TVCast Package
Window Size in Front of the IR Receiver Module (TSOPx9xxx)

The window in front of the IR receiver should be large enough that the radiation from a wide receiving angle is received. The exact dimension depends on the specified receiving angle.

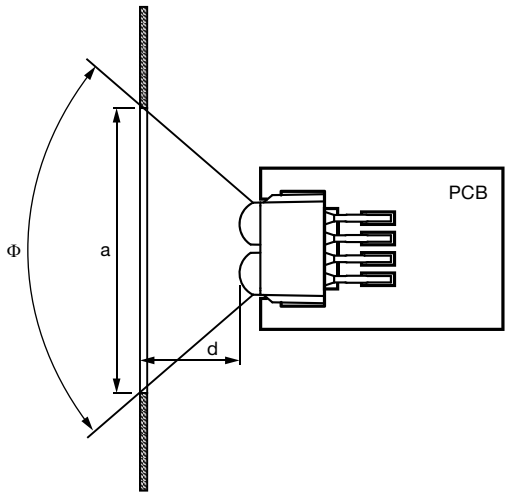

Fig. 1

a: horizontal window size

d: distance between top of the lens and the window

Φ: required directivity, in case the expected angular response is ± 50°, Φ would be 100°

The minimum window size is:

$$a = 6\ mm + 2 \times (d + 1.3\ mm) \times \tan\left(\frac{\Phi}{2}\right)$$

Example:

The horizontal receiving angle should be ± 60° and the distance between window and IR receiver is 3 mm. In that case the minimum window width should be: 20.9 mm

Calculation:

a = 6 mm + 2 x (3 mm + 1. 3 mm) x 1.73 = 20.9 mm

If the window size needs to be small then a light guide may be helpful to span the distance between front panel and IR receiver. There is some loss of optical power at the transition between IR receiver and light guide. In case the IR signal is applied from a wide off axis direction then the efficiency of the light guide is significantly less compared to a window (see above).

In order to have good coupling between light guide and IR receiver we recommend to keep the gap between light guide and the vertex of the lens of the IR receiver as short as possible.

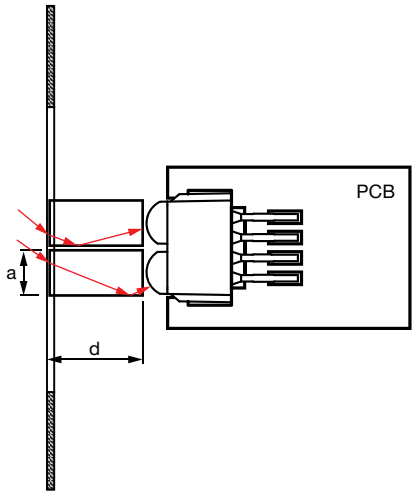

Fig. 2

a: diameter of light guide

b: length of light guide

We recommend a diameter of about a = 2.6 mm and a length of more than d = 7.5 mm for good efficiency and smooth directivity of the light guide.

Please note that a light guide that is shorter than 3 times its thickness may have blind spots in the directivity characteristic. There could be a poor reception at a certain angle of incidence.