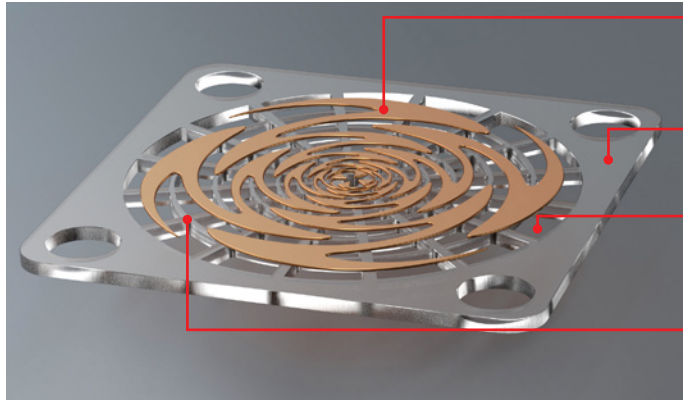


RF/MICROWAVE ANTENNAS

Improved Antenna Performance

Phased Array (PA), dipole, sinuous, and patch antennas with superior dielectric (Dk) and loss tangent specifications



1) Antenna Element

Custom-designed antenna element rests on thin glass rails, surrounded by $\geq 95\%$ air

2) Glass Substrate and Frame

Glass support structure enables easy device handling

3) Air Gap

Dielectric constants from 1.5 to 6.4 are achievable by controlling the glass-to-air-gap ratios

4) Glass Support Rails

150-micron thick, 15-micron wide glass supports maintain the structural integrity of the antenna

Features and Benefits

- Narrowband with high gain
- Broadband from MHz to GHz in a single compact antenna
- Selective removal of glass structure for a configurable dielectric constant of 1.5 to 6.4
- mmWave capable
- Build antenna elements with SMT connections for direct die attach to PCBs
- Integrate directly with other passive elements, such as bandpass filters, into monolithic sub-systems
- Directly integrate RFIC for a full Antenna-in-Package (AiP) solution

Applications

- 5G Wireless at 28 GHz PA
- 60 GHz Wireless Systems
- 79 GHz Automotive Radar Systems
- Dipole and Sinuous Antenna
- DVB-S and VSAT Terminals
- Distributed Antenna Systems (DAS)
- Radio Access Network (RAN) and CRAN
- Advanced Driver Assistance Systems (ADAS)
- Advanced Defense, EW and SIGINT Systems

High-Q and Low-Loss Tangent

Today's wireless communications and collision avoidance systems demand superior antenna performance with very low loss. This requires a support material with low dielectric and loss tangent properties.

Our unique design and manufacturing capabilities enable antenna designers to generate radiative antenna structures with dielectric constants as low as 1.5.

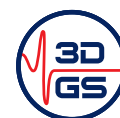
Tailorable dielectric performance ranging from 1.5 to 6.4 is realized by integrating radiative metal patterns on a matrix of glass and air. Designs are optimized for Dk, loss tangent, and environmental durability in the field.



1-505-916-5590



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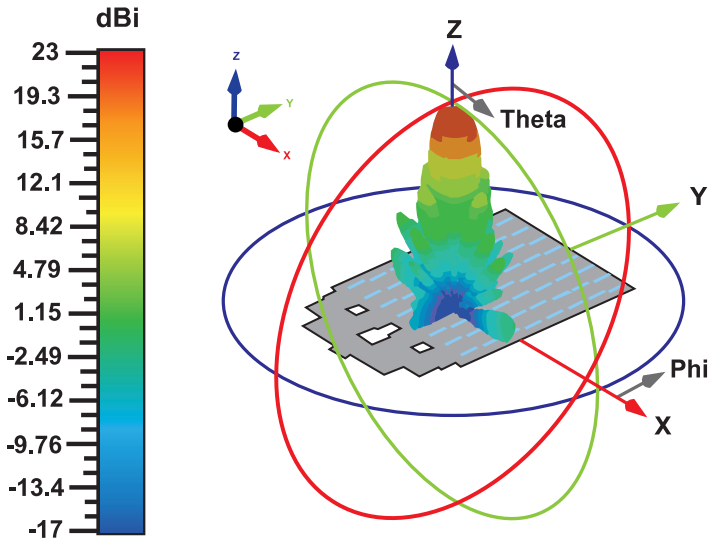
RF/MICROWAVE ANTENNAS

79 GHz 8-Element Antenna

In collaboration with **Nokia Bell Labs**

Compatible with

Patch, Sinuous, Dipole, Slot, and Other Architectures



Farfield (f=79) [1]

TYPE	FARFIELD
Approximation	Enabled (9kR >> 1)
Component	Abs
Output	Realized Gain
Frequency	79 GHz
Rad. Effic.	-1.959 dB
Tot. Effic.	-1.968 dB
Rizd. Gain	22.97 dBi

Design Limits

PARAMETERS	TYPICAL
Frequency Range	1 – 200 GHz
Dielectric Constant	1.5 to 6.4 configurable
Connection Type	Customer defined
Compliance	ROHS compliant, lead-free

Custom Packaging

Antenna packaging is customer defined: may include SMT, probe-launched, or coplanar waveguide-launched.

Wide Variety of Designs

Custom single element, dual element, MIMO, and PA designs demonstrate robust performance.

Advanced manufacturing processes in our proprietary APEX® glass enable:

- Micron-scale precision with metal features
- Thick metal for high-power applications
- Integrated through-glass vias for topside-to-backside interconnects such as microstrip patch antennas and spiral antennas
- Robust shock and vibration tolerance



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