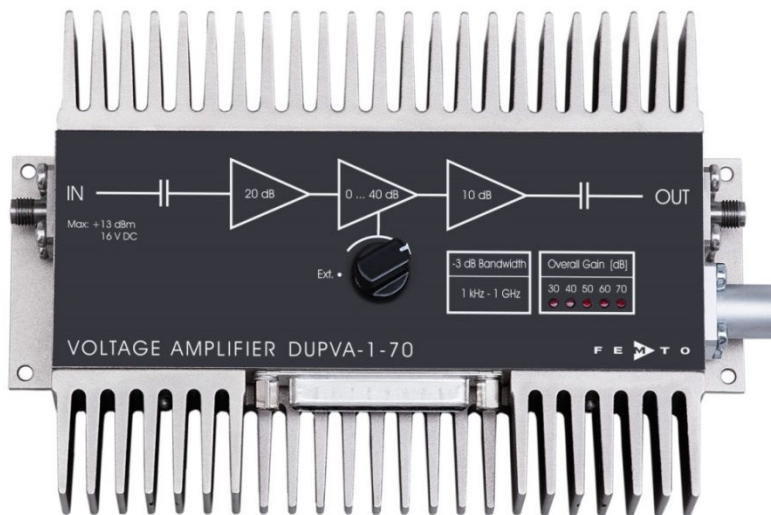


Variable-Gain Ultra-Wideband Voltage Amplifier



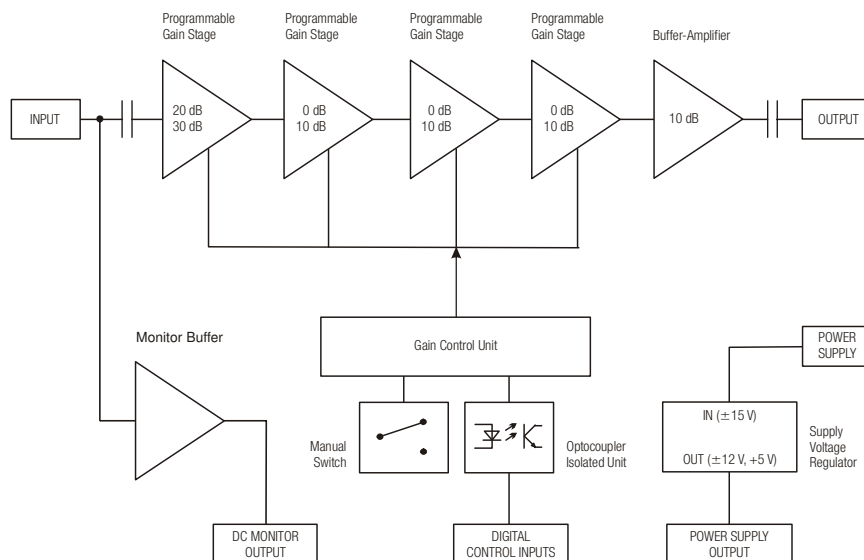
Features

- Variable gain 30 to 70 dB (approx. x30 to x3000), 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

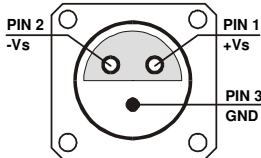


BS-DUPVA-1-70_R1

Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications	Test conditions	$V_s = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, system impedance = $50\ \Omega$	
Gain	Gain values	30, 40, 50, 60, 70 dB	
	Gain accuracy	$\pm 0.1\text{ dB}$ (between settings) $\pm 1\text{ dB}$ (overall)	
	Gain flatness	$\pm 0.15\text{ dB}$	
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	$50\ \Omega$	
	Input impedance DC	100 k Ω	
	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)
1/f-noise corner	400 pV/ $\sqrt{\text{Hz}}$	(@ 40 - 60 dB gain)	
Output	Output impedance	$50\ \Omega$	
	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	
	Reverse isolation	80 dB	
	Dynamic range (without average)	62 dB	(P_{1dB} – min. detectable signal)
Monitor Output	Monitor output gain	1	(@ $\geq 100\text{ k}\Omega$ load)
	Monitor output impedance	$50\ \Omega$	(designed for $\geq 100\text{ k}\Omega$ load)
	Monitor output voltage range	$\pm 10\text{ V}$	
	Monitor output current	$\pm 25\text{ mA}$	
	Monitor output bandwidth	DC ... 100 kHz	
Digital Control	Control input voltage range	Low: $-0.8\text{ ... }+0.8\text{ V}$ High: $+1.8\text{ ... }+12\text{ V}$	
Power Supply	Supply voltage	$\pm 15\text{ V}$	
	Supply current	$+250\text{ / }-100\text{ mA}$ (without current consumption from Sub-D-connector)	
	Stabilized power supply output	$\pm 12\text{ V / max. }50\text{ mA}$, $+5\text{ V / max. }50\text{ mA}$ (Auxiliary voltage outputs Pin 1-4 Sub-D-connector)	
Case	Weight	510 g (1.1 lb)	
	Material	AlMg4.5Mn, nickel-plated	

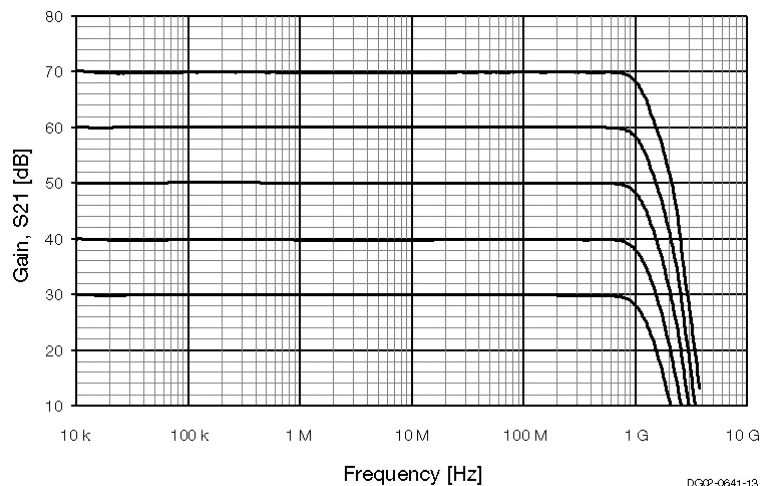
Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications (continued) Temperature Range	Storage temperature -40 ... +100 °C Operating temperature 0 ... +60 °C																								
Absolute Maximum Ratings	Signal input power +13 dBm (f > 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																								
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 <div style="text-align: center;">  </div> 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 style="margin-left: 40px; 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>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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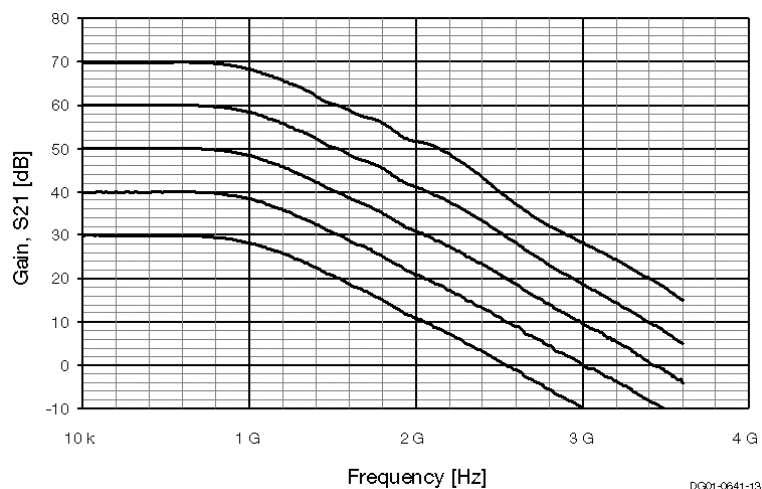
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Frequency response (logarithmic)



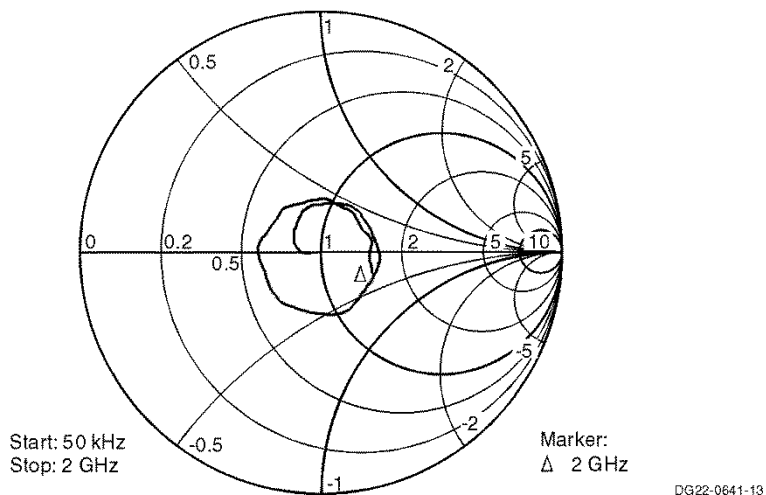
Frequency response (linear)



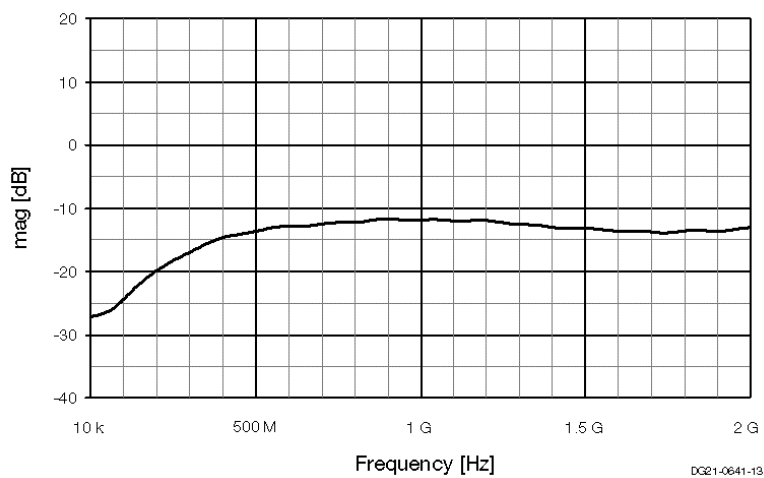
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance
Characteristics

Input reflection, S11



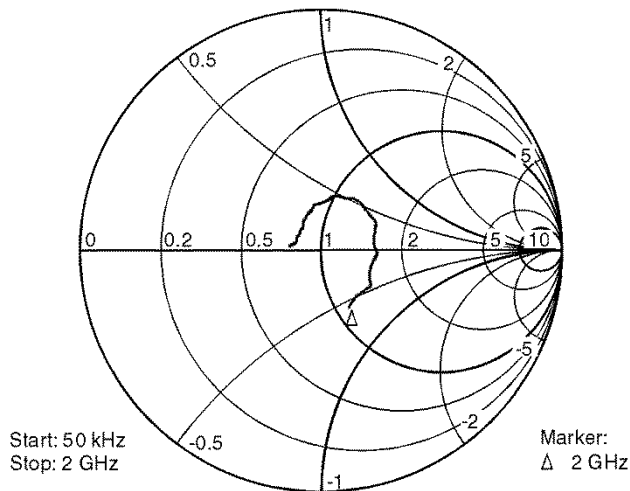
Input return loss, S11 (Linear Magnitude)



Variable-Gain Ultra-Wideband Voltage Amplifier

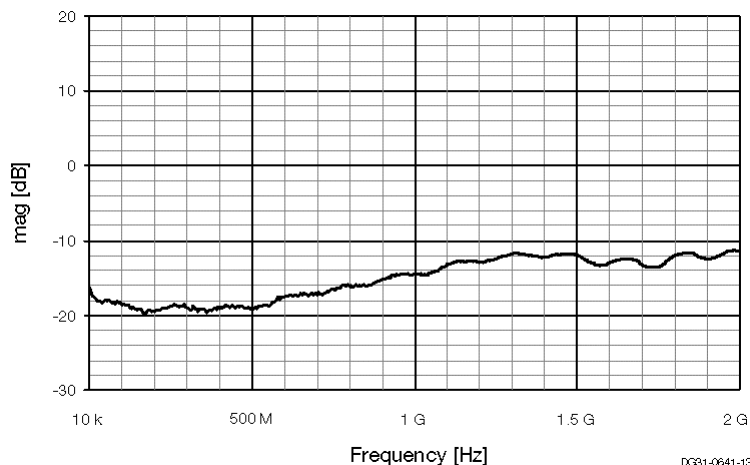
Typical Performance
Characteristics

Output reflection, S22



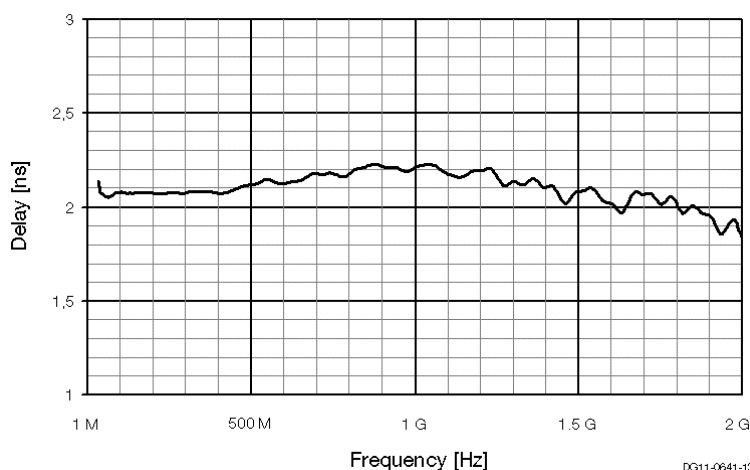
DG32-0641-13

Output return loss, S22 (Linear Magnitude)



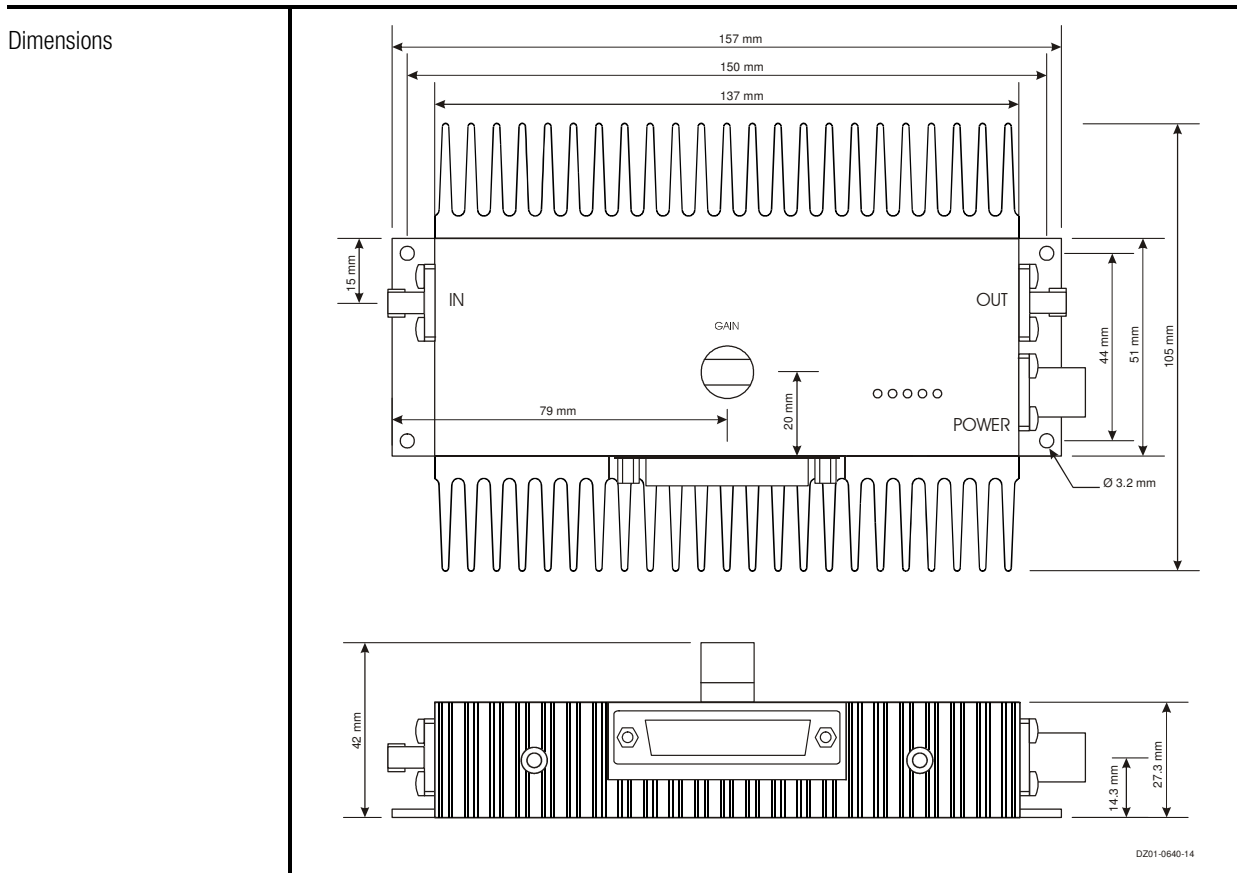
DG31-0641-13

Group delay



DG11-0641-13

Variable-Gain Ultra-Wideband Voltage Amplifier



<p>Accessories</p>	<p>BNC adapter set Model no.: ADAP-SMA-BNC-1 - set of 2 SMA to BNC adapters</p>
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