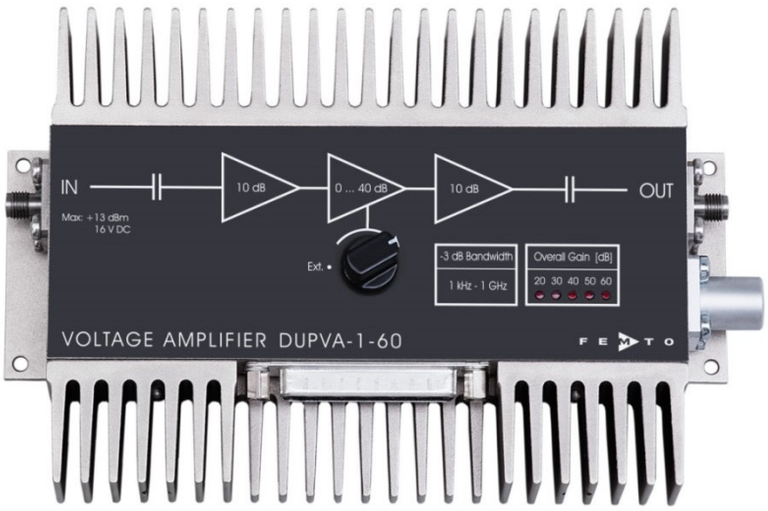
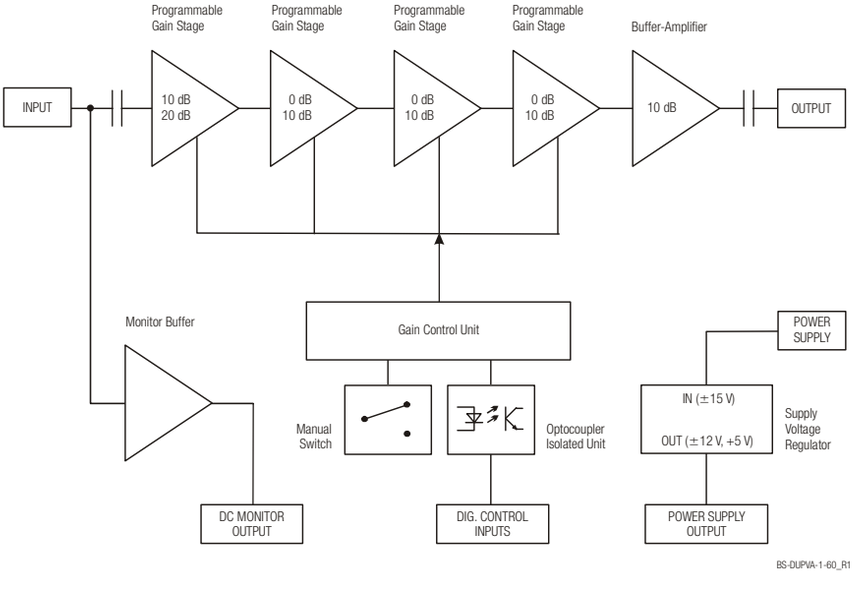
Datasheet DUPVA-1-60

Variable-Gain Ultra-Wideband Voltage Amplifier



Features	• **Variable gain 20 to 60 dB (×10 to ×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	

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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 kΩ	
	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/√Hz	(@ 60 dB gain)
		500 pV/√Hz	(@ 30 - 50 dB gain)
	1/f-noise corner	40 kHz	

Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued)

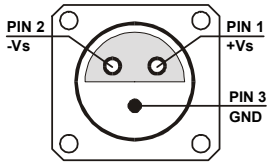
Output	Output impedance	50 Ω	
	Output power P_{1dB}	13 dBm	(@ 100 MHz)
		10 dBm	(@ 500 MHz)
	Output peak-peak voltage for linear Amplification	2 V	(@ 100 MHz)
		1.7 V	(@ 500 MHz)
	Output VSWR	1.77 : 1	(f < 1 GHz)
		2.0 : 1	(f < 2 GHz)
	Third order intercept point IP_3	21 dBm	
	Reverse isolation	80 dB	
	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 ... +0.8 V High: +1.8 ... +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 ... +100 °C	
	Operating temperature	0 ... +60 °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

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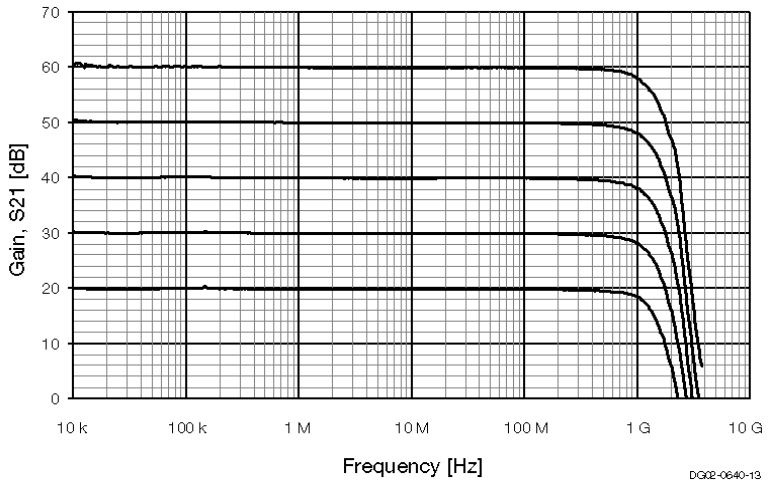
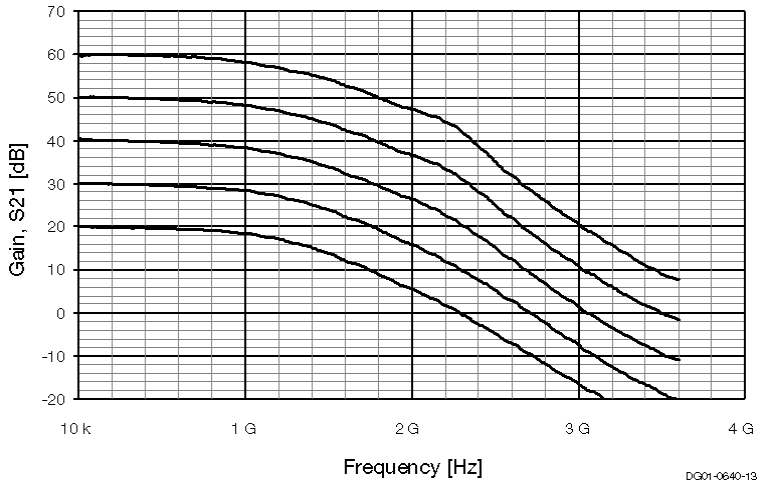
Typical Performance Characteristics

Frequency response (logarithmic)



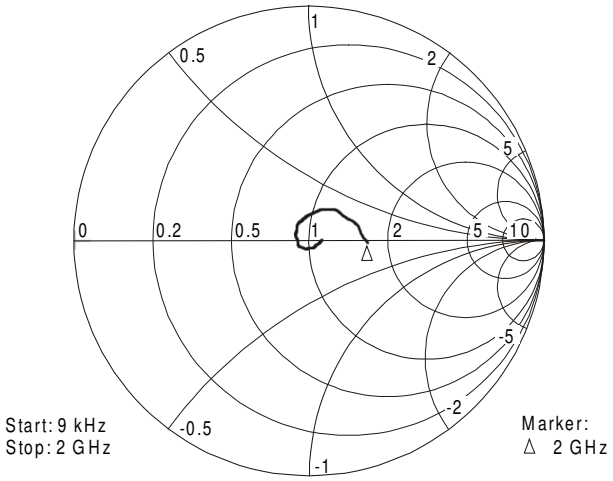
Frequency response (linear)



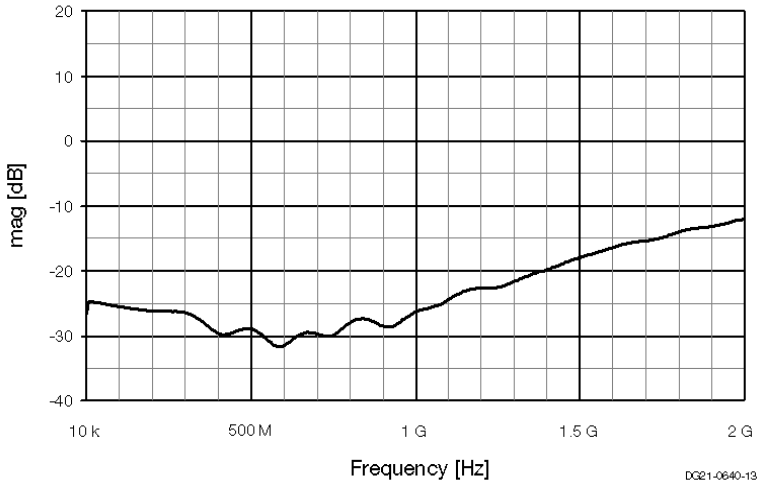
Variable-Gain
Ultra-Wideband Voltage Amplifier

Typical Performance Characteristics

Input reflection, S11



Input return loss, S11 (linear magnitude)



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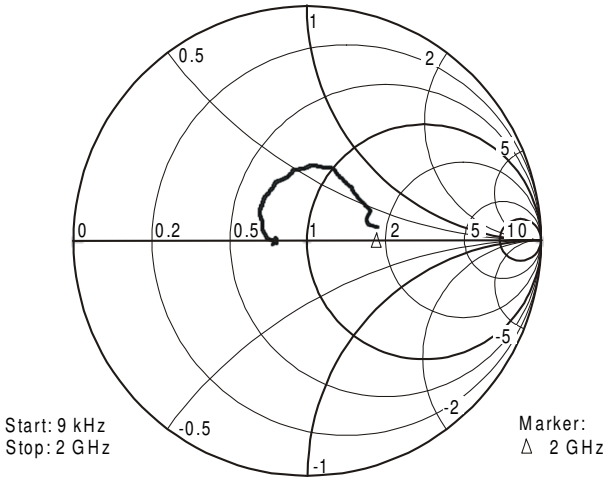
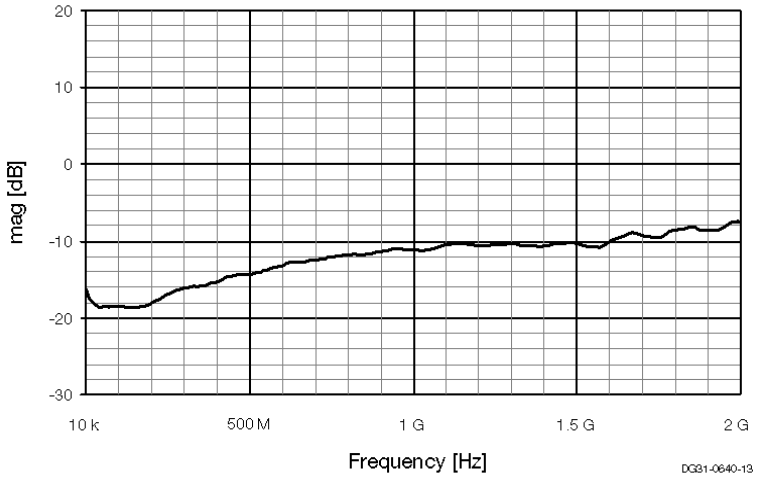
Typical Performance Characteristics

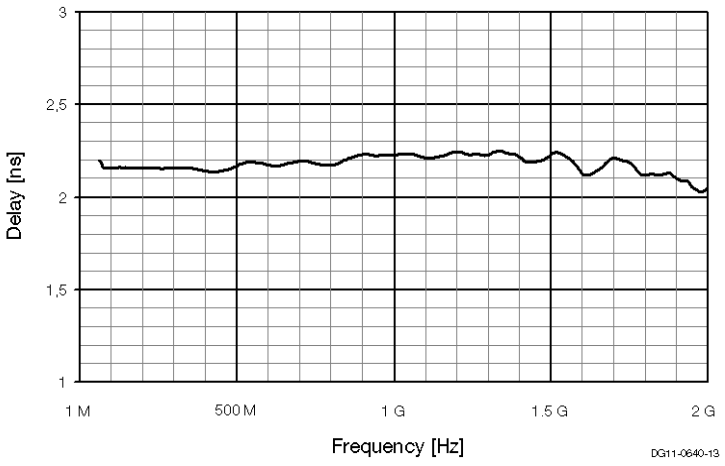
Output reflection, S22



Output return loss, S22 (linear magnitude)



Group delay



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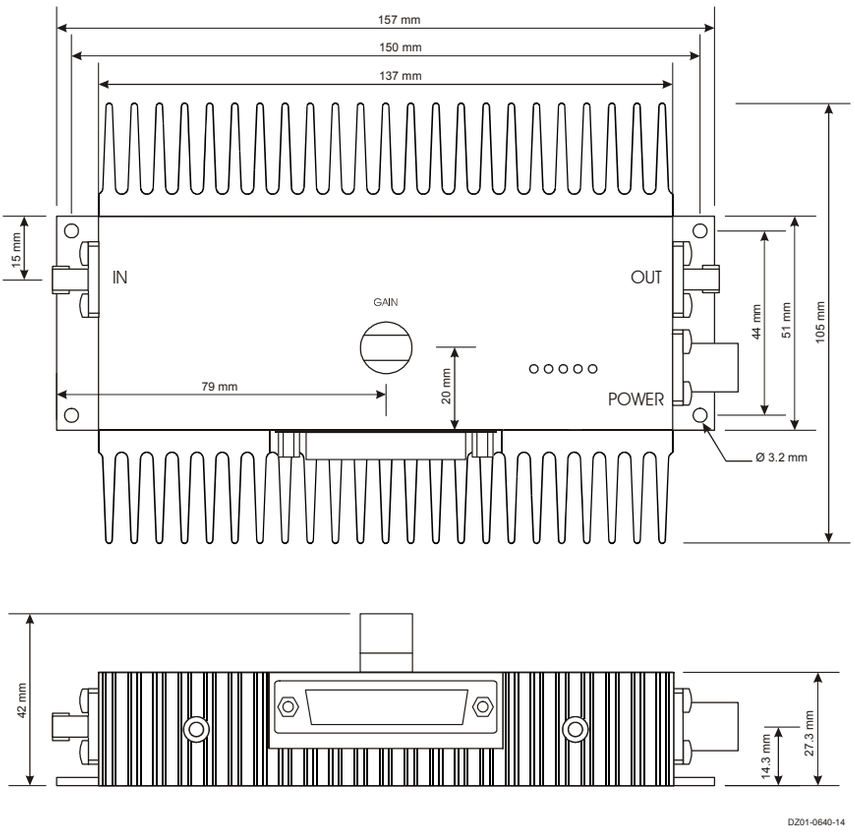
Dimensions



FEMTO Messtechnik GmbH
Klosterstr. 64
10179 Berlin · Germany
Phone: +49 30 280 4711-0
Fax: +49 30 280 4711-11
Email: info@femto.de
www.femto.de