Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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RF High Power GaN Portfolio

GaN on Si and GaN on SiC

MACOM™

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GaN RF Power Products

Next generation high power RF semiconductor technology

MACOM continues to develop industry-leading gallium nitride (GaN) RF power products. Our product portfolio leverages MACOM's more than 60-year heritage of providing best-in-class standard, application specific and custom solutions for our radar, EW, ISM, and communications customers.

RFENERGY ALLIANCE

As a member of the RF Energy Alliance, MACOM brings GaN technology into mainstream applications such as RF ignition systems, solid-state cooking, and high-lumen plasma lighting.

MACOM GaN products are offered as unmatched transistors, internally matched power transistors, and fully matched power pallets and modules. Using high performance GaN HEMT processes and leveraging our proprietary die layout and assembly techniques, these products exhibit robust thermal properties and excellent RF performance with respect to power, gain, gain-flatness, efficiency, and ruggedness for applications up to 6 GHz.

MACOM's industry-leading portfolio of cost-effective RF power products uses our unique GaN on Silicon and GaN on Silicon Carbide technology to deliver the cost, bandwidth, power density, and efficiency advantages of GaN in a variety of form factors—including 5 W to 90 W peak power transistors in DFN and SOT89 plastic packages, as well as HF through S-band modules and 50 Ω matched pallets. Our GaN on Silicon transistors and amplifiers improve upon the high power and efficiency performance of LDMOS with the high frequency performance of GaAs, and include ceramic transistors up to 200 W, DFN packaged broadband transistors from 5 W to 25 W, and TO272 packaged transistors from 50 W to 200 W. Only MACOM delivers GaN performance at silicon cost structures to drive adoption.

Why choose GaN?

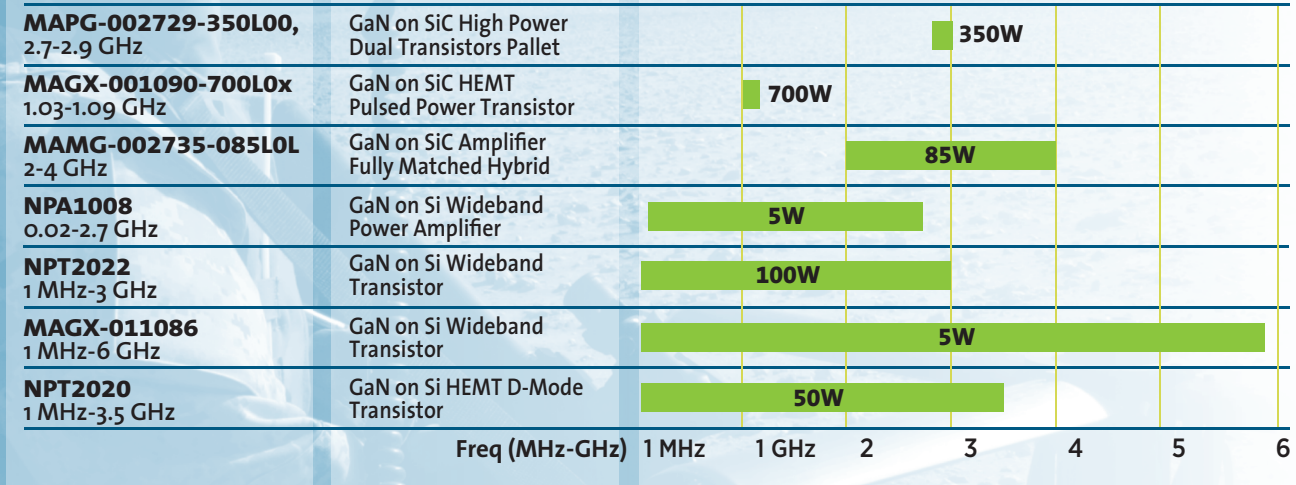
GaN advantages include:

- High breakdown voltage
- Superior power density
- High RF gain and efficiency
- GaN performance at silicon cost structures
- Multi-octave bandwidth
- High frequency operation
- Excellent thermal conductivity

For over 45 years, MACOM engineers have been redefining RF power and are now applying their GaN expertise to an array of commercial, industrial, scientific, medical and wireless applications.

Turn to MACOM for superior performance, high power GaN solutions.

Part # / Frequency	Description	Power
MAPG-002729-350L00, 2.7-2.9 GHz	GaN on SiC High Power Dual Transistors Pallet	350W
MAGX-001090-700L0x 1.03-1.09 GHz	GaN on SiC HEMT Pulsed Power Transistor	700W
MAMG-002735-085L0L 2-4 GHz	GaN on SiC Amplifier Fully Matched Hybrid	85W
NPA1008 0.02-2.7 GHz	GaN on Si Wideband Power Amplifier	5W
NPT2022 1 MHz-3 GHz	GaN on Si Wideband Transistor	100W
MAGX-011086 1 MHz-6 GHz	GaN on Si Wideband Transistor	5W
NPT2020 1 MHz-3.5 GHz	GaN on Si HEMT D-Mode Transistor	50W



ISM, Communications & Instrumentation

MACOM—the first choice for GaN in communications, multi-market and ISM applications

Features and Benefits

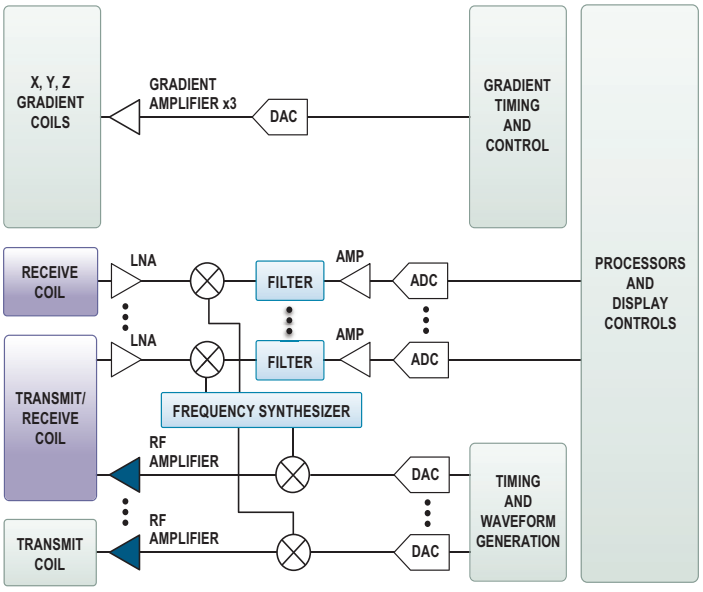
- Broadband, unmatched transistors can be used for a variety of applications including communications, instrumentation and industrial, scientific and medical (ISM)
- Very rugged: allows GaN transistors to withstand high VSWR mismatches during power on/start up and during operation without damaging the transistor
- High voltage: reduces bias current load on power supply allowing for reduced cost power supplies
- Excellent thermal performance: allows reduced heat sink costs for easier PCB designs
- High RF gain and efficiency
- MTTF of 100 year+ (channel temperature < 200°C)
- Non-magnetic parts available
- EAR99 export classification

Description

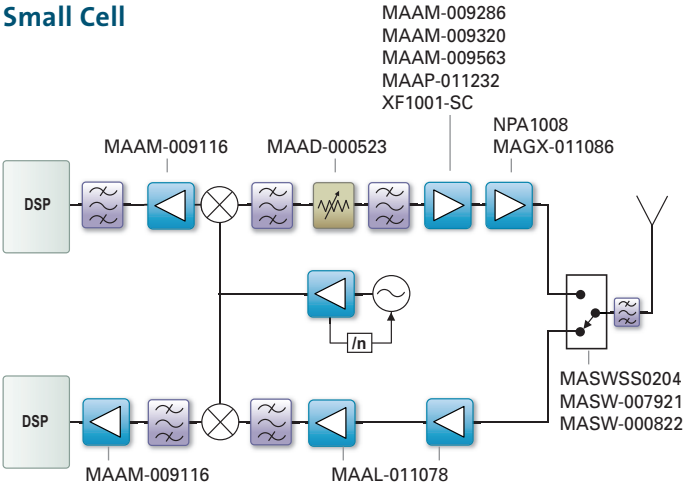
As gallium nitride grows from its initial role in military and radar applications to expand into commercial markets, MACOM is uniquely positioned to enable those demanding applications. Leveraging our GaN experience and the with the industry's only dual source wafer fabrication agreement in place for GaN, MACOM satisfies many of the commercial requirements that have limited GaN penetration in broader markets. Packaging choices range from ceramic flanged and earless, to discrete plastic, including plastic laminate modules that enable traditional SMT PCB production techniques. The portfolio of 5-200 W devices allows customers a wide set of options to build line-ups for their ISM applications.

Block Diagrams

MRI



Small Cell



ISM Devices

MAGX-000025-150000	MAGX-000245-014000
MAGX-000035-01000X	MAGX-000245-025000
MAGX-000035-015000	
MAGX-000035-01500S	**In development:**
MAGX-000035-030000	MAGX-000027-300C0P
MAGX-000035-045000	MAGX-000027-200C0P
MAGX-000040-00500P	MAGX-000027-100C0P

Avionics and Air Traffic Control

MACOM's high power GaN is leading the future of next generation power in avionics systems

Features and Benefits

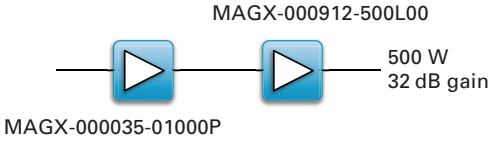
> High *power* allows customer to upgrade systems for increased range and performance
> High *efficiency* reduces the power consumption and cooling requirements of systems
> Increased *ruggedness* provides greater tolerance under demanding operating conditions and improves the reliability of the system
> High *voltage* operation enhances the system performance and reduces the bias current load of power supplies and distribution network

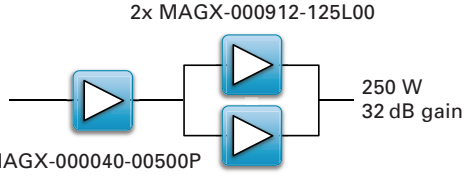
Description

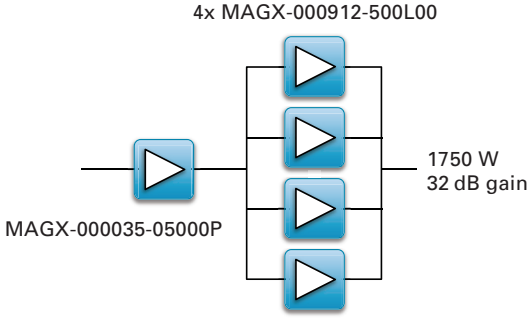
MACOM's high power GaN power transistors, optimized for avionics applications, offer customers greater performance, flexibility, and functionality through the benefits of GaN on SiC technology. A growing family of leading power GaN transistors offers high pulsed power operation of up to 700 W for avionics applications in the 960-1215 MHz and 1030-1090 MHz bands. GaN technology offers the customer higher power and efficient operation in a similar size and footprint as compared to LDMOS or Si Bipolar technologies. Furthermore, the inherent higher thermal performance and higher breakdown voltage of GaN benefit the customer with greater flexibility in broadband operation, increased power leading to longer pulse lengths and duty cycles, in addition to increased ruggedness under load mismatch conditions.

Block Diagrams

960-1215 MHz Line-ups







Avionics Devices

MAGX-000912-125L00
MAGX-000912-250L00
MAGX-000912-500L00
MAGX-000912-500L0S
MAGX-000912-700L0X
MAGX-001090-600L00
MAGX-000040-00500P
MAGX-000035-01000P
MAGX-000035-01000X
MAGX-000035-015000
MAGX-000035-01500P
MAGX-000035-01500S
MAGX-000035-045000
MAGX-000035-05000P
MAGX-000035-09000P

Radar

GaN discrete and module solutions enable SWaP improvements and speed time-to-market for next generation AESA radar systems and high power single aperture designs

Features and Benefits

- Fully matched wideband products enable new multifunction system capability requiring complex waveforms and efficient, economical, designs
- Small size, SMT products, enables system SWaP and faster time-to-market through standard surface mount assembly
- High gain and 50 V operation provide efficient operation and significantly reduces the size of matching networks
- SMT assembly compatible
- High power ceramic products are engineered for maximum performance and reliable long life operation in demanding environments

Description

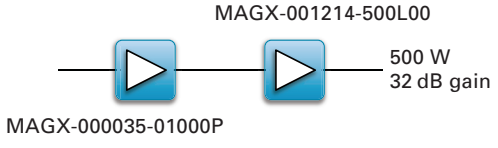
MACOM's portfolio of surface mount GaN in plastic power modules affords radar system designers a common platform and pin-out architecture to leverage across a growing range of frequency bands. These fully matched, 2-stage GaN power modules deliver 90 W typical output power in a lightweight 14 x 24 mm package, and deliver breakthrough power performance.

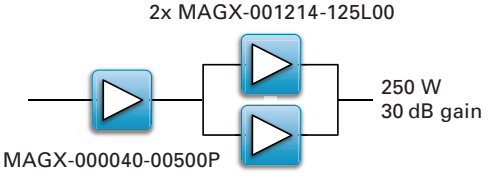
Supporting voltage operation from 28 to 50 V with high gain to reduce input power requirements, the module maximizes power and cooling efficiency and provides robust performance over a wide range of input voltages. Flexible voltage operation equips system operators to optimize the module for different power requirements and dynamically manage their total system power budget.

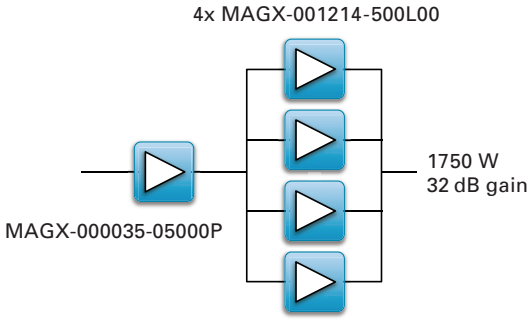
Complementing the SMT module portfolio MACOM offers a broad line of discrete high power GaN transistors designed for maximum power and high reliability. Engineered using advanced packaging techniques and innovative semiconductor designs MACOM's high power transistor products provide optimal operation for pulsed UHF-band, L-band, and S-band radar applications.

Block Diagrams

1.2 - 1.4 GHz Line-ups







L-Band Devices

MAGX-001214-125L00
MAGX-001214-250L00
MAGX-001214-500L00
MAGX-001214-500L0S
MAGX-001214-650L00
MAGX-000912-700L0X
MAGX-000040-00500P
MAGX-000035-01000P
MAGX-000035-01000X
MAGX-000035-015000
MAGX-000035-01500P
MAGX-000035-01500S
MAGX-000035-030000
MAGX-000035-045000
MAGX-000035-05000P
MAGX-000035-09000P
MAMG-001214-090PSM

RF Power Transistors GaN on SiC: Pulsed

Part Number	Min Freq (MHz)	Max Freq (MHz)	Operating Voltage (V)	Output Power (W)	Min. Gain (dB)	Pulse Width (µs)	Duty Cycle (%)	Test Freq (MHz)	Package Type and/or Size
MATR-GCHJ04-022050	1	4000	50	15	15	3000	10	1200-1400	Die (0.75 x 0.90 x 0.10)
MATR-GCHJ04-066050	1	4000	50	50 60	11.3 18	1000	10	2700-3500 1030-1090	Die (0.75 x 1.70 x 0.10)
MAGX-000025-150000	1	2500	50	150	18	300	20	1200-1400	P-256
MAGX-000040-00500P	1	4000	50	5	13 11	1000 3000	10 20	1600	SOT-89
MAGX-000035-01000P	1	3500	50	10	14.8 14	1000 3000	10 20	1600	3 x 6 mm DFN-14
MAGX-000035-01500P	1	3500	50	15	19.5 14.2	1000 3000	10 20	1600 2600	3 x 6 mm DFN-14
MAGX-000035-05000P	1	3500	50	50	18 17	1000 3000	10	1600	3 x 6 mm DFN-14
MAGX-000035-09000P	1	3500	50	90	17.5 16.6	1000 3000	10	1600 1300	3 x 6 mm DFN-14
MAGX-000035-015000	1	3500	50	15	15.5 15	1000 3000	10 20	1200-1400	P-260
MAGX-000035-01500S	1	3500	50	15	15.5 15	1000 3000	10 20	1200-1400	P-254A
MAGX-000035-045000	1	3500	50	50 60	11.3 18	1000	10	2700-3500 1030-1090	P-253
MAGX-000912-125L00	960	1215	50	125	20	128	10		P-237
MAGX-000912-250L00	960	1215	50	250	19	128	10		P-237
MAGX-000912-500L00	960	1215	50	500	19.8	128	10		P-238
MAGX-000912-500L0S	960	1215	50	500	19.8	128	10		P-261
MAGX-000912-650L00	960	1215	50	650	20.5	128	10		P-238
MAGX-000912-650L0S	960	1215	50	650	20.5	128	10		P-261
MAGX-001090-600L00	1030	1090	50	600	21.4	32	2		P-238
MAGX-001090-600L0S	1030	1090	50	600	21.4	32	2		P-261
MAGX-001090-700L00	1030	1090	50	700	20.5	32	6.4		P-238
MAGX-001090-700L0S	1030	1090	50	700	20.5	32	6.4		P-261
MAGX-001214-125L00	1200	1400	50	125	19	300	10		P-237
MAGX-001214-250L00	1200	1400	50	250	19	300	10		P-237
MAGX-001214-500L00	1200	1400	50	500	19.2	300	10		P-238
MAGX-001214-500L0S	1200	1400	50	500	19.2	300	10		P-261
MAGX-001214-650L00	1200	1400	50	650	19	300	10		P-238
MAGX-001220-100L00	1200	2000	50	100	14	300	10		P-258
MAGX-002731-100L00	2700	3100	50	100	12	500	10		P-258
MAGX-002731-180L00	2700	3100	50	180	11	300	10		P-253
MAGX-002731-180L0S	2700	3100	50	180	11	300	10		P-259
MAGX-002735-040L00	2700	3500	—	40	10.5	300	10		P-253
MAGX-003135-120L00	3100	3500	50	120	11.8	300	10		P-258

RF Power Transistors GaN on SiC: CW

Part Number	Min Freq (MHz)	Max Freq (MHz)	Operating Voltage (V)	Output Power (W)	Min. Gain (dB)	Duty Cycle (%)	Package Type
MAGX-000245-014000	1	2500	50	14	15.2	100	P-260
MAGX-000245-025000	1	2500	28	25	12	100	P-253
MAGX-000035-01000P	1	3500	50	10	14.5	10	3 x 6 mm DFN-14
MAGX-000035-010000	30	3500	50	10	19	100	P-260
MAGX-000035-01000S	30	3500	50	10	19	100	P-254A
MAGX-000040-00500P	1	4000	50	4	10	10	SOT-89

RF Power Transistors GaN on Si: CW

Part Number	Min Freq (MHz)	Max Freq (MHz)	Supply Voltage (V)	Output Power P_{SAT} (W)	Gain (dB)	Test Freq (MHz)	Package
NPA1006	20	1000	28	12.5	14	900	6 x 5 mm DFN-8
NPA1003QA	20	1500	28	5	18	1000	4 mm PQFN-16
NPT1010B	1	2000	28	100	20	900	Flange Ceramic
NPT1010P	1	2000	28	100	20	900	Flange Ceramic
NPT2022	1	2000	48	100	20	900	TO272
NPT2010	1	2200	48	100	17	2100	Flange Ceramic
NPT2021	1	2500	48	4	12.8	2500	TO272
NPA1007	30	2500	28	10	11	2000	6 x 5 mm DFN-8
NPT1007B	1	2500	28	10	11	2000	Flange Ceramic
NPT25100B	1	2700	28	90	16	2500	Flange Ceramic
NPT25100P	1	2700	28	90	16	2500	Flange Ceramic
NPA1008	20	2700	28	5	12	1900	4 x 4 mm PQFN-24
NPT2020	1	3500	48	50	17	2100	Flange Ceramic
NPT1015B	1	3500	28	45	14	2500	Flange Ceramic
NPT35050AB	3300	3800	28	50	13	3500	Flange Ceramic
NPT1012B	1	4000	28	25	13	3000	Flange Ceramic
NPTB00025AB	1	4000	28	25	13	3000	Flange Ceramic
NPTB00025B	1	4000	28	25	13	3000	Flange Ceramic
NPTB00050B	1	4000	28	—	—	—	Flange Ceramic
MAGX-011086	1	6000	28	4	9	5800	4 mm PQFN-24
NPT2018	1	6000	48	12.5	17.5	2500	6 x 3 mm PDFN-14
NPTB00004A	1	6000	28	5	17	2500	SOIC-8NE
NPTB00004D	1	6000	28	5	17	2500	SOIC-8NE

RF Power Transistors GaN on Si: Pulsed

Part Number	Min Freq (MHz)	Max Freq (MHz)	Supply Voltage (V)	Output Power P_{SAT} (W)	Gain (dB)	Test Freq (MHz)	Package
NPT1004D	1	3000	28	45	11	2500	SOIC-8
NPT25015D	1	3000	28	23	14	2500	SOIC-8
NPT2019	1	6000	48	25	16	2500	3 x 6 mm DFN-14
NPT35015D	3000	4000	28	18	11	3500	SOIC-8

RF Power Hybrid Amplifiers: GaN Amplifiers

Part Number	Min Freq (MHz)	Max Freq (MHz)	Operating Voltage (V)	Output Power (W)	Gain (dB)	Pulse Width (µs)	Duty Cycle (%)	Package Type
MAMG-000305-050L0L	380	480	50	50	28	300	10	LGA2414
MAMG-000305-050L0M	380	480	50	50	28	300	10	LGA2414
MAMG-000912-090PSM	960	1215	50	90	30	300	10	LGA2414
MAMG-001214-090PSM	1200	1400	45	90	30.5	1000	10	LGA2414
MAMG-001215-090L0L	1200	1450	45	90	30.5	1000	10	LGA2414
MAMG-001215-090L0M	1200	1450	45	90	30.5	1000	10	LGA2414
MAMG-002735-085L0L	2700	3500	50	85	23 23	1000 750	10 20	LGA2414
MAMG-002735-030L0L	2700	3500	50	30	25.5 20	1000 750	10 20	7 x 7 mm PQFN-28

RF Power Hybrid Pallets: GaN Pallets

Part Number	Min Freq (MHz)	Max Freq (MHz)	Operating Voltage (V)	Output Power (W)	Min. Gain (dB)	Pulse Width (µs)	Duty Cycle (%)	Package Size (mm)
MAPG-002729-350L00	2700	2900	50	400	11.5	300	10	50.8 x 22.9 x 5.8

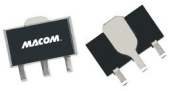
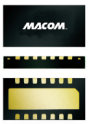
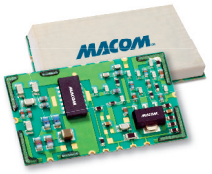
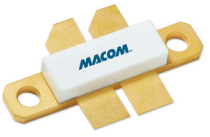
GaN and GaAs Device Bias Sequencer

Part Number	Positive Supply V_{DS1} (V)	Positive Supply V_{DS2} (V)	Negative Supply V_{GS} (V)	Pulse Enable TTL (V)	Positive Supply I_{DS1} (mA)	Positive Supply I_{DS2} (mA)	Negative Supply I_{GS} (mA)	Peak Output Gate I_{GC} (mA)	Open Drain ON/OFF Prop Delay (ns)	Package
MABC-001000-DP000L	10 to 60	N/A	-8 to 0	0/3.3	2.3	N/A	-3	50	100/70	SMJ2307
MABC-001000-DPS00L	10 to 60	4.4 to 5.6	-8 to 0	0/3.3	0	2.2	-3	50	100/70	SMJ2307

RF Power Hybrid Pallets and Modules: Silicon Pallets and Modules

Part Number	Min Freq (MHz)	Max Freq (MHz)	Pout (W)	Gain (dB)	Efficiency (%)	Package Type
MAPM-020512-010C00	20	512	10	25		Nickel Plated Aluminum Housing
PHA2729-300M	2700	2900	315	7.5	36	Flange Ceramic Pkg

GaN Package Guide

Package Type	Approximate Dimensions (mm)	
SOT-89	4.5 x 4.0 x 1.5	
6 mm x 3 mm DFN-14	6.0 x 3.0 x 1.0	
7 mm x 7 mm PQFN-20	7.0 x 7.0 x 1.4	
LA2414	24.0 x 14.0 x 3.2	
P-254A	24.0 x 14.0 x 3.2	
P-260	13.97 x 8.12 x 3.25	
P-253	20.32 x 10.92 x 3.99	
P-256	28.96 x 17.78 x 4.78	
P-237	20.32 x 14.96 x 4.11	
P-261	20.57 x 19.44 x 3.74	
P-238	34.04 x 19.44 x 3.74	
P-264	41.15 x 16.62 x 5.13	

Package Type	Approximate Dimensions (mm)	
QFN4x4-24	4.0 x 4.0 x 0.9	
SOIC-8NE	4.9 x 6.1 x 1.47	
TO272-2	23.62 x 11.18 x 2.59	
TO272-4	23.62 x 14.1 x 2.59	
AC200B-2	13.97 x 8.13 x 3.1	
AC360B-2	20.32 x 10.92 x 3.86	
AC360P-2	9.65 x 10.92 x 3.86	
AC780P-2	20.57 x 19.43 x 3.6	
C780B-2	34.04 x 19.43 x 3.6	
AC780B-4	34.04 x 19.43 x 3.6	

Additional product information can be found on our website at
www.macom.com/GaN

Contact our worldwide sales offices, authorized representatives, and industry-leading distributors to request samples, test boards, and application support.

All contacts are listed on our website at:
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