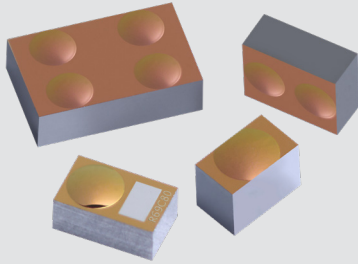


Product Brief



Key Features

- 1250 nm to 1650 nm wavelength range
- High coupling efficiency for xWDM and parallel single-mode optical sub-assemblies
- Low reflectivity (< 0.5%) double-sided AR coating
- Metal fiducials/solder pads available on request
- Suitable for use in non-hermetic environments (GR-1221 CORE)
- RoHS compliant

Applications

- Collimating/focusing laser light
- Electro-optical sub-assemblies (OSA)
- High-speed fiber optic transceivers
- Onboard or embedded optical engines
- Silicon photonics

Silicon Lens and Lens Array

- High coupling efficiency
- Uniform ROC, conic, and pitch
- Telcordia qualified
- RoHS/REACH certified

Silicon Micro Lens

Coupling/Focusing Lenses for 1310-nm DFB and EAM Lasers

Overview

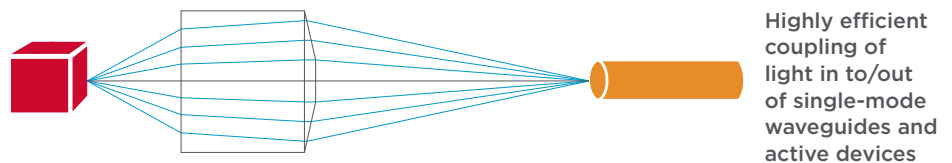
Broadcom single-channel silicon lenses are designed for use in single-mode fiber optic communications devices. These refractive lenses are optimized for collimating or focusing light from a laser diode to optical waveguides, fiber, or photodetectors.

Broadcom silicon lenses are available in a variety of standard and custom sizes and designs. Custom designs are available—contact Broadcom Sales for more information.

Optical Specifications

Parameter	Value
Wavelength of operation	1250 nm to 1650 nm
Lens SAG	0.010 mm to 0.100 mm
Lens ROC	0.200 mm to 2.0 mm $\pm 5\%$
Lens conic	0 to -5.0 ± 0.5
Lens diameter	0.1 to 2.0 mm
AR coating	Double-sided
Wavelength range	1250 nm to 1650 nm
Reflectance (per surface)	0.5% max.

Focusing Micro Lens/Arrays



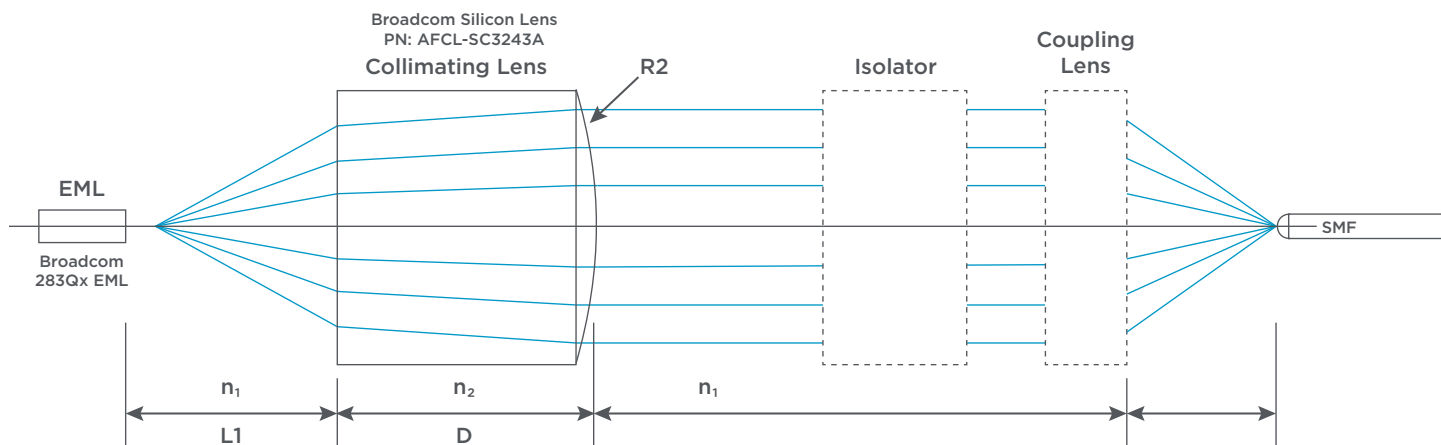
Collimating Micro Lens/Arrays



In addition to being highly reliable and stable over temperature, silicon has an additional advantage when it comes to the high-NA lens designs required for many highly integrated optical sub-assemblies. The high index of refraction of Silicon (3.5) is ideal for short focal length, high-NA optics in that it enables the use of plano-convex lens design. A plano-convex design has the lowest spherical aberration, leading to the best coupling efficiency. In contrast, a fused silica or molded glass equivalent lens may require either a very high SAG (with a higher cost of manufacture) or a bi-convex design (meaning reduced performance).

Broadcom's wafer scale lithographic fabrication process ensures precision ($<1\ \mu\text{m}$) alignment of all lens features. This process can be used to form 1D or 2D arrays of lenses on both the front and back surfaces and can be combined with Broadcom state-of-the-art diffractive elements, mirrors, or coatings to create more complex optical functions.

Many Broadcom single-channel lenses (collimating and focusing) are designed for optimal coupling efficiency based on the emission profile of Broadcom InP lasers.



In addition to many standard lenses, Broadcom develops custom silicon lens designs to meet customer mechanical and optical design requirements. This makes it easy to integrate Broadcom solutions into an existing optical system design while simultaneously using a lens optimized to achieve the best overall performance.

Product Selection Guide

Part Number	Type	Material	Wavelength, λ (nm)	Part Size H×W×T (mm)	Aperature Diameter, ϕ (mm)	ROC (mm)	Conic, k	L1, WD, (mm)	L2, BFL (mm)	Magnific, M	EFL (mm)	NA1 × NA2
AFCL-MC3150A	Focusing	Silicon	1525 to 1610	0.7 × 1.15 × 0.5	0.64	1.02	-2.8	0.35	2.55	4.99	0.41	0.5 × 0.115
AFCL-MC3183A	Focusing	Silicon	1250 to 1350	0.7 × 1.0 × 1.0	0.40	0.60	-1.5	0.05	0.79	2.50	0.24	0.5 × 0.2
AFCL-SC3260A	Focusing	Silicon	1250 to 1350	1.0 × 0.6 × 0.5	0.52	0.93	-2.3	0.56	0.78	1	0.37	0.15 × 0.15
AFCL-MC3168A	Collimating	Silicon	1250 to 1350	0.6 × 1.0 × 0.6	0.58	0.93	-3.0	0.20	∞	∞	0.37	0.5
AFCL-SC3223A	Collimating	Silicon	1250 to 1350	1.0 × 0.6 × 0.6	0.58	1.08	-4.2	0.29	∞	∞	0.43	0.5
AFCL-SC3240A	Collimating	Silicon	1525 to 1610	1.15 × 0.7 × 0.5	0.63	1.17	-4.3	0.33	∞	∞	0.47	0.5
AFCL-SC3243A	Collimating	Silicon	1250 to 1350	1.6 × 0.8 × 0.5	0.65	1.09	-3.8	0.29	∞	∞	0.43	0.55
AFCL-SC3250A	Collimating	Silicon	1250 to 1350	1.23 × 1.0 × 1.0	0.70	1.43	-2.7	0.42	∞	∞	0.57	0.5
AFCL-SC3256A	Collimating	Silicon	1250 to 1350	1.0 × 0.6 × 0.75	0.74	1.54	-4.0	0.40	∞	∞	0.62	0.41