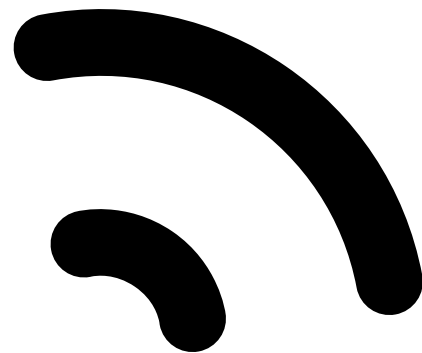


Qorvo® RF Test & Measurement Solutions

Precision Performance for RF Testing



QORVO
all around you

RF building blocks for next-generation test systems, instrumentation and mission-critical measurement platforms.

Advanced RF for Test and Measurement

Engineers building advanced test and measurement systems face constant pressure to deliver more bandwidth, better linearity, higher integration and reliable performance across wider frequency ranges. Qorvo helps address those challenges with a growing RF portfolio designed for wideband signal chains in instrumentation, radar, EW, communications and data-converter test platforms.

With GaAs, GaN, SOI and SiGe technology options, plus strong design, packaging and manufacturing expertise, Qorvo provides the RF building blocks needed to simplify design and support demanding next-generation systems.

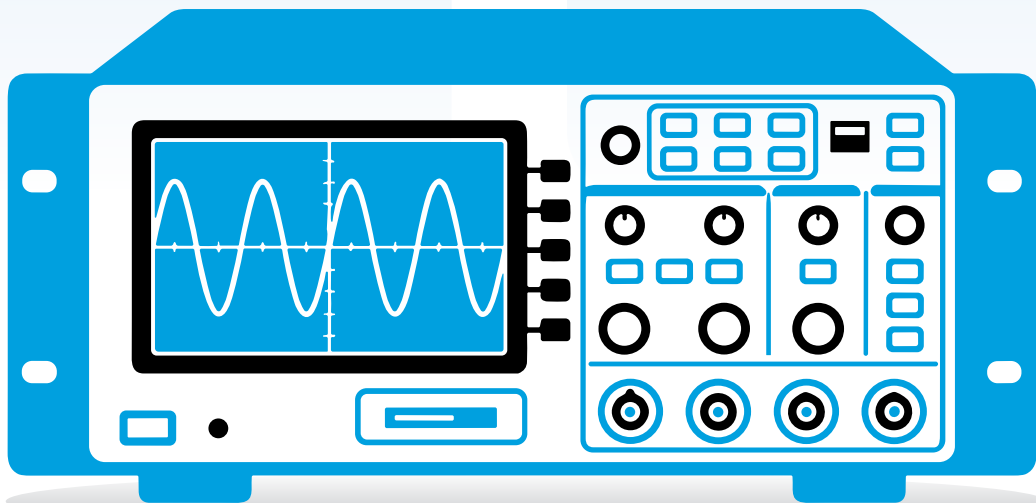
Built Around the Needs of Modern RF Test Systems

YOUR SYSTEM REQUIRES...

- Wider bandwidth across of the signal chain
- Better RF performance in demanding test environments
- To reduce design complexity and speed development
- Confidence in long product life and roadmap stability

QORVO PROVIDES...

- Wideband technology options across GaAs, GaN, SOI and SiGe to support control, gain and conversion functions over broad frequency ranges
- High-performance building blocks designed for low loss, high linearity, high isolation and broad frequency coverage
- Integration expertise in packaging, module design and test that help reduce lineup complexity, save board space and shorten development time
- Market-aligned portfolio planning shaped around instrumentation, EW, radar, communications and other long-life applications



Portfolio At A Glance

	PRODUCT FAMILY	ROLE IN T&M SIGNAL CHAIN	EXAMPLE PRODUCTS
1	Wideband switches	Route, protect and isolate RF paths	QPC5020, QPC5021, QPC5040, QPC5041, future SPDT / SP4T to 72 GHz
2	Digital and variable attenuation	Coarse and fine amplitude control	QPC1008, QPC0045, future high-resolution DSA, coarse-step DSA, wideband VVA
3	Wideband amplifiers	Gain, driver and power stages	QPL general-purpose amps, QPA2213, QPA2962, TGA2962, QPA2966, QPA2966D, QPA2040D, QPA2640D
4	Active balun/ ADC driver	Single-ended to differential conversion	QPA2010 and future related differential solutions
5	Integrated modules	Reduce size and lineup complexity	QPF0218, QPF0219



Low Noise Amplifiers

Qorvo offers low noise amplifiers for broadband T&M applications where sensitivity, gain and linearity are all critical design parameters.

Frequency (GHz)	Noise Figure (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Vd (V)	Package Type	Part Number
2-18	2	17	17	29	5	Die	TGA2525
2-20	3	11	18	26	6	Die	QPA0012D
2-20	1.7 to 4.0	> 17	> 17	-	5	QFN, 18-pin / 6x5x1.72	QPM1000
2-20	2.5	17.5	20	30	5	Die	TGA2526
2-20	2	17	19	29	5	QFN / 4x1.625	TGA2567-SM
2-22	2.5	16	20.3	-	8	Die / 2.04x1.49x0.1	TGA2227
2-22	2.6	15.7	> 23	-	8	QFN / 4x4x1.7	TGA2227-SM
18-40	3.5	17	8	17	3	Die	CMD299
18-40	4	16	7	18	3	Plastic QFN / 4x4	CMD299K4

Low Phase Noise Amplifiers

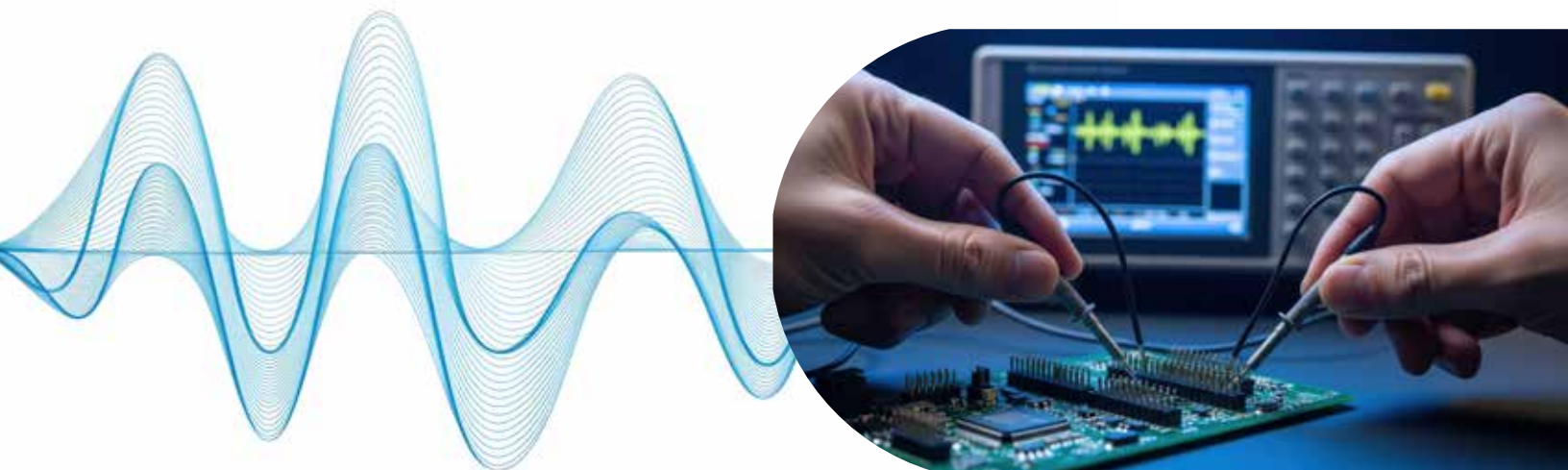
Qorvo's low phase noise amplifier portfolio supports precision sources and signal-chain stages that demand strong spectral purity across wide bandwidths.

Frequency (GHz)	Gain (dB)	Phase Noise (dBc/Hz)	Psat (dBm)	OIP3 (dB)	Vd (V)	Package Type	Part Number
DC-18	14.4	-165 @ 10 kHz Offset	24	34	5	Die	CMD326
DC-26.5	16	-165	20.5	29	5	Die	CMD275
DC-26.5	16	-165	20.5	29	5	Plastic QFN / 4x4	CMD275P4
DC-40	11.1	-165 @ 10 kHz Offset	21.4	31	5	Die	CMD327
2-20	17	-165	22	30.5	5	Die	CMD274
2-20	17	-165	22	30	5	Plastic QFN / 4x4	CMD274P4

Driver Amplifiers

Qorvo offers driver amplifiers for broadband test paths that need strong gain, linearity and enough output capability to support subsequent stages.

Frequency (GHz)	Gain (dB)	OP1dB (dBm)	OP3 (dBm)	NF (dB)	Vd (V)	Package Type	Part Number
1-24	16	24	33	3	5 to 8	Die	CMD317
2-20	26.5	16	28.5	3.5	3	Die	CMD295
2-20	27	16	29	3	2 to 4	Ceramic QFN / 4x4	CMD295C4
2-22	17	29	-	-	12	Die / 2.3x3.2x0.1	TGA2509
20-45	20	26	31.5	6	5	Die	CMD293



Power Amplifiers

Qorvo's wideband power amplifier portfolio addresses broadband T&M, EW and radar platforms that require efficient RF power across extended frequency coverage.

Frequency (GHz)	Psat (dBm)	Gain (dB)	PAE (%)	Vd (V)	Package Type/ Size (mm)	Part Number
0.5-20	36.5	13	-	-2.8 to 28	Die	CMD184
2-18	43	12	25	22	Flange	QPA2966
2-18	37	> 22	> 20	22	Die / 3x5x0.10	TGA2214
2-18	36	> 22	> 15	22	CP / 15.2x15.2x3.5	TGA2214-CP
2-20	35	16	>20	18	Laminate / 4.5x4.5x1.7	QPA2213
2-20	35	16	23	18	Die / 2.75x2.75x0.10	QPA2213D
2-20	40	13	22	22	Laminate / 5x5x1.45	QPA2962
2-20	44	13	25	22	Die	QPA2966D
20-40	33.5	12.5	13	18	Die / 2.692x1.882x0.050	QPA2040D
20-40	39	12	> 12	18	Die / 5.87x3.50x0.05	QPA2640D
20-40	39	12	> 12	18	Die on Tab / 3.58x6.05x0.33	QPA2640T

Distributed Amplifiers

Qorvo's distributed amplifiers cover broad frequency spans for gain stages where flatness and bandwidth are especially important.

Frequency (GHz)	Gain (dB)	NF (dBm)	OP1dB (dBm)	Psat (dBm)	OIP3 (dB)	Package Type/ Size (mm)	Part Number
0.1-20	19.5	1.9	24.5	26	31	Die	CMD192
0.1-20	19.5	1.9	24.5	26	31	Ceramic QFN / 5x5	CMD192C5
0.1-20	17.5	2.5	25	26.5	31	Plastic QFN / 5x5	CMD244K5
0.1-20	13	3.4	30	31	38	Die	CMD249
0.1-20	12.5	3	28	32	39	Plastic QFN / 5x5	CMD249P5
0.1-20	12	2.5	11	13.5	22	Plastic QFN / 4x3	CMD311P34
0.1-22	15	2.2	19	22	28	Die	CMD240
0.1-22	15	2	19	22	27	Ceramic QFN / 4x4	CMD240C4
0.1-22	15	2.2	19	22	28	Plastic QFN / 4x4	CMD240P4
0.1-22	17	2.5	19	20.5	28	Die	CMD284
0.1-22	17	2.5	19	20.5	28	Plastic QFN / 4x4	CMD284P4
0.1-24	18	2.5	25	26.5	32	Die	CMD244
0.1-30	13	3	27	28.5	33	Die	CMD292
0.1-40	11	4.4	18	20	27	Die	CMD242
0.1-40	10.5	5	17.5	20	26	Plastic QFN / 4x4	CMD242K4
0.1-55	12.5	3	15	17.5	27.5	Die	QPA0009D
0.1-67	10	3	11	14	21	Die	CMD304
1-24	16	3	23	24	35	Ceramic QFN / 4x4	CMD317C4
2-20	9	4.5	20.5	22	24	Die	CMD233
2-20	9	4.5	20.5	22	24	Ceramic QFN / 4x4	CMD233C4
2-20	14	4.5	26	-	34	Die	CMD238
2-20	11	3	18	20	26	Die	QPA0012D
2-22	13.5	2.3	21	23	28	Die	CMD241
2-22	13.5	2.3	21	23	28	Plastic QFN / 4x4	CMD241P4

Limiters

Qorvo's limiter products help protect sensitive receiver and instrumentation chains while maintaining wideband RF performance.

Frequency (GHz)	Insertion Loss (dB)	Flat Leakage (dBm)	Package Type/ Size (mm)	Part Number
0.1-20	< 0.7	< 18.5	Die / 1.5x1x0.1	TGL2217
0.1-20	< 0.9	< 18.5	QFN / 3.5x3.5x1.64	TGL2217-SM
2-12	< 0.5	< 18	QFN / 3x3x1.35	TGL2201-SM
2-20	> 17	1.7 to 4	5	TGL2217
2-20	< 1.0	< 18	QFN / 3x3x1.35	TGL2217-SM
2-25	< 1	< 18	Die / 1.1x1.1x0.1	TGL2201-SM

Digital Step Attenuators

Qorvo's digital step attenuator portfolio supports calibration, amplitude leveling and path control across broadband T&M architectures.

Frequency (GHz)	Attenuation Range (dB)	Step Size (dB)	Interface	IIP3 (dBm)	Vd (V)	Package Type/ Size (mm)	Part Number
DC-20	31	1	Parallel	33	(DCA) -2.5 to -5.5, <br / >(ACV) 0 to -5	QFN / 3.9x3.9	QPC1008
DC-22	12	4	Parallel	42	-5	Ceramic QFN / 3x3	CMD282C3
DC-30	31.5	0.5	Parallel	40	-5	Die	CMD325
DC-40	12	4	Parallel	42	-5	Die	CMD282
10-48	31.5	0.5	SPI	57 @ 40 GHz	3.3	OVM QFN / 3.5x3.5	QPC0045
20-30	31.5	0.5	SPI	-	3.3	OVM QFN / 3.5x3.5	QPC5430
100-31	15.5	0.5	Parallel	> 32	-3.3 to -5.0	QFN / 3x3	TGL2223-SM

Voltage Controlled Attenuators

Qorvo's variable attenuator solutions provide fine control for broadband amplitude adjustment, leveling and calibration functions.

Frequency (GHz)	Insertion Loss (dB)	Attenuation Range (dB)	IP1dB (dBm)	IIP3 (dBm)	Vd (V)	Package Type/ Size (mm)	Part Number
DC-20	DC-20	DC-20	DC-20	30	-8 to 0.3	Ceramic QFN / 3x3	CMD285C3
DC-20	DC-20	DC-20	DC-20	33	(DCA) -2.5 to -5.5, <br / >(ACV) 0 to -5	QFN / 3.9x3.9	QPC1008
DC-30	DC-30	DC-30	DC-30	-	-1 to 0	Die / 3x3x0.9	TGL4203-SM
DC-50	DC-50	DC-50	DC-50	-	-1 to 0	Die / 1.7x0.8x0.1	TGL4203
0.05-18	0.05-18	0.05-18	0.05-18	45	5	Laminate MCM / 3.2x3.2	RFS2113
2-31	2-31	2-31	2-31	-	0 to 1.5	Die / 1.17x0.98x0.1	TGL2767
2-31	2-31	2-31	2-31	-	0 to 1.5	SMT / 3x3x1.53	TGL2767-SM

RF Switch Solutions

Qorvo offers a wide variety of broadband RF switches in SPST, SPDT and SP4T configurations, with absorptive and reflective options.

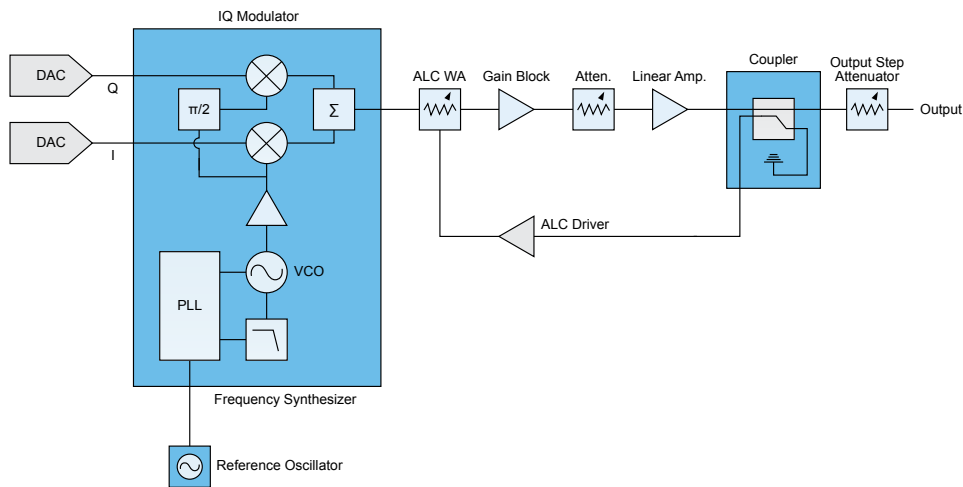
Frequency (GHz)	Type	Termination Type	IL (dB)	Isolation (dB)	IP1dB (dBm)	Vcc (V)	Package Type/ Size (mm)	Part Number
DC-18	SPDT	Absorptive	1.5	46	23	0, -5	Ceramic QFN / 3x3	CMD196C3
DC-20	SP4T	Absorptive	2.4	45	21	0, -5	Die	CMD203
DC-20	SP4T	Absorptive	2.4	39	21	0, -5	Ceramic QFN / 4x4	CMD203C4
DC-20	SPST	Absorptive	1	50	25	0, -5	Die	CMD204
DC-20	SPST	Absorptive	1.3	48	25	0, -5	Ceramic QFN / 3x3	CMD204C3
DC-28	SPDT	Absorptive	1.75	46	23	0, -5	Die	CMD196
20-30	SPDT	Reflective	< 1.5	> 40	33	0/+3	OVM QFN / 2.25x2.25	QPC2420
20-50	SPDT	Reflective	< 2 @ 40 GHz	40 dB @ 40 GHz	33	0/+3	OVM QFN / 2.25x2.25	QPC0542
9 kHz-50	SPDT	Absorptive	1.7	55	32	5	LGA / 3x3	QPC5020
9 kHz-[BS1.1]30	SP4T	Absorptive	2.8	55	32	5	LGA / 3x3	QPC5040
9 kHz-[BS2.1]30	SP4T	Reflective	2.8	55	32	5	LGA / 3x3	QPC5041
9 kHz-30 GHz	SPDT	Reflective	1.7	55	32	5	LGA / 3x3	QPC5120

High Power GaN Switches

Part Number	Description	Switch Type	Frequency Min (MHz)	Frequency Max (MHz)	Insertion Loss (dB)	Isolation (dB)	Switching Speed (ns)	OPO.1dB (dBm)	Package Type	Package Size (mm)
TGS2352-2	0.1-12 GHz, 20 Watt, High Power GaN SPDT Switch	SPDT	500	12,000	< 1	-35	< 35	43	Die	1.65x1.15x0.1
TGS2352-2-SM	0.5-12 GHz, 20 Watt, High Power GaN SPDT Reflective Switch	SPDT	500	12,000	< 1	-35	< 35	43	QFN	4x4x1.42
TGS2353-2	0.5-18 GHz, 10 Watt, High Power GaN SPDT Switch	SPDT	500	18,000	1.5	-30	35	40	Die	1.15x1.65x0.1
TGS2353-2-SM	0.5-18 GHz, 10 Watt, High Power GaN SPDT Reflective Switch	SPDT	500	18,000	< 1.5	-30	35	40	QFN	4x4x1.42

RF Test & Measurement System Applications

Vector Signal Generator

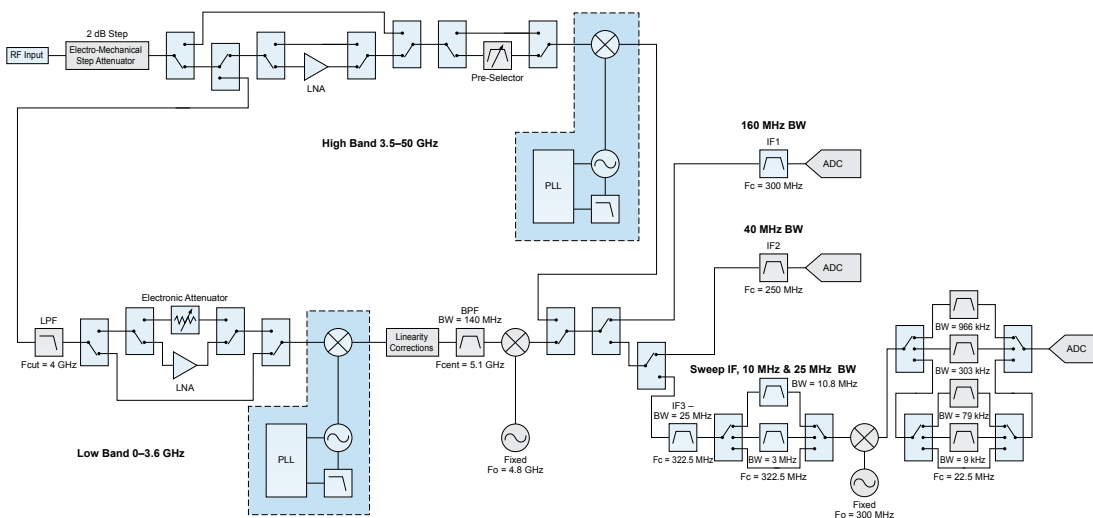


Modern vector signal generators need clean, stable output across wide bandwidths with precise control over gain, attenuation and routing. Qorvo supports these designs with RF building blocks that help enable low loss, strong linearity and repeatable performance.

Qorvo solutions used here:

Switches • Digital step attenuators • Gain blocks • Driver amplifiers • Active baluns

Spectrum Analyzer



Spectrum analyzers require sensitive, wideband receive paths that support accurate signal capture, good linearity and strong dynamic range. Qorvo helps enable these designs with RF building blocks for low-noise gain, signal routing and control.

Qorvo solutions used here:

Low noise amplifiers • Gain blocks • Switches • Attenuators • Active baluns

Check Out Our Design Hub

Qorvo connects the world. From the IoT and smartphones to defense and everything in between. Explore our resources to find out how.

Resource Categories:

Downloadable Software



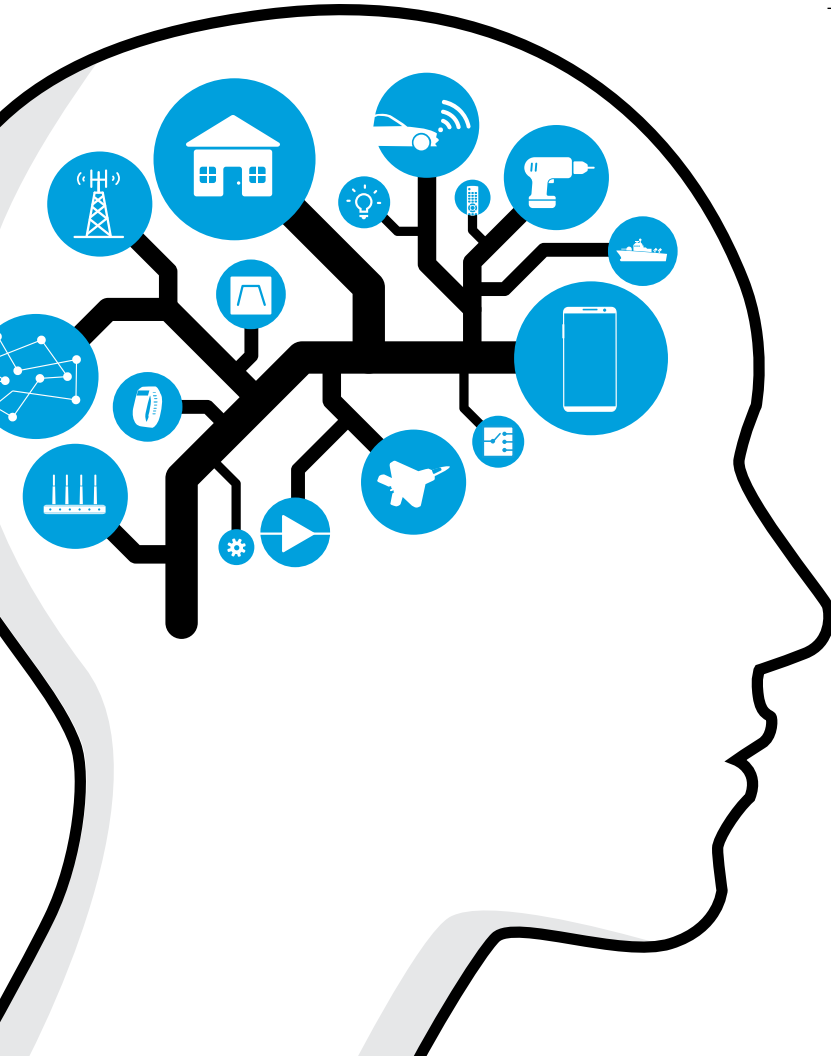
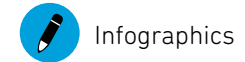
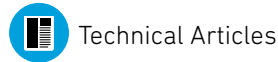
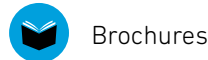
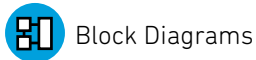
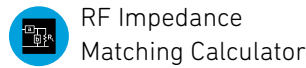
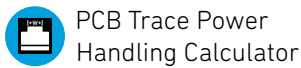
GaN Models



Array Calculators

SATCOM Array Calculator
5G Array Calculator

Design Tools



Here to Inspire and Help

Qorvo has a long and proud history of providing RF designers and engineers, from around the world, with the inspiration and technical support they need to make their designs a reality. In addition to designing and manufacturing the industry's best in class RF and mmWave products, Qorvo provides the system level technical know-how that enables true design collaboration. Qorvo stands ready to support our valued customers so they can overcome their toughest design challenges together.

www.qorvo.com/design-hub