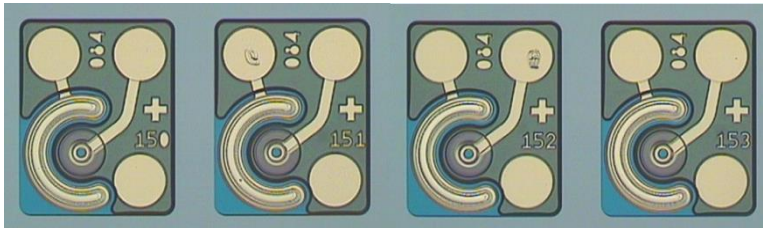



# 850nm 25Gb/s Multimode Dual Top Contact VCSEL Array

APA4501010001, APA4501040001, APA4501120001



## Features:

- 850nm multimode emission
- Data rates from DC to 25 Gb/s
- Dual top contact configuration with common cathode electrodes
- High reliability
- High humidity robustness compliant with GR468
- Available as single chip, 4 and 12 channel array
- RoHS compliant 

## Applications:

- Single channel and parallel fiber optical communication links
- Transceivers, active optical cables

## 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		0.7	0.9	mA
		T=0°C - 80°C			1.2	
Slope efficiency	$\eta$	$I=I_{th}+1mA$ , T=25°C	0.3	0.45		mW/mA
		$I=I_{th}+1mA$ , T=80°C	0.25	0.35		
Optical output power	$P_{out}$	$I_{op} = 6.0mA$ , T=25°C	1.8	2.2		mW
		$I_{op} = 7.0mA$ , T=80°C	1.5			
Operating voltage	$U_{op}$	$I_{op}=6mA$		2.1	2.2	V
Differential resistance	$R_d$	$I_{op}=6mA$ , T=25°C	60	72	85	$\Omega$
		$I_{op}=6mA$ , T=0°C - 80°C	57		88	$\Omega$
Emission wavelength	$\lambda$	$I_{op} = 6.0mA$ , T=0°C - 80°C	840	850	860	nm
Spectral width, RMS	$\Delta\lambda$	$I_{op}=6mA$			0.65	nm
Modulation bandwidth	$f_{3dB}$	$I_{op}=6mA$ , T=25°C	13	14.5		GHz
		$I_{op}=7mA$ , T=80°C	12.5	13.5		
Beam divergence	$\Theta$	$I_{op} = 6.0mA$ , Full width $1/e^2$		28	33	°
Relative intensity noise	$RIN_{(OMA)}$	$I_{op} = 7.0mA$ , ER=4dB, 19GHz BW		-130	-128	dB/Hz
Threshold uniformity	$\Delta I_{th}$	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 0°C - 80°C	$\delta\lambda/\delta T$		0.06		nm/K
Slope efficiency variation 0°C - 80°C	$\Delta\eta_T$		-0.35		%/K
Thermal impedance	$Z_{th}$		3.0		K/mW

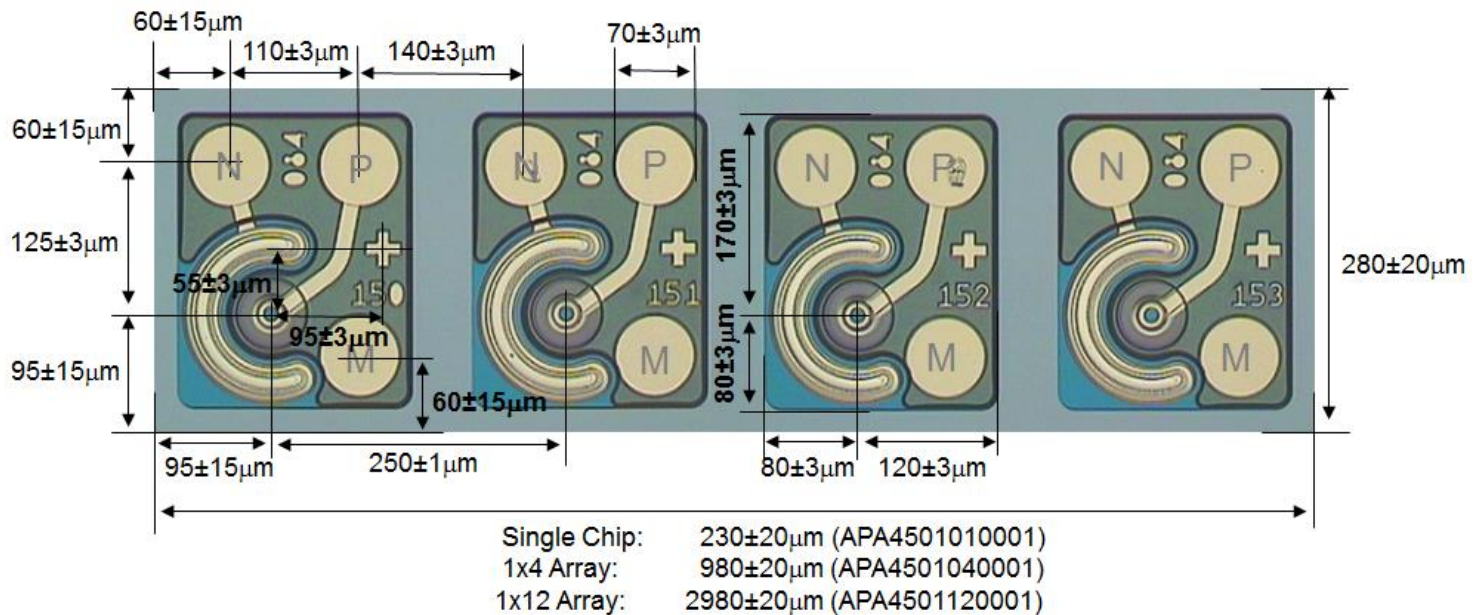
### Absolute Maximum Ratings

Parameter	Rating	Unit
Optical output power	8	mW
Peak forward current (max. 10sec)	12	mA
VCSEL reverse voltage	5	V
Operating temperature	0 to +80	°C
Storage temperature	-40 to +100	°C
Mounting temperature (max. 10sec)	260	°C

### Chip Outer Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA4501010001, APA4501010101, APA4501010201	210	230	250	µm
Die length, APA4501040001, APA4501040101, APA4501040201	960	980	1000	µm
Die length, APA4501120001, APA4501120101, APA4501120201	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
APA4501010001	25Gb/s	850nm 25G MM DTC VCSEL chip	Diced wafer on metal lead frame <sup>(1)</sup>
APA4501040001	25Gb/s	850nm 25G MM 1x4 DTC VCSEL array	Diced wafer on metal lead frame <sup>(1)</sup>
APA4501120001	25Gb/s	850nm 25G MM 1x12 DTC VCSEL array	Diced wafer on metal lead frame <sup>(1)</sup>
APA4501010101	25Gb/s	850nm 25G MM DTC VCSEL chip	Grip ring <sup>(2)</sup>
APA4501040101	25Gb/s	850nm 25G MM 1x4 DTC VCSEL array	Grip ring <sup>(2)</sup>
APA4501120101	25Gb/s	850nm 25G MM 1x12 DTC VCSEL array	Grip ring <sup>(2)</sup>
APA4501010201	25Gb/s	850nm 25G MM DTC VCSEL chip	Gel-Pak <sup>(3)</sup>
APA4501040201	25Gb/s	850nm 25G MM 1x4 DTC VCSEL array	Gel-Pak <sup>(3)</sup>
APA4501120201	25Gb/s	850nm 25G MM 1x12 DTC VCSEL array	Gel-Pak <sup>(3)</sup>

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

**Contact Information**

[www.laserenterprise.com](http://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 05**

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