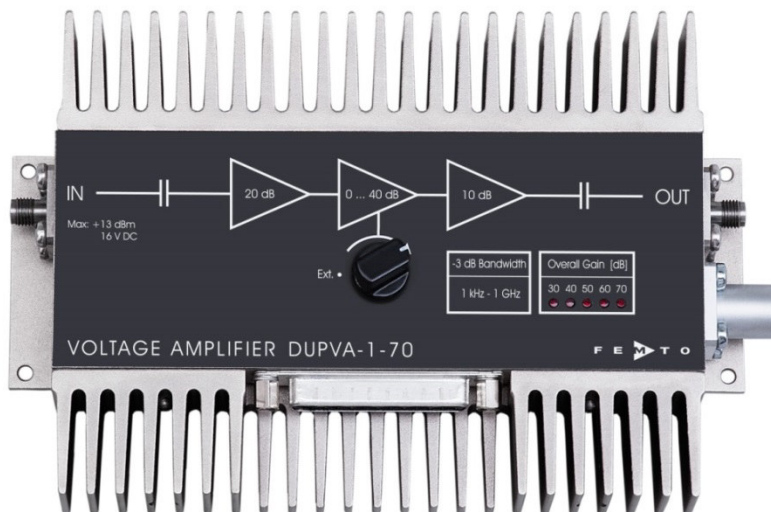


Variable-Gain Ultra-Wideband Voltage Amplifier



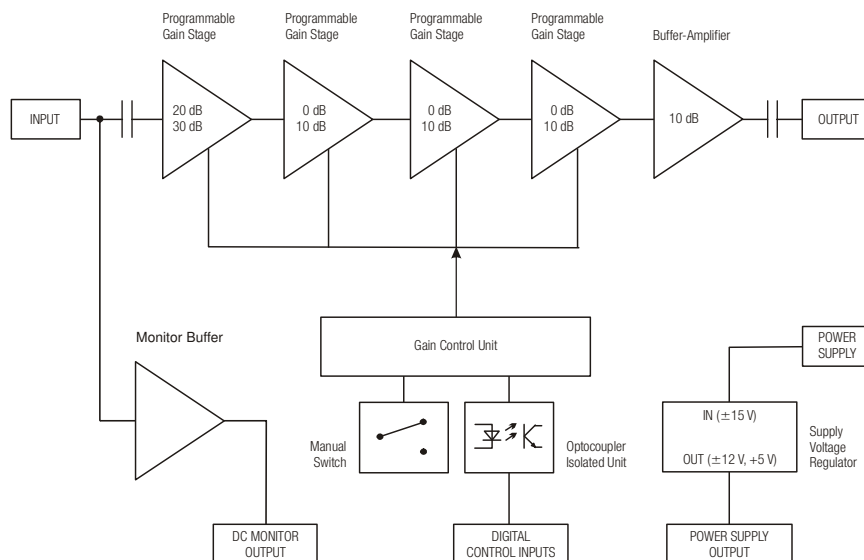
Features

- **Variable gain 30 to 70 dB (approx. $\times 30$ to $\times 3000$), switchable in 10 dB steps**
- **Bandwidth 1 kHz ... 1.1 GHz**
- **Bandwidth, frequency response and pulse response independent of gain setting**
- **Local and remote control**
- **DC monitor output**

Applications

- **Oscilloscope and transient-recorder preamplifier**
- **Photomultiplier and microchannel-plate amplifier**
- **Signal-booster for optical receivers and current amplifiers**
- **Time-resolved pulse and transient measurements**
- **Automated measurement systems**

Block Diagram



BS-DUPVA-1-70_R1

Variable-Gain Ultra-Wideband Voltage Amplifier

Related Models	DUPVA-1-60	Gain values 20, 30, 40, 50, 60 dB Upper cut-off frequency 1.2 GHz
Available Accessories	CA-SMA-BNC SMA to BNC adapter PS-15  power supply input: 100 - 240 VAC output: ± 15 VDC, $\pm 400/-250$ mA LUCI-10  compact digital I/O interface for USB remote control, supports opto-isolation of amplifier signal path from PC USB port, 16 digital outputs, 3 opto-isolated digital inputs, bus-powered operation	
Specifications	Test conditions $V_s = \pm 15$ V, $T_A = 25$ °C, system impedance = 50 Ω Gain Gain values 30, 40, 50, 60, 70 dB Gain accuracy ± 0.1 dB (between settings) ± 1 dB (overall) Gain flatness ± 0.15 dB Frequency Response Lower cut-off frequency 1 kHz Upper cut-off frequency 1.1 GHz Upper cut-off frequency rolloff 40 dB/oct. Time Response Rise/fall time (10 % - 90 %) 390 ps Group delay 2.2 ns Input Input impedance AC 50 Ω Input impedance DC 100 kΩ Input VSWR (@ 30 dB gain) 1.1 : 1 ($f < 1$ GHz) 1.2 : 1 ($f < 2$ GHz) Input VSWR (@ 40 - 70 dB gain) 1.7 : 1 ($f < 1$ GHz) 1.7 : 1 ($f < 2$ GHz) 50 Ω noise figure 1.9 dB (@ 70 dB gain) 2.5 dB (@ 40 - 60 dB gain) Equivalent input voltage noise 330 pV/$\sqrt{\text{Hz}}$ (@ 70 dB gain) 400 pV/$\sqrt{\text{Hz}}$ (@ 40 - 60 dB gain) 1/f-noise corner 20 kHz	

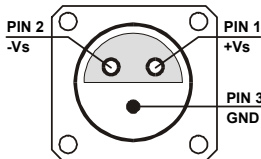
Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued)

Output	Output impedance	50 Ω	
	Output power P_{1dB}	12 dBm	(@ 100 MHz)
		11 dBm	(@ 500 MHz)
	Output peak-to-peak voltage for linear amplification	2 V	(@ 100 MHz)
		1.7 V	(@ 500 MHz)
	Output VSWR	1.5 : 1	(f < 1 GHz)
		1.7 : 1	(f < 2 GHz)
	Third order intercept point IP_3	20 dBm	
Monitor Output	Reverse isolation	80 dB	
	Dynamic range (without average)	62 dB	(P_{1dB} – min. detectable signal)
	Monitor output gain	1	(@ ≥ 100 k Ω load)
	Monitor output impedance	50 Ω	(designed for ≥ 100 k Ω load)
	Monitor output voltage range	± 10 V	
	Monitor output current	± 25 mA	
Digital Control	Monitor output bandwidth	DC ... 100 kHz	
	Control input voltage range	Low: -0.8 ... +0.8 V High: +1.8 ... +12 V	
Power Supply	Supply voltage	± 15 V	
	Supply current	+250 / -100 mA	(without current consumption from Sub-D-connector)
	Stabilized power supply output	± 12 V / max. 50 mA, +5 V / max. 50 mA	(Auxiliary voltage outputs Pin 1-4 Sub-D-connector)
Case	Weight	510 g (1.1 lb)	
	Material	AlMg4.5Mn, nickel-plated	
Temperature Range	Storage temperature	-40 ... +100 $^{\circ}$ C	
	Operating temperature	0 ... +60 $^{\circ}$ C	
Absolute Maximum Ratings	Signal input power	+13 dBm	(f > 500 Hz)
	Signal input DC voltage	± 16 V	(slope max. ± 1 V/ms)
	Signal output reverse power	+13 dBm	
	Signal output reverse DC voltage	+16 V / -12 V	(slope max. ± 1 V/ms)
	Control input voltage	+16 V / -5 V	
	Power supply voltage	± 17 V	

Variable-Gain Ultra-Wideband Voltage Amplifier

Connectors

Input	SMA female
Output	SMA female
Power supply	Lemo® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52) Pin 1: +15V Pin 2: -15V Pin 3: GND
	
Control port	Sub-D 25-pin, female, qual. class 2 Pin 1: +12V (stabilized power supply output) Pin 2: -12V (stabilized power supply output) Pin 3: AGND (analog ground) Pin 4: +5V (stabilized power supply output) Pin 5: Monitor output Pin 6 - 8: NC Pin 9: DGND (ground f. digital control pin 10 - 25) Pin 10 - 13: NC Pin 14: Digital control input: gain, LSB Pin 15: Digital control input: gain Pin 16: Digital control input: gain, MSB Pin 17 - 25: NC

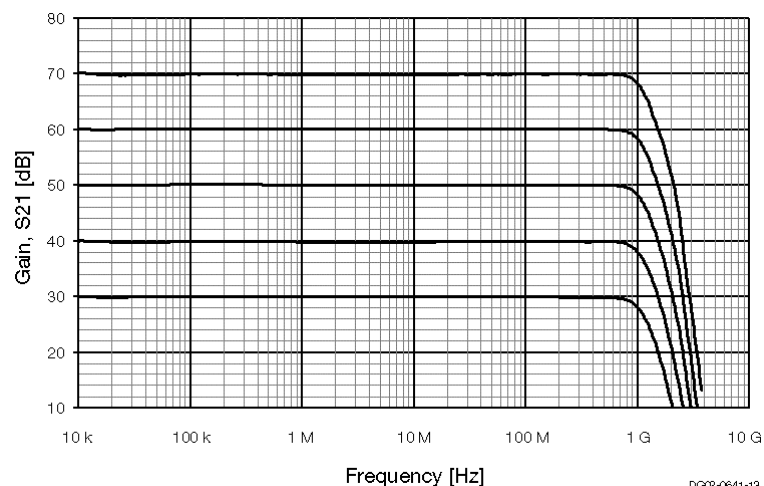
Remote Control Operation

General	Remote control input bits are opto-isolated and connected by logical OR to local switch setting. For remote control of the gain setting, set the local switch to "Ext." and select the wanted gain setting via a 3-bit-code at the corresponding digital inputs:			
Gain setting - corresponding inputs	Gain	Pin 14	Pin 15	Pin 16
	30 dB	Low	Low	Low
	40 dB	High	Low	Low
	50 dB	Low	High	Low
	60 dB	High	High	Low
	70 dB	Low	Low	High

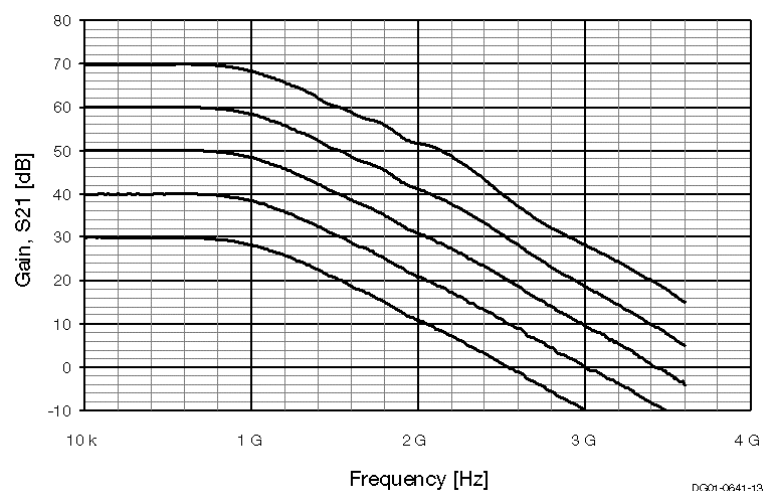
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Frequency response (logarithmic)



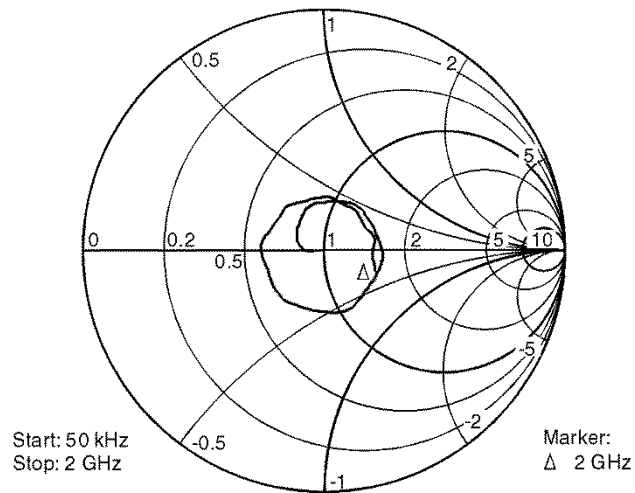
Frequency response (linear)



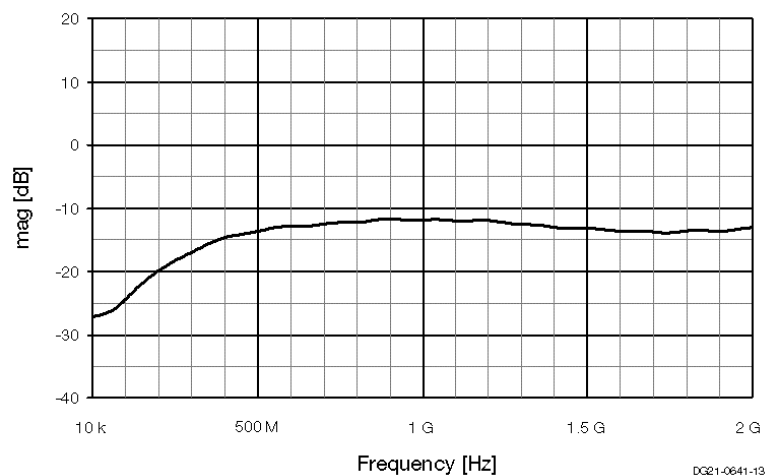
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Input reflection, S11



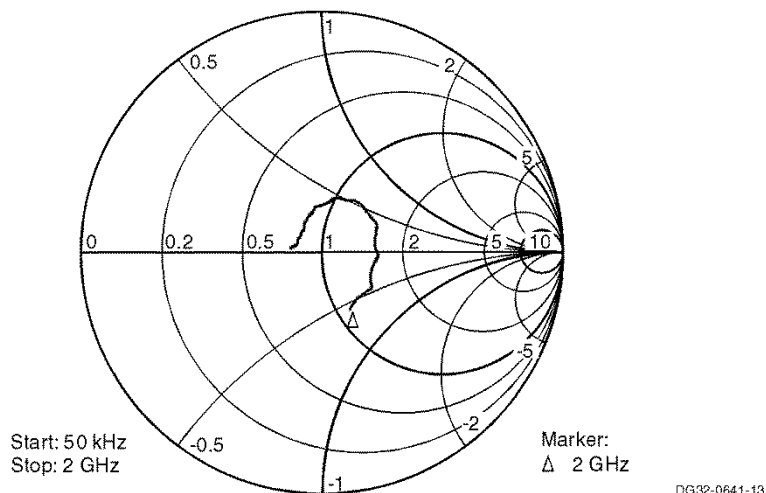
Input return loss, S11 (Linear Magnitude)



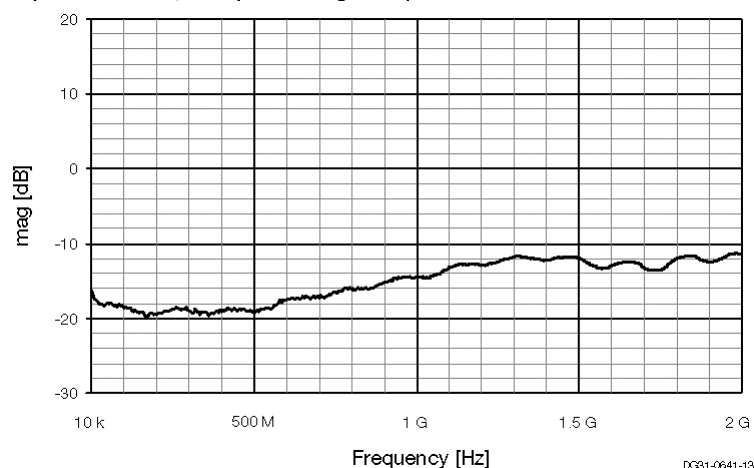
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

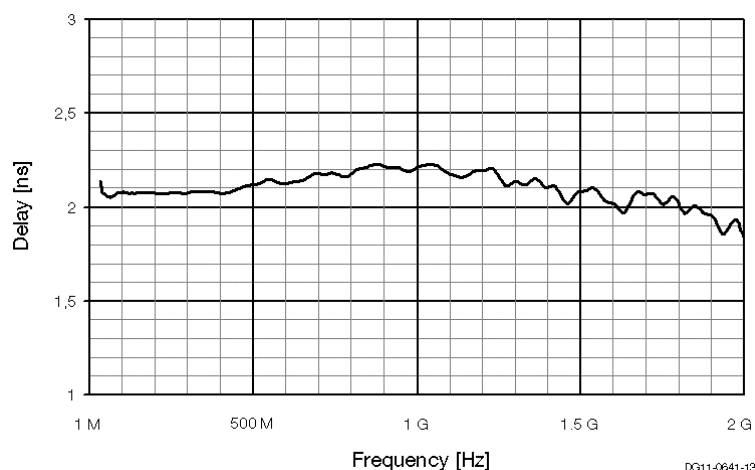
Output reflection, S22



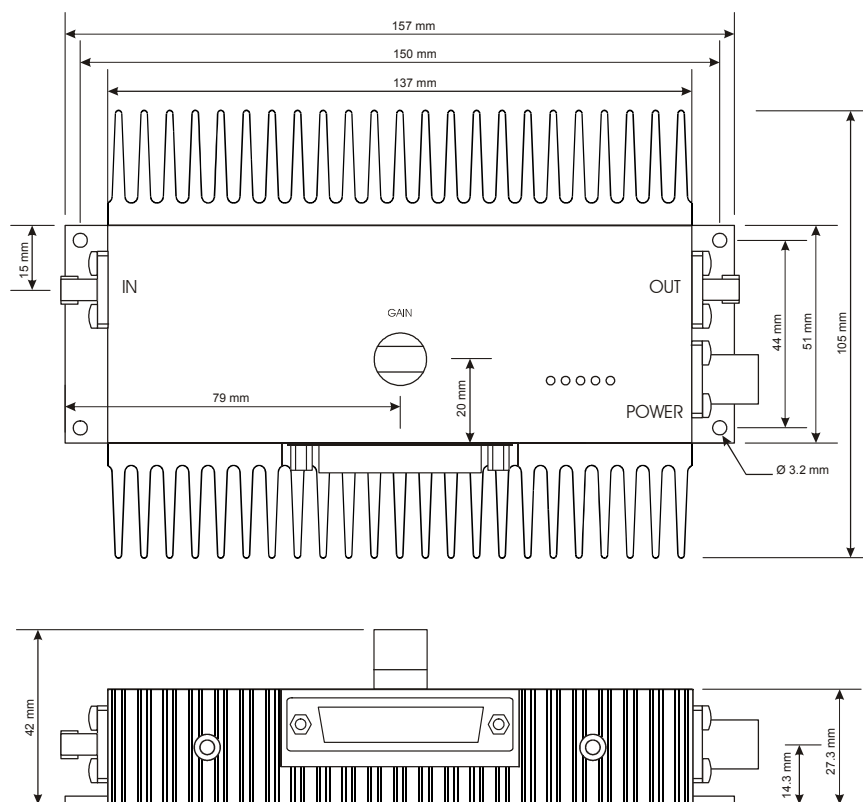
Output return loss, S22 (Linear Magnitude)



Group delay



Dimensions



DZ01-0640-14

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SOPHISTICATED TOOLS FOR SIGNAL RECOVERY