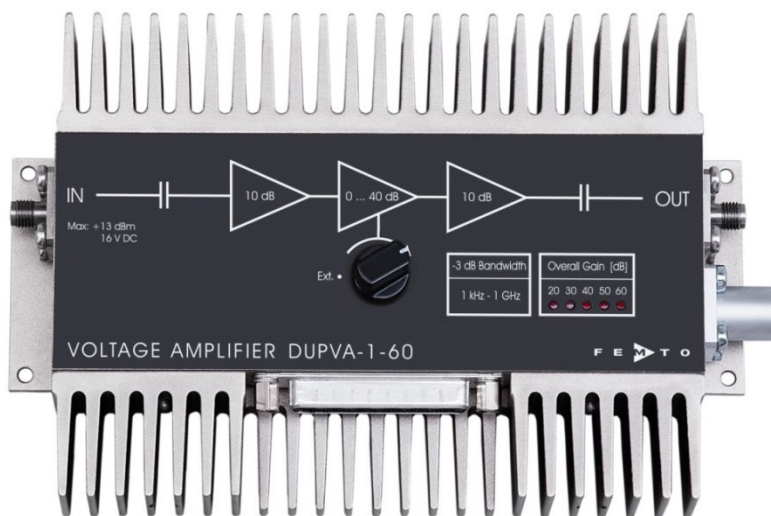


Variable-Gain Ultra-Wideband Voltage Amplifier



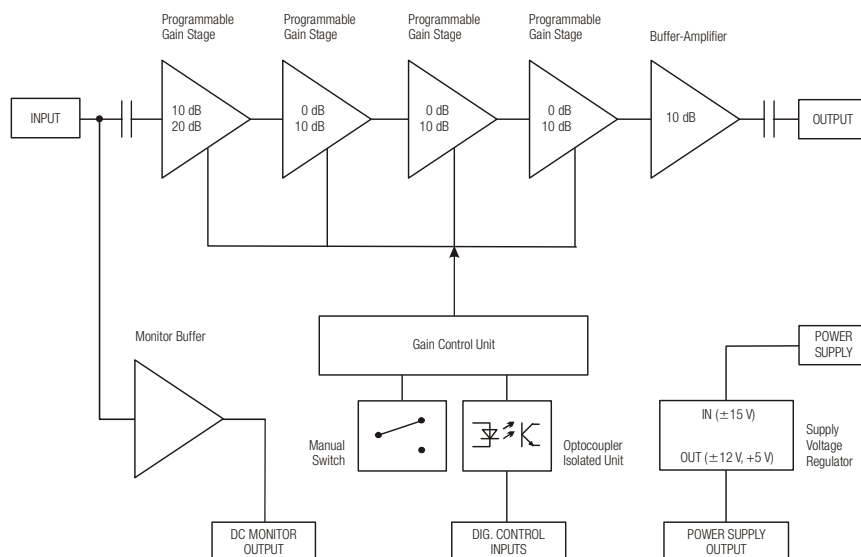
Features

- **Variable gain 20 to 60 dB ($\times 10$ to $\times 1000$), switchable in 10 dB steps**
- **Bandwidth 1 kHz ... 1.2 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-1-60_R1

Variable-Gain Ultra-Wideband Voltage Amplifier

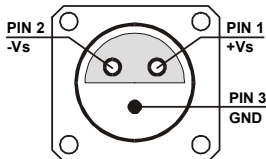
Related Models	DUPVA-1-70	Gain values 30, 40, 50, 60, 70 dB Upper cut-off frequency 1.1 GHz
Available Accessories	CA-SMA-BNC	SMA to BNC adapter
	PS-15	power supply input: 100 - 240 VAC output: ± 15 VDC, +400/-250 mA
	LUCI-10	compact digital I/O interface for USB remote control, supports opto-isolation 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	20, 30, 40, 50, 60 dB
	Gain accuracy	± 0.1 dB (between settings) ± 1 dB (overall)
	Gain flatness	± 0.15 dB
Frequency Response	Lower cut-off frequency	1kHz
	Upper cut-off frequency	1.2 GHz
	Upper cut-off frequency rolloff	40 dB/Oct.
Time Response	Rise/fall time (10 % - 90 %)	380 ps
	Group delay	2.2 ns
Input	Input impedance AC	50 Ω
	Input impedance DC	100 k Ω
	Input VSWR (@ 20 dB gain)	1.12 : 1 (f < 1 GHz)
		1.7 : 1 (f < 2 GHz)
	Input VSWR (@ 30 - 60 dB gain)	1.2 : 1 (f < 1 GHz)
		1.75 : 1 (f < 2 GHz)
	50 Ω noise figure	3.0 dB (@ 60 dB gain)
		3.5 dB (@ 30 - 50 dB gain)
	Equivalent input voltage noise	450 pV/ $\sqrt{\text{Hz}}$ (@ 60 dB gain)
1/f-noise corner	500 pV/ $\sqrt{\text{Hz}}$ (@ 30 - 50 dB gain) 40 kHz	

Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued)	
Output	Output impedance 50 Ω Output power P_{1dB} 13 dBm (@ 100 MHz) 10 dBm (@ 500 MHz) Output peak-peak voltage for linear Amplification 2 V (@ 100 MHz) 1.7 V (@ 500 MHz) Output VSWR 1.77 : 1 (f < 1 GHz) 2.0 : 1 (f < 2 GHz) Third order intercept point IP_3 21 dBm Reverse isolation 80 dB Dynamic range (without average) 70 dB (P_{1dB} – min. detectable signal)
Monitor Output	Monitor output gain 1 (@ ≥ 100 kΩ load) Monitor output impedance 50 Ω (designed for ≥ 100 kΩ load) Monitor output voltage range ± 10 V Monitor output current ± 25 mA Monitor output bandwidth DC ... 100 kHz
Digital Control	Control input voltage range Low: $-0.8 \dots +0.8$ V High: $+1.8 \dots +12$ V
Power Supply	Supply voltage ± 15 V Supply current $+350 / -100$ 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 $-40 \dots +100$ $^{\circ}\text{C}$ Operating temperature $0 \dots +60$ $^{\circ}\text{C}$
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: +15 V Pin 2: -15 V Pin 3: GND 
Control port	Sub-D 25-pin, female, qual. class 2 Pin 1: +12 V (stabilized power supply output) Pin 2: -12 V (stabilized power supply output) Pin 3: AGND (analog ground) Pin 4: +5 V (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

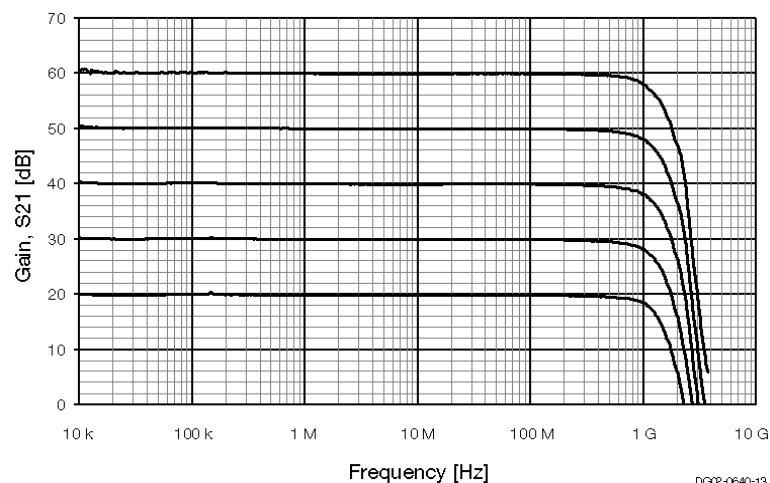
Remote Control Operation

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
	20 dB	Low	Low	Low
	30 dB	High	Low	Low
	40 dB	Low	High	Low
	50 dB	High	High	Low
	60 dB	Low	Low	High

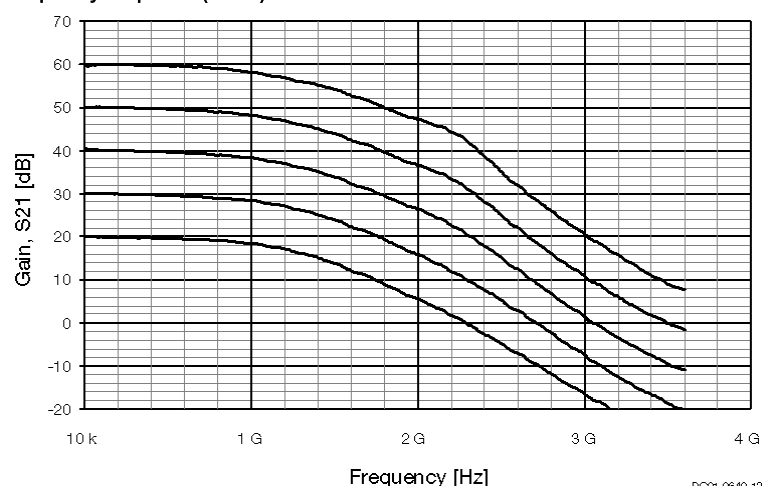
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Frequency response (logarithmic)



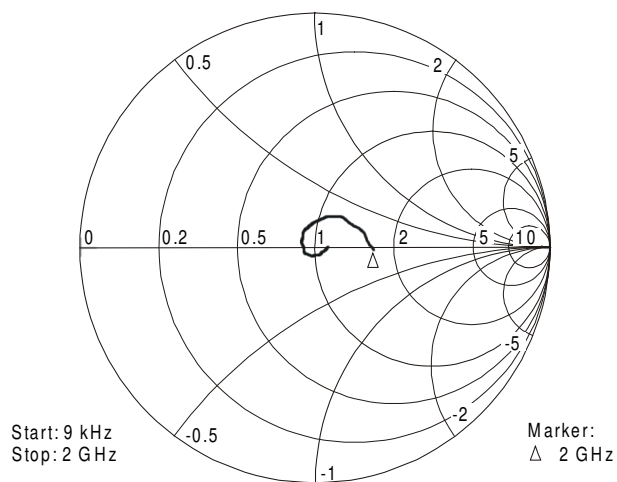
Frequency response (linear)



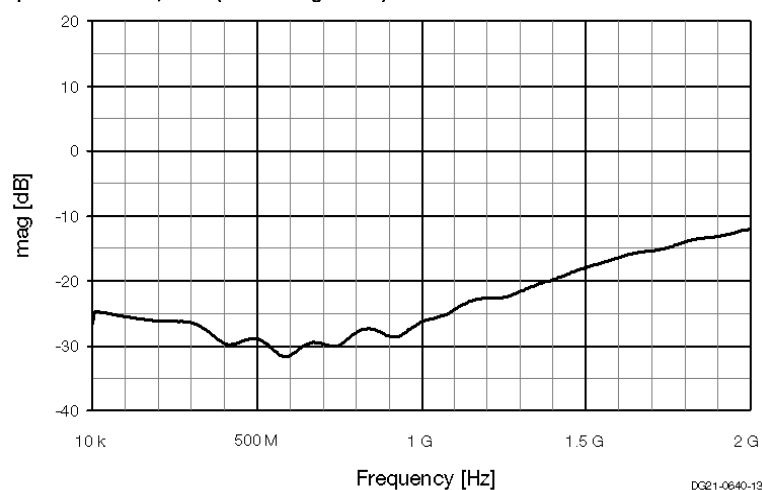
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Input reflection, S11



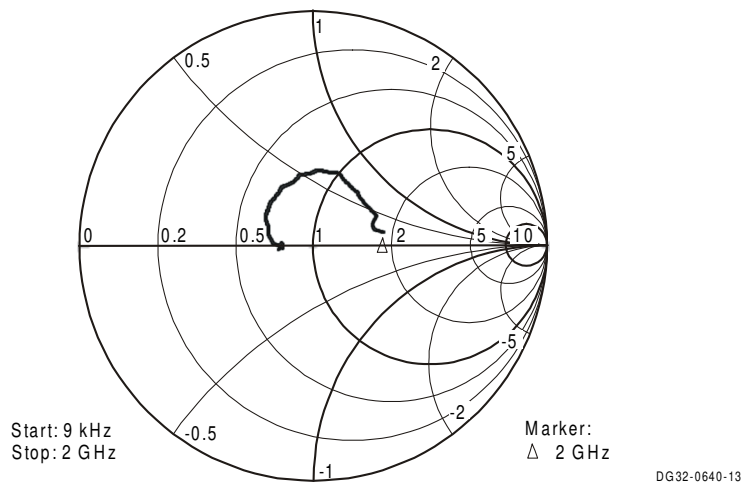
Input return loss, S11 (linear magnitude)



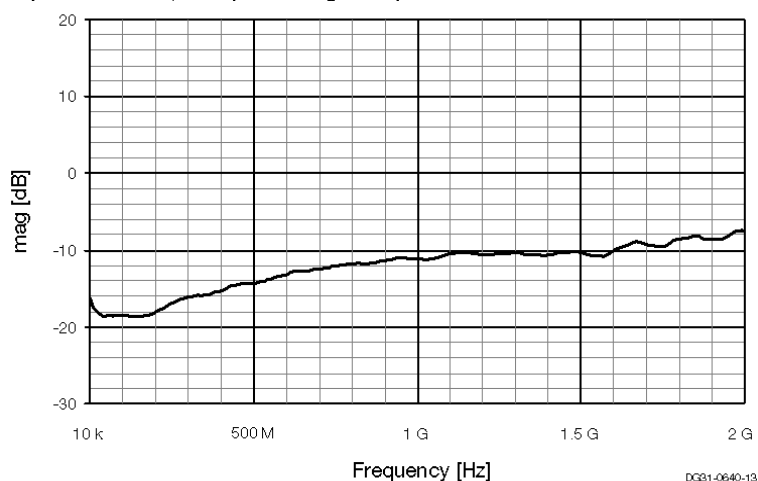
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

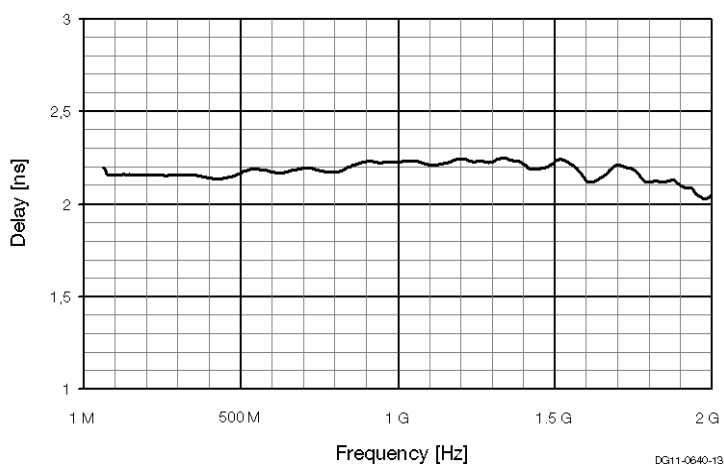
Output reflection, S22



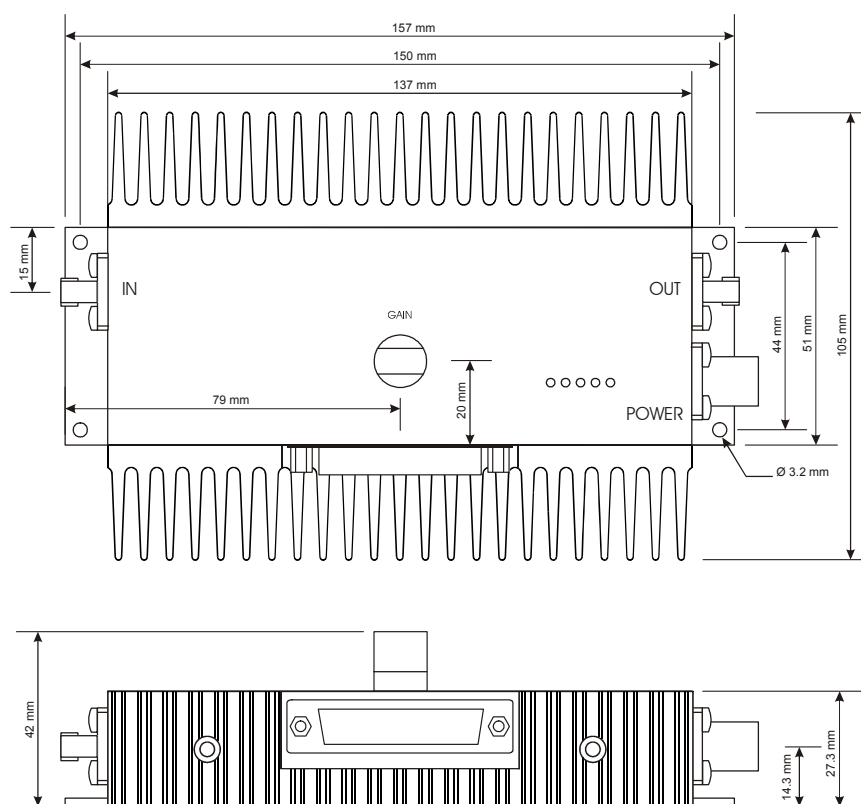
Output return loss, S22 (linear magnitude)



Group delay



Dimensions



DZ01-0640-14

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SOPHISTICATED TOOLS FOR SIGNAL RECOVERY