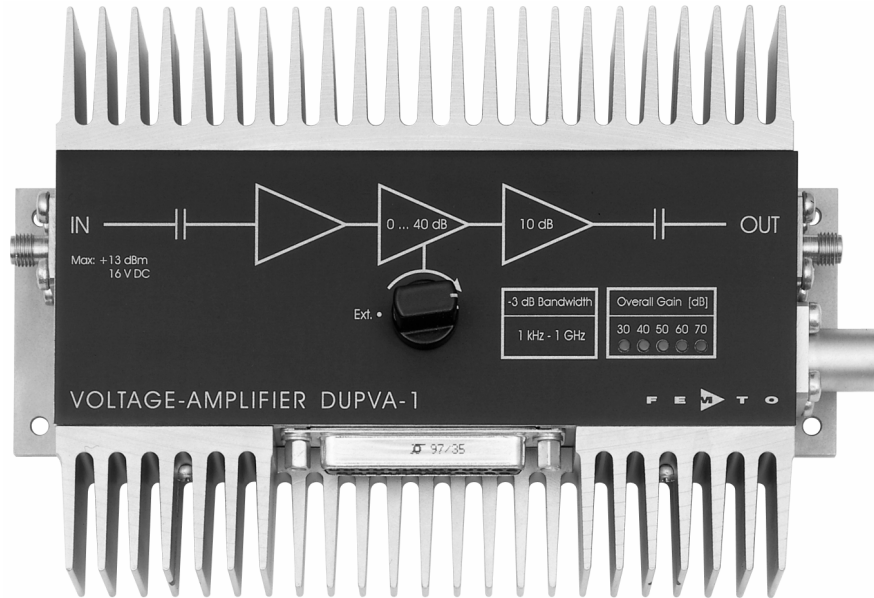


# Variable-Gain Ultra-Wideband Voltage Amplifier



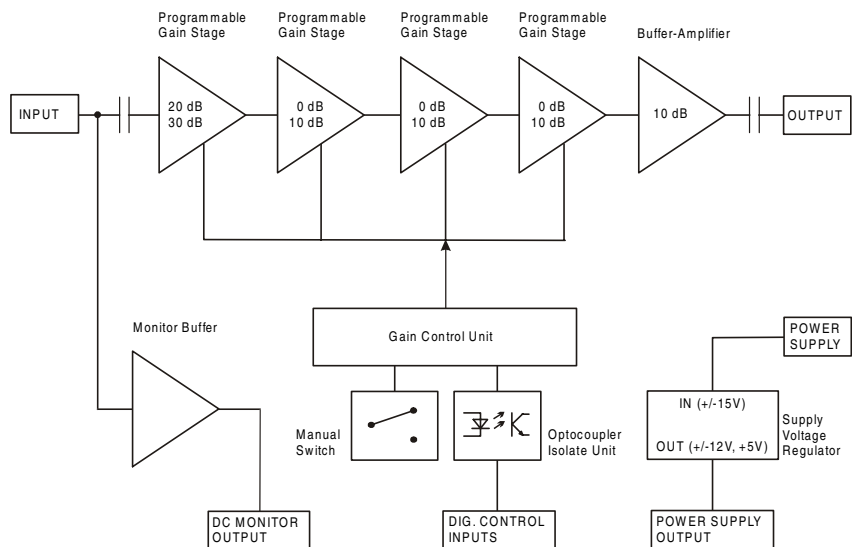
Features

- Variable Gain 30 to 70 dB, switchable in 10 dB Steps
- Bandwidth 1 kHz ... 1.1 GHz
- Bandwidth, Frequency- 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

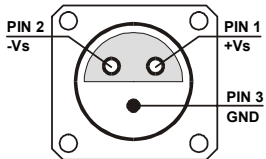


BS01-0641-13

## Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications	<i>Test Conditions</i>	<i>V<sub>s</sub> = ± 15 V, T<sub>a</sub> = 25°C, System Impedance = 50 Ω</i>	
Gain	Gain Values	30, 40, 50, 60, 70 dB	
	Gain Accuracy	± 0.1 dB	(between Settings)
		± 1 dB	(Overall)
Frequency Response	Gain Flatness	± 0.15 dB	
	Lower Cut-Off Frequency	1 kHz	
	Upper Cut-Off Frequency	1.1 GHz	
Time Response	Upper Cut-Off Frequency Rolloff	40 dB/Oct.	
	Rise / Fall Time (10% - 90%)	390 ps	
Input	Group Delay	2.2 ns	
	Input Impedance AC	50 Ω	
Output	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/√Hz	(@ 70 dB Gain)
		400 pV/√Hz	(@ 40 – 60 dB Gain)
	1/f-Noise Corner	20 kHz	
Monitor Output	Output Impedance	50 Ω	
	Output Power P <sub>1dB</sub>	12 dBm	(@ 100 MHz)
		11 dBm	(@ 500 MHz)
	Output Peak-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 <sub>3</sub>	20 dBm	
	Reverse Isolation	80 dB	
	Dynamic Range (w/o Average)	62 dB	(P <sub>1dB</sub> – Min. Detectable Signal)
Digital Control	Monitor Output Gain	1	
	Monitor Output Voltage Range	± 10 V	
	Monitor Output Current	± 25 mA	
	Monitor Output Bandwidth	DC ... 100 kHz	
Power Supply	Control Input Voltage Range	Low: - 0.8 ... + 0.8 V High: + 1.8 ... + 12 V	
	Supply Voltage	± 15 V	
	Supply Current	+ 250 / -100 mA	
Case	Stabilized Power Supply Output	± 12 V / max. 100 mA, + 5V / max. 50 mA	
	Weight	510 gr. (1.2 lbs)	
	Material	AlMg4.5Mn, nickel-plated	

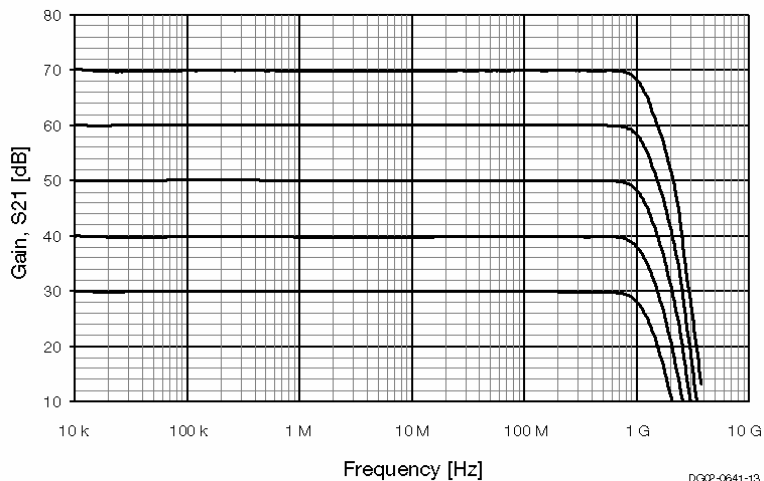
## Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued)																											
Temperature Range	Storage Temperature	-40 ... +100 °C																									
	Operating Temperature	0 ... +60 °C																									
Absolute Maximum Ratings	Signal Input Power	+ 13 dBm (f > 1 kHz)																									
	Signal Input DC Voltage	± 16 V																									
	Signal Output Reverse Power	+ 20 dBm																									
	Signal Output Reverse DC Voltage	+ 20 V / - 12 V																									
	Control Input Voltage	+ 16 V / - 5 V																									
	Power Supply Voltage	± 17 V																									
Connectors	Input	SMA																									
	Output	SMA																									
	Power Supply	LEMO Series 1S, 3-pin fixed Socket 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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Gain</th> <th>Pin 14</th> <th>Pin 15</th> <th>Pin 16</th> </tr> </thead> <tbody> <tr> <td>30 dB</td> <td>Low</td> <td>Low</td> <td>Low</td> </tr> <tr> <td>40 dB</td> <td>High</td> <td>Low</td> <td>Low</td> </tr> <tr> <td>50 dB</td> <td>Low</td> <td>High</td> <td>Low</td> </tr> <tr> <td>60 dB</td> <td>High</td> <td>High</td> <td>Low</td> </tr> <tr> <td>70 dB</td> <td>Low</td> <td>Low</td> <td>High</td> </tr> </tbody> </table>		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
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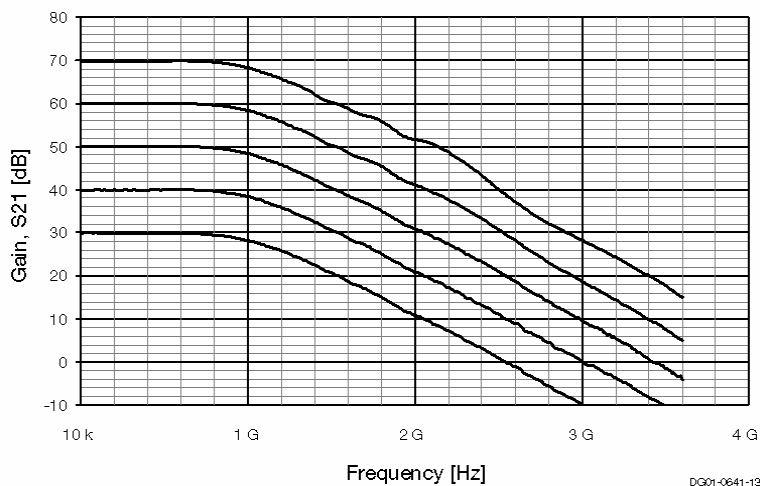
# Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance  
Characteristics

Frequency Response (Logarithmic)



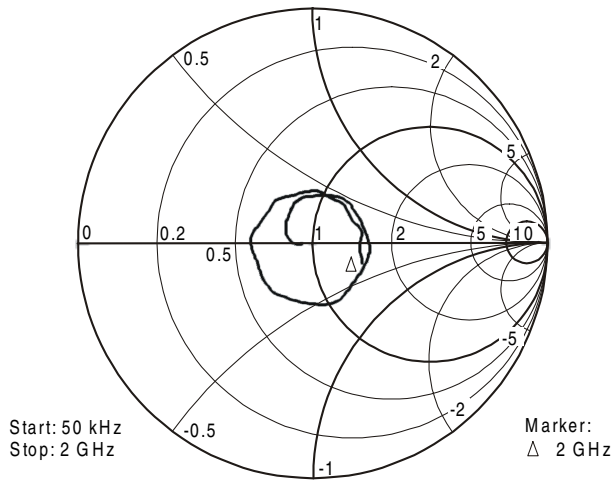
Frequency Response (Linear)



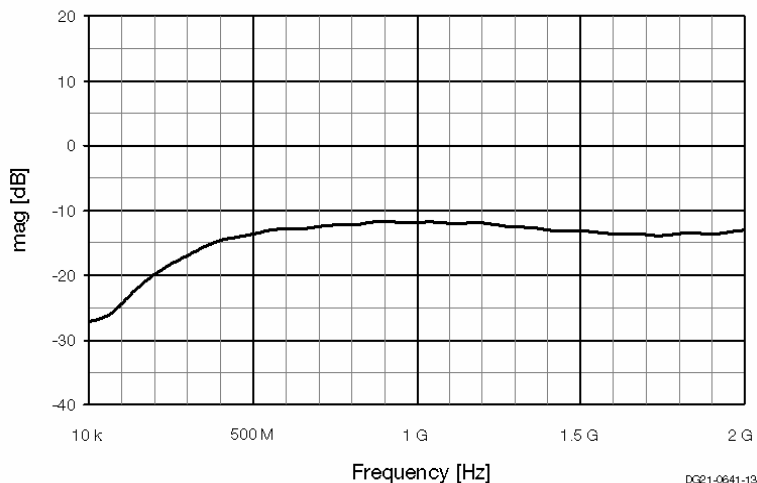
# Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance  
Characteristics

Input Reflection, S11



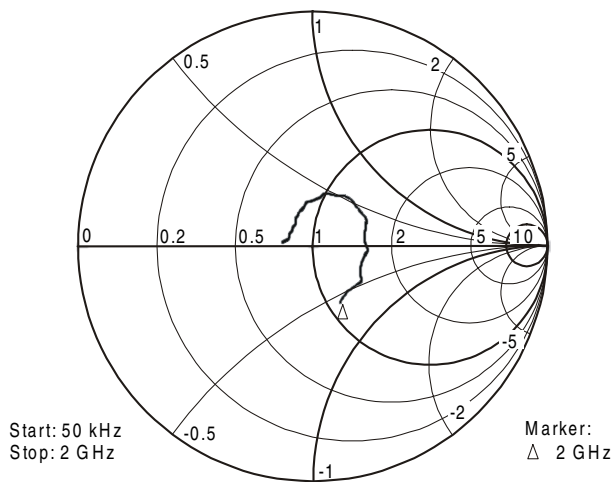
Input Return Loss, S11 (Linear Magnitude)



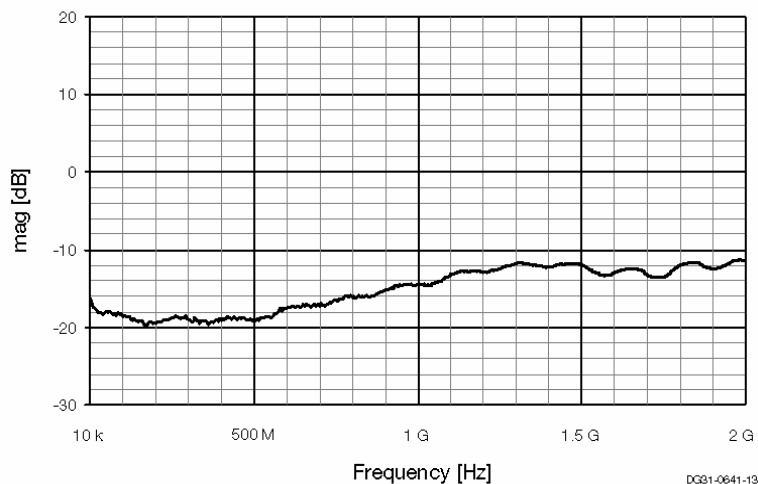
# Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance  
Characteristics

Output Reflection, S22



Output Return Loss, S22 (Linear Magnitude)



Group Delay

