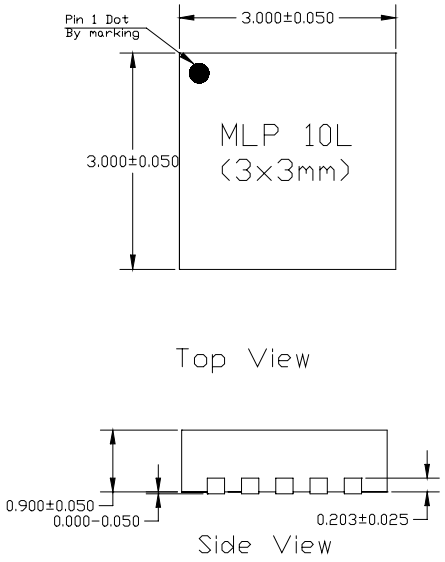
GSM850/900 and DCS1800/PCS1900 Tx – Bandpass Filter

Features:

- **Low insertion loss**
- **High suppression of 2nd,3rd , 4th harmonics**
- **High selectivity**
- **Balanced to single-ended operation**
- **GSM Input: 310 Ohm balanced**
  PCN/PCS Input: 80 Ohm balanced
- **50 Ω single-ended output impedances.**
- **Integrated DC-biasing to input**
- **MLP 10L 3x3 package (3x3mm²)**

Package Outline:

Dimensions in mm



Application:

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

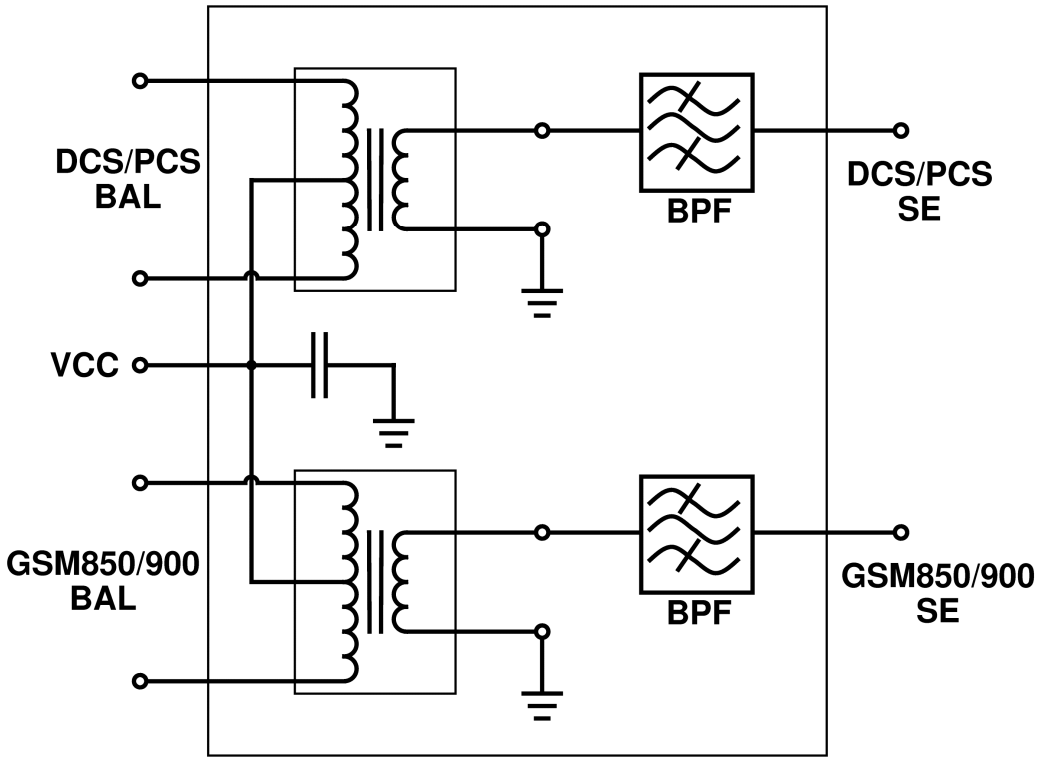
Description:

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}=2Ohm)	mA
Maximum bias current PCN/PCS		50mA(R_{max}=1.5Ohm)	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 [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	

Stoppband Parameter (Z_{DIFF}=310Ω||-0.85pF;Z_{COMMON}=50Ω;Z_{OUTPUT}=50Ω)				
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

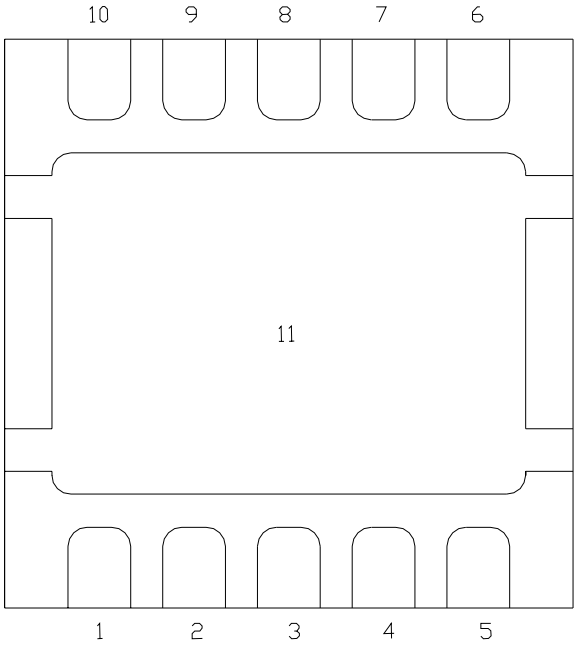
Electrical Specifications High Band DCS1800 / PCS1900

(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 [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	

Stoppband Parameter (Z_{DIFF}=80Ω||-0.80pF;Z_{COMMON}=50Ω;Z_{OUTPUT}=50Ω)				
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:



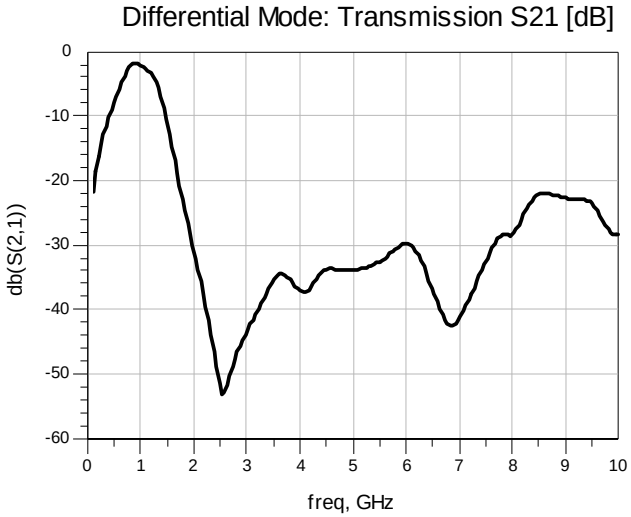
Pin #	Description	Function
1	DCS_IN1	DCS balanced input , 80Ohm || -0.8pF @ 1810MHz
2	DCS_IN2	
3	VCC1	Input bias voltage *)[1]
4	GSM_IN1	GSM balanced input, 310Ohm || -0.85pF @ 875MHz
5	GSM_IN2	
6	GSM_OUT	GSM single ended output, 50Ohm
7	GND	GSM isolated GND *)[2]
8	VCC2	Input bias voltage *)[1]
9	GND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

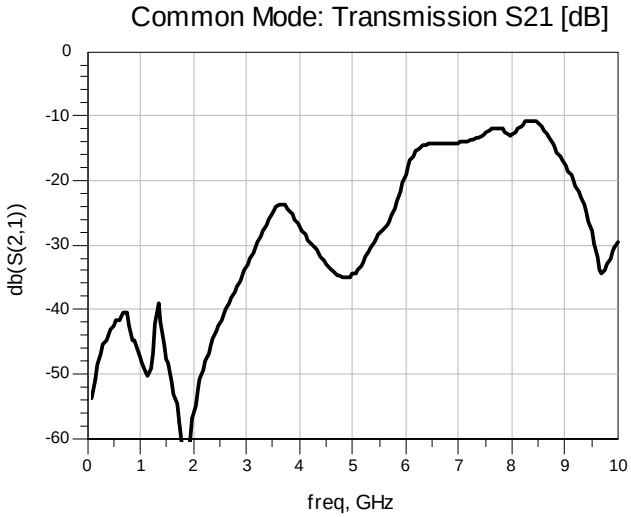
*)[1] Either VCC1 or VCC2 needs to be connected. VCC1 and VCC2 are alternate inputs short-circuited on TQ1422.

*)[2] 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: