

Surface Mount

# Voltage Variable Equalizer

VAEQ-1220-75+

75Ω

50 to 1220 MHz

## The Big Deal

- Adjustable attenuation slope
- IP3 +50 dBm typical
- Minimal deviation from linear loss,  $\pm 0.5$  dB



CASE STYLE: HE1354

## Product Overview

The VAEQ-1220-75+ is a 75Ω Voltage Variable Equalizer built into a shielded case (size of 394"x.394"x.150", 10 x 10 x 3.8 mm). This model offers excellent performance over a wide frequency range of 50 to 1220 MHz with the variable slope providing great flexibility in a small 10 mm package.

The VAEQ-1220-75+ is often used to compensate RF chain gain flatness or cable loss versus frequency.

## Key Features

Feature	Advantages
Low power consumption: <ul style="list-style-type: none"><li>• Supply voltage +5V<sub>DC</sub> at max 16mA</li><li>• Control voltage 0-7V at max 20mA</li></ul>	Allows for use in applications with power constraints.
Adjustable attenuation slope (Control voltage of 0V to 7V)	Allows adjusting the slope to compensate for the precise losses encountered.
High linearity (IP3 +50 dBm typ.)	Low distortion enabling improved system performance.
Minimal deviation from linear loss over frequency range: $\pm 0.5$ dB	Provides low signal distortion over the passband.



# Surface Mount Voltage Variable Equalizer

## VAEQ-1220-75+

75Ω

50 to 1220 MHz

### Features

- Wide bandwidth
- Low insertion loss
- Low deviation from linear loss,  $\pm 0.5$  dB typ.
- High IP3 +50 dBm typ.
- Shielded case
- Aqueous washable

### Applications

- Cable loss compensation
- Instrumentation
- DOCSIS 3.1



CASE STYLE: HE1354

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

### Electrical Specifications at 25°C, V+=5V<sub>DC</sub> unless otherwise noted

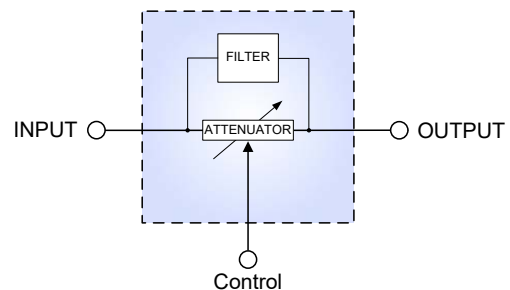
Parameter	Condition	Min.	Typ.	Max.	Units
Frequency Range		50		1220	MHz
Insertion Loss	50 MHz, Control Voltage, 0 - 7V 1220 MHz, Control Voltage, 0 - 7V		15 - 1.7 4.7 - 3.3		dB
Deviation from Linear Loss	Control Voltage 0 - 7V		$\pm 0.5$		dB
IP3	Control Voltage, 2.5 - 7V	+42	+50		dBm
1 dB Compression	Control Voltage, 0 - 7V		+30		dBm
Input Return Loss	Control Voltage, 0 - 7V		13		dB
Output Return Loss	Control Voltage, 0 - 7V		11.5		dB
Supply Voltage (V+)	Control Voltage, 0 - 7V	3.5	5	5.5	V
Supply Current	Control Voltage 7V, Control Voltage 0V,		0 10	16	mA
Control Current	Control Voltage 7V Control Voltage 2.5V		12 0	20	mA

### Maximum Ratings

Parameter	Ratings
Operating Temperature	0°C to 85°C
Storage Temperature	-55°C to 100°C
Input Power	+23 dBm
Control voltage	11 V
Supply Voltage (V+)	7 V

Permanent damage may occur if any of these limits are exceeded.

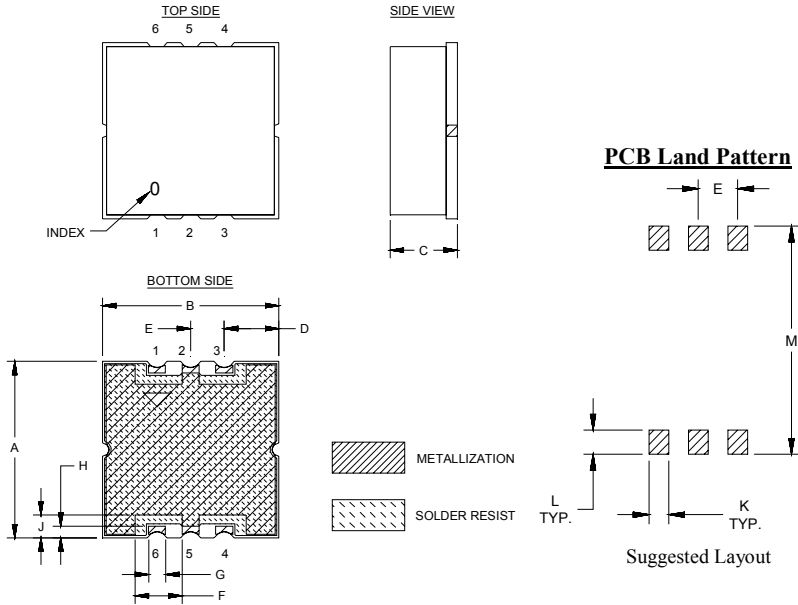
### Simplified Functional Diagram



### Pad Connections

Function	Pin Number
RF IN	1
RF OUT	6
V CONTROL	3
V+	4
GROUND	2,5

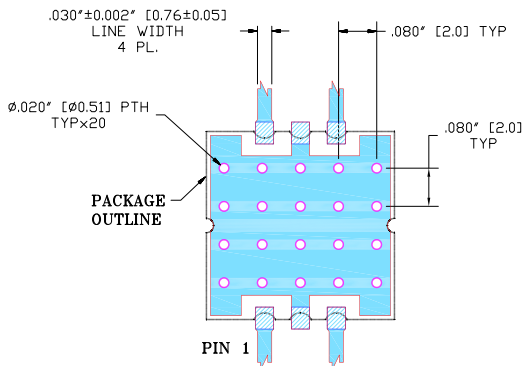
## Outline Drawing



## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	wt.
.394	.394	.150	.122	.075	.098	.038	.026	.051	.038	.046	.434	grams
10.01	10.01	3.81	3.10	1.90	2.49	0.97	0.66	1.29	0.97	1.17	11.02	0.7

## Demo Board MCL P/N: TB-1052+ Suggested PCB Layout (PL-315)



### NOTE:

- TRACE WIDTH IS SHOWN FOR R04350 WITH DIELECTRIC THICKNESS.  $.030 \pm 0.002$ ". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

## Pad Connections

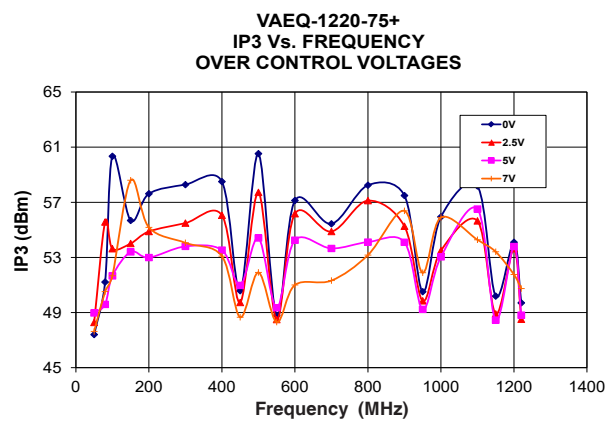
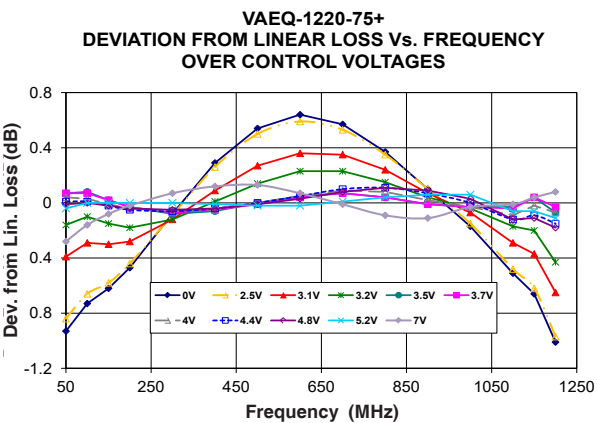
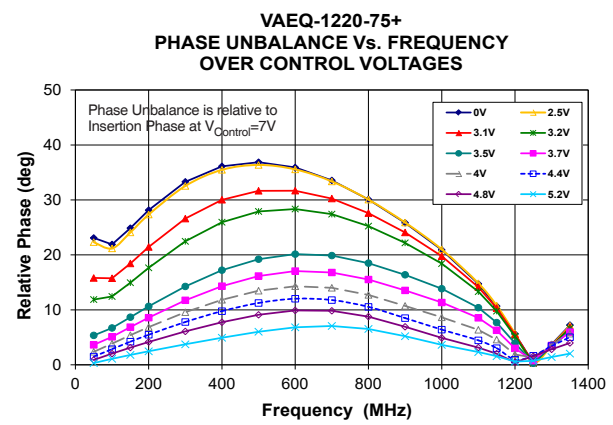
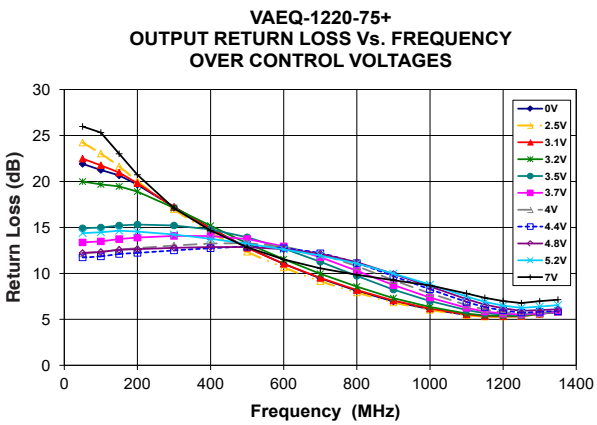
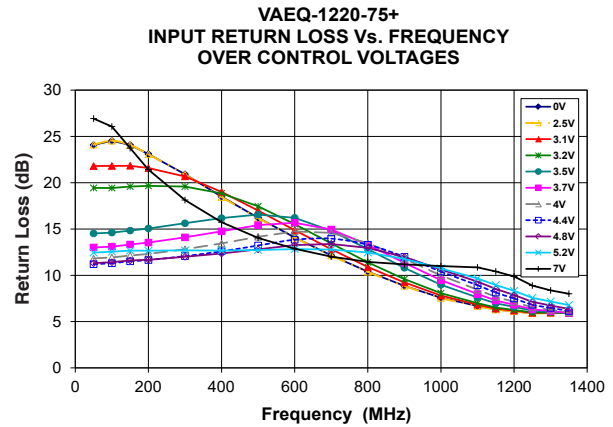
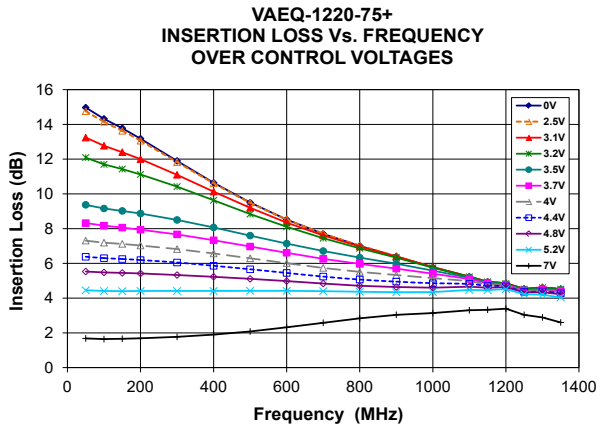
Function	Pin Number
RF IN	1
RF OUT	6
V CONTROL	3
V+	4
GROUND	2,5

@  $V_{Control}=0V$  &  $V_{Control}=2.5V$

Frequency (MHz)	Insertion Loss (dB)		Input Return Loss (dB)		Output Return Loss (dB)		Deviation from Linear Loss (dB)		Insertion Phase (deg)		Input IP3 (dBm)	
	$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$	
	0V	2.5V	0V	2.5V	0V	2.5V	0V	2.5V	0V	2.5V	0V	2.5V
50	14.97	14.76	24.08	24.10	21.91	24.23	0.93	0.84	18.62	17.84	47.40	48.28
100	14.32	14.15	24.53	24.53	21.25	23.03	0.73	0.66	10.22	9.50	60.34	53.63
150	13.78	13.63	24.08	24.06	20.66	21.64	0.62	0.58	6.52	5.74	55.68	54.01
200	13.18	13.06	23.10	23.06	19.65	20.03	0.47	0.44	3.31	2.51	57.62	54.88
300	11.90	11.83	20.92	20.87	17.22	16.97	0.08	0.09	4.28	5.04	58.28	55.49
400	10.64	10.61	18.50	18.45	14.91	14.46	0.29	0.26	14.06	14.72	58.50	56.06
450	10.06	10.04	17.22	17.19	13.78	13.33	0.43	0.39	19.72	20.32	50.58	49.73
500	9.50	9.49	16.21	16.18	12.80	12.35	0.54	0.50	25.76	26.27	60.53	57.72
550	8.99	8.99	15.06	15.04	11.90	11.48	0.61	0.57	32.19	32.63	48.79	48.49
600	8.52	8.53	14.09	14.07	11.03	10.65	0.64	0.59	38.84	39.21	57.13	56.17
700	7.70	7.72	12.15	12.14	9.46	9.16	0.57	0.53	52.82	53.01	55.44	54.88
800	7.01	7.03	10.39	10.38	8.11	7.92	0.37	0.35	67.27	67.31	58.24	57.12
900	6.40	6.41	8.87	8.86	6.95	6.84	0.10	0.10	81.98	81.95	57.49	55.26
950	6.10	6.11	8.24	8.23	6.45	6.36	0.05	0.04	89.89	89.85	50.51	49.85
1000	5.78	5.78	7.57	7.56	6.09	6.03	0.17	0.15	97.44	97.36	55.94	53.49
1100	5.23	5.24	6.69	6.68	5.48	5.46	0.51	0.48	114.11	114.00	58.18	55.65
1150	4.94	4.94	6.30	6.30	5.31	5.30	0.66	0.62	122.37	122.27	50.19	48.90
1200	4.85	4.85	6.12	6.12	5.30	5.30	1.01	0.97	132.09	132.01	54.10	53.63
1220	4.73	4.74	6.02	6.01	5.28	5.29	1.07	1.02	135.30	135.22	49.70	48.51

@  $V_{Control}=5V$  &  $V_{Control}=7V$

Frequency (MHz)	Insertion Loss (dB)		Input Return Loss (dB)		Output Return Loss (dB)		Deviation from Linear Loss (dB)		Insertion Phase (deg)		Input IP3 (dBm)	
	$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$		$V_{control}$	
	5.2V	7V	5.2V	7V	5.2V	7V	5.2V	7V	5.2V	7V	5V	7V
50	4.45	1.68	12.45	26.93	14.38	25.98	0.04	0.28	4.15	4.48	48.97	47.63
100	4.41	1.64	12.55	26.07	14.47	25.32	0.00	0.16	10.59	11.69	51.66	51.67
150	4.40	1.66	12.67	23.74	14.64	23.01	0.00	0.08	16.54	18.35	53.40	58.60
200	4.41	1.69	12.66	21.42	14.55	20.73	0.00	0.02	22.37	24.83	52.99	55.18
300	4.41	1.77	12.69	18.13	14.23	17.09	0.00	0.07	33.85	37.59	53.80	54.06
400	4.41	1.90	12.67	15.73	13.76	14.66	0.01	0.12	45.25	50.18	53.53	53.09
450	4.43	1.99	12.64	14.68	13.44	13.60	0.02	0.12	50.93	56.46	50.97	48.66
500	4.42	2.08	12.73	14.04	13.23	12.84	0.02	0.13	56.61	62.63	54.41	51.91
550	4.42	2.19	12.66	13.28	12.95	12.15	0.02	0.11	62.31	68.79	49.35	48.31
600	4.42	2.32	12.83	12.86	12.61	11.52	0.02	0.07	67.93	74.76	54.25	51.00
700	4.40	2.58	12.78	12.02	11.95	10.55	0.01	0.01	79.31	86.37	53.65	51.32
800	4.37	2.84	12.46	11.45	11.08	9.85	0.04	0.09	90.83	97.36	54.11	53.17
900	4.34	3.04	11.78	11.18	9.98	9.26	0.06	0.11	102.62	107.82	54.10	56.38
950	4.35	3.10	11.42	11.20	9.34	8.94	0.06	0.09	108.88	113.31	49.23	51.89
1000	4.35	3.14	10.74	11.00	8.78	8.69	0.06	0.03	114.71	118.35	53.04	55.90
1100	4.47	3.30	9.66	10.86	7.49	7.82	0.06	0.01	126.52	128.84	56.51	54.28
1150	4.46	3.33	8.95	10.42	6.90	7.34	0.06	0.04	131.47	133.03	48.45	53.41
1200	4.52	3.39	8.32	9.87	6.50	6.99	0.11	0.08	137.12	137.71	53.79	51.76
1220	4.43	3.30	8.00	9.49	6.36	6.86	0.02	0.20	138.75	138.82	48.81	50.74



### Additional Notes

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# Voltage Variable Equalizer, 75Ω

# VAEQ-1220-75+

Typical Performance Data @ V+=5V

Frequency (MHz)	Insertion Loss (dB)		Input Return Loss (dB)		Output Return Loss (dB)		Deviation from Linear Loss (dB)		Insertion Phase (deg)	
	Vcontrol		Vcontrol		Vcontrol		Vcontrol		Vcontrol	
	0V	2.5V	0V	2.5V	0V	2.5V	0V	2.5V	0V	2.5V
10	20.09	19.72	20.26	20.33	32.73	29.77	-	-	60.06	58.54
30	15.68	15.45	23.04	23.06	22.83	24.96	-	-	28.74	27.79
50	14.97	14.76	24.08	24.10	21.91	24.23	-0.93	-0.84	18.62	17.84
70	14.66	14.47	24.48	24.49	21.61	23.80	-0.80	-0.72	13.96	13.23
90	14.43	14.25	24.57	24.58	21.36	23.30	-0.75	-0.68	11.23	10.52
110	14.22	14.05	24.46	24.46	21.14	22.75	-0.71	-0.65	9.35	8.61
130	14.00	13.84	24.29	24.28	20.92	22.19	-0.67	-0.62	7.85	7.09
150	13.78	13.63	24.08	24.06	20.66	21.64	-0.62	-0.58	6.52	5.74
170	13.54	13.41	23.76	23.73	20.32	21.03	-0.57	-0.53	5.24	4.46
200	13.18	13.06	23.10	23.06	19.65	20.03	-0.47	-0.44	3.31	2.51
220	12.93	12.82	22.64	22.59	19.18	19.37	-0.40	-0.38	1.95	1.16
240	12.68	12.58	22.23	22.17	18.72	18.75	-0.32	-0.31	0.52	-0.28
260	12.42	12.33	21.87	21.81	18.24	18.15	-0.24	-0.24	-0.98	-1.77
300	11.90	11.83	20.92	20.87	17.22	16.97	-0.08	-0.09	-4.28	-5.04
320	11.64	11.58	20.35	20.30	16.71	16.41	0.00	-0.01	-6.07	-6.81
340	11.39	11.34	19.83	19.78	16.25	15.89	0.08	0.06	-7.95	-8.68
360	11.14	11.09	19.38	19.33	15.81	15.40	0.15	0.13	-9.90	-10.60
380	10.89	10.85	18.96	18.91	15.37	14.94	0.22	0.19	-11.92	-12.60
400	10.64	10.61	18.50	18.45	14.91	14.46	0.29	0.26	-14.06	-14.72
420	10.40	10.38	17.98	17.94	14.44	13.99	0.35	0.32	-16.29	-16.92
450	10.06	10.04	17.22	17.19	13.78	13.33	0.43	0.39	-19.72	-20.32
500	9.50	9.49	16.21	16.18	12.80	12.35	0.54	0.50	-25.76	-26.27
550	8.99	8.99	15.06	15.04	11.90	11.48	0.61	0.57	-32.19	-32.63
600	8.52	8.53	14.09	14.07	11.03	10.65	0.64	0.59	-38.84	-39.21
650	8.08	8.09	13.11	13.10	10.16	9.82	0.64	0.60	-45.83	-46.11
700	7.70	7.72	12.15	12.14	9.46	9.16	0.57	0.53	-52.82	-53.01
750	7.32	7.33	11.34	11.33	8.76	8.52	0.51	0.48	-60.19	-60.32
770	7.20	7.22	10.92	10.92	8.50	8.28	0.45	0.42	-63.09	-63.21
800	7.01	7.03	10.39	10.38	8.11	7.92	0.37	0.35	-67.27	-67.31
820	6.87	6.88	10.11	10.10	7.86	7.68	0.34	0.32	-70.19	-70.22
840	6.73	6.74	9.84	9.84	7.62	7.45	0.30	0.29	-73.33	-73.37
860	6.63	6.65	9.53	9.53	7.40	7.25	0.22	0.21	-76.43	-76.41
880	6.53	6.54	9.19	9.18	7.18	7.05	0.14	0.14	-79.22	-79.23
900	6.40	6.41	8.87	8.86	6.95	6.84	0.10	0.10	-81.98	-81.95
920	6.25	6.26	8.59	8.57	6.73	6.63	0.07	0.07	-85.01	-84.98
950	6.10	6.11	8.24	8.23	6.45	6.36	-0.05	-0.04	-89.89	-89.85
970	5.99	6.00	7.99	7.98	6.31	6.24	-0.12	-0.11	-92.84	-92.76
990	5.85	5.85	7.71	7.70	6.17	6.10	-0.15	-0.14	-95.82	-95.75
1000	5.78	5.78	7.57	7.56	6.09	6.03	-0.17	-0.15	-97.44	-97.36
1020	5.67	5.68	7.32	7.31	5.93	5.87	-0.24	-0.22	-100.68	-100.58
1040	5.58	5.58	7.13	7.11	5.77	5.72	-0.33	-0.30	-103.86	-103.78
1060	5.46	5.47	6.98	6.97	5.64	5.61	-0.39	-0.36	-107.01	-106.90
1100	5.23	5.24	6.69	6.68	5.48	5.46	-0.51	-0.48	-114.11	-114.00
1120	5.15	5.16	6.50	6.48	5.42	5.40	-0.61	-0.57	-117.25	-117.17
1140	5.01	5.02	6.35	6.34	5.34	5.33	-0.64	-0.61	-120.52	-120.41
1150	4.94	4.94	6.30	6.30	5.31	5.30	-0.66	-0.62	-122.37	-122.27
1180	4.83	4.84	6.20	6.19	5.29	5.29	-0.82	-0.78	-128.57	-128.46
1200	4.85	4.85	6.12	6.12	5.30	5.30	-1.01	-0.97	-132.09	-132.01
1220	4.73	4.74	6.02	6.01	5.28	5.29	-1.07	-1.02	-135.30	-135.22
1250	4.53	4.54	5.90	5.90	5.33	5.34	-	-	-141.55	-141.44
1300	4.60	4.62	5.94	5.94	5.58	5.60	-	-	-151.43	-151.30
1400	4.71	4.74	6.16	6.16	6.26	6.31	-	-	-172.24	-172.04

Frequency (MHz)	Input IP3 (dBm)	
	Vcontrol	
	0V	2.5V
10	43.10	40.29
30	50.16	52.30
50	47.40	48.28
80	51.21	55.57
100	60.34	53.63
150	55.68	54.01
200	57.62	54.88
300	58.28	55.49
400	58.50	56.06
450	50.58	49.73
500	60.53	57.72
550	48.79	48.49
600	57.13	56.17
700	55.44	54.88
800	58.24	57.12
900	57.49	55.26
950	50.51	49.85
1000	55.94	53.49
1100	58.18	55.65
1150	50.19	48.90
1200	54.10	53.63
1220	49.70	48.51
1300	53.06	50.98
1400	54.02	50.37

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# Voltage Variable Equalizer, 75Ω

# VAEQ-1220-75+

Typical Performance Data @ V+=5V

Frequency (MHz)	Insertion Loss (dB) Vcontrol		Input Return Loss (dB) Vcontrol		Output Return Loss (dB) Vcontrol		Deviation from Linear Loss (dB) Vcontrol		Insertion Phase (deg) Vcontrol	
	5.2V	7V	5.2V	7V	5.2V	7V	5.2V	7V	5.2V	7V
	10	4.80	2.10	11.94	20.73	13.41	18.61	-	-	3.73
30	4.51	1.74	12.32	25.48	14.20	24.11	-	-	-1.09	-1.00
50	4.45	1.68	12.45	26.93	14.38	25.98	-0.04	0.00	-4.15	-4.48
70	4.42	1.65	12.51	27.12	14.45	26.35	-0.02	0.00	-6.83	-7.48
90	4.41	1.64	12.53	26.51	14.46	25.78	0.00	0.00	-9.36	-10.32
110	4.41	1.64	12.56	25.58	14.49	24.82	0.00	0.00	-11.81	-13.04
130	4.41	1.65	12.62	24.62	14.56	23.87	0.00	0.00	-14.19	-15.72
150	4.40	1.66	12.67	23.74	14.64	23.01	0.00	0.00	-16.54	-18.35
170	4.40	1.67	12.68	22.84	14.65	22.15	0.00	0.00	-18.88	-20.95
200	4.41	1.69	12.66	21.42	14.55	20.73	0.00	0.00	-22.37	-24.83
220	4.41	1.70	12.67	20.56	14.47	19.81	0.00	0.00	-24.69	-27.40
240	4.41	1.72	12.71	19.87	14.41	19.01	0.00	0.00	-26.97	-29.96
260	4.41	1.74	12.75	19.32	14.37	18.32	0.00	0.00	-29.25	-32.50
300	4.41	1.77	12.69	18.13	14.23	17.09	0.00	0.00	-33.85	-37.59
320	4.41	1.80	12.64	17.48	14.13	16.51	-0.01	0.00	-36.15	-40.13
340	4.42	1.82	12.65	16.93	14.04	15.98	-0.01	0.00	-38.43	-42.66
360	4.42	1.85	12.68	16.51	13.97	15.52	-0.01	0.00	-40.67	-45.16
380	4.41	1.87	12.70	16.13	13.88	15.09	-0.01	0.00	-42.95	-47.66
400	4.41	1.90	12.67	15.73	13.76	14.66	-0.01	0.00	-45.25	-50.18
420	4.42	1.93	12.62	15.27	13.62	14.21	-0.01	0.00	-47.55	-52.72
450	4.43	1.99	12.64	14.68	13.44	13.60	-0.02	0.00	-50.93	-56.46
500	4.42	2.08	12.73	14.04	13.23	12.84	-0.02	0.00	-56.61	-62.63
550	4.42	2.19	12.66	13.28	12.95	12.15	-0.02	0.00	-62.31	-68.79
600	4.42	2.32	12.83	12.86	12.61	11.52	-0.02	0.00	-67.93	-74.76
650	4.41	2.43	12.72	12.36	12.22	10.91	0.00	0.00	-73.71	-80.74
700	4.40	2.58	12.78	12.02	11.95	10.55	0.01	0.00	-79.31	-86.37
750	4.38	2.70	12.66	11.77	11.55	10.18	0.03	0.00	-85.20	-92.12
770	4.38	2.77	12.53	11.58	11.38	10.05	0.02	0.00	-87.49	-94.30
800	4.37	2.84	12.46	11.45	11.08	9.85	0.04	0.00	-90.83	-97.36
820	4.35	2.87	12.45	11.46	10.87	9.72	0.06	0.00	-93.20	-99.51
840	4.34	2.90	12.37	11.45	10.66	9.60	0.07	0.00	-95.71	-101.79
860	4.35	2.97	12.19	11.37	10.46	9.49	0.05	0.00	-98.15	-103.98
880	4.36	3.02	11.97	11.26	10.23	9.39	0.05	0.00	-100.38	-105.92
900	4.34	3.04	11.78	11.18	9.98	9.26	0.06	0.00	-102.62	-107.82
920	4.32	3.04	11.64	11.16	9.71	9.12	0.09	0.00	-105.05	-109.94
950	4.35	3.10	11.42	11.20	9.34	8.94	0.06	0.00	-108.88	-113.31
970	4.37	3.14	11.20	11.16	9.15	8.86	0.04	0.00	-111.15	-115.26
990	4.35	3.14	10.89	11.05	8.91	8.76	0.05	0.00	-113.50	-117.27
1000	4.35	3.14	10.74	11.00	8.78	8.69	0.06	0.00	-114.71	-118.35
1020	4.38	3.17	10.49	10.91	8.51	8.52	0.03	0.00	-117.18	-120.53
1040	4.41	3.22	10.29	10.90	8.22	8.34	0.00	0.00	-119.47	-122.55
1060	4.43	3.24	10.12	10.93	7.95	8.15	-0.02	0.00	-121.70	-124.53
1100	4.47	3.30	9.66	10.86	7.49	7.82	-0.06	0.00	-126.52	-128.84
1120	4.50	3.35	9.33	10.67	7.26	7.65	-0.10	0.00	-128.46	-130.54
1140	4.48	3.35	9.06	10.49	7.01	7.44	-0.07	0.00	-130.37	-132.12
1150	4.46	3.33	8.95	10.42	6.90	7.34	-0.06	0.00	-131.47	-133.03
1180	4.46	3.34	8.60	10.15	6.64	7.10	-0.06	0.00	-135.20	-136.17
1200	4.52	3.39	8.32	9.87	6.50	6.99	-0.11	0.00	-137.12	-137.71
1220	4.43	3.30	8.00	9.49	6.36	6.86	-0.02	0.00	-138.75	-138.82
1250	4.22	3.04	7.57	8.89	6.25	6.77	-	-	-142.62	-141.87
1300	4.20	2.89	7.17	8.37	6.39	6.98	-	-	-149.14	-147.72
1400	4.19	2.63	6.70	7.98	6.91	7.42	-	-	-163.98	-161.71

Frequency (MHz)	Input IP3 (dBm) Vcontrol	
	5V	7V
	10	38.24
30	44.50	48.58
50	48.97	47.63
80	49.59	50.52
100	51.66	51.67
150	53.40	58.60
200	52.99	55.18
300	53.80	54.06
400	53.53	53.09
450	50.97	48.66
500	54.41	51.91
550	49.35	48.31
600	54.25	51.00
700	53.65	51.32
800	54.11	53.17
900	54.10	56.38
950	49.23	51.89
1000	53.04	55.90
1100	56.51	54.28
1150	48.45	53.41
1200	53.79	51.76
1220	48.81	50.74
1300	50.84	50.02
1400	50.81	49.59

**Notes**

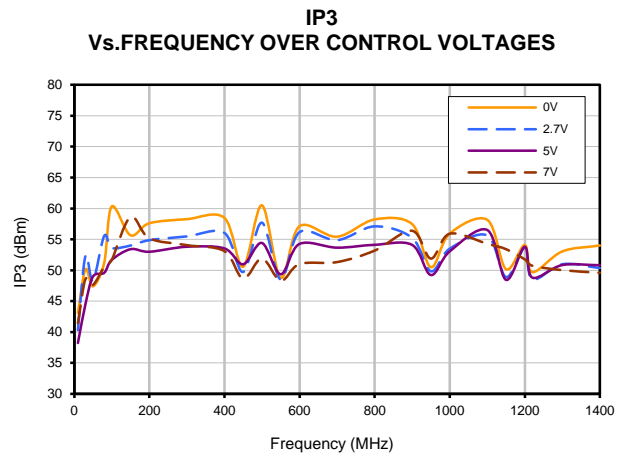
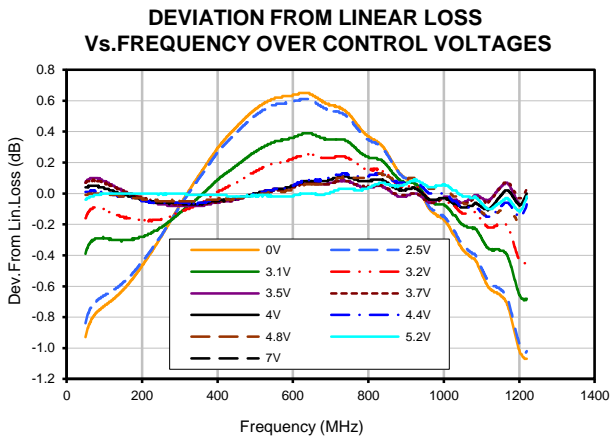
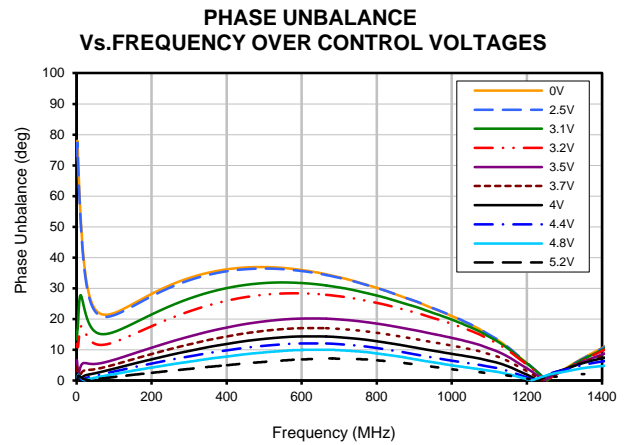
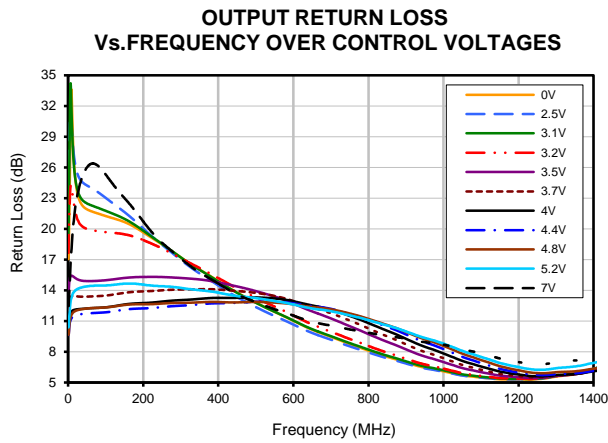
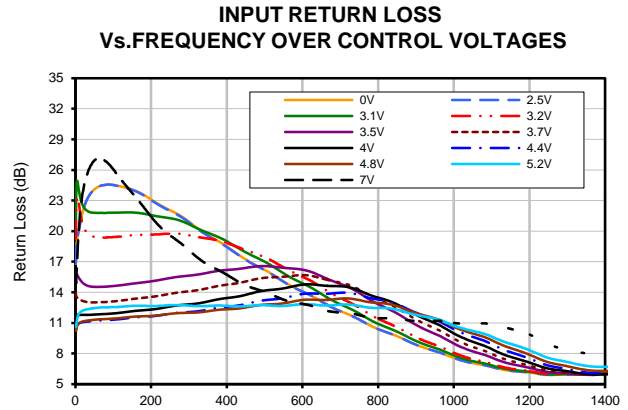
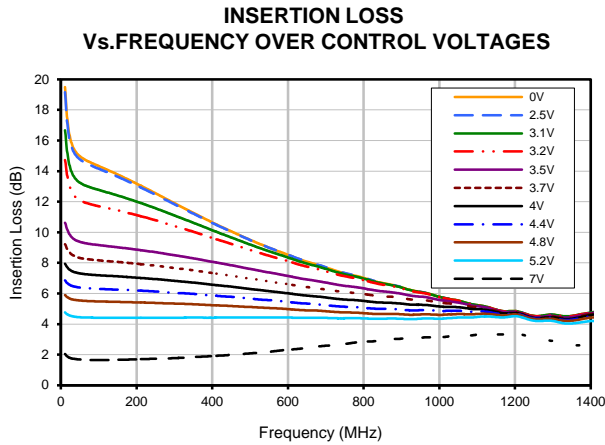
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# Voltage Variable Equalizer, 75Ω

## Typical Performance Curves @ $V_+ = 5V$

# VAEQ-1220-75+



**Notes**

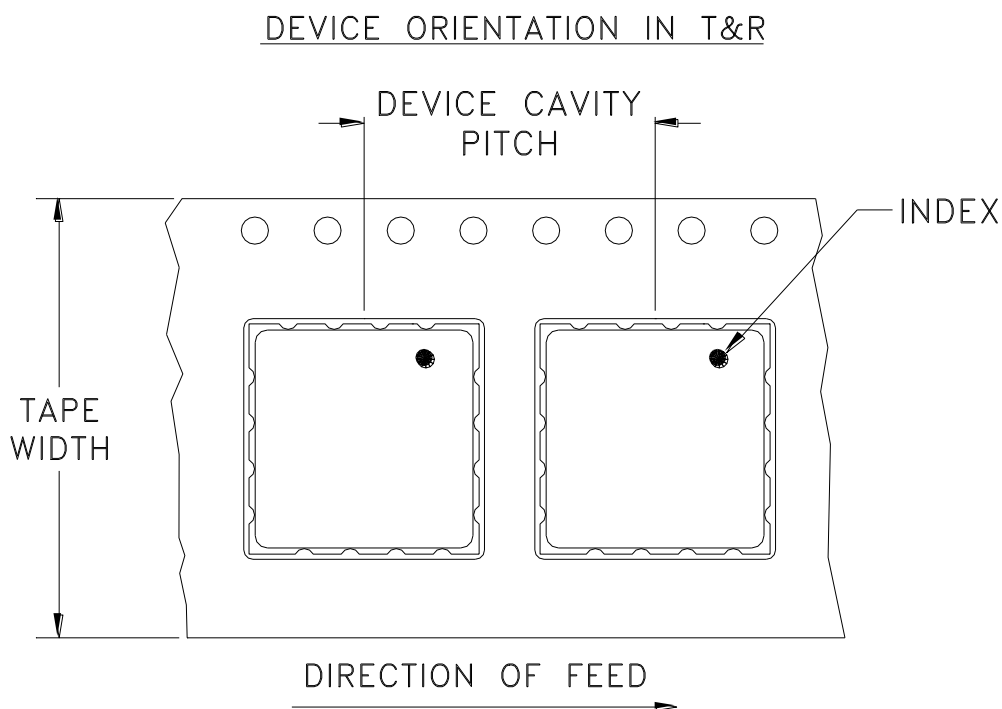
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# Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
500				

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



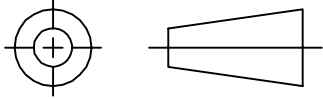
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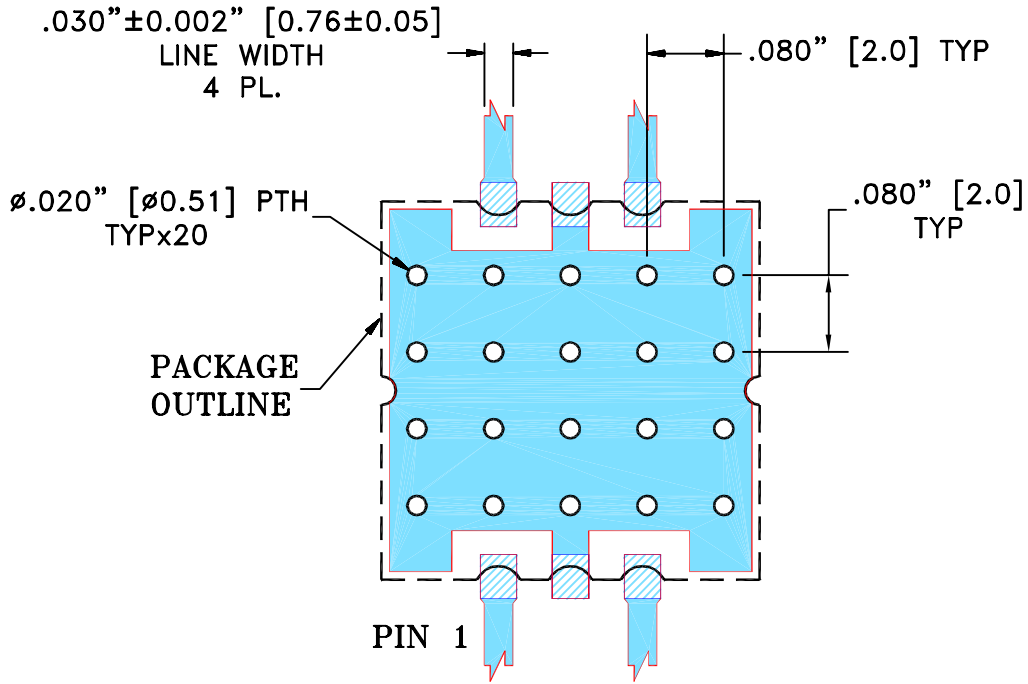
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M124493	NEW RELEASE (FROM RAVON)	09/09	EM	YB
OR	R77678	NEW RELEASE (FROM RAVON)	09/09	EM	YB

**SUGGESTED MOUNTING CONFIGURATION  
FOR HE1354 CASE STYLE, qg PIN CONNECTION, 75 OHM**



**NOTE:**

1. TRACE WIDTH IS SHOWN FOR R04350B WITH DIELECTRIC THICKNESS  $.030'' \pm .002''$ . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	EM (RAVON)	16 SEP 09
	CHECKED	HH (RAVON)	21 SEP 09
	APPROVED	YB (RAVON)	21 SEP 09



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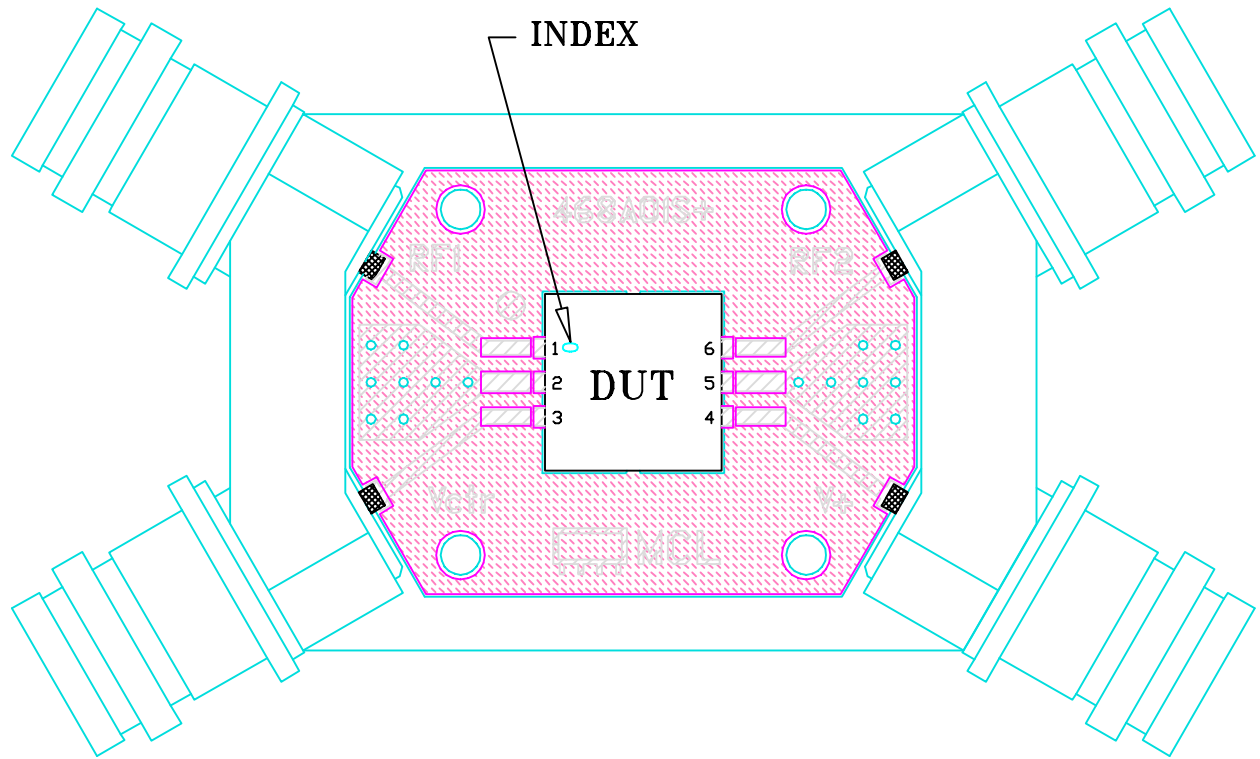
PL, qg, HE1354, TB-549+, 75 OHM

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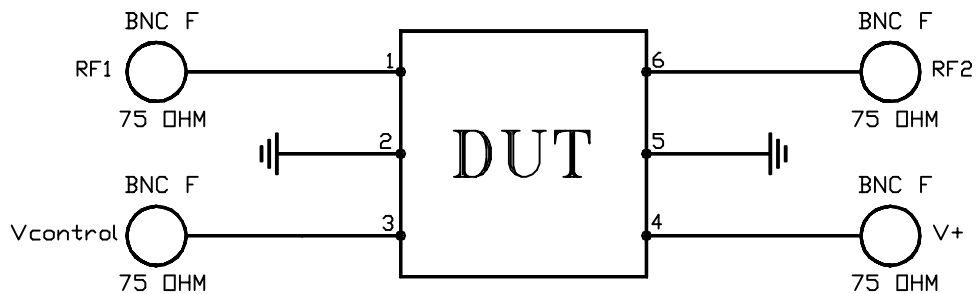
ASHEETA1.DWG REV:A DATE:01/12/95

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-315	OR
FILE:	98PL315	SCALE: 5:1	SHEET: 1 OF 1

# Evaluation Board and Circuit




TB-549+



Schematic Diagram

## Notes:

1. BNC Female connectors.
2. PCB Material: Rogers R04350B or equivalent,  
Dielectric constant=3.48, Thickness=.030 inch.

 Mini-Circuits®

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	0° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215