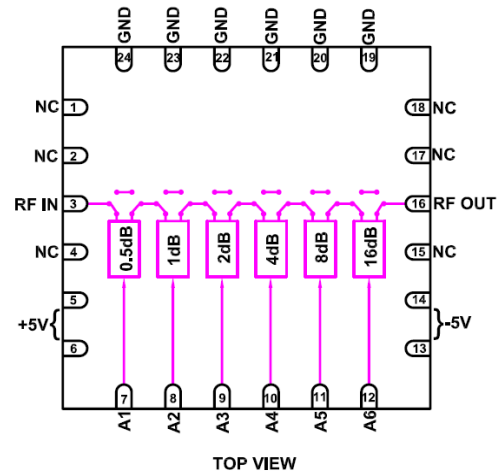


## 0.5 - 4 GHz 6-Bit Digital Attenuator

### Features

- ◆ Frequency Range : 0.5 to 4 GHz
- ◆ 31.5dB Attenuation Range
- ◆ 0.5dB resolution
- ◆ 4.5 dB Insertion loss max.
- ◆  $\pm 0.4$ dB Attenuation Error
- ◆ 50 $\Omega$  Impedance
- ◆ 10<sup>0</sup> Typical Phase variation
- ◆ 0.2 dB RMS Error
- ◆ Integral TTL Driver
- ◆ 24 Lead 6 x 6 x 0.75 mm QFN Package

**Functional Diagram**


### Typical Applications

- ◆ Radar
- ◆ Military & Space
- ◆ Instrumentation
- ◆ Test and Measurements
- ◆ Instrumentation Applications

### Description

The ASL3005P6 is a high performance 6-bit digital attenuator MMIC offering an attenuation range of 31.5dB in steps 0.5dB. This device is in 24 lead TQLMP 6 x 6mm QFN Package. The attenuator bit values are 0.5dB (LSB), 1,2,4,8 and 16dB (MSB) for a total attenuation of 31.5dB. The attenuator features good attenuation accuracy of  $\pm 0.4$ dB over all 64 states. The attenuator provides an integral TTL driver facilitating a 6-bit control. The driver operates on +5/-5V voltages with minimal DC power consumption.

### Absolute Maximum Ratings <sup>(1)</sup>

Parameter	Absolute Maximum	Units
RF Input Power	20	dBm
Positive Supply Voltage	+6	V
Negative Supply Voltage	-6	V
Control Voltage	-0.5 to +5.5	V
Operating Temperature	-55 to +85	°C
Storage Temperature	-65 to +150	°C

1. Operation beyond these limits may cause permanent damage to the component

**Electrical Specifications <sup>(1)</sup> @ T<sub>A</sub> = 25 °C, Z<sub>o</sub> = 50 Ω**

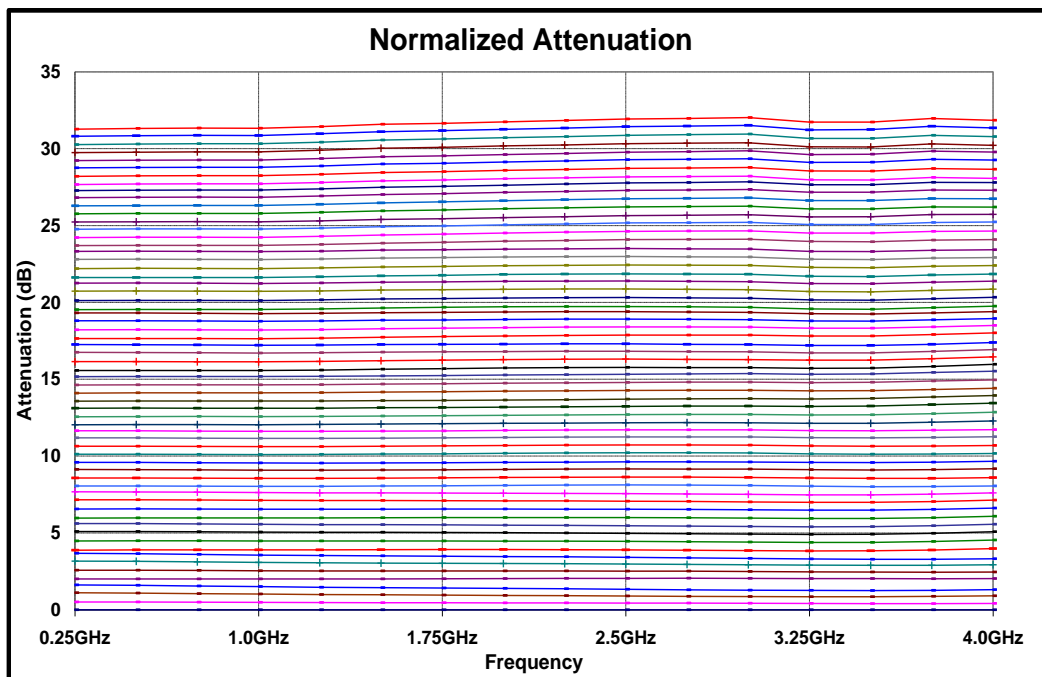
Parameter	Min.	Typ.	Max.	Units
Frequency	0.5	-	4	GHz
Insertion Loss	-	4.5	-	dB
Attenuation Range	0	-	31.5	dB
Attenuation step	-	0.5	-	dB
Attenuation Accuracy (All States)	-	± 0.4	-	dB
Phase variation 1 - 32 States 32 - 64 States	-	4 10	-	deg
RMS Error	-	0.2	-	dB
Input/Output Return Loss	10	15	-	dB
Input Power for 1dB Compression	-	24	-	dBm
DC Bias Voltages	-	+5, -5	-	V
Control Voltage	-	0 / +5	-	V

**Note:**

1. The above mentioned electrical specifications are measured on PCB mounted QFN package.

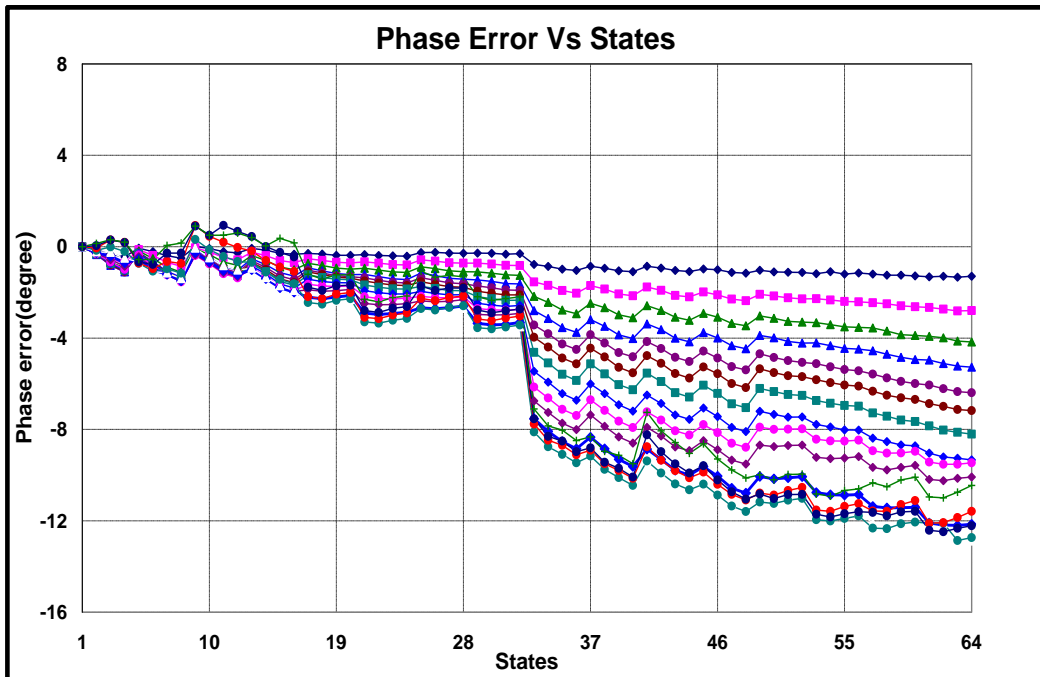
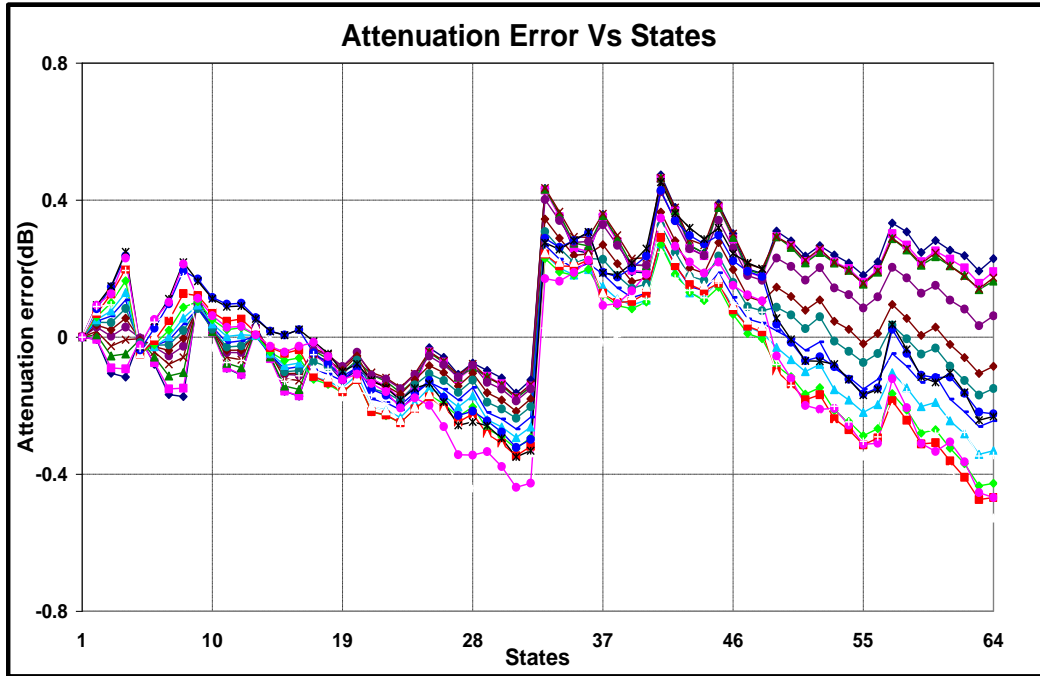
**Test Fixture data**

$T_A = 25^\circ\text{C}$



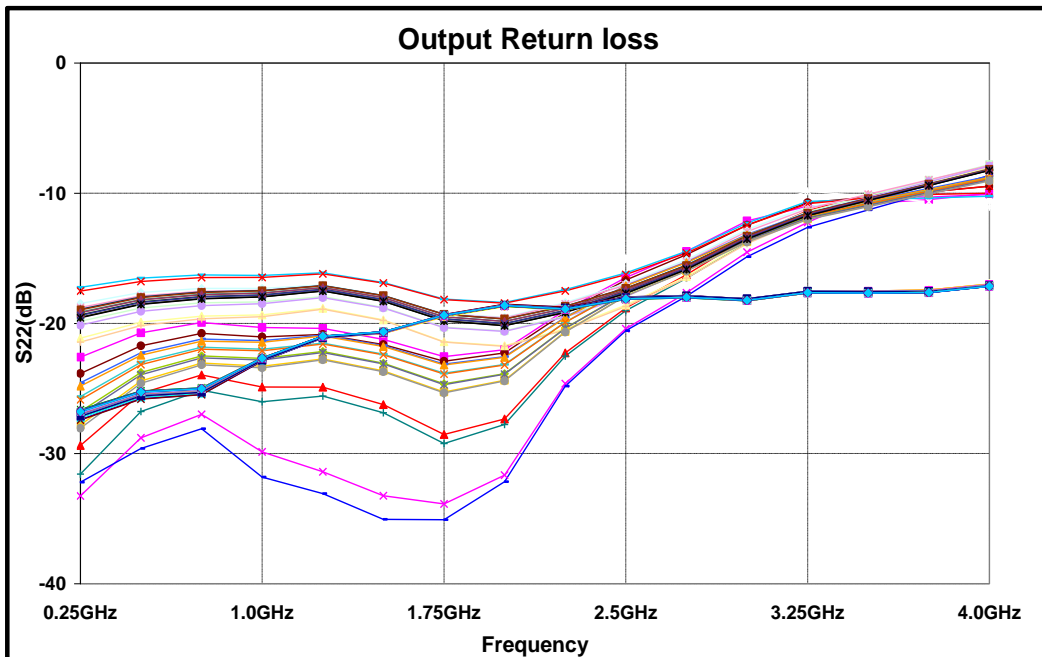
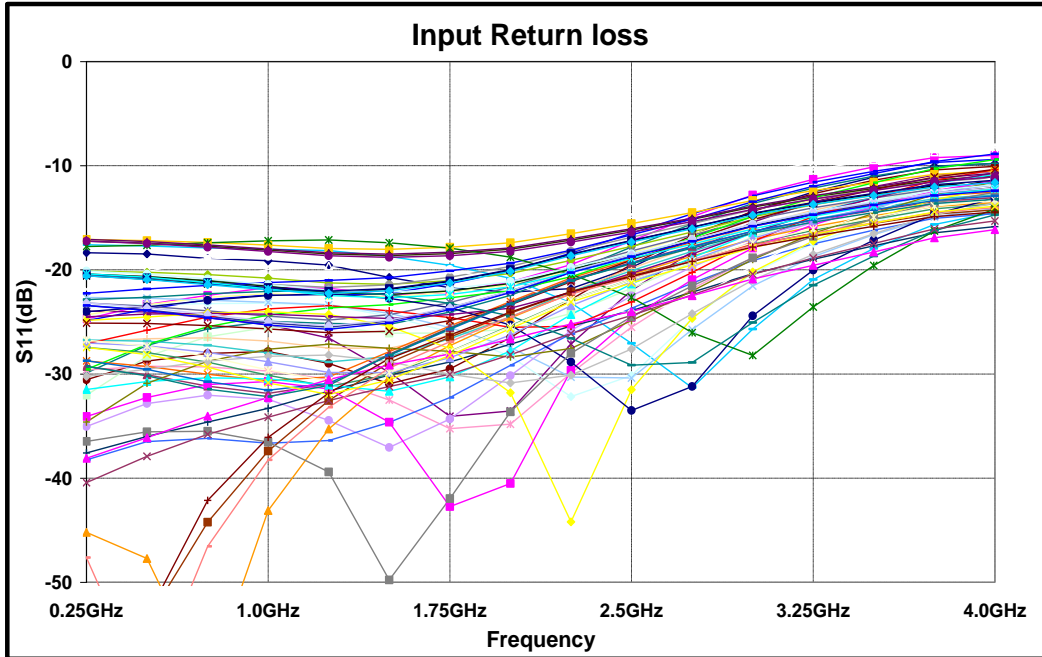
**Test Fixture data**

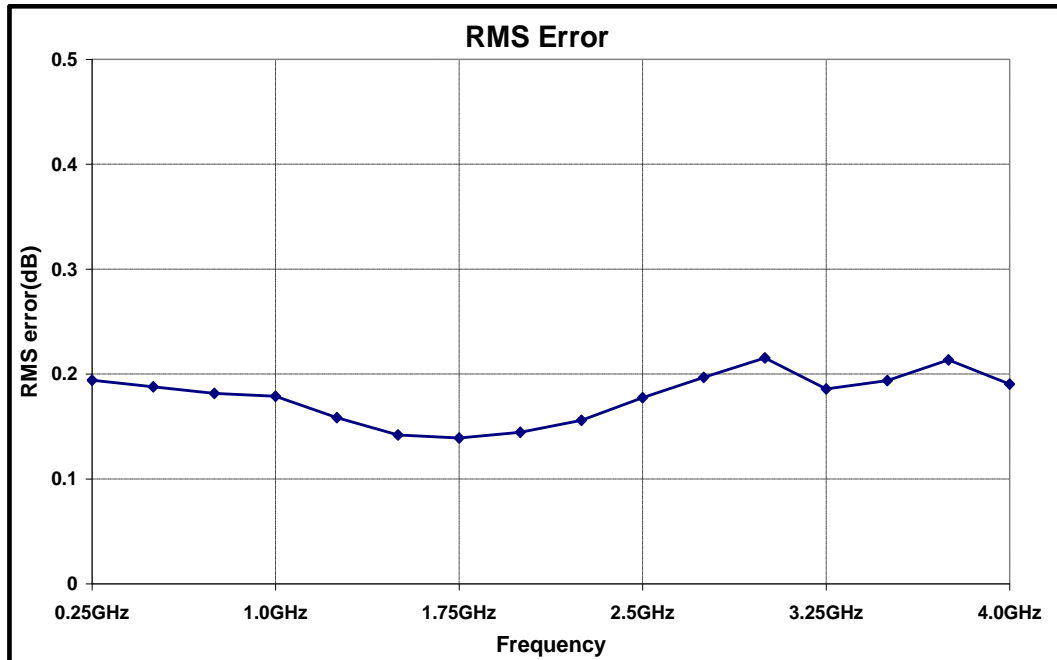
$T_A = 25\text{ }^\circ\text{C}$



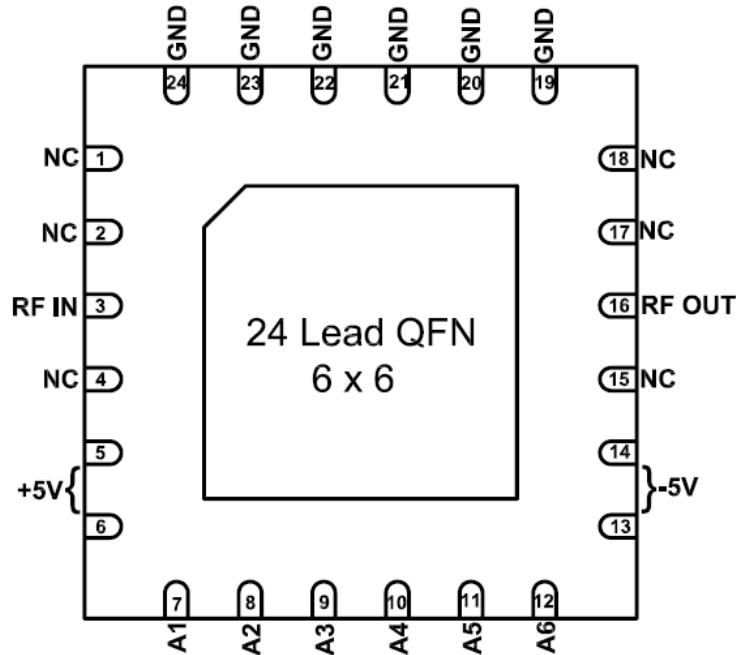
Test Fixture data

$T_A = 25\text{ }^\circ\text{C}$



**Test Fixture data** $T_A = 25\text{ }^\circ\text{C}$ 

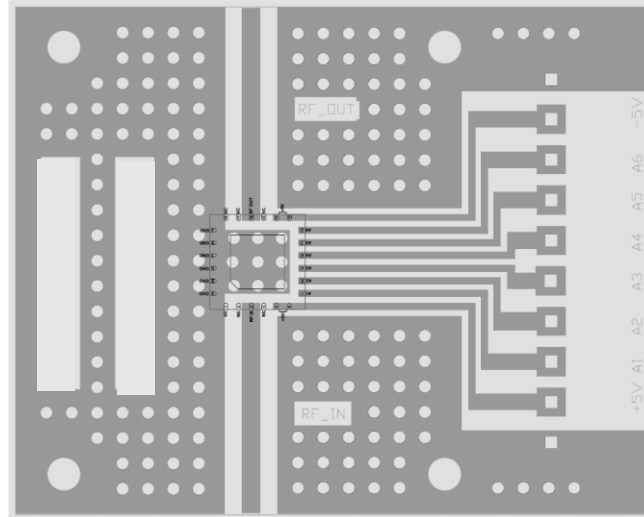
## Pin Configuration (Top View)



## Pin Descriptions

PIN	Function	Description
1,2	NC	No Connections
3	RF IN	RF Input
4	NC	No Connection
5,6	+5V	DC Supply Voltage
7	A1	DC Control Voltage
8	A2	DC Control Voltage
9	A3	DC Control Voltage
10	A4	DC Control Voltage
11	A5	DC Control Voltage
12	A6	DC Control Voltage
13,14	-5V	DC Supply Voltage
15	NC	No Connection
16	RF OUT	RF Output
17,18	NC	No Connections
19-24	GND	Ground

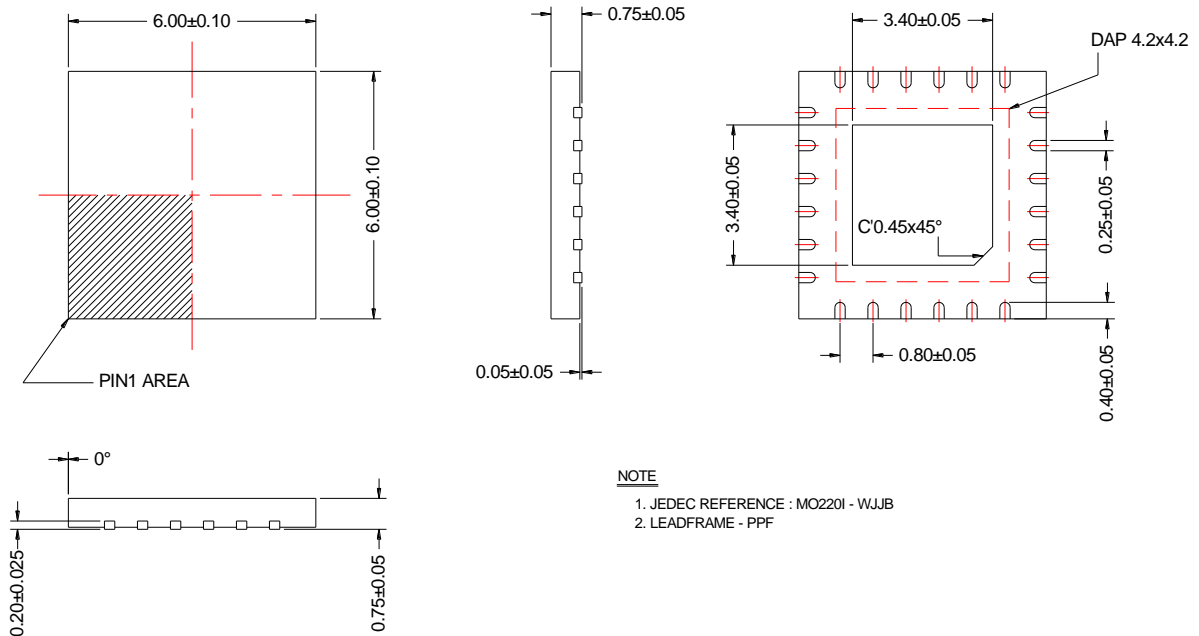
## Test Board Pattern



**Note:**

1. Circuit board material: Rogers 4350
2. Input\Output signal lines have 50Ω impedance
3. No off chip component is required.

## Package Outline Drawing





**Truth Table**

State	Attenuation (dB)	TTL Control ( 1 = 3 to 5 V, 0 = 0 to 0.2 V )					
		A6 (16)	A5 (8)	A4(4)	A3 (2)	A2(1)	A1 (0.5)
0	0	0	0	0	0	0	0
1	0.5	0	0	0	0	0	1
2	1	0	0	0	0	1	0
3	1.5	0	0	0	0	1	1
4	2	0	0	0	1	0	0
5	2.5	0	0	0	1	0	1
6	3	0	0	0	1	1	0
7	3.5	0	0	0	1	1	1
8	4	0	0	1	0	0	0
9	4.5	0	0	1	0	0	1
10	5	0	0	1	0	1	0
11	5.5	0	0	1	0	1	1
12	6	0	0	1	1	0	0
13	6.5	0	0	1	1	0	1
14	7	0	0	1	1	1	0
15	7.5	0	0	1	1	1	1
16	8	0	1	0	0	0	0
17	8.5	0	1	0	0	0	1
18	9	0	1	0	0	1	0
19	9.5	0	1	0	0	1	1
20	10	0	1	0	1	0	0
21	10.5	0	1	0	1	0	1
22	11	0	1	0	1	1	0
23	11.5	0	1	0	1	1	1
24	12	0	1	1	0	0	0
25	12.5	0	1	1	0	0	1
26	13	0	1	1	0	1	0
27	13.5	0	1	1	0	1	1
28	14	0	1	1	1	0	0
29	14.5	0	1	1	1	0	1
30	15	0	1	1	1	1	0
31	15.5	0	1	1	1	1	1
32	16	1	0	0	0	0	0
33	16.5	1	0	0	0	0	1
34	17	1	0	0	0	1	0
35	17.5	1	0	0	0	1	1

**Truth Table**

State	Attenuation (dB)	TTL Control ( 1 = 3 to 5 V, 0 = 0 to 0.2 V )					
		A6 (16)	A5 (8)	A4(4)	A3 (2)	A2(1)	A1 (0.5)
36	18.0	1	0	0	1	0	0
37	18.5	1	0	0	1	0	1
38	19	1	0	0	1	1	0
39	19.5	1	0	0	1	1	1
40	20	1	0	1	0	0	0
41	20.5	1	0	1	0	0	1
42	21	1	0	1	0	1	0
43	21.5	1	0	1	0	1	1
44	22	1	0	1	1	0	0
45	22.5	1	0	1	1	0	1
46	23	1	0	1	1	1	0
47	23.5	1	0	1	1	1	1
48	24	1	1	0	0	0	0
49	24.5	1	1	0	0	0	1
50	25	1	1	0	0	1	0
51	25.5	1	1	0	0	1	1
52	26	1	1	0	1	0	0
53	26.5	1	1	0	1	0	1
54	27	1	1	0	1	1	0
55	27.5	1	1	0	1	1	1
56	28	1	1	1	0	0	0
57	28.5	1	1	1	0	0	1
58	29	1	1	1	0	1	0
59	29.5	1	1	1	0	1	1
60	30	1	1	1	1	0	0
61	30.5	1	1	1	1	0	1
62	31	1	1	1	1	1	0
63	31.5	1	1	1	1	1	1



***GaAs MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing***

All information and Specifications are subject to change without prior notice