

## 5.0 Conclusions

The VCSELs mounted on diamond were capable of being overdriven at higher current levels without damage. The highly accelerated voltage and current stress demonstrated that the diamond substrate provided a significant margin of thermal mitigation. VCSELs were driven at up to 3X the manufacturers recommended maximum instantaneous operating current and 10X the typical threshold current. Key parameters from the data sheet are summarized below in Table 4.

Parameter	Rating	Min	Typical	Max
Max Continuous Operating Current	20mA			
Max Instantaneous Operating Current	25mA			
Peak Wavelength		830nm	850nm	860nm
Threshold Current		5mA	8mA	9mA
Output Power at 20mA		3dBm	7.8dBm	10dBm
Operating Voltage at 9mA		1.6V	2.2V	2.3V

Table 4. Key Parameters from Emcore VCSEL data sheet (p/n 8085-1000)

Additional testing is required to assess the effects of screening on the long term reliability of VCSEL mounted on diamond. Additional characterization of wavelength stability in current generation VCSEL arrays is also warranted.