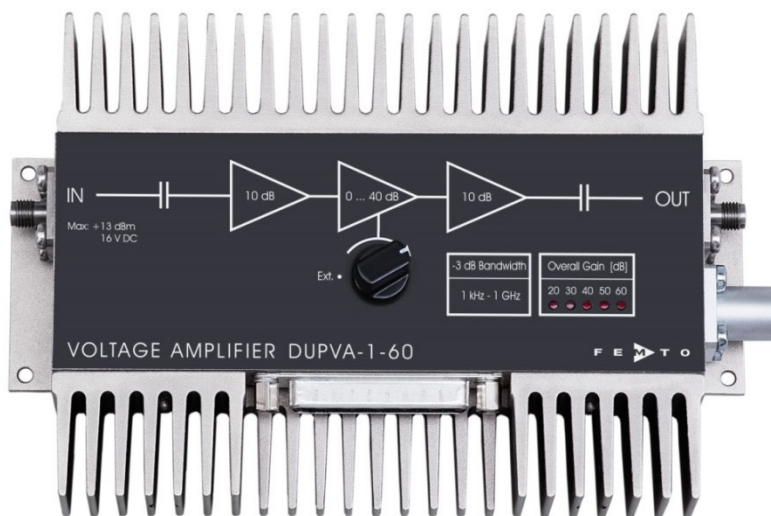


Variable-Gain Ultra-Wideband Voltage Amplifier



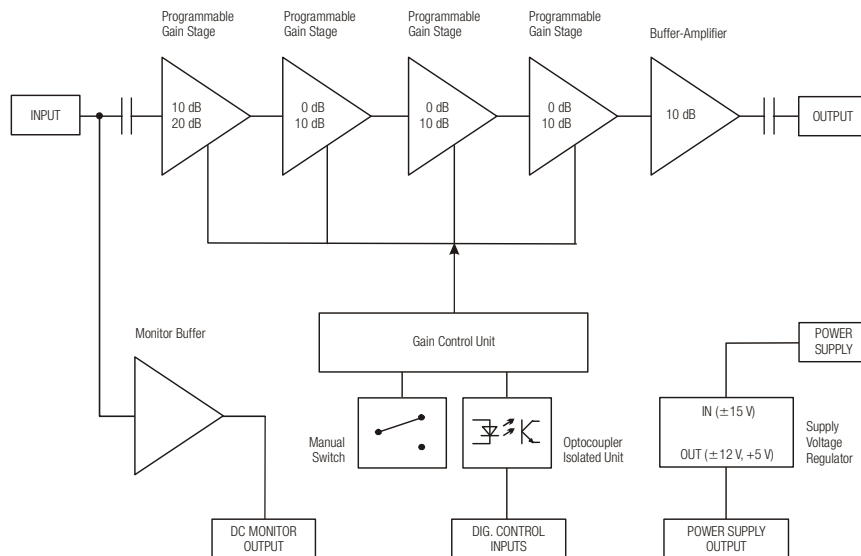
Features

- 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

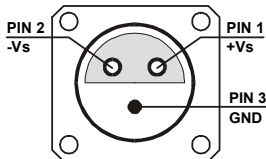
Variable-Gain Ultra-Wideband Voltage Amplifier

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	$V_s = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, system impedance = $50\ \Omega$
Gain	Gain values Gain accuracy Gain flatness	20, 30, 40, 50, 60 dB $\pm 0.1\text{ dB}$ (between settings) $\pm 1\text{ dB}$ (overall) $\pm 0.15\text{ dB}$
Frequency Response	Lower cut-off frequency Upper cut-off frequency Upper cut-off frequency rolloff	1kHz 1.2 GHz 40 dB/Oct.
Time Response	Rise/fall time (10 % - 90 %) Group delay	380 ps 2.2 ns
Input	Input impedance AC Input impedance DC Input VSWR (@ 20 dB gain) Input VSWR (@ 30 - 60 dB gain) 50 Ω noise figure Equivalent input voltage noise 1/f-noise corner	50 Ω 100 k Ω 1.12 : 1 (f < 1 GHz) 1.7 : 1 (f < 2 GHz) 1.2 : 1 (f < 1 GHz) 1.75 : 1 (f < 2 GHz) 3.0 dB (@ 60 dB gain) 3.5 dB (@ 30 - 50 dB gain) 450 pV/ $\sqrt{\text{Hz}}$ (@ 60 dB gain) 500 pV/ $\sqrt{\text{Hz}}$ (@ 30 - 50 dB gain) 40 kHz

Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued)	<table border="0"> <tr> <td>Output</td> <td>Output impedance</td> <td>50 Ω</td> <td></td> </tr> <tr> <td></td> <td>Output power P_{1dB}</td> <td>13 dBm</td> <td>(@ 100 MHz)</td> </tr> <tr> <td></td> <td></td> <td>10 dBm</td> <td>(@ 500 MHz)</td> </tr> <tr> <td></td> <td>Output peak-peak voltage for linear Amplification</td> <td>2 V</td> <td>(@ 100 MHz)</td> </tr> <tr> <td></td> <td></td> <td>1.7 V</td> <td>(@ 500 MHz)</td> </tr> <tr> <td></td> <td>Output VSWR</td> <td>1.77 : 1</td> <td>(f < 1 GHz)</td> </tr> <tr> <td></td> <td></td> <td>2.0 : 1</td> <td>(f < 2 GHz)</td> </tr> <tr> <td></td> <td>Third order intercept point IP₃</td> <td>21 dBm</td> <td></td> </tr> <tr> <td></td> <td>Reverse isolation</td> <td>80 dB</td> <td></td> </tr> <tr> <td></td> <td>Dynamic range (without average)</td> <td>70 dB</td> <td>(P_{1dB} – min. detectable signal)</td> </tr> <tr> <td>Monitor Output</td> <td>Monitor output gain</td> <td>1</td> <td>(@ ≥100 kΩ load)</td> </tr> <tr> <td></td> <td>Monitor output impedance</td> <td>50 Ω</td> <td>(designed for ≥100 kΩ load)</td> </tr> <tr> <td></td> <td>Monitor output voltage range</td> <td>±10 V</td> <td></td> </tr> <tr> <td></td> <td>Monitor output current</td> <td>±25 mA</td> <td></td> </tr> <tr> <td></td> <td>Monitor output bandwidth</td> <td>DC ... 100 kHz</td> <td></td> </tr> <tr> <td>Digital Control</td> <td>Control input voltage range</td> <td>Low: -0.8 ... +0.8 V</td> <td></td> </tr> <tr> <td></td> <td></td> <td>High: +1.8 ... +12 V</td> <td></td> </tr> <tr> <td>Power Supply</td> <td>Supply voltage</td> <td>±15 V</td> <td></td> </tr> <tr> <td></td> <td>Supply current</td> <td>+350 / -100 mA</td> <td>(without current consumption from Sub-D-connector)</td> </tr> <tr> <td></td> <td>Stabilized power supply output</td> <td>±12 V / max. 50 mA, +5 V / max. 50 mA</td> <td>(Auxiliary voltage outputs Pin 1-4 Sub-D-connector)</td> </tr> <tr> <td>Case</td> <td>Weight</td> <td>510 g (1.1 lb)</td> <td></td> </tr> <tr> <td></td> <td>Material</td> <td>AlMg4.5Mn, nickel-plated</td> <td></td> </tr> <tr> <td>Temperature Range</td> <td>Storage temperature</td> <td>-40 ... +100 °C</td> <td></td> </tr> <tr> <td></td> <td>Operating temperature</td> <td>0 ... +60 °C</td> <td></td> </tr> <tr> <td>Absolute Maximum Ratings</td> <td>Signal input power</td> <td>+13 dBm</td> <td>(f > 500 Hz)</td> </tr> <tr> <td></td> <td>Signal input DC voltage</td> <td>±16 V</td> <td>(slope max. ±1 V/ms)</td> </tr> <tr> <td></td> <td>Signal output reverse power</td> <td>+13 dBm</td> <td></td> </tr> <tr> <td></td> <td>Signal output reverse DC voltage</td> <td>+16 V / -12 V</td> <td>(slope max. ±1 V/ms)</td> </tr> <tr> <td></td> <td>Control input voltage</td> <td>+16 V / -5 V</td> <td></td> </tr> <tr> <td></td> <td>Power supply voltage</td> <td>±17 V</td> <td></td> </tr> </table>	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	
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																																																																																																																							

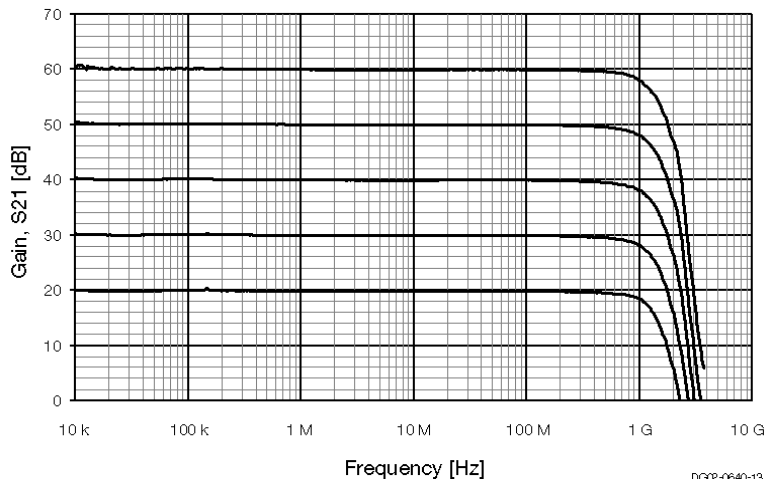
Variable-Gain Ultra-Wideband Voltage Amplifier

Connectors	<p>Input: SMA female</p> <p>Output: SMA female</p> <p>Power supply: Lemo® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)</p> <p>Pin 1: +15 V Pin 2: -15 V Pin 3: GND</p> <div style="text-align: center;">  </div> <p>Control port: Sub-D 25-pin, female, qual. class 2</p> <p>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</p>																								
Remote Control Operation	<p>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:</p> <table style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">Gain</th> <th style="border-bottom: 1px solid black;">Pin 14</th> <th style="border-bottom: 1px solid black;">Pin 15</th> <th style="border-bottom: 1px solid black;">Pin 16</th> </tr> </thead> <tbody> <tr> <td>20 dB</td> <td>Low</td> <td>Low</td> <td>Low</td> </tr> <tr> <td>30 dB</td> <td>High</td> <td>Low</td> <td>Low</td> </tr> <tr> <td>40 dB</td> <td>Low</td> <td>High</td> <td>Low</td> </tr> <tr> <td>50 dB</td> <td>High</td> <td>High</td> <td>Low</td> </tr> <tr> <td>60 dB</td> <td>Low</td> <td>Low</td> <td>High</td> </tr> </tbody> </table> <p>Gain setting - corresponding inputs</p>	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
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

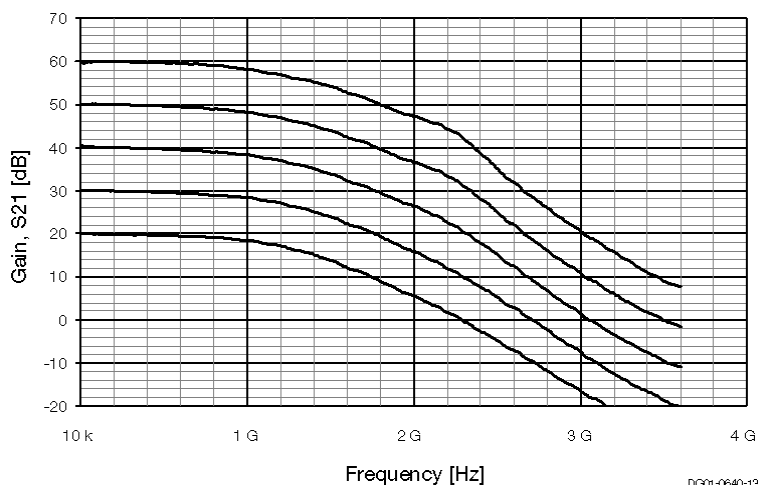
Typical Performance
Characteristics

Frequency response (logarithmic)



DG02-0640-13

Frequency response (linear)

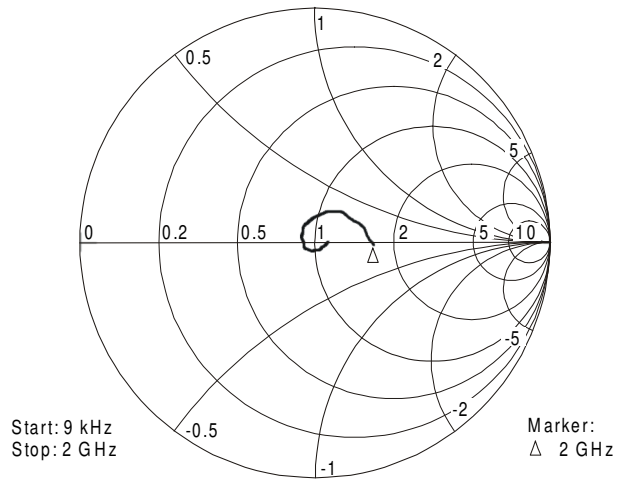


DG01-0640-13

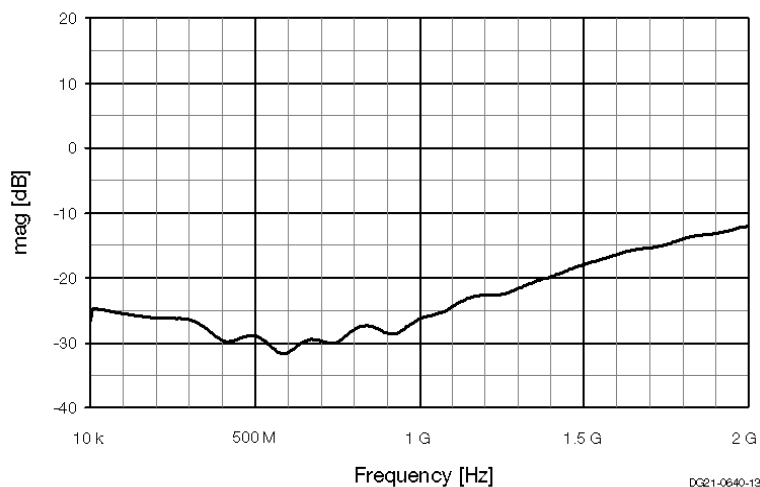
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Input reflection, S11



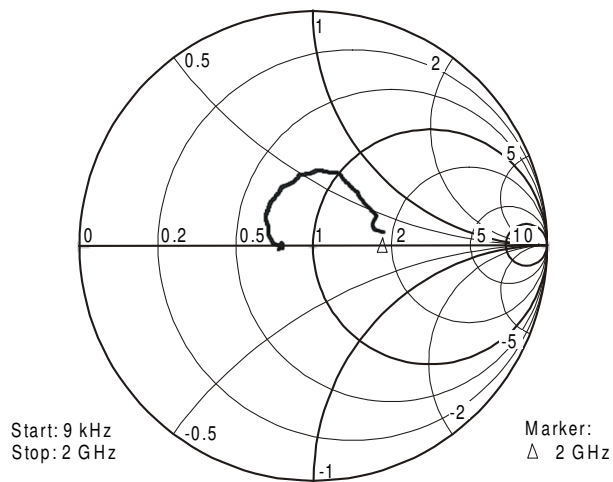
Input return loss, S11 (linear magnitude)



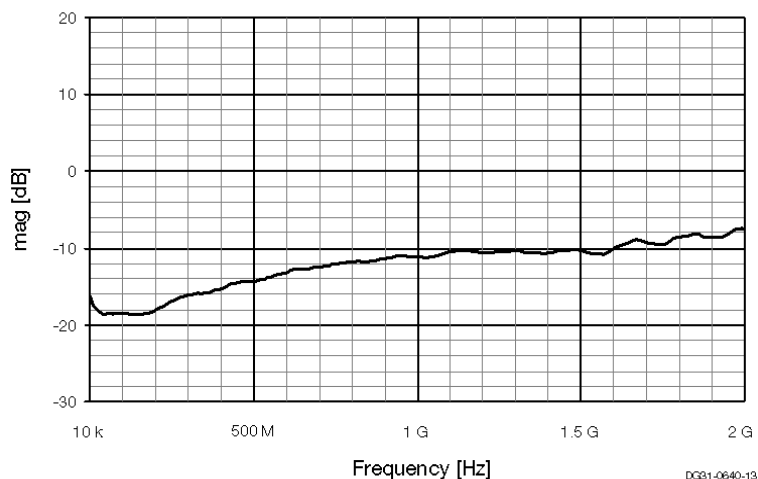
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

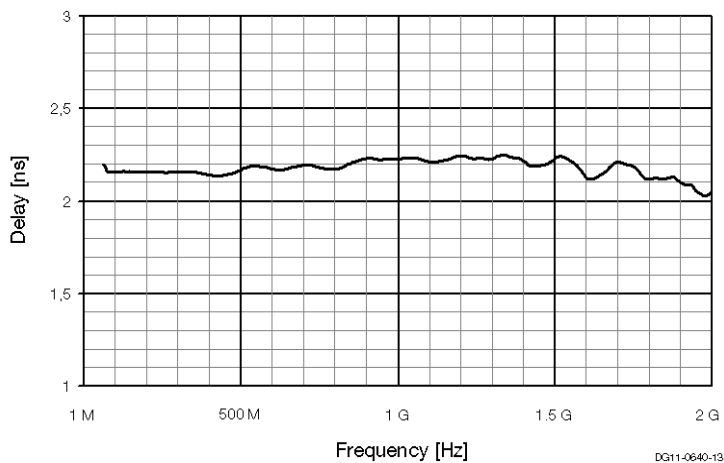
Output reflection, S22



Output return loss, S22 (linear magnitude)

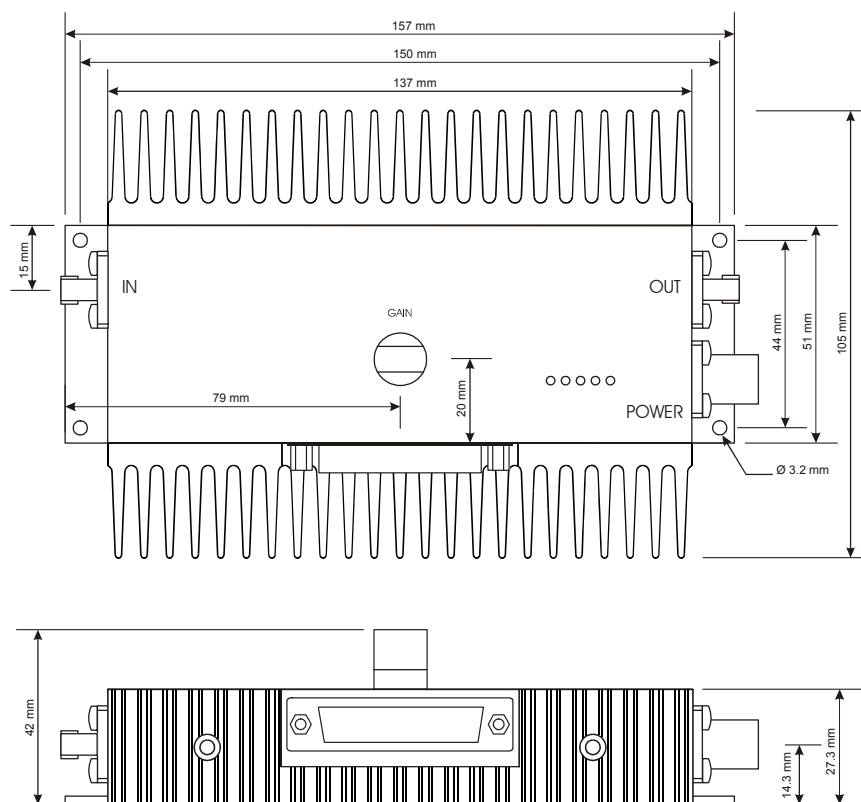


Group delay



Variable-Gain Ultra-Wideband Voltage Amplifier

Dimensions



DZ01-0640-14

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

Specifications are subject to change without notice. Information provided herein is believed to be accurate and reliable. However, no responsibility is assumed by FEMTO Messtechnik GmbH for its use, nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of FEMTO Messtechnik GmbH. Product names mentioned may also be trademarks used here for identification purposes only.

© by FEMTO Messtechnik GmbH · Printed in Germany