

High Speed 840–960 nm Photodetector up to 112 Gbit/s

Product Code:

D40-SWDM-C1 1x1

D40-SWDM-C4 4x1

Product Description

High-speed 840-960 nm top-illuminated InP-based pin photodetector chip for data rates of up to 112 Gbit/s PAM-4 for application in the next-generation data communication systems. These photodetectors are available as single chip or as 4-channel chip array with a 250 μm pitch, allowing alignment to multi-mode fibers. The chips can be wire bonded.

Active area: 20 μm diameter, $\sim 315 \mu\text{m}^2$



Features

- Single chip or 4-channel chip array
- Up to 112 Gbit/s PAM4 per channel
- High temperature stability

Applications

- SWDM Optical Interconnects
- Active Optical Cables
- Chip-to-Chip Interconnects

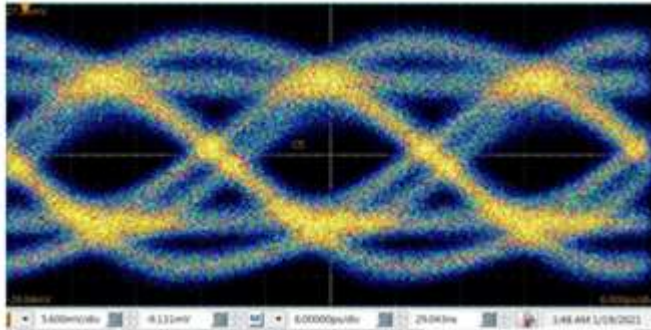
Parameter	Typical	Notes
Operating Wavelength	840 - 960 nm	
Data Rate	up 112 Gbit/s per channel	PAM-4
Responsivity	min 0.5 A/W	at 850 nm
Small signal -3dBo bandwidth	> 30 GHz	typ.

Electro-Optical Specifications (T = 0 to 85°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Dark current	I_d	$V_{Bias} = -2.5 V$			4	nA
S_{21} 3 dB Bandwidth	$BW_{f_{3dB}}$	-2.5V 50Ω load	30		40	GHz
Operating wavelength	λ		840		960	nm
Responsivity	R	850 nm	0.50	0.50		A/W
	R	880 nm	0.50	0.52		A/W
	R	910 nm	0.50	0.54		A/W
	R	940 nm	0.50	0.56		A/W
	R	1310 nm*	0.70	0.75		A/W
	R	1550 nm*	0.70	0.75		A/W
Capacitance	C	-5V 1 MHz		0.095		pF
Series resistance	R_s	-2V		7		Ohm

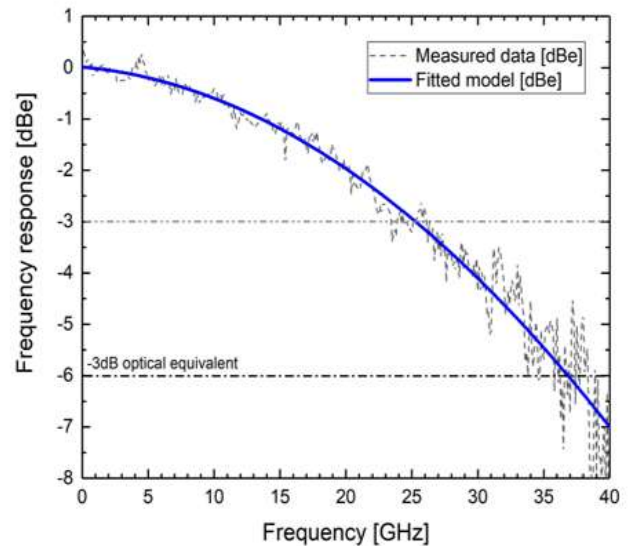
*anti-reflection coating is optimized for <1% reflectivity within the range 840 nm - 960 nm

NRZ application performance



50 Gbit/s -3V PRBS15
w/o amplification, equalization or DSP
850nm VCSEL Transmitter used: VIS T56-850

Frequency response graph (20 μm)



S21 and S11 measurements can be supplied upon request

Absolute Maximum Ratings

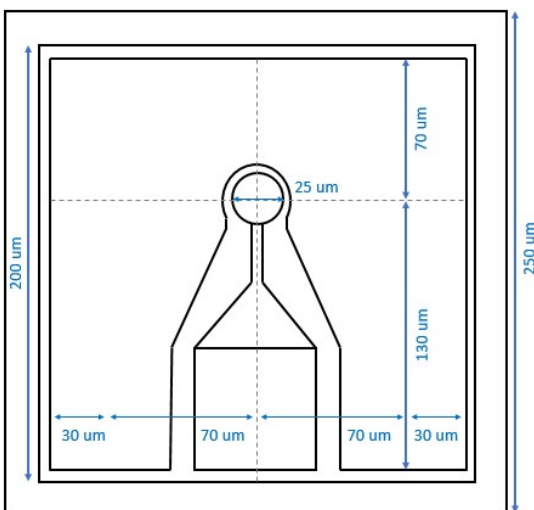
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating temperature	T_{op}		0		85	°C
Storage temperature	T_{st}		-40		85	°C
Soldering temperature	T_{sl}	10 sec			260	°C
Forward current	I_{FW}				10	mA
Reverse Voltage	V_R				10	V
HBM ESD Threshold	V_{ESD}				90	V

Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate irreversible damage to the component even if all other parameters are within the electro-optical specifications. Exposure to any of the Absolute Maximum Ratings for extended periods can adversely affect the reliability of these chips.

Mechanical Dimensions

Parameter	Type	Min	Typ	Max	Unit
Length	D40-SWDM-C1		235	250	μm
	D40-SWDM-C4		975	1000	μm
Height			150		μm
Width			250	260	

Dimensions of D40-SWDM-C1

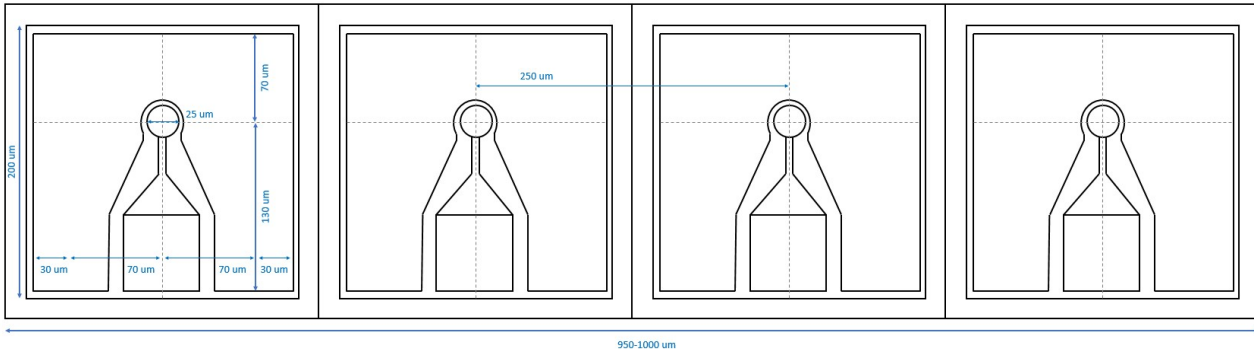


A

Contact shape

Active area: $\sim 20\mu\text{m}$ diameter, $\sim 315\mu\text{m}^2$

Dimensions of D40-SWDM-C4



Qualification Notification

The D40-SWDM-Cxx chips have been tested to meet the specifications outlined in this datasheet. A reliability assessment report is available as a separate document upon request.



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