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No. 3626

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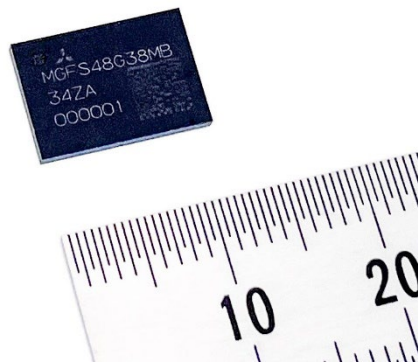
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Mitsubishi Electric to Ship Samples of GaN Power Amplifier Module for 5G Massive MIMO Base Stations

*Achieves at least 43% power-added efficiency over a wide frequency range of 400 MHz,
helping to reduce the power consumption of base stations*



GaN power amplifier module for 5G massive MIMO base stations (MGFS48G38MB)

TOKYO, September 14, 2023 – [Mitsubishi Electric Corporation](https://www.mitsubishielectric.com) (TOKYO: 6503) announced today that it will begin shipping samples of a new Gallium Nitride (GaN) power amplifier module for use in 5G massive MIMO¹ (mMIMO) base stations on September 21. Power amplifier modules help reduce the power consumption of 5G mMIMO base stations.

Providing high-speed, large-capacity communications, 5G mobile networks are becoming increasingly popular across the world, with their 5G mMIMO base stations installed predominantly in metropolitan areas. Since these base stations utilize multi-element antennas and a correspondingly high number of power amplifiers, highly efficient power amplifier modules play an important role reducing the power consumption and manufacturing costs of these base stations. In addition, the power amplifier module needs to deliver 3GPP-compliant low distortion characteristics² over a wide frequency range in order to be compatible with multiple countries' networks.

¹ Multiple Input Multiple Output is a wireless communication technique that improves communication speed and quality. MIMO uses multiple antennas at both the transmitter and receiver end

² In 5G mobile networks, in-band and out-of-band distortion characteristics are regulated by the Third Generation Partnership Project (3GPP)

Mitsubishi Electric will commence sample shipments of a GaN power amplifier module for 5G mMIMO base stations that can deliver an average output power of 8W (39 dBm) over wide frequencies ranging from 3.4GHz to 3.8GHz. In particular, the product is suitable for 64T64R mMIMO antennas³ because of its more than 43% high power-added efficiency operation. The high efficiency and low distortion result from Mitsubishi Electric’s new GaN High Electron Mobility Transistors (HEMTs). The wideband characteristics in addition to the high efficiency are realized using the company’s original circuit design and high-density packaging techniques.

Product Features

- 1) ***Higher power-added efficiency of more than 43% in the 400MHz band reduces power consumption of 5G mMIMO base stations.***
 - A GaN HEMT featuring an epitaxial growth layer structure⁴ providing high efficiency and low distortion characteristics even when used in 5G environments.
 - Mitsubishi Electric’s original wideband Doherty circuit⁵ design can mitigate bandwidth limitations caused by the output parasitic capacitance of GaN HEMTs and helps achieve more than 43% power-added efficiency in the 400MHz band, thus helping to reduce the power consumption of 5G mMIMO base stations.
- 2) ***Modularization of power amplifiers reduces the circuit design burden and manufacturing cost of 5G mMIMO base stations***
 - Mitsubishi Electric’s original high-density packaging technique allows the realization of a Doherty-circuit-based power amplifier module that is indispensable to 5G base station power amplifiers.
 - Deployment of the new power amplifier module will reduce the number of components required in 5G mMIMO base stations, thereby facilitating circuit design and lowering manufacturing costs.

Main Specifications

Model	MGFS48G38MB
Frequency	3.4-3.8GHz
Average output power	8.0W (39dBm)
Saturated output power	63W (48dBm) min
Gain	28dB min
Power added efficiency	43% min
Dimensions	11.5 x 8.0 x 1.4 mm
Shipment date	September 21, 2023
Environmental Awareness	This product is compliant with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) directive 2011/65/EU and (EU) 2015/863.

Future Developments

Mitsubishi Electric plans to expand the lineup of GaN power amplifier module products that are suitable for 32T32R antennas and/or can operate in different frequency bands, allowing them to be deployed in multiple countries and regions, helping to further reduce the power consumption of 5G mMIMO base stations.

³ 64T64R is a massive MIMO antenna consisting of 64 transmitters/receivers. In mMIMO installations, there is a 32T32R antenna using 32 transmitters/receivers

⁴ Thin-film crystal growth layer produced by growing a crystalline thin film on a crystalline substrate

⁵ High-efficiency circuit technique for power amplifiers proposed by W.H. Doherty in 1936

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About Mitsubishi Electric Corporation

With more than 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Mitsubishi Electric enriches society with technology in the spirit of its “Changes for the Better.” The company recorded a revenue of 5,003.6 billion yen (U.S.\$ 37.3 billion*) in the fiscal year ended March 31, 2023. For more information, please visit www.MitsubishiElectric.com

*U.S. dollar amounts are translated from yen at the rate of ¥134=U.S.\$1, the approximate rate on the Tokyo Foreign Exchange Market on March 31, 2023