Thermal calculation of LED-modules

$T_{ambient} := 25$ ambient-temperature of the LED-modules [unit: ℃]

$T_{modules\_max} := 65$ maximum temperature of the LED-modules [unit: ℃]

$\Delta T := T_{modules\_max} - T_{ambient} = 40$ temperature-difference between module and ambient [unit: ℃]

P320 LED-module:

$U_{forward\_nominal\_P320\_1050mA} := 28.8 \cdot 1.035 = 29.81$ nominal forward-voltage of the LED-module @1050mA [unit: V]

$P_{module\_1050mA} := U_{forward\_nominal\_P320\_1050mA} \cdot 1.050 = 31.3$

$Light\_efficiency_{P320} := 92$ light-efficiency (approximated) [unit: lm/W]

$Lighting\_current_{Effektiv\_Emitted\_P320\_1050mA} := 1850$ effective emitted lighting-current@1050mA [unit: lm]

$$P_{output\_P320\_1050mA} := \frac{Lighting\_current_{Effektiv\_Emitted\_P320\_1050mA}}{Light\_efficiency_{P320}} = 20.11$$ effective radiated output-power of the module@1050mA [unit: W]

$P_{dissipation\_P320\_1050mA} := P_{module\_1050mA} - P_{output\_P320\_1050mA} = 11.19$ power dissipation @1050mA [unit: W]

$$R_{Th\_P320\_1050mA} := \frac{\Delta T}{P_{dissipation\_P320\_1050mA}} = 3.57$$

maximum required thermal-resistor of the module-series

$$\eta_{P320\%} := \frac{P_{output\_P320\_1050mA}}{P_{module\_1050mA}} \cdot 100$$

$\eta_{P320\%} = 64.25$ efficiency of the module [unit: %]

$A_{P320\_700mA} := 120$ minimum required area of aluminium-sheet (with 2mm thickness) ... determined by the calculated thermal-resistor and the diagram from top [unit: cm^2]

$A_{P320\_1050mA} := 256$ maximum required area of aluminium-sheet (with 2mm thickness)... determined by the calculated thermal-resistor and the diagram from top [unit: cm^2]