CL300P

300 MHz Integrated MRI Low Noise Preamplifier with Protection Circuitry and Detuning Bias

General Description

The CL300P is an integrated 300 MHz preamplifier with preamp protection circuitry and Detuning Bias. With single DC operation, the amplifier has 50 ohm input impedance and unconditional stable condition. The product has standard SMA as input and output.

Key Features

- For 300 MHz MRI Frequency
- Gain: 28 dB
- 50 ohm Input Impedance
- Preamplifier Noise Figure: 0.45 dB
- Reverse Isolation: 60 dB
- Output IP3: 22 dBm
- P1dB: 10.0 dBm
- Output VSWR: 1.3:1
- Coil De-tune Control Port Provided
- Unconditionally stable
- Single Power Supply
- RoHS Compliant
- Made In USA

Ordering Info

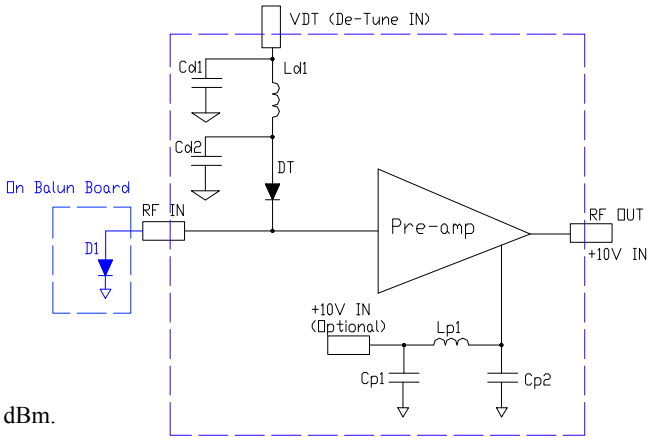
Part #	Description
CL300P-H-1	Magnetic, Machined Housing, Positive Detuning
CL300P-H-2	Magnetic, Machined Housing, Negative Detuning
CL300P-P-1	Non-Magnetic, No Housing, Positive Detuning
CL300P-P-2	Non-Magnetic, No Housing, Negative Detuning

Absolute Maximum Ratings [1]

Parameter	Maximum Value	Unit
DC Power Supply Voltage	16	V
Drain Current	50	MA
Total Power Dissipation	700	mW
RF Input Power, 10% Duty Cycle	40[2]	dBm
Channel Temperature	150	°C
Storage Temperature	-40 ~ +85	°C
Operating Temperature	0 ~ +60	°C
Thermal Resistance	215	°C/W

[1] Operating beyond these limits may cause permanent damages.
[2] With D1 in customer's board, Maximum RF Input Power can be 47 dBm. Recommend D1: Macom MADP-000402-12530P.

Block Diagram



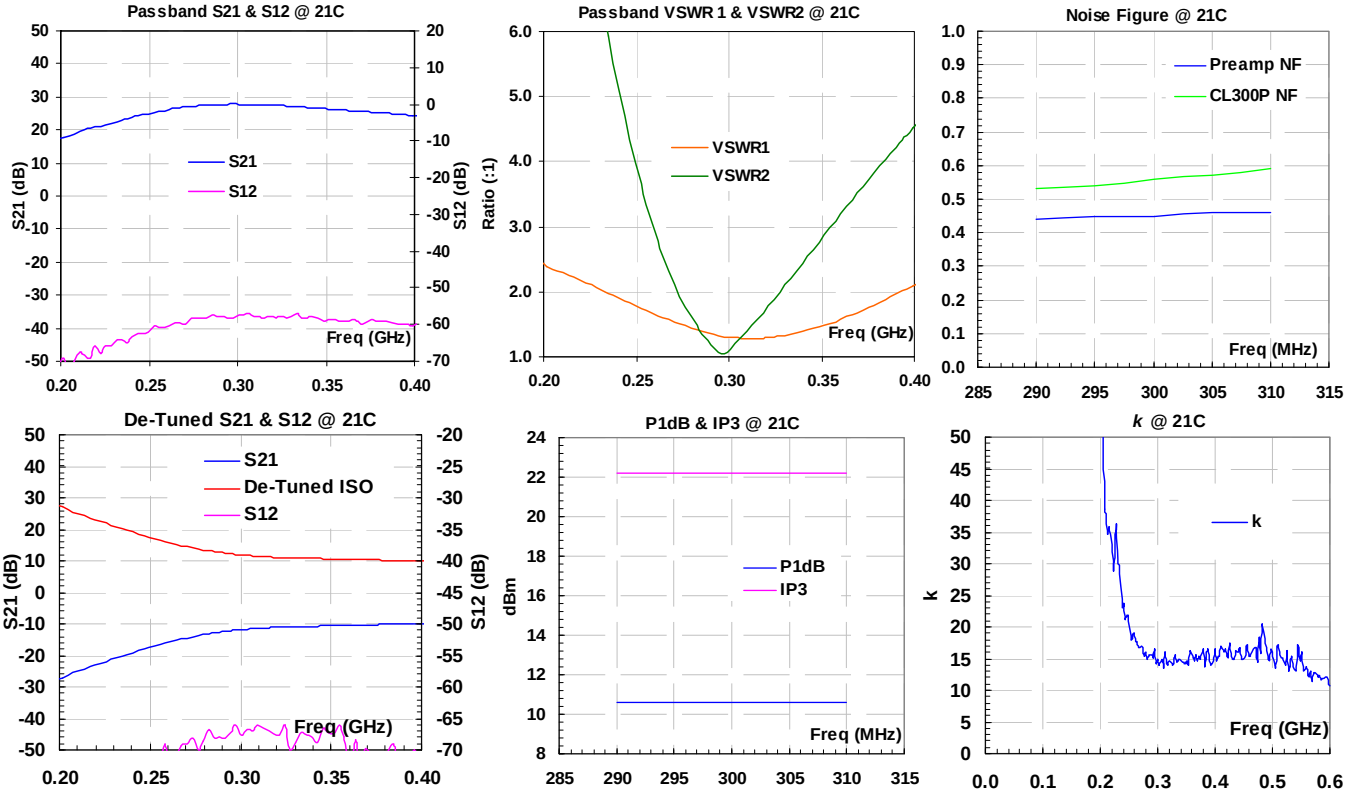
Detuning (TX Decoupling)

The current limiting resistor or pull up resistor is required to limit the de-tuning current. The maximum detune path average current is 250 mA. Without the limiting resistor, the RF choke in the de-tune path will be damaged.
Improper detuning can cause preamplifier failure by the TX signal.

Electrical Performance

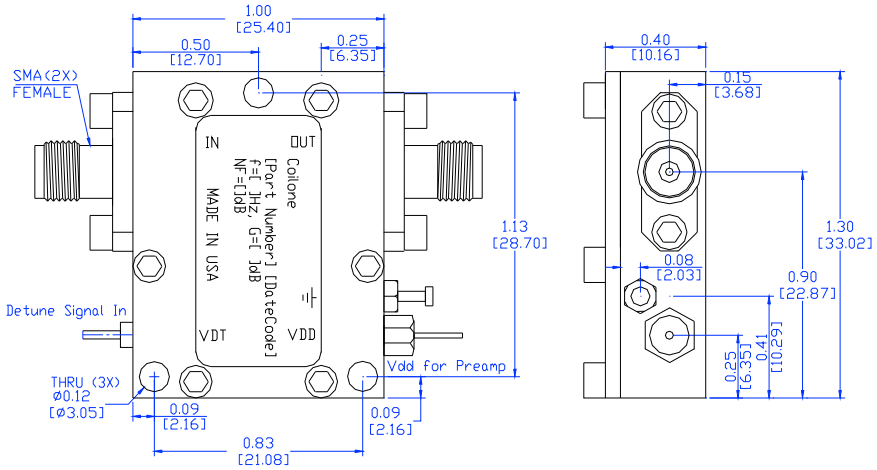
Parameter	Testing Items/Test Constraints	Min	Typical	Max	Unit
S_{21}	Gain at 290 MHz ~ 310 MHz		28		dB
ΔG	Gain Variation		±0.25	±0.50	dB
Z_0	Input & Output Impedance		50		Ohm
$VSWR_1$	Input VSWR		1.22:1	1.4:1	Ratio
$VSWR_2$	Output VSWR		1.30:1	1.5:1	Ratio
S_{12}	Reverse Isolation	55	60		dB
ISO	De-Tuning Isolation, De-Tuning On	35	40		dB
NF	Noise Figure, with De-Tuning Circuitry		0.55	0.65	dB
P_{1dB}	Output power 1 dB compression point	8	10		dBm
OIP_3	Output IP_3, -3.0 dBm each tone, 1 MHz separation	16	22		dBm
Tr	Recovering speed, 20 dBm @ input		2	4	µS
I_{DD}	Current consumption		18		mA
V_{DD}	Power supply voltage	+7		+16	V
$P_{IN,max}$	DC-6GHz, 10% Duty Cycle, 50 Ohm Source			40	dBm
$TEMP_O$	Operating temperature	0		+60	°C
TEMPs	Storage temperature	–40		+85	°C
V_{ESDN}	ESD Protection, None Contact, Output Port			16	KV
V_{ESD}	ESD Protection, Direct Contact, Output Port			6	KV
V_{DT}	Positive Detune Step Control Signal, with pull-up 100 Ω resistor		15	+20	V
I_{DT}	Positive Detune Step Control Signal, with pull-up 100 Ω resistor			250	mA

Typical Data



Mechanical Outline

CL300P-H:



CL300P-P: