



COAXIAL WIDEBAND

Digital Step Attenuator **ZX76-31R75PP-S+**

50Ω 0 to 31.5 dB, 0.25 dB Step 9 kHz to 6 GHz
7 Bit, Parallel Control Interface, Single Supply Voltage

THE BIG DEAL

- Wideband, operates up to 6 GHz
- Immune to latch up
- High IIP3, 53 dBm
- Good Return Loss, 15dB Typ
- Excellent Accuracy, 0.1 dB Typ
- Low Insertion Loss
- Glitch-less attenuation transitions
- Single Supply Voltage: $V_{DD}=+3.3V$ or 5V

APPLICATIONS

- Test Setup
- Lab
- Instrumentation



Generic photo used for illustration purposes only

Model No.	ZX76-31R75PP-S+
Case Style	HK1172
Connectors	SMA

RoHS Compliant

See our website for RoHS Compliance methodologies and qualifications

PRODUCT OVERVIEW

The ZX76-31R75PP-S+ is a 50Ω Digital Step Attenuator that provides adjustable attenuation from 0 to 31.75 dB in 0.25 dB steps. The control is a 7-bit parallel interface, with a single positive supply voltage. Control lines are buffered by Schmitt Triggers to allow a wide range of control voltage levels. The model is produced using a unique unibody case package for ruggedness and operation in tough environments.

KEY FEATURES

Feature	Advantages
Wideband operation, specified from 9 kHz to 6 GHz	Can be used in multiple applications such as communications, satellite and defense, reducing part count.
Parallel control interface with wide control voltage range	Uses a simple parallel control interface with no clock required and can accept commands with '1' from 1.17V to 5V making it suitable for a wide range of applications.
Good VSWR, 1.45:1 typ.	Eases interfacing with adjacent components and results in low amplitude ripple.
Glitch-less attenuation transitions	The ZX76-31R75PP-S+ employs novel architecture to reduce the RF output power spikes during attenuation transition to 0.3 dB typ thus reducing noise in the system and eliminating the risk of a transient spike damaging sensitive components in the system.
Single positive supply	The use of a single positive supply simplifies power supply design. An internal negative voltage generator supplies the desired negative voltage. Single positive supply results in excellent spurious performance.
Power Supply +3 to +5.5 V	Model suitable for both 5V and 3.3V systems applications with no voltage dividers or multipliers needed.

**RF ELECTRICAL SPECIFICATIONS, 9 KHz - 6 GHz, T_{AMB}=25°C, V_{DD}=+3.3V**

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Insertion Loss @ 0dB Attenuation Setting	0.009 - 3000	—	1.4	3.0	dB
	3000 - 4000	—	2.1	3.5	
	4000 - 6000	—	2.6	4.0	
Accuracy @ 0.25 dB Attenuation Setting	0.009 - 3000	—	± 0.02	± 0.20	dB
	3000 - 4000	—	± 0.03	± 0.25	
	4000 - 6000	—	± 0.08	± 0.25	
Accuracy @ 0.5 dB Attenuation Setting	0.009 - 3000	—	± 0.05	± 0.25	dB
	3000 - 4000	—	± 0.03	± 0.25	
	4000 - 6000	—	± 0.08	± 0.25	
Accuracy @ 1 dB Attenuation Setting	0.009 - 3000	—	± 0.04	± 0.20	dB
	3000 - 4000	—	± 0.05	± 0.25	
	4000 - 6000	—	± 0.10	± 0.30	
Accuracy @ 2 dB Attenuation Setting	0.009 - 3000	—	± 0.03	± 0.20	dB
	3000 - 4000	—	± 0.05	± 0.30	
	4000 - 6000	—	± 0.12	± 0.35	
Accuracy @ 4 dB Attenuation Setting	0.009 - 3000	—	± 0.09	± 0.25	dB
	3000 - 4000	—	± 0.12	± 0.35	
	4000 - 6000	—	± 0.29	± 0.60	
Accuracy @ 8 dB Attenuation Setting	0.009 - 3000	—	± 0.16	± 0.40	dB
	3000 - 4000	—	± 0.30	± 0.50	
	4000 - 6000	—	± 0.48	± 0.80	
Accuracy @ 16 dB Attenuation Setting	0.009 - 3000	—	± 0.30	± 0.60	dB
	3000 - 4000	—	± 0.45	± 0.80	
	4000 - 6000	—	± 0.75	± 1.05	
Input IP3 (at Min. and Max. Attenuation) ¹	1 - 6000	—	+53	—	dBm
Input Power @ 0.2dB Compression (at Min. and Max. Attenuation) ^{1,2}	1 - 6000	—	+30	—	
Input Operating Power	0.009 - 50	—	—	See note 2	dBm
	50 - 6000	—	—	+23	
Return Loss	0.009 - 3000	—	15.5	—	dB
	3000 - 4000	—	16.5	—	
	4000 - 6000	—	12	—	
Attenuation Transient Envelope	0.009 - 6000	—	0.3	—	dB

1. Input IP3 and 1dB compression degrade below 1 MHz. Input power not to exceed max operating specification for continuous operation.

2. Derate linearly from +23 dBm at 50 MHz to +9 dBm at 1 MHz. Power handling below 1 MHz remains constant at +9 dBm.

DC ELECTRICAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Supply Voltage, V _{DD}	+3.0	+3.3	+5.5	V
Supply Current, I _{DD}	—	—	3500	μA
Control Input Low	-0.3	—	+0.6	V
Control Input High	+1.17	—	+5.5	V
Control Current	—	—	400	μA

SWITCHING SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Switching Speed, 50% Control to 0.5dB of Attenuation Value	—	300	—	nsec
Switching Control Frequency	—	25	—	kHz



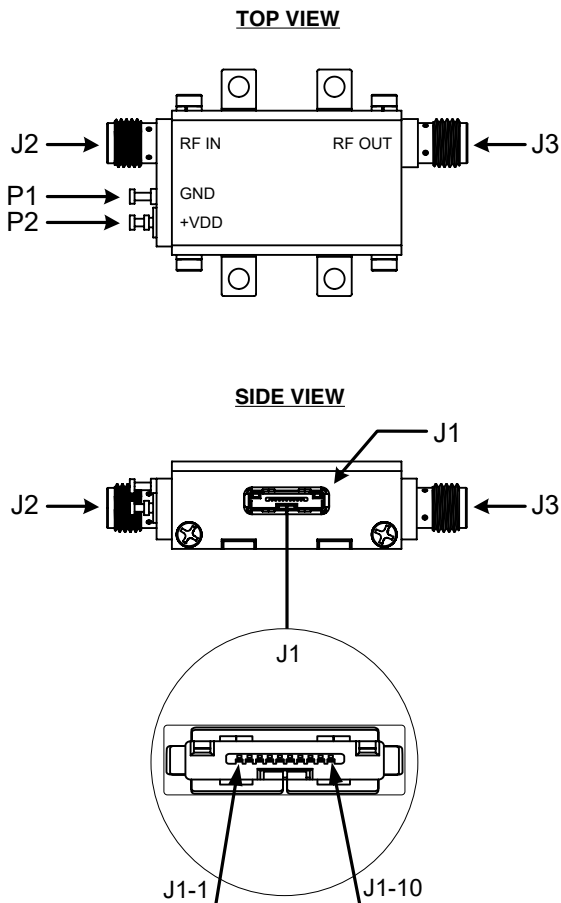
ABSOLUTE MAXIMUM RATINGS

Parameter		Ratings
Operating Temperature		-40°C to 85°C
Storage Temperature		-40°C to 85°C
V _{DD}		-0.3V Min., +6V Max.
Voltage on any control input		-0.3V Min., +6V Max.
ESD, HBM		500V
ESD, MM		100V
Input Power	DC to 1 MHz	+12dBm
	1 to 50 MHz	Derate linearly from +26 dBm at 50 MHz to +12 dBm at 1 MHz
	50 to 6000 MHz	+31dBm ³

Permanent damage may occur if any of these limits are exceeded. Operating in the range between operating power limits and absolute maximum ratings for extended periods of time may result in reduced life and reliability.

³ There is a discontinuity in Absolute Maximum power at 50 MHz changing from +26 dBm to +31 dBm.

PIN CONFIGURATION



PIN DESCRIPTION

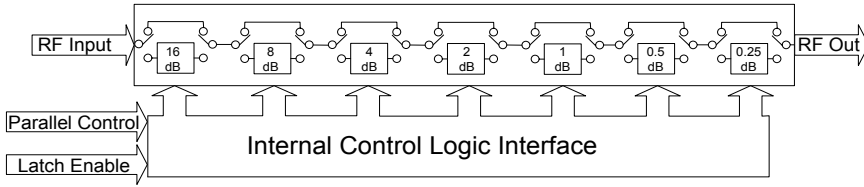
Function	Pin Number	Description
LE	J1-1	Latch Enable Input
C1	J1-2	Control for attenuation bit, 1.0 dB
C0.5	J1-3	Control for attenuation bit, 0.5 dB
C0.25	J1-4	Control for attenuation bit, 0.25 dB
C16	J1-5	Control for attenuation bit, 16 dB
GND	J1-6	Ground Connection
GND	J1-7	Ground Connection
C4	J1-8	Control for attenuation bit, 4 dB
C8	J1-9	Control for attenuation bit, 8 dB
C2	J1-10	Control for attenuation bit, 2 dB
RF in	J2	RF in port ⁴
RF out	J3	RF out port ⁴
GND	P1	Ground Connection
Vdd	P2	Positive Supply Voltage

⁴ Both RF ports must be held at 0VDC or DC blocked with an external series capacitor.



Digital Step Attenuator ZX76-31R75PP-S+

SIMPLIFIED SCHEMATIC



The ZX76-31R75PP-S+ parallel interface consists of 7 control bits that select the desired attenuation state, as shown in Table 1: Truth Table.

TABLE 1. TRUTH TABLE

Attenuation State	C16	C8	C4	C2	C1	C0.5	C0.25
Reference	0	0	0	0	0	0	0
0.25 (dB)	0	0	0	0	0	0	1
0.5 (dB)	0	0	0	0	0	1	0
1 (dB)	0	0	0	0	1	0	0
2 (dB)	0	0	0	1	0	0	0
4 (dB)	0	0	1	0	0	0	0
8 (dB)	0	1	0	0	0	0	0
16 (dB)	1	0	0	0	0	0	0
31.75 (dB)	1	1	1	1	1	1	1

Note: Not all 128 possible combinations of C0.25 - C16 are shown in table

The parallel interface timing requirements are defined by Figure 1 (Parallel Interface Timing Diagram) and Table 2 (Parallel Interface AC Characteristics), and the switching speed.

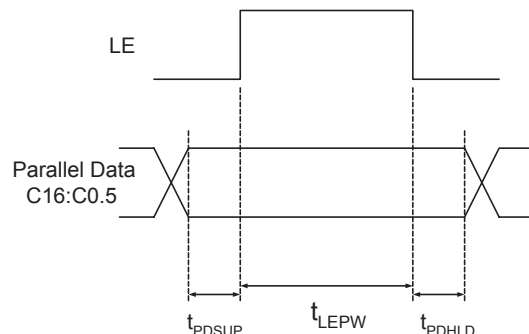
For latched parallel programming the Latch Enable (LE) should be held LOW while changing attenuation state control values, then pulse LE HIGH to LOW (per Figure 1) to latch new attenuation state into the device.

For direct parallel programming, the Latch Enable (LE) line should be pulled HIGH. Changing the attenuation state control values will immediately change the device's state to a new attenuation value. Direct mode is ideal for manual control of the device (using hardware, switches, or jumpers).

TABLE 2. PARALLEL INTERFACE AC CHARACTERISTICS

Symbol	Parameter	Min.	Units
t_{LEPW}	LE minimum pulse width	10	ns
t_{PDSUP}	Data set-up time before clock rising edge of LE	10	ns
t_{PDHLD}	Data hold time after clock falling edge of LE	10	ns

FIGURE 1: PARALLEL INTERFACE TIMING DIAGRAM

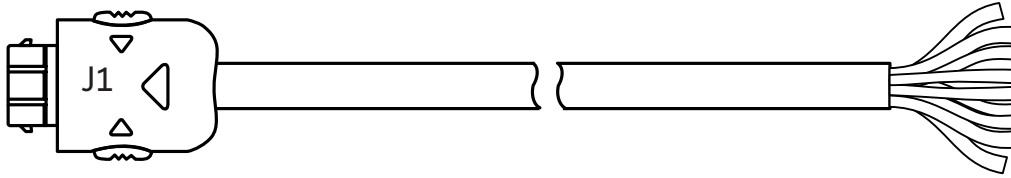


POWER-UP STATE

When the attenuator powers up and LE is logic low, the nominal attenuation is set on 0 dB. When LE is logic high, the nominal attenuation selected upon control logics (see Table 1).



CBL-5FT-MPD+ CONTROL CABLE



RECOMMENDED ACCESSORIES

An optional CBL-5FT-MPD+ is a "Pigtail" connector. CBL-5FT-MPD+ is a shielded cable with stripped wires (#32AWG) on one end and a connector on the other end designed to mate to the ZX76-31R75PP-S+. These bare wires enable the customer to assemble their own cable as required to interface with the ZX76-31R75PP-S+ (cable length is 4.9ft/ 1.5meters).

CBL-5FT-MPD+ WIRING INFORMATION

J1 Pin Number	Function	Description	Wire Color
1	LE	Latch Enable Input	Green
2	C1	Control for attenuation bit, 1.0 dB	Green/Black
3	C0.5	Control for attenuation bit, 0.5 dB	Red
4	C0.25	Control for attenuation bit, 0.25 dB	Orange
5	C16	Control for attenuation bit, 16 dB	Orange/Black
6	GND	Ground Connection	Black
7	GND	Ground Connection	Red/Black
8	C4	Control for attenuation bit, 4.0 dB	Blue
9	C8	Control for attenuation bit, 8.0 dB	White
10	C2	Control for attenuation bit, 2.0 dB	White/Black
Shield	-	Shield Braid/ Drain	-

Note: Cable shield connected to case ground.



TYPICAL PERFORMANCE DATA (AT 25°C)

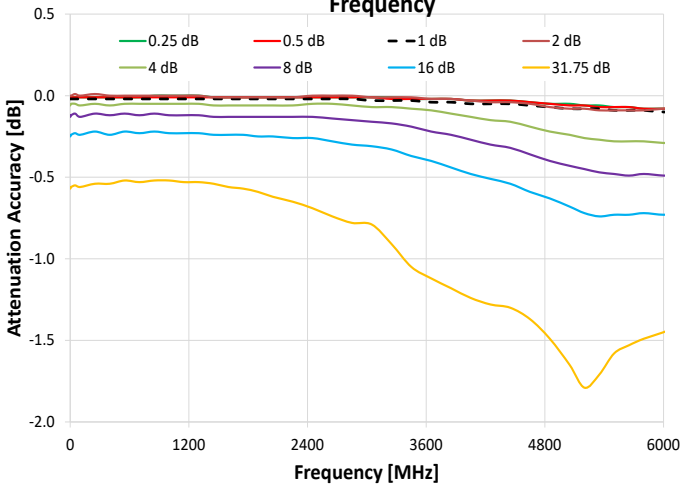
Freq. [MHz]	I.Loss [dB]	Attenuation relative to Insertion Loss [dB]								
		@ Attenuation setting [dB]								
		0.25	0.5	1	2	4	8	16	31.75	
0.1	-0.94	-0.01	-0.01	-0.02	0.00	-0.06	-0.12	-0.24	-0.56	
10	-0.97	-0.01	-0.01	-0.02	0.00	-0.05	-0.12	-0.24	-0.56	
100	-1.00	-0.01	-0.01	-0.02	0.00	-0.06	-0.13	-0.24	-0.56	
400	-1.11	-0.01	-0.01	-0.02	0.00	-0.06	-0.12	-0.24	-0.54	
700	-1.23	-0.01	-0.01	-0.02	0.00	-0.05	-0.12	-0.23	-0.53	
1000	-1.35	0.00	-0.01	-0.02	0.00	-0.05	-0.12	-0.23	-0.52	
1150	-1.40	0.00	-0.01	-0.02	0.00	-0.05	-0.12	-0.23	-0.53	
1450	-1.50	-0.01	-0.01	-0.02	-0.01	-0.06	-0.13	-0.24	-0.54	
1600	-1.54	-0.01	-0.01	-0.02	-0.01	-0.06	-0.13	-0.24	-0.56	
1900	-1.63	-0.01	-0.01	-0.02	-0.01	-0.06	-0.13	-0.25	-0.59	
2050	-1.69	-0.01	-0.01	-0.02	-0.01	-0.06	-0.13	-0.25	-0.62	
2450	-1.82	-0.01	-0.01	-0.02	0.00	-0.05	-0.13	-0.26	-0.69	
2650	-1.88	-0.01	-0.01	-0.02	0.00	-0.05	-0.14	-0.28	-0.74	
3050	-1.99	-0.01	-0.01	-0.03	-0.01	-0.07	-0.16	-0.31	-0.79	
3250	-2.04	-0.01	-0.02	-0.03	-0.01	-0.07	-0.17	-0.33	-0.91	
3650	-2.14	-0.02	-0.02	-0.04	-0.02	-0.09	-0.22	-0.40	-1.12	
3850	-2.19	-0.02	-0.02	-0.04	-0.02	-0.11	-0.24	-0.44	-1.18	
4250	-2.29	-0.03	-0.03	-0.05	-0.04	-0.15	-0.30	-0.51	-1.28	
4450	-2.35	-0.03	-0.03	-0.05	-0.04	-0.16	-0.32	-0.54	-1.30	
4850	-2.47	-0.05	-0.05	-0.07	-0.07	-0.22	-0.40	-0.63	-1.49	
5050	-2.56	-0.05	-0.06	-0.08	-0.08	-0.24	-0.43	-0.68	-1.65	
5350	-2.69	-0.06	-0.07	-0.08	-0.09	-0.27	-0.47	-0.74	-1.71	
5500	-2.78	-0.07	-0.07	-0.09	-0.09	-0.28	-0.48	-0.73	-1.58	
5800	-2.93	-0.08	-0.08	-0.09	-0.09	-0.28	-0.48	-0.72	-1.49	
6000	-3.03	-0.08	-0.08	-0.10	-0.08	-0.29	-0.49	-0.73	-1.45	

Freq. [MHz]	Return Loss In [dB]										Return Loss Out [dB]								
	@ Attenuation setting [dB]										@ Attenuation setting [dB]								
	0	0.25	0.5	1	2	4	8	16	31.75	0	0.25	0.5	1	2	4	8	16	31.75	
0.1	-18.79	-20.44	-21.29	-22.58	-31.50	-29.93	-22.58	-18.98	-21.32	-20.40	-20.19	-20.07	-19.99	-19.54	-19.91	-20.26	-21.71	-26.97	
10	-18.59	-20.41	-21.26	-22.56	-31.31	-30.00	-22.56	-19.00	-21.34	-20.27	-20.11	-20.01	-19.95	-19.58	-20.01	-20.42	-21.90	-27.01	
100	-18.59	-20.28	-21.14	-22.43	-30.95	-30.25	-22.65	-19.06	-21.39	-20.08	-19.93	-19.84	-19.80	-19.46	-19.91	-20.35	-21.81	-26.75	
400	-18.53	-20.71	-21.54	-22.87	-31.81	-29.77	-22.52	-19.05	-21.40	-20.52	-20.35	-20.28	-20.21	-19.92	-20.29	-20.69	-22.06	-26.34	
700	-18.56	-21.62	-22.47	-23.96	-34.61	-28.20	-21.89	-18.71	-20.98	-21.31	-21.12	-21.07	-20.97	-20.79	-21.12	-21.51	-22.82	-26.24	
1000	-18.58	-22.48	-23.32	-25.00	-37.55	-27.01	-21.39	-18.43	-20.65	-22.68	-22.48	-22.44	-22.26	-22.13	-22.36	-22.66	-23.84	-26.14	
1150	-18.59	-23.00	-23.84	-25.63	-39.20	-26.41	-21.13	-18.29	-20.48	-23.29	-23.09	-23.07	-22.86	-22.77	-22.99	-23.28	-24.42	-26.13	
1450	-18.46	-23.67	-24.46	-26.43	-37.44	-25.47	-20.79	-18.12	-20.30	-24.81	-24.52	-24.45	-24.18	-24.06	-24.23	-24.44	-25.44	-25.94	
1600	-18.42	-23.58	-24.29	-26.28	-35.34	-25.16	-20.66	-18.03	-20.21	-25.62	-25.27	-25.19	-24.87	-24.74	-24.85	-25.00	-25.89	-25.76	
1900	-18.23	-23.29	-23.85	-25.80	-31.35	-24.50	-20.57	-18.04	-20.25	-27.35	-26.87	-26.82	-26.42	-26.23	-26.26	-26.22	-26.72	-25.12	
2050	-18.16	-22.84	-23.29	-25.13	-29.85	-24.43	-20.71	-18.18	-20.47	-28.37	-27.82	-27.79	-27.38	-27.13	-27.19	-27.08	-27.37	-24.85	
2450	-18.22	-22.21	-22.52	-24.26	-28.09	-24.30	-21.00	-18.50	-20.94	-30.96	-29.94	-29.82	-29.62	-28.94	-29.19	-29.02	-28.78	-24.41	
2650	-18.22	-21.83	-22.12	-23.85	-27.80	-24.71	-21.42	-18.86	-21.45	-33.43	-31.95	-31.79	-31.57	-30.48	-30.68	-30.11	-29.06	-23.74	
3050	-18.00	-22.18	-22.39	-24.25	-29.10	-25.65	-21.78	-19.17	-21.97	-43.60	-38.20	-38.03	-38.44	-35.43	-36.25	-34.59	-30.29	-22.57	
3250	-17.52	-21.98	-22.23	-24.10	-29.73	-26.66	-22.10	-19.37	-22.27	-47.55	-39.92	-40.33	-45.13	-38.38	-41.83	-38.33	-30.35	-21.83	
3650	-16.33	-22.23	-22.51	-24.64	-31.10	-26.10	-21.37	-18.89	-21.69	-34.84	-34.54	-34.56	-39.49	-34.43	-37.03	-39.43	-29.91	-20.69	
3850	-15.94	-22.77	-23.07	-25.44	-33.02	-25.55	-20.77	-18.44	-21.10	-32.83	-32.51	-32.32	-35.58	-31.65	-32.70	-33.87	-28.68	-20.09	
4250	-14.78	-24.19	-24.59	-27.95	-34.52	-22.84	-18.82	-16.94	-19.17	-28.12	-27.12	-26.94	-28.71	-25.88	-25.99	-26.50	-25.36	-18.91	
4450	-14.38	-24.10	-24.29	-27.64	-30.59	-21.51	-18.02	-16.28	-18.37	-26.25	-25.09	-24.99	-26.43	-23.89	-23.87	-24.28	-23.82	-18.37	
4850	-14.16	-22.92	-22.84	-25.25	-25.48	-19.29	-16.58	-15.11	-16.99	-22.14	-20.97	-20.78	-21.65	-19.84	-19.77	-20.11	-20.54	-17.26	
5050	-13.95	-21.22	-21.14	-22.83	-22.73	-17.99	-15.77	-14.45	-16.20	-20.19	-19.14	-19.02	-19.75	-18.30	-18.33	-18.78	-19.57	-17.11	
5350	-14.16	-18.00	-18.08	-19.31	-19.72	-16.77	-15.28	-14.11	-15.81	-17.41	-16.60	-16.60	-17.19	-16.17	-16.36	-16.94	-18.01	-16.64	
5500	-13.86	-16.94	-17.05	-18.11	-18.56	-16.09	-14.90	-13.87	-15.55	-16.32	-15.60	-15.63	-16.17	-15.32	-15.57	-16.20	-17.37	-16.47	
5800	-14.19	-14.57	-14.72	-15.54	-16.06	-14.57	-14.03	-13.24	-14.82	-14.49	-13.92	-13.94	-14.40	-13.81	-14.16	-14.88	-16.19	-16.11	
6000	-16.22	-13.65	-13.88	-14.65	-15.23	-14.10	-13.85	-13.19	-14.77	-13.47	-12.97	-13.00	-13.43	-12.96	-13.37	-14.13	-15.52	-15.94	

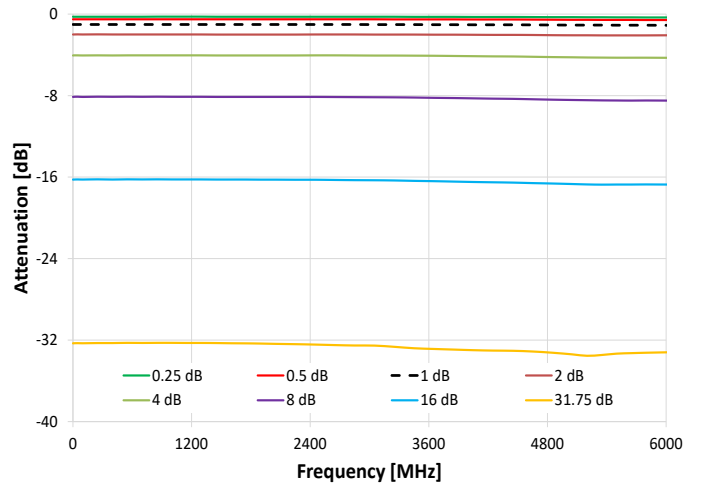


TYPICAL PERFORMANCE CURVES (AT 25°C)

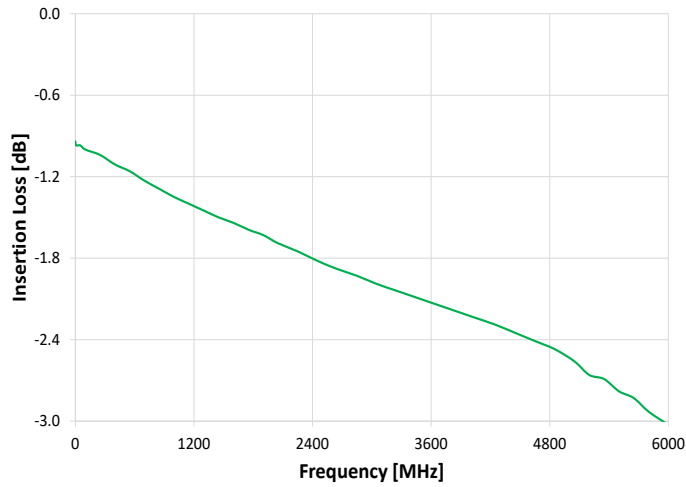
Attenuation Accuracy relative to Insertion Loss vs. Frequency



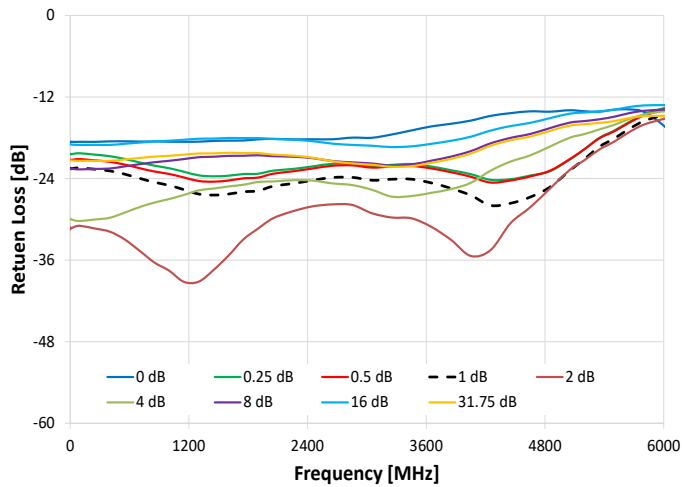
Attenuation relative to Insertion Loss vs. Frequency



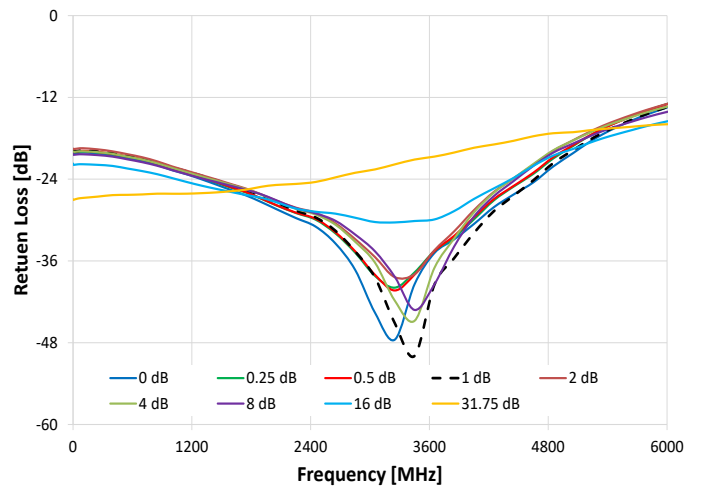
Insertion Loss vs. Frequency



R. Loss In vs. Frequency over Attenuation settings



R. Loss Out vs. Frequency over Attenuation settings






Digital Step Attenuator **ZX76-31R75PP-S+**

ORDERING INFORMATION

Model	Description
ZX76-31R75PP-S+	Digital attenuator - Parallel interface, Single Voltage (Positive)

RECOMMENDED ACCESSORIES

Recommended Accessories	Part No.	Description
	CBL-5FT-MPD+	5 ft. (1.5M) Control Cable

ADDITIONAL DETAILED TECHNICAL INFORMATION

Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip.file)
Case Style	HK1149
Environmental Rating	ENV28T14

Additional information is available on our dash board. To access this information [click here](#)

- 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

Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	0.81	0.27	0.52	1.04	2.04	4.14	8.25	16.42	32.55
0.3	0.81	0.27	0.52	1.04	2.04	4.14	8.26	16.43	32.56
0.5	0.81	0.27	0.52	1.04	2.04	4.15	8.26	16.44	32.57
1	0.82	0.27	0.52	1.04	2.04	4.14	8.25	16.43	32.56
5	0.84	0.27	0.52	1.04	2.04	4.14	8.25	16.43	32.55
10	0.84	0.27	0.52	1.04	2.04	4.14	8.25	16.42	32.55
50	0.84	0.27	0.52	1.03	2.03	4.12	8.22	16.39	32.52
100	0.87	0.27	0.52	1.04	2.04	4.13	8.23	16.40	32.53
200	0.90	0.26	0.52	1.03	2.04	4.13	8.23	16.40	32.52
300	0.92	0.26	0.52	1.04	2.04	4.14	8.25	16.42	32.53
400	0.95	0.26	0.52	1.04	2.05	4.14	8.25	16.42	32.53
500	0.98	0.26	0.52	1.04	2.05	4.14	8.25	16.42	32.53
600	1.01	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
700	1.05	0.26	0.52	1.04	2.05	4.15	8.26	16.42	32.53
800	1.08	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.52
900	1.11	0.26	0.52	1.04	2.05	4.15	8.26	16.42	32.52
1000	1.14	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1100	1.17	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1200	1.20	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1300	1.23	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.53
1400	1.26	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1500	1.29	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.54
1600	1.31	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.56
1700	1.34	0.26	0.52	1.04	2.05	4.15	8.26	16.43	32.57
1800	1.36	0.26	0.52	1.04	2.05	4.15	8.26	16.44	32.58
1900	1.39	0.26	0.52	1.04	2.05	4.15	8.26	16.44	32.59
2000	1.42	0.26	0.52	1.04	2.05	4.14	8.26	16.43	32.60
2100	1.44	0.26	0.52	1.04	2.05	4.14	8.26	16.44	32.62
2200	1.46	0.26	0.52	1.04	2.05	4.15	8.27	16.46	32.66
2300	1.48	0.26	0.52	1.04	2.06	4.16	8.29	16.48	32.69
2400	1.50	0.26	0.52	1.04	2.06	4.16	8.29	16.49	32.72
2500	1.53	0.26	0.52	1.05	2.06	4.17	8.30	16.50	32.75
2600	1.56	0.26	0.52	1.05	2.06	4.17	8.30	16.51	32.77
2700	1.59	0.26	0.52	1.05	2.06	4.16	8.30	16.51	32.79
2800	1.62	0.26	0.52	1.04	2.05	4.16	8.29	16.50	32.79
2900	1.65	0.26	0.52	1.04	2.05	4.15	8.28	16.50	32.79
3000	1.67	0.26	0.52	1.04	2.05	4.15	8.28	16.50	32.79
3200	1.71	0.27	0.52	1.05	2.05	4.15	8.30	16.51	32.82
3400	1.77	0.27	0.52	1.05	2.05	4.17	8.33	16.57	33.03
3600	1.81	0.27	0.53	1.05	2.06	4.19	8.36	16.62	33.11
3800	1.84	0.27	0.53	1.06	2.07	4.20	8.38	16.65	33.16
4000	1.89	0.27	0.53	1.06	2.07	4.23	8.42	16.70	33.21
4200	1.95	0.28	0.53	1.07	2.08	4.24	8.44	16.73	33.25
4400	2.00	0.28	0.54	1.08	2.10	4.28	8.50	16.80	33.31
4600	2.05	0.29	0.55	1.08	2.10	4.30	8.52	16.82	33.32
4800	2.13	0.30	0.55	1.08	2.11	4.31	8.54	16.84	33.38
5000	2.20	0.30	0.56	1.09	2.11	4.32	8.56	16.87	33.48
5200	2.30	0.31	0.56	1.09	2.11	4.33	8.57	16.91	33.66
5400	2.32	0.31	0.57	1.10	2.12	4.36	8.61	16.95	33.62
5600	2.38	0.32	0.57	1.11	2.13	4.38	8.64	16.97	33.44
5800	2.49	0.33	0.58	1.11	2.13	4.38	8.64	16.96	33.38
6000	2.59	0.33	0.58	1.11	2.13	4.39	8.64	16.96	33.32
6200	2.70	0.34	0.59	1.11	2.13	4.39	8.64	16.95	33.26
6500	2.91	0.35	0.59	1.11	2.11	4.37	8.61	16.91	33.17
7000	3.19	0.35	0.59	1.12	2.09	4.35	8.59	16.88	32.97

Notes

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- 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



Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE								
	(dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	21.83	22.40	23.41	25.77	50.74	22.91	18.19	15.62	17.09
0.3	21.91	22.47	23.49	25.86	47.97	22.86	18.16	15.62	17.10
0.5	21.66	22.22	23.23	25.56	53.15	22.97	18.19	15.63	17.10
1	21.58	22.13	23.13	25.45	57.76	23.05	18.21	15.63	17.12
5	21.64	22.23	23.22	25.56	56.39	23.02	18.21	15.65	17.12
10	21.62	22.20	23.19	25.52	52.91	23.04	18.22	15.66	17.13
50	21.41	21.96	22.91	25.11	42.64	23.37	18.45	15.84	17.35
100	21.19	21.71	22.60	24.66	41.99	24.03	18.89	16.19	17.78
200	21.05	21.54	22.40	24.34	37.03	24.18	19.03	16.33	17.93
300	21.45	21.99	22.93	25.05	36.03	23.08	18.33	15.79	17.28
400	22.15	22.73	23.76	26.18	39.52	22.60	18.02	15.56	17.01
500	22.28	22.85	23.91	26.44	41.05	22.49	17.92	15.49	16.93
600	22.87	23.46	24.59	27.33	39.84	22.15	17.75	15.39	16.82
700	22.92	23.50	24.64	27.42	39.96	22.13	17.74	15.39	16.82
800	23.63	24.22	25.45	28.55	36.84	21.69	17.49	15.23	16.63
900	24.24	24.82	26.13	29.53	35.05	21.41	17.36	15.15	16.55
1000	24.19	24.77	26.06	29.44	35.33	21.45	17.38	15.17	16.58
1100	24.68	25.28	26.68	30.46	33.55	21.03	17.09	14.95	16.33
1200	24.74	25.25	26.62	30.48	32.15	20.84	16.99	14.86	16.22
1300	23.99	24.43	25.65	29.05	33.08	21.28	17.28	15.10	16.51
1400	24.30	24.69	25.93	29.46	32.00	21.11	17.22	15.08	16.49
1500	24.29	24.63	25.83	29.25	31.05	21.02	17.20	15.07	16.49
1600	24.37	24.63	25.77	29.10	29.77	20.78	17.10	15.00	16.42
1700	24.34	24.52	25.60	28.79	29.02	20.71	17.12	15.05	16.49
1800	24.54	24.64	25.70	28.84	28.35	20.53	17.05	15.02	16.46
1900	24.56	24.60	25.61	28.71	28.25	20.57	17.11	15.07	16.54
2000	24.47	24.46	25.43	28.48	28.20	20.67	17.22	15.18	16.68
2100	24.73	24.72	25.75	29.03	28.76	20.79	17.29	15.26	16.79
2200	25.36	25.26	26.30	29.76	28.00	20.36	17.01	15.05	16.54
2300	25.48	25.29	26.28	29.63	27.25	20.06	16.81	14.90	16.37
2400	24.76	24.48	25.33	28.12	26.07	19.79	16.71	14.82	16.29
2500	24.13	23.81	24.58	27.06	25.43	19.69	16.70	14.83	16.30
2600	23.29	22.96	23.62	25.81	24.67	19.61	16.74	14.86	16.34
2700	22.61	22.27	22.87	24.88	24.00	19.49	16.77	14.90	16.39
2800	21.85	21.53	22.12	24.08	23.88	19.82	17.11	15.19	16.75
2900	21.42	21.14	21.72	23.74	24.40	20.57	17.69	15.64	17.32
3000	21.62	21.37	21.98	24.21	25.74	21.55	18.29	16.13	17.95
3200	22.55	22.30	23.04	25.77	28.06	21.97	18.25	16.13	18.00
3400	22.93	22.70	23.46	26.49	29.82	22.25	18.24	16.15	18.04
3600	23.69	23.38	24.22	27.66	29.37	21.33	17.56	15.64	17.44
3800	23.47	23.18	24.06	27.65	30.24	21.41	17.49	15.61	17.44
4000	24.42	23.94	24.87	29.02	28.86	20.29	16.65	14.93	16.62
4200	23.38	22.96	23.91	27.82	28.56	20.20	16.49	14.79	16.47
4400	24.61	23.97	25.05	29.67	27.23	18.89	15.41	13.88	15.38
4600	21.65	21.09	21.89	24.87	24.58	18.70	15.47	13.88	15.43
4800	20.36	19.81	20.52	23.01	22.89	18.09	15.11	13.57	15.08
5000	19.23	18.75	19.42	21.60	21.75	17.86	15.08	13.58	15.13
5200	18.76	18.20	18.80	20.49	20.04	16.59	14.28	12.96	14.43
5400	18.47	17.92	18.49	20.00	19.52	16.31	14.18	12.95	14.44
5600	17.30	16.73	17.16	18.15	17.53	14.77	13.05	12.02	13.38
5800	14.96	14.55	14.97	15.88	15.75	13.98	12.74	11.75	13.08
6000	13.93	13.59	13.93	14.62	14.49	12.99	12.03	11.19	12.46
6200	12.69	12.45	12.80	13.51	13.58	12.60	12.01	11.24	12.53
6500	11.20	11.05	11.38	11.96	12.11	11.46	11.20	10.60	11.83
7000	9.91	9.89	10.19	10.75	11.02	10.93	11.20	10.79	12.09

Notes

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=-40°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	21.80	21.84	21.95	22.31	22.52	24.35	26.55	31.15	40.29
0.3	21.87	21.91	22.03	22.37	22.61	24.46	26.67	31.32	40.41
0.5	21.68	21.73	21.85	22.24	22.51	24.41	26.72	31.48	40.27
1	21.64	21.69	21.82	22.21	22.50	24.40	26.73	31.52	40.40
5	21.71	21.78	21.91	22.28	22.57	24.46	26.78	31.55	40.61
10	21.69	21.76	21.88	22.26	22.55	24.43	26.75	31.50	40.73
50	21.50	21.55	21.66	22.01	22.25	23.99	26.10	30.32	44.61
100	21.37	21.40	21.48	21.77	21.93	23.45	25.23	28.80	60.02
200	21.29	21.32	21.41	21.68	21.87	23.30	24.97	28.13	36.09
300	21.30	21.38	21.53	21.87	22.26	23.98	26.05	29.62	33.32
400	21.60	21.68	21.86	22.23	22.71	24.58	26.88	30.71	32.43
500	22.17	22.26	22.46	22.84	23.39	25.38	27.86	31.96	31.61
600	22.33	22.42	22.64	23.03	23.66	25.71	28.34	32.50	31.12
700	22.79	22.90	23.13	23.53	24.22	26.35	29.08	32.93	30.06
800	23.04	23.16	23.41	23.82	24.59	26.81	29.68	33.58	29.70
900	23.17	23.29	23.55	23.93	24.73	26.90	29.61	32.76	28.98
1000	23.81	23.95	24.23	24.58	25.50	27.77	30.42	32.27	27.55
1100	24.39	24.57	24.88	25.28	26.36	28.96	31.83	32.54	26.74
1200	25.39	25.57	25.92	26.38	27.58	30.57	33.70	32.84	26.20
1300	26.83	26.97	27.35	27.82	29.10	32.52	36.12	33.60	26.07
1400	27.00	27.11	27.51	28.02	29.36	33.05	37.16	33.88	26.01
1500	27.92	28.01	28.44	29.01	30.42	34.58	38.76	33.49	25.64
1600	28.51	28.53	29.00	29.71	31.15	35.96	41.66	33.71	25.51
1700	28.79	28.72	29.20	29.97	31.33	36.23	43.03	33.96	25.52
1800	29.31	29.21	29.70	30.57	31.96	37.27	43.42	33.31	25.19
1900	30.30	30.12	30.68	31.72	33.12	39.27	45.10	32.87	24.89
2000	31.16	30.78	31.34	32.54	33.74	39.93	46.90	33.05	24.88
2100	32.04	31.64	32.21	33.20	34.54	41.16	44.76	32.65	24.68
2200	31.74	31.44	32.05	33.12	34.72	42.37	42.65	31.77	24.24
2300	31.96	31.61	32.32	33.64	35.44	45.00	40.86	30.92	23.78
2400	32.74	32.13	32.90	34.88	36.51	47.81	38.94	30.12	23.34
2500	33.38	32.51	33.32	36.02	37.39	45.63	37.14	29.38	22.92
2600	31.97	30.96	31.71	34.78	35.30	39.46	36.21	29.09	22.70
2700	30.75	29.75	30.42	33.40	33.67	36.98	35.90	29.07	22.64
2800	30.92	29.78	30.39	33.71	33.45	35.40	34.14	28.33	22.22
2900	31.21	29.98	30.46	33.70	32.77	33.05	32.01	27.46	21.75
3000	31.09	29.89	30.25	33.10	31.88	31.58	30.96	27.13	21.57
3200	30.91	29.54	29.73	32.22	30.66	30.01	29.70	26.68	21.31
3400	34.55	32.21	32.38	35.89	32.93	31.70	31.08	27.53	21.59
3600	38.33	35.16	35.01	38.65	34.40	31.39	29.38	25.82	20.51
3800	33.99	32.85	32.40	33.65	31.25	28.50	26.67	23.86	19.32
4000	32.05	30.99	30.46	31.17	28.95	26.31	24.56	22.17	18.21
4200	26.81	26.25	25.90	26.34	24.85	23.03	21.81	20.12	16.87
4400	24.86	23.83	23.54	24.04	22.42	20.75	19.71	18.45	15.79
4600	22.70	21.63	21.45	22.05	20.65	19.41	18.75	17.90	15.57
4800	20.07	19.17	19.10	19.72	18.70	17.87	17.52	16.99	15.02
5000	18.85	17.98	17.94	18.50	17.57	16.90	16.71	16.46	14.83
5200	17.61	16.81	16.82	17.39	16.67	16.26	16.30	16.27	14.86
5400	17.65	16.80	16.81	17.34	16.55	16.11	16.15	16.23	14.94
5600	16.35	15.57	15.62	16.13	15.52	15.20	15.32	15.43	14.29
5800	14.38	13.77	13.83	14.28	13.85	13.72	13.96	14.24	13.50
6000	13.61	13.07	13.16	13.61	13.32	13.36	13.76	14.20	13.64
6200	12.55	12.10	12.19	12.61	12.41	12.59	13.10	13.67	13.38
6500	11.13	10.79	10.91	11.31	11.25	11.62	12.30	13.05	13.08
7000	9.63	9.40	9.53	9.90	9.94	10.47	11.29	12.23	12.69

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	0.94	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.31
0.3	0.94	0.26	0.52	1.02	2.00	4.06	8.13	16.25	32.32
0.5	0.94	0.26	0.51	1.02	2.00	4.06	8.13	16.25	32.32
1	0.95	0.26	0.51	1.02	2.00	4.06	8.13	16.25	32.32
5	0.97	0.26	0.51	1.02	2.00	4.05	8.12	16.24	32.31
10	0.97	0.26	0.51	1.02	2.00	4.05	8.12	16.24	32.31
50	0.97	0.26	0.51	1.02	1.99	4.05	8.11	16.23	32.30
100	1.00	0.26	0.51	1.02	2.00	4.06	8.13	16.24	32.31
200	1.03	0.26	0.51	1.02	2.00	4.06	8.13	16.24	32.31
300	1.07	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.30
400	1.11	0.26	0.51	1.02	2.00	4.06	8.12	16.24	32.29
500	1.15	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
600	1.19	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
700	1.23	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.28
800	1.27	0.26	0.51	1.02	2.00	4.05	8.12	16.23	32.27
900	1.31	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1000	1.35	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1100	1.38	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.27
1200	1.42	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.28
1300	1.45	0.25	0.51	1.02	2.00	4.05	8.12	16.23	32.28
1400	1.48	0.26	0.51	1.02	2.01	4.06	8.12	16.24	32.29
1500	1.51	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.30
1600	1.54	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.31
1700	1.56	0.26	0.51	1.02	2.01	4.06	8.13	16.24	32.32
1800	1.60	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.33
1900	1.63	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.34
2000	1.66	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.36
2100	1.70	0.26	0.51	1.02	2.01	4.06	8.13	16.25	32.37
2200	1.73	0.26	0.51	1.02	2.01	4.06	8.14	16.26	32.40
2300	1.75	0.26	0.51	1.02	2.01	4.06	8.14	16.27	32.42
2400	1.78	0.26	0.51	1.02	2.01	4.06	8.14	16.27	32.44
2500	1.82	0.26	0.51	1.02	2.01	4.06	8.14	16.28	32.47
2600	1.85	0.26	0.51	1.02	2.00	4.06	8.14	16.28	32.49
2700	1.88	0.26	0.51	1.02	2.00	4.06	8.15	16.29	32.51
2800	1.92	0.26	0.51	1.02	2.00	4.06	8.15	16.29	32.53
2900	1.95	0.26	0.51	1.02	2.00	4.06	8.15	16.30	32.54
3000	1.97	0.26	0.51	1.03	2.00	4.06	8.16	16.31	32.54
3200	2.03	0.26	0.51	1.03	2.01	4.07	8.17	16.32	32.60
3400	2.08	0.27	0.52	1.03	2.01	4.08	8.19	16.36	32.77
3600	2.13	0.27	0.52	1.04	2.02	4.09	8.21	16.40	32.85
3800	2.18	0.27	0.52	1.04	2.02	4.11	8.24	16.43	32.92
4000	2.23	0.28	0.53	1.04	2.03	4.13	8.27	16.47	32.97
4200	2.29	0.28	0.53	1.05	2.03	4.14	8.29	16.50	33.01
4400	2.34	0.28	0.53	1.05	2.04	4.16	8.32	16.54	33.05
4600	2.40	0.29	0.54	1.06	2.05	4.19	8.36	16.58	33.10
4800	2.47	0.29	0.55	1.07	2.07	4.21	8.39	16.62	33.21
5000	2.56	0.30	0.55	1.07	2.07	4.23	8.42	16.66	33.34
5200	2.66	0.31	0.56	1.08	2.08	4.26	8.45	16.72	33.54
5400	2.74	0.31	0.57	1.08	2.09	4.27	8.47	16.73	33.41
5600	2.83	0.32	0.57	1.09	2.09	4.28	8.48	16.73	33.28
5800	2.93	0.33	0.58	1.09	2.09	4.28	8.48	16.72	33.24
6000	3.03	0.33	0.58	1.10	2.08	4.29	8.49	16.73	33.20
6200	3.16	0.34	0.59	1.10	2.08	4.29	8.49	16.72	33.15
6500	3.35	0.35	0.60	1.11	2.07	4.29	8.49	16.70	33.10
7000	3.61	0.36	0.60	1.13	2.07	4.30	8.51	16.70	32.97

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	18.79	20.44	21.29	22.58	31.50	29.93	22.58	18.98	21.32
0.3	18.60	20.52	21.36	22.66	31.62	29.79	22.53	18.97	21.32
0.5	18.55	20.37	21.22	22.52	31.28	29.99	22.55	18.97	21.32
1	18.59	20.36	21.19	22.49	31.18	30.07	22.57	18.99	21.33
5	18.59	20.42	21.27	22.58	31.36	29.96	22.55	18.99	21.33
10	18.59	20.41	21.26	22.56	31.31	30.00	22.56	19.00	21.34
50	18.61	20.32	21.17	22.46	31.06	30.18	22.62	19.03	21.38
100	18.59	20.28	21.14	22.43	30.95	30.25	22.65	19.06	21.39
200	18.62	20.36	21.21	22.51	31.08	30.21	22.65	19.08	21.43
300	18.57	20.52	21.36	22.68	31.42	30.02	22.61	19.07	21.43
400	18.53	20.71	21.54	22.87	31.81	29.77	22.52	19.05	21.40
500	18.53	20.97	21.80	23.18	32.53	29.31	22.35	18.96	21.29
600	18.51	21.25	22.09	23.52	33.38	28.80	22.14	18.85	21.15
700	18.56	21.62	22.47	23.96	34.61	28.20	21.89	18.71	20.98
800	18.56	21.99	22.85	24.41	35.96	27.65	21.65	18.57	20.81
900	18.54	22.28	23.14	24.76	36.96	27.28	21.51	18.50	20.72
1000	18.58	22.48	23.32	25.00	37.55	27.01	21.39	18.43	20.65
1100	18.58	22.82	23.65	25.40	38.69	26.61	21.22	18.34	20.54
1200	18.62	23.12	23.95	25.78	39.10	26.21	21.05	18.25	20.43
1300	18.57	23.53	24.36	26.28	39.16	25.73	20.86	18.14	20.31
1400	18.46	23.67	24.49	26.46	37.78	25.43	20.75	18.08	20.25
1500	18.45	23.68	24.45	26.45	36.85	25.32	20.72	18.06	20.24
1600	18.42	23.58	24.29	26.28	35.34	25.16	20.66	18.03	20.21
1700	18.48	23.50	24.17	26.18	33.99	24.95	20.61	18.01	20.19
1800	18.38	23.49	24.11	26.12	32.67	24.66	20.54	17.99	20.17
1900	18.23	23.29	23.85	25.80	31.35	24.50	20.57	18.04	20.25
2000	18.27	22.98	23.47	25.35	30.30	24.47	20.67	18.14	20.40
2100	18.20	22.83	23.26	25.12	29.82	24.48	20.77	18.24	20.54
2200	18.25	22.67	23.06	24.88	29.26	24.40	20.81	18.30	20.64
2300	18.18	22.49	22.83	24.63	28.73	24.33	20.86	18.37	20.74
2400	18.22	22.26	22.57	24.33	28.21	24.32	20.98	18.49	20.91
2500	18.17	22.00	22.30	24.03	27.88	24.44	21.17	18.65	21.14
2600	18.09	21.81	22.10	23.81	27.69	24.64	21.37	18.82	21.39
2700	18.08	21.84	22.11	23.85	27.86	24.82	21.50	18.94	21.57
2800	17.96	21.86	22.10	23.85	27.83	24.85	21.55	19.00	21.68
2900	17.95	21.89	22.09	23.86	28.05	25.18	21.75	19.16	21.93
3000	17.85	22.10	22.30	24.12	28.63	25.44	21.78	19.18	21.99
3200	17.75	22.13	22.35	24.23	29.70	26.42	22.03	19.33	22.22
3400	17.15	21.90	22.17	24.10	29.68	26.46	21.93	19.27	22.18
3600	16.51	22.18	22.45	24.54	30.77	26.20	21.51	18.98	21.81
3800	16.02	22.65	22.92	25.23	32.37	25.64	20.92	18.56	21.25
4000	15.55	23.31	23.64	26.31	34.71	24.73	20.11	17.96	20.46
4200	14.91	24.23	24.68	28.00	35.78	23.16	19.01	17.10	19.37
4400	14.35	24.34	24.57	28.03	31.66	21.83	18.22	16.45	18.57
4600	14.21	23.50	23.66	26.71	28.53	20.82	17.62	15.97	18.00
4800	14.17	23.24	23.20	25.81	26.19	19.62	16.80	15.30	17.21
5000	14.24	21.74	21.62	23.44	23.29	18.24	15.92	14.59	16.36
5200	14.10	19.66	19.67	21.11	21.28	17.45	15.54	14.28	16.00
5400	13.98	17.61	17.72	18.90	19.36	16.62	15.24	14.11	15.83
5600	13.83	15.99	16.10	17.03	17.48	15.40	14.46	13.53	15.16
5800	14.19	14.57	14.72	15.54	16.06	14.57	14.03	13.24	14.82
6000	16.22	13.65	13.88	14.65	15.23	14.10	13.85	13.19	14.77
6200	19.09	12.88	13.15	13.87	14.48	13.59	13.56	13.03	14.61
6500	23.41	11.76	12.05	12.72	13.40	12.94	13.29	12.94	14.51
7000	23.01	10.82	11.25	11.90	12.59	12.56	13.37	13.29	14.93

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+25°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000	0000001	0000010	0000100	0001000	0010000	0100000	1000000	1111111
	0 dB	0.25 dB	0.5 dB	1.0 dB	2.0 dB	4.0 dB	8.0 dB	16 dB	31.75 dB
0.1	20.40	20.19	20.07	19.99	19.54	19.91	20.26	21.71	26.97
0.3	20.46	20.26	20.14	20.05	19.61	19.99	20.33	21.77	26.95
0.5	20.28	20.09	20.00	19.92	19.54	19.96	20.37	21.84	27.05
1	20.20	20.03	19.94	19.88	19.52	19.96	20.38	21.87	27.05
5	20.27	20.11	20.01	19.95	19.58	20.02	20.43	21.90	27.03
10	20.27	20.11	20.01	19.95	19.58	20.01	20.42	21.90	27.01
50	20.17	20.01	19.91	19.86	19.50	19.93	20.36	21.82	26.84
100	20.08	19.93	19.84	19.80	19.46	19.91	20.35	21.81	26.75
200	20.15	19.99	19.91	19.86	19.54	19.97	20.39	21.83	26.58
300	20.25	20.09	20.02	19.96	19.66	20.08	20.50	21.91	26.44
400	20.52	20.35	20.28	20.21	19.92	20.29	20.69	22.06	26.34
500	20.70	20.52	20.46	20.39	20.14	20.51	20.91	22.27	26.28
600	21.08	20.88	20.83	20.74	20.50	20.84	21.22	22.55	26.28
700	21.31	21.12	21.07	20.97	20.79	21.12	21.51	22.82	26.24
800	21.73	21.52	21.48	21.36	21.19	21.50	21.85	23.12	26.19
900	22.12	21.92	21.88	21.74	21.60	21.87	22.22	23.45	26.14
1000	22.68	22.48	22.44	22.26	22.13	22.36	22.66	23.84	26.14
1100	23.05	22.85	22.82	22.63	22.54	22.77	23.08	24.24	26.13
1200	23.57	23.35	23.32	23.10	23.01	23.22	23.50	24.61	26.11
1300	24.03	23.78	23.75	23.51	23.42	23.62	23.89	24.96	26.05
1400	24.57	24.30	24.25	23.99	23.87	24.04	24.26	25.28	25.97
1500	25.10	24.79	24.72	24.43	24.30	24.44	24.63	25.59	25.89
1600	25.62	25.27	25.19	24.87	24.74	24.85	25.00	25.89	25.76
1700	26.15	25.77	25.69	25.34	25.20	25.29	25.38	26.17	25.59
1800	26.64	26.22	26.16	25.79	25.64	25.72	25.76	26.42	25.34
1900	27.35	26.87	26.82	26.42	26.23	26.26	26.22	26.72	25.12
2000	28.11	27.57	27.53	27.11	26.87	26.90	26.80	27.14	24.93
2100	28.73	28.14	28.10	27.71	27.43	27.50	27.39	27.61	24.82
2200	29.42	28.74	28.69	28.33	27.96	28.08	27.96	28.05	24.73
2300	30.01	29.21	29.14	28.86	28.37	28.57	28.46	28.48	24.68
2400	30.60	29.65	29.56	29.35	28.73	28.98	28.87	28.75	24.56
2500	31.44	30.32	30.20	30.02	29.24	29.49	29.27	28.86	24.28
2600	32.71	31.39	31.23	31.00	30.06	30.25	29.79	28.96	23.90
2700	34.16	32.58	32.41	32.14	31.00	31.19	30.50	29.10	23.51
2800	36.14	34.02	33.83	33.71	32.17	32.45	31.50	29.44	23.21
2900	38.72	35.67	35.48	35.62	33.50	33.97	32.73	29.86	22.95
3000	42.04	37.50	37.30	37.56	34.88	35.51	33.92	30.10	22.68
3200	48.40	39.83	40.00	42.29	37.55	39.63	36.91	30.36	22.05
3400	41.59	38.45	38.83	54.89	38.25	45.56	42.96	30.37	21.33
3600	35.20	34.71	34.78	40.14	34.76	37.83	40.47	30.02	20.78
3800	32.97	32.70	32.57	35.98	32.09	33.38	34.77	28.93	20.21
4000	31.03	30.53	30.25	32.64	29.30	29.71	30.32	27.17	19.48
4200	28.76	27.84	27.64	29.54	26.59	26.73	27.26	25.76	19.00
4400	26.70	25.55	25.46	26.99	24.41	24.45	24.93	24.35	18.57
4600	24.93	23.70	23.56	24.75	22.40	22.32	22.63	22.55	17.91
4800	22.52	21.34	21.17	22.08	20.20	20.15	20.49	20.86	17.36
5000	20.55	19.48	19.33	20.08	18.57	18.58	18.99	19.69	17.10
5200	18.70	17.79	17.74	18.40	17.18	17.31	17.83	18.76	16.85
5400	17.06	16.29	16.29	16.87	15.89	16.10	16.69	17.80	16.59
5600	15.58	14.92	14.96	15.48	14.74	15.04	15.73	16.96	16.35
5800	14.49	13.92	13.94	14.40	13.81	14.16	14.88	16.19	16.11
6000	13.47	12.97	13.00	13.43	12.96	13.37	14.13	15.52	15.94
6200	12.52	12.10	12.18	12.59	12.23	12.72	13.55	15.02	15.88
6500	11.54	11.22	11.35	11.72	11.45	12.00	12.87	14.40	15.83
7000	10.47	10.25	10.32	10.64	10.50	11.11	12.02	13.64	15.96

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	STEP ATTENUATION* AT TTL CONTROL STATE (dB)								
	0000000 THRU	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	1.04	0.26	0.52	1.02	1.98	4.02	8.06	16.13	32.15
0.3	1.04	0.26	0.52	1.02	1.98	4.02	8.07	16.14	32.16
0.5	1.04	0.26	0.52	1.03	1.99	4.02	8.07	16.14	32.16
1	1.05	0.26	0.52	1.02	1.98	4.02	8.06	16.14	32.15
5	1.07	0.26	0.52	1.02	1.98	4.02	8.06	16.13	32.15
10	1.07	0.26	0.51	1.02	1.98	4.02	8.06	16.14	32.15
50	1.07	0.26	0.51	1.02	1.98	4.01	8.05	16.12	32.14
100	1.09	0.26	0.52	1.02	1.98	4.02	8.07	16.14	32.16
200	1.12	0.26	0.51	1.02	1.99	4.02	8.07	16.15	32.16
300	1.17	0.26	0.51	1.02	1.99	4.02	8.06	16.14	32.14
400	1.21	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.13
500	1.25	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.13
600	1.29	0.26	0.51	1.02	1.99	4.02	8.06	16.13	32.12
700	1.33	0.26	0.51	1.02	1.99	4.02	8.06	16.12	32.12
800	1.37	0.26	0.51	1.02	1.99	4.01	8.06	16.12	32.12
900	1.41	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1000	1.45	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1100	1.49	0.26	0.51	1.03	1.99	4.01	8.06	16.12	32.12
1200	1.53	0.26	0.51	1.03	1.99	4.02	8.06	16.12	32.13
1300	1.56	0.26	0.51	1.03	1.99	4.02	8.06	16.13	32.13
1400	1.59	0.26	0.51	1.03	2.00	4.02	8.06	16.13	32.14
1500	1.62	0.26	0.51	1.03	2.00	4.02	8.06	16.13	32.15
1600	1.65	0.26	0.51	1.03	2.00	4.02	8.07	16.14	32.16
1700	1.67	0.26	0.51	1.03	2.00	4.02	8.07	16.14	32.17
1800	1.70	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.19
1900	1.74	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.20
2000	1.77	0.26	0.52	1.03	2.00	4.03	8.08	16.15	32.22
2100	1.80	0.26	0.52	1.03	2.00	4.03	8.08	16.16	32.23
2200	1.83	0.26	0.52	1.03	2.00	4.03	8.09	16.17	32.25
2300	1.85	0.26	0.52	1.03	2.01	4.03	8.09	16.18	32.28
2400	1.88	0.26	0.52	1.03	2.01	4.04	8.10	16.18	32.30
2500	1.92	0.26	0.52	1.03	2.01	4.04	8.10	16.19	32.33
2600	1.95	0.26	0.52	1.03	2.01	4.04	8.10	16.19	32.35
2700	1.98	0.26	0.52	1.03	2.01	4.04	8.10	16.20	32.37
2800	2.02	0.26	0.52	1.03	2.01	4.04	8.11	16.21	32.40
2900	2.05	0.27	0.52	1.03	2.01	4.04	8.11	16.21	32.41
3000	2.07	0.27	0.52	1.04	2.01	4.04	8.11	16.22	32.40
3200	2.13	0.27	0.52	1.04	2.01	4.05	8.12	16.23	32.47
3400	2.20	0.27	0.53	1.04	2.01	4.05	8.13	16.26	32.61
3600	2.26	0.27	0.53	1.04	2.02	4.07	8.16	16.29	32.70
3800	2.31	0.28	0.53	1.05	2.02	4.08	8.17	16.32	32.77
4000	2.37	0.28	0.54	1.05	2.03	4.09	8.19	16.35	32.83
4200	2.42	0.28	0.54	1.06	2.04	4.11	8.22	16.38	32.88
4400	2.46	0.29	0.55	1.06	2.05	4.13	8.26	16.43	32.93
4600	2.52	0.29	0.55	1.07	2.06	4.15	8.29	16.46	33.00
4800	2.60	0.30	0.55	1.07	2.06	4.17	8.31	16.49	33.11
5000	2.67	0.30	0.56	1.08	2.07	4.19	8.35	16.54	33.28
5200	2.77	0.31	0.57	1.09	2.08	4.23	8.39	16.60	33.41
5400	2.85	0.32	0.57	1.09	2.09	4.24	8.41	16.62	33.30
5600	2.95	0.33	0.58	1.10	2.09	4.26	8.43	16.62	33.22
5800	3.06	0.33	0.59	1.10	2.09	4.26	8.44	16.62	33.19
6000	3.19	0.34	0.59	1.11	2.09	4.27	8.45	16.62	33.17
6200	3.30	0.35	0.60	1.11	2.09	4.28	8.45	16.61	33.13
6500	3.52	0.35	0.60	1.12	2.07	4.27	8.45	16.60	33.11
7000	3.75	0.36	0.61	1.14	2.07	4.30	8.49	16.62	33.05

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	INPUT RETURN LOSS AT TTL CONTROL STATE								
	(dB)								
	0000000 0 dB	0000001 0.25 dB	0000010 0.5 dB	0000100 1.0 dB	0001000 2.0 dB	0010000 4.0 dB	0100000 8.0 dB	1000000 16 dB	1111111 31.75 dB
0.1	19.53	19.61	20.74	26.16	54.67	28.87	23.09	23.09	27.43
0.3	19.63	19.68	20.82	26.24	53.61	28.77	23.06	23.06	27.42
0.5	19.46	19.53	20.68	26.01	57.71	28.81	23.05	23.05	27.40
1	19.40	19.47	20.62	25.91	61.61	28.82	23.06	23.06	27.39
5	19.46	19.56	20.70	26.03	57.46	28.77	23.06	23.06	27.38
10	19.44	19.53	20.68	25.99	56.30	28.76	23.06	23.06	27.37
50	19.33	19.43	20.60	25.88	46.48	28.55	22.93	22.93	27.11
100	19.29	19.41	20.63	26.01	44.03	27.92	22.54	22.54	26.47
200	19.49	19.61	20.90	26.58	43.41	27.26	22.16	22.16	25.88
300	19.50	19.59	20.83	26.23	40.17	27.84	22.60	22.60	26.60
400	19.74	19.80	20.99	26.35	40.34	28.24	22.92	22.92	27.17
500	19.84	19.89	21.08	26.47	41.92	28.27	22.97	22.97	27.24
600	20.12	20.14	21.35	26.86	40.64	28.02	22.90	22.90	27.16
700	20.34	20.33	21.55	27.11	39.33	27.90	22.91	22.91	27.22
800	20.75	20.71	21.95	27.71	38.61	27.65	22.84	22.84	27.14
900	21.00	20.95	22.21	28.10	37.88	27.45	22.77	22.77	27.06
1000	21.36	21.28	22.57	28.70	37.34	27.14	22.65	22.65	26.85
1100	21.79	21.68	23.01	29.50	35.58	26.63	22.39	22.39	26.48
1200	22.10	21.96	23.33	30.04	34.62	26.34	22.26	22.26	26.30
1300	22.11	21.97	23.32	29.94	35.46	26.50	22.38	22.38	26.48
1400	22.54	22.37	23.80	30.90	33.66	25.91	22.05	22.05	25.99
1500	22.48	22.30	23.75	30.68	33.39	25.97	22.11	22.11	26.13
1600	22.93	22.72	24.29	31.86	31.99	25.29	21.69	21.69	25.48
1700	22.98	22.74	24.37	31.91	31.10	25.01	21.51	21.51	25.24
1800	23.00	22.75	24.46	31.95	30.33	24.69	21.30	21.30	24.95
1900	22.86	22.58	24.35	31.46	29.88	24.61	21.28	21.28	24.94
2000	22.54	22.25	24.01	30.36	29.36	24.68	21.38	21.38	25.12
2100	22.10	21.83	23.52	29.32	29.52	25.10	21.70	21.70	25.65
2200	22.11	21.82	23.57	29.20	28.83	24.83	21.55	21.55	25.45
2300	22.00	21.69	23.46	28.90	28.55	24.80	21.57	21.57	25.50
2400	21.65	21.32	23.04	27.95	28.03	24.86	21.69	21.69	25.68
2500	21.63	21.30	23.03	27.98	28.24	25.01	21.80	21.80	25.89
2600	21.65	21.30	23.09	27.94	27.76	24.72	21.63	21.63	25.66
2700	21.60	21.25	23.07	27.83	27.54	24.64	21.60	21.60	25.63
2800	21.45	21.10	22.91	27.54	27.45	24.71	21.69	21.69	25.79
2900	21.42	21.06	22.85	27.48	27.62	24.87	21.82	21.82	26.06
3000	21.40	21.03	22.79	27.43	28.07	25.22	22.09	22.09	26.54
3200	21.29	20.89	22.68	27.32	28.05	25.10	21.96	21.96	26.34
3400	20.84	20.48	22.21	26.70	28.71	25.82	22.48	22.48	27.33
3600	21.21	20.79	22.66	27.47	28.55	25.14	22.01	22.01	26.60
3800	21.08	20.65	22.58	27.40	28.27	24.80	21.78	21.78	26.28
4000	21.80	21.32	23.54	29.13	28.04	23.88	21.11	21.11	25.22
4200	22.48	21.91	24.53	30.82	26.28	22.46	20.09	20.09	23.70
4400	24.16	23.45	26.88	36.91	25.33	21.14	19.05	19.05	22.09
4600	23.37	22.60	26.07	32.22	23.53	20.26	18.39	18.39	21.31
4800	23.24	22.35	25.81	28.33	21.12	18.62	17.09	17.09	19.61
5000	22.22	21.36	24.36	26.26	20.24	18.06	16.65	16.65	19.07
5200	20.13	19.46	21.74	22.87	18.51	16.92	15.72	15.72	17.88
5400	17.81	17.31	19.13	20.26	17.22	16.21	15.25	15.25	17.33
5600	16.34	15.97	17.56	18.70	16.40	15.83	15.07	15.07	17.12
5800	14.34	14.09	15.36	16.33	14.74	14.60	14.10	14.10	15.89
6000	13.66	13.48	14.75	15.80	14.55	14.68	14.32	14.32	16.19
6200	12.67	12.54	13.75	14.82	13.96	14.38	14.20	14.20	16.02
6500	11.98	11.96	13.14	14.24	13.71	14.46	14.50	14.50	16.39
7000	11.14	11.21	12.39	13.51	13.45	14.71	15.13	15.13	17.09

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Digital Step Attenuator

ZX76-31R75PP+

Typical Performance Data

TEST CONDITIONS: INPUT POWER=0 dBm, Vdd=+3V, TEMPERATURE=+85°C

FREQUENCY (MHz)	OUTPUT RETURN LOSS AT TTL CONTROL STATE (dB)								
	0000000	0000001	0000010	0000100	0001000	0010000	0100000	1000000	1111111
	0 dB	0.25 dB	0.5 dB	1.0 dB	2.0 dB	4.0 dB	8.0 dB	16 dB	31.75 dB
0.1	19.52	19.18	18.93	18.60	17.85	17.65	17.39	18.10	21.13
0.3	19.59	19.26	19.00	18.67	17.92	17.71	17.43	18.14	21.12
0.5	19.46	19.14	18.90	18.58	17.88	17.71	17.47	18.20	21.18
1	19.44	19.12	18.88	18.58	17.88	17.72	17.49	18.22	21.17
5	19.51	19.20	18.97	18.65	17.95	17.77	17.54	18.25	21.16
10	19.49	19.19	18.95	18.64	17.94	17.77	17.54	18.25	21.17
50	19.45	19.16	18.93	18.63	17.96	17.82	17.62	18.36	21.29
100	19.51	19.23	19.02	18.74	18.11	18.01	17.86	18.63	21.65
200	19.61	19.34	19.14	18.88	18.28	18.22	18.11	18.93	22.04
300	19.57	19.28	19.07	18.79	18.17	18.04	17.88	18.63	21.53
400	19.68	19.38	19.16	18.86	18.23	18.03	17.80	18.48	21.15
500	20.03	19.71	19.50	19.17	18.54	18.28	18.02	18.66	21.20
600	20.33	19.99	19.78	19.43	18.82	18.53	18.24	18.86	21.32
700	20.56	20.21	20.00	19.63	19.02	18.68	18.35	18.93	21.24
800	20.82	20.46	20.24	19.84	19.24	18.84	18.47	18.99	21.11
900	21.23	20.85	20.62	20.18	19.58	19.11	18.69	19.16	21.11
1000	21.58	21.19	20.97	20.48	19.91	19.39	18.93	19.36	21.16
1100	21.84	21.45	21.22	20.71	20.16	19.61	19.12	19.51	21.13
1200	22.13	21.73	21.50	20.97	20.44	19.84	19.32	19.66	21.06
1300	22.55	22.15	21.92	21.32	20.83	20.15	19.57	19.85	21.03
1400	22.74	22.35	22.12	21.51	21.08	20.39	19.83	20.06	21.02
1500	23.42	22.98	22.74	22.05	21.58	20.80	20.15	20.31	21.03
1600	23.74	23.32	23.07	22.34	21.93	21.12	20.45	20.56	21.02
1700	24.28	23.86	23.60	22.81	22.42	21.56	20.83	20.88	21.08
1800	24.72	24.30	24.03	23.22	22.85	21.98	21.23	21.23	21.16
1900	25.39	24.94	24.65	23.77	23.38	22.45	21.64	21.58	21.23
2000	26.18	25.65	25.32	24.36	23.90	22.89	22.01	21.88	21.31
2100	27.04	26.41	26.02	24.97	24.44	23.33	22.37	22.17	21.36
2200	27.53	26.84	26.44	25.39	24.80	23.71	22.72	22.46	21.40
2300	28.22	27.48	27.08	25.94	25.32	24.17	23.10	22.77	21.38
2400	29.17	28.33	27.87	26.66	25.93	24.68	23.49	23.03	21.30
2500	30.01	29.09	28.59	27.29	26.51	25.20	23.95	23.40	21.32
2600	30.64	29.55	29.08	27.85	26.96	25.73	24.46	23.83	21.37
2700	31.41	30.12	29.63	28.43	27.42	26.25	24.96	24.28	21.42
2800	32.27	30.74	30.23	29.10	27.88	26.78	25.47	24.67	21.40
2900	33.63	31.77	31.18	29.96	28.50	27.34	25.92	25.01	21.37
3000	35.08	32.86	32.19	30.84	29.19	27.94	26.38	25.34	21.30
3200	37.48	34.39	33.74	32.57	30.47	29.50	27.78	26.20	20.97
3400	45.17	38.55	38.14	39.28	33.56	33.12	30.60	27.54	20.59
3600	37.07	35.32	35.48	43.45	33.25	36.24	35.30	29.80	20.43
3800	32.20	31.21	31.33	36.11	30.42	34.38	40.91	32.58	20.35
4000	29.85	28.82	28.78	31.99	27.76	30.46	35.78	35.81	20.36
4200	28.43	27.53	27.45	30.09	26.23	28.22	31.64	35.45	20.19
4400	27.35	26.24	26.06	28.09	24.56	25.87	27.98	31.75	19.94
4600	25.26	24.14	23.93	25.46	22.52	23.44	24.95	28.23	19.72
4800	23.36	22.13	21.96	23.09	20.70	21.40	22.63	25.75	19.70
5000	21.85	20.75	20.60	21.51	19.39	19.92	20.88	23.60	19.38
5200	19.70	18.70	18.60	19.33	17.74	18.26	19.22	21.76	19.11
5400	17.79	16.95	16.88	17.47	16.18	16.66	17.54	19.82	18.66
5600	16.06	15.38	15.35	15.85	14.89	15.40	16.28	18.52	18.68
5800	14.81	14.24	14.23	14.69	13.92	14.48	15.40	17.61	18.58
6000	13.63	13.13	13.15	13.58	13.00	13.59	14.56	16.73	18.45
6200	12.77	12.36	12.38	12.76	12.26	12.85	13.77	15.85	18.29
6500	11.73	11.42	11.47	11.82	11.48	12.11	13.06	15.13	18.53
7000	10.96	10.74	10.80	11.11	10.85	11.46	12.36	14.39	19.13

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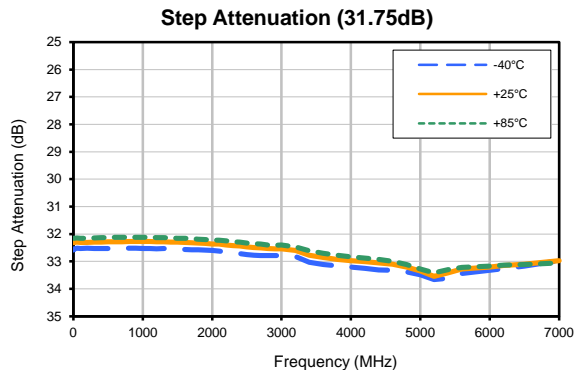
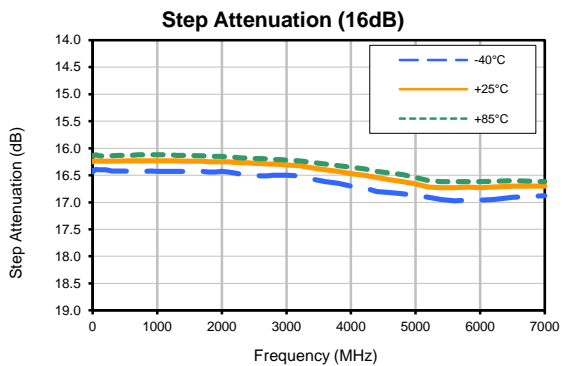
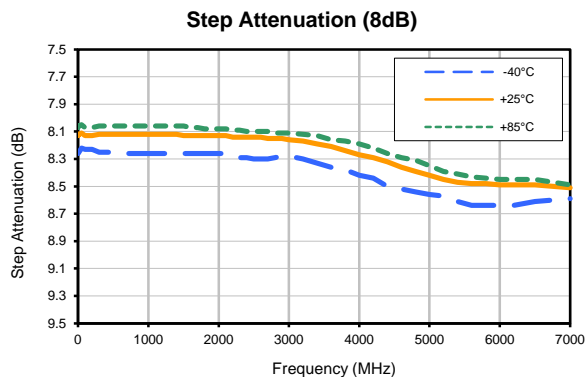
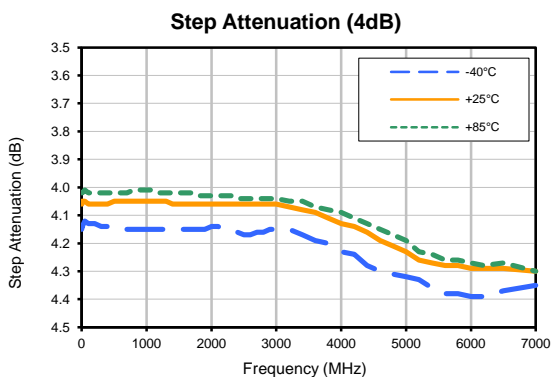
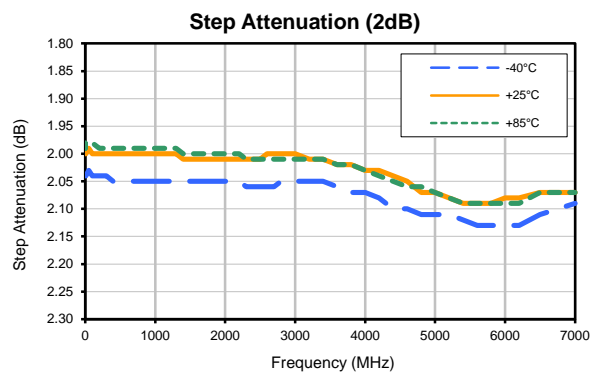
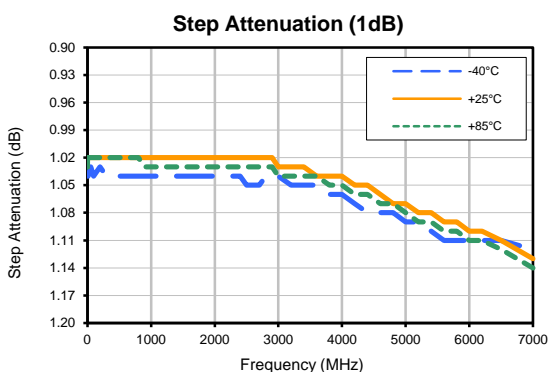
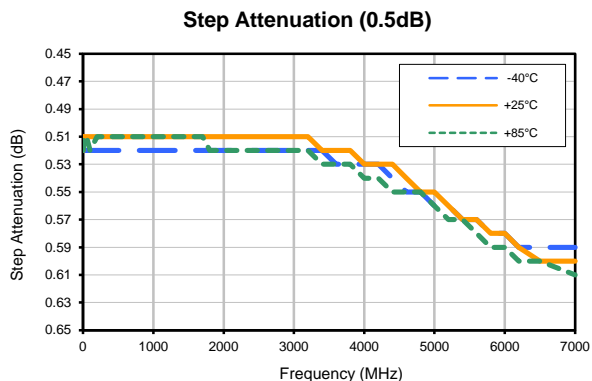
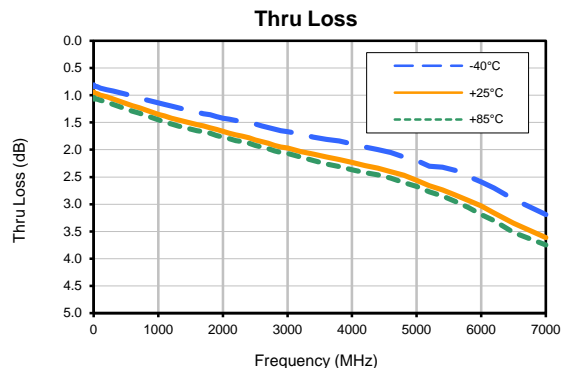
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Digital Step Attenuator

Typical Performance Curves

ZX76-31R75PP+



Notes

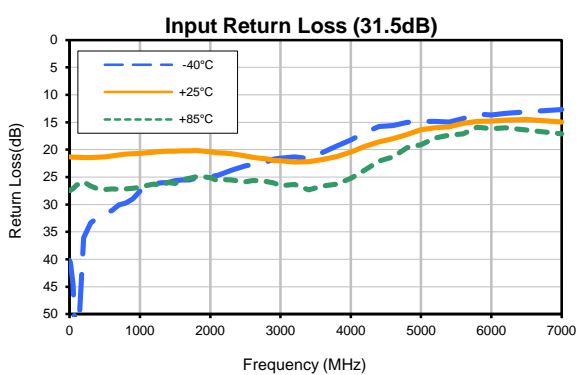
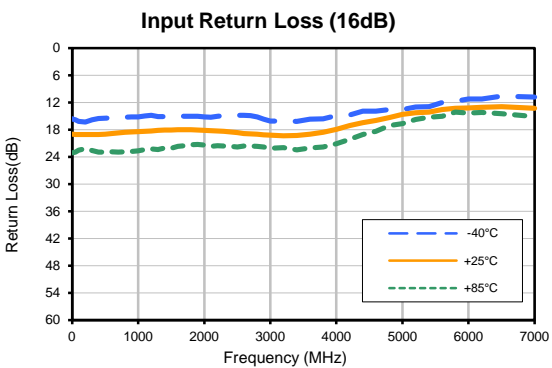
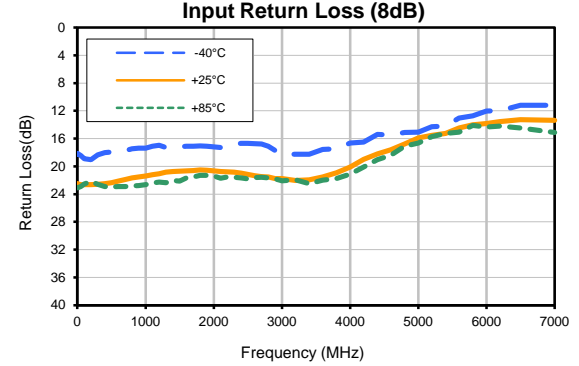
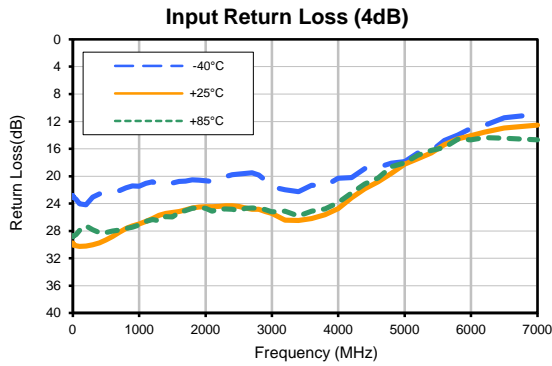
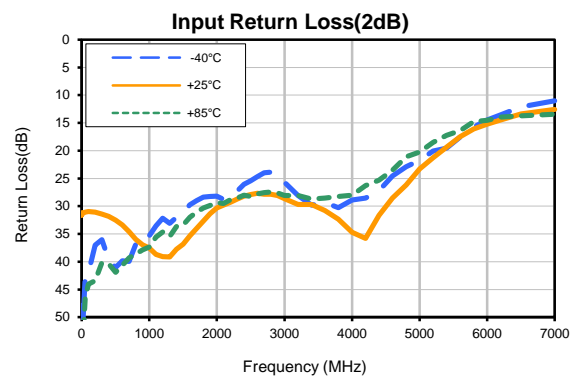
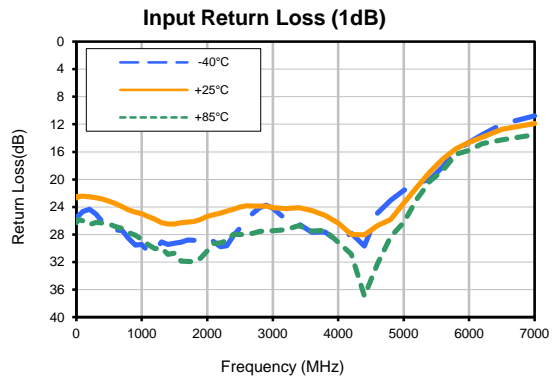
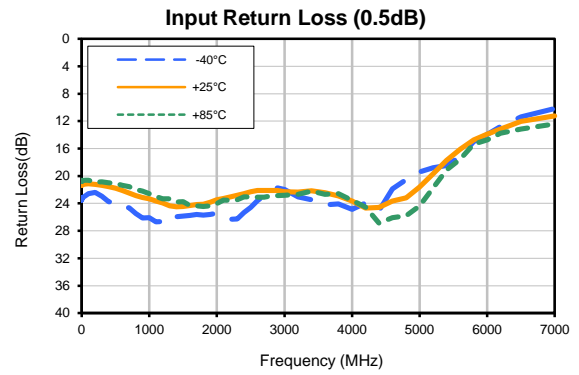
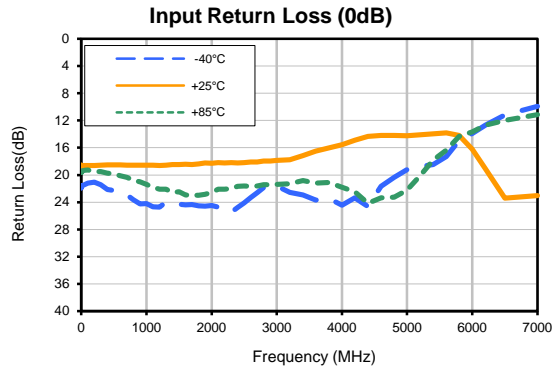
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Digital Step Attenuator

Typical Performance Curves

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Notes

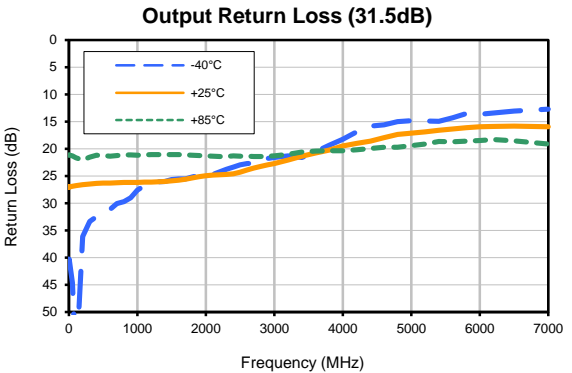
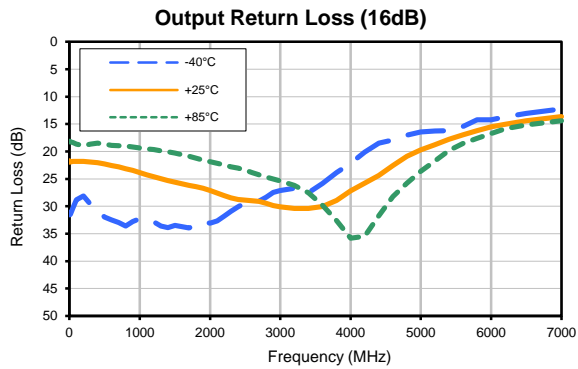
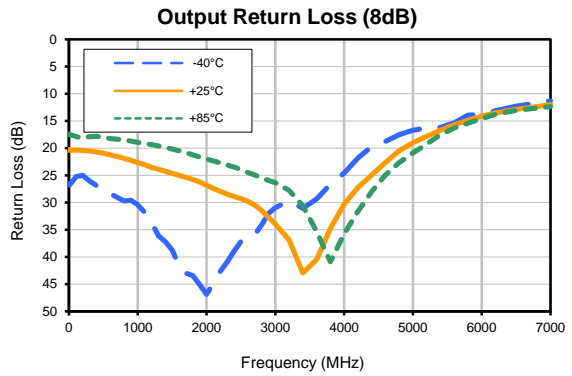
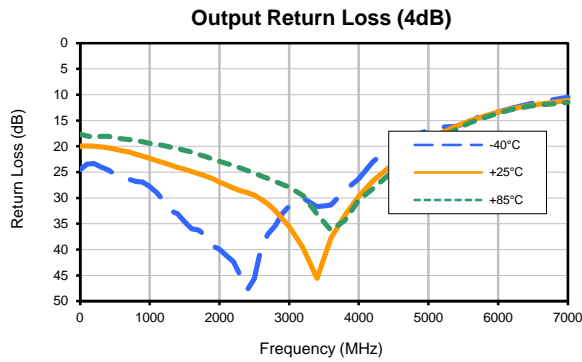
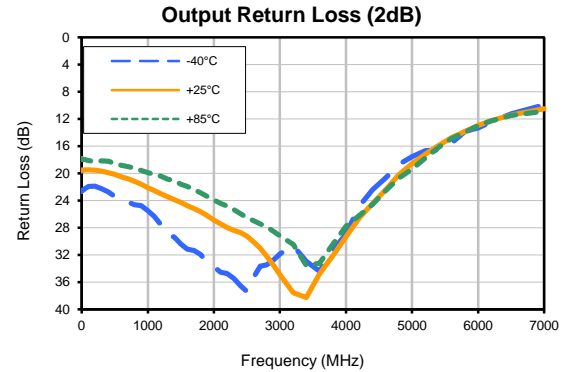
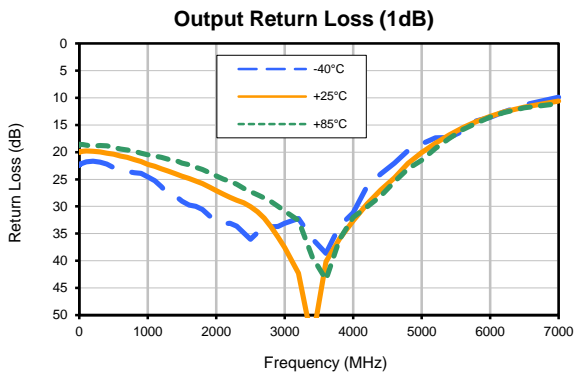
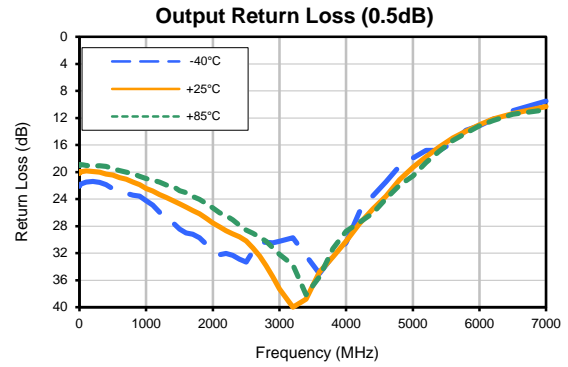
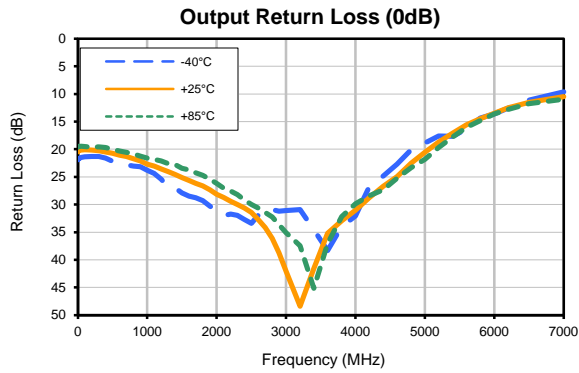
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' 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



Digital Step Attenuator

Typical Performance Curves

ZX76-31R75PP+



Notes

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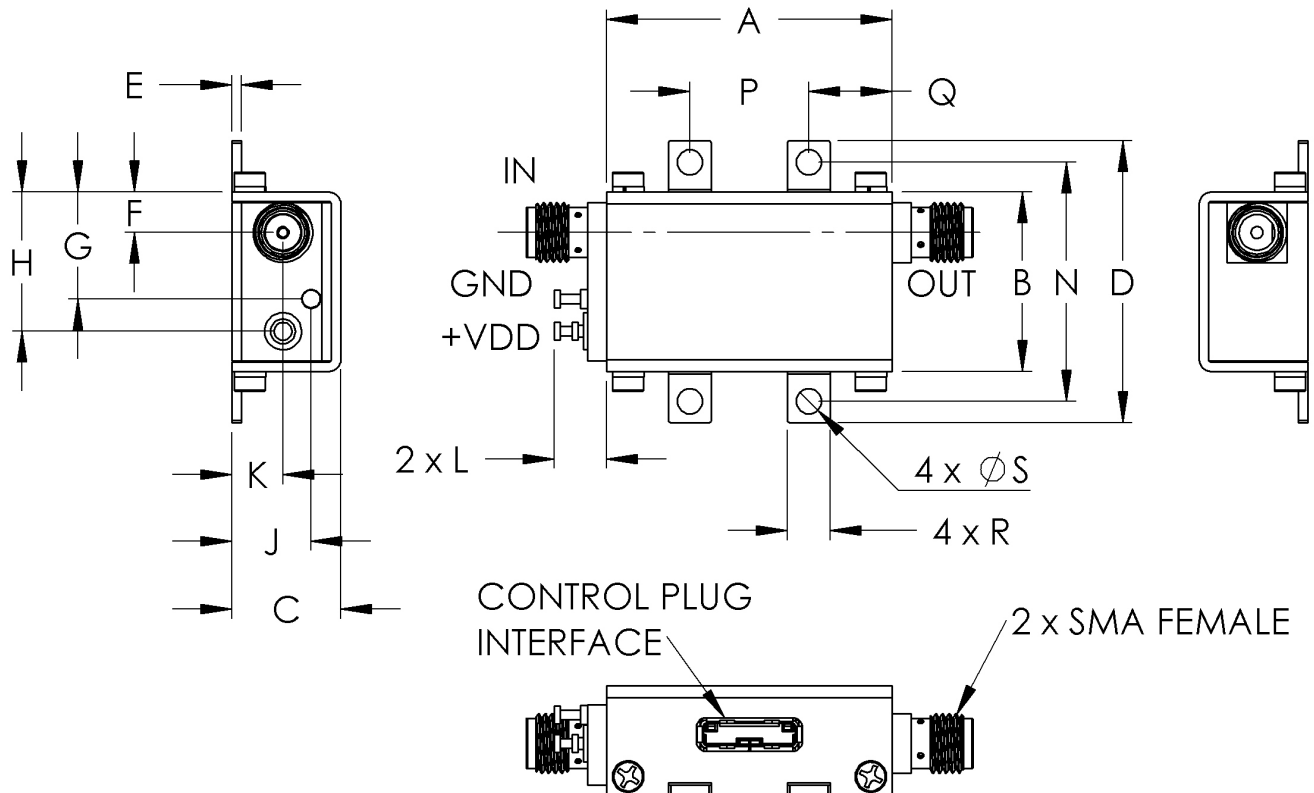


Case Style

HK

Outline Dimensions

HK1172



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
HK1172	1.20 (30.48)	.75 (19.15)	.46 (11.61)	1.18 (30.07)	.04 (1.02)	.17 (4.32)	.45 (11.40)	.59 (14.86)	.33 (8.31)	.21 (5.44)	.22 (5.59)	-	1.00 (25.4)

CASE #.	P	Q	R	S	WT GRAMS
HK1172	.50 (12.70)	.35 (8.89)	.18 (4.57)	.106 (2.69)	35

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$
Tolerance on hole size and interaxes dimensions to be $\pm .005$.

Note:

1. Case material: Brass
2. Case finish: Nickel plate

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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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-40° to 85° 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