

SK5118E

LNA for Global Navigation Satellite System (GNSS)

GENERAL DESCRIPTION

The SK5118E high gain, low noise amplifier (LNA) is dedicated to GPS, GLONASS, Galileo and Beidou standards. The LNA achieves 0.6dB low noise figure and 18.5dB high gain with excellent linearity.

The SK5118E works under a 1.5V to 3.3V single power supply while consumes 7mA current. In power down (PD) mode, the power consumption will be reduced to less than 1uA.

The SK5118E is available in a DFN-6 pin package.

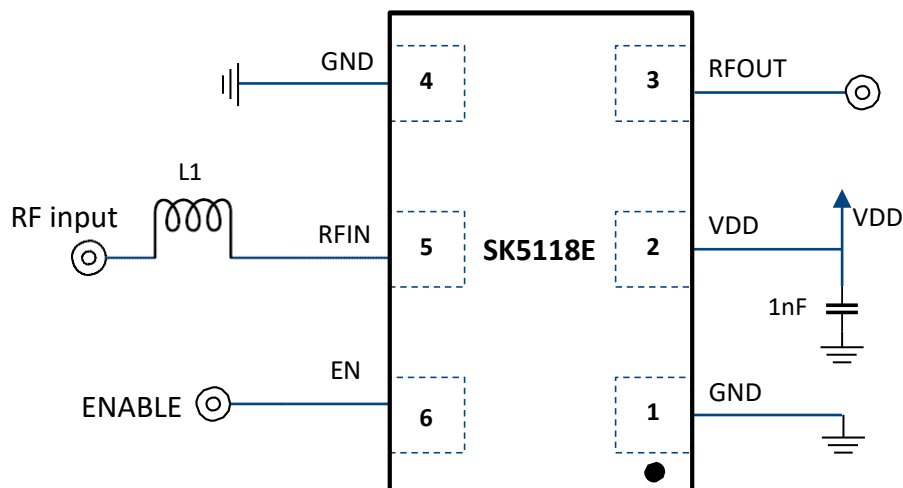
FEATURES

- High Gain: 18.5dB
- Low noise figure 0.6dB @ 1575.42MHz
- Low operation current 7.0mA & PD current less than 1uA
- Single supply voltage range 1.5V to 3.3V
- Working Frequency: 1559MHz ~ 1610MHz
- Lead-Free and RoHS-Compliant
- Small package 1.1mmx0.9mmx0.45mm

APPLICATIONS

- Automotive Navigation
- Personal Navigation Device (PND)
- Cell Phone with GPS
- MID/PAD with GPS

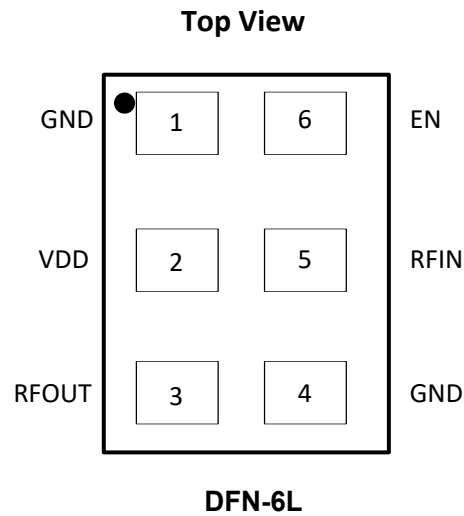
TYPICAL APPLICATION CIRCUIT



Recommended component value in application circuit

Component Description	Symbol	Value
Chip inductor	L1	9.1nH

PIN CONFIGURATION



PIN DESCRIPTION

Pin	Pin Name	I/O	Pin Description
1	GND	AG	Analog VSS
2	VDD	AP	Power supply
3	RFOUT	AO	LNA output
4	GND	AG	Analog VSS
5	RFIN	AI	LNA input from antenna
6	EN	DI	Pull high enable, pull low into power down mode

Note: DI (digital input), AI (analog input), AO (analog output), AP (analog power), AG (analog ground).

ORDERING INFORMATION

Part Number	Package	Quantity/ Reel
SK5118E	1.1mmx0.9mmx0.45mm, DFN-6L	5000 pcs

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
DC Supply Voltage	V _{DD}	-0.3	3.6	V
Supply Voltage For other Pin	V _{IO}	-0.3	V _{DD} +0.3	
Maximum RF Input Power	P _{IN}	20		dBm
Device Operating Temperature	T _{OP}	-40	90	°C
Device Storage Temperature	T _{STG}	-65	160	°C
Lead Temperature (soldering)	T _{LT}	260		°C
Soldering Temperature (reflow)	T _{ST}	260		
Electrostatic Discharge	V _{ESD(HBM)}	±2000		V
	V _{ESD(CDM)}	±500		

Note: 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.

RECOMMENDED OPERATING CONDITIONS

Parameters	Condition	Min.	Typ.	Max.	Units
Supply Voltage	-	1.5	2.8	3.3	V
Supply Current	EN=High, $V_{DD}=2.8V$	-	7.0	-	mA
	EN=High, $V_{DD}=1.8V$	-	6.0	-	
	EN=Low	-	0.05	1	uA
EN Input High	-	1.0	1.8	V_{DD}	V
EN Input Low	-	0	0	0.3	V

AC CHARACTERISTICS

$T_A=25^{\circ}\text{C}$ $V_{DD}=2.8\text{V}$, all data measured on Suntek's EVB, unless otherwise noted

Parameters	Conditions	Min	Typ	Max	Units
RF Frequency Range	-	1559	1575.42	1610	MHz
Power Gain	-	-	18.5	-	dB
Noise Figure	-	-	0.6	-	dB
Input Return Loss	Note1	-	-10	-	
Output Return Loss	Note1	-	-10	-	dB
Reverse Isolation	Note1	-	-30	-	dB
Stability	Note2	1.0	-	-	-
Input Power 1-dB Compression Point	1575MHz	-	-9	-	dBm
	900MHz	-	-1	-	
	2400MHz	-	3	-	
Out-Band IIP3	Note3	-	4	-	dBm
Out-Band IIP2	Note4	-	7	-	dBm
Turn on time	EN on to 90%RF	-	2	-	us
Turn off time	EN off to 10%RF	-	1	-	us

Note1: sweep power -30dBm, 1575.42MHz

Note2: frequency range 500MHz-5GHz

Note3: $f_1 = 1712.7\text{ MHz}$, -20dBm, $f_2 = 1850\text{ MHz}$, -65dBm, $IIP3 = (2 \cdot P_1 + P_2 + \text{Gain}_{1575\text{MHz}} - IM3)/2$

Note4: $f_1 = 824.6\text{ MHz}$, -25dBm, $f_2 = 2400\text{ MHz}$, -32dBm, $IIP2 = P_1 + P_2 - (IM2 - \text{Gain}_{1575\text{MHz}})$

AC CHARACTERISTICS

$T_A=25^{\circ}\text{C}$ $V_{DD}=1.8\text{V}$, all data measured on Suntek's EVB, unless otherwise noted

Parameters	Conditions	Min	Typ	Max	Units
RF Frequency Range	-	1559	1575.42	1610	MHz
Power Gain	-	-	18.0	-	dB
Noise Figure	-	-	0.7	-	dB
Input Return Loss	Note1	-	-10	-	dB
Output Return Loss	Note1	-	-10	-	dB
Reverse Isolation	Note1	-	-30	-	dB
Stability	Note2	1.0	-	-	-
Input Power 1-dB Compression Point	1575MHz	-	-12	-	dBm
	900MHz	-	-3	-	
	2400MHz	-	0	-	
Out-Band IIP3	Note3	-	0	-	dBm
Out-Band IIP2	Note4	-	6	-	dBm
Turn on time	EN on to 90%RF	-	2	-	us
Turn off time	EN off to 10%RF	-	1	-	us

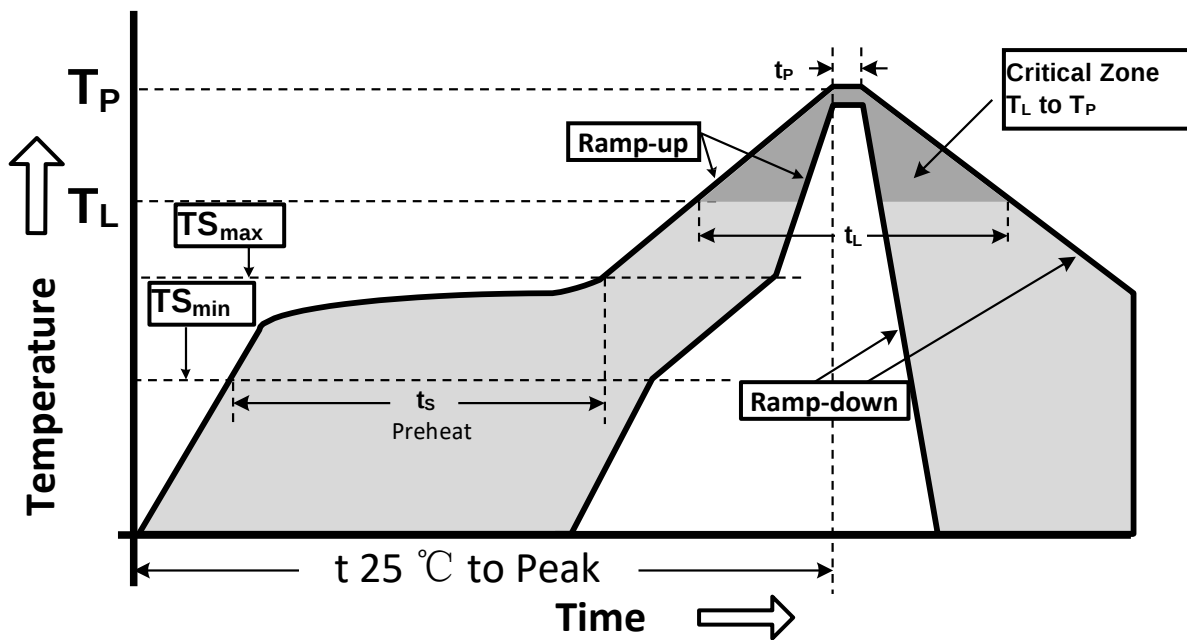
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REFLOW CHART

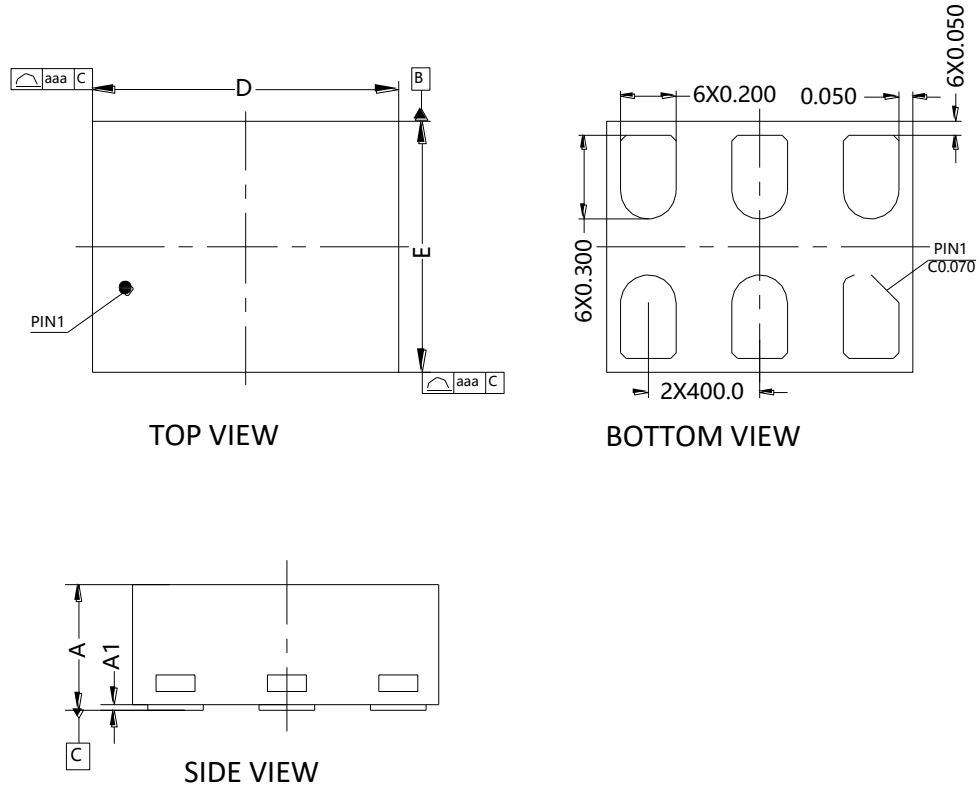


Recommended Lead-Free Reflow Profile

Reflow condition table

Profile Parameter	Lead-Free Assembly, Convection, IR/Convection
Ramp-up rate (TS_{max} to T_P)	3°C/second max.
Preheat temperature (TS_{min} to TS_{max})	150°C to 200°C
Preheat time (t_S)	60 - 180 seconds
Time above T_L , 217°C (T_L)	60 - 150 seconds
Peak temperature (T_P)	260°C
Time within 5°C of peak temperature(t_P)	20 - 40 seconds
Ramp-down rate	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

PACKAGE DIMENSION: DFN-6L



SYMBOL	MILIMETER		
	MIN	NOM	MAX
A	0.410	0.450	0.500
A1	0.000	0.020	0.050
D	1.050	1.100	1.150
E	0.850	0.900	0.950
aaa	0.050		