

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

Bookham's high speed 850nm multimode VCSEL chip is designed to meet stringent specifications for high speed data communications. The high performance, high reliability device is engineered with low electrical parasitics for data rates up to 10Gb/s. The VCSEL operates in multiple transverse and single longitudinal modes and emits a circular symmetric beam with low divergence that can be efficiently coupled into 50/125 and 62.5/125µm multimode fibers. The chip design allows flexible linear array combinations in common cathode configuration with a pitch of 250 microns between individual channels

Features

- 850nm multimode emission
- Low threshold and operation current
- High reliability
- Low electrical parasitics
- Data rates from DC to 10 Gb/s
- Backside common cathode and top-side anode configuration
- Different array configurations and special operating temperatures available on request

Applications

- Datacom applications up to 10 Gb/s
- Gigabit ethernet and storage area networks
- Parallel fiber optical communication links

Product Code	Data Rate	Description
APA7301010000	10Gb/s	850nm MM single VCSEL chip
APA7301040000	10Gb/s	850nm MM 1x4 VCSEL array
APA7301120000	10Gb/s	850nm MM 1x12 VCSEL array



Electro – Optical Characteristics*

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Threshold current	I_{th}			1.0	1.6	mA
Optical output power	P_{out}	$I_{op} = 6.5mA$		2.2		mW
Slope efficiency	η	$I = I_{th} + 1mA$	0.25	0.4	0.6	mW/mA
Operating voltage	U_{op}	$I_{op} = 6.5mA$		1.9		V
Differential resistance	R_d	$I_{op} = 6.5mA$		50	85	Ω
Emission wavelength	λ	$I_{op} = 6.5mA, T = -10^\circ C - 85^\circ C$	840	850	860	nm
Spectral bandwidth, RMS	$\Delta\lambda$	APA7301010000 ($I_{op} = 6.5mA$)			0.4	nm
		APA7301040000, APA7301120000 ($I_{op} = 6.5mA$)			0.65	nm
Beam divergence	Θ	$I_{op} = 6.5mA, \text{Full width } 1/e^2$		26	32	$^\circ$
Capacitance	C	$I_{op} = 6.5mA$		0.5	0.7	pF
Modulation bandwidth	f_{3dB}	$I_{op} = 6.5mA$	9			GHz
Rise/fall time	t_r	$I_{op} = 6.5mA, ER=5dB, 20\% - 80\%$		30	35	ps
	t_f			40	45	ps
Relative intensity noise	$RIN_{12(OMA)}$	$I_{op} = 6.5mA, ER=5dB, 7.73GHz \text{ BW}$			-128	dB/Hz
Threshold uniformity	ΔI_{th}	APA7301040000, APA7301120000			0.3	mA
Slope efficiency uniformity	$\Delta\eta$	APA7301040000, APA7301120000			0.1	mW/mA

Thermal Characteristics

Parameter	Symbol	Ratings			Unit
		Min	Typ	Max	
Wavelength tuning co-efficient	$\delta\lambda/\delta T$		0.06		nm/K
Threshold current variation -10°C - 85°C	$\Delta I_{th,T}$			1.2	mA
Slope efficiency variation -10°C - 85°C	$\Delta\eta_T$		-0.4		%/K
Thermal impedance	Z_{th}		2.0		K/mW

*T=25°C unless otherwise noted

Absolute Maximum Ratings

Parameter	Rating	Unit
Optical output power	6	mW
Peak forward current	12	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	$^\circ C$

Chip Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA7301010000	260	280	300	µm
Die length, APA7301040000	960	980	1000	µm
Die length, APA7301120000	2960	2980	3000	µm
Die width	210	230	250	µm
Die height	135	150	165	µm

RoHS Compliance



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Ordering Information

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