Vertical Cavity Surface Emitting Laser in ST Optical Sub-Assembly OPV314AT, OPV314BT, OPV314YAT, OPV314YBT

OPTEK Technology


## Description:

The OPV314AT and OPV314BT are high performance 850nm VCSEL packaged for high speed communication links. OPV314AT and OPV314BT combines all the performance advantages of a VCSEL with the addition of a power monitor diode for precise control of optical power.

The OPV314YAT and OPV314YBT are identical electrically and optically and differ only in pin out. Refer to mechanical drawings for details.

This product's combination of features including high speed, high output power and concentric beam makes it an ideal transmitter for integration into all types of data communications equipment.

## Applications:

- Fibre Channel
- Gigabit Ethernet
- ATM
- VSR (Very Short Reach)
- Intra-system links applications
- Optical backplane interconnects
* ST is a registered trademark of AT\&T

Absolute Maximum Ratings ( $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ unless otherwise noted)

| Storage Temperature | $-40^{\circ} \mathrm{C}$ to $+125^{\circ} \mathrm{C}$ |
| :--- | ---: |
| Operating Temperature | $0^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |
| Soldering Lead Temperature | $260^{\circ} \mathrm{C}$ for 10 Seconds |
| Maximum Forward Peak Current, Continuous | 12 mA |
| Maximum Reverse Voltage | 5 V |
| Maximum Forward Current, pulsed $1 \mu \mathrm{~s}$ P.W., 10\% D.C. $)$ | 48 mA |



Additional laser safety information can be found on the Optek website. See application \#221.
Classification is not marked on the device due to space limitations. See package outline for centerline of optical radiance. Operating devices beyond maximum rating may cause devices to exceed rated classification

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Electrical/Optical Characteristics (at $25^{\circ} \mathrm{C}$ unless otherwise specified)

| SYMBOL | PARAMETER |  | MIN | TYP | MAX | UNITS | TEST CONDITION |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{P}_{\text {T50 }}$ | Total Coupled Power 50/125 $\mu \mathrm{m}$ Fiber | OPV314AT, OPV314YAT OPV314BT, OPV314YBT | 600 |  |  | $\mu \mathrm{W}$ | $\mathrm{I}_{\mathrm{F}}=7 \mathrm{~mA}$ |
|  |  |  | 400 |  |  | $\mu \mathrm{W}$ | $\mathrm{I}_{\mathrm{F}}=7 \mathrm{~mA}$ |
| $\mathrm{I}_{\text {TH }}$ | Threshold Current |  | 0.8 |  | 3.0 | mA | Note1 |
| $V_{F}$ | Forward Voltage |  | 1.6 |  | 2.2 | V | $\mathrm{I}_{\mathrm{F}}=7 \mathrm{~mA}$ |
| $\mathrm{I}_{\mathrm{R}}$ | Reverse Current |  |  |  | 100 | nA | $\mathrm{V}_{\mathrm{R}}=5 \mathrm{~V}$ |
| $\mathrm{R}_{\mathrm{S}}$ | Series Resistance |  | 20 |  | 55 | ohms | Note 2 |
| $\eta$ | Slope Efficiency | OPV314AT, OPV314YAT OPV314BT, OPV314YBT | 60 |  |  | $\mu \mathrm{W} / \mathrm{mA}$ | Note 3 |
|  |  |  | 40 |  |  | $\mu \mathrm{W} / \mathrm{mA}$ | Note 3 |
| $\mathrm{I}_{\text {RPD }}$ | Reverse Current, photodiode |  |  |  | 30 | nA | $\mathrm{V}_{\mathrm{R}}=40 \mathrm{~V}$ |
| $\mathrm{I}_{\mathrm{M}}$ | Monitor Current |  | 30 |  |  | $\mu \mathrm{A}$ | $\mathrm{I}_{\mathrm{F}}=7 \mathrm{~mA}, \mathrm{~V}_{\mathrm{R}}=5 \mathrm{~V}$ |
| $\lambda$ | Wavelength |  | 840 |  | 860 | nm |  |
| $\Delta \lambda$ | Optical Bandwidth |  |  |  | 0.85 | nm |  |
| $\mathrm{t}_{\mathrm{r}}$ | Rise Time |  |  | 90 |  | ps | 20\% to 80\% |
| $\mathrm{t}_{\mathrm{f}}$ | Fall Time |  |  | 120 |  | ps | 80\% to 20\% |
| $\mathrm{N}_{\mathrm{RI}}$ | Relative Intensity Noise |  |  | -123 |  | $\mathrm{db} / \mathrm{Hz}$ |  |
| $\Delta \eta / \Delta T$ | Temp Coefficient of Slope Efficiency |  |  | -0.4 |  | \%/ ${ }^{\circ} \mathrm{C}$ | $0^{\circ}-70^{\circ} \mathrm{C}$ |
| $\Delta \mathrm{I}_{\text {TH }}$ | Temp Variance of Threshold Current |  |  | $\pm 1.0$ |  | mA | $0^{\circ}-70^{\circ} \mathrm{C}$ |
| $\Delta \lambda / \Delta T$ | Temp Coefficient of Wavelength |  |  | 0.06 |  | $\mathrm{nm} /{ }^{\circ} \mathrm{C}$ | $0^{\circ}-70^{\circ} \mathrm{C}$ |
| $\Delta \mathrm{Vf} / \Delta \mathrm{T}$ | Temperature Coefficient for $\mathrm{V}_{\mathrm{F}}$ |  |  | -2.5 |  | $\mathrm{mV} /{ }^{\circ} \mathrm{C}$ |  |

NOTES:
(1) Threshold Current is based on the two line intersection method specified in Telcordia GR-468-Core. Line 1 from 4 mA to 6 mA . Line 2 from 0 mA to 0.5 mA .
(2) Series Resistance is the slope of the Voltage-Current line from 5 to 8 mA .
(3) Slope efficiency, is the slope of the best fit LI line from 5 mA to 8 mA using no larger than .25 mA test interval points. Measured with a 50/125 $\mu \mathrm{m}$ fiber.
(4) Linearity-Using data points taken for slope efficiency above, data L/delta I shall be calculated for each adjacent pair of points.

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OPV314AT, OPV314BT

| Pin | Connection |
| :--- | :--- |
| $\mathbf{1}$ | VCSEL Anode |
| $\mathbf{2}$ | VCSEL Cathode/PD Anode |
| $\mathbf{3}$ | PD Cathode |

VCSEL PD


| OPV314YAT, OPV314YBT |  |
| :--- | :--- |
| Pin | Connection |
| $\mathbf{1}$ | VCSEL Cathode |
| $\mathbf{2}$ | VCSEL Anode/PD Cathode |
| $\mathbf{3}$ | PD Anode |

