

850nm 10Gb/s Multimode Flip Chip VCSEL Array (Preliminary)

Bookham'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 62.5/125µm multi-mode fibers. The VCSEL array is available in 4 or 12 channel configuration.

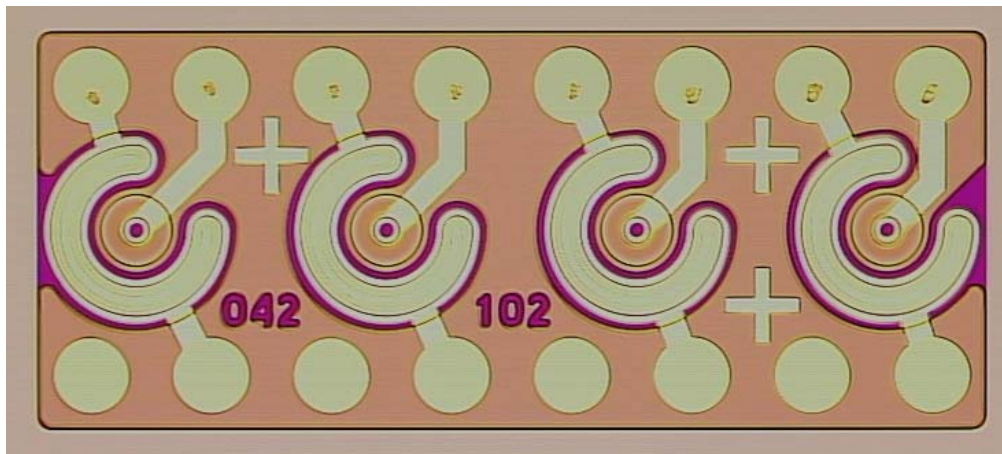
Features

- 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

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



Electro – Optical Characteristics*

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Threshold current	I_{th}	$T=25^{\circ}C$	0.5	1.3	2.0	mA
		$T=85^{\circ}C$	0.8	2.0	3.0	mA
Operating power	P_{op}	$I_{op} = 7mA$		2.2		mW
Slope efficiency	η	$I=I_{th}+1mA$	0.2	0.4	0.6	mW/mA
Operating voltage	U_{op}	$I_{op} = 7mA$		2.0		V
Differential resistance	R_d	$I_{op} = 7mA$		40	85	Ω
Emission wavelength	λ	$I_{op} = 7mA, T=-10^{\circ}C - 85^{\circ}C$	840	850	860	nm
Spectral bandwidth, RMS	$\Delta\lambda$	$I_{op} = 7mA$		0.5	0.7	nm
Beam divergence	Θ	$I_{op} = 7mA, \text{Full width } 1/e^2$		28	32	$^{\circ}$
Capacitance	C	$I_{op} = 7mA$		0.4	0.7	pF
Modulation bandwidth	f_{3dB}	$I_{op} = 7mA$	9			GHz
Rise/Fall time	t_r	$I_{op} = 7mA, ER=5dB, 20\% - 80\%$		30	35	ps
	t_f			40	45	ps
Relative intensity noise	$RIN_{12(OM)}$ A)	$I_{op} = 7mA, ER=5dB, 7.73GHz \text{ BW}$			-128	dB/Hz
Threshold uniformity	ΔI_{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 $-10^{\circ}C - 85^{\circ}C$	$\Delta\eta_T$		-0.4		%/K
Thermal impedance	Z_{th}		2.0	2.5	K/mW

* $T=25^{\circ}C$ 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	$^{\circ}C$
Storage temperature	-40 to +100	$^{\circ}C$
Mounting temperature (max. 1h)	165	$^{\circ}C$

Mechanical Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA4201040000	960	980	1000	µm
Die length, APA4201120000	2960	2980	3000	µm
Die width	210	430	250	µm
Die height	185	200	215	µm
Die length, APA4201040000	960	980	1000	µm

RoHS Compliance



Bookham 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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