

## Temperature Effects on NIR LEDs

Peak Wavelength, Forward Voltage and Power Output are all affected by changes in the junction temperature. The junction temperature in a given circuit is affected by the input current, ambient temperature and level of heat sinking of the package.

**Peak Wavelength:** For applications where an optically unfiltered photodiode is the receiver the shift in wavelength is not critical. However, for wavelength specific applications such as CCD or Night Vision goggle illumination high junction temperatures can play a critical role. The wavelength shift is typically 0.35nm/C shift in the junction temperature. For instance, if the junction temperature rises from 40°C to 100°C the wavelength may shift from 885 nm to 906 nm.

**Forward Voltage:** The forward voltage decreases as the junction temperature increases. The typical shift is approximately  $-0.1\%/^{\circ}\text{C}$ . This can be important if the current source does not have enough headroom at low temperatures to support the increased forward voltage of the LED. If figure 2 circuit is employed at high temperatures the current will increase and may potentially damage the device from excess current and junction temperature.

**Power Output:** The power output efficiency of IRLEDs decreases by approximately  $-0.5\%/^{\circ}\text{C}$ . In applications where there are large temperature swings, the variation in LED output will be far greater than the drop in LED power output caused by long term degradation.