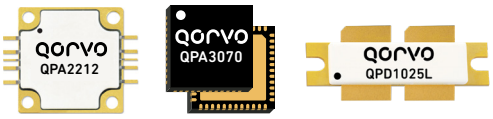
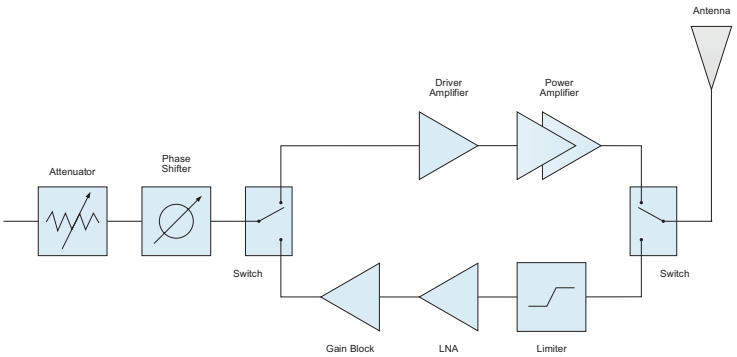
High-Performance GaN & GaAs Solutions

for Defense and Aerospace Applications



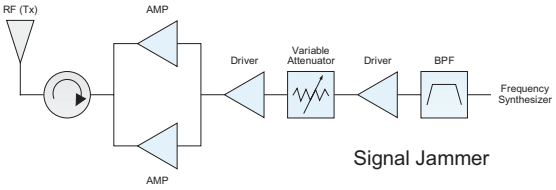
all around you

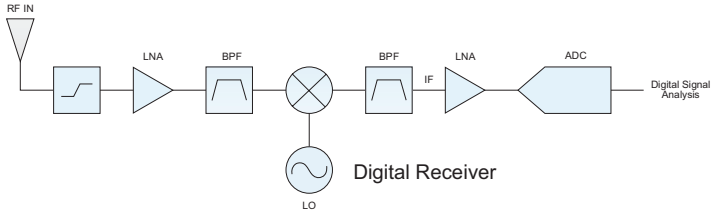
Mission Critical Defense Applications (Signal Chains)



Radar (L, S, C, X, Ku - Band)

Today's advanced radar systems need to be more powerful and have greater functionality to detect a variety of growing global threats. Qorvo® has the largest portfolio of high-performance MMICs and discrete components designed for these applications. We can deliver the products and signal chain expertise you need to maintain the leading edge no matter what frequency band you want to operate in.

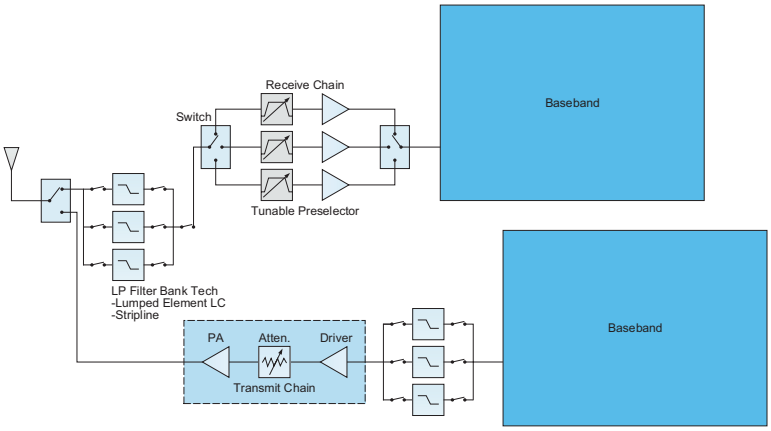




Electronic Warfare (EW)

Over the past decade there has been a greater emphasis given to EW technologies by other countries. EW supremacy is vital to maintaining the battlefield advantage.

Qorvo offers a full array of best-in-class RF solutions that are designed for broadband applications like EW that offer the industry's lowest noise figures. We can offer designers a single function block or the entire signal chain depending on your needs. Our products are designed to operate at peak performance with each other making your job easier.



Communications

Secure and reliable communications are priority one in any potential conflict. Qorvo is a leader in wireless communications both on and off the battlefield. We understand what it takes to maintain a reliable and secure wireless connection all the way from the antenna to the receiver. You can trust Qorvo products to keep the lines of communications open and working at maximum efficiency under any circumstances.

Gallium Nitride (GaN) Innovation

With high-performance GaN technology, Qorvo continues to build on a strong gallium arsenide (GaAs) legacy by offering new products and strategic foundry services that strive to meet our partners' demanding requirements. With Qorvo, our partners also benefit from a 'trusted' supplier with industry-leading GaN reliability. Qorvo is also the only GaN supplier to reach manufacturing readiness level MRL10.

The GaN Advantage

Qorvo GaN powers improvements in SWaP-C analyses. With superior power, efficiency and gain, system designers now have the flexibility to make design trades that were previously not possible. Higher power densities lead to higher power capability in a smaller area. Reduced combining leads to improved efficiencies. Higher voltage operation results in lower system losses. Improved power handling supports high power switches and highly robust LNAs. Qorvo's leading GaN reliability at higher junction temperatures gives the user the confidence in long-term operation. Whether the motivation is to increase power, reduce board area or improve efficiency, Qorvo GaN makes this possible while reducing overall system costs.

Key Qorvo GaN attributes:

- >65 million device hours on 16,900 devices in the field, with less than 0.013% failures per million hours
- Proven reliability at high junction temperatures, mean time to failure (MTTF) of greater than 10^7 (10 million) to 10^9 (1 billion) hours at 200 degrees (C) and greater than 10^6 (1 million) to 10^8 (100 million) hours at 225 degrees (C)
- Production technologies supporting DC through Ka-band
- Excellent noise figure – comparable to pHEMT
- Highly robust to ESD and RF input signals
- SiC substrates for superior thermal management
- High power density (Improved SWaP)
- High power-added efficiency (Improved SWaP)

GaN Foundry Processes

As a DoD-accredited 'Microelectronics Trusted Source', Qorvo offers a variety of GaN technologies for optimized solutions. Accreditation encompasses foundry, post-processing, packaging/assembly and test services. Support provided by our foundry services division complements Qorvo's high-frequency standard product portfolio.

QGaN25:

- Technology: 0.25µm GaN on SiC
- Drain bias (Vd): up to 40V
- Operating frequencies: DC-18 GHz
- PAE: >60% at 10 GHz
- Power density: 6W/mm at 10 GHz
- Reliability: >10M hours at 200C and 40V (3-temp DC MTTF w/failure defined as 10% degradation in Idmax)

QGaN15:

- Technology: 0.15µm GaN on SiC
- Drain bias (Vd): up to 28V
- Operating frequencies: DC-40 GHz
- PAE: >50% at 30 GHz
- Power density: 4.2W/mm at 30 GHz
- Reliability: >10M hours at 200C and 28V (DC MTTF w/failure defined as 10% degradation in Idmax)

QGaN25HV:

- Technology: 0.25µm GaN on SiC
- Drain bias (Vd): up to 48V
- Operating frequencies: DC-12 GHz
- PAE: >78% at 3.5 GHz
- Power density: 6.5W/mm at 3.5 GHz
- Reliability: >10M hours at 200C and 48V (3-temp DC MTTF w/failure defined as 10% degradation in Idmax)

QGaN50:

- Technology: 0.50µm GaN on SiC
- Drain bias (Vd): up to 65V
- Operating frequencies: DC-8 GHz
- PAE: >78% at 3.5 GHz
- Power density: 9W/mm at 3.5 GHz
- Reliability: >10M hours at 200C and 65V (DC MTTF w/failure defined as 10% degradation in Idmax)

GaN Packaging Solutions

Qorvo packaging solutions focus on maximizing performance while managing thermal behavior and cost. Our high-performance GaN products can be found in a variety of Cu-based packages for superior heat transfer. Depending on the functionality and operating conditions, Qorvo offers bolt down packages down to small surface mount packages in either air cavity or overmold formats.

GaN Standard Product Portfolio

Qorvo's leadership in high-performance GaAs has been extended to GaN. With GaN proving to be an evolutionary technology in support of next-generation military and commercial applications, Qorvo is leading the way with world-class products across frequency and functionality. With a growing portfolio of GaN-based amplifiers and switches, along with high-performance transistors, Qorvo is the premiere solution provider for your GaN needs.

Qorvo conducts extensive testing and analysis of both processes and products to provide exceptional performance, reliability and high-volume manufacturing capability. When measuring and predicting thermal behaviors, Qorvo simulates FET channel temperature using finite element analysis, then verifies those models against micro-Raman measurements of the FET to provide accurate, lifetime reliability data.

GaN Power Transistors

Description	Frequency (GHz)	LS Compression Gain (dB)	PAE (%)	Psat (dBm)	Bias (V)	Package (mm)	Part Number
500 W Discrete	DC-1.7	15	67	57.3	50	NI-780	QPD1016L
150 W Discrete	DC-2.7	15	65	52.5	65	7.2x6.6 DFN	QPD1013
125 W Discrete	DC-3.2	16	73	52.1	50	NI-360	QPD1008/L
200 W Discrete	DC-3.4	12	60	51	50	NI-360	TGF2819-FL
55 W Discrete	DC-3.5	13	50	47.2	28	NI-360	T2G4005528-FS
100 W Discrete	DC-3.5	14	72	50	28	NI-360	TGF2929-FL
130 W Discrete	DC-3.5	15	72	51.2	28	NI-360 HM	TGF2929-HM
2x200 W Discrete	DC-3.5	14	68	54	50	NI-650	T1G4020036-FL/-FS
75 W Discrete	DC-3.6	20	80	48.7	48	7.2x6.6 DFN	QPD0050
90 W Discrete	DC-3.6	16	73	49.5	48	7.2x6.6 DFN	QPD0060
75 W Discrete	DC-3.7	15	80	48.5	48	NI-360	QPD1015/L
10 W Discrete	DC-4	17	70	41	50	3x3 QFN	QPD1010
15 W Discrete	DC-4	17	72	42	50	3x3 QFN	QPD1009
45 W Discrete	DC-4	17	72	46.9	48	4x3 QFN	QPD0030
10 W Discrete	DC-6	14	56	40	28	NI-200	T2G6000528-Q3
15 W Discrete	DC-6	13	65	42.3	28	NI-200	T2G6001528-Q3
30 W Discrete	DC-6	11	54	43.5	28	NI-200	T2G6003028-FL
35 W Discrete	DC-6	17	78	45.4	48	4x3 QFN	QPD0020
5 W Discrete	DC-12	8	50	37	32	3x3 QFN	TGF2977-SM
10 W Discrete	DC-12	14	55	40.4	32	3x3 QFN	QPD1022
20 W Discrete	DC-12	15	65	43	32	4x3 QFN	TGF2978-SM
27 W Die	DC-12	14	54	44.3	32	Die	TGF2954
12 W Die	DC-18	18	73	40.1	28	Die	TGF2023-2-02
25 W Die	DC-18	15	78	43	28	Die	TGF2023-2-05
50 W Die	DC-18	17	70	47.3	28	Die	TGF2023-2-10
90 W Die	DC-18	16	71	50.5	28	Die	TGF2023-2-20
7 W Discrete	0.03-1.2	16	60	39.4	50	6x5 DFN	QPD1011
15 W Discrete	0.03-1.2	18	70	41	50	6x5 DFN	QPD1014
25 W Discrete	0.03-1.2	18	73	46	50	6x5 DFN	QPD1004
15 W Discrete	0.03-1.215	17	78	42	28	6x5 DFN	QPD1000
5 W Discrete	0.03-3	14	63	37	32	3x3 QFN	TGF2965-SM
10 W Discrete	0.03-3	14	63	39.7	32	3x3 QFN	TGF3015-SM
30 W Discrete	0.03-4	17	73	44	32	4x3 QFN	TGF3021-SM
1300 W Discrete	0.42-0.45	21	81	61.2	65	NI-1230	QPD1026L
1800 W Discrete	0.96-1.215	18	77	62.7	65	NI-1230	QPD1025/L
100 W PAM	1.2-1.4	32	60	50	50	25x12.5 SMD	QPA2511
450 W IMFET	1.2-1.4	15	62	54.9	45	NI50-CW	QPD1006
500 W IMFET	1.2-1.4	17	67	57.3	50	17x24	QPD1003
750 W Discrete	1.2-1.4	17	65	58.8	65	NI-780	QPD1028/L
1500 W Discrete	1.2-1.4	17	70	61.8	65	NI-1230	QPD1029L
400 W Discrete	2.7-2.9	17	71	56.3	50	NI-780	QPD1881L
500 W IMFET	2.7-3.1	14	68	57.6	50	RF-565	QPD1018
30 W Discrete	2.7-3.5	15	64	45	50	6x5 DFN	QPD1020
500 W IMFET	2.9-3.3	13	67	57.7	50	RF-565	QPD1019
125 W PAM	3.1-3.5	30	62	51	50	25x12.5 SMD	QPA2513
500 W IMFET	3.1-3.5	13	60	56.6	50	17x24	QPD1017
400 W IMFET	4.9-5.9	12	65	56	50	NI50-CW	QPD1031
30 W Discrete	9.2-9.7	9	49	34.3	28	7x7	QPD9300

RF Filters and Diplexers

Description	Frequency (MHz)	Bands	Technology	IL (dB)	Package (mm)	Part Number
1030 MHz RF BAW Filter	1030	SSR/IFF (14 MHz)	BAW	3	3.71x2.57	880367
1090 MHz RF BAW Filter	1090	SSR/IFF (16 MHz)	BAW	3	3.71x2.57	880374
L5 Low Loss GPS SAW Filter	1,160.95-1,191.95	L5	TC-SAW	1.2	1.4x1.2	QPQ1062
L2 Low Loss GPS SAW Filter	1,212.1-1,243.1	L2	TC-SAW	1.2	1.4x1.2	QPQ1061
L1 Low Loss GPS SAW Filter	1,559.92-1,590.92	L1	TC-SAW	1.3	1.4x1.2	QPQ1060
L1/L2 Low Loss GPS SAW Diplexer	1,559.92-1,590.92, 1,212.1-1,243.1	L1, L2	TC-SAW	1.6, 1.3	5x5	QPQ1063

GaN Switches

Description	Frequency (GHz)	IL (dB)	ISO (dB)	P1dB (dBm)	Voltage (V)	Package (mm)	Part Number
50 W SP3T	0.15-2.8	<1	>30	47	0/-40	4x4 QFN	QPC1006
100 W SPDT	0.5-6	<1.1	>40	50	0/-40	5x5 QFN	TGS2355-SM
20 W SPDT	0.5-12	<1	>30	43	0/-40	4x4 QFN	TGS2352-2-SM
10 W SPDT	0.5-18	<1.5	>25	40	0/-40	4x4 QFN	TGS2353-2-SM
30 W SP3T	2-11	1.5	20	–	0/-30	4x4 Laminate	QPC2511
10 W SPDT	8-12	<1.2	30	41.7	0/-28	4x4 QFN	QPC2040

GaN Power Amplifiers

Description	Frequency (GHz)	Psat (dBm)	LS Gain (dB)	PAE (%)	Bias (V/mA)	Package (mm)	Part Number
10 W Wideband PA	0.03-2.5	40	13	55	32/360	4x4 QFN	QPA2237
10 W Wideband PA	0.1-3	41	13	40	40/360	4x4 AC-QFN	TGA2976-SM
10 W Wideband PA	1-8	40	15	30	28/650	5x6 AC-QFN	QPA1003P
2 W Wideband PA	2-6	32.5	14.5	30	25/40	4x4 QFN	TGA2597-SM
30 W Wideband PA	2-6	45	22	30	28/400	15x15 Flange	TGA2578-CP
2.5 W Wideband PA	2-20	34	16	23	18/330	4.5x4.5 AC-QFN	QPA2213
10 W Wideband PA	2-20	40	13	22	22/1680	Die	TGA2962
10 W Wideband PA	2-20	40	13	22	22/1680	5x5 AC-QFN	QPA2962
20 W Wideband PA	2-20	44	16	23	22/3360	Die	QPA2966D
45 W Wideband PA	2.5-6	46.5	20	36	30/1550	Flange	TGA2576-2-FL
12 W S-Band PA	2.7-3.5	41	25	52	28/175	5x5 QFN	TGA2975-SM
40 W S-Band PA	2.7-3.7	46	24	48	28/450	6x6 QFN	QPA1014
100 W S-Band PA	2.7-3.5	50	25	53	30/300	7x7 QFN	QPA3069
50 W S-Band PA	2.8-3.2	47	22	58	25/200	7x7 QFN	QPA1000
60 W/50 V S-Band PA	2.8-3.5	48	22	55	50/300	6x6 QFN	QPA1027
150 W/50 V S-Band PA	2.9-3.5	52	28	t58	50/422	7x7 QFN	QPA3070
10 W C-Band PA	4.5-7	40	19	40	22/290	5x5 QFN	QPA1019
50 W/50 V C-Band PA	5-6	48	23	49	50/300	7x7 QFN	QPA2310
100 W/50 V C-Band PA	5-6	50	22	47	50/600	7x7 QFN	QPA2309
2 W C-Band Driver	5-8	33	15	34	25/50	4x4 QFN	TGA2599-SM
100 W C-Band PA	5.7-7	50	20	38	26/2000	19x19 Flange	QPM1017
2.5 W Wideband PA	6-12	34	16	30	22/55	4x4 QFN	QPA2598
30 W C/X-Band PA	6-12	45	22	30	20/2000	15x15 Flange	TGA2590-CP
10 W Wideband PA	6-18	40	20	20	20/1250	Die	QPA1013D
20 W Wideband PA	6-18	43	18	20	20/2500	15x15 Flange	TGA2963-CP
25 W Wideband PA	6-18	44	13	23	20/2200	Die	QPA2971D
4.5 W X-Band PA	7-10.5	36.5	23.5	38.5	20/200	4.5x4.5 QFN	TGA3042-SM
15 W X-Band PA	7.9-11	42	18	38	24/600	4.5x5.0 AC-QFN	QPA1010
25 W X-Band PA	7.9-11	44.5	19.5	37.5	24/1200	4.5x5.0 AC-QFN	QPA1011
50 W X-Band PA	7.9-11	47	24	34	28/650	15x15 Flange	TGA2238-CP
100 W X-Band PA	7.9-11	50	22	35	28/1300	19x19 Flange	TGM2635-CP
5 W X-Band PA	8-12	38	26	42	24/105	5x5 QFN	QPA2610
12 W X-Band PA	8-12	41	23	40	24/250	5x5 QFN	QPA2611
2 W X-Band PA	8.5-10.5	33	23	47	20/56	5x5 QFN	QPA2612
4 W X-Band PA	8.5-11	36.5	24	45	22/500	4x4 QFN	QPA1022
20 W X-Band PA	9-10	43	25	40	28/365	7x7 AC-QFN	TGA2624-SM
35 W X-Band PA	9-10	45.5	27.5	42	28/290	7x7 AC-QFN	TGA2622-SM
100 W X-Band PA	10-12	50	22	26	28/2000	19x19 Flange	QPM1021
2 W Ku-Band Driver	13-18	33	20	25	20/70	4x4 AC-QFN	TGA2958-SM
17 W X-Band PA	10.7-12.7	43.5	17	40	20/600	Die	QPA1009D
35 W X-Band PA	10.7-12.7	46	17	40	20/1200	Die	QPA1006D
80 W Ku-Band PA	13-15.5	49	24	25	28/800	19x19 Flange	QPM2239
35 W Ku-Band PA	13.4-15.5	45.5	25.5	34	28/900	15x15 Flange	TGA2239-CP
12 W Ku-Band PA	13.4-16.5	41	23	30	28/225	5.5x4.5 AC-QFN	TGA2218-SM
25 W Ku-Band PA	13.4-16.5	44	28	31	28/450	15x15 Flange	TGA2219-CP
10 W K-Band PA	17-20	40	22	30	28/300	5x5.5 AC-QFN	TGA4548-SM
6 W Ka-Band PA	27-31	37.5	26	32	20/200	5x5 AC-QFN	QPA2210
10 W Ka-Band PA	27.5-31	41	24	26	22/280	15x15 Flange	QPA2211
20 W Ka-Band PA	27.5-31	43	22	22	22/460	15x15 Flange	QPA2212
0.4 W Ka-Band PA	28-38	26	23	n/a	20/64	Die	QPA2225D
5 W Ka-Band PA	32-38	37	16	20	24/320	Die	TGA2224
10 W Ka-Band PA	32-38	40	16	22	24/640	Die	TGA2222

GaN Low Noise Amplifiers

Description	Frequency (GHz)	Max Pin (dBm)	P1dB/OIP3 (dBm)	Gain (dB)	NF (dB)	Voltage/Current (V/mA)	Package (mm)	Part Number
Low Noise Amplifier	0.03-3	37	23/-	17	1.2	12/50	3x3 QFN	QPL1002
S/C-Band LNA	2-6	30	18/30	22	1	10/100	4x4 PQFN	TGA2611-SM
Wideband LNA	2-20	40	23	15	2	8/125	4x4 QFN	TGA2227-SM
C-Band LNA	2.6-4	36	25.5/32	14.5	1.2	5-28/225	4x4 QFN	CMD276C4
C-Band LNA	4-8	36	17/28	22.5	1	5-28/75	4x4 QFN	CMD219C4
C-Band LNA	5-7	36	26.5/33.5	20	1.2	5-28/200	4x4 QFN	CMD277C4
C/X-Band LNA	5-9	36	18.5/29	22	1.1	5-28/75	4x4 QFN	CMD218C4
Low Noise Amplifier	8-11	36	9/-	27	1.7	10/10	4x4 QFN	QPL1000
X-Band LNA	8-12	36	28/33	15	1.8	5-28/280	4x4 QFN	CMD278C4

GaAs Performance

Qorvo has always been recognized as the industry leader in GaAs design and manufacturing. With the recent acquisition of Custom MMIC, we have bolstered our existing GaAs product portfolio to include virtually every RF function block in a complete signal chain making Qorvo the leader in GaN and GaAs MMIC solutions.

Explore our GaAs product selection tables to find the perfect product(s) for your next RF design or go to www.qorvo.com and use our easy-to-use parametric search tool to help speed your search and selection.

Integrated Front-End Modules (GaN and GaAs Combined)

Description	Freq. Min (MHz)	Freq. Max (GHz)	Tx Gain (dB)	Tx Voltage (V)	Tx Current (mA)	Rx Gain (dB)	Rx NF (dB)	Rx Voltage (V)	Rx Current (mA)	Package (mm)	Part Number
8-12 GHz 10 W Transmit/Receive Module	8	12	22	24	250	25	2.2	1.8	90	7x5	QPF5010
8-12 GHz 5 W Transmit/Receive Module	8	12	24	24	50	25	2.2	1.8	90	7x5	QPF5005
8.5-10.5 GHz 2 W Transmit/Receive Module	8.5	10.5	20.5	20	56	24	2.1	1.8	90	7x5	QPF5002
8.5-10.5 GHz GaN Transmit/Receive Module	8.5	10.5	33	25	110	25	2.2	10	20	5x5	QPM1002
2.5-4 GHz GaAs Transmit/Receive Module	2.5	4	-1.2	–	–	30	1.2	3.3	180	7x7	QPM2100
9-10.5 GHz GaN Transmit/Receive Module	9	10.5	23	28	600	21	2.7	10	60	6x5	QPM2637

GaAs Switches

Freq. Min (MHz)	Freq. Max (GHz)	Switch Type	Abs/ Refl	IL (dB)	ISO (dB)	Speed (ns)	IP1dB (dBm)	Voltage (V)	Package (mm)	Part Number
DC	20	SPST	Non-R	1.3/1	48/50	1.8	25	0 -5	3x3/Die	CMD204C3/CMD204
DC	20	SPDT	Non-R	2	37/41	1.8	25	0 /-5	3x3/Die	CMD195C3/CMD195
DC	18	SPDT	Non-R	1.75/1.5	46	1.8	23	0 /-5	3x3/Die	CMD196C3/CMD196
DC	40	SPDT	R	2.3	36	4	19	0 /-5	Die	CMD215
DC	20	SP4T	Non-R	2.4	39	66	21	0 -5	4x4/Die	CMD203C4/CMD203
DC	10	DPDT	Non-R	1.5	35	4	24	0 /+5	3x3	CMD272P3
DC	12	DPDT	Non-R	1.7	42	12	25	0/+5	3x3	CMD273P3
DC	26	SPDT	R	1.4	40	3.4	21	0 /-5	Die	CMD230
DC	15	SP3T	Non-R	2	42	66	21	0 /-5	4x4	CMD234C4
DC	18	SP5T	Non-R	2.5	44	66	21	0 -5	4x4	CMD235C4/CMD235
DC	18	SP6T	Non-R	2.5	42	60	18	0 /-5	4x4	CMD236C4/CMD236
0.100	6	SP3T	R	0.6	34	110	34	3.3	3x3	TQP4M0011

GaAs Limiters

Description	Frequency (GHz)	Insertion Loss (dB)	Flat Leakage (dBm)	Package (mm)	Part Number
0.05-6 GHz, 100 W VPIN Limiter	0.05-6	< 0.7	< 17	4x4	TGL2210-SM
0.1-20 GHz, 10 W VPIN Limiter	0.1-20	< 0.7	< 18.5	1.5x1 Die	TGL2217
0.1-20 GHz, 10 W VPIN Limiter	0.1-20	< 0.9	< 18.5	3.5x3.5	TGL2217-SM
1-6 GHz, 100 W S-Band & C-Band VPIN Limiter	1-6	< 0.5	< 16	2x2 Die	TGL2205
2-4 GHz, 200 W VPIN Limiter	2-4	< 0.6	< 18	4x4	TGL2927-SM
2-4.5 GHz, 100 W S-Band VPIN Limiter	2-4.5	< 0.5	15	2.5x2.5 Die	TGL2206
2-5.5 GHz, 100 W VPIN Limiter	2-5.5	< 1.0	< 15.5	5x5	TGL2206-SM
2-6 GHz, 100 W VPIN Limiter	2-6	< 0.6	< 16.5	4x4	TGL2205-SM
2-12 GHz Wideband Dual Stage	2-12	<0.5	<18	3x3 Die	TGL2201-SM
2-20 GHz, 5 W VPIN Limiter	2-20	< 1.0	< 18	3x3	TGL2208-SM
2-25 GHz Wideband Dual Stage VPIN Limiter	2-25	< 1	< 18	1.1x1.1 Die	TGL2201
8-12 GHz, 50 W VPIN Limiter	8-12	< 0.5	< 18	2x2 Die	TGL2209
8-12 GHz, 50 W VPIN Limiter	8-12	< 0.5	< 18.5	4x4	TGL2209-SM
X-Band 40 W Limiter in Plastic 4x4 mm OVM QFN	8-12	< 0.5	< 19	4x4	QPP2209

GaAs Low Noise Amplifiers

Frequency (GHz)	Gain (dB)	NF (dB)	OP1dB (dBm)	OIP3 (dBm)	Voltage (V)	Current (mA)	Package (mm)	Part Number
0.005-4	24	2	1	9	3.3	10.5	2x2	SGL0622Z
2-6	31	1.6	12	23	3-5	45	4x4/Die	CMD308P4/CMD308
2-6	27	0.6	16	26	2-5/1.5	42	3x3/Die	CMD283C3/CMD283
2-18	17	2	17	29	5	75	Die	TGA2525
2-20	17	2	19	29	5	100	4x4	TGA2567-SM
4-8	15.5	1.8	17	30	3-5	60	3x3/Die	CMD270P3/CMD270
5-9	22	1.25	14	25.5	2.5-4.5	33	3x3	CMD318P3
5-11	27	1.5	13	23	3-5	45	4x4/Die	CMD309P4/CMD309
5-11	23	1.4	11	23	2-4.5	35	3x3/Die	CMD263P3/CMD263
6-11	20	1.8/2	16.5	27	3-5	66	3x3/Die	CMD271P3/CMD271
6-18	26	1.7/1.6	11	24/27	2-4.5	63	3x3/Die	CMD264P3/CMD264
6-18	27	1.4	12	24	3	52	3x3	CMD328K3
6-20	21	2.0	15	25	3-5.0	100	3x3/Die	CMD316C3/CMD316
7-14	26/27	1.1	18	–	3.5	120	4x4/Die	QPA2609/QPA2609D
8-12	20	0.92	16	22	3	30	3x3	CMD319C3
8-16	17	2.0	12	25	2-4	55	3x3/Die	CMD307P3/CMD307
10/10.5-13/12.7	16/17	1.2/1.1	-1.2/1	8	2	11	3x3/Die	QPL2210/QPL2210D
10.7-12.7	18	1.07	16	23	3	32	3x3	CMD320C3
13-20	26	1.1/1.2	18	–	3.5	105	4x4/Die	QPA2735/QPA2735D
17-22	25	1.3	20	28	3.5	90	4x4	QPA2626
17-25	27	1.4	8	17	3/1.5	27	4x4/Die	CMD298C4/CMD298
17-27	24/23	1.7/1.3	19	26	2-4 3	120	4x4/Die	CMD163C4/CMD163
18-40	17	3.5	8	17	3/3	33	4x4/Die	CMD299K4/CMD299
22/25-32/31	23/22	1.6/1.7	19	27	3.5	90	4x4/Die	QPA2628/QPA2628D

GaAs Driver Amplifiers

Frequency (GHz)	Gain (dB)	OP1dB (P_{SAT})	OP1dB (dBm)	NF (dB)	Voltage (V)	Current (mA)	Package (mm)	Part Number
0.150-0.960	15	36	49	3.2	7	650	SOIC-8	RFPA3800
1.8-2.7	30.5	27.5	46	3.5	5	225	4x4	TQP9109
2-9	15	17	23	4.5	5-6	90	3x3/Die	CMD232C3/CMD232
2-20	27	16	29	3	2-4	145	4x4	CMD295C4/CMD295
4-10	19.5	21	33	5.5	5	143	4x4	CMD315C4
5-7	19	28.4	37	6.5	7	375	4x4	CMD169P4
6-16	18.5	21	33	4-6	5	100	4x4	CMD305/C4/P3
20-45	20	26	31.5	6	5	480	Die	CMD293
26-35	15	19.5	24.5	3.5	5	72	Die	CMD199
26-35	15.5	21	24	4.4	5	90	Die	CMD243

GaAs Distributed Amplifiers

Frequency (GHz)	Gain (dB)	OP1dB/P_{SAT} (dBm)	OP1dB (dBm)	NF (dB)	Voltage (V)	Current (mA)	Package (mm)	Part Number
DC-20	11/12	30/29	38	3.4	10/-0.55/5	400	5x5/Die	CMD201P5/CMD201
DC-20	12	11/13.5	22	2.5	3-8/3-8	40	3x4	CMD311P34
DC-20	13	31/30	38	3.4	10/-0.95	400	5x5/Die	CMD249P5/CMD249
DC-20	19.5	26/25	31	1.9	5-8/-1	200	5x5/Die	CMD192C5/CMD192
DC-20/24	17.5/18	25	31/32	2.5	5-8/-0.65	185	5x5/Die	CMD244K5/CMD244
DC-22	15	22/19	28	2.2	5-8/-0.65	80	4x4/Die	CMD240P4(C4)/CMD240
DC-22	17	20.5/19.5	28	2.5	5-8	108	4x4/Die	CMD284P4/CMD284
DC-30	13	27/28.5	33	3	10/3.5/-0.6	250	Die	CMD292
DC-40	11	21/18	27	4.4	5-8/-0/32	100	4x4/Die	CMD242K4/CMD242
DC-67	10	11/14	11	3.5	3/-0.4	40	Die	CMD304
1-24	16	24.5/24	33	3	5-8	225	4x4/Die	CMD317C4/CMD317
2-20	26.5	17/16	24	3	2-4/2	145	4x4/Die	CMD295C4/CMD295
2-20	9	22/20.5	24	4.5	3-6	120	4x4/Die	CMD233C4/CMD233
2-22	13.5	23/21	28	2.3	5-8/-0.65	74	4x4/Die	CMD241P4/CMD241

GaAs Low Phase Noise Amplifiers

Frequency (GHz)	Phase Noise	Gain (dB)	OP1dB/P_{SAT} (dBm)	OIP3 (dBm)	Bias Voltage (V)	Bias Current (mA)	Package (mm)	Part Number
DC-18	-165	14.4	0/24	34	5/3	180	Die	CMD326
DC-26.5	-165	16	18-20.5	29	+3-5/+3	74	4x4/Die	CMD275P4/CMD275
DC-40	-165	11.1	0/21.4	31	5/3	100	Die	CMD327
2-20	-165	15	19-22	30.5	+3-5/+3	82	4x4	CMD274P4
6-18	-165	18	18-22	29	+3-5/+3	76	4x4/Die	CMD245C4/CMD245
8-22	-165	17	18-18	25	+3-5/+3	48	4x4/Die	CMD246C4/CMD246
30-40	<-160	13	13.5/15	21	+2-4/+3	28	Die	CMD247

GaAs Mixers

Description	Frequency RF (GHz)	Frequency IF (GHz)	LO Drive (dBm)	Conver. Loss (dB)	LO-RF Isolation (dB)	LO-IF Isolation (dB)	IIP3 (dBm)	Package (mm)	Part Number
Fundamental Mixer	4-8.5	DC-2.2	+17	7	45	36	21	3x3	CMD251C3
Fundamental Mixer	4-28	DC-3	+17	8	43	50	20	Die	CMD312
Fundamental Mixer	6-14	DC-5	+13	6.5	43	37	16	3x3/Die	CMD177C3/CMD177
Double Balanced	6-14	DC-5	+19	6	43	39	23	3x3/Die	CMD253C3/CMD253
Fundamental Mixer	6-45	DC-3	+17	9	41	42	20	Die	CMD313
Fundamental Mixer	11-21	DC-6	+13	6	45	45	16	3x3	CMD178C3
Double Balanced	11-21	DC-6	+19	6	48	44	22	3x3	CMD254C3
Sub-harmonic x2	13-21	DC-4/3	+2	-10/-8.5	22/28	34/48	13/12	3x3/Die	CMD303C3/CMD303
Fundamental Mixer	16-26	DC-9	+13	6.5	40	48	17	3x3/Die	CMD179C3/CMD179
Double Balanced	16-26	DC-9	+19	6.5	40	33	24	3x3	CMD255C3
Fundamental Mixer	20-32	DC-10	+13	7	36	36	18	3x3/Die	CMD180C3/CMD180
Sub-harmonic x2	20-32	DC-7	-2/-4	-8.5/-9.5	36	53	11/10	3x3/Die	CMD310C3/CMD310
Fund./Double Bal.	26-45	DC-12	+17	6.5	37	29	22	Die	CMD181/CMD181K3
Hi IF Mixer	30-46	5-20	+19	8	30	20	21	Die	CMD261

GaAs/IQ Mixers

Frequency RF (GHz)	Frequency IF (GHz)	LO Drive (dBm)	Conver. Loss (dB)	LO-RF Isolation (dB)	LO-IF Isolation (dB)	IMR (dB)	IIP3 (dBm)	Package (mm)	Part Number
2.5-15	DC-1	17	-8	45	25	23	22	4x4	QPX0002
4-8	DC-2.4	+20	-6.5	52	27	30	25	4x4	CMD252C4
6-10	DC-3.5	+15	-6	50	20	30	18	Die	CMD182
6-10	DC-3.5	+15	-6	46	20	30	18	4x4	CMD182C4
6-10	DC-3.5	+21	-5.5	40	18	31	25	4x4	CMD257C4
6-26	DC-3	17	-8	40	27	25	21	3.9x3.9	QPX0001
7.5-13	DC-4.5	+15	-5.5	43	23	26	18	4x4	CMD183C4
7.5-13	DC-3.5	+21	-5.5	38	20	29	25	4x4/Die	CMD258C4/CMD258
16-26	DC-9	+19	6.5	40	33	–	24	3x3	CMD255C3
20-32	DC-10	+13	-7	36	36	–	18	3x3	CMD180C3/CMD180
24-34	DC-7	15	-9	30	24	15	19	Die	QPX0004D
30-40	DC-5	15	-7	35	25	25	18	Die	QPX0003D

GaAs Multipliers

Description	Frequency (GHz)	RF Output (GHz)	Gain (dB)	Power (dBm)	Fo ISO (dB)	Voltage (V)	Current (mA)	Package (mm)	Part Number
Passive Multiplier	4-8	8-16	-12	15	48	–	–	3x3/Die	CMD225C3/CMD225
Passive Multiplier	7-11	14-22	-10.5	15	44	–	–	3x3/Die	CMD226C3/CMD226
Passive Multiplier	8-15	16-30	-11	15	32/40	–	–	3x3/Die	CMD227C3/CMD227
Active Multiplier	12-18	24-36	5	17	32	5	40	Die	CMD214
Passive Multiplier	14-20	28-40	-15	15	38	–	–	Die	CMD256
Active Multiplier	15-20	30-40	0	18	46	5	55	Die	CMD213

GaAs Digital Step Attenuators

Frequency (GHz)	Insertion Loss (dB)	Attenuator Range (dB)	Bits	RMS Step Err. (dB)	Switching Speed	Voltage (V)	Package (mm)	Part Number
DC-18/30	3	15.5	5	0.1	25	0/-5	3x3/Die	CMD280C3/CMD280
DC-22/40	1.5/1.2	6	2	0.1	25	0/-5	3x3/Die	CMD281C3/CMD281
DC-22/40	1.9/1.5	12	2	0.2/0.1	25	0/-5	3x3/Die	CMD282C3/CMD282
DC-30	2.9	30	2	+/-2	28	0/-5	Die	CMD324
DC-30	4	31.5	6	+/-0.2	25	0/-5	Die	CMD325
0.1-15	< 4.0	31.5	6	-	<30	-3.0 to -5.0	3x3	TGL2226-SM
1-31	< 4.2	15.5	5	<0.5	<30	-3.3 to -5.0	3x3	TGL2223-SM
2-18/30	3.5	15.5	5	0.2	25	0/+5	3x3/Die	CMD279C3/CMD279

GaAs Variable Attenuators

Frequency (GHz)	Insertion Loss (dB)	Attenuator Range (dB)	Voltage (V)	Package (mm)	Part Number
DC-20	3.2	33	+0.3 to -8	3x3	CMD285C3
0.050-18	3	32	5	3.2x3.2	RFSA2113
18-40	1.6	37	0/-3	Die	CMD172

GaAs Analog Attenuators

Frequency (GHz)	Insertion Loss (dB)	Attenuator Range (dB)	Voltage (V)	Package (mm)	Part Number
DC-30	1.5	16	-1 to 0	3x3	TGL4203-SM
DC-50	2	17	-1 to 0	Die	TGL4203
2-31	< 2	20	0 to 1.5	3x3/Die	TGL2767-SM/TGL2767

GaAs Fixed Attenuators

Frequency (MHz)	Attenuation (dB)	Package (mm)	Part Number
DC->40,000	0	0.5x0.5/Die	TGL4201-00
DC->40,000	2	0.5x0.5/Die	TGL4201-02
DC->40,000	3	0.5x0.5/Die	TGL4201-03
DC->40,000	6	0.5x0.5/Die	TGL4201-06
DC->40,000	10	0.5x0.5/Die	TGL4201-10

GaAs Digital Phase

Frequency (MHz)	Number Bits (dB)	Insertion Loss (dB)	Amp. Err. (dB)	Phase Err. (deg)	Package (mm)	Part Number
2-4	5	7	–	5	4x4	CMD175P4
2.5-4	6	5	< 0.4	< 2.8	6x6	QPC2108
2.5-4	6	5	< 0.4	< 5	5x5	TGP2108-SM
5-18	Analog	3.2/3	–	200/400	4x4	CMD297P34/CMD297
6-18	6	< 10	0.45	4	5x5/3.15x3.15 Die	TGP2105-SM/TGP2105
8-12	6	6	0.5	4	4x4/2.2x2.2 Die	TGP2109-SM/TGP2109
13-17	4	8	–	5	4x4	CMD176P4
15-19	6	7	0.85	4	4x4/2.11x1.41 Die	TGP2615-SM/TGP2615
28-32	5	6	0.5	5	1.88x0.75 Die	TGP2100
32-37	5	7	0.4	3.5	1.88x0.75 Die	TGP2102

GaAs Up/Down Converters

Description	RF Min (GHz)	RF Max (GHz)	IF Min (GHz)	IF Max (GHz)	LO Min (GHz)	LO Max (GHz)	Converstion Gain (dB)	Package (mm)	Part Number
17.7-26.5 GHz K-Band Upconverter	6	26.5	DC	4	6.85	15.25	13	5x5	TGC4510-SM
17-27 GHz K-Band Image Reject Downconverter	17	27	DC	4	6.5	15.5	15	5x5	TGC4610-SM
21-26.5 GHz GaAs MMIC IQ Upconverter	21	26.5	DC	4	8.5	15.25	21	5x5	RFUV1703

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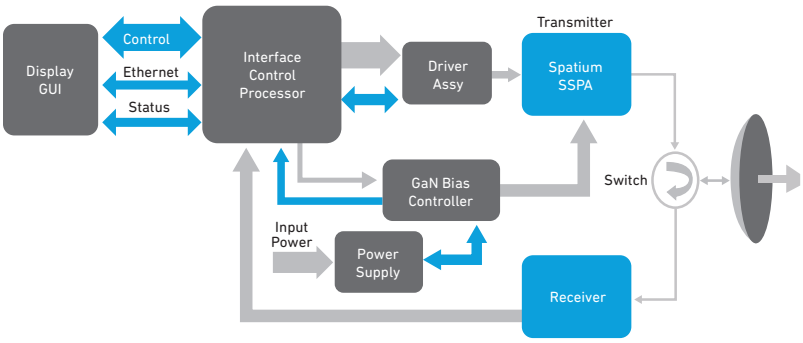
Patented Spatium RF power combining technology from Qorvo provides a low loss, broadband, highly reliable, efficient alternative to traveling wave tube amplifiers (TWTAs) for commercial and defense communications, radar, EW and many other RF applications. The Spatium SSPAs dramatically improve broadband RF power and efficiency through patented coaxial spatial combining techniques. These SSPA solutions are offered as standard products with several platforms available across the 2 to 40 GHz spectrum. For those applications that require customer specific SSPAs, Spatium solutions are readily customizable. Qorvo uses its world class GaN MMIC amplifiers to deliver longer service lifetimes than comparable TWTAs or conventional planar power combining products. Spatium SSPAs provide clear advantages in size, weight, power, and cost (SWaP-C). RF system designers can use Spatium technology to achieve unprecedented combining efficiency with output power from hundreds to thousands of watts. Spatium technology combined with GaN MMICs can allow solid state technology to reach power levels, bandwidths, and efficiencies never achieved before.



Benefits of Spatium Technology

- Ultra-broadband operation: up to decade bandwidth
- Efficiently combines 16 GaN MMIC HPAs
- Up to 93% combining efficiency with high-operating frequencies
- Predictable performance, continuous operation
- SSPA provides graceful degradation vs TWTA single point of failure
- High reliability: 7+ years compared to TWTAs
- Technology readiness level (TRL 9)
- Much lower supply voltage: 6-50 V
- Provides instantaneous bandwidth without warm-up time
- Compact design: smaller than TWTAs

Applications

- EW
- Radar/SAR systems/jammers
- Satellite communications
- Terrestrial ground stations
- Test Instrumentation

Spatium

Description	Frequency (GHz)	P_{SAT} (W)	Power Gain (dB)	Small Signal Gain (dB)	Power (dBm)	PAE (%)	Voltage (V)	Part Number
2-18 GHz, 150 W Wideband SSPA	2-18	151	12.8	17	51.8	22.6	20	QPB0218
2-18 GHz, 300 W Wideband SSPA	2-18	225	10.8	16.7	53.8	21.9	20	QPB0220
8-11 GHz, 700 W High Power SSPA	8-11	676	20.3	26.6	58.3	33.8	22	QPB1024
13-16 GHz 700 W High Power SSPA	13-16	724	24.7	32.8	58.7	31.3	28	QPB1316
27-31 GHz 100 W Ka-Band SSPA	27-31	100	18	20	48	12	22	QPB2731
27-31 GHz 100 W Ka-Band SSPA w/IBC	27-31	100	18	20	48	12	22	QPB2731N
32-38 GHz 100 W Ka-Band SSPA	32-38	125	10	19	51	15	24	QPB3238
32-38 GHz 100 W Ka-Band SSPA w/IBC	32-38	125	10	19	51	15	24	QPB3238N
34-36 GHz 250 W Ka-Band SSPA w/IBC	34-36	250	16.2	21	55.2	16	28	QPB1111

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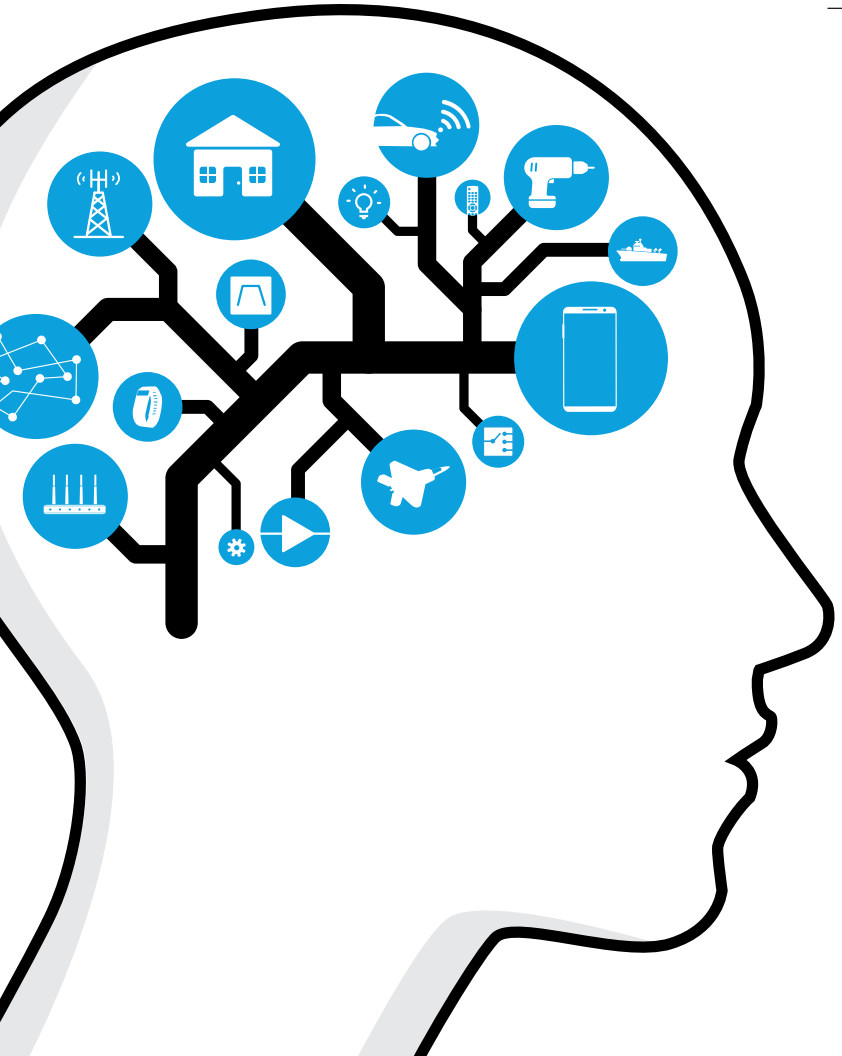

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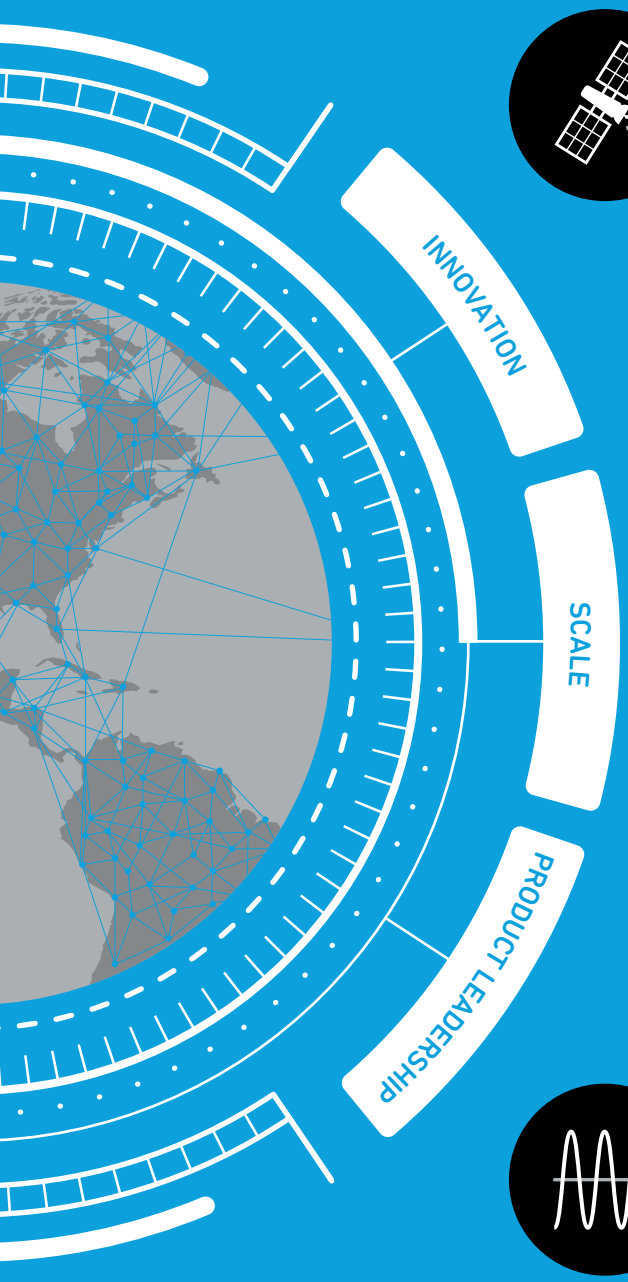

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