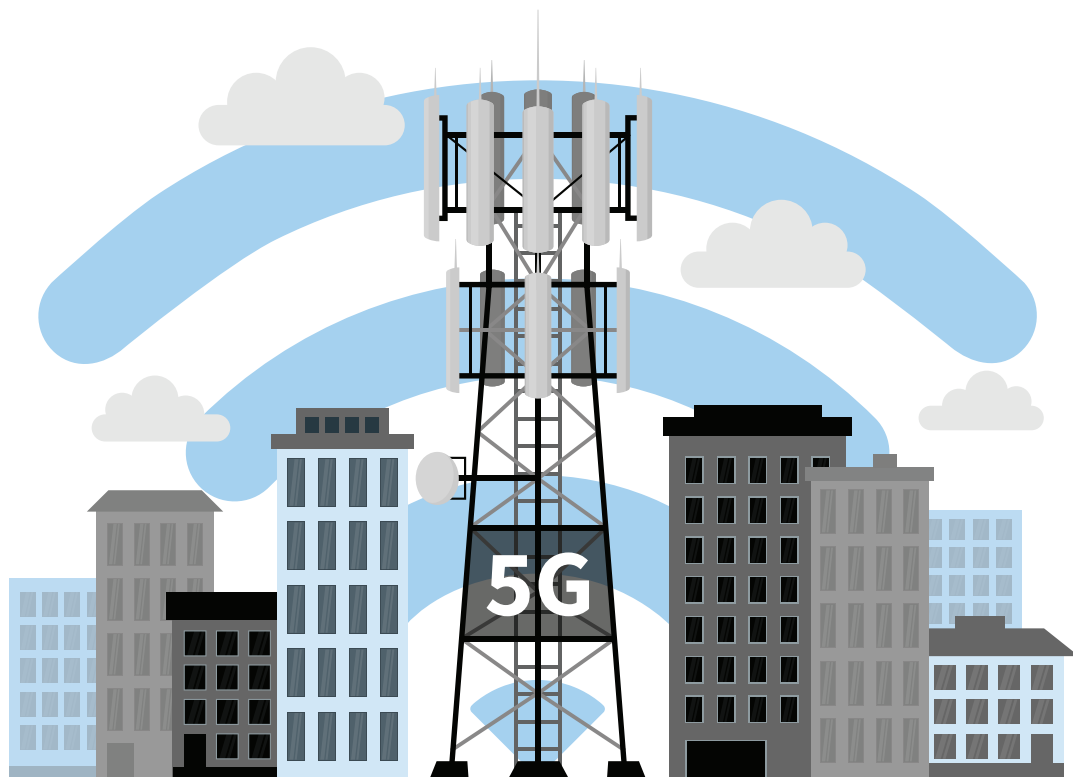


# Enabling Higher Data Rates and Increased Capacity

Qorvo® 5G Solutions Continue to Transform the World



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Qorvo is making 5G deployment a reality and supporting the growth of mobile data with a broad range of RF connectivity solutions. Our robust RF portfolio for both infrastructure and smartphone applications include PAs, phase shifters, LNAs, gain block amplifiers, switches, integrated modules and other high-performance RF solutions. Qorvo's early start in 5G comes from our legacy of millimeter wave (mmW) R&D and product development in the defense and aerospace markets, as well as a leading supplier of sub-6 GHz RF solutions to the world's leading 2G, 3G and 4G base station manufacturers.

Qorvo offers a family of high-performance discrete RF components to provide flexibility to system designers, as well as the highest level of integration of multifunction building blocks to reduce size, lower costs and accelerate time to market.

Our highly integrated front-end modules feature switch LNA modules in a single or dual-channel configuration and are targeted for 5G massive MIMO or TDD macro base stations.

## Switch LNA Modules for Sub-6 GHz 5G

Frequency (GHz)	# of Channels	IL (dB)	Noise Figure (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Tx Pin (W)	Package (mm)	Part Number
2.3-4.2	1	0.7	1.2	35.5	16.8	29	8	5x3	QPB9362
2.3-5.0	1	0.5	1.1	34	18	31	8	3x3	QPB9850
1.7-4.2	2	0.5	1.2	37	20	35	15	6x6	QPB9348
2.3-5.0	2	0.5	1.1	34	18	35	22	6x6	QPB9378
2-3-4.2	2	0.5	1.0	38	16.8	34	22	6x6	QPB9380

Qorvo continues to lead the industry with lowest noise figure amplifiers across multiple process technologies. Qorvo's portfolio includes gain block amplifiers to be used in systems where additional gain is required.

## Low Noise Amplifiers for Sub-6 GHz 5G

Frequency (GHz)	Noise Figure (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Vd (V)	Package (mm)	Part Number
0.1-6	0.3	19.5	23	38	5	2x2	QPL9547
0.6-4.2	0.67	20	21.7	41.5	5	2x2	TQL9093
0.7-4.5	0.5	20	19	35	5	2x2	QPL9057
1-5	0.6	18	21	35	5	2x2	QPL9058
2-6	0.7	21.5	18	34.5	5	2x2	QPL9504

## Gain Block Amplifiers for Sub-6 GHz 5G

Frequency (GHz)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Noise Figure (dB)	Vd (V)	Package (mm)	Part Number
0.02-4	22	22	39.5	1.3	5	3x3	TQP3M9019
0.02-4	20.5	21	37	1.3	5	3x3	TQP3M9018
0.05-6	16	21.3	40.3	1.5	5	2x2	TQL9062
0.05-4	14.5	20.8	35.5	1.6	5	2x2	TQL9047
0.05-4	21.8	22	39.5	1.3	5	SOT-89	TQP3M9009
0.05-4	20.6	20	36	1.3	5	SOT-89	TQP3M9008
0.05-4	14.9	21.6	39.5	2	5	3x3	TQP3M9038
0.05-4	14.5	20.7	40	1.8	5	SOT-89	TQP3M9028
0.1-4	13	23.6	41	1.3	5	SOT-89	TQP3M9007
1-6	16	20	35	1.4	5	2x2	QPL9126
1-6	20	19.5	35	1.4	5	2x2	QPL9127

## Driver Amplifiers for Sub-6 GHz 5G

Frequency (GHz)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Noise Figure (dB)	Vd (V)	Id (mA)	Package (mm)	Part Number
0.6-2.8	15.5	30	44	5.7	5	230	4x4	QPA9442
1.7-5	28	22	36	1.5	5	95	3x3	QPA9120
2.3-5	27	25.5	34	5	5	95	3x3	QPA9121
2.3-5	37	25.5	34	5	5	90-120	3x3	QPA9122M
2.7-3.8	18.5	25	38	2.3	5	280	5x5	QPA9842

## Doherty® Power Amplifier Modules (PAM) for Sub-6 GHz 5G

Frequency (GHz)	P <sub>AVG</sub> (W)	P <sub>SAT</sub> (W)	Lineup Efficiency (%)	Gain (dB)	Package (mm)	Part Number
3.4-3.8	8	50	40	32	10x8	QPA3810
3.4-3.8	8	55	>40	32	12x8	QPB3810
3.7-4	8	50	40	32	10x8	QPA3908
4.4-5	1.25	23	26	30	10x6	QPA4501
4.5-4.6	5	40	40	26	10x6	QPA4605

## 48V GaN Transistor Solutions for Sub-6 GHz 5G

Frequency (GHz)	Gain (dB)	Drain Efficiency (%)	P <sub>PEAK</sub> (dBm)	ACPR (dBc)	Package (mm)	Condition Note	Part Number
2.3-5	18	20	39	-30	4x4.5	@ P <sub>OUT</sub> =24 dBm	QPD0005M

## Switch Solutions for Sub-6 GHz 5G

Frequency (GHz)	Type	Termination Type	IL (dB)	Isolation (dB)	P <sub>in</sub> Max (dBm)	Vcc (V)	Package (mm)	Part Number
0.005-6	SP2T	R	0.3	37	37	3 to 5	2x2	RFSW1012
0.005-6	SP2T	R	0.25	46	37	3 to 5	1.1x.5	QPC1022
0.005-6	SP4T	R	0.45	34	35	3 to 5	2.5x2.5	RFSW6042
0.005-6	SP6T	R	0.5	28	32	3 to 5	2x2	RFSW6062
0.005-6	SP2T	A	0.7	70	35	3 to 5	4x4	RFSW6024
0.005-8	SP4T	R	0.48	30	38	2.7 to 5.5	1.9x1.9	QPC6041
0.005-6	SP4T	A	0.98	50	36	3 to 5	4x4	QPC6044
0.005-6	SP5T	A	1.1	57	36	3 to 5	4x4	QPC6054
0.005-6	SP6T	A	1.1	57	36	3 to 5	4x4	QPC6064

Higher frequency mmW bands are expected to expand both network capacity and wireless use cases, with theoretical 5G transfer speeds of up to 10 gigabits per second. These mmW bands operate over a significantly shorter range than lower frequency bands, driving a significant increase in residential and commercial placements of short-range, smaller cell sites.

Qorvo has over a decade of experience supporting mmW applications and solutions. Qorvo combines mmW systems expertise and the industry's most comprehensive high-power RF product and technology portfolio to help leading manufacturers quickly launch next-generation infrastructure products.

## Solutions for mmW 5G

Frequency (GHz)	Function	Channels	RF NF (dB)	Rx Gain (dB)	Tx Psat (W)	Tx Gain (dB)	Tx PAE (%)	Package (mm)	Part Number
26.5-29.5	FEM	1	3.5	17	1	27	8*	5x4	QPF4001
37-40.5	FEM	2	4.2	18	2	23	7*	6x4.5	QPF4006
		1			4.5x4			QPF4005	

\* PAE at backed off linear operating power

Frequency (GHz)	Function	Noise Figure (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Bias (V)	Package (mm)	Part Number
DC-40	Dist. Amp	5	10.5	17.5	26	5-8	4x4	CMD242K4
18-40	LNA	4	16	-	7	3	4x4	CMD299K4
22-32	LNA	1.6	23	19	27	3.5	4x4	QPA2628

## RF Filters and Diplexers

Frequency (MHz)	Bands	Description	Technology	IL Typ (dB)	Package (mm)	Part Number
699-716, 729-756, 777-787	B12/B13 UL/DL	LTE Band 12/Band 13 Triplexer Filter Module	TC-SAW	3 max	4x5	QPQ1214
1710-1785, 1805-1880	B3	Band 3 BAW Duplexer	BAW	2.3	2x2.5	QPQ1297
2500-2570, 2620-2690	B7	Band 7 BAW Duplexer	BAW	2.4	2x2.5	QPQ1270
2515-2675	B41	Band 41, 160 MHz Sub-Band Filter	BAW	2.5	2x1.6	QPQ1298
3300-3600	B52, B42	Band 52+42, 300 MHz Bandpass Filter	BAW	3.2 max	2x1.6	QPQ3501
3400-3600	B42	Band 42, 200 MHz Bandpass Filter	BAW	3.2 max	2x1.6	QPQ3500
3700-3980	C-band	1W C-band BAW Bandpass Filter	BAW	3 max	3x2	QPQ3509
4800-4960	n79	Sub-band n79, 160 MHz Bandpass Filter	BAW	2.2 max	2x1.6	QPQ4900