Solid-State
Electronic Controlled Attenuators

Features

- **Low insertion losses**
- **High isolation**
- **Low switching time**
- **Fullband operation**
- **Low cost**

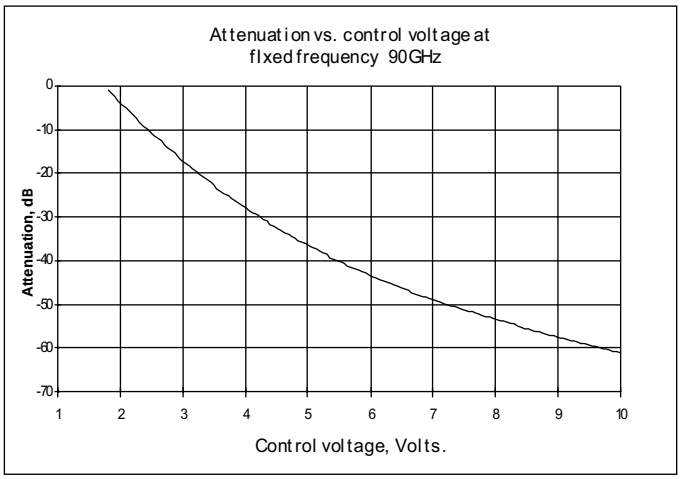
Applications

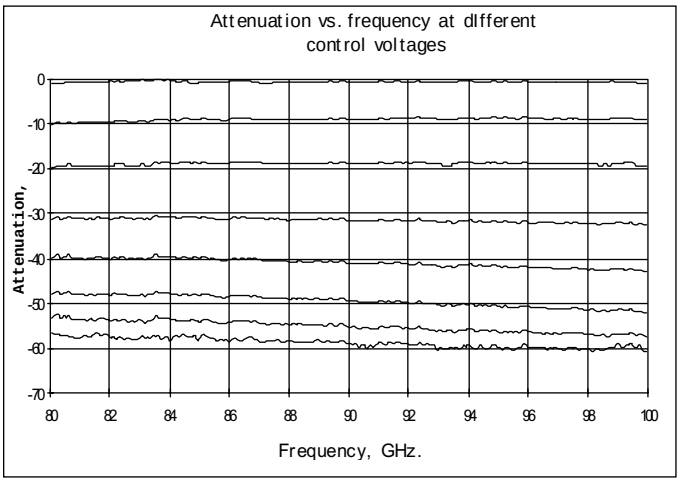
- **Low cost alternative for p-i-n modulators and polarization attenuators**
- **AM of microwave signals.**
- **Power control**
- **Lock-in detection systems**

Description

ELVA-1 series Voltage-Controlled Variable Attenuators VCVA is built on the base of PIN diodes as an active element. Modern technology allows to combine advantages of different types of attenuators and modulators in one device.Fullband operation, accuracy,60dB attenuation range and small insertion losses are comparable with specification for polarization attenuators. On the other hand a small switching time allows to use the device instead Faraday rotation ferrite modulators or ON/OFF type p-i-n modulators. The attenuators are designed as a gold covered waveguide section and have a high reliability.

The basic unit is a current controlled attenuator.We propose also an external driver which provides a voltage-current conversion and a switching time up to the 25 µsec. We supply each device with personal calibration characteristics. Typical characteristics for the VCVA-10 model are shown on two plots below: attenuation versus control voltage with fixed frequency and attenuation versus frequency with different control voltages.





ELVA-1
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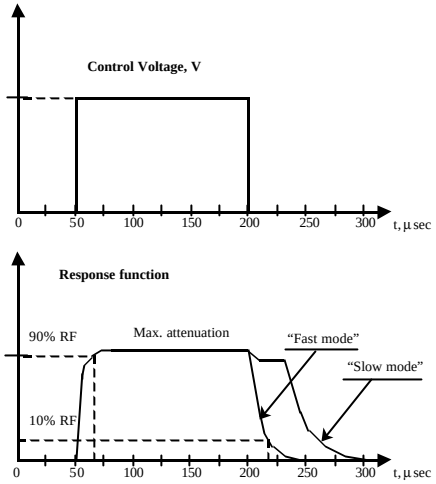
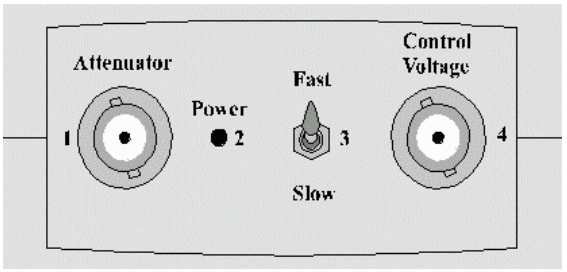
Electrical Specifications

MODEL NUMBER	VCVA-42	VCVA-28	VCVA-22	VCVA-19	VCVA-15	VCVA-12	VCVA-10	VCVA-08	VCVA-06
Frequency Band and Range, GHz	K 18-26.5	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-170
Wideband Version									
Bandwidth, %	20	15	15	15	15	15	15	15	15
Insertion Loss, dB (max)	0.7	0.7	0.8	0.8	0.8	1.0	1.0	1.0	1.0
Isolation, d B (min)	* 50	* 50	* 50	* 50	* 50	* 50	* 50	* 50	* 50
Power Handing (peak), W (max)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Switching Time, µsec * **	100	50	50	50	50	50	25	25	25
DC Bias Input, V/mA	+15/100-15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/150 -15/40**	+15/150 -15/40**	+15/150 -15/40**
Control Voltage, V	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Fullband Version									
Bandwidth, %	100	100	100	100	100	100	100	100	100
Insertion Loss, dB (max)	0.7	1.6	2.0	2.0	2.0	2.0	2.0	3.0	3.0
Isolation, d B (min)	* 50	* 50	* 50	* 50	* 50	* 50	* 50	* 50	45
Power Handing (peak), W (max)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Switching Time, µsec	100	50	50	50	50	50	25	25	25
DC Bias Input, V/mA	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/100 -15/40**	+15/150 -15/40**	+15/150 -15/40**	+15/150 -15/40**
Control Voltage, V	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10	0-10

*The models with 60 dB Isolation are available upon request
**Negative DC Power Source is needed only in fast switching mode (see below)
***Guaranteed for Rise Time 0-90% RF and Fall Time 100-10% RF. Models with twice lower switching time are available upon request for the 50-170 GHz frequency range.
External driver provides two modes of operation: "slow mode" (switch 3 in "down" position) and "fast mode" (switch 3 in "up" position). First one allows to change the attenuation with very high accuracy like a motorised polarization attenuator. Second one allows to use VCVA as "on/off" fast modulator. Typical Response Function of the attenuation for VCVA-08 model is shown on the left plot below. In "fast mode" the driver applies a short negative voltage pulse to accelerate the fall time.





1. Attenuator control current plug.
2. Power Indication LED.
3. Slow-Fast mode switch.
4. External control voltage plug.

MODEL NUMBER	VCVA-42	VCVA-28	VCVA-22	VCVA-19	VCVA-15	VCVA-12	VCVA-10	VCVA-08	VCVA-06
A,mm	35	30	20	20	20	18	18	18	18
B,mm	35	30	20	20	20	18	18	18	18
C,mm	40	30	20	20	15	10	10	8	8
Weight, G	60	50	40	40	30	25	25	20	20
External Driver, mm typical				70x30x70					

Optionally each device may be supplied with a controller, that provides square-wave pulse or sinusoidal modulation with manually adjusted frequency and depth of modulation. Sinusoidal 10 dB modulation is provided with frequencies up to 10 kHz. A card of Digital Analog Converter for PC microcomputer with software for the precision control of attenuator is available optionally. It allows to control the attenuation with 0.05dB step.

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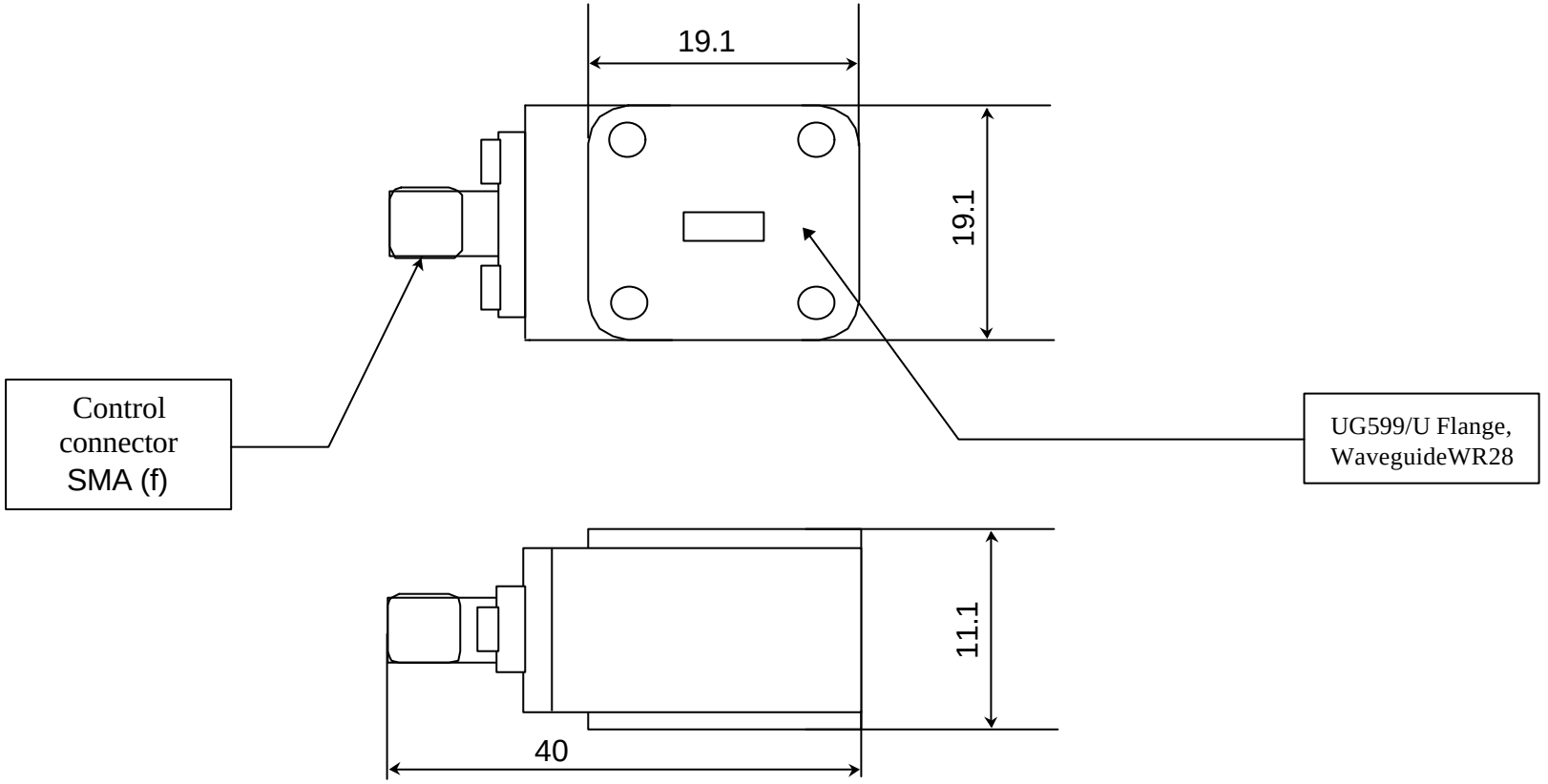

Notes:
All dimensions are in mm

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TITLE		
Ka-band PIN Voltage Controlled Attenuator **Part No. VCVA-28**		
DATE 10.11.99	SHEET 1 OF 1	SPEC. NO. 30BM0135