ASB ALE2045T3 Internally Matched LNA Module Datasheet

http://www.manuallib.com/asb/ale2045t3-internally-matched-lna-module-datasheet.html

The plerow ACL-series is the compactly designed surface-mount module for the use of the LNA with or without the following gain blocks in the infrastructure equipment of the mobile wireless (CDMA,GSM,PCS,PHS,WCDMA,DMB,WLAN,WiBro,WiMAX),GPS,satellite communi- cation terminals,CATV and so on.It has an exceptional performance of low noise figure,high gain,high OIP3,and low bias current. The stability factor is always kept more than unity over the application band in order to ensure its unconditionally stable implementation to the application system environment. The surface-mount module package including the completed matching circuit and other components necessary just in case allows very simple and convenient implementation onto the system board in mass production level.
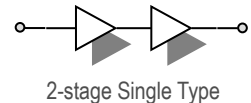
Features

· S_{21} = 25.7 dB @ 1920 MHz

  = 24.3 dB @ 2170 MHz
· NF of 0.70 dB over Frequency
· Unconditionally Stable
· Single 5V Supply
· High OIP3 @ Low Current

Description

The plerow™ ALE-series is the compactly designed surface-mount module for the use of the LNA with or without the following gain blocks in the infrastructure equipment of the mobile wireless (CDMA, GSM, PCS, PHS, WCDMA, DMB, WLAN, WiBro, WiMAX), GPS, satellite communi- cation terminals, CATV and so on. It has an exceptional performance of low noise figure, high gain, high OIP3, and low bias current. The stability factor is always kept more than unity over the application band in order to ensure its unconditionally stable implementation to the application system environment. The surface-mount module package including the completed matching circuit and other components necessary just in case allows very simple and convenient implementation onto the system board in mass production level.

RoHS-compliant

2-stage Single Type

More Information

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Specifications (in Production)

Typ. @ T = 25°C, V_s = 5 V, Freq. = 2045 MHz, $Z_{o.sys}$ = 50 ohm

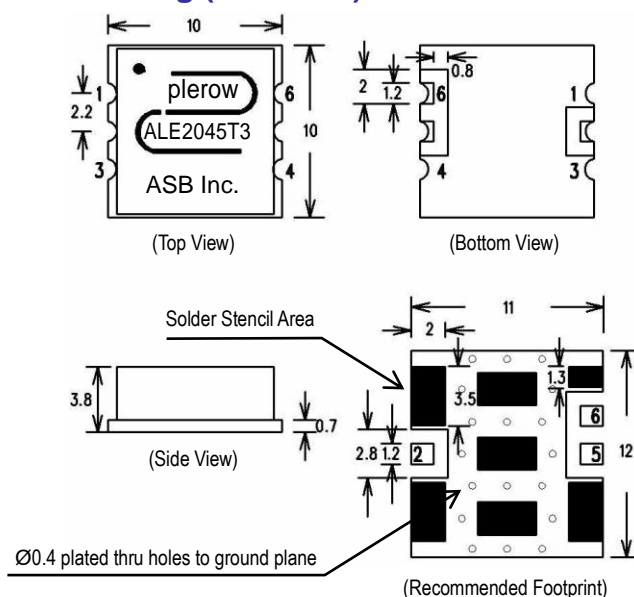| Parameter	Unit	Specifications		
		Min	Typ	Max
Frequency Range	MHz	1920		2170
Gain	dB	24	25	
Gain Flatness	dB		$\pm$ 0.7	$\pm$ 0.8
Noise Figure	dB		0.70	0.75
Output IP3 [1]	dBm	37.5	39.5	
S11 / S22 [2]	dB			-18 / -10
Output P1dB	dBm	20	21	
Switching Time [3]	μsec		-	
Supply Current	mA		200	220
Supply Voltage	V	5		
Impedance	Ω	50		
Max. RF Input Power	dBm	C.W 29 ~ 31 (before fail)		
Package Type & Size	mm	Surface Mount Type, 10Wx10Lx3.8H		

Operating temperature is -40°C to +85°C.
1) OIP3 is measured with two tones at an output power of 4 dBm / tone separated by 1 MHz.
2) S11/S22 (max) is the worst value within the frequency band.
3) Switching time means the time that takes for output power to get stabilized to its final level after switching DC voltage from 0 V to V_s.

Outline Drawing (Unit: mm)

(Top View)

(Bottom View)

(Side View)

Solder Stencil Area

Ø0.4 plated thru holes to ground plane

(Recommended Footprint)

Pin Number	Function
2	RF In
5	RF Out
6	Vs
Others	Ground

Note: 1. The number and size of ground via holes in a circuit board is critical for thermal RF grounding considerations.
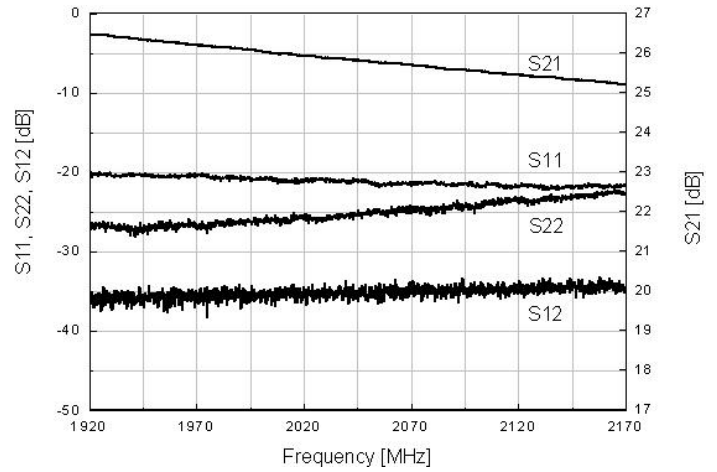2. We recommend that the ground via holes be placed on the bottom of all ground pins for better RF and thermal performance, as shown in the drawing at the left side.
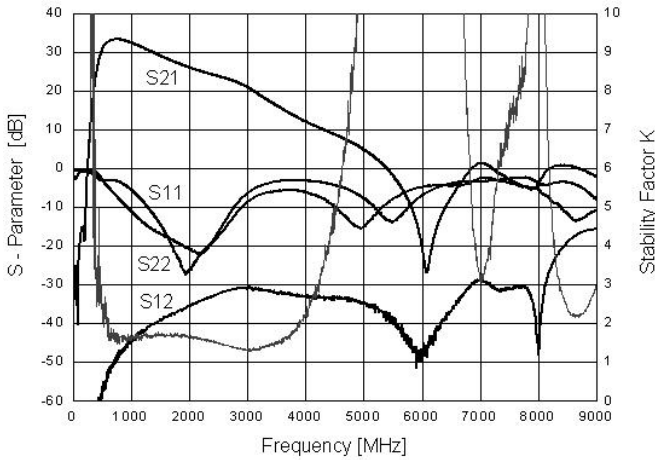
S-parameters

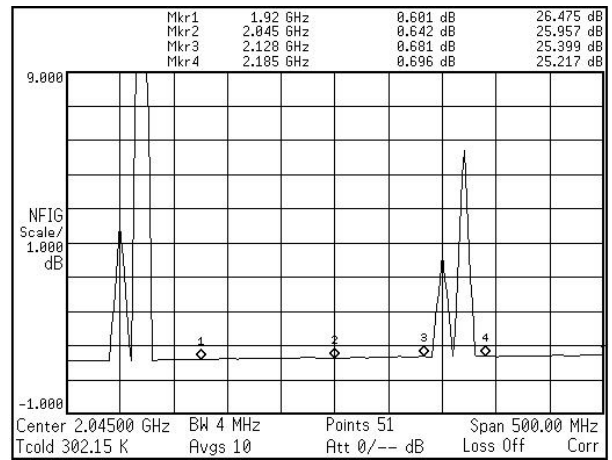## Typical Performance
(Measured)

1920~2045 MHz
+5 V

S-parameters & K Factor

Noise Figure

Mkr1	1.92 GHz	0.601 dB	26.475 dB
Mkr2	2.045 GHz	0.642 dB	25.957 dB
Mkr3	2.128 GHz	0.681 dB	25.399 dB
Mkr4	2.185 GHz	0.696 dB	25.217 dB

Center 2.04500 GHz　BW 4 MHz　　Points 51　　Span 500.00 MHz
Tcold 302.15 K　　Avgs 10　　Att 0/-- dB　Loss Off　　Corr

OIP3

Ch Freq　2.045 GHz　　　Trig Free
Intermod (TOI)
Center 2.045000000 GHz
Mkr1　2.045 500 GHz
Ref 4.9 dBm　#Atten 34 dB　　　4.041 dBm
#Samp Log 10 dB/ Offst 0.9 dB
Center 2.045 000 GHz　　　Span 5 MHz
#Res BW 30 kHz　　#VBW 3 kHz　　Sweep 138 ms

TOI (Worst Case)	2.046 GHz	41.09 dBm
TOI lower	2.043 GHz	41.16 dBm
TOI upper	2.046 GHz	41.09 dBm

P1dB

Mkr1　2.045 008 GHz
Ref 30 dBm　　　Atten 40 dB　　　　　22.44 dBm
Norm Log 10 dB/ Offst 0.9 dB

Marker
2.045008000 GHz
22.44 dBm

LgAv
W1 S2
S3 FC
AA
£(f):
f>50k
Swp
Center 2.045 000 GHz　　　　Span 5 MHz
Res BW 47 kHz　　　VBW 47 kHz　　Sweep 2.76 ms

RF Performance with Voltage Change

1. S-parameter

	1920 MHz			2045 MHz				2170 MHz		
	S21 (dB)	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	S11 (dB)	S22 (dB)	S21 (dB)	S11 (dB)	S22 (dB)
4.50 V	26.37	-19.10	-24.41	25.69	1.29	-19.83	-22.65	25.08	-20.02	-20.70
4.75 V	26.38	-19.68	-25.65	25.72	1.28	-20.38	-23.80	25.10	-20.69	-21.64
5.00 V	26.40	-20.06	-26.77	25.73	1.28	-20.85	-25.15	25.12	-21.38	-22.65
5.25 V	26.41	-20.45	-28.21	25.73	1.29	-21.43	-26.95	25.12	-22.12	-23.96
5.50 V	26.38	-20.99	-29.45	25.72	1.27	-21.94	-29.18	25.11	-22.97	-25.25

2. OIP3, P1dB & NF

	1920 MHz			2045 MHz			2170 MHz		
	OIP3 (dBm)	P1dB (dBm)	NF (dB)	OIP3 (dBm)	P1dB (dBm)	NF (dB)	OIP3 (dBm)	P1dB (dBm)	NF (dB)
4.50 V	38.73	21.20	0.573	38.61	21.42	0.589	38.31	21.44	0.625
4.75 V	39.92	21.72	0.581	39.77	21.94	0.629	39.59	21.97	0.652
5.00 V	40.86	22.20	0.601	41.09	22.44	0.642	40.66	22.46	0.696
5.25 V	41.29	22.66	0.623	41.42	22.96	0.667	41.21	22.91	0.734
5.50 V	41.39	23.08	0.658	41.66	23.38	0.704	41.91	23.36	0.774

Note: tested at room temperature.

RF Performance with Operating Temperature

1. S-parameter

	1920 MHz			2045 MHz				2170 MHz		
	S21 (dB)	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	S11 (dB)	S22 (dB)	S21 (dB)	S11 (dB)	S22 (dB)
-45 °C	27.16	-19.54	-24.10	26.57	1.12	-20.05	-34.54	26.04	-21.61	-37.39
-10 °C	27.01	-19.65	-27.46	26.42	1.16	-20.77	-30.47	25.85	-21.27	-27.05
25 °C	26.53	-19.87	-28.40	25.96	1.16	-20.83	-26.45	25.37	-21.05	-24.08
60 °C	26.48	-20.10	-26.71	25.89	1.19	-20.90	-23.41	25.29	-20.84	-21.89
85 °C	26.25	-20.11	-25.06	25.63	1.21	-20.73	-21.77	25.04	-20.99	-20.85

2. OIP3, P1dB & NF

|	1920 MHz			2045 MHz			2170 MHz		
	OIP3 (dBm)	P1dB (dBm)	NF (dB)	OIP3 (dBm)	P1dB (dBm)	NF (dB)	OIP3 (dBm)	P1dB (dBm)	NF (dB)
-45 °C	39.76	22.33	0.267	40.37	22.66	0.291	40.48	22.73	0.318
-10 °C	40.33	22.21	0.438	40.51	22.57	0.464	40.54	22.63	0.499
25 °C	40.72	22.19	0.604	40.86	22.52	0.626	40.97	22.59	0.633
60 °C	40.80	22.02	0.735	40.95	22.35	0.761	41.19	22.52	0.788
85 °C	41.15	21.95	0.923	41.02	22.29	0.949	41.93	22.49	0.975

Note: tested at V_s= 5V.

Application Circuit
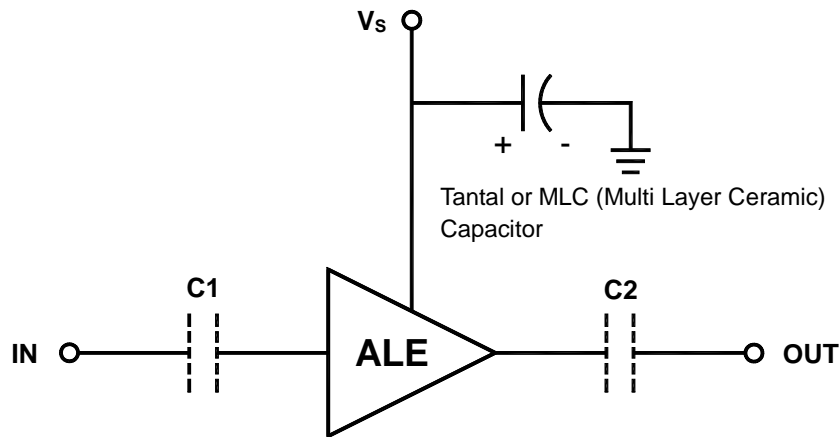
1) The tantal or MLC (Multi Layer Ceramic) capacitor is optional and for bypassing the AC noise introduced from the DC supply. The capacitance value may be determined by customer's DC supply status. The capacitor should be placed as close as possible to V_s pin and be connected directly to the ground plane for the best electrical performance.

2) DC blocking capacitors are always necessarily placed at the input and output port for allowing only the RF signal to pass and blocking the DC component in the signal. The DC blocking capacitors are included inside the ALE module. Therefore, C1 & C2 capacitors may not be necessary, but can be added just in case that the customer wants. The value of C1 & C2 is determined by considering the application frequency.

Recommended Soldering Reflow Process
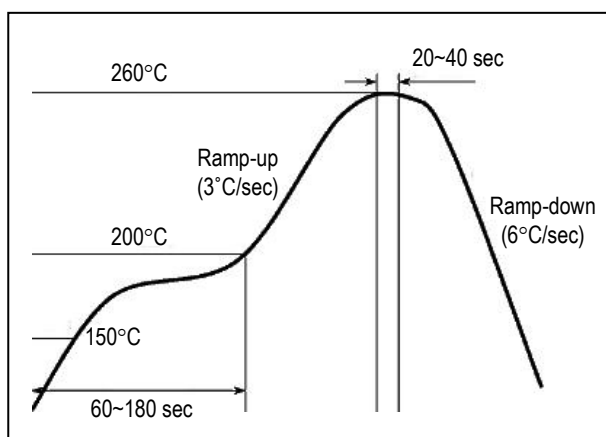
Evaluation Board Layout
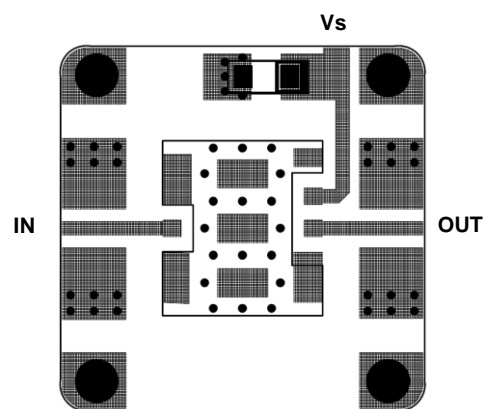
Size 25x25mm
(for ALE-T Series – 10x10mm)