## ABSOLUTE MAXIMUM RATINGS

| Parameter | Rating |
|---|---|
| Storage Temperature | -40 to +100 °C |
| Operating Temperature | 0 to +70 °C |
| Lead Solder Temperature | 260 °C, 10 sec. |
| Laser Continuous Forward Current, Heat Sinked | 15 mA |
| Laser Reverse Breakdown Voltage ($I_R$=10 μA) | 5 V @ 10 μA |

## ELECTRO-OPTICAL CHARACTERISTICS ($T_A$=25 °C unless otherwise stated)

| VCSEL Parameters | Test Condition | Symbol | Min. | Typ. | Max. | Units | Notes |
|---|---|---|---|---|---|---|---|
| Peak Operating Current | Adjustable to establish operating power | $I_{peak}$ | | 12 | 20 | mA | 1 |
| Optical Power Output | $I_F$=12mA | Po | 0.9 | 1.8 | 3.6 | mW | 1 |
| Threshold Current | | $I_{TH}$ | 1.5 | 3.5 | 6 | mA | |
| Threshold Current Temperature Variation | $T_A$ = 0°C to 70°C | $\Delta I_{TH}$ | -1.5 | | 1.5 | mA | 2 |
| Slope Efficiency | Po =1.3mW | $\eta$ | 0.1 | 0.25 | 0.4 | mW/mA | 3 |
| Slope Efficiency Temperature variation | $T_A$ = 0°C to 70°C | $\Delta\eta / \Delta T$ | | -0.5 | | %/°C | |
| Peak Wavelength | $I_F$=12mA | $\lambda_P$ | 830 | 850 | 860 | nm | |
| $\lambda_P$ Temperature Variation | $I_F$=12mA | $\Delta\lambda_P/\Delta T$ | | 0.06 | | nm/°C | |
| Spectral Bandwidth, RMS | $I_F$=12mA | $\Delta\lambda$ | | | 0.85 | nm | |
| Laser Forward Voltage | $I_F$=12 mA | $V_F$ | 1.6 | 1.8 | 2.2 | V | |
| Laser Reverse Voltage | $I_R$=10 μA | $BVR_{LD}$ | 5 | 10 | | V | |
| Rise and Fall Times | Prebias Above Threshold, 20%-80% | $t_r/t_f$ | | 100 | 300 | ps | 4 |
| Relative Intensity Noise | 1 GHz BW, $I_F$=12mA | RIN | | -128 | -122 | dB/Hz | |
| Series Resistance | $I_F$=12 mA | $R_S$ | 18 | 25 | 40 | Ohms | |
| Beam Divergence | $I_F$=12 mA | $\theta$ | 5 | 15 | 20 | Degrees | 5 |

**Notes:**

1. Operating power is set by the peak operating current $I_{PEAK}=I_{BIAS}+I_{MODULATION}$.
2. Operation at temperatures outside the specified range may result in the threshold current exceeding the maximums defined in the electro-optical characteristics table.
3. Slope efficiency is defined as $\Delta Po/\Delta IF$ at a total power output of 1.3 mW.
4. Rise and fall times are sensitive to drive electronics, 200ps rise and fall times are achievable with Honeywell VCSELs.
5. Beam divergence is defined as the total included angle between the $1/e^2$ intensity points.