

## 850nm 10Gb/s Multimode Flip Chip VCSEL Array

(Preliminary)

### Features:

- 850nm multimode emission
- Low threshold and operation current
- High reliability
- Low electrical parasitics
- Data rates from DC to 10 Gb/s
- Flip chip bondable top contact configuration
- Common cathode electrodes
- Available as 4 or 12 channel array chip

### Applications:

- Parallel fiber optical communication links
- Smart cables



Oclaro's high speed 850nm flip chip VCSEL array is designed to meet stringent specifications for parallel high speed data communication. The high performance, high reliability VCSEL array is engineered with low electrical parasitics for data rates up to 10Gb/s per channel. The common cathode configuration with cathode and anode contacts on the top side of the chip is ideal for flip chip packaging, but can also be used for wire bonding. The individual VCSELs of the array operate in multiple transverse and single longitudinal modes and emit circular symmetric beams with narrow divergence that can be efficiently coupled into 50/125 and 62.5/125  $\mu\text{m}$  multi-mode fibers. The VCSEL array is available in 4 or 12 channel configuration.

## Electro - Optical Characteristics\*

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Threshold current	$I_{th}$	$T=25^{\circ}\text{C}$	0.5	1.3	2.0	mA
		$T=85^{\circ}\text{C}$	0.8	2.0	3.0	mA
Operating power	$P_{op}$	$I_{op} = 7\text{mA}$		2.2		mW
Slope efficiency	$\eta$	$I=I_{th}+1\text{mA}$	0.2	0.4	0.6	mW/mA
Operating voltage	$U_{op}$	$I_{op} = 7\text{mA}$		2.0		V
Differential resistance	$R_d$	$I_{op} = 7\text{mA}$		40	85	W
Emission wavelength	$\lambda$	$I_{op} = 7\text{mA}, T=-10^{\circ}\text{C} - 85^{\circ}\text{C}$	840	850	860	nm
Spectral bandwidth, RMS	$\Delta\lambda$	$I_{op} = 7\text{mA}$		0.5	0.7	nm
Beam divergence	$Q$	$I_{op} = 7\text{mA}, \text{Full width } 1/e^2$		28	32	$^{\circ}$
Capacitance	$C$	$I_{op} = 7\text{mA}$		0.4	0.7	pF
Modulation bandwidth	$f_{3dB}$	$I_{op} = 7\text{mA}$	9			GHz
Rise/Fall time	$t_r$	$I_{op} = 7\text{mA}, ER=5\text{dB}, 20\% - 80\%$		30	35	ps
	$t_f$			40	45	ps
Relative intensity noise	$RIN_{12(OM A)}$	$I_{op} = 7\text{mA}, ER=5\text{dB}, 7.73\text{GHz BW}$			-128	dB/Hz
Threshold uniformity	$\Delta I_{th}$				0.3	mA
Slope efficiency uniformity	$\Delta\eta$				0.1	mW/mA

## Thermal Characteristics

Parameter	Symbol	Ratings			Unit
		Min	Typ	Max	
Temperature tuning co-efficient	$\delta I/\delta T$		0.06		nm/K
Slope efficiency variation $-10^{\circ}\text{C} - 85^{\circ}\text{C}$	$\Delta\eta_T$		-0.4		%/K
Thermal impedance	$Z_{th}$		2.0	2.5	K/mW

\* $T=25^{\circ}\text{C}$  unless otherwise noted

## Absolute Maximum Ratings

Parameter	Rating	Unit
Optical output power	6	mW
Peak forward current	15	mA
VCSEL reverse voltage	5	V
Operating temperature	-10 to +85	$^{\circ}\text{C}$
Storage temperature	-40 to +100	$^{\circ}\text{C}$
Mounting temperature (max. 1h)	165	$^{\circ}\text{C}$

## Mechanical Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA4201040000	960	980	1000	µm
Die length, APA4201120000	2960	2980	3000	µm
Die width	410	430	450	µm
Die height	185	200	215	µm

## RoHS Compliance



Oclaro is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

## Ordering Information:

Product Code	Data Rate	Description
APA4201040000	10Gb/s	850nm MM 1x4 flip chip VCSEL array
APA4201120000	10Gb/s	850nm MM 1x12 flip chip VCSEL array

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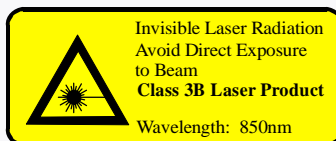
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## Safety Labels



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