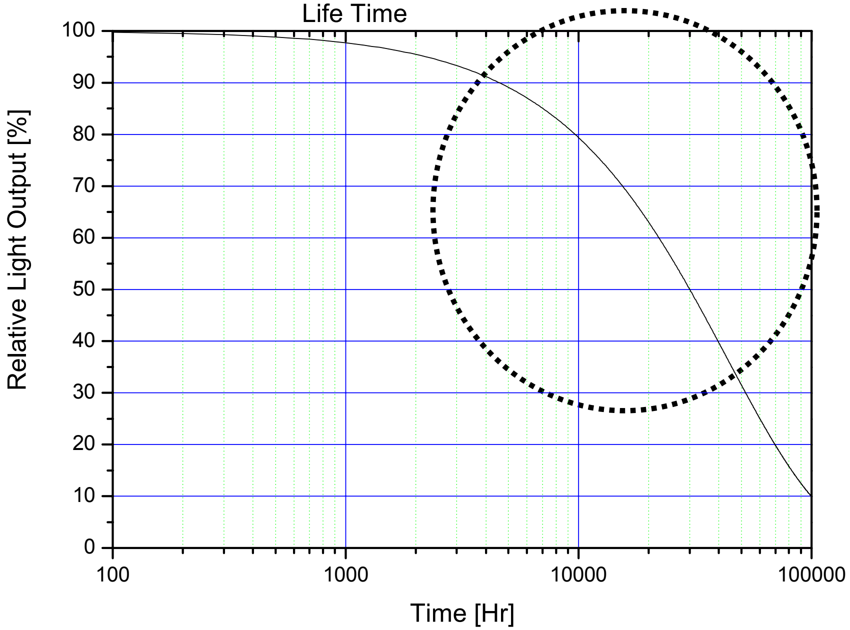
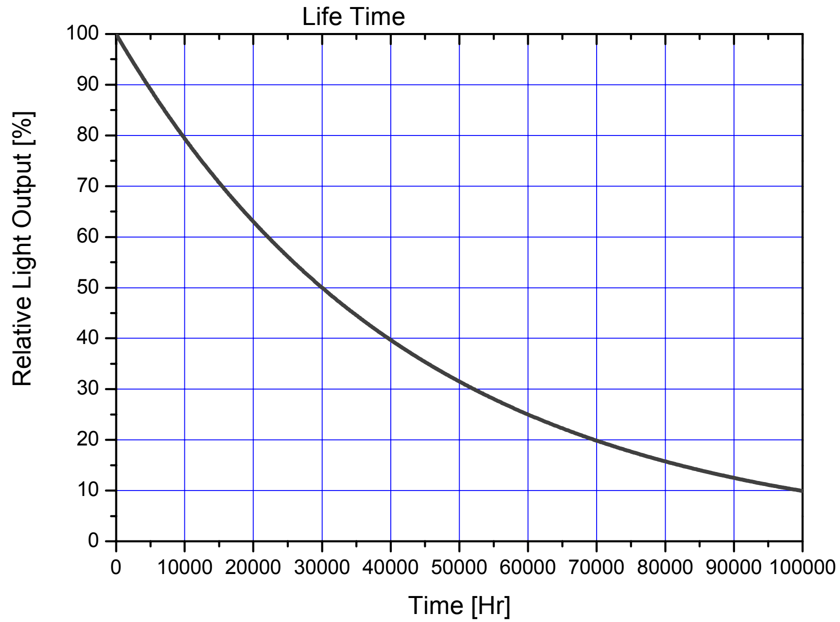
Life Time Graph of Z-Power LED

Life Time Graph of P1 1W Series for T_J = 90 ℃



Detail



30,000hr 50% degradation

*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

where

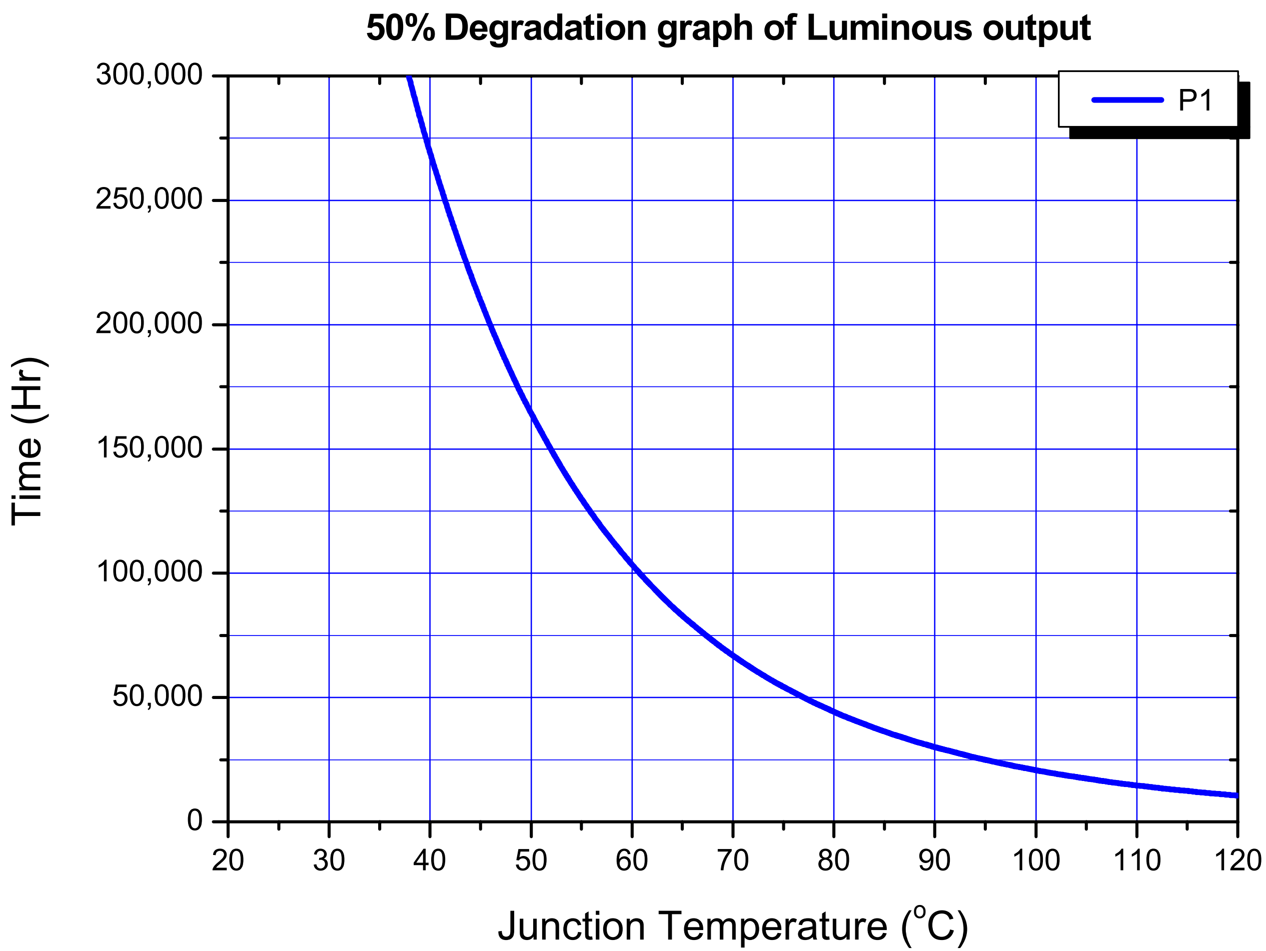
R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

Life time of P1 blue can be shorter than others as junction temperature goes higher.

Tj vs. Life Time Graph of Z-Power P1 1W Series



Life time of P1 blue can be shorter than others as junction temperature goes higher.

*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

$$\lambda_2 = \lambda_1 exp\left[\frac{E_A}{k}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

λ_1 = failure rate at junction temperature T_1

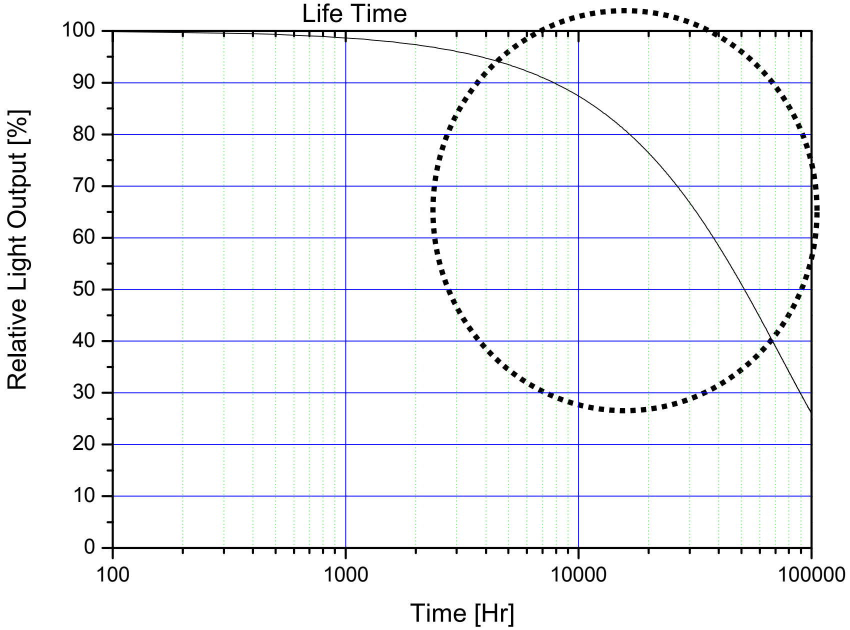
λ_2 = failure rate at junction temperature T_2

E_A = activation energy, in units eV

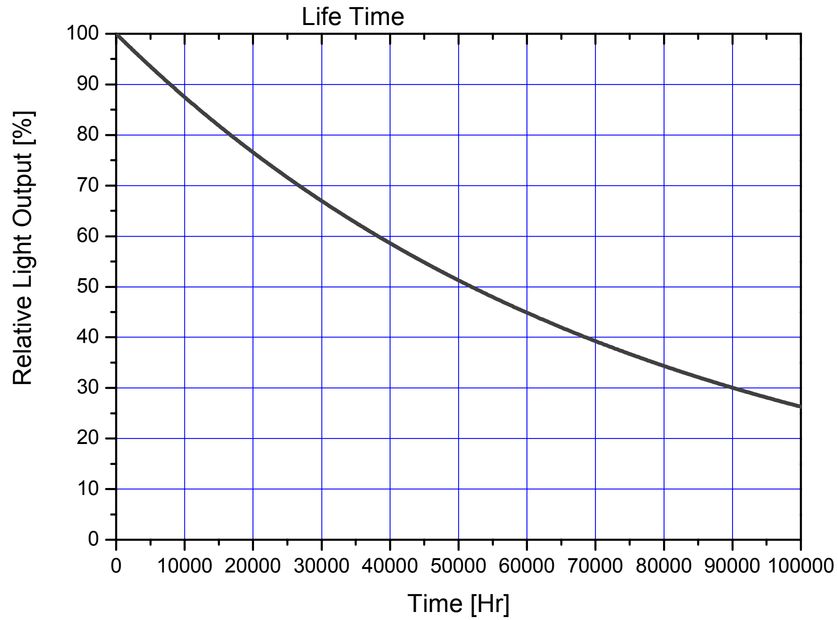
k = Boltzmann's constant (8.617×10^{-5} eV/°K)

T = junction temperature in °K(°K = ℃ + 273)

Life Time Graph of P9 White for T_J = 90 ℃



Detail



50,000hr 50% degradation

*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

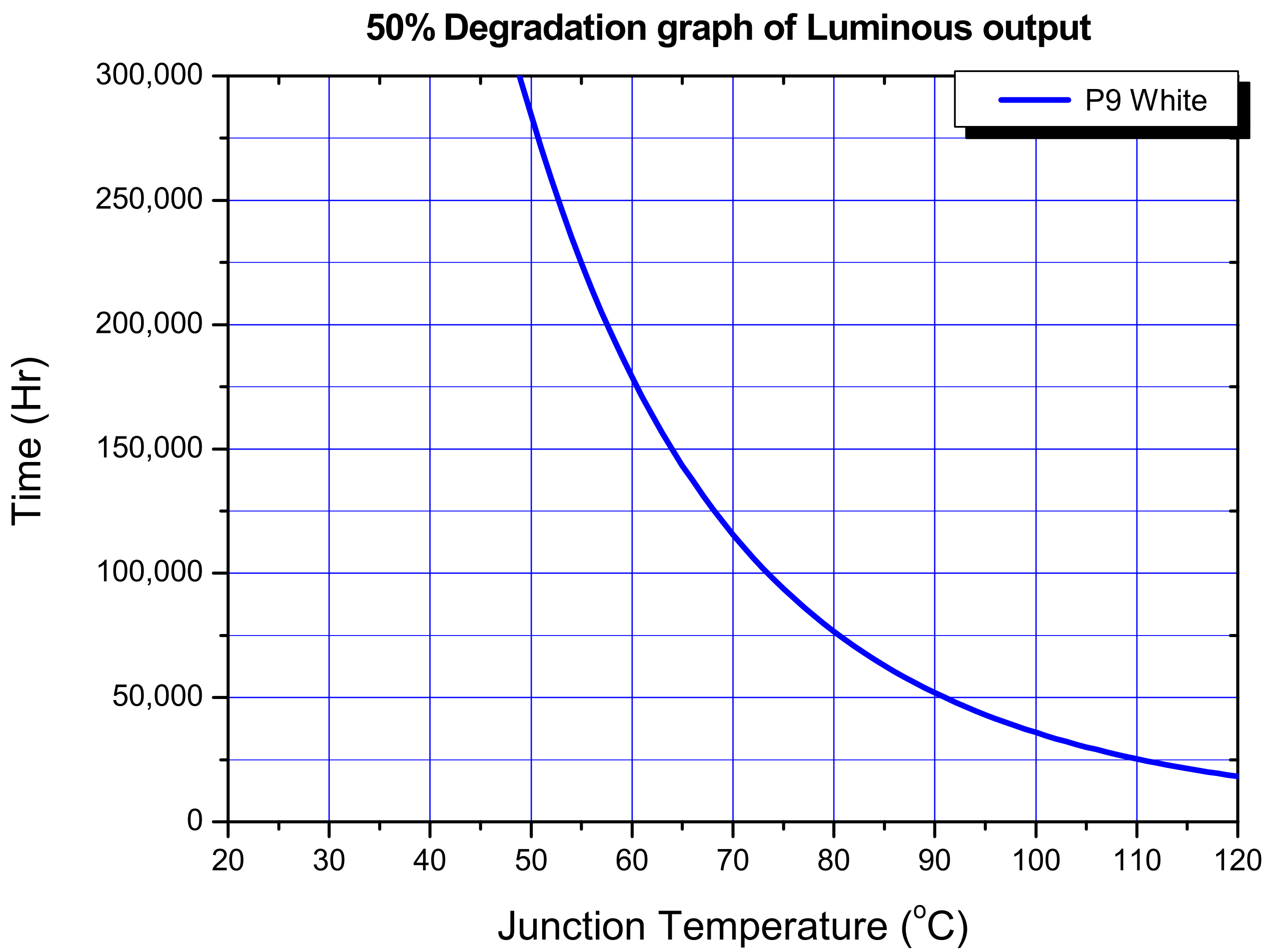
where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

Tj vs. Life Time Graph of Z-Power 0.5W series



*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=\exp(-\lambda t)$$

$$\lambda_2 = \lambda_1 exp\left[\frac{E_A}{k}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

where

R(t)= Probability that unit will operate at time t

λ = *failure rate*

t= Time component is on

λ_1 = *failure rate at junction temperature* T_1

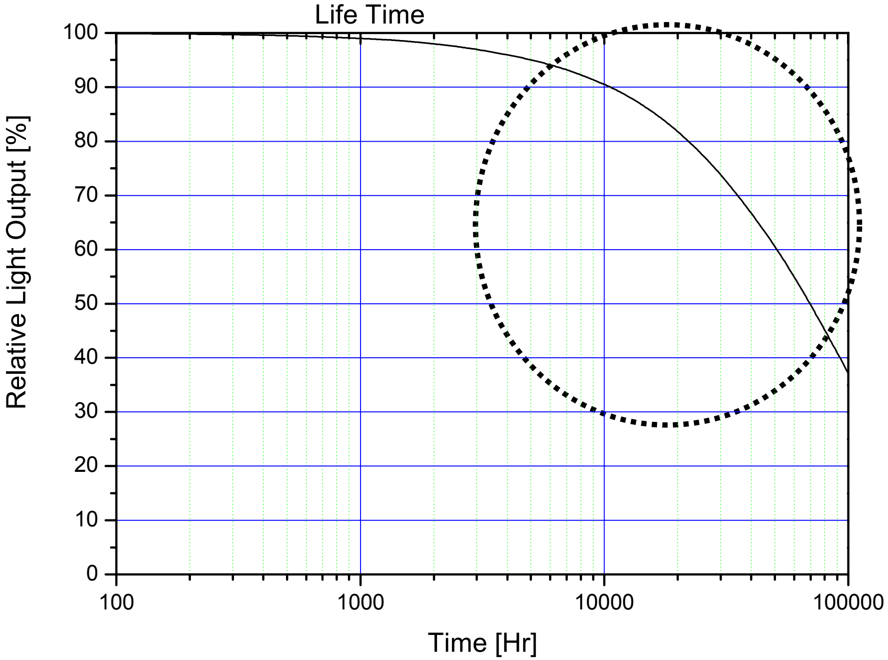
λ_2 = *failure rate at junction temperature* T_2

E_A = *activation energy, in units eV*

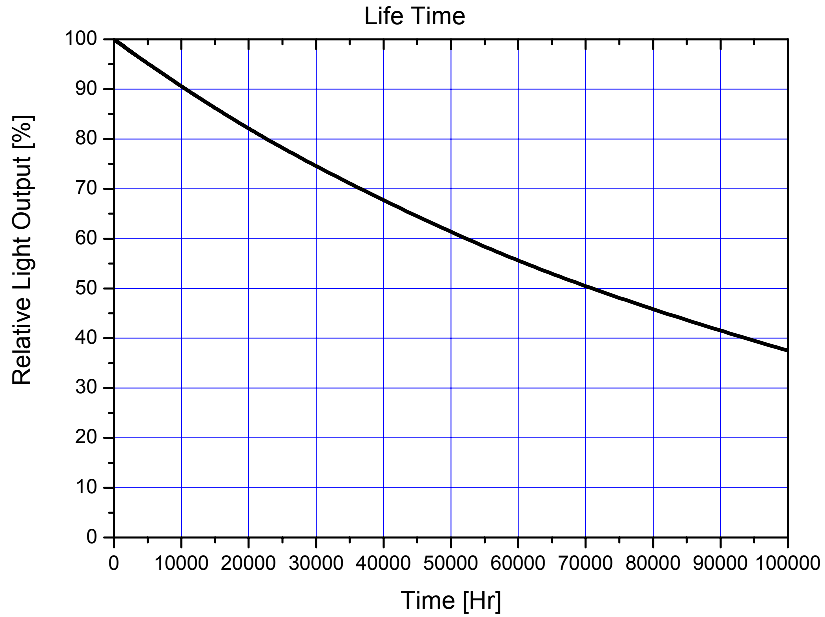
k = *Boltzmann's constant* $(8.617 \times 10^{-5} eV/°K)$

T = junction temperature in °K(°K = ℃ + 273)

Life Time Graph of P4 1W Pure White for T_J = 90 ℃ (@350mA)



Detail



70,000hr 50% degradation

∗This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

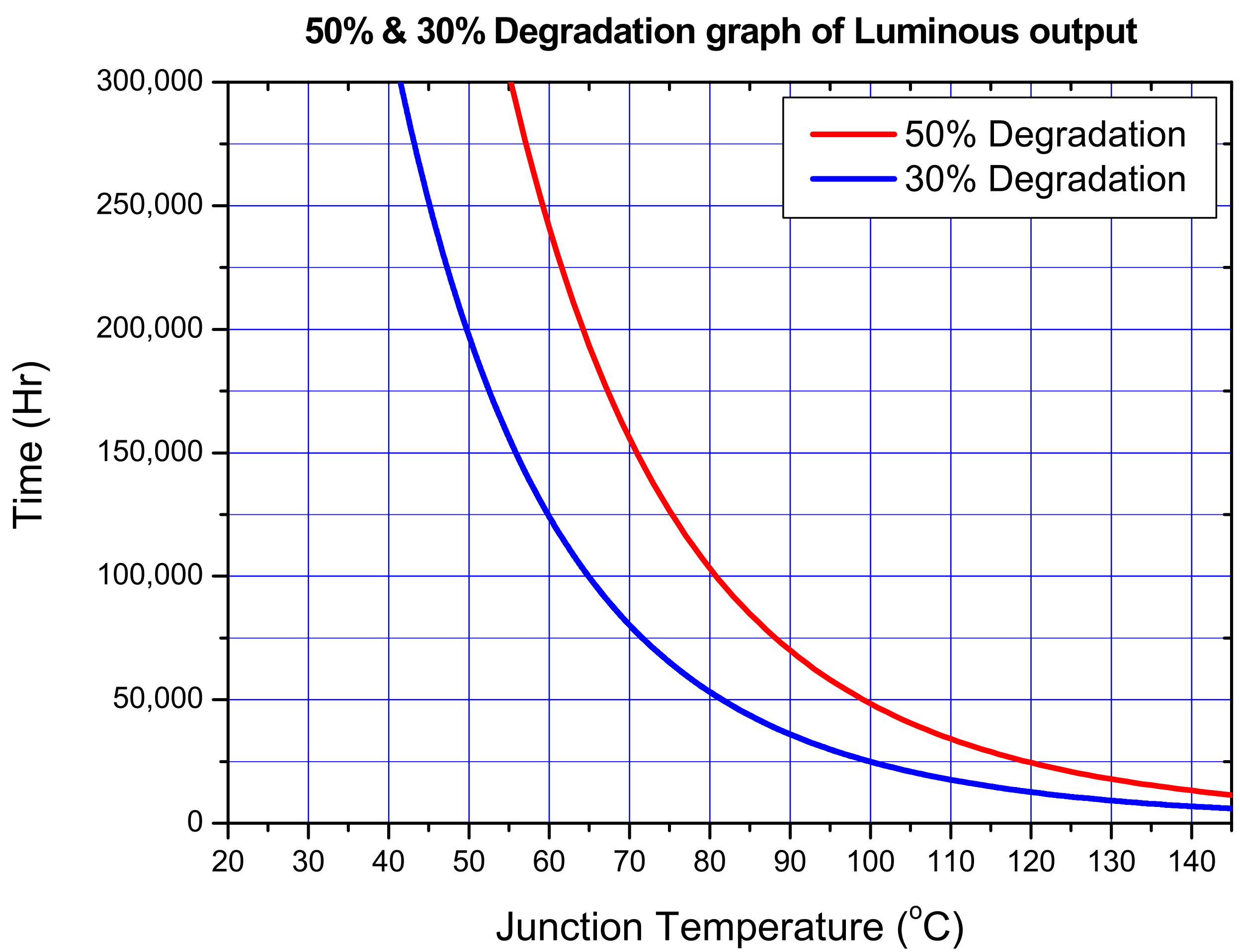
where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

Tj vs. Life Time Graph of Z-Power P4 1W Pure White Series



*This calculation can be done using the Arrhenius Model as shown below

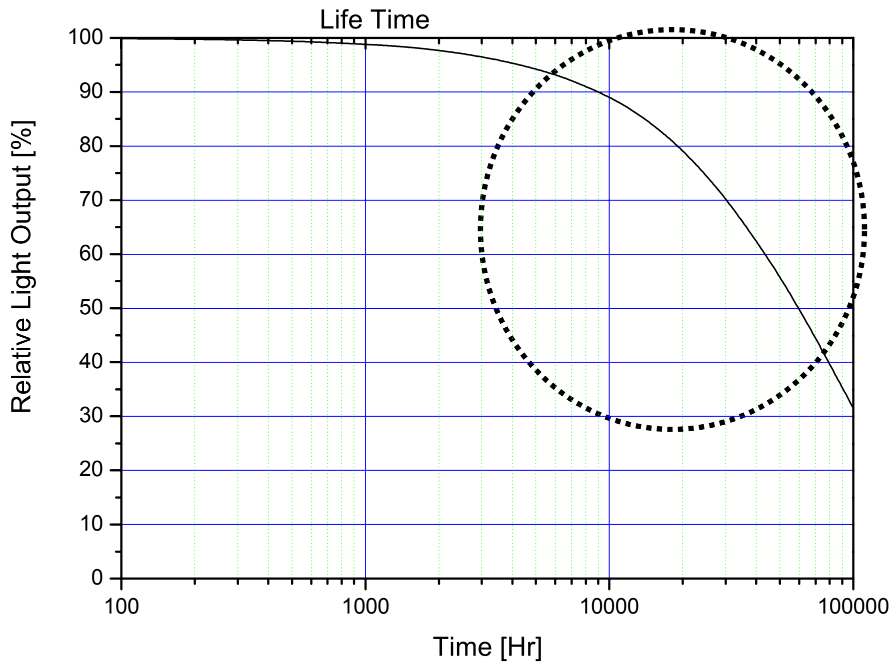
$$R(t) = exp(-\lambda t)$$

$$\lambda_2 = \lambda_1 exp\left[\frac{E_A}{k}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

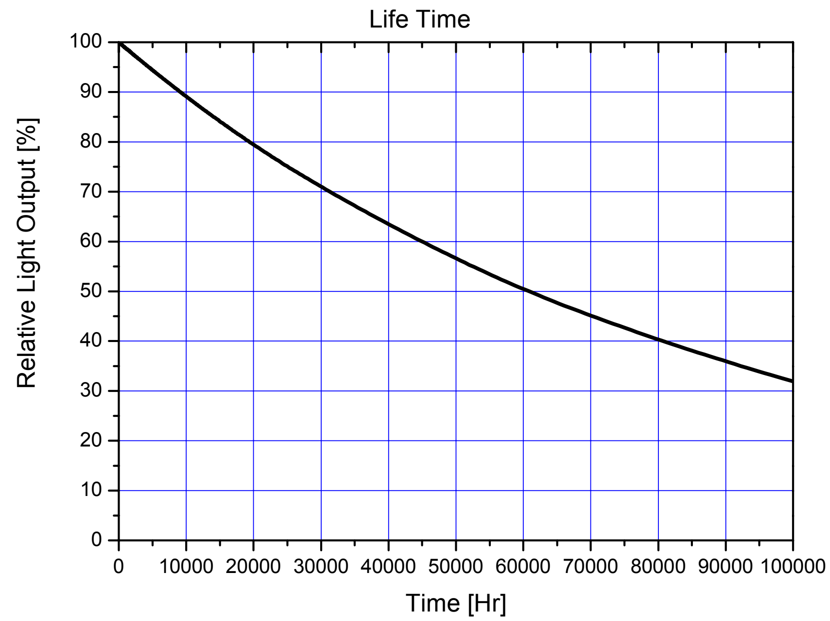
where

- $R(t)$ = *Probability that unit will operate at time t*
- λ = *failure rate*
- t = *Time component is on*
- λ_1 = *failure rate at junction temperature* T_1
- λ_2 = *failure rate at junction temperature* T_2
- E_A = *activation energy, in units eV*
- k = *Boltzmann's constant* $(8.617 \times 10^{-5} eV/°K)$
- T = *junction temperature in °K(°K = ℃ + 273)*

Life Time Graph of P4 2.5W Pure White for T_J = 90 ℃ (@700mA)



Detail



60,000hr 50% degradation

*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

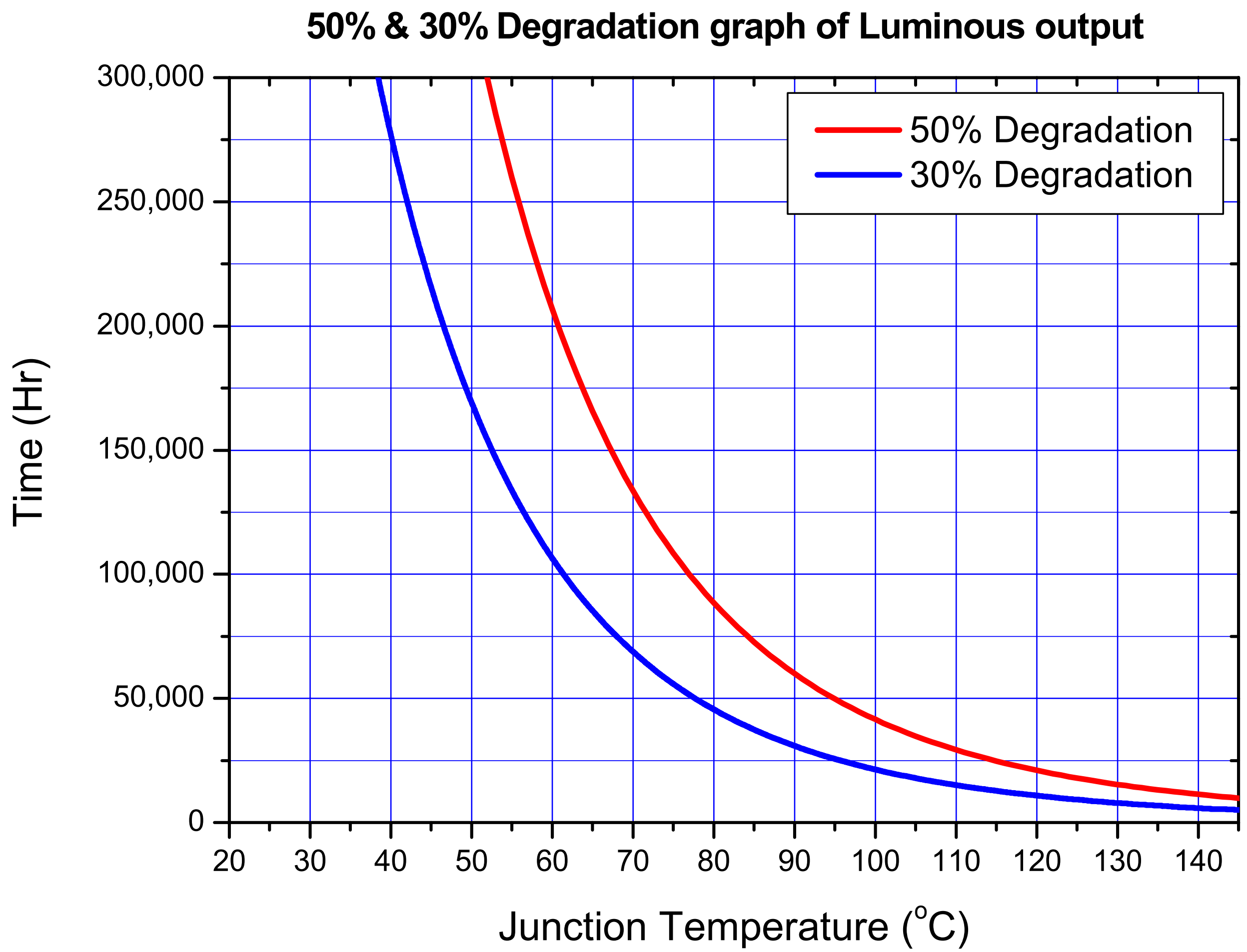
where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

Tj vs. Life Time Graph of Z-Power P4 2.5W Pure White Series



*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

$$\lambda_2 = \lambda_1 exp\left[\frac{E_A}{k}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

where

$R(t)$ = Probability that unit will operate at time t

λ = failure rate

t = Time component is on

λ_1 = failure rate at junction temperature T_1

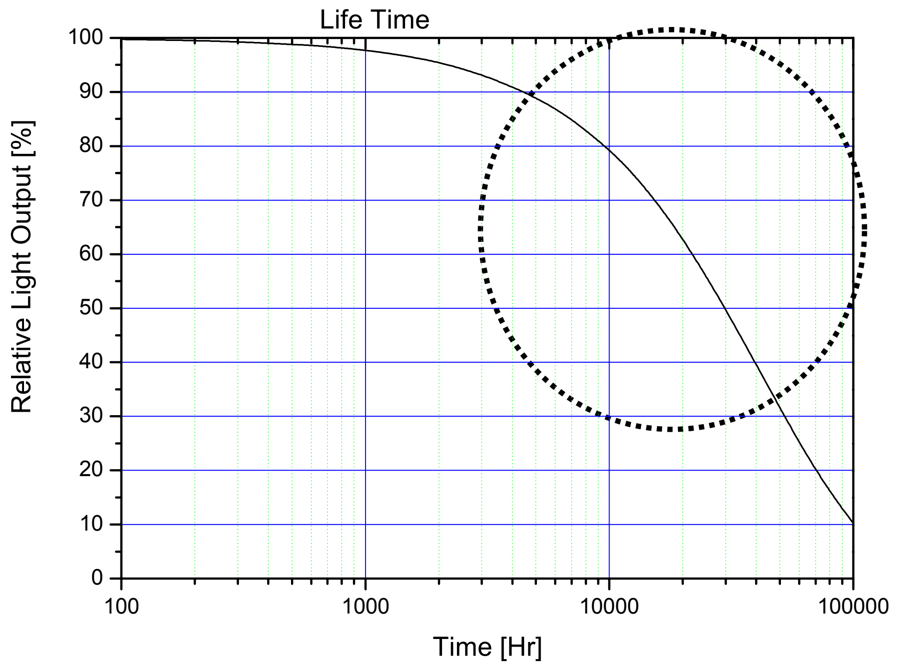
λ_2 = failure rate at junction temperature T_2

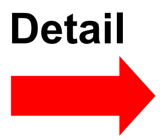
E_A = activation energy, in units eV

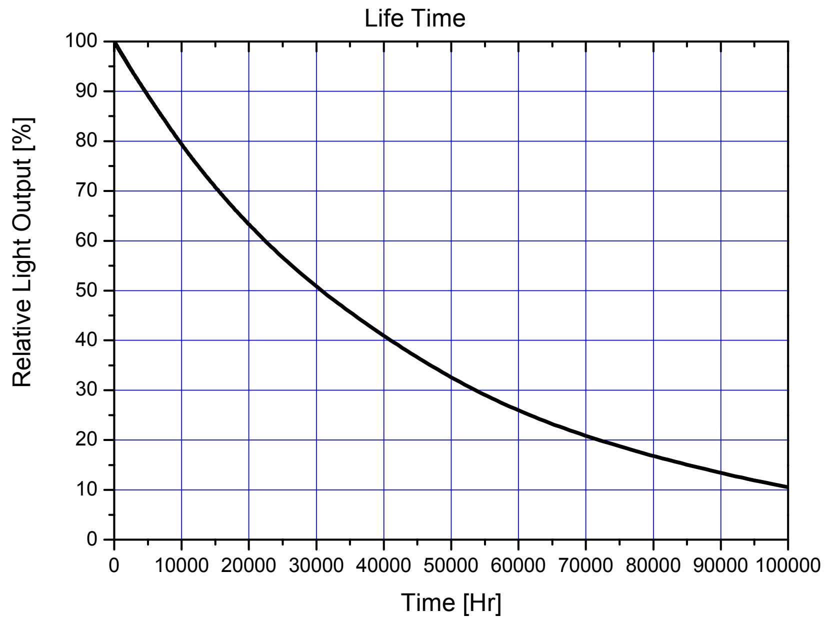
k = Boltzmann's constant (8.617×10^{-5} eV/°K)

T = junction temperature in °K(°K = ℃ + 273)

Life Time Graph of P4 4W Pure White for T_J = 90 ℃ (@1A)







30,000hr 50% degradation

*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

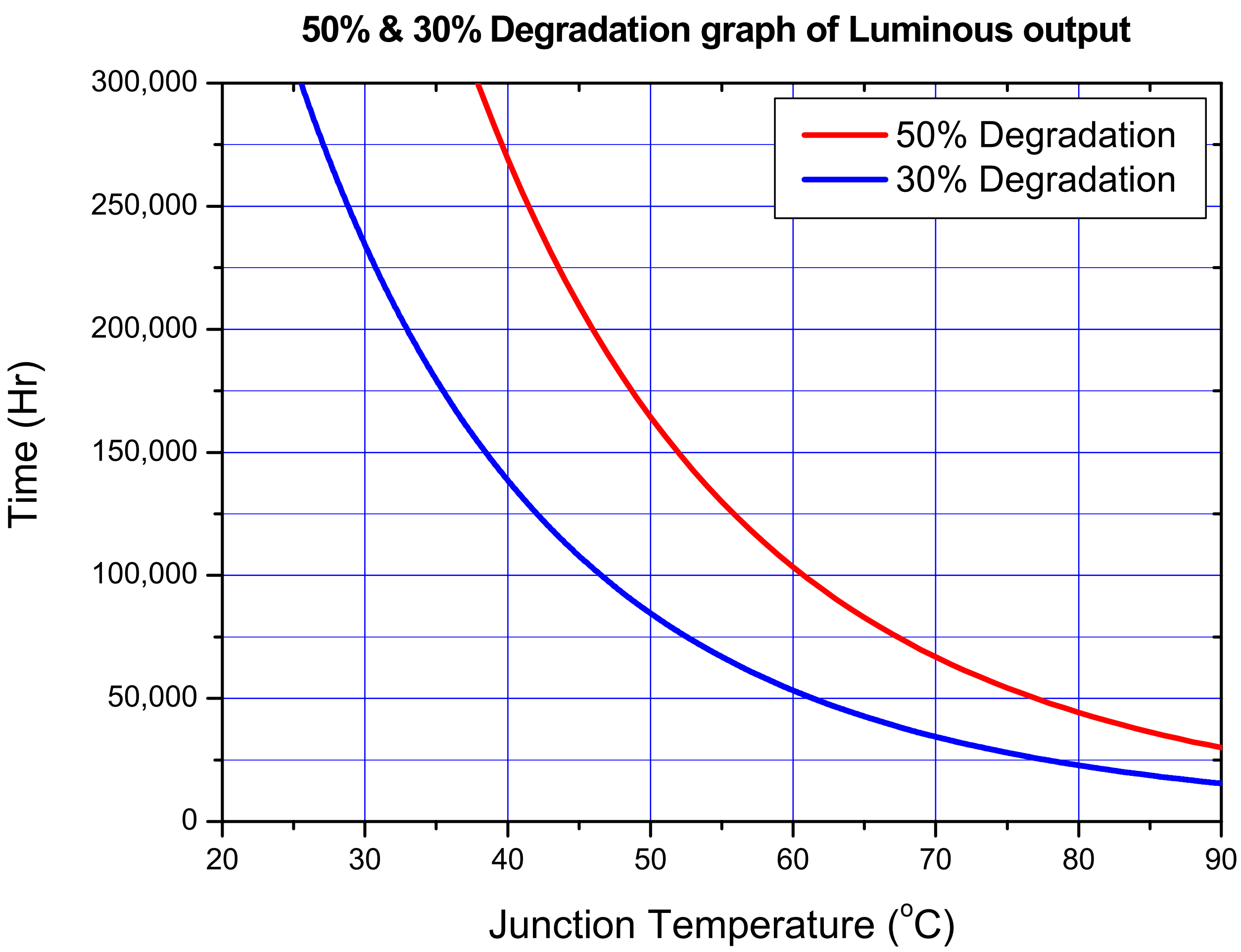
where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

Tj vs. Life Time Graph of Z-Power P4 4W Pure White Series



*This calculation can be done using the Arrhenius Model as shown below

$$R(t)=exp(-\lambda t)$$

$$\lambda_2 = \lambda_1 exp\left[\frac{E_A}{k}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

where

R(t)= Probability that unit will operate at time t

λ = failure rate

t= Time component is on

λ_1 = failure rate at junction temperature T_1

λ_2 = failure rate at junction temperature T_2

E_A = activation energy, in units eV

k = Boltzmann's constant (8.617×10^{-5} eV/°K)

T = junction temperature in °K(°K = ℃ + 273)