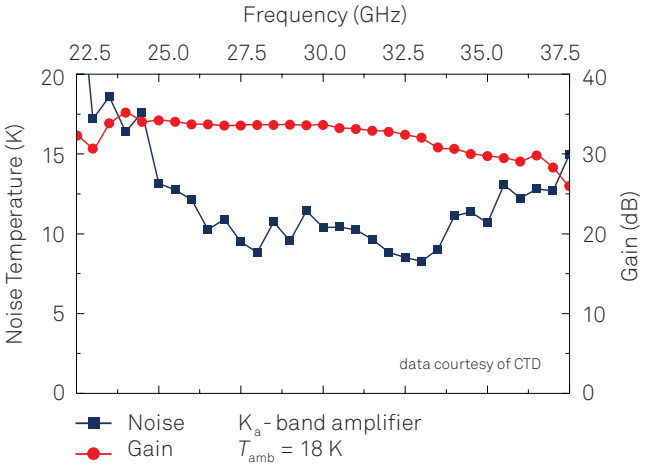
DIRAMICS

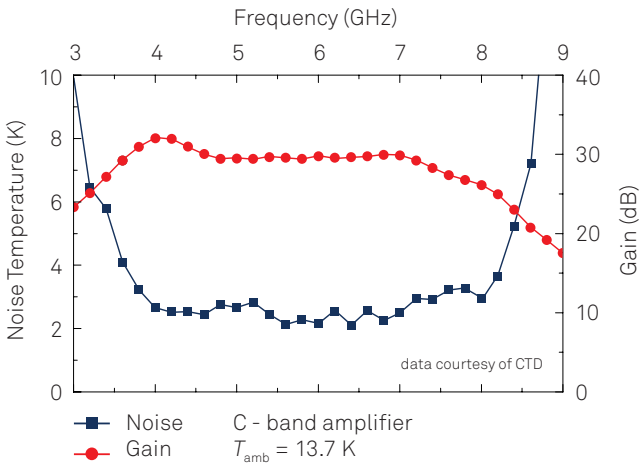
pH-100 Series Discrete Ultra Low Noise InP pHEMTs

The pH-100 series devices are AlInAs/InGaAs pHEMTs (pseudomporphic High Electron Mobility Transistors) on InP substrates with a gate length of 100 nm. The gate width and number of fingers can be customized according to the application. The transistor technology provides ultimate noise performance at cryogenic temperatures and offers outstanding noise figures at room temperature. The pH-100 technology is field proven and used in ESA ESTRACK ground stations for more than 10 years. Every transistor is tested on-wafer to ensure performance compliance.

Typical Applications

Measured performance of hybrid low noise amplifier modules for C- and K_a-Band built by the Center for Technology Development (CTD) of the Yebes Observatory, Spain. Both are based on pH-100 series transistors, using a 2 × 75 µm configuration at C-band and a 4 × 20 µm geometry at K_a-band.





pH-100 Technology

Gate Length	100 nm
Number of Gate Fingers	2 / 4 / 6
Gate Finger Width	10–150 µm

Basic Characteristics of a 4 × 20 µm Device (incl. bond/probe-pads)

Temperature	**300 K**	**80 K**	**15 K**
Cutoff Frequency f_T	220 GHz	235 GHz	235 GHz
Cutoff Frequency f_{MAX}	550 GHz	700 GHz	800 GHz
Transconductance *gm*	1250 mS/mm	1500 mS/mm	1500 mS/mm
Maximum Drain Current I_{DSmax}	800 mA/mm	900 mA/mm	1000 mA/mm
Gate-Drain Breakdown Voltage $V_{GDbreak}$	-2.5 V	-2.5 V	-2.5 V
Noise Figure NF_{min} (@4 GHz)	0.1 dB	0.03 dB	0.016 dB
Noise Temperature T_{min} (@4 GHz)	7 K	2 K	1 K
Noise Figure NF_{min} (@30 GHz)	0.6 dB	0.2 dB	0.08 dB
Noise Temperature T_{min} (@30 GHz)	43 K	14 K	5 K