IPAG - Innovative Processing AG

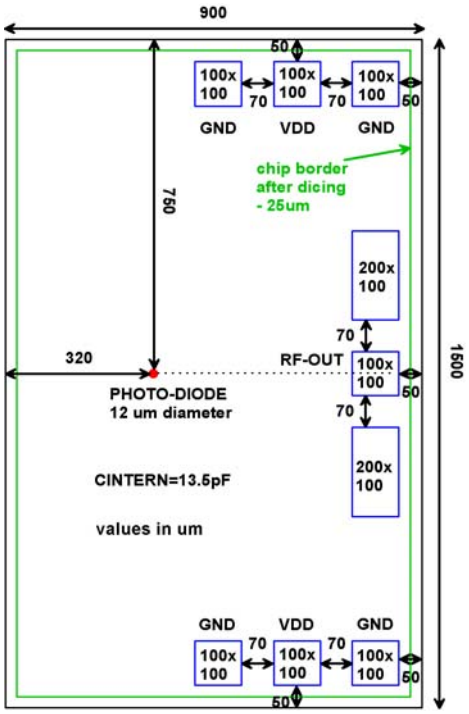
IPD48C-40z: 40 GHz PIN Diode

Applications

The series IPD48 PINs are applicable for building up the next generation of high bit rate opto-electronic receivers for SONET/SDH (OC-768) and Ethernet applications.

Features

- True bandwidth of 40 GHz (-3dB)
- High optical input power (+6 dBm)
- High linear phase characteristic
- Low bias voltage (< 4 V)
- Low leakage current
- On-chip biasing: IPD48C-40B
  External biasing: IPD48C-40N
- Customized layouts possible



note: all coordinates are center-coordinates relative to the center of the PIN diode (all coordinates in µm)

Description

The IPD48 series are vertical PIN diode devices suitable for hybrid integration in opto-electronic receivers and measurement testsets. The IPD48 offer high optical input power capability and high linear phase behavior. The PINs comprise anti-reflection coating and passivation. Depending on application, types with and without on-chip bias networks are available. For frequencies below 2 GHz external blocking capacitors are necessary.

Optical / Electrical Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remarks
Maximum Optical Input Power	P_{max}		10	dBm	
Maximum Reverse Voltage	$V_{r,max}$	10		V	
Maximum Forward Current	$I_{f,max}$		2	mA	
Storage Temperatures	t_{st}	-10	+80	°C	
Operating Temperatures	t_{op}	+10	+70	°C	+150 °C short term
Peak Temperature (unbiased)	t_{pe}		+300	°C	30 sec.
Humidity		5	65	% r.h.	

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Optical / Electrical Parameters

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Wavelength	λ	1520		1620	nm	typ. 1550 nm
Optical Input Power	$P_{o,in}$			6	dBm	@ 1 dB compression
Polarization Dependence				$\pm$ 0.1	dB	
Responsivity	R	0.4			A/W	@ B = 40 GHz [1)]
Small Signal Bandwidth	B		40	45	GHz	f_{3dB}
Lower Frequency Limit [2)]	f_{cl}	1	2		GHz	[2)]
Group Delay Time Variations	τ_{grp}		$\pm$ 4	$\pm$ 5	ps	
Bias Voltage [4)]	V_{pin}	-2.5	-3.0	-3.5[3)]	V	
Leakage Current	I_{rev}		10	100	nA	@ V_{pin} = -3 V

1) and 1550 nm optical wavelength

2) external blocking capacitor enables lower frequency limits down to 100kHz

3) this is the maximum bias voltage to achieve the desired responsivity, see also Maximum Ratings

4) on-chip biasing IPD48C-40B; or external biasing IPD48C-40N

Small signal models for the description of the PIN diode frequency behavior are available on request.

Mechanical Parameters

Parameter	Typ.	Unit	Remarks
Chip size	1500 x 900	µm	changes after dicing [1)]
Thickness	500	µm	
Pad sizes	100 x 100	µm	200 x 100 for RF-OUT
Active Optical Region Radius	6	µm	

1) absolute chip size varies within ±100 µm, rf-out pads are always as close as possible to edge of chip

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