OpSIS-IME OI50 Process – Performance Summary

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Typical performance is indicated. Performance is often indicated for a wavelength regime; unless otherwise indicated, we expect performance in most cases to be relatively consistent the 1480-1580 nm regime for "1550" components, and for 1280 – 1340 nm for the "1310" components.

Waveguide Performance

1550 Components	Typical Propagation Loss
0.5 μm channel	1.8 dB/cm
0.5 μm rib	1.2 dB/cm
1.2 μm channel	0.32 dB/cm
0.5 μm rib under oxide opening (*)	4.1 dB/cm

(*) – Specified component has the cladding oxide completely removed, exposing the bare silicon for further processing. The yield for such waveguides may only be 50% and performance may vary.

1310 Components	Typical Propagation Loss
0.42 μm channel	4.5 dB/cm
0.42 μm rib	2.4 dB/cm
1 μm channel	0.7 dB/cm

Passive Component Performance

Grating coupler performance has been verified by both OpSIS internal testing and an external packaging vendor. Performance is similar for packaged and unpackaged chips. The parameters for a packaged chip are shown below when accompanied by (*). The edge coupler performance was verified only by a packaging vendor. Results shown below are based on a limited sample size and eventual performance may vary somewhat.

1550 Components	Typical Performance
Y-junction excess loss	0.4 dB
waveguide-crossing excess loss	0.9 dB
waveguide-crossing isolation	40 dB
directional coupler excess loss	0.5 dB

enhanced grating coupler loss	3.1 dB
enhanced grating coupler 1.5 dB bandwidth	50 nm
enhanced grating coupler polarizations supported	TE
grating coupler loss (*)	3.7 dB
grating coupler 1.5 dB bandwidth (*)	45 nm
grating coupler polarizations supported (*)	TE
edge coupler loss (*)	2 dB
edge coupler 0.25 dB bandwidth (*)	> 80 nm
edge coupler polarizations supported (*)	TE, TM
polarization-splitting grating coupler insertion loss	7 dB
polarization-splitting grating coupler 3 dB window	50 nm
on-chip polarization beam splitter typical worst-case loss	3 dB

(*) – Tested performance in packaged chip. Performance in most optical testing labs is expected to be similar.

1310 Components	**Typical Performance**
Y-junction excess loss	0.8 dB
waveguide-crossing excess loss	0.2 dB
grating coupler loss	4.6 dB
grating coupler 1.5 dB bandwidth	30 nm
grating coupler polarizations supported	TE
expected edge coupler loss - TE(**)	3.5 dB
expected edge coupler loss - TM(**)	5.5 dB
expected edge coupler 0.25 dB bandwidth (**)	> 80 nm
expected edge coupler polarizations supported (**)	TE, TM
polarization-splitting grating coupler insertion loss (***)	8.2 dB
polarization-splitting grating coupler 3 dB window (***)	25 nm

on-chip polarization beam splitter typical worst-case loss	3 dB

(**) – Value has been measured for specified design in highly similar process elsewhere, but not by OpSIS. We expect these values to be realized in the OpSIS-IME process.
(***) – Mode coupled on chip is TM mode.

Modulator and Detector Performance

1550 Components	Typical Performance
detector responsivity (2V bias) (*)	0.7 A/W
detector dark current (2V bias)	3.3 μA
detector bandwidth (2V bias, 50Ω load)	> 50 GHz
3mm traveling-wave modulator small-signal Vπ (1V dc bias)	9 V
3mm traveling-wave modulator insertion loss	5 dB
3mm traveling-wave modulator 3dB EO bandwidth , (1V dc bias)	30 GHz
3mm traveling-wave modulator impedance	33Ω
ring modulator tunability	28 pm/V
ring modulator EO bandwidth	30 GHz
ring modulator free spectral range	11 nm

(*) – valid for wavelengths < 1560 nm

1310 Components	Typical Performance
detector responsivity (1V bias)	0.4 A/W
detector dark current (1V bias)	0.3 μA
expected detector bandwidth (*)	> 20 GHz
3mm traveling-wave modulator small-signal Vπ	8 V
3mm traveling-wave modulator insertion loss	5 dB
3mm traveling-wave modulator 3dB EO bandwidth	30 GHz

3mm traveling-wave modulator 33Ω impedance

(*) – value specified is expected value, but is not measured