SK3530

MSL 3 Device

Band L1+L5, RF-Rx SAW Filter
Revision 0 : April 2020

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Description

- SK3530 is the low-loss RF SAW filter for GPS L1+L5 band.
- High stability and reliability with good performance and no adjustment.
- Ni, gold-plated terminals.
- RoHS compatible

Applications

- GPS dual SAW RX filter for L1+L5

Features

- Single-ended input and dual-ended output operation
- Small, LGA (10-pin, 1.5mm x 1.1mm x 0.5mm) package，MSL3.

Pin Configuration/Application Diagram (Top view)

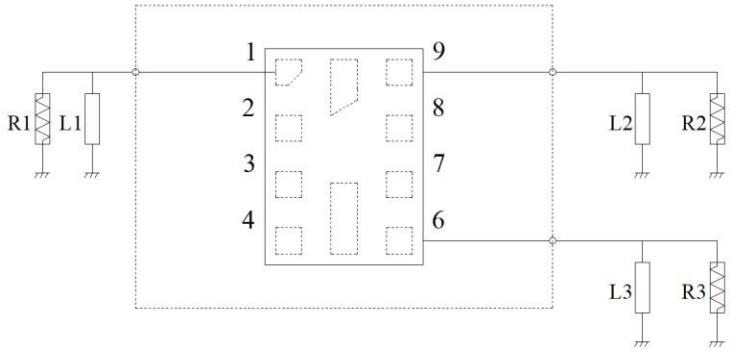


Figure 1 Pin Configuration and Application Diagram

Table 1 Pin Descriptions

Pin	Pin Name	Pin Description	Pin	Pin Name	Pin Description
1	Input	SAW input	6	Output	Output GPS L1
2	GND	Analog VSS	7	GND	Analog VSS
3	GND	Analog VSS	8	GND	Analog VSS
4	GND	Analog VSS	9	Output	Output GPS L5
5	GND	Analog VSS			

Table 2 Recommended component value

Component	Value	Units			
R1	50.0	Ohm	L1	9.6	nH
R2	50.0	Ohm	L2	14.0	nH
R3	50.0	Ohm	L3	14.0	nH

Electrical Characteristics

Table 3 Absolute Maximum Ratings

Parameter	Symbol	Range	Unit
DC Supply Voltage	V_{DC}	5	V
RF Power(in BW) (2000h, 50℃)	P	15	dBm
Device Operating Temperature	T_{OP}	-30~+85	℃
Device Storage Temperature	T_{STG}	-40~+85	
Electrostatic Discharge	$V_{ESD(HBM)}$	250	V
	$V_{ESD(MM)}$	200	
	$V_{ESD(CDM)}$	1000	

Notice: *Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.*

Note1: *According to JESD22-A115C*

Specifications

Table 4 Specifications L5

Parameter	Unit	Minimum	Typical(@25°C)	Maximum
Center Frequency	MHz	1166.22	1176.5	1186.68
Maximum insertion	dB	-	1.5	2.0
VSWR ANT	-	-	1.4	1.9
VSWR Output	-	-	1.5	1.9
Group delay ripple	ns	-	7.0	12
Absolute Attenuation				
10... 850 MHz	dB	36	40	-
850... 980 MHz	dB	35	38	-
980... 1010 MHz	dB	35	39	-
1010... 1100 MHz	dB	35	39	-
1100... 1130 MHz	dB	37	41	-
1220... 1250 MHz	dB	22	28	-
1250... 1427 MHz	dB	25	31	-
1427... 1463 MHz	dB	42	50	-
1710... 2025 MHz	dB	40	46	-
2025... 2600 MHz	dB	38	43	-
2600... 3000 MHz	dB	32	39	-
3000... 6000 MHz	dB	22	26	-

Notes 1: *All specifications are based on the test circuit shown.*
Notes 2: *In production, all specifications are measured by Agilent Network analyzer and full 2 port calibration at room temperature.*
Notes 3: *Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances.*
Notes 4: *This is the optimum impedance in order to achieve the performance show.*

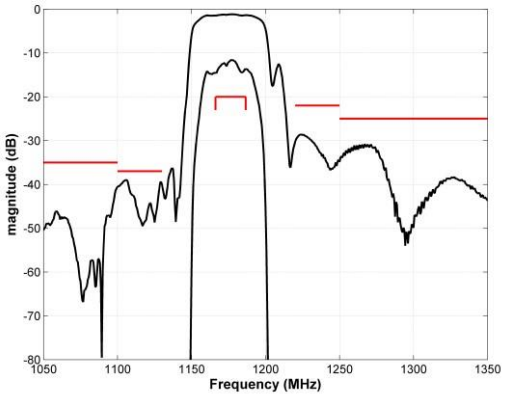
Table 5 Specifications GPS + COMPASS + GLONASS

Parameter		Unit	Minimum	Typical(@25°C)	Maximum
Center Frequency		MHz	-	1581.6	-
Insertion loss	1559.052… 1563.144MHz	dB	-	1.9	2.4
	1574.42… 1576.42MHz	dB	-	1.5	2.0
	1597.55… 1605.89MHz	dB	-	2.0	2.4
VSWR ANT	1559.052… 1563.144MHz	-	-	1.6	2.1
	1574.42… 1576.42MHz	-	-	1.2	1.8
	1597.55… 1605.89MHz	-	-	1.6	1.9
VSWR Output	1559.052… 1563.144MHz	-	-	1.5	1.9
	1574.42… 1576.42MHz	-	-	1.1	1.8
	1597.55… 1605.89MHz	-	-	1.4	1.9
Group delay ripple	1597.55… 1605.89MHz	ns	-	3	12
Absolute Attenuation					
10.0… 850.0 MHz		dB	36	40	-
850.0… 980.0 MHz		dB	35	39	-
980.0… 1010.0 MHz		dB	36	40	-
1010.0… 1100.0 MHz		dB	36	40	-
1100.0… 1130.0 MHz		dB	38	42	-
1220.0… 1250.0 MHz		dB	35	39	-
1250.0… 1463.0 MHz		dB	35	40	-
1463.0… 1511.0 MHz		dB	35	40	-
1650.0… 1710.0 MHz		dB	42	48	-
1710.0… 2025.0 MHz		dB	40	47	-
2025.0… 2600.0 MHz		dB	40	45	-
2600.0… 3000.0 MHz		dB	42	47	-
3000.0… 6000.0 MHz		dB	30	35	-

Notes 1: *All specifications are based on the test circuit shown.*
Notes 2: *In production, all specifications are measured by Agilent Network analyzer and full 2 port calibration at room temperature.*
Notes 3: *Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances.*
Notes 4: *This is the optimum impedance in order to achieve the performance show.*

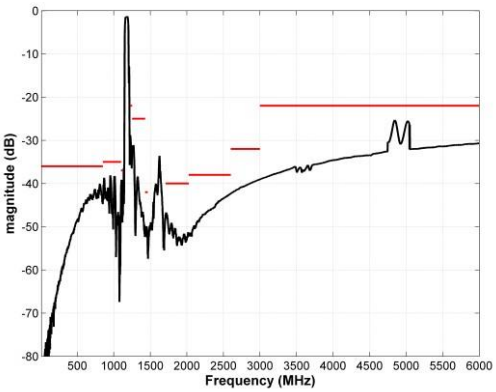
Typical Performance (GPS L5)

Frequency Response



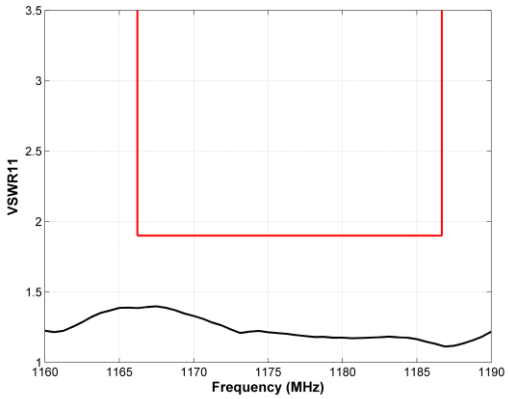
Vertical: 10dB/Div

Wideband Response



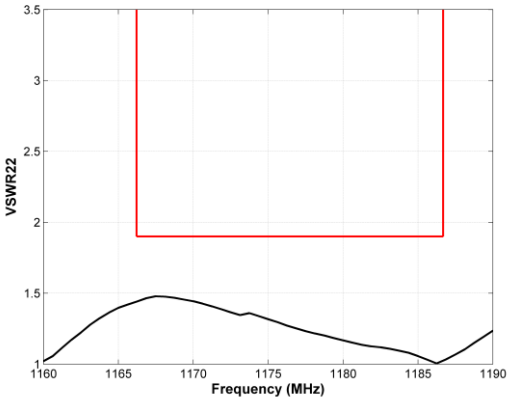
Vertical: 10dB/Div

VSWR11 (1160~1190MHz)



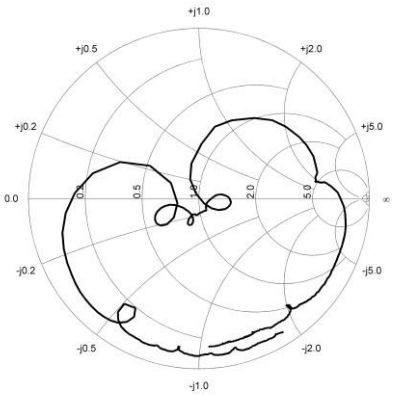
Vertical: 0.5/Div

VSWR22 (1160~1190MHz)



Vertical: 0.5/Div

S11 smith chart



S22 smith chart

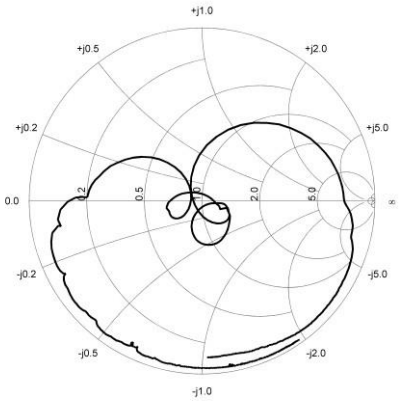
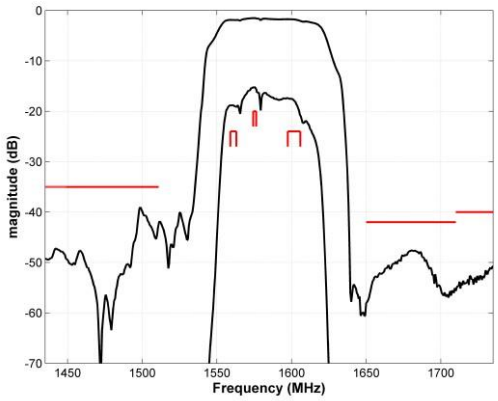


Figure 2 Typical Performance (GPS L5)

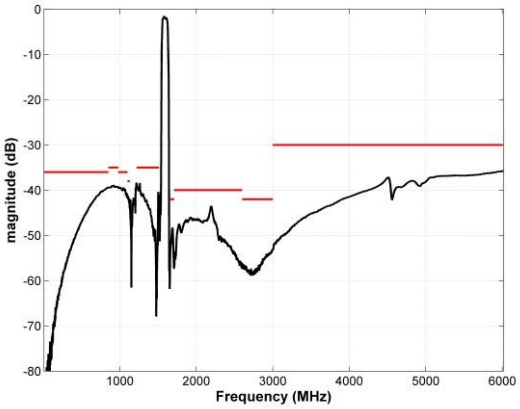
Typical Performance (GPS + COMPASS + GLONASS)

Frequency Response



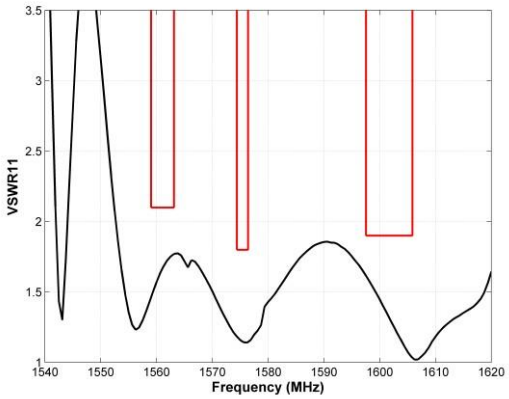
Vertical: 10dB/Div

Wideband Response



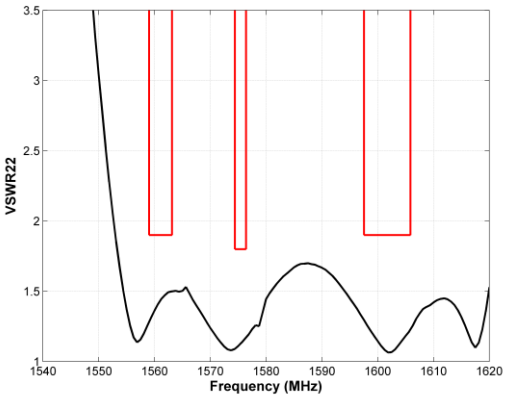
Vertical: 10dB/Div

VSWR11 (2270~2430MHz)



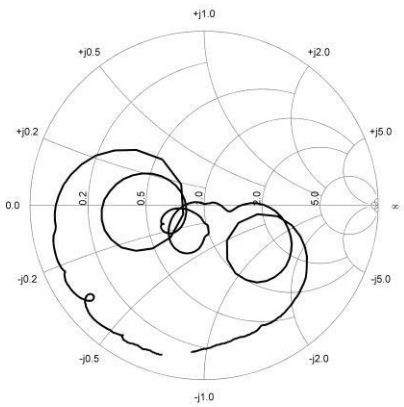
Vertical: 0.5/Div

VSWR22 (2270~2430MHz)



Vertical: 0.5/Div

S11 smith chart



S22 smith chart

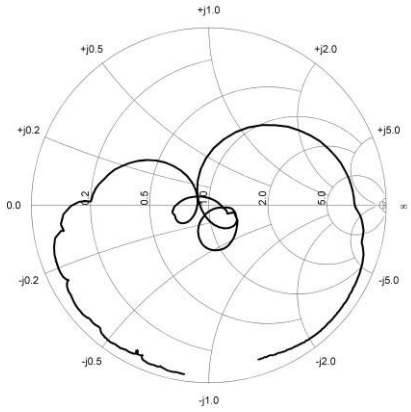
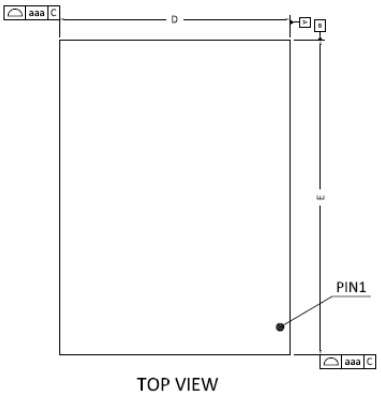
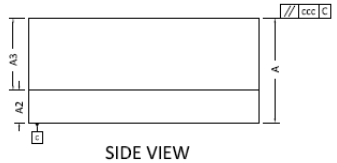


Figure 3 Typical Performance (GPS + COMPASS + GLONASS)

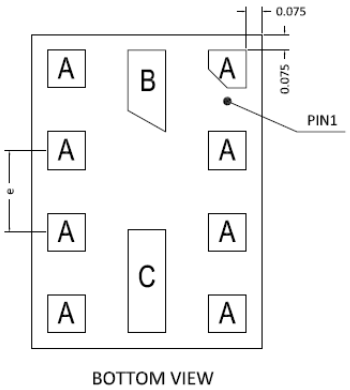
Package Outline Dimensions



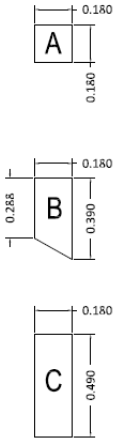
TOP VIEW



SIDE VIEW



BOTTOM VIEW



MILLIMETER			
SYMBOL	MIN	NOR	MAX
A	0.450	0.500	0.550
A2	0.125	0.155	0.185
A3	0.315	0.345	0.375
D	1.05	1.10	1.15
E	1.45	1.50	1.55
e1	0.39 BSC		
aaa	0.10		
ccc	0.05		

Figure 4 Package Outline Dimensions

Marking Specifications

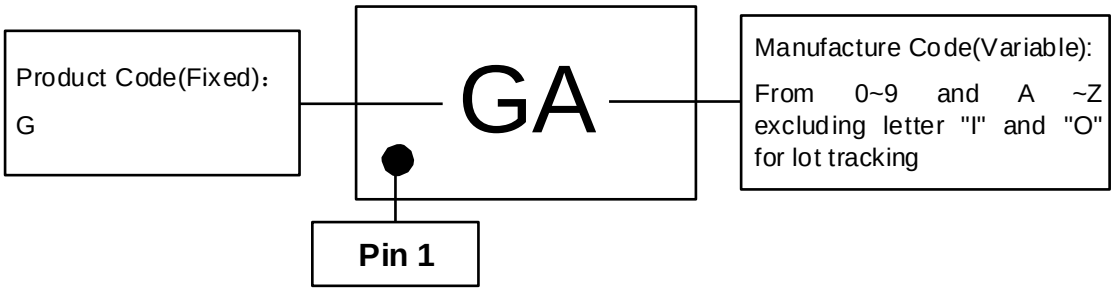


Figure 5 Marking Specification (Top View)

Tape and Reel Dimensions

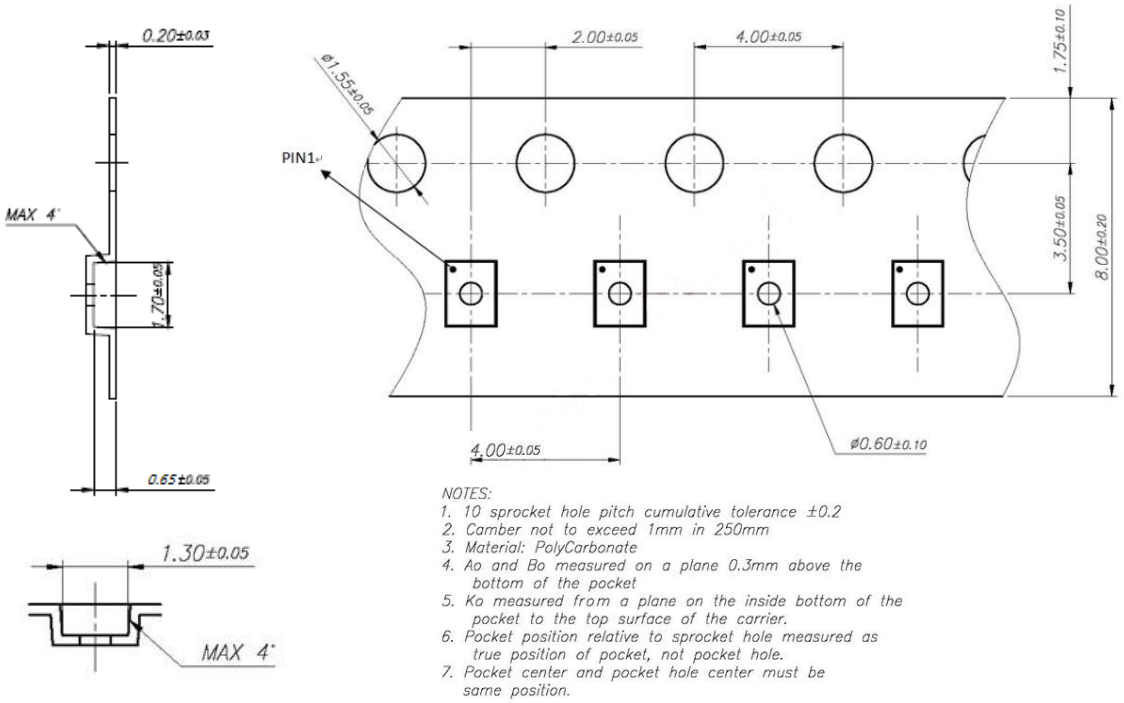


Figure 6 Tape and Reel Dimensions

Reflow Chart

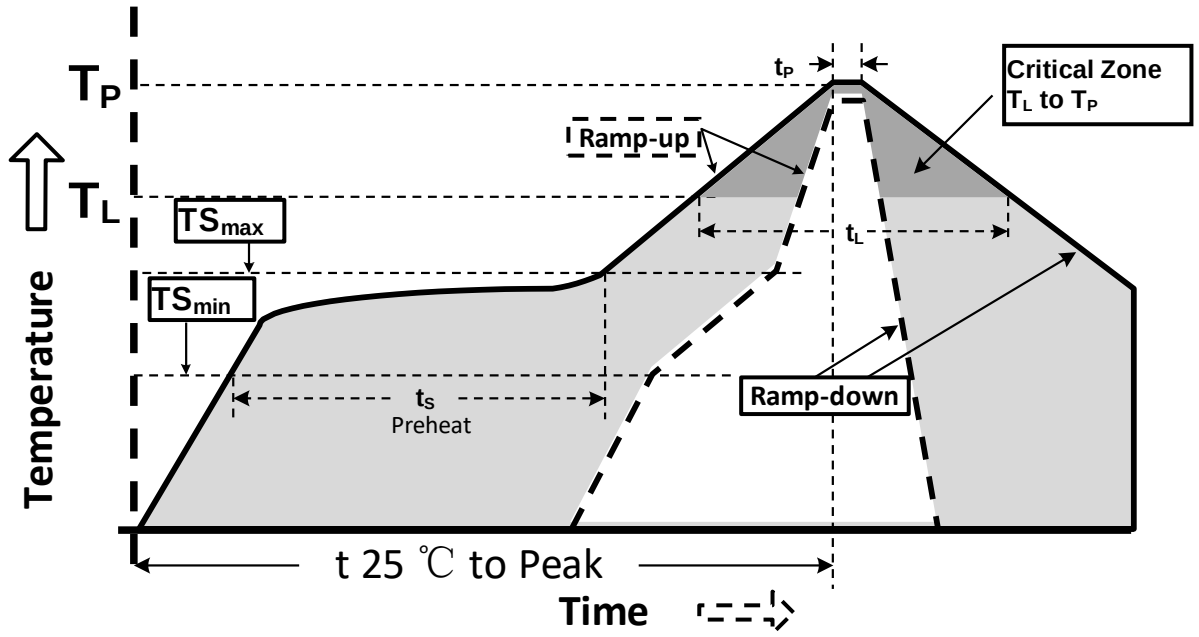


Figure 7 Recommended Lead-Free Reflow Profile

Table 5 Reflow condition

Profile Parameter	Lead-Free Assembly, Convection, IR/Convection
Ramp-up rate (TSmax to T_p)	3℃/second max.
Preheat temperature (TSmin to TS_{max})	150℃ to 200℃
Preheat time (t_s)	60 - 180 seconds
Time above TL , 217℃ (t_L)	60 - 150 seconds
Peak temperature (T_p)	260℃
Time within 5℃ of peak temperature(tp)	20 - 40 seconds
Ramp-down rate	6℃/second max.
Time 25℃ to peak temperature	8 minutes max.

ESD Sensitivity

Integrated circuits are ESD sensitive and can be damaged by static electric charge. Proper ESD protection techniques should be used when handling these devices.

RoHS Compliant

This product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), and are considered RoHS compliant.

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