

3.83GHz Bandpass BAW Filter

AKF-1938

Description

Akoustis' AKF-1938 is a high performance, ultra-small band pass BAW Filter targeting 5G infrastructure, radar and general-purpose applications. AKF-1938 utilizes Akoustis' XBAW technology which provides leading RF filter performance. This BAW filter provides 100 MHz bandwidth, low insertion loss at 3.8GHz and high out of band attenuation. AKF-1938 is assembled in hermetic sealed package and is compatible with high volume, lead-free SMT soldering processes.

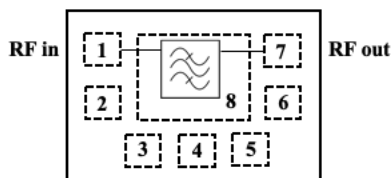
Features

- Ultra small form factor 2.5mm x 2.0mm x 0.8mm
- Single ended 50 Ohm Ant, Tx/Rx ports
- High out of band attenuation
- High power handling, maximum +27dBm
- Low insertion loss 100 MHz band pass filter
- Performance -40 C to +85 C
- Hermetically sealed

Applications

- 5G Wireless Infrastructure
- Commercial and military radar
- General Purpose

Functional Block Diagram



Pin #	Description
1	RF Input
2	Ground
3	Ground
4	Ground
5	Ground
6	Ground
7	RF Output
8	Ground

Ordering Information

Part Number	Description
AKF-1938EVB	Evaluation board
AKF-1938SP	(5) Loose pcs
AKF-1938SR	(100) Short Reel
AKF-1938TR1	(1000) Tape & Reel
AKF-1938TR2	(2500) Tape & Reel

Absolute Maximum Rating

Parameter	Rating
Storage Temperature	-40 to 125 °C
Input Power (CW)	+28 dBm

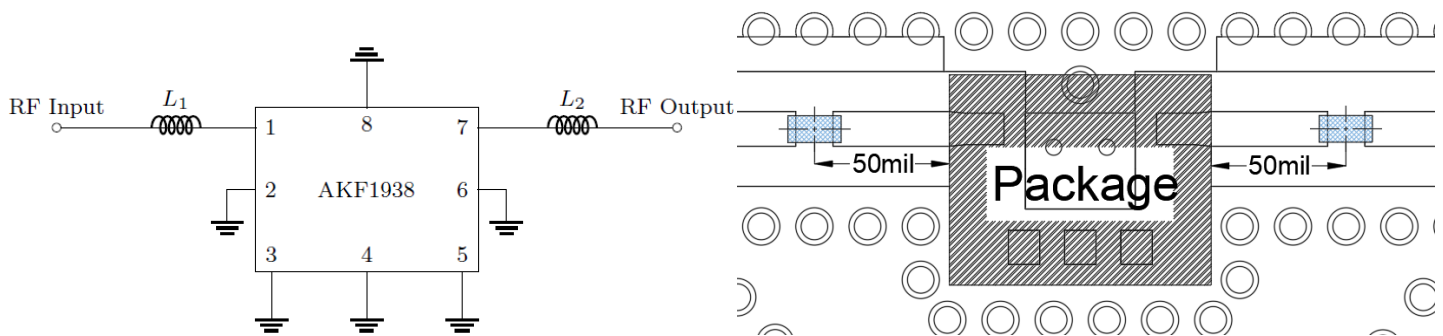
Nominal Operating Parameters

Parameter	Units	Min.	Typ.	Max.
Center Frequency (Fc)	MHz		3830	
Pass Bandwidth	MHz	90	100	
Insertion Loss of Pass Bandwidth	dB		1.8 ⁽¹⁾	3
Amplitude Variation ⁽²⁾				
3780 - 3880 MHz	dB ptp		1.0	1.5
Attenuation				
0 – 2880 MHz	dB	40	42	
2880 – 3720 MHz	dB	45	50	
3960 – 4000 MHz	dB	45	50	
4000 – 4800 MHz	dB	45	50	
4800 – 7640 MHz	dB	40	45	
7640 – 9500 MHz	dB	40	45	
Return Loss of Pass Bandwidth		11	16 ⁽¹⁾	
Operating Temperature	°C	-40		85
Load Impedance	Ohm		50	
Power Handling - CW	dBm			27

Note:

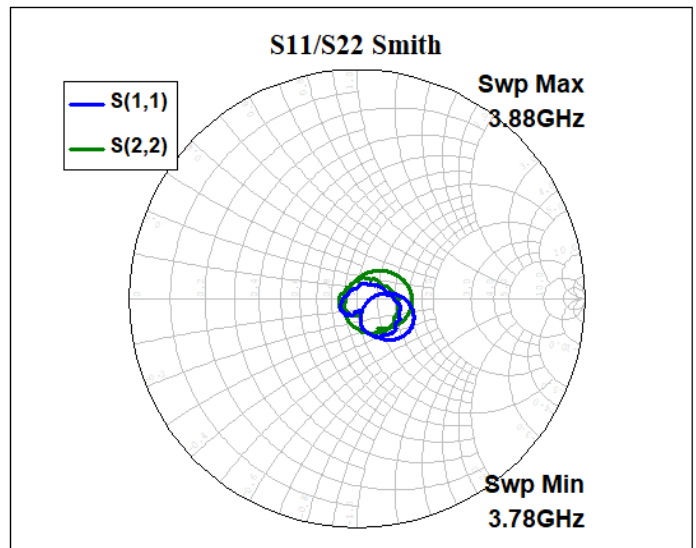
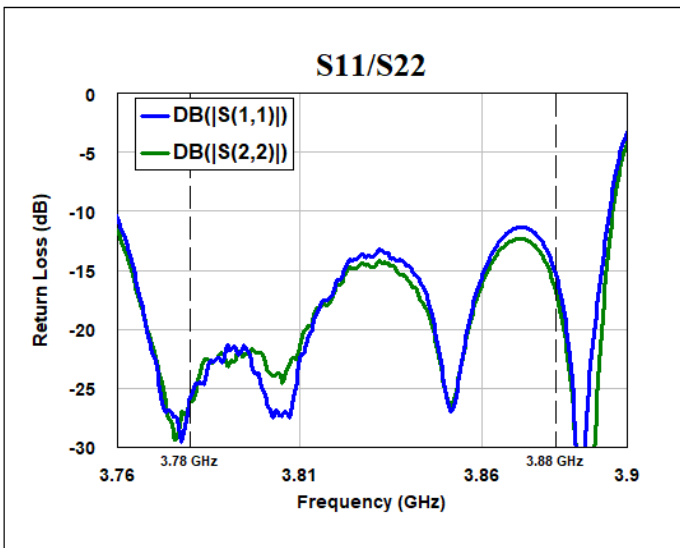
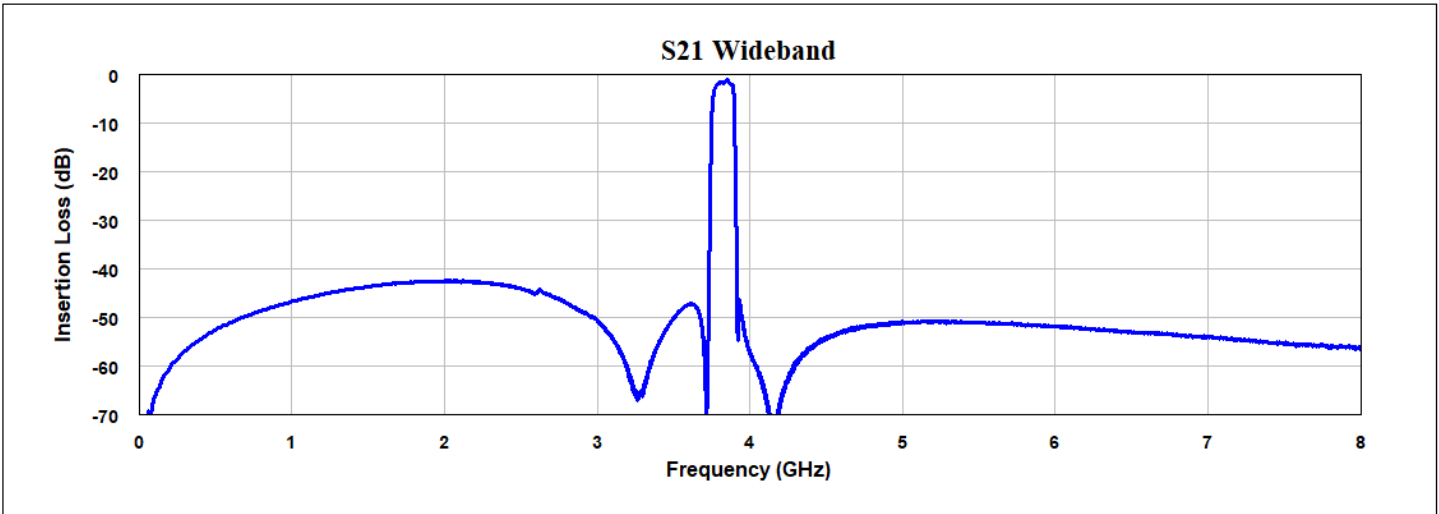
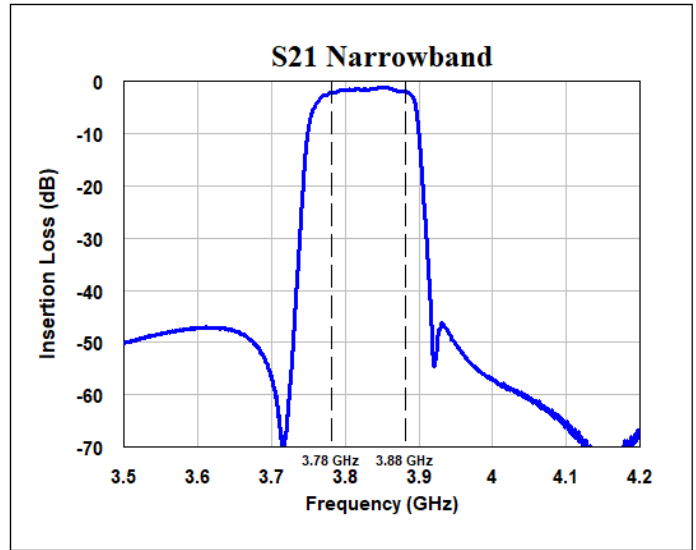
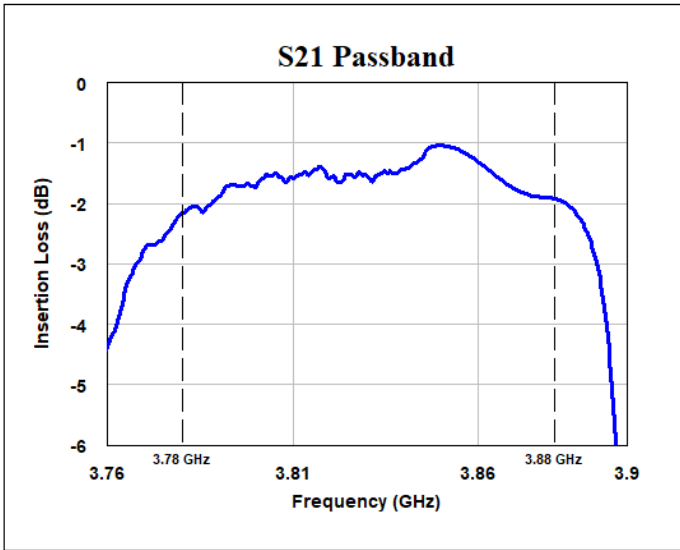
1. S-parameter averaged over specified pass band frequency at room
2. Amplitude ripple defined peak-to-valley difference over specified pass band

Schematic & Bill of Materials



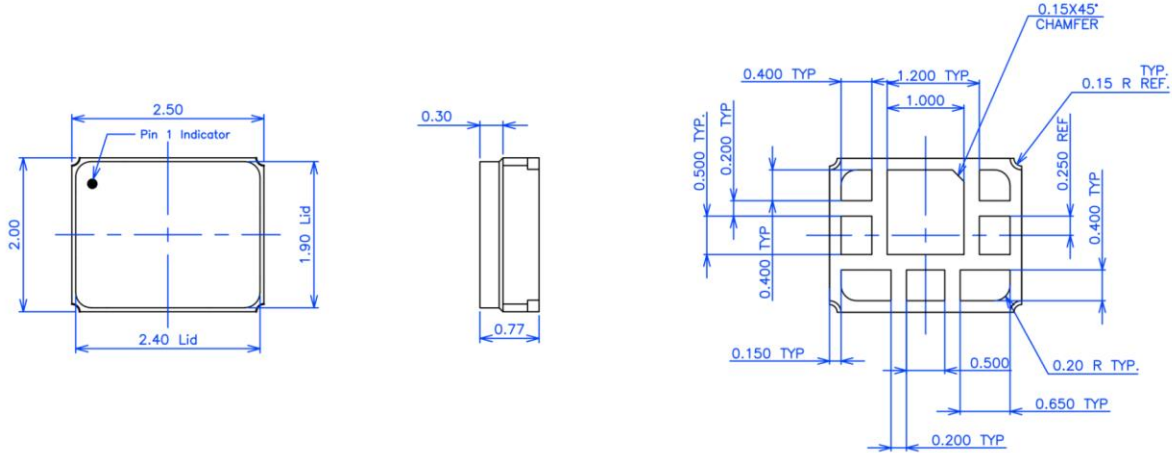
Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	3 layer	Multiple	
U1	N/A	3.8 GHz BAW Filter	Akoustis	AKF-1938
L1	2.4nH	Chip inductor, 0201, ±0.1nH	Murata	LQP03HQ2N4B02D
L2	2.4nH	Chip inductor, 0201, ±0.1nH	Murata	LQP03HQ2N4B02D

Performance Plots



Package Dimensions & Pin Descriptions

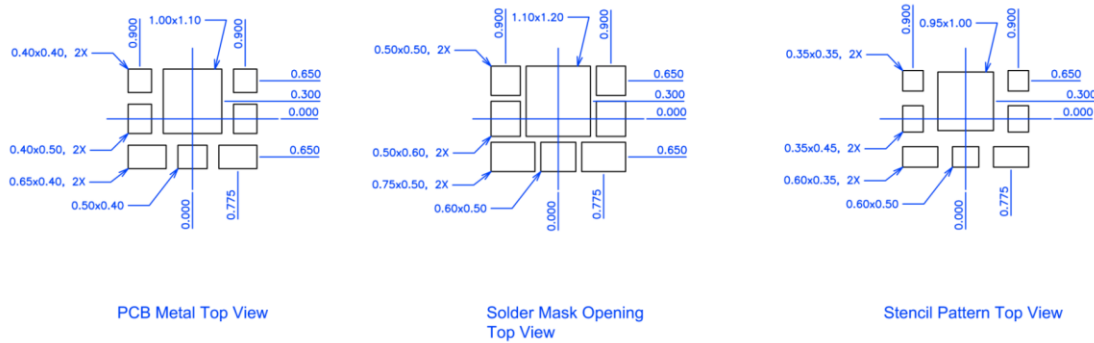
- Notes:
 - All Units are in mm unless otherwise stated
 - General Tolerance:
 Linear X.XXX = $\pm 0.050\text{mm}$
 X.XX = $\pm 0.10\text{mm}$



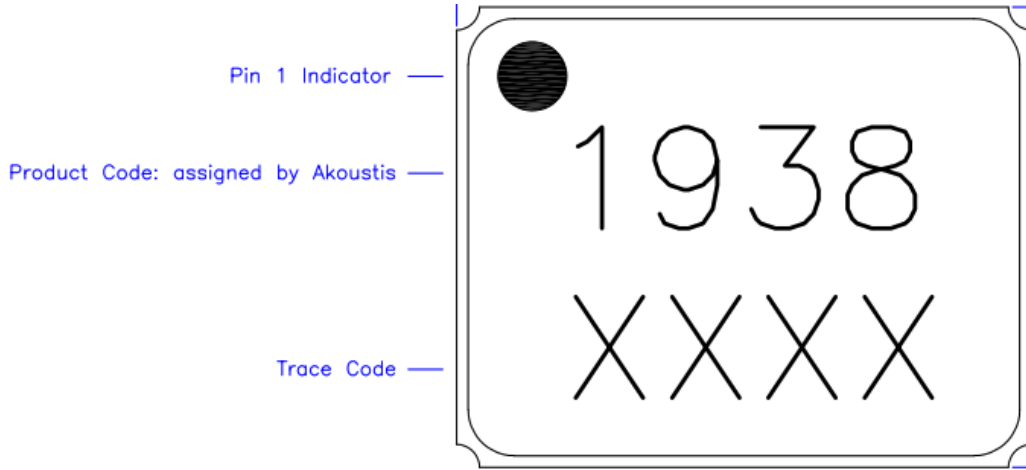
- NOTES:
 1. PLATING THICKNESS
 ELECTRO Ni : 1.27~8.89 μm (S/P)
 ELECTRO Au : 0.30~1.00 μm (S/P)

PCB Mounting Pattern

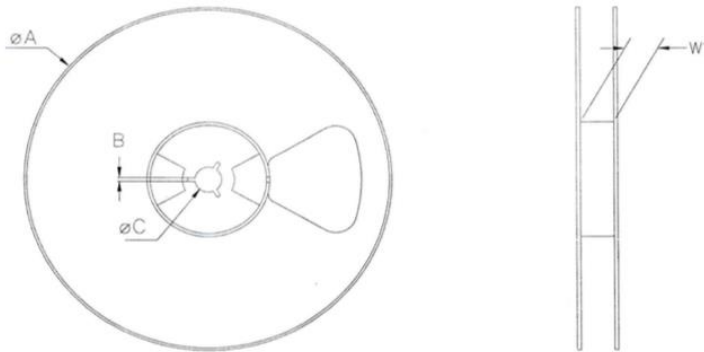
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Typical Part Marking



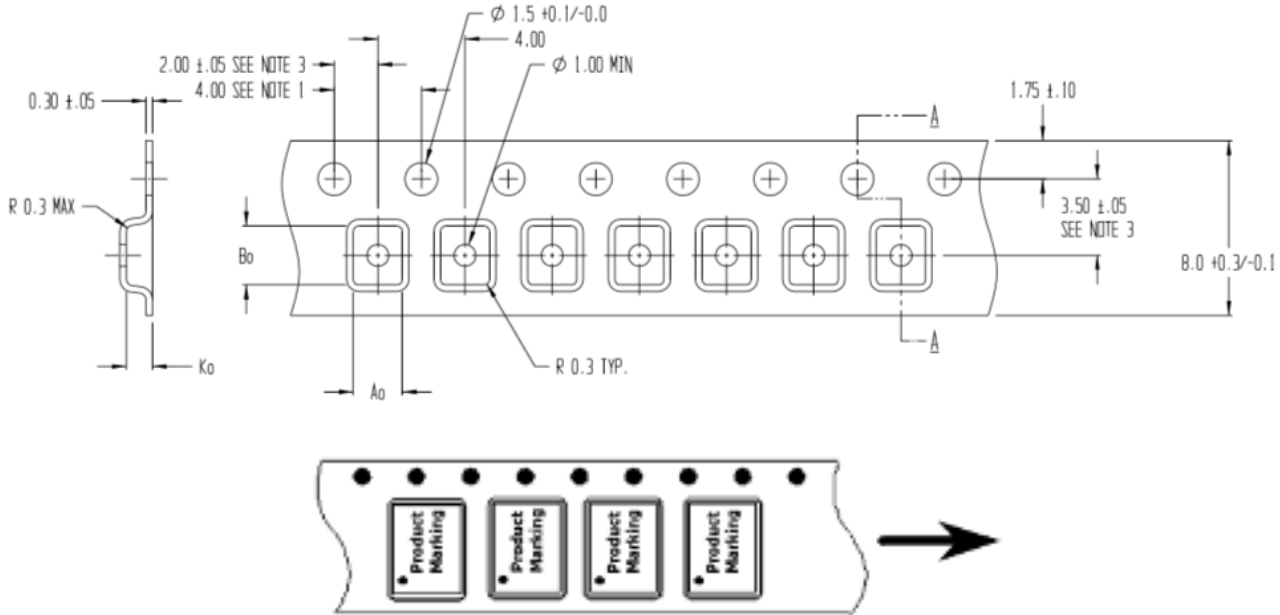
Reel Dimension



Item	Parameters	Method	Min	Max
1	ø A (180mm + 0 / - 2.0)	Caliper	178.96	179.00
2	B (1.5mm Min)	Caliper	2.33	2.36
3	ø C (13.0mm + 0.5 / - 0.2)	Caliper	13.26	13.29
4	W1 (8.40mm + 1.5 / - 0)	Caliper	9.24	9.27
5	Surface Resistivity (10 ¹¹ Max) ohms / sq	S.R meter	10 ⁹	10 ¹⁰
6	Visual		PASS	

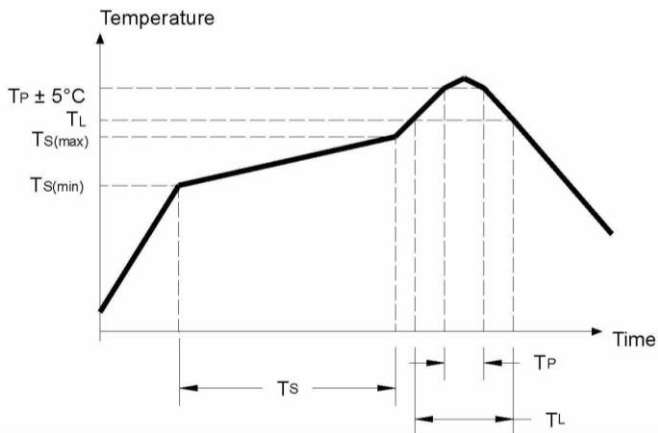
Tape Dimension

$A_0 = 2.25$
 $B_0 = 2.70$
 $K_0 = 1.20$



Recommended Solder Profile

Parameter	Eutectic Sn/Pb	Pb Free
Max Ramp Up Rate	6 Deg C/Second	6 Deg C/Second
Soak Temp Time T_S (min) - T_S (max)	135 - 155 Deg C	150-200 Deg C
Max Soak Time T_S	2 minutes	3 minutes
Liquidous Temp T_L	183 Deg C	220 Deg C
Max Time Above T_L	150 Seconds	150 Seconds
Max Peak Temperature T_P	225 Deg C	260 Deg C
Max Time at Peak T_P	30 Seconds	30 Seconds
Max Ramp Down Rate	10 Deg C/Second	10 Deg C/Second



Product Compliance Information

ESD Sensitivity Ratings

Human Body Model (HBM) Test

Rating: 500V

Standard: ANSI/ESDA/JEDEC JS-001-2017

Charged Device Model (CDM)

Rating: 1000V

Standard: ANSI/ESDA/JEDEC JS-002-2018

MSL Rating

N/A – Hermetic Package

RoHS

This part is compliant with 2011/65EU RoHS directive on the restrictions of the use of certain hazardous substances in electrical and electronics equipment as amended by Directive (EU) 2015/863

Contact Information

All contents specified in datasheet are subject to change. Please contact Akoustis for the latest on our products and company information.

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