OKI Electronic Components

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KGA4121D Preliminary

10 Gbps Transimpedance Amplifier IC

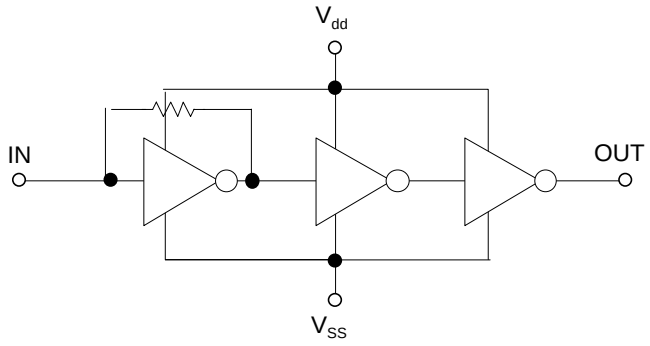
DESCRIPTION

Oki's 10 Gbps transimpedance amplifier is fabricated 0.1 μm gate length P-HEMTs for high-speed optical communication. The IC has a large transimpedance, high sensitivity and a wide dynamic range.

FEATURES

- High Transimpedance : 60 dBΩ
- Wide Dynamic Range : 18 dB
- Ultra-Broadband Amplifier : >9 GHz
- Ultra-Low Noise Current : <8 pA/√Hz (T.B.D)
- +3.3 V and –2 V Power Supply

FUNCTION DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25ºC)

Parameters	Symbol	Units	Rating
Supply Voltage	V_{dd}	V	0 to +5
Supply Voltage	V_{SS}	V	–5 to 0
Input Current	$I_{(IN)}$	mA	4
Storage Temperature Range	T_{ST}	ºC	–40 to 125

RECOMMENDED OPERATING CONDITIONS (Ta = 25ºC)

Parameters	Symbol	Units	Min.	Typ.	Max.
Supply Voltage	V_{dd}	V	+3.14	+3.3	+3.46
Supply Voltage	V_{SS}	V	–2.1	–2	–1.9

ELECTRICAL CHARACTERISTICS (Ta= 25ºC, V_{dd}= +3.3 V, V_{SS}= –2 V, $C_{(diode)}+C_{(stray)}$ = 0.3 pF)

Parameters		Units	Min.	Typ.	Max.
Transimpedance (<100 µA)		kΩ	—	1.2	—
Bandwidth (–3 dB)		GHz	9	9.5	—
Transimpedance Flatness (300 kHz to 6 GHz)		dBΩ	—	—	±1
Equivalent Input Noise Current	*1)	pA/√Hz	—	T.B.D	—
Optical Sensitivity	*2)	dBm	—	–19	—
Optical Overload	*2)	dBm	—	-1	—
Input Resistance		Ω	—	150	—
Input Offset Voltage		V	—	+0.06	—
Output Return Loss (<10 GHz)		dB	—	—	10
Power Consumption		W	—	0.36	—
Operating Temperature Range	*3)	ºC	0	—	+85

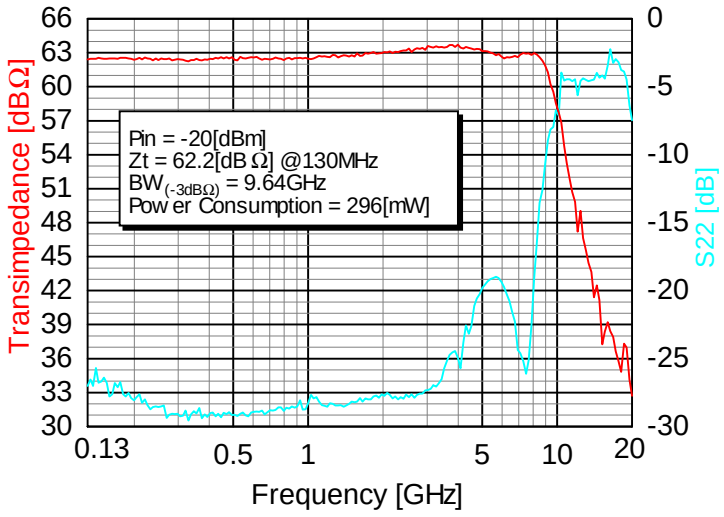
*1) Averaged Equivalent Input Noise Current from 130 MHz to 7.5 GHz.

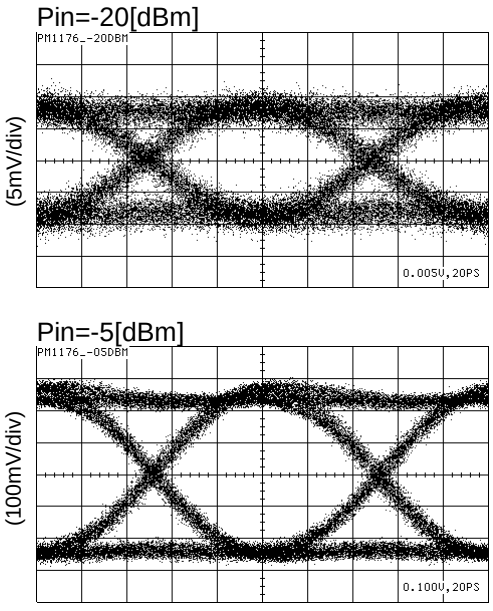
*2) Value of optical sensitivity is guaranteed by design, assuming responsivity of photo diode of 0.8 A/W.

*3) At backside of die.

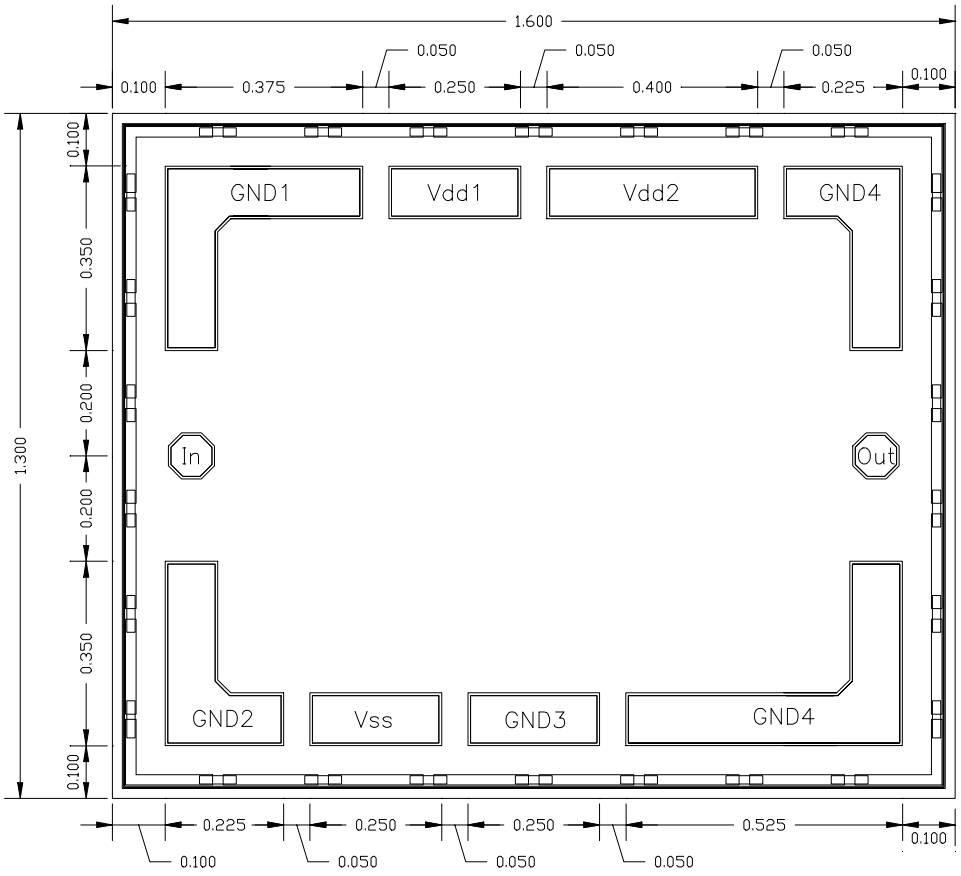
TYPICAL FREQUENCY RESPONSE AND EYE DIAGRAMS

(Vdd = +3.3 V, Vss = –2 V, Ta = 25ºC, $C_{(PD)} \approx$ 0.25 pF, Responsivity of PD = 0.80 A/W)





PAD LAYOUT



(Dimensions in mm)

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