



MXDLF16GC

**Fully-integrated Low Noise Amplifier Front-End Module with
BDS/GPS/GNSS Pre-Filter**

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General Description

MXDLF16GC is a front-end module (FEM) with a fully-integrated low-noise amplifier and pre-filter designed for Beidou/GPS/GNSS receiver applications. This product has an extremely low noise figure, high gain, excellent linearity and high out-band rejection.

MXDLF16GC works under a 1.5V to 3.3V single power supply while consumes 5.5 mA current, in power down (PD) mode, the power consumption will be reduced to less than 1uA.

MXDLF16GC uses a small 1.5mm x 1.0mm x 0.75mm LGA 6-pin package, and requires no external matching component.

Applications

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

Features

- High Gain: 18dB
- Low noise figure 1.3dB @ 1575.42MHz
- Low operation current 5.5mA & PD current less than 1uA
- High out-band rejection
- Single supply voltage range 1.5V to 3.3V
- Small package 1.5mmx1.0mmx0.75mm, MSL1
- Input/output impedance internally matched to 50Ω and do not need any matching component
- Lead-Free and RoHS-Compliant

Pin Configuration/Application Diagram (Top view)

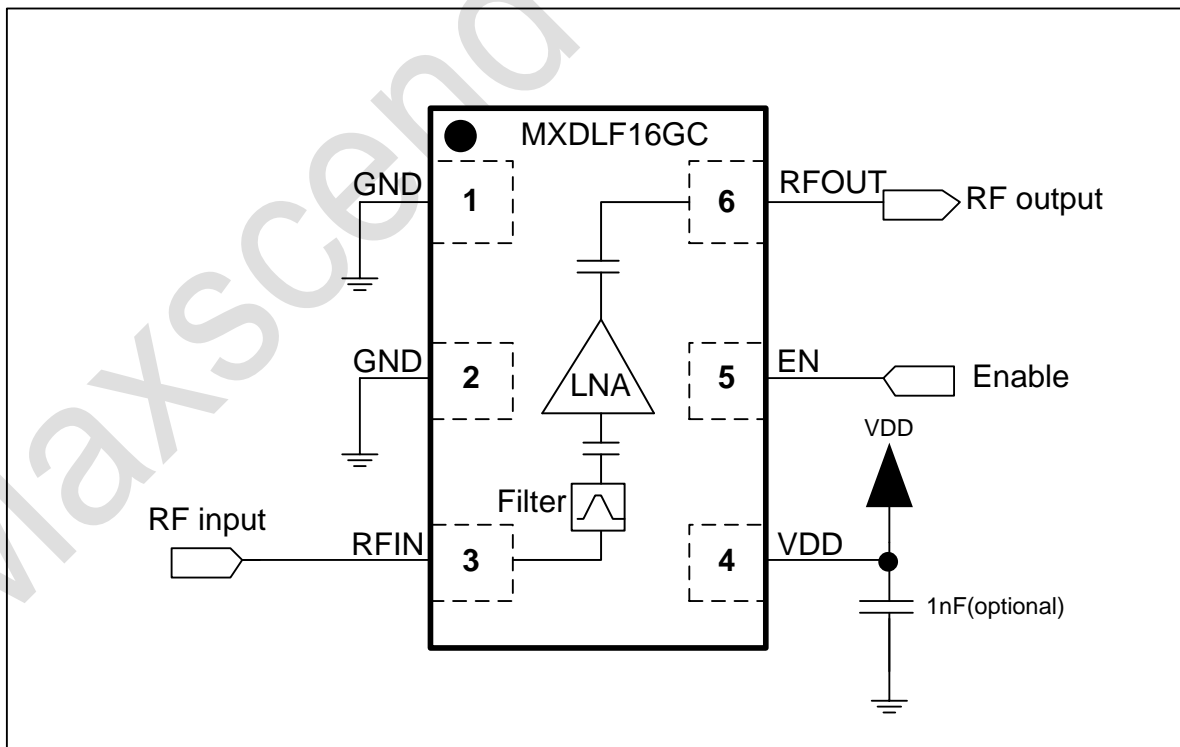


Figure 1.MXDLF16GC application circuit

Pin Descriptions

Table 1.

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

Note: DI (digital input), DO (digital output), DIO (digital bidirectional), AI (analog input), AO (analog output), AIO (analog bidirectional), AP (analog power), AG (analog ground),

Absolute Maximum Ratings

Table 2.

Parameters	Range	Units
Power supply	-0.3 ~ 3.6	V
Other Pin to GND	-0.3~VDD+0.3	V
Maximum RF Input Power	20	dBm
Operation Temperature Range	-40~90	°C
Junction Temperature	150	°C
Storage temperature Range	-65~160	°C
Lead Temperature (soldering)	260	°C
Soldering Temperature (reflow)	260	°C
Human Body Mode ESD	-2000~+2000	V
Charge Device Mode ESD	-500~+500	V

Specifications

DC Characteristics

$T_A = -40 \sim +90^\circ\text{C}$, Typically $T_A = 25^\circ\text{C}$ VDD=2.8V, unless otherwise noted

Table 3.

Parameters	Condition	Min.	Typ.	Max.	Units
Supply Voltage		1.5	2.8	3.3	V
Supply Current	EN=High, VDD=2.8V	4.5	5.5	8.5	mA
	EN=High, VDD=1.8V	2.8	3.6	5.5	
	EN=Low	0	0.05	1	uA
EN Input High	On state	1.0	1.8	VDD	V
EN Input Low	Off state	0	0	0.3	V

Specifications

AC Characteristics

T_A=-40~+90°C, typically T_A=25°C VDD=2.8V, all data measured on Maxscend's EVB, unless otherwise noted

Table 4.

Parameters	Conditions	Min	Typ	Max	Units
RF Frequency Range			1575.42		MHz
Power Gain			18		dB
	Note6		18		
Noise Figure			1.3		dB
	Note6		1.3		
Input Return Loss	Note1		-15	-10	dB
	Note6		-15	-10	
Output Return Loss	Note1		-12	-8	dB
	Note6		-11	-8	
Reverse Isolation	Note1		-27		dB
Desense	Note2		0.25		dB
Stability	Note3	1.4			
Input Power 1-dB Compression Point (In-band Gain 1dB compression)	1575MHz		-8		dBm
	900MHz		12		
	2450MHz		17		
Input Out-Band IP3	Note4		5		dBm
Input Out-Band IP2	Note5		55		dBm
Input referred 2 nd Harmonics	Note7		-80		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: jammed signal @ 850MHz, -20dBm

Note3: frequency range 500MHz-5GHz

Note4: f1 = 1712.7 MHz, -20dBm, f2 = 1850 MHz, -65dBm, IIP3= (2*P1+P2+ Gain_{1575MHz} -IM3)/2

Note5: f1 = 874.6 MHz, -25dBm, f2 = 2450 MHz, -32dBm, IIP2 = P1+P2-(IM2-Gain_{1575MHz})

Note6: Beidou frequency range B1: 1559.052MHz---1591.788MHz

Note7: f=787.76MHz, -25dBm, IHD2 = OHD2 - Gain_{1575MHz}

Specifications

AC Characteristics

T_A=-40~+90°C, typically T_A=25°C VDD=1.8V, all data measured on Maxscend's EVB, unless otherwise noted

Table 5.

Parameters	Conditions	Min	Typ	Max	Units
RF Frequency Range			1575.42		MHz
Power Gain			16.5		dB
	Note6		16.5		
Noise Figure			1.4		dB
	Note6		1.4		
Input Return Loss	Note1		-13	-10	dB
	Note6		-13	-10	
Output Return Loss	Note1		-10	-8	dB
	Note6		-10	-8	
Reverse Isolation	Note1		-27		dB
Desense	Note2		0.25		dB
Stability	Note3	1.4			
Input Power 1-dB Compression Point (In-band Gain 1dB compression)	1575MHz		-9		dBm
	900MHz		11		
	2450MHz		16		
Input Out-Band IP3	Note4		4		dBm
Input Out-Band IP2	Note5		52		dBm
Input referred 2 nd Harmonics	Note7		-79		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: jammed signal @ 850MHz, -20dBm

Note3: frequency range 500MHz-5GHz

Note4: f1 = 1712.7 MHz, -20dBm, f2 = 1850 MHz, -65dBm, IIP3= (2*P1+P2+ Gain_{1575MHz} -IM3)/2

Note5: f1 = 824.6 MHz, -25dBm, f2 = 2400 MHz, -32dBm, IIP2 = P1+P2-(IM2-Gain_{1575MHz})

Note6: Beidou frequency range B1: 1559.052MHz---1591.788MHz

Note7: f=787.76MHz, -25dBm, IHD2 = OHD2 - Gain_{1575MHz}

S-Parameter

AC Characteristics

$T_A = -40 \sim +90^\circ\text{C}$, typically $T_A = 25^\circ\text{C}$ $V_{DD} = 2.8\text{V}$, all data measured on Maxscend's EVB, unless otherwise noted

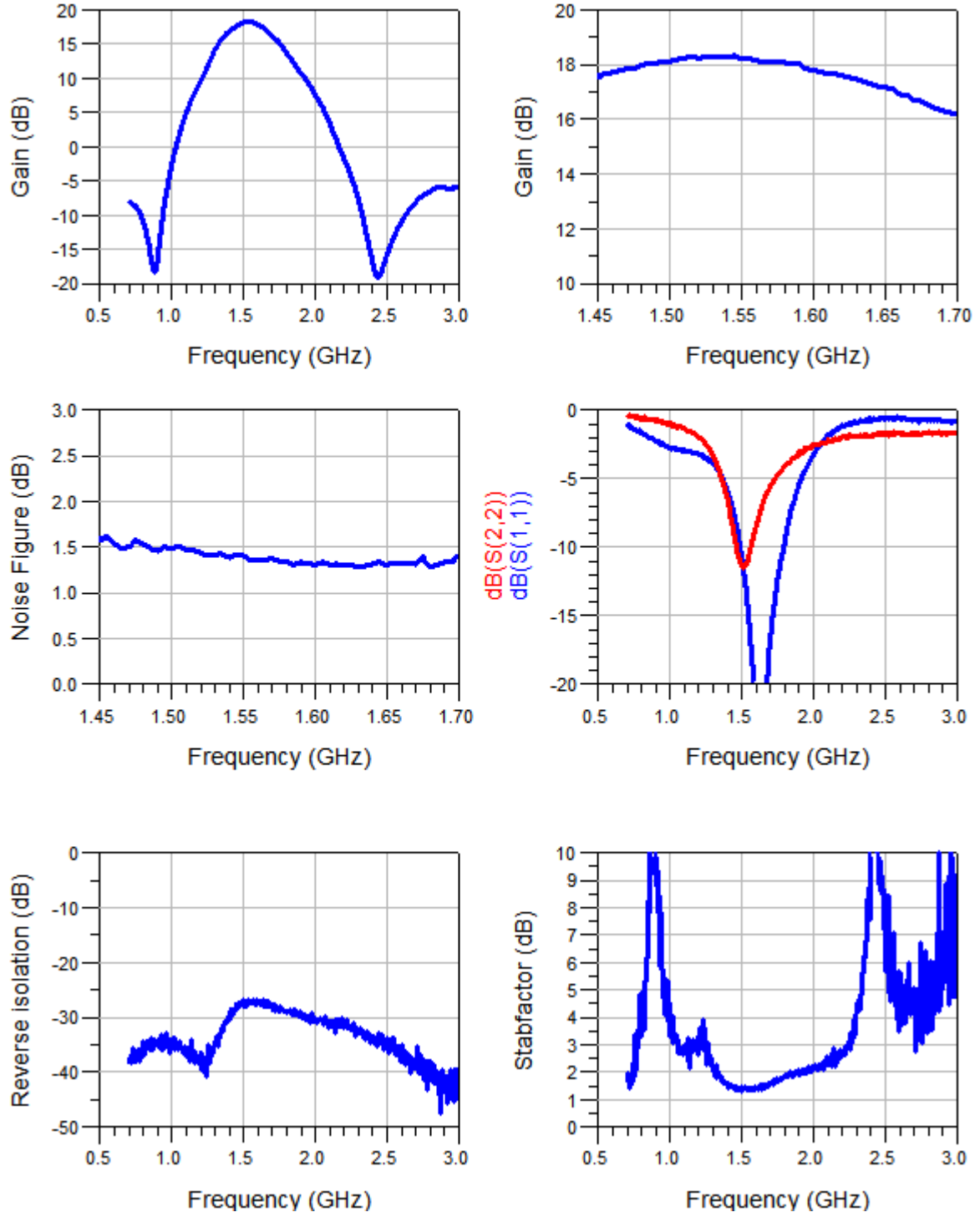


Figure 2. S-Parameter plot

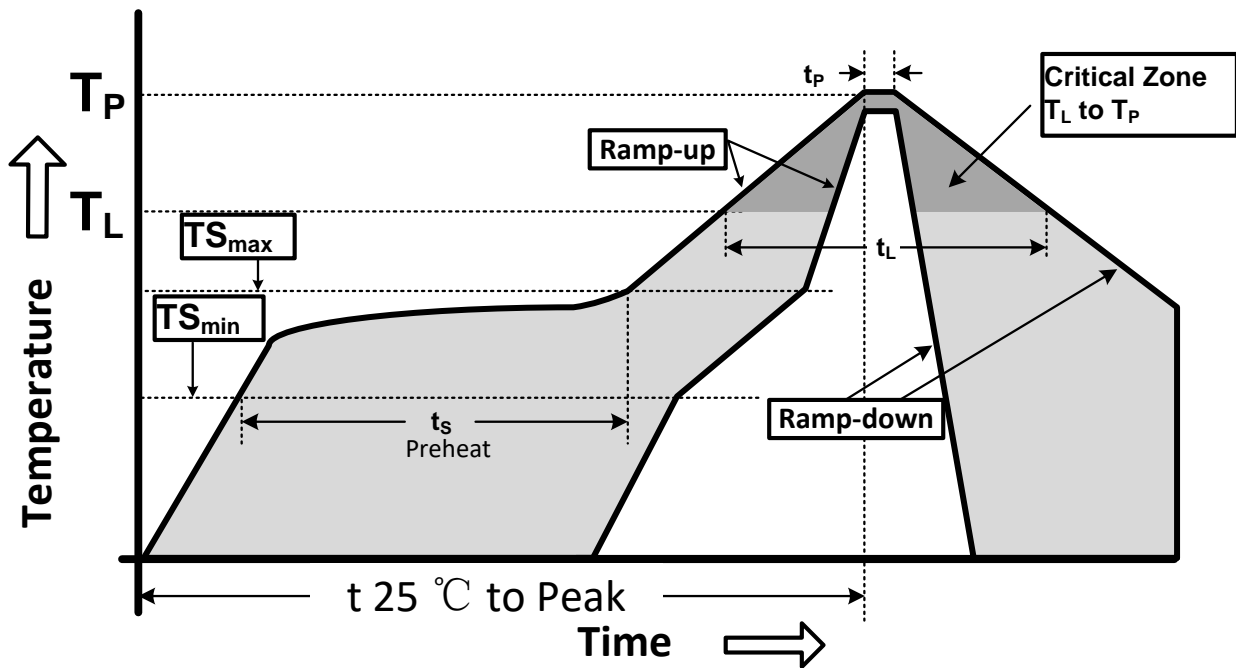
Reflow Chart


Figure 4. Recommended Lead-Free Reflow Profile

Table 6.

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 TL, 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.

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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