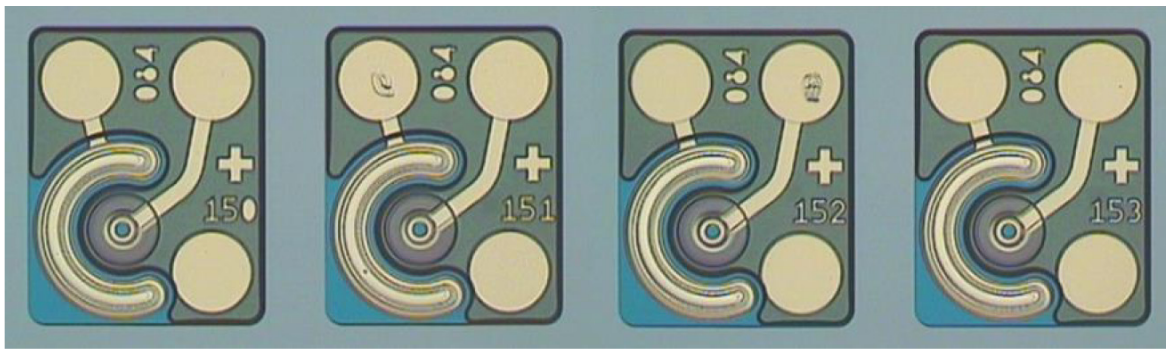


# 850 nm 10 Gbps DUAL TOP CONTACT MULTIMODE VCSEL ARRAY


APA4301010002

APA4301040002

APA4301120002



## FEATURES

- 850 nm multimode emission
- Low spectral width
- Low threshold and operation current
- High reliability
- High humidity robustness compliant with GR468
- Low electrical parasitics
- Data rates from DC to 10 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 at 10 Gb/s up to 300 m.
- Smart cables, HDMI

## SHIPMENT PACKAGING OPTIONS

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

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### Electro-Optical Characteristics

T = 25 °C unless otherwise noted

Parameter	Symbol	Conditions	Ratings			Unit
			Min	Typ	Max	
Threshold current	$I_{th}$			0.8	1.1	mA
Slope efficiency	$\eta$	$I = 4 \text{ mA}$	0.34	0.43	0.52	mW/mA
Optical output power	$P_{out}$	$I_{op} = 5 \text{ mA}$	1.4	1.8	2.2	mW
Operating voltage	$U_{op}$	$I_{op} = 5 \text{ mA}$		1.9	2.1	V
Differential resistance	$R_d$	$I_{op} = 5 \text{ mA}$	45	60	75	$\Omega$
Emission wavelength	$\lambda$	$I_{op} = 5 \text{ mA}, T = -10^\circ\text{C} - 85^\circ\text{C}$	840	850	860	nm
Spectral width, RMS	$\Delta\lambda$	$I_{op} = 5 \text{ mA}, T = -10^\circ\text{C} - 85^\circ\text{C}$			0.4	nm
Modulation bandwidth	$f_{3dB}$	$I_{op} = 5 \text{ mA}$	9			GHz
Rise time	$t_r$	$I_{op} = 5 \text{ mA}, ER = 5 \text{ dB}, 20\% - 80\%$		30	35	ps
Fall time	$t_f$	$I_{op} = 5 \text{ mA}, ER = 5 \text{ dB}, 20\% - 80\%$		40	45	ps
Capacitance	C	$I_{op} = 5 \text{ mA}$		0.2	0.3	pF
Beam divergence	$\Theta$	$I_{op} = 5 \text{ mA}, \text{Full width } 1/e^2$		24	30	$^\circ$
Relative Intensity Noise	RIN(OMA)	$I_{op} = 5 \text{ mA}, ER = 5 \text{ dB}, 7.7 \text{ GHz bandwidth}$			-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	$\delta\lambda/\delta T$		0.06		nm/K
Slope efficiency variation 25 °C - 85 °C	$\Delta\eta_T$	-0.5	-0.3	-0.1	%/K
Thermal impedance	$Z_{th}$		3.0		K/mW

### Absolute Maximum Ratings

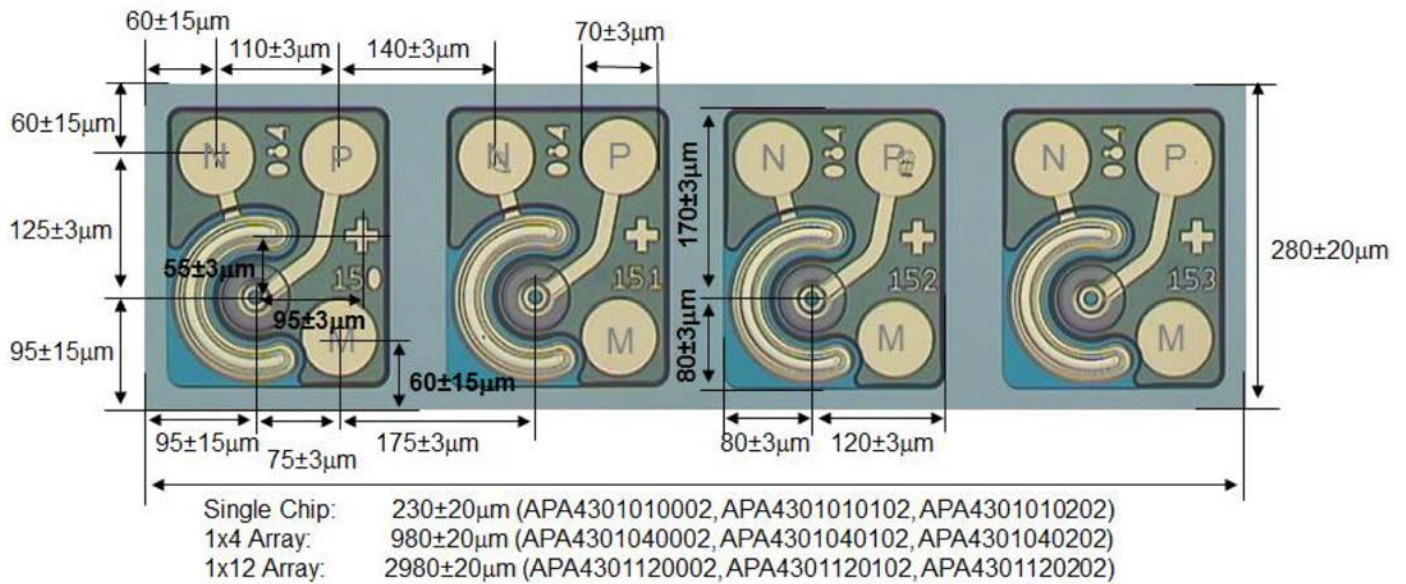
Parameter	Rating	Unit
Optical output power	8	mW
Peak forward current (max. 10sec)	12	mA
VCSEL reverse voltage	5	V
Operating temperature	-10 to +85	$^\circ\text{C}$
Storage temperature	-40 to +100	$^\circ\text{C}$
Mounting temperature (max. 10sec)	260	$^\circ\text{C}$

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## Chip Outer Dimensions

Parameter	Min	Typ	Max	Unit
Die length, APA4301010002, APA4301010102, APA4301010202	210	230	250	$\mu\text{m}$
Die length, APA4301040002, APA4301040102, APA4301040202	960	980	1000	$\mu\text{m}$
Die length, APA4301120002, APA4301120102, APA4301120202	2960	2980	3000	$\mu\text{m}$
Die width	260	280	300	$\mu\text{m}$
Die height	135	150	165	$\mu\text{m}$

## Chip Layout



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

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## RoHS Compliance

Coherent 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
APA4301010302	10 Gb/s	850 nm 10 G MM DTC VCSEL chip	Diced wafer on metal lead frame <sup>(1)</sup>
APA4301040302	10 Gb/s	850 nm 10 G MM 1x4 DTC VCSEL array	Diced wafer on metal lead frame <sup>(1)</sup>
APA4301120302	10 Gb/s	850 nm 10 G MM 1x12 DTC VCSEL array	Diced wafer on metal lead frame <sup>(1)</sup>
APA4301010102	10 Gb/s	850 nm 10 G MM DTC VCSEL chip	Grip ring <sup>(2)</sup>
APA4301040102	10 Gb/s	850 nm 10 G MM 1x4 DTC VCSEL array	Grip ring <sup>(2)</sup>
APA4301120102	10 Gb/s	850 nm 10 G MM 1x12 DTC VCSEL array	Grip ring <sup>(2)</sup>
APA4301010202	10 Gb/s	850 nm 10 G MM DTC VCSEL chip	Gel-Pak <sup>(3)</sup>
APA4301040202	10 Gb/s	850 nm 10 G MM 1x4 DTC VCSEL array	Gel-Pak <sup>(3)</sup>
APA4301120202	10 Gb/s	850 nm 10 G MM 1x12 DTC VCSEL array	Gel-Pak <sup>(3)</sup>

<sup>(1)</sup> Full diced 6" wafer on UV tape on metal lead frame Ø 230 mm, electronic wafermap provided (standard high volume)

<sup>(2)</sup> Known Good Dies on UV tape on grip ring Ø 150 mm (medium volume)

<sup>(3)</sup> Known Good Dies in 2" Gel-Pak (low volume)

## Important Notice

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