

15 laser diodes (Model TO-658PLR-35) were subjected to high temperature lifetest (60°C) at constant current .

The pre an post burn-in LIV curves from the 15 laser diodes illustrated in figure 1 and 2 are well behaved.

No diodes failed in 3,800 hours of operation at 60°C.

The formula used to estimate time to failure is the Arrhenius formula:

$$t_{T_1} = A \cdot e^{\left(\frac{E_A}{k \cdot T_1}\right)} \quad (1)$$

Where  $t_{T_1}$  = the time to failure [hours]

$A$  = scaling factor

$E_A$  = Activation Energy [eV]

$k$  = Boltzman constant [ $8.617 \cdot 10^{-5}$  ev/K]

$T_1$  = Temperature [K]

The acceleration factor  $\alpha$  used to estimate lifetime at lower temperature  $T_2$  Is computed from (1):

$$\alpha = \frac{t_{T_1}}{t_{T_2}} = e^{\frac{E_A}{k} \left( \frac{1}{T_1} - \frac{1}{T_2} \right)} \quad (2)$$

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With  $T_1 = 25^\circ\text{C}$  and  $T_2 = 60^\circ\text{C}$  (test temperature), and a activation energy  $E_A$  chosen conservatively (0.3eV), the acceleration factor is computed with Equation (2) and equal to 3.4.

Therefore, we estimate that 3,800 hours of operation at 60 °C is equivalent to 12,920 hours at 25 °C.

Figure 1

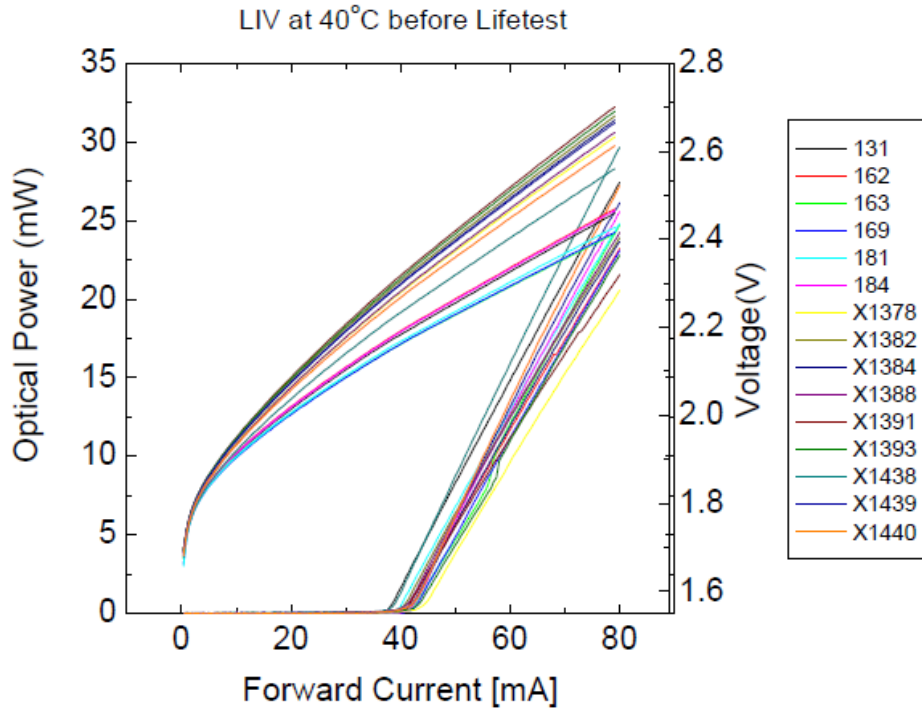


Figure 2

