Optical simulation results are meant for relative comparison of competing design configurations. Design prototypes are required for optical performance verification.
The design goal is to control system xtalk. The main factors for controlling system xtalk are airgap, glass thickness, glass apertures, optical barrier, and ink/tint characteristics.

General system recommendation are:

- Glass/TMF8X0X airgap 0.3 - 0.6mm range; IR ink required for calibration and operation
- Optical barrier design (e.g. rubber boot)
- Glass thickness 0.55mm
- Glass apertures Ø1.5 / Ø1.1mm (Rx Ø / Tx Ø)
- Glass aperture ink with 85% IR transmissivity
- Assembly XY tolerance between Glass apertures and TMF8X01 is ±0.20mm maximum

The optical simulation results are provided using 4 configuration for reference. The 4 configurations are:

1. GLASS WITH APERTURES (TxØ1.1mm/RxØ1.5mm) uses 85% T-IR ink in apertures
2. GLASS NO APERTURES uses plain clear cover glass without 85% T-IR ink/tint
3. GLASS NO APERTURES WITH OPTICAL BARRIER uses plain clear cover glass without 85% T-IR ink/tint
4. GLASS NO APERTURES uses plain clear cover glass with 85% T-IR ink/tint.
TMF8X0X FoV CONE

3D File: TMF8X01 FOV CONE v4.STEP

±9.50° (19°)
(1/e^2)

±18.5° (37°) (FWHM)
SHORT DISTANCE MODE

±12° (24°) (FWHM)
LONG DISTANCE MODE

Rx FoV
SHORT DISTANCE MODE

Rx FoV
LONG DISTANCE MODE

Tx FoI
**TMF8X0X GLASS APERTURE DESIGN**

**Drawing: TMF8X0X Recommendation**

– use IR ink to hide the TMF8X0X, 85% Transmissive IR (MIN), 15% Visible

– simulated results presented here use IR ink cover glass apertures. Simulations use IR ink in cover glass apertures
TMF8X0X OPTICAL BARRIER DESIGN

Drawing: TMF8X0X Recommendation

– use tinted cover to hide the TMF8X0X, 85% Transmissive IR (MIN), 15% Visible
– simulated results presented here do not use tinted cover glass. Simulations use plain clear cover glass.

Simulation assumes that the Optical Barrier is flexible and contacts the Glass over the air gap range.
Target Crosstalk Values

ToF EVM

Operate the EVM with the full optical stack
No target in front, low ambient light

For TMF8701
• Select proximity histogram only, see (1)
• The highest peak shall be within 300-1500 counts, see (2)

For TMF8801
• Select short range histogram only, see (1)
• The highest peak shall be within 400-1900 counts, see (2)

For TMF8805
• Select short range histogram only, see (1)
• The highest peak shall be within 400-7000 counts, see (2)
Tx VCSEL, TMF8X0X (PART ONLY)

Fol, EMISSION, ±9.5° (19°) 1/e²
Rx SPAD, PROX MODE, TMF8X0X (PART ONLY)

SPAD FoV: 37° ±18.5° FWHM  Proximity Mode is based on the entire SPAD array.

TMF8x0X Rx FoV, Proximity Mode (Typical), 37° (±18.5°) FWHM

TMF8801/TMF8805: This mode is used for short range detection
Rx SPAD, DIST MODE, TMF8X0X (PART ONLY)

SPAD FoV: 24° (±12°) FWHM  Distance Mode is based on the entire SPAD array.

TMF8801/TMF8805: This mode is used for long range detection
XTALK vs AIR GAP, TMF8X01, GLASS 0.55mm THK

XTALK RESPONSE

- GLASS WITH APERTURES (TxØ1.1mm/RxØ1.5mm)
- GLASS NO APERTURES
- GLASS NO APERTURES WITH OPTICAL BARRIER
- GLASS NO APERTURES, 85%T-IR
### Simulation configuration descriptions:

1. **GLASS WITH APERTURES (TxØ1.1mm/RxØ1.5mm)** uses 85% T-IR ink in apertures
2. **GLASS NO APERTURES** uses plain clear cover glass without 85% T-IR ink/tint
3. **GLASS NO APERTURES WITH OPTICAL BARRIER** uses plain clear cover glass without 85% T-IR ink/tint
4. **GLASS NO APERTURES** uses plain clear cover glass with 85% T-IR ink/tint

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<th>AIR GAP, mm</th>
<th>GLASS NO APERTURES</th>
<th>GLASS NO APERTURES WITH OPTICAL BARRIER</th>
<th>GLASS NO APERTURES, 85% T-IR</th>
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</table>

Units: nW
Optical simulation can be used for estimating the variation of an actual customer design.

The actual crosstalk value need to be empirically evaluated in a real application:

- The crosstalk shall meet the requirement defined in slide “Target Crosstalk Values”
- Please note that TMF8701, TMF8801 and TMF8805 have different application target crosstalk values.
Thank you!

Please visit our website
www.ams.com