Coaxial

Phase Detector

50Ω High Output 1 to 100 MHz

ZRPD-1+

Generic photo used for illustration purposes only

CASE STYLE: M22

Connectors	Model
BNC	ZRPD-1+
BRACKET (OPTION "B")	
BRACKET (OPTION "BR")	

+RoHS Compliant

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

Absolute Maximum Ratings

Operating Temperature	-55 °C to +100 °C
Storage Temperature	-55 °C to +100 °C
Input Power	50 mW
Peak IF current	20 mA

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

Coaxial Connections

RF REF (RF2)	1
RF IN (RF1)	3
DC OUT (I)	2

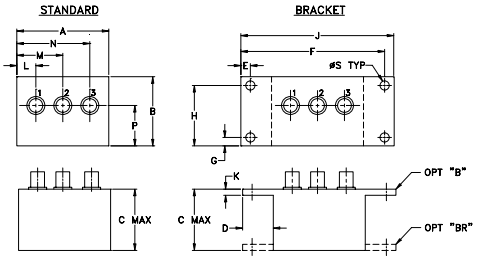
Features

- Wideband, 1 to 100 MHz
- Low DC offset, 0.2 mV typ.
- High DC output, 1000 mV typ.

Applications

- Monitoring circuits
- Leveling circuits
- PLL

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
2.25	1.38	1.24	.50	.150	3.100	.138	1.238
57.15	35.05	31.50	12.70	3.81	78.74	3.51	31.45

J	K	L	M	N	P	S	wt
3.25	.10	.40	1.15	1.86	.64	.150	grams
82.55	2.54	10.16	29.21	47.24	16.26	3.81	74.0

Electrical Specifications at +25 °C

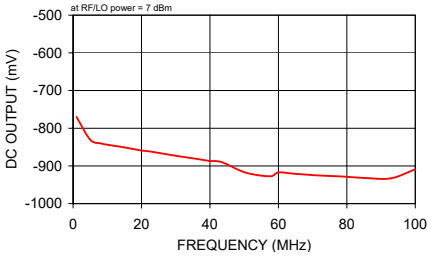
FREQUENCY (MHz) RF1 / RF2	I	POWER IN RF1 / RF2 (dBm)	SCALE FACTOR mV/deg.	IMPEDANCE (ohms) Output Load I	ISOLATION (dB) RF1/RF2 Min.	OUTPUT POLARITY RF1/RF2 In-Phase	DC OUTPUT[1] (mV) Max. Typ.	Max. Min.	Offset Typ.	Offset Max.	FIGURE OF MERIT Typ.
1-100	DC-50	+7	8	500	40	neg.	1000	700	0.2	1	143

1. DC output decreases to 550 mV over 1-10 MHz as temperature decreases to -55 °C.

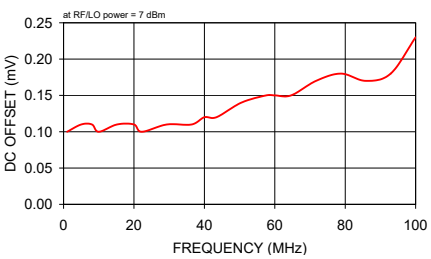
Typical Performance Data

Frequency (MHz)	DC Output mV $\bar{X}$	DC Output mV σ	DC Offset mV $\bar{X}$	DC Offset mV σ	RF1-RF2 Isolation (dB) $\bar{X}$
1.00	-769.98	14.85	0.10	0.16	76.12
5.00	-830.34	8.90	0.11	0.18	75.09
8.07	-840.24	14.44	0.11	0.18	74.07
10.00	-843.71	14.61	0.10	0.18	73.19
15.14	-851.12	17.01	0.11	0.19	70.19
20.00	-859.20	18.91	0.11	0.19	68.10
22.21	-861.26	20.52	0.10	0.20	67.28
29.29	-872.02	22.55	0.11	0.21	65.14
36.36	-881.57	24.77	0.11	0.22	63.29
40.00	-886.86	25.39	0.12	0.23	62.38
43.43	-889.93	26.41	0.12	0.23	61.76
50.50	-917.82	25.99	0.14	0.25	60.51
57.57	-927.50	28.69	0.15	0.27	59.35
60.00	-917.14	33.08	0.15	0.26	59.18
64.64	-920.62	38.60	0.15	0.27	58.73
71.71	-925.22	45.18	0.17	0.31	57.82
78.79	-928.03	51.83	0.18	0.31	57.35
85.86	-932.34	57.31	0.17	0.31	57.15
92.93	-932.98	60.65	0.18	0.38	56.93
100.00	-909.17	74.27	0.23	0.43	56.36

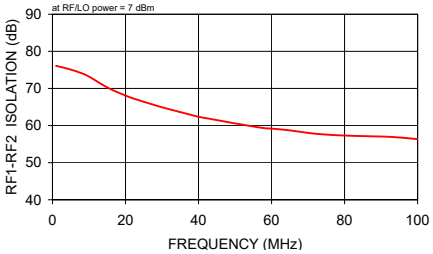
ZRPD-1+
DC OUTPUT



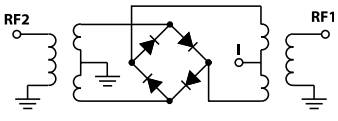
ZRPD-1+
DC OFFSET



ZRPD-1+
RF1-RF2 ISOLATION



electrical schematic



Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

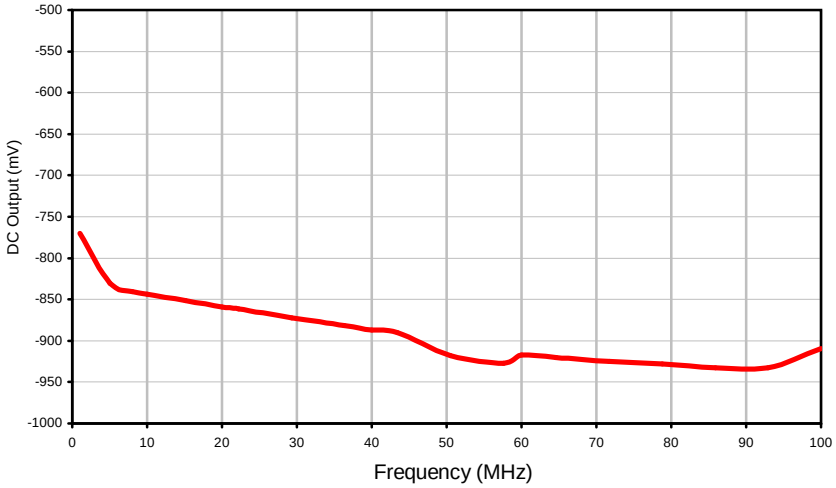
Phase Detector (High DC Output) ZRPD-1+

Typical Performance Data

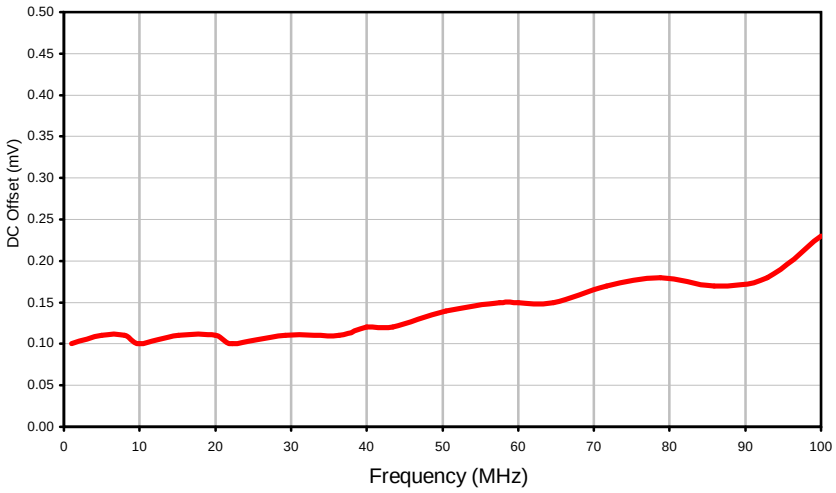
FREQUENCY (MHz)	DC OUTPUT (mV)	DC OFFSET (mV)	RF1-RF2 ISOLATION (dB)
1.00	-769.98	0.10	76.12
5.00	-830.34	0.11	75.09
8.07	-840.24	0.11	74.07
10.00	-843.71	0.10	73.19
15.14	-851.12	0.11	70.19
20.00	-859.20	0.11	68.10
22.21	-861.26	0.10	67.28
29.29	-872.02	0.11	65.14
36.36	-881.57	0.11	63.29
40.00	-886.86	0.12	62.38
43.43	-889.93	0.12	61.76
50.50	-917.82	0.14	60.51
57.57	-927.50	0.15	59.35
60.00	-917.14	0.15	59.18
64.64	-920.62	0.15	58.73
71.71	-925.22	0.17	57.82
78.79	-928.03	0.18	57.35
85.86	-932.34	0.17	57.15
92.93	-932.98	0.18	56.93
100.00	-909.17	0.23	56.36

Typical Performance Curves

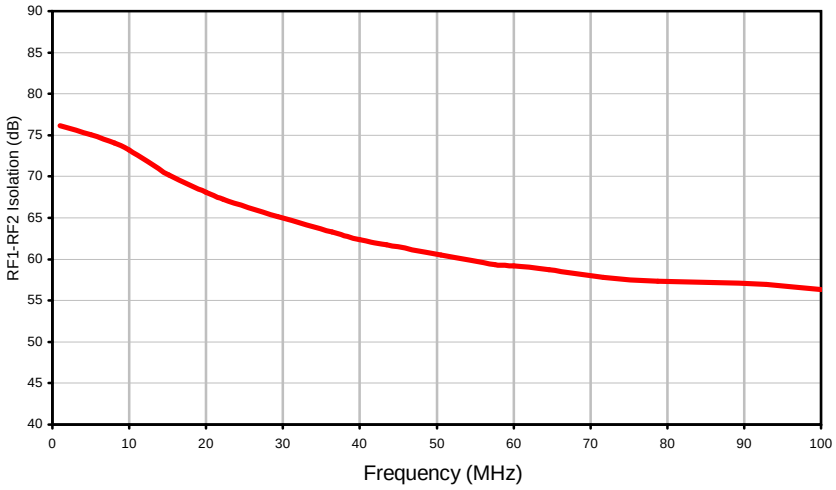
DC Output



DC Offset



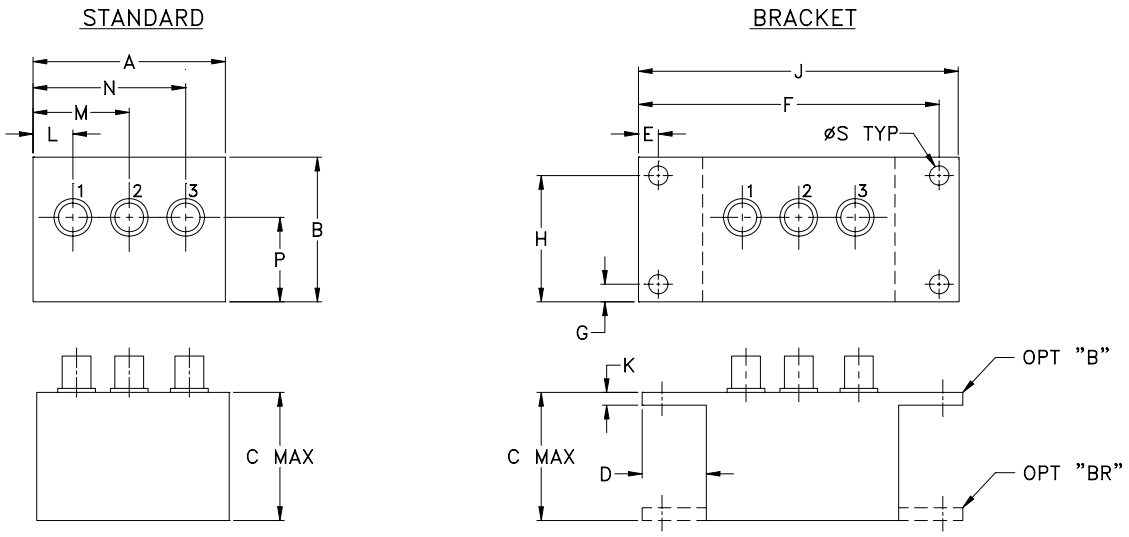
RF1-RF2 Isolation



Case Style M

Outline Dimensions

M21
M22
M23



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
M21	1.50 (38.10)	1.13 (28.70)	1.00 (25.40)	.50 (12.70)	.155 (3.94)	2.345 (59.56)	.138 (3.51)	.987 (25.07)	2.50 (63.50)	.10 (2.54)	.31 (7.87)	.75 (19.05)	1.19 (30.23)
M22	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.40 (10.16)	1.15 (29.21)	1.86 (47.24)
M23	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.63 (16.00)	1.06 (26.92)	1.63 (41.40)

CASE#	P	Q	R	S	WT. GRAMS
M21	.66 (16.76)	-- --	-- --	.150 (3.81)	40.0
M22	.64 (16.26)	-- --	-- --		74.0
M23	.69 (17.53)	-- --	-- --		70.0

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

   For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.
   Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
3. Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add $5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add $1.50 to unit cost.

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Environmental Specifications ENV28

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	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I