DIGITAL DIODE

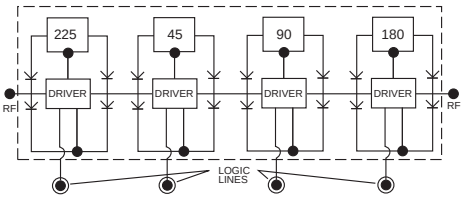
PHASE SHIFTERS

SERIES DP

0.25–5.1 GHz

GENERAL INFORMATION

KDI/Triangle's switched line digital phase shifters are controllable by binary logic. If a 360° phase shifter having sixteen discrete steps is required, then four logic lines are employed. The smallest phase increment will be 22.5°. This type of phase is illustrated below.



DESCRIPTION

Two advantages of the switched line phase shifter, Series DP, over the digitally controlled analog phase shifter, Series QQ, are faster switching speed, and less change with temperature. The disadvantage is that phase increments smaller than 5.63° are impractical, while the digitally controlled analog device can have increments as small as 0.088° (12 bits) and maintain monotonicity.

ELECTRICAL SPECIFICATIONS

All performance characteristics, especially insertion loss, can be improved over narrower frequency bands.

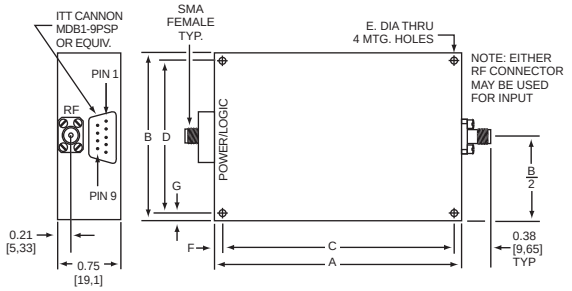
GENERAL SPECIFICATIONS

Frequency Coverage:	0.25-5.1 GHz
RF Impediance:	50 Ohms.
D.C. Requirements:	+5 volts at 70 mA, and –5 volts at 70 mA per bit. For each logic line at logic 0, +70 mA is drawn from the +5 V supply and 10 mA from the –5V supply. For each logic line at logic, 1 –70 mA is drawn from the 5V supply and 10 mA from the +5 V supply
RF Power:	200 mW average, 10 watts peak.
Temperature Information:	Operating temperature from –55°C to +85°C.
Switching Speed:	The switching speed of all models in 500 nanoseconds (750 nanoseconds including storage and delay time). Any model can be switched in 15 nanoseconds (35 nanosec. including storage and delay time) if required. However, the insertion loss will increase by 30%. If 15 nanoseconds is required add-1 to the model no. (e.g. DP-51-1)
Connectors:	SMA (Mating multipin connector is supplied with each unit; ITT Cannon MDB1-9SSL or equiv.)

POWER LOGIC PIN CONNECTIONS

PIN*	FUNCTION
1–6	Logic Inputs
7	GND
8	+5VDC
9	–5VDC

*PIN 1 is least significant bit.



MECHANICAL OUTLINES

Outline	A in [mm]	B in [mm]	C in [mm]	D in [mm]	E in [mm]	F in [mm]	G in [mm]
1	9.50 [241,3]	3.50 [88,9]	9.250 [235,0]	3.300 [83,82]	0.093 [2,36]	0.12 [3,05]	0.10 [2,5]
2	6.50 [165,1]	3.00 [76,2]	6.250 [158,8]	2.800 [71,12]	0.093 [2,36]	0.12 [3,05]	0.10 [2,5]
3	5.50 [139,7]	2.75 [69,85]	5.250 [133,4]	2.550 [64,8]	0.093 [2,36]	0.12 [3,05]	0.10 [2,5]
4	6.25 [158,8]	5.00 [127,0]	5.75 [146,1]	4.50 [114,3]	0.156 [3,96]	0.25 [6,35]	0.25 [6,35]
5	5.00 [127,0]	2.75 [69,85]	4.700 [119,4]	2.450 [62,2]	0.093 [2,36]	0.12 [3,05]	0.10 [2,5]
6	3.50 [88,9]	1.00 [2,54]	3.300 [83,82]	0.800 [20,3]	0.093 [2,36]	0.12 [3,05]	0.10 [2,5]
7	5.50 [139,7]	3.00 [76,2]	5.00 [127,0]	3.00 [76,2]	0.156 [3,96]	0.18 [4,57]	0.18 [4,57]

ELECTRICAL PERFORMANCE

Model No.	Freq. Range GHz	No. of Bits	No. of Steps	Smallest Bit Size Degrees	Phase Accuracy For Any Value of Phase Typ/Max. ± Degrees	VSWR Maximum	Insertion Loss Maximum dB	Amplitude Ripple Maximum ±dB	Outline
DP-21	0.25–0.5	4	16*	22.5	5/20	1.6	2.5	0.50	1
DP-32	0.50–1.0	5	32**	11.25	5/20	1.6	3.0	0.50	1
DP-33	0.75–1.00	4	16**	11.25	3.0/7.0	1.50	1.8	0.25	7
DP-36	0.95–1.22	4	16**	11.25	3/10	1.35	2.5	0.50	2
DP-41	1.0-2.0	3	8*	45	5/20	1.80	4.0	0.75	2
DP-42	1.08–1.10	6	64*	5.625	1/4	1.4	2.3	0.40	4
DP-44	1.2–1.5	4	16*	22.5	3/10	1.75	2.6	0.50	5
DP-51	2.0–4.0	4	16*	22.5	5/20	2.0	5.0	1.00	3
DP-60	5.0–5.1	4	16*	22.5	1/4	1.40	2.0	0.40	6

*Total phase shift, 360° **Total phase shift, 180°

KEY: Inches[Millimeters] .XX ±.03 .XXX ±.010 [.X ±0.8 .XX ±0.25]

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