

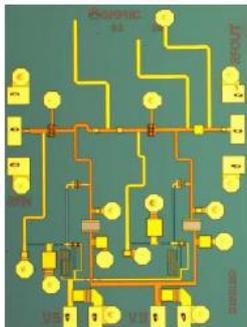
产品介绍

YLN12-1826C2 是一款高性能 GaAs 低噪声放大器 MMIC，适用于 K 波段。

YLN12-1826C2 具有良好的低噪声系数 1.2 dB @ 22 GHz，其增益为 19 dB。芯片匹配提供 12 dB 的输入回波损耗和 11 dB 输出回波损耗 @ 22 GHz。它主要用于雷达，通信，仪器仪表应用。

应用领域

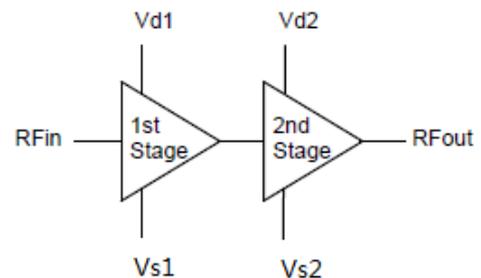
- 雷达
- 通信
- 仪表



YLN12-1826C2 芯片

关键技术指标

- 工作频率：18到 26 GHz
- 射频增益：19±0.4dB
- 噪声系数：<1.5dB, 1.2 dB at 22GHz
- 供电方式：61mA@+1.5V
- 总功耗：<92mW
- P_{INmax} ：+19dBm,CW
- 50 Ohms 输入和输出匹配
- 输入回波损耗：> 12 dB @ 22GHz
- 输出回波损耗：> 11 dB @ 22GHz
- 芯片尺寸：1.5 x 2.0 mm



YLN12-1826C2功能框图

最大值

$T_{amb} = +25\text{ }^{\circ}\text{C}$; 除非有其它说明。

符号	参数	条件	最小值	最大值	单位
V_{s1}, V_{s2}	栅极电压	V_D 开路	- 3.0	0	V
V_{d1}, V_{d2}	漏极电压	V_D 开路	0	+ 3	V
I_s, I_d	电流			10/100	mA
P_{IN}	RF 输入功率	连续波		+ 19	dBm
T_{amb}	环境温度		- 40	+ 85	$^{\circ}\text{C}$
T_j	结温			+ 150	$^{\circ}\text{C}$
T_{stg}	储存温度		- 55	+ 150	$^{\circ}\text{C}$

在上述所给参数外操作该器件可能会造成永久性损害。

热阻

符号	参数	典型值	单位
$R_{th(j-amb)}$	热阻@室温 (+25 $^{\circ}\text{C}$)	TBD	$^{\circ}\text{C}/\text{W}$

电参数

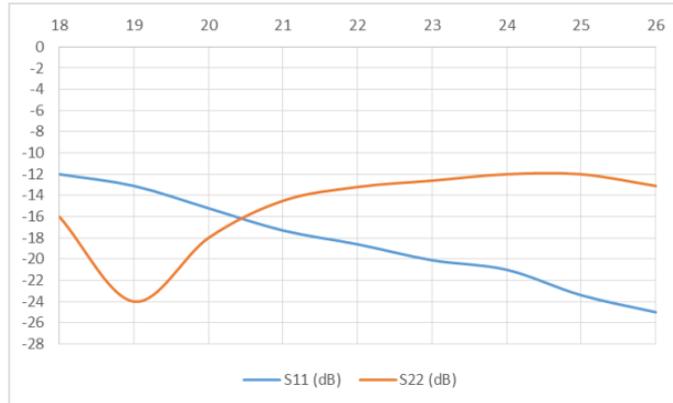
$T_{amb} = +25\text{ }^{\circ}\text{C}$, $V_{d1}, V_{d2} = 1.5\text{V}$, $V_s = -1.5\text{V}$ 。

符号	参数	条件	最小值	典型值	最大值	单位
R_{Fin}	输入频率		18		26	GHz
输入和输出加0.25nH电感, 参考测试板上性能						
V_D	漏极电源电压		+1.3	+1.5	+1.7	V
I_s+I_D	漏极电源电流	@ $V_D = 1.3/1.5/1.7\text{V}$	44	61	78	mA
G	增益	@ $V_D = 1.3/1.5/1.7\text{V}$	18.4	19	19.7	dB
NF_{MIN}	噪声系数		1.2	1.3	1.7	dB
$OP1_{dB}$	1dB	@ 20/22/24GHz		6/7/8.5		dBm
ISO_{rev}	反向隔离度	R_{FOUT}/R_{FIN}	-50		-32	dB
S_{11}	输入反射系数	50 Ohms		-12	-10	dB
S_{22}	输出反射系数	50 Ohms	-10	-19	-10	dB

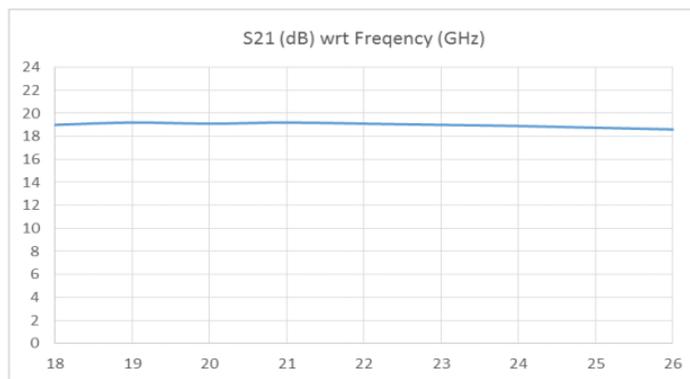
(*)测试参考平面为 YLN12-1826C2 MMIC的输入和输出方案。

S-参数

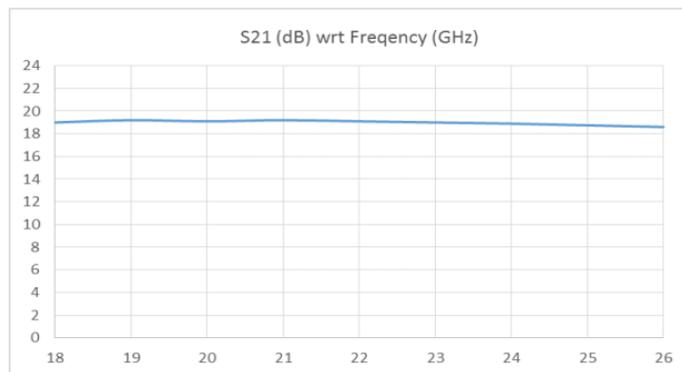
条件 : $V_d = 1.5V$, $V_s = -1.5V$, $T_{amb} = + 25^{\circ}C$ (在载体测试, 加0.25nH电感)。



输入输出回波损耗



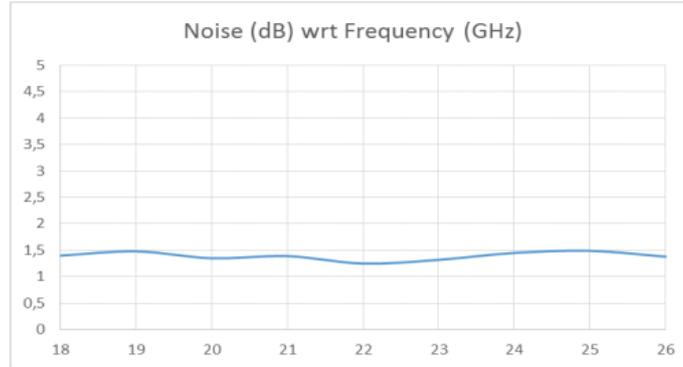
增益



反向隔离度

FREQ	S11M	S11A	S21M	S21A	S12M	S12A	S22M	S22A
0.400000000	9.942001E-01	-2.303	8.343937E-03	-31.330	3.342864E-05	161.621	1.001237E+00	-4.327
1.000000000	9.924753E-01	-7.214	9.508982E-06	-149.012	9.721058E-06	-117.274	1.000159E+00	-11.253
1.400000000	9.946622E-01	-10.868	1.153089E-03	-42.154	2.017038E-05	68.685	1.001888E+00	-15.882
2.000000000	9.917662E-01	-15.762	2.499541E-03	-70.462	2.229215E-05	71.643	9.982312E-01	-23.096
2.400000000	9.919719E-01	-19.387	3.185947E-03	-80.998	2.340182E-05	62.159	9.952984E-01	-27.815
3.000000000	9.929461E-01	-24.611	7.829309E-03	-105.535	5.300073E-05	84.069	9.937590E-01	-35.363
3.400000000	9.923777E-01	-28.288	1.155947E-02	-113.105	5.152580E-05	87.719	9.905831E-01	-40.289
4.000000000	9.908955E-01	-33.789	2.244060E-02	-131.000	1.176936E-04	67.520	9.867871E-01	-48.370
4.400000000	9.888960E-01	-37.493	3.538381E-02	-146.840	1.643916E-04	65.854	9.832571E-01	-53.822
5.000000000	9.795953E-01	-42.994	6.510311E-02	174.411	3.708514E-04	47.464	9.744985E-01	-62.521
5.400000000	9.752302E-01	-46.219	7.797528E-02	129.831	5.581270E-04	20.173	9.713427E-01	-68.515
6.000000000	9.809264E-01	-52.082	4.290260E-02	75.552	6.448520E-04	-15.758	9.610796E-01	-78.535
6.400000000	9.825023E-01	-56.276	2.571680E-02	57.919	6.533306E-04	-22.967	9.526942E-01	-85.614
7.000000000	9.764332E-01	-62.388	7.673125E-03	43.073	7.495716E-04	-35.080	9.358364E-01	-97.386
7.400000000	9.725162E-01	-66.718	1.567247E-03	61.686	8.325977E-04	-38.363	9.208030E-01	-106.065
8.000000000	9.652687E-01	-72.942	2.401740E-03	-140.786	1.046271E-03	-47.504	8.915846E-01	-120.673
8.400000000	9.571538E-01	-77.532	3.039377E-03	-73.940	1.406165E-03	-47.929	8.656277E-01	-131.802
9.000000000	9.412722E-01	-85.085	1.617172E-02	-45.737	1.685994E-03	-66.191	8.114859E-01	-150.950
9.400000000	9.301241E-01	-90.007	3.090615E-02	-41.749	2.079519E-03	-76.548	7.656832E-01	-165.722
10.000000000	9.113928E-01	-98.121	7.938534E-02	-36.864	2.646975E-03	-93.452	6.820322E-01	-169.316
10.400000000	8.969244E-01	-103.867	1.475227E-01	-35.308	2.944170E-03	-107.231	6.241365E-01	-150.838
11.000000000	8.597501E-01	-112.626	3.838605E-01	-46.127	3.386306E-03	-129.615	5.412273E-01	-120.453
11.400000000	8.340441E-01	-118.891	6.970857E-01	-57.731	3.657498E-03	-144.776	4.989079E-01	-99.734
12.000000000	7.891269E-01	-128.943	1.521298E+00	-84.971	3.642735E-03	-165.477	4.603296E-01	-69.040
12.400000000	7.488548E-01	-136.515	2.391504E+00	-105.800	3.610917E-03	179.245	4.476035E-01	-49.870
13.000000000	6.845898E-01	-147.587	4.136582E+00	-141.038	3.409295E-03	160.712	4.339788E-01	-25.549
13.400000000	6.411882E-01	-156.192	5.452791E+00	-166.813	3.273907E-03	146.107	4.284036E-01	-12.273
14.000000000	5.615277E-01	-171.144	7.289099E+00	-155.777	3.119382E-03	126.345	4.195728E-01	-3.668
14.400000000	5.017902E-01	-177.909	8.111471E+00	-131.918	2.924613E-03	111.059	4.187263E-01	-12.067
15.000000000	4.024806E-01	-158.038	8.997981E+00	-100.233	2.721595E-03	85.716	4.232824E-01	-23.089
15.400000000	3.287634E-01	-142.767	9.186123E+00	80.272	2.673045E-03	65.602	4.268728E-01	-30.039
16.000000000	2.417917E-01	-117.488	9.359029E+00	54.216	2.609184E-03	29.445	4.288894E-01	-39.912
16.400000000	1.987725E-01	-97.006	9.238568E+00	38.443	2.549169E-03	14.479	4.273495E-01	-46.600
17.000000000	1.608018E-01	-63.969	9.094944E+00	16.662	2.867546E-03	-11.003	4.164105E-01	-56.238
17.200000000	1.511996E-01	-50.655	9.025776E+00	10.626	2.991047E-03	-20.762	4.111927E-01	-59.440
17.400000000	1.522265E-01	-39.722	8.998409E+00	5.013	3.196023E-03	-28.644	4.063007E-01	-62.239
17.600000000	1.574758E-01	-28.163	8.954752E+00	-1.800	3.243379E-03	-35.771	3.967197E-01	-65.332
17.800000000	1.626577E-01	-22.162	8.932602E+00	-7.202	3.518923E-03	-42.372	3.894868E-01	-68.568
18.000000000	1.629914E-01	-11.787	8.736577E+00	-12.995	3.669030E-03	-48.849	3.813673E-01	-71.360
18.400000000	1.823786E-01	0.616	8.838578E+00	-23.320	4.131312E-03	-61.008	3.586772E-01	-77.167
19.000000000	2.086966E-01	-14.248	8.847290E+00	-38.755	4.764491E-03	-75.495	3.157185E-01	-85.881
19.400000000	2.196271E-01	-19.754	8.862725E+00	-49.561	5.372560E-03	-82.437	2.764269E-01	-91.937
20.000000000	2.511549E-01	-24.852	9.013975E+00	-63.699	6.588768E-03	-94.750	2.087331E-01	-97.755
20.400000000	2.642503E-01	-31.280	8.997871E+00	-74.452	7.487141E-03	-105.231	1.611401E-01	-99.737
21.000000000	2.826818E-01	-35.507	9.082990E+00	-89.074	8.430580E-03	-117.653	8.849466E-02	-84.623
21.400000000	3.074922E-01	-39.923	9.076735E+00	-99.739	9.204821E-03	-125.063	7.093664E-02	-44.974
22.000000000	3.272830E-01	-43.729	9.035695E+00	-114.925	1.047820E-02	-137.102	1.373904E-01	-11.134
22.400000000	3.392197E-01	-46.775	8.996519E+00	-124.894	1.146202E-02	-145.115	1.964457E-01	-9.540
23.000000000	3.503259E-01	-51.330	8.744015E+00	-139.593	1.269577E-02	-156.938	2.765385E-01	-15.201
23.400000000	3.597771E-01	-55.276	8.765188E+00	-149.372	1.354192E-02	-164.727	3.239308E-01	-19.938
24.000000000	3.668543E-01	-61.719	8.364953E+00	-163.250	1.425619E-02	-177.672	3.816164E-01	-28.219
24.400000000	3.666879E-01	-64.078	8.223495E+00	-173.235	1.492260E-02	176.133	4.125409E-01	-33.391
25.000000000	3.646041E-01	-69.266	7.852419E+00	173.167	1.590927E-02	165.253	4.422442E-01	-40.555
25.400000000	3.510638E-01	-70.412	7.610055E+00	162.604	1.664785E-02	158.544	4.582173E-01	-44.176
26.000000000	3.406391E-01	-70.246	7.253855E+00	149.196	1.770818E-02	147.141	4.743732E-01	-48.589
26.400000000	3.304455E-01	-70.691	7.182520E+00	140.383	1.823243E-02	138.366	4.868346E-01	-50.430
27.000000000	3.236671E-01	-65.552	6.653464E+00	126.124	1.897223E-02	125.240	5.115082E-01	-53.721
27.400000000	3.308552E-01	-65.199	6.377822E+00	116.868	1.879259E-02	116.518	5.330622E-01	-55.754
28.000000000	3.405073E-01	-59.443	5.706749E+00	102.135	1.797113E-02	101.473	5.690279E-01	-59.486
28.400000000	3.653811E-01	-57.440	5.254837E+00	93.966	1.712080E-02	95.197	5.928233E-01	-62.152
29.000000000	4.123963E-01	-55.273	4.765916E+00	81.185	1.655123E-02	85.321	6.293497E-01	-65.554
29.400000000	4.469989E-01	-56.460	4.284561E+00	75.189	1.579951E-02	78.151	6.613217E-01	-68.484
30.000000000	4.894842E-01	-59.437	3.866301E+00	62.332	1.489539E-02	66.464	6.970039E-01	-73.550
30.400000000	5.262553E-01	-61.354	3.652359E+00	52.936	1.379772E-02	59.026	7.224963E-01	-77.383
31.000000000	5.731001E-01	-66.800	3.022391E+00	42.803	1.220451E-02	48.946	7.546883E-01	-82.731
31.400000000	5.986132E-01	-68.863	2.832551E+00	32.570	1.125223E-02	43.514	7.714455E-01	-87.002
32.000000000	6.463342E-01	-73.591	2.282762E+00	26.981	9.586811E-03	34.943	7.950746E-01	-91.816
32.400000000	6.631867E-01	-76.397	2.156750E+00	20.245	9.161716E-03	31.881	8.059676E-01	-95.768
33.000000000	7.034586E-01	-79.982	2.014783E+00	11.380	7.599985E-03	19.768	8.226859E-01	-101.313
33.400000000	7.243452E-01	-83.862	1.900178E+00	5.727	5.976293E-03	7.324	8.317684E-01	-104.984
34.000000000	7.411534E-01	-87.443	1.517164E+00	-1.444	4.749679E-03	-0.424	8.458482E-01	-110.571
34.400000000	7.655966E-01	-90.660	1.310325E+00	-6.875	3.177053E-03	-3.389	8.515694E-01	-114.196
35.000000000	7.808647E-01	-94.841	1.099885E+00	-12.644	2.504331E-03	-26.617	8.609842E-01	-119.333
35.400000000	7.876277E-01	-98.714	9.394050E-01	-14.707	1.585337E-03	-72.541	8.647118E-01	-122.947
36.000000000	7.977734E-01	-102.608	8.709013E-01	-26.019	1.919116E-03	-145.813	8.676526E-01	-128.816

噪声系数 测试条件: $V_d=1.5V$, $V_s=-1.5V$, $T_{amb} = + 25^\circ C$



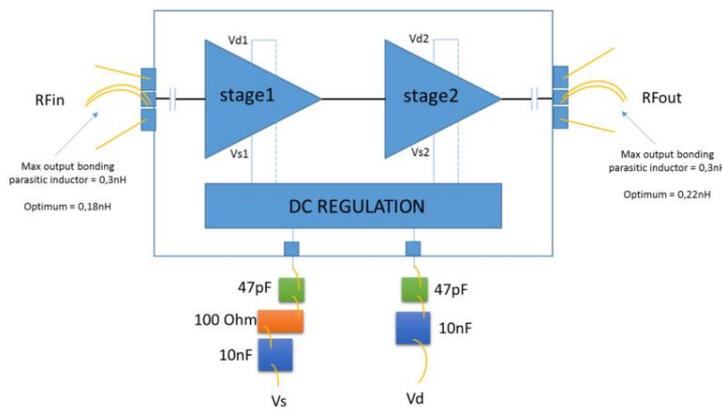
噪声系数

应用原理图

为了防止客户设计的不稳定性，强烈建议将小芯片电容尽可能地靠近到YLN12-1826C2芯片，并将它们尽可能地键合连接。

另外，以保证低频去耦，10nF的电容可以添加在漏极连接处。在栅极电路中，添加一个500 Ohms的串联电阻以此来提高隔离度和，并且阻止不必要的振动。在快速功率转换同时使用栅极控制结构的情况下，这些电阻引入了某种低通过滤波器。

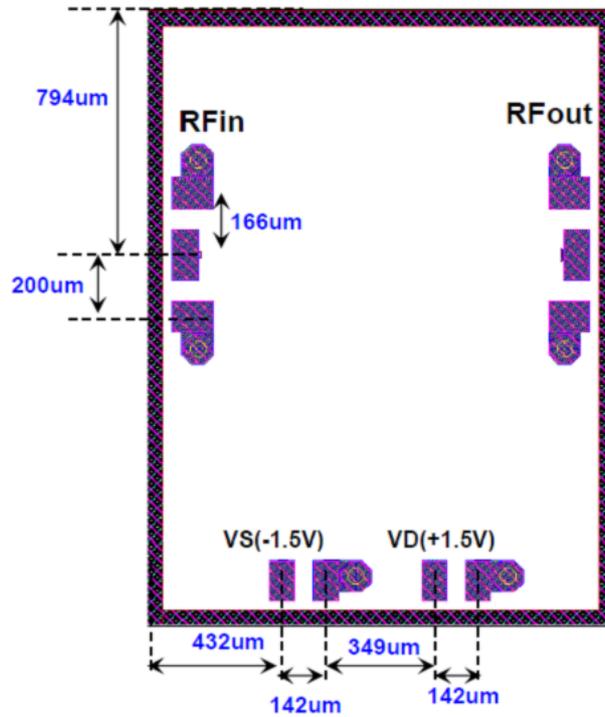
根据50 Ohms连接线和相关的锥度，关于RFIN和RFOUT连接有许多连接方案可以研究/使用。



应用原理图

器件名称	值	类型	描述
所有 47pF 电容	47pF	芯片电容	芯片电容 PRESIDIO COMPONENTS P/N SA151BX470M2HX5#013B 近芯片焊接，键合尽可能短
所有100Ω电阻	100Ω	芯片电阻	芯片电阻 US MICROWAVES RG1421-500-1%靠近 47pF 芯片电容焊接，键合尽可能短
所有10nF 电容	10nF	芯片电容	MURATA GMA085R71C103MD01T GM260 X7R 103M 16M100 PM520

结构框架和焊盘配置



焊盘

符号	焊盘	描述
RFOUT	OUT	RF 输出
RFIN	IN	RF 输入
Vd	VD	漏极
Vs	Vs	栅极
GND	背面	接地

注意 :为了保持良好的RF性能和稳定性, 将芯片的金属背面接地。

键合焊盘坐标

符号	焊盘 X 坐标	焊盘 Y 坐标
GND	100	1406
RFIN	100	1206
GND	100	1006
VS	432	100
GND	574	100
VD	923	100
GND	1065	100
GND	1400	1006
RFOUT	1400	1206
GND	1400	1406

封装

类型	描述	端口	间距 (mm)	封装尺寸(mm)
芯片	100% RF 和 DC 晶圆在片测试	23	-	1.5 x 2 x 0.1

采购信息

编号	封装	版本	分类	描述
YLN12-1826C2	裸芯片	C2	-	在片晶圆测试芯片

焊接

为了避免在焊接过程中对稳定性造成永久性损害或影响，芯片温度应不超过330℃。

芯片温度超过300℃的时间应不长于1mn。

温度高于400℃时，会产生有毒烟。