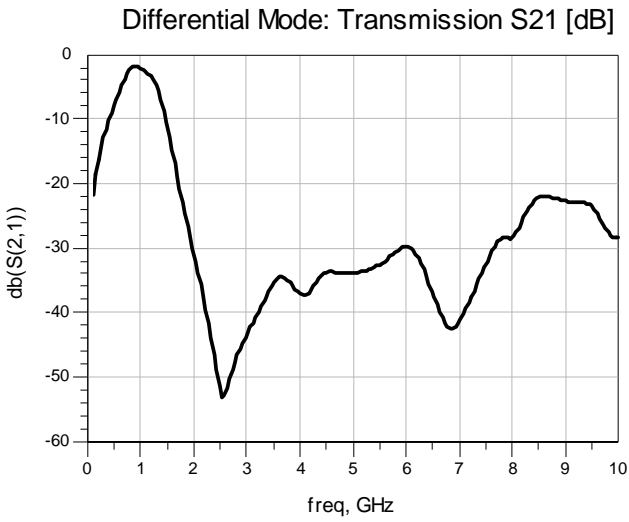
| Pin # | Description | Function                                       |
|-------|-------------|--|
| 1     | DCS_IN1     | DCS balanced input , 80Ohm    -0.8pF @ 1810MHz |
| 2     | DCS_IN2     |  |
| 3     | VCC1        | Input bias voltage *) <sup>1</sup>             |
| 4     | GSM_IN1     | GSM balanced input, 310Ohm    -0.85pF @ 875MHz |
| 5     | GSM_IN2     |  |
| 6     | GSM_OUT     | GSM single ended output, 50Ohm                 |
| 7     | GND         | GSM isolated GND *) <sup>2</sup>               |
| 8     | VCC2        | Input bias voltage *) <sup>1</sup>             |
| 9     | GND         | DCS isolated GND *) <sup>2</sup>               |
| 10    | DCS_OUT     | DCS single ended output, 50Ohm                 |
| (11)  | Heat sink   | Common GND                                     |

\*)<sup>1</sup> Either VCC1 or VCC2 needs to be connected. VCC1 and VCC2 are alternate inputs short-circuited on TQ1422.

\*)<sup>2</sup> Isolated GND pins must not be connected to the heat sink directly. Use (separated) vias to connect to the PCB RF ground plane as close as possible !

# Typical Performance

- GSM 850 / E-GSM:



- DCS1800 / PCS1900:

