OKI Electronic Components

This version:1.0 Sept. 2000

# KGL4112F Preliminary

**10 Gbps AGC Amplifier IC**

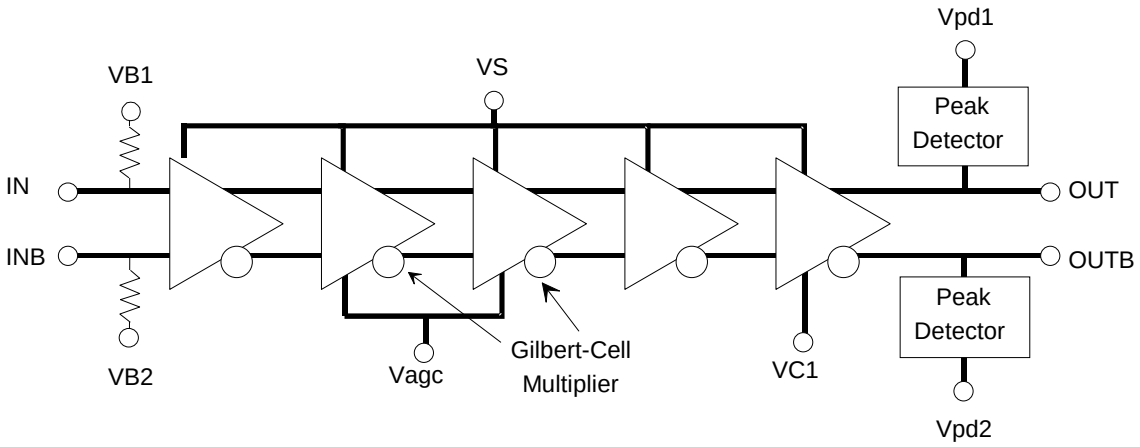
## DESCRIPTION

KGL4112F is an ultra-broadband AGC (Automatic Gain Control) Amplifier implemented 0.1 μm gate GaAs P-HEMT device technology by using the Gilbert-Cell multiplier circuit configuration.

## FEATURES

- Broadband Amplifier: to 10 GHz
- Wide Variable Gain Range: 25 dB
- Single Supply Voltage: –5 V
- Power Consumption < 1W (@VS=–5 V)

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Items | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Supply Voltage | VS | -6.5 | 0.3 | V |
| Output Saturation Control Voltage | VC1 | -6.5 | VS + 1.2 (Max. 0.3) | V |
| Bias Control Voltage | VB1,VB2 | VS - 5 (Min. –6.5) | VS + 3.5 (Max. 0.3) | V |
| Gain Control Voltage | Vagc | –6.5 | VS + 4.5 (Max. 0.3) | V |
| Temperature at Package Base under Bias | Ts | –45 | 100 | °C |
| Storage Temperature | $T_{ST}$ | –45 | 125 | °C |

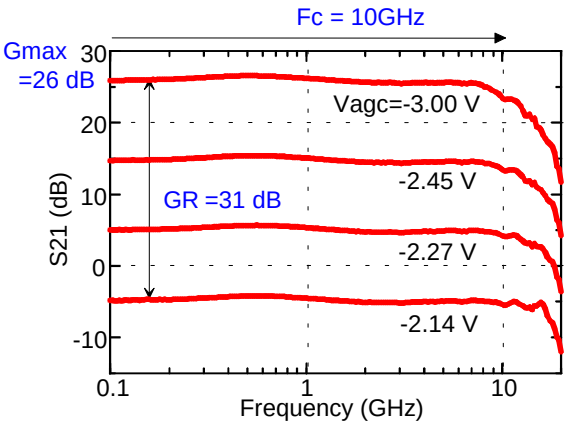
## RECOMMENDED OPERATION CONDITION

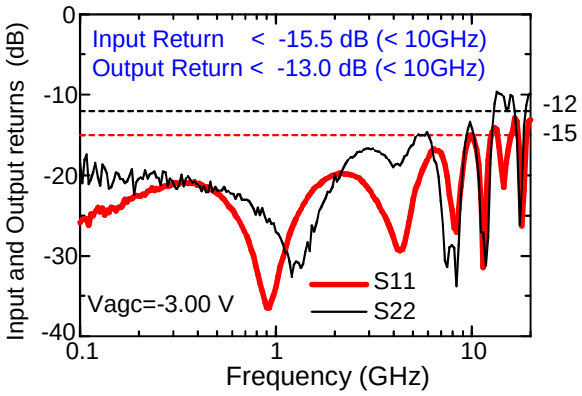
| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Supply Voltage | VS | -5.5 | -5.2 | -4.9 | V |
| Output Saturation Control Voltage | VC1 | VS | — | VS + 0.5 | V |
| Bias Control Voltage | VB1,VB2 | VS + 1.1 | — | VS +1.9 | V |
| Gain Control Voltage | Vagc | VS + 1.9 | — | VS + 3.6 | V |
| Operating Temperature | Ta | 0 | — | 80 | °C |

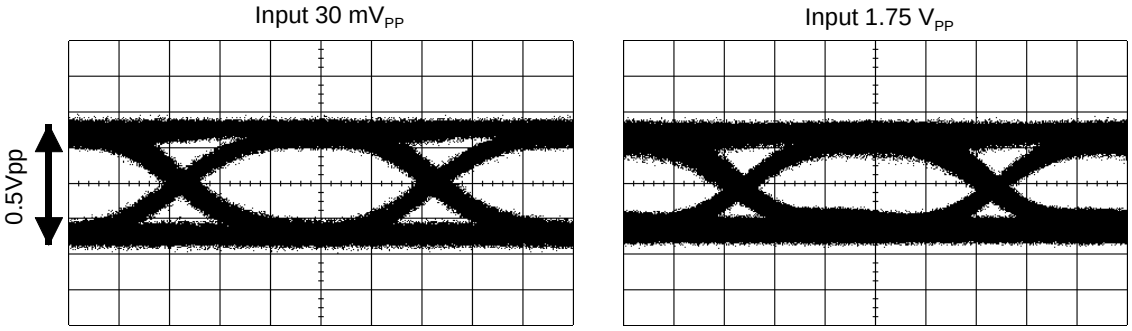
## ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Power Consumption | Pc | — | — | 1.2 | W | |
| Maximum Gain | Gmax | 22 | — | — | dB | |
| Bandwidth (–3 dB) | Fc | 8 | 10 | — | GHz | @ Maximum Gain |
| Variable Gain Range | GR | 25 | 30 | — | dB | |
| Output Saturation Amplitude | ΔVop | 1.0 | — | 1.8 | $V_{PP}$ | @ VC1 = VS |
| Peak Detector Sensitivity | Vpk | 0.3 | — | — | $V/V_{PP}$ | |
| Input Return Loss (<10 GHz) | S11 | 15 | — | — | dB | |
| Output Return Loss (<10 GHz) | S22 | 12 | — | — | dB | |

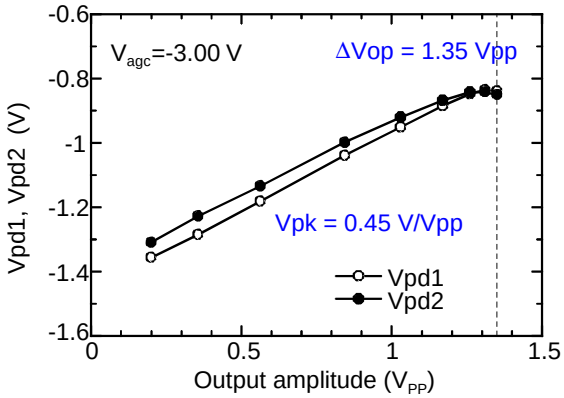
## TYPICAL CHARACTERISTICS



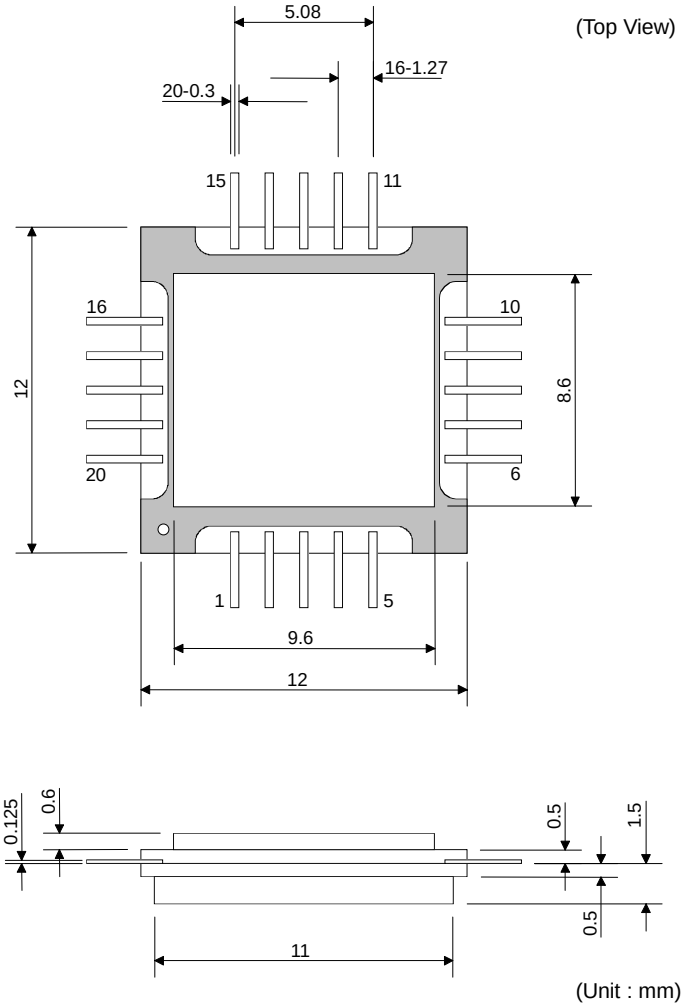




V:200mV/div , H:20ps/div
Input 10Gbps, PN 31



## PACKAGE DIMENSIONS




(Unit : mm)

## PIN CONNECTION

| No. | Symbol | Note | No. | Symbol | Note |
|---|---|---|---|---|---|
| 1 | VB2 | Input-bar termination port (External capacitor is required) and input-bar bias control port | 11 | Vpd1 | Output of peak detector(OUT) |
| 2 | N.C. | No connection | 12 | VS | Supply voltage port |
| 3 | N.C. | No connection | 13 | Vagc | Gain control port |
| 4 | Vc1 | Output saturation voltage control port | 14 | VS | Supply voltage port |
| 5 | Vpd2 | Output of peak detector(OUTB) | 15 | VB1 | Input termination port (External capacitor is required) and input bias control port |
| 6 | GND | Ground | 16 | GND | Ground |
| 7 | OUTB | Signal output-bar port | 17 | IN | Signal input port |
| 8 | GND | Ground | 18 | GND | Ground |
| 9 | OUT | Signal output port | 19 | INB | Signal input-bar port |
| 10 | GND | Ground | 20 | GND | Ground |

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