

# Electronic Line Stretcher

ELS-1300

50Ω 360° Voltage Variable 750 to 1300 MHz



CASE STYLE: K18

Connectors Model  
SMA ELS-1300-S  
BRACKET (OPTION "B")

## Maximum Ratings

Operating Temperature	0°C to 50 °C
Storage Temperature	-40°C to 100°C
RF Input Power	13dBm
Control Voltage	0.5V to 30V

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

## Coaxial Connections

RF IN	1
MONITOR OUT*	2
CONTROL	3

\* Monitor out port should be connected to a 50-ohm load

## Features

- over 360° phase shift of the reflected signal
- normalized and stable magnitude of the reflected signal
- voltage controlled for automated applications
- protected under US Patent 6,479,977

## Applications

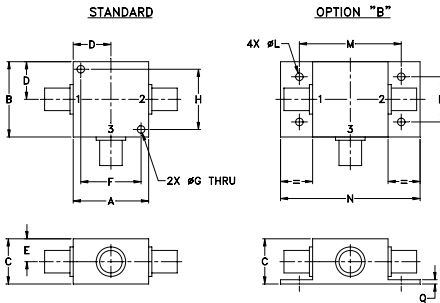
- automated load-pull measurement of oscillators<sup>1</sup>

## Electrical Specifications

FREQUENCY RANGE (MHz)	INPUT POWER (dBm)	PHASE RANGE (Degrees)	RETURN LOSS (dB)	CONTROL VOLTAGE (V)
$f_L$ - $f_U$	Max.	Min.	Typ.	
750-1300	10	360	10-12	1-25

1. See Application Note AN-45-002 on our web site.

## Outline Drawing



## Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
1.25	1.25	.75	.63	.38	1.00	.125	1.000
31.75	31.75	19.05	16.00	9.65	25.40	3.18	25.40

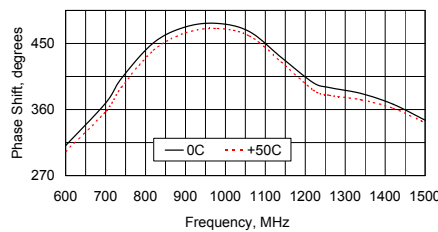
  

J	K	L	M	N	P	Q	wt
--	--	.125	1.688	2.18	.75	.07	grams
--	--	3.18	42.88	55.37	19.05	1.78	70.0

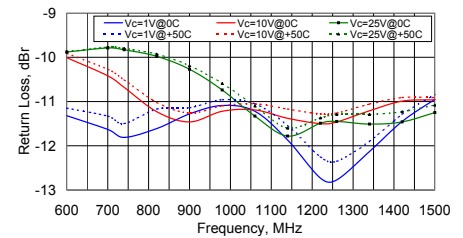
## Typical Performance Data

FREQ. (MHz)	PHASE SHIFT (Deg.)		RETURN LOSS (dBr)					
	0°C	50°C	Vc=0.5V @ 0°C	Vc=10V @ 0°C	Vc=25V @ 0°C	Vc=0.5V @ +50°C	Vc=10V @ +50°C	Vc=25V @ +50°C
600	310.91	302.56	-11.32	-10.01	-9.88	-11.15	-9.91	-9.88
700	368.80	357.25	-11.63	-10.42	-9.79	-11.33	-10.27	-9.77
740	402.57	390.39	-11.81	-10.68	-9.83	-11.50	-10.51	-9.80
820	450.97	440.76	-11.61	-11.23	-9.98	-11.17	-11.02	-9.93
900	472.51	464.41	-11.28	-11.46	-10.27	-11.14	-11.26	-10.19
980	477.28	470.45	-11.09	-11.22	-10.74	-10.96	-11.10	-10.59
1060	466.16	460.26	-11.22	-11.19	-11.33	-11.05	-11.05	-11.10
1140	430.97	424.98	-11.87	-11.38	-11.78	-11.54	-11.17	-11.60
1220	396.57	386.46	-12.73	-11.50	-11.49	-12.25	-11.28	-11.37
1260	390.00	379.35	-12.77	-11.46	-11.45	-12.35	-11.26	-11.29
1340	381.80	373.28	-12.13	-11.21	-11.51	-11.90	-11.06	-11.29
1420	367.17	361.69	-11.45	-10.99	-11.46	-11.29	-10.91	-11.23
1500	345.54	342.13	-10.95	-10.96	-11.25	-10.84	-10.91	-11.08

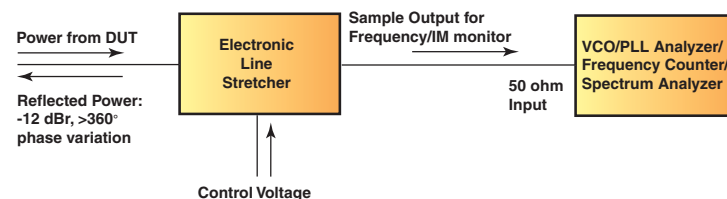
Maximum Phase Shift vs. Frequency at temperature extremes @ Pin = +7 dBm



Return Loss vs. Frequency at temperature extremes @ Pin = +7 dBm



## Application Block Diagram



### Notes

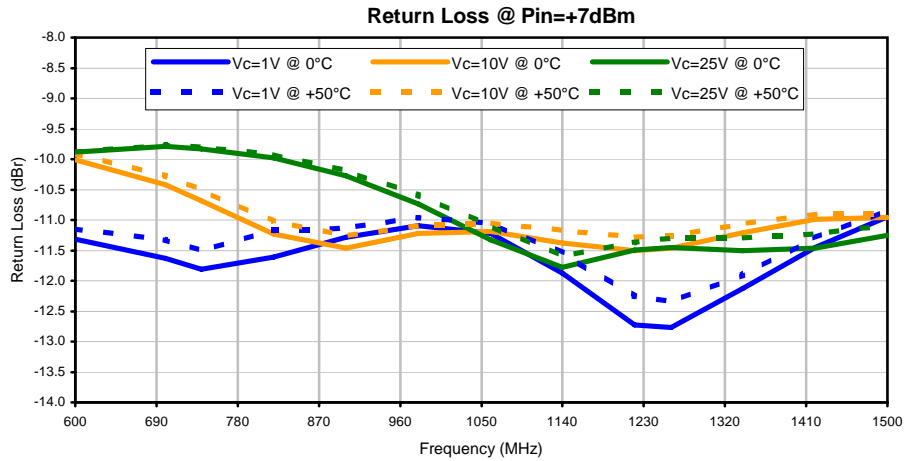
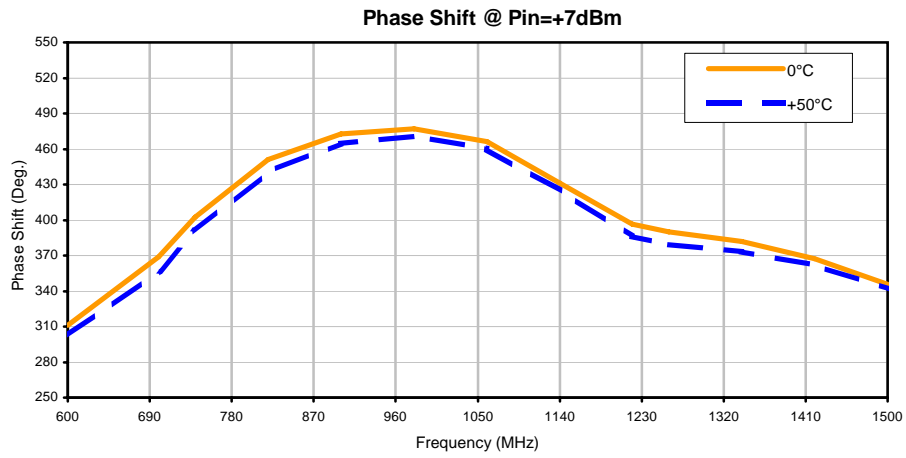
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## Typical Performance Data

FREQUENCY (MHz)	PHASE SHIFT		RETURN LOSS					
	(Deg.)		(dBr)					
	0°C	°50C	Vc=1V @ 0°C	Vc=10V @ 0°C	Vc=25V @ 0°C	Vc=1V @ +50°C	Vc=10V @ +50°C	Vc=25V @ +50°C
600.0	310.91	302.56	-11.32	-10.01	-9.88	-11.15	-9.91	-9.88
700.0	368.80	357.25	-11.63	-10.42	-9.79	-11.33	-10.27	-9.77
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1500.0	345.54	342.13	-10.95	-10.96	-11.25	-10.84	-10.91	-11.08

## Typical Performance Curves

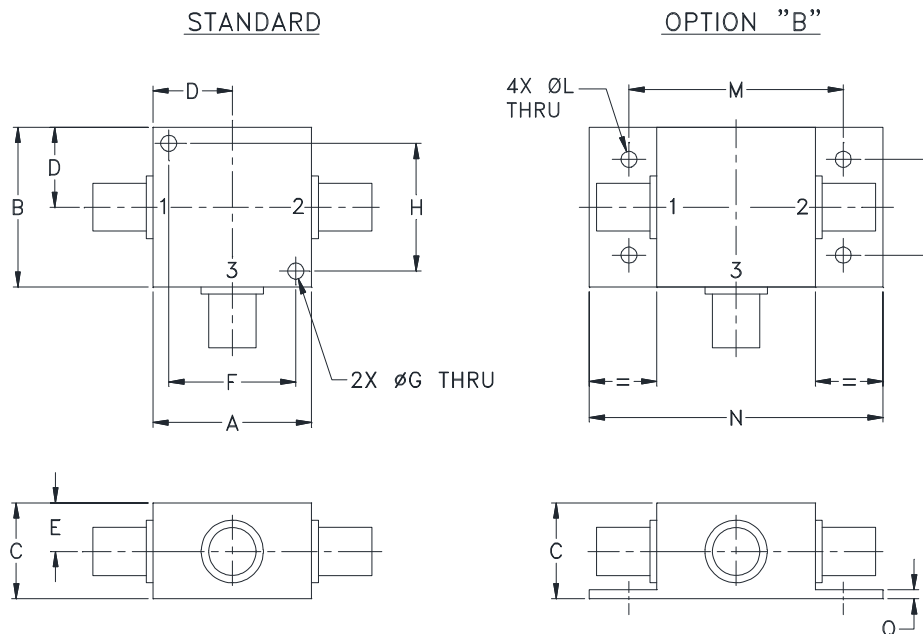


# Case Style

# K

## K18

### Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
K18	1.25 (31.75)	1.25 (31.75)	.75 (19.05)	.63 (16.00)	.38 (9.65)	1.000 (25.40)	.125 (3.18)	1.000 (25.40)	--	--	.125 (3.18)	1.688 (42.88)	2.18 (55.37)

CASE#	P	Q	WT. GRAMS
K18	.75 (19.05)	.07 (1.78)	70.0

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

#### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Mounting bracket available on request. Add suffix B to part number.
- For port marking 1, 2, and 3 see specifications data sheet.
- For bracket version, option B, dimension "C" changes from .75 to .94 inches when connectors are type N.
- Refer to the individual model data sheet for the type of connectors available.

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-0° to 50° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-40° 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