

QRC02001 Datasheet

1600 MHz Compound-loop Antenna

Applications

- GNSS L1 – GPS, GLONASS, Beidou & Galileo

Key Specifications

- Average total efficiency
 - 94.5%¹ (1559 – 1609 MHz)
- Peak gain
 - 1.8 – 2.0 dBi² (1559 – 1609 MHz)

Features

- Omnidirectional radiation pattern
- Standard low-cost FR4 material
- Superior efficiency across the 1559–1609 MHz band

Overview

The QuantalRF QRC02001 is a high-efficiency 1600-MHz PCB antenna for GPS applications. This design is intended to deliver an omnidirectional radiation pattern with linear polarization, stable gain, and superior efficiency across the 1559–1609 MHz band. It is primarily designed for use as an external antenna; however, its versatile architecture also allows it to be adapted for embedded applications. The base design which is specified in this data sheet can be customized to specific use cases and applications to ensure that all customer demands are met.

¹ This value does not include cable loss which could be estimated in range of 5 to 10% depending on length and quality of cable.

² This value does not include cable loss which could be estimated in range of 0.3 to 0.5 dB depending on length and quality of cable & connector.

Contents

1 Antenna Specifications.....3

 1.1 Electrical Specifications3

 1.2 Mechanical and Environmental Specifications3

2 Antenna Performance.....4

 2.1 VSWR.....4

 2.2 Return loss.....5

 2.3 Efficiency6

 2.4 Peak gain7

 2.5 2D Radiation patterns8

 2.5.1 Azimuth plane8

 2.5.2 Elevation plane8

1 Antenna Specifications

1.1 Electrical Specifications

Table 1: General specifications

Parameter	Specification
Frequency range	1559 – 1609 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omnidirectional

Table 2: Detailed specifications

Parameter	1559 – 1609 MHz
Maximum VSWR	1.6
Minimum return loss (dB)	13.0
Average efficiency (%)	84.5 (with ~10% reduction to account for the cable loss)
Maximum peak gain (dBi)	1.5 (with ~0.5dB reduction to account for the cable loss)

1.2 Mechanical and Environmental Specifications

Parameter	Specification
Antenna dimensions	45 mm x 14 mm
Antenna type	Integrated on PCB
Material	FR4 ($\epsilon_r = 4.4$, $\tan\delta = 0.02$)
Operating temperature	-40C to +85C
Storage temperature	-40C to +85C

2 Antenna Performance

2.1 VSWR

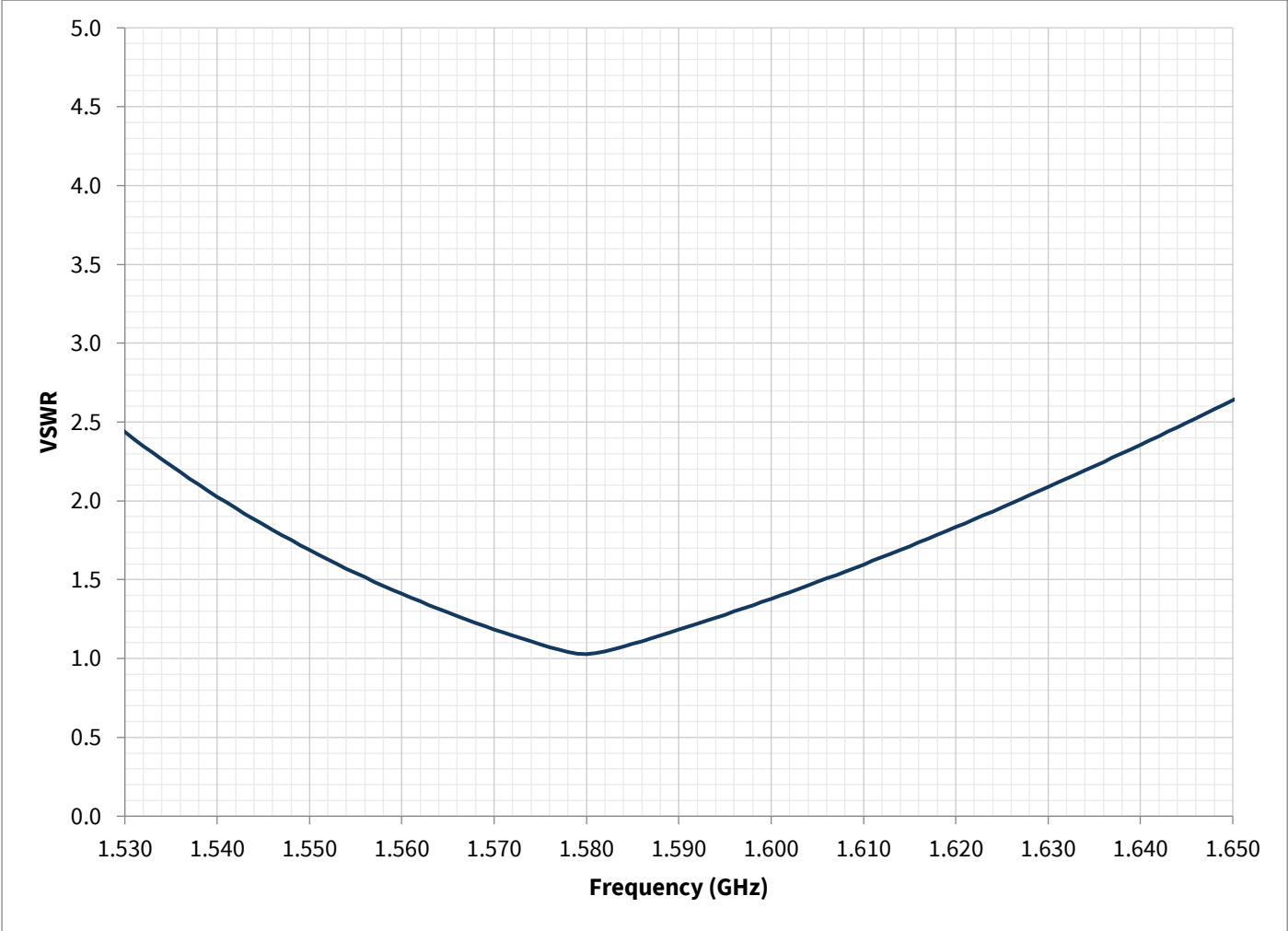


Table 3: 1559 – 1609 MHz VSWR

Frequency (MHz)	1559	1560	1565	1570	1575
VSWR	1.4	1.4	1.3	1.2	1.1
Frequency (MHz)	1580	1585	1590	1595	1600
VSWR	1.0	1.1	1.2	1.3	1.4
Frequency (MHz)	1605	1609			
VSWR	1.5	1.6			

2.2 Return loss

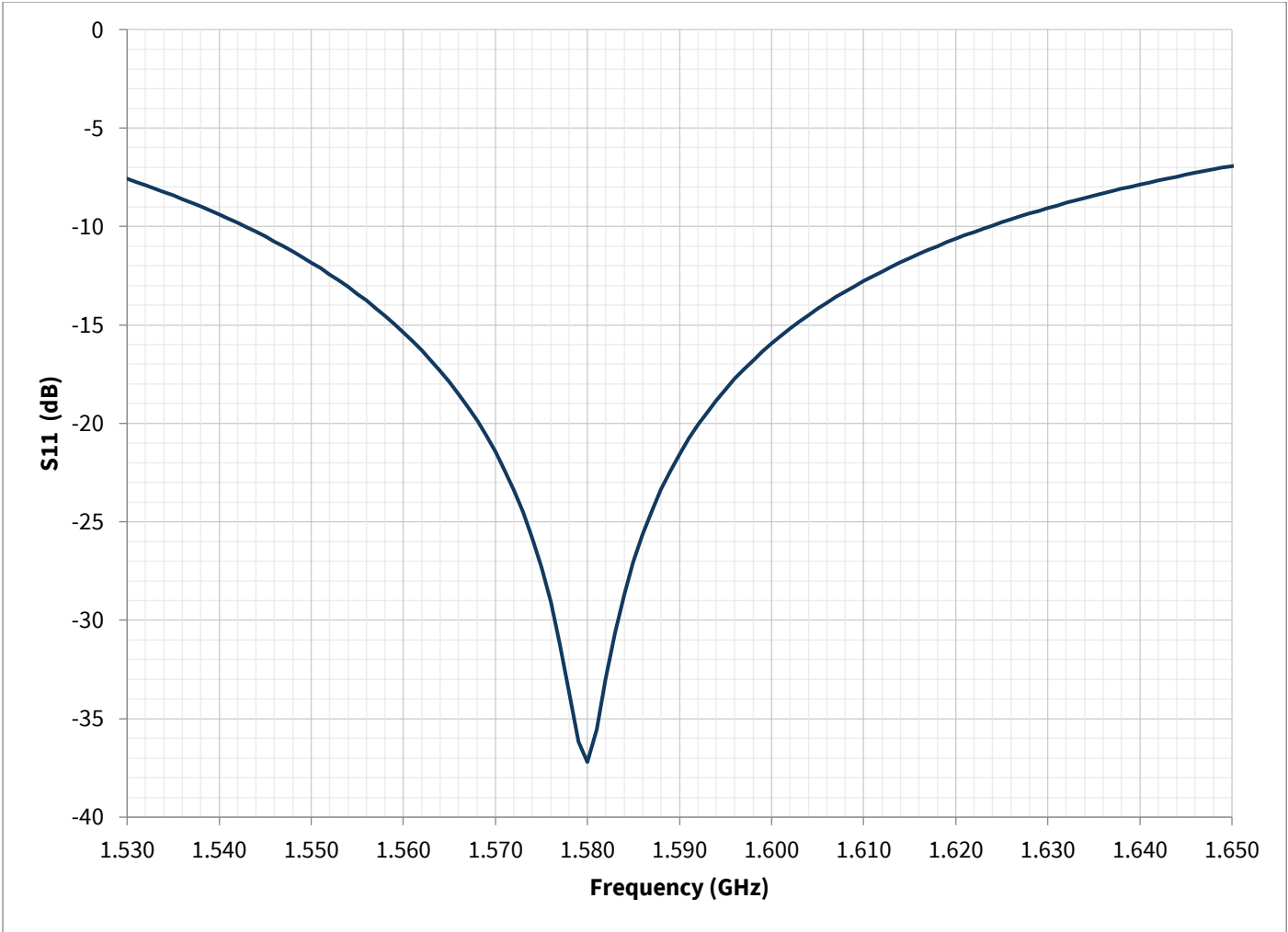


Table 4: 1559 – 1609 MHz Return loss (dB)

Frequency (MHz)	1559	1560	1565	1570	1575
Return loss (dB)	14.9	15.4	17.9	21.4	27.3
Frequency (MHz)	1580	1585	1590	1595	1600
Return loss (dB)	37.2	27.2	21.6	18.3	15.9
Frequency (MHz)	1605	1609			
Return loss (dB)	14.2	13.0			

2.3 Efficiency

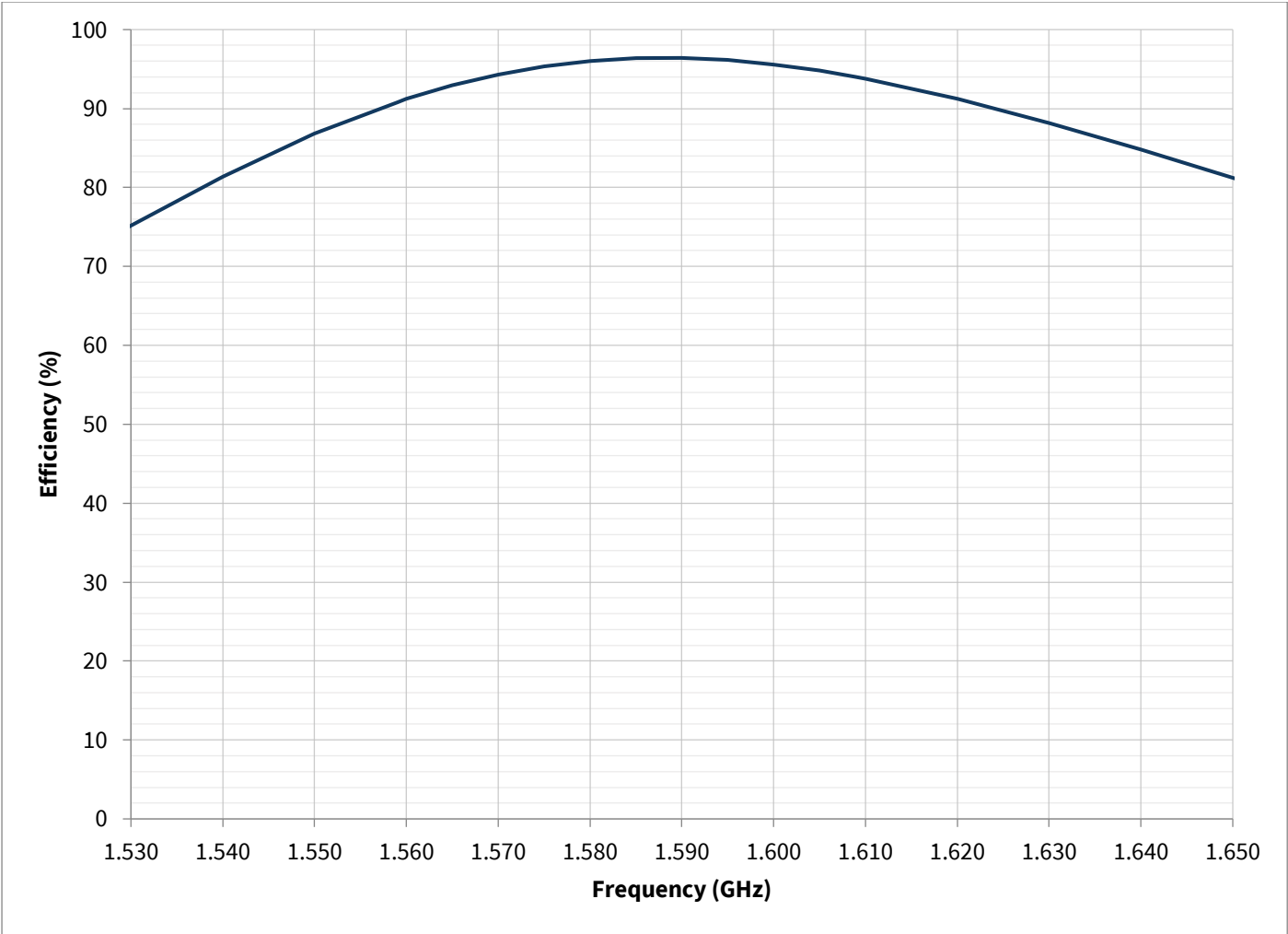


Table 5: 1559 – 1609 MHz Efficiency (%)

Frequency (MHz)	1559	1560	1565	1570	1575
Efficiency (%)	90.8	91.2	92.9	94.3	95.3
Frequency (MHz)	1580	1585	1590	1595	1600
Efficiency (%)	96.0	96.4	96.4	96.1	95.6
Frequency (MHz)	1605	1609			
Efficiency (%)	94.8	94.0			

2.4 Peak gain

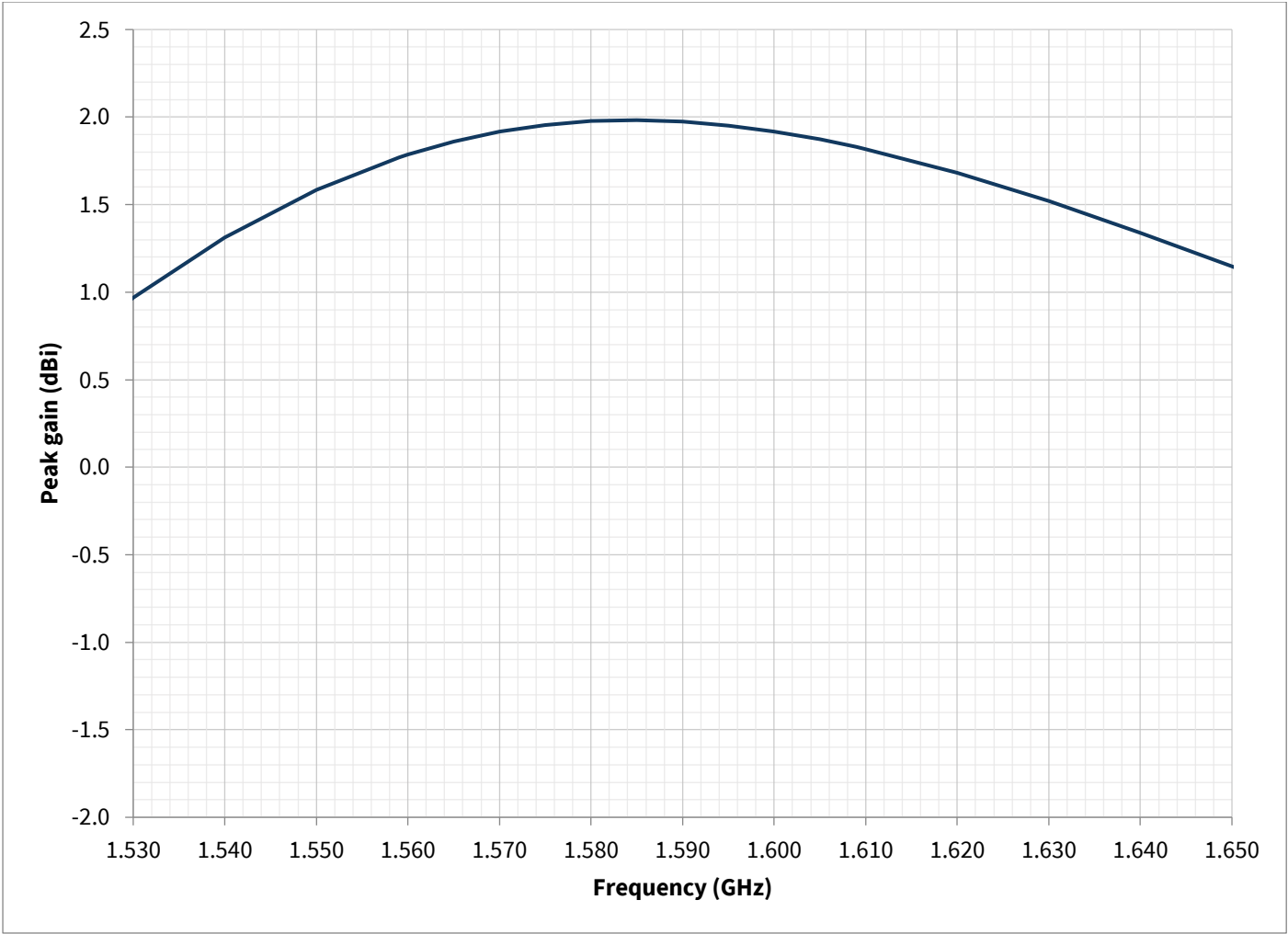


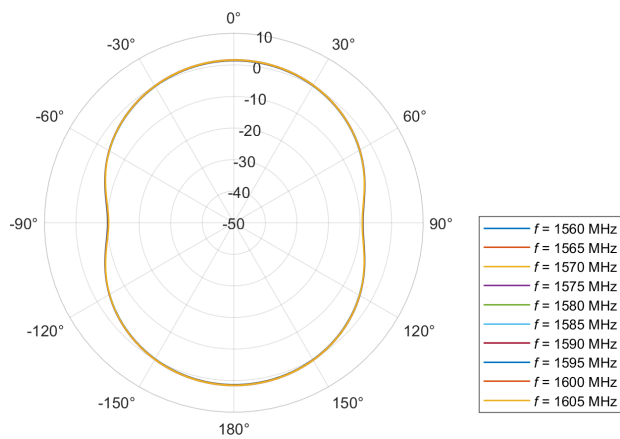
Table 6: 1559 – 1609 MHz Peak gain (dBi)

Frequency (MHz)	1559	1560	1565	1570	1575
Peak gain (dBi)	1.8	1.8	1.9	1.9	2.0
Frequency (MHz)	1580	1585	1590	1595	1600
Peak gain (dBi)	2.0	2.0	2.0	2.0	1.9
Frequency (MHz)	1605	1609			
Peak gain (dBi)	1.9	1.8			

2.5 2D Radiation patterns

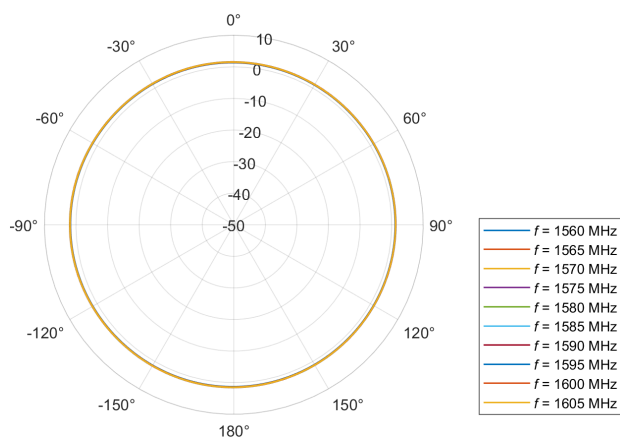
2.5.1 Azimuth plane

1560 – 1605 MHz azimuth plane



2.5.2 Elevation plane

1560 – 1605 MHz elevation plane



RoHS Compliance

The part is compliant with the 2011/65/EU RoHS directive, as amended by Directive 2015/863/EU.

Contact Information

For the latest specifications, additional product information and support:

sales@quantalrf.com

Learn more at [quantalrf.com](https://www.quantalrf.com)

Disclaimer

Limited warranty and liability Information in this document is believed to be accurate and reliable. However, QuantalRF does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of the use of such information.

Right to make changes QuantalRF reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.