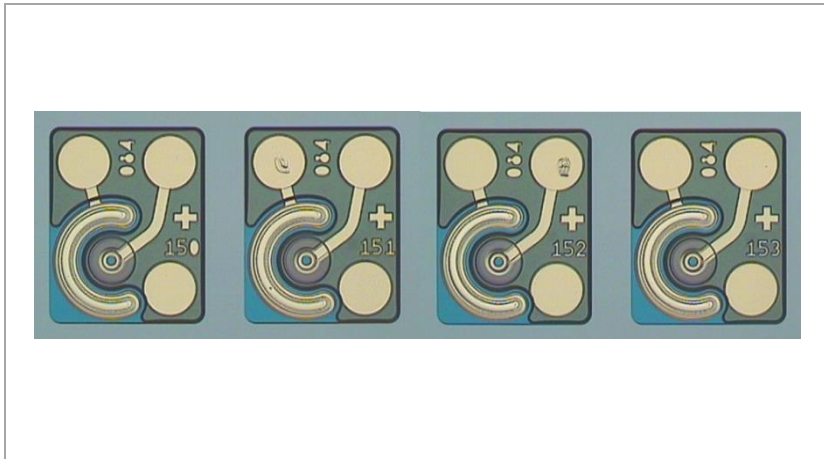



850nm 14Gb/s Multimode Dual Top Contact VCSEL Array

APA4401010001, APA4401040001, APA4401120001



Features:

- 850nm multimode emission
- Low threshold and operation current
- High reliability
- High humidity robustness compliant with GR468
- Low electrical parasitics
- Data rates from DC to 14 Gb/s
- Dual top contact configuration with common cathode electrodes
- Available as single chip, 4 and 12 channel array
- RoHS compliant 

Applications:

- Single channel and parallel fiber optical communication links
- Smart cables, consumer applications

Shipment packaging options:

- Diced wafer on UV tape on metal lead frame
- Grip ring
- Gel-Pak

Electro-Optical Characteristics

T=25°C unless otherwise noted

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Threshold current	I_{th}	T=25°C	0.4		1.0	mA
		T=0°C - 85°C	0.3		1.3	
Slope efficiency	η	$I = I_{th} + 1\text{mA}$	0.35	0.5	0.65	mW/mA
Optical output power	P_{out}	$I_{op} = 6.0\text{mA}$, T=25°C	1.8	2.2		mW
		$I_{op} = 6.0\text{mA}$, T=85°C	1.3			
Operating voltage	U_{op}	$I_{op} = 6\text{mA}$, T=0°C - 85°C			2.2	V
Differential resistance	R_d	$I_{op} = 6\text{mA}$, T=25°C - 85°C	45	60	75	Ω
Emission wavelength	λ	$I_{op} = 6.0\text{mA}$, T=0°C - 85°C	840	850	860	nm
Spectral width, RMS	$\Delta\lambda$	$I_{op} = 6\text{mA}$, T=25°C - 85°C			0.65	nm
Modulation bandwidth	f_{3dB}	$I_{op} = 7\text{mA}$, T=25°C - 85°C	12	14		GHz
Capacitance	C	$I_{op} = 6.0\text{mA}$		0.2		pF
Beam divergence	Θ	$I_{op} = 6.0\text{mA}$, Full width $1/e^2$		28	33	°
Relative intensity noise	$RIN_{12(OMA)}$	$I_{op} = 6.0\text{mA}$, ER=5dB, 7.73GHz BW			-128	dB/Hz
Threshold uniformity	ΔI_{th}	Range across 1x4 and 1x12 array chips			0.15	mA
Slope efficiency uniformity	$\Delta\eta$				0.05	mW/mA

Thermal Characteristics

Parameter	Symbol	Ratings			Unit
		Min	Typ	Max	
Wavelength tuning coefficient	$\delta\lambda/\delta T$		0.06		nm/K
Slope efficiency variation 0°C - 85°C	$\Delta\eta_T$	-0.45	-0.3	-0.1	%/K
Thermal impedance	Z_{th}		3.0		K/mW

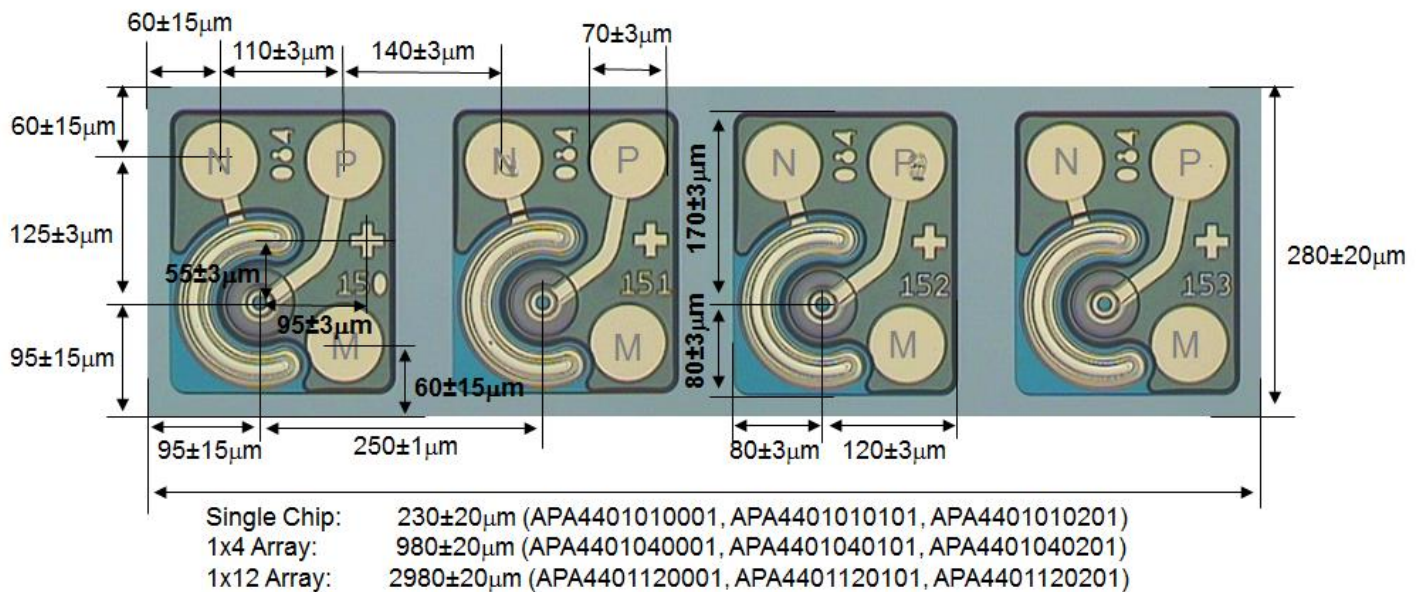
Absolute Maximum Ratings

Parameter	Rating	Unit
Optical output power	8	mW
Peak forward current (max. 10sec)	12	mA
VCSEL reverse voltage	5	V
Operating temperature	0 to +85	°C
Storage temperature	-40 to +100	°C
Mounting temperature (max. 10sec)	260	°C

Chip Outer Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA4401010001, APA4401010101, APA4401010201	210	230	250	μm
Die length, APA4401040001, APA4401040101, APA4401040201	960	980	1000	μm
Die length, APA4401120001, APA4401120101, APA4401120201	2960	2980	3000	μm
Die width	260	280	300	μm
Die height	135	150	165	μm

Chip Layout



N: n-contact (common cathode)
 P: p-contact (anode)
 M: mechanical pad

RoHS Compliance



II-VI Laser Enterprise 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	Shipment Packaging
APA4401010001	14Gb/s	850nm 14G MM DTC VCSEL chip	Diced wafer on metal lead frame ⁽¹⁾
APA4401040001	14Gb/s	850nm 14G MM 1x4 DTC VCSEL array	Diced wafer on metal lead frame ⁽¹⁾
APA4401120001	14Gb/s	850nm 14G MM 1x12 DTC VCSEL array	Diced wafer on metal lead frame ⁽¹⁾
APA4401010101	14Gb/s	850nm 14G MM DTC VCSEL chip	Grip ring ⁽²⁾
APA4401040101	14Gb/s	850nm 14G MM 1x4 DTC VCSEL array	Grip ring ⁽²⁾
APA4401120101	14Gb/s	850nm 14G MM 1x12 DTC VCSEL array	Grip ring ⁽²⁾
APA4401010201	14Gb/s	850nm 14G MM DTC VCSEL chip	Gel-Pak ⁽³⁾
APA4401040201	14Gb/s	850nm 14G MM 1x4 DTC VCSEL array	Gel-Pak ⁽³⁾
APA4401120201	14Gb/s	850nm 14G MM 1x12 DTC VCSEL array	Gel-Pak ⁽³⁾

- ⁽¹⁾ Full diced 3” wafer on UV tape on metal lead frame Ø 230mm, electronic wafermap provided (standard high volume)
- ⁽²⁾ Known Good Dies on UV tape on grip ring Ø 150mm (medium volume)
- ⁽³⁾ Known Good Dies in 2” Gel-Pak (low volume)

Contact Information

www.laserenterprise.com

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by II-VI Laser Enterprise before they become applicable to any particular order or contract. In accordance with the II-VI Laser Enterprise policy of continuous improvement specifications may change without notice. Further details are available from any II-VI Laser Enterprise sales representative.

Safety Labels



Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Issue 02

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