Qorvo® Broadband Access, CATV & FTTH Product Selection Guide

qorvo®

all around you

Technology Leadership in Broadband Connections Through Best-in-Class Innovative RF Solutions

Qorvo offers leading technology and comprehensive product solutions for demanding hybrid fiber coaxial (HFC) and broadband applications. Qorvo's broadband portfolio includes high power amplifiers in industry-standard SOT115J package and in multi-chip modules (MCMs), low power MMICs and control products. These products are designed for HFC headend, CMTS, optical nodes and distributed architecture supporting DOCSIS® standards in various configurations like fiber deep, node split, remote PHY, and full duplex. In addition, Qorvo offers products for FTTx and xPON system solutions with transimpedance amplifiers and complete optical modules.

High Output Hybrid & MCMs

1.218 GHz DOCSIS 3.1 Power Doubler Amplifiers

Table (A)

Freq Range (MHz)	Gain (dB)	Power Consumption Current (mA)	Power Consumption Voltage (V)	Max Out (dBmV)*	Max Comp Out (dBmV)*	CTB (dBc)	CSO (dBc)	XMOD (dBc)	CIN (dB)	Release Status	Technology	Package	Part Number
45-1218	28	420	24	59	68.8	-80	-80	-76	55	Production	GaAs/GaN	Hybrid	RFPD3540
45-1218	28	420	24	59	68.8	-80	-74	-75	60	Production	GaAs/GaN	MCM	QPA3333
45-1218	23	470	24	63	73.8	-73	-76	-68	57	Production	GaAs/GaN	Hybrid	RFPD3210
45-1218	23	370-470	24	63	73.8	-73	-76	-68	57	Production	GaAs/GaN	Hybrid	QPA3230
45-1218	23	370-470	24	63	73.8	-80	-80	-76	58	Production	GaAs/GaN	MCM	RFCM3327
45-1218	25	470	24	63	73.8	-73	-76	-68	57	Production	GaAs/GaN	Hybrid	RFPD3220
45-1218	25	370-470	24	63	73.8	-73	-76	-68	57	Production	GaAs/GaN	Hybrid	QPA3240
45-1218	25	370-470	24	63	73.8	-80	-80	-76	58	Production	GaAs/GaN	MCM	RFCM3328
45-1218	23	430-530	24-34	67	76.8	-73	-74	-68	55	Production	GaAs/GaN	Hybrid	RFPD3580

*Virtual level, 190 QAM256 channels, 22 dB tilt
Actual level = virtual -6 dB

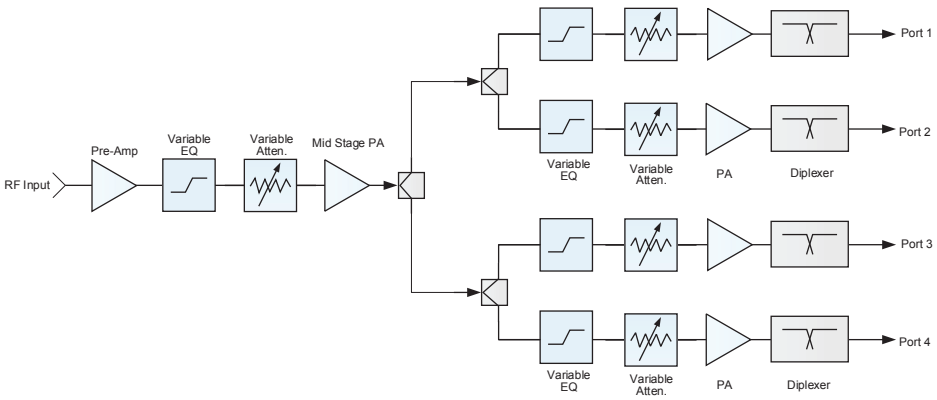
1.218 GHz DOCSIS 3.1 Push Pull Amplifiers (Interstage)

Table (B)

Freq Range (MHz)	Gain (dB)	Power Consumption Current (mA)	Power Consumption Voltage (V)	P_{OUT} (dBmV)*	CTB (dBc)	CSO (dBc)	XMOD (dBc)	CIN (dB)	Release Status	Technology	Package	Part Number
45-1218	24	230	24	43	-64	-70	-60	66	Production	GaAs	Hybrid	RFPP2590
45-1218	28 (Var)	410	12	45	-67	-70	-60	64	Production	GaAs	MCM	RFAM3790
45-1218	28	260	24	45	-72	-80	-65	70	Production	GaAs/GaN	MCM	RFCM4363
45-1218	28	260	24	45	-72	-78	-63	69	Production	GaAs/GaN	Hybrid	RFPP3870
45-1218	34	240	24	45	-66	-72	-62	64	Production	GaAs	Hybrid	RFPP3180
45-1218	36 (Var)	510	12	46	-73	-75	-70	64	Production	GaAs	MCM	RFAM3620

*79 analog channels plus 111 QAM256 channels (ITU-T/J.83 Annex B), -6 dB offset, flat

4 Port Optical Node, RF Launch AMP: CATV



1 GHz Power Doubler Amplifiers

Table (C)

Freq Range (MHz)	Gain (dB)	Power Consumption		CTB (dBc)	CSO (dBc)	XMOD (dBc)	CIN (dB)	Release Status	Technology	Package	Part Number
		Current (mA)	Voltage (V)								
40-1000	18	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040180GT
40-1000	18	420	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040180GTH
40-1000	20	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040200GT
40-1000	20	420	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040200GTH
40-1000	22	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040220GT
40-1000	22	420	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040220GTH
40-1000	23	370-470	24	-73	-76	-65	60	Production	GaAs/GaN	Hybrid	QPA3238
40-1000	23	470	24	-73	-76	-65	60	Production	GaAs/GaN	Hybrid	QPA3340
40-1000	24	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040240GT
40-1000	24	420	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040240GTH
50-1000	24	445	24	-75	-69	-65	58	Production	GaAs/GaN	Hybrid	TAT8888
40-1000	24	445	24	-75	-69	-65	59	Production	GaAs/GaN	5x7 QFN	TAT9988
40-1000	25	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040250GT
40-1000	25	440	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040250GTH
40-1000	25	370-470	24	-73	-76	-65	60	Production	GaAs/GaN	Hybrid	QPA3248
40-1000	25	470	24	-73	-76	-65	60	Production	GaAs/GaN	Hybrid	QPA3350
45-1000	25	350	24	-73	-74	-68	60	Production	GaAs	SOIC16W	TAT8857A1H
40-1000	27	375	24	-64	-65	-60	–	Production	GaAs	Hybrid	D10040270GT
40-1000	27	420	24	-65	-67	-62	–	Production	GaAs	Hybrid	D10040270GTH
40-1000	27	325	24	-61	-63	-58	–	Production	GaAs	Hybrid	D10040270GTL
40-1000	27	370	24	-73	-70	-67	62	Production	GaAs	Hybrid	RFPD3890
40-1000	30	420	24	-65	-65	-62	–	Production	GaAs	Hybrid	D10040300GTH

1 GHz Push Pull Amplifiers (Interstage)

Table (D)

Freq Range (MHz)	Gain (dB)	Power Consumption		CTB (dBc)	CSO (dBc)	XMOD (dBc)	Release Status	Technology	Package	Part Number
		Current (mA)	Voltage (V)							
40-1000	14	250	24	-64	-64	-55	Production	GaAs	Hybrid	S10040140P1
40-1000	18	250	24	-68	-68	-59	Production	GaAs	Hybrid	S10040180P1
40-1000	20	255	24	-60	-63	-57	Production	GaAs	Hybrid	S10040200P
40-1000	22	230	24	-63	-59	-58	Production	GaAs	Hybrid	S10040220GT
40-1000	22	260	24	-66	-66	-59	Production	GaAs	Hybrid	S10040220P
40-1000	23	240	24	-63	-59	-58	Production	GaAs	Hybrid	S10040230GT
40-1000	24	250	24	-66	-66	-59	Production	GaAs	Hybrid	S10040240P
40-1000	28	250	24	-65	-63	-58	Production	GaAs	Hybrid	S10040280GT
45-1000	32	270	24	-69	-68	-61	Production	GaAs	SOIC16W	TAT8858A1H
45-1000	34	280	24	-66	-65	-60	Production	GaAs	Hybrid	QPA3320

Return Path Amplifiers

Table (E)

Freq Range (MHz)	Gain (dB)	Power Consumption Current (mA)	Power Consumption Voltage (V)	CTB (dBc)	CSO (dBc)	XMOD (dBc)	Release Status	Technology	Package	Part Number
5-65	25	133	24	-69	-70	-59	Production	Si	Hybrid	R0605250L
5-65	30	133	24	-64	-68	-55	Production	Si	Hybrid	R0605300L
5-100	25	133	24	-69	-70	-59	Production	Si	Hybrid	R1005250L
5-100	28	158	24	-72	-70	-64	Production	Si	Hybrid	RFRP2920
5-100	30	130	24	-64	-68	-55	Production	Si	Hybrid	R1005300L
5-100	30	130	24	-66	-70	-57	Production	Si	Hybrid	RFRP2241
5-210	28	135	24	-69	-70	-65	Production	Si	Hybrid	R2005280L
5-210	30	138	24	-72	-72	-65	Production	Si	Hybrid	R2005300L
5-210	35	158	24	-72	-72	-64	Production	Si	Hybrid	R2005350L
5-220	39 (Var)	205	24	-70	-70	-60	Production	Si	MCM	RFCM5304
5-300	25	138	24	-71	-75	-63	Production	Si	Hybrid	R3005250L
5-300	30	148	24	-70	-72	-63	Production	Si	Hybrid	R3005300L
5-300	35	158	24	-70	-75	-63	Production	Si	Hybrid	RFRP3120
5-300	35.3	195	12	-72	-75	-63	Production	Si	MCM	QPA5368

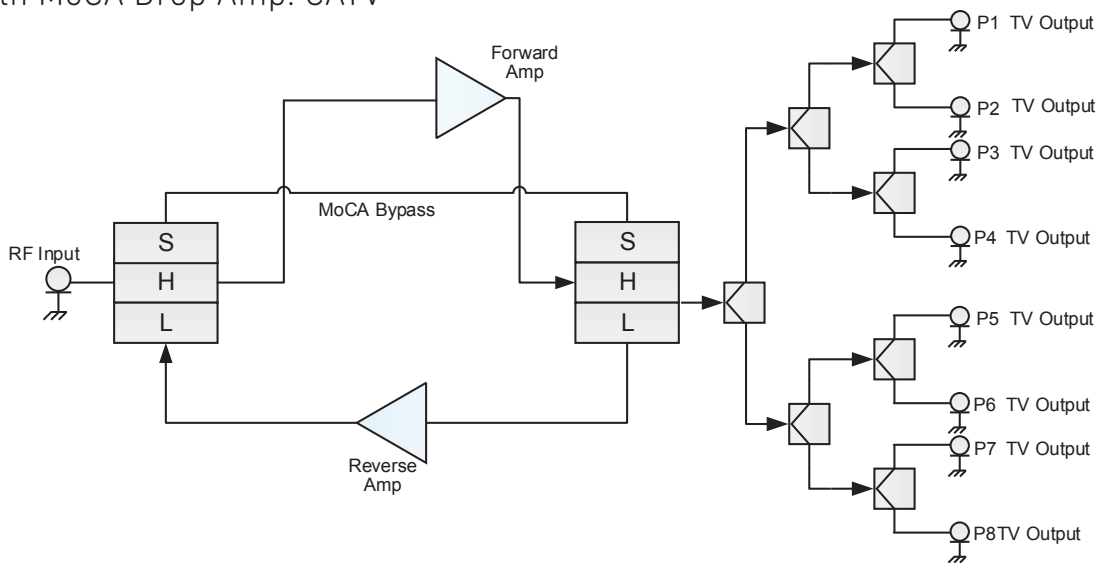
Medium and Low Power MMICs

Differential MMIC

Table (F)

Freq Range (MHz)	Description	Gain (dB)	P1dB (dBm)	Output IP3 (dBm)	Noise Figure (dB)	Vcc (V)	Icc (mA)	Release Status	Package	Part Number
5-65	Dual Reverse Amp	25.4	74	40	2.7	5	262	Production	SOIC 8	CGR0118Z
5-210	Dual Reverse Amp	15.5	26.2	48	3.8	5, 8	235	Production	SOIC 8	QPB2318
5-210	Dual Reverse Amp	17.3	23	42	4	5	217	Production	SOIC 8	CGR0218Z
5-210	Dual Reverse Amp	17.8	27	46	3.5	5, 8	235	Production	SOIC 8	QPB2328
5-1000	High Linearity RF Amplifier	17	23	40	4	5	217	Production	SOIC 8	RFCA1008
50-1000	High Linearity RF Amplifier	13	21	39	5.4	5	160	Production	SOIC 8	CGA6618Z
50-1000	Dual RF Amplifier	14	20.3	37	5	5	165	Production	SOIC 8	AG606
50-1000	Dual RF Amplifier	14	–	40	4	5	190	Production	SOIC 8	TAT7466
50-2600	Dual RF Amplifier	11.5	17.5	37	4.5	5	240	Production	SOIC 8	QPB7464
50-1210	Dual RF Amplifier	15.4	24.5	44	2.5	5	320	Production	SOIC 8	TAT7472A1F
50-1200	High Linearity RF Amplifier	16.4	25	44	2.75	5	293	Production	SOIC 8	RFCA8828
50-1200	Dual RF Amplifier	17.5	–	38	3.2	5	250	Production	SOIC 8	TAT7469
50-1218	Dual RF Amplifier	18	25	43	4.7	5	380	Production	SOIC 8	TAT7467E1F
45-1218	High Linearity RF Amplifier	19	24	40	2.5	5	280	Production	SOIC 8	RFCA8830
50-1218	Power Doubler	20.5	33	50	4.5	12	525	Production	5x7 QFN	QPB8808
50-1218	Power Doubler	21	34	49	4.5	12	650	NRND Use QPB8808	5x7 QFN	TAT8804D1H
50-1218	Power Doubler	28	30	53	4.5	24	440	Target Q2 2018	5x7 QFN	QPB8857
50-1000	Power Doubler	28	28	51	4.5	24	350	Target Q2 2018	5x7 QFN	QPB8957
50-1218	Push Pull	34	27	48	4.5	24	290	Target Q3 2018	5x7 QFN	QPB8858
50-1000	Push Pull	34	26	46	4.5	24	240	Target Q3 2018	5x7 QFN	QPB8958
5-700	Dual Reverse Amp	25	22.6	38	1.8	5	275	Target Q3 2018	SOIC 8	QPB8896

8 Port with MoCA Drop Amp: CATV



Single Ended MMIC

Table (G)

Freq Range (MHz)	Description	Gain (dB)	P1dB (dBm)	Output IP3 (dBm)	Noise Figure (dB)	Vcc (V)	Icc (mA)	Release Status	Package	Part Number
5-210	Return Path RF Amplifier	15	23.5	48	3.8	5, 8	172	Production	SOIC 8	QPB3311
5-210	Return Path RF Amplifier	17.5	24	48	3.4	5, 8	170	Production	SOIC 8	QPB3321
5-1000	High Linearity Amplifier	14.5	22	33.5	3.6	8.5	147	Production	SOT 89	RFCA3310
5-1500	General Purpose Amplifier	20.5	25	38	1.3	8	120	Production	3x3 QFN	RF3827
5-2500	High Linearity Amplifier	16	21	36	3.8	5 - 12	100	Production	SOIC 8	RF2312
5-3000	Linear Amplifier	15	22	43	4.8	9	180	Production	CJ2BATO	RF2317
50-1000	Low Noise Amplifier	13	18.5	38.5	3	3 - 5	110	Production	SOT 89	CXE1089Z
50-1000	General Purpose RF Amplifier	16.1	–	39	2.3	6	130	Production	SOT 89	TAT7461
50-1000	RF Amplifier 7461 Screened S22	16.1	–	36	2.3	6	130	Production	SOT 89	TAT7461A6A
50-1000*	High Gain RF Amplifier	18.5	–	38	2.5	6-8	145	Production	SOT 89	TAT7427BT1
40-1000	Low Noise Linear Amplifier	18.5	–	40	2.3	6	318	Production	5x5 QFN	TGA2807-SM
50-1000	Linear General Purpose Amplifier	20	23	36	1.5	7	105	Production	SOT 89	CXE2089Z
50-1000	High Linearity Amplifier	21	24.5	36.7	3	8	140	Production	SOT 89	RFCA3306
50-1000*	High Gain RF Amplifier	22	22	41	2	5-8	190	Production	SOT 89	TAT7430B
47-1218	Adjustable Gain RF Amplifier	9-11	17	41	3.5	5	105	Production	SOT 89	QPB7400
50-2600	General Purpose RF Amplifier	16.5	20.5	36	2.5	5	100	Production NRND	SOT 89	TAT7460
50-2600	General Purpose RF Amplifier	17	20	38	3	5	90	Production	SOT 89	TAT7460B1A
50-1200	Adjustable Gain Amplifier, TIA	19	21	40	2.3	5	120	Production	SOT 89	TAT7457
40-1218	RF Gain Block, TIA	20	–	42	1.5	8	350	Production	4x4 QFN	TGA2803-SM
47-1218	Low Noise Amplifier	20	20	35.5	1.2	3, 5, 8	50	Production	SOT 89	QPB7420
50-1200	High Linearity Amplifier	21	22.5	39	1.54	6	169	Production	SOT 89	RFCA3828
47-1218	Low Noise Amplifier	25	24.7	39	1.1	3, 5, 8	105	Production	SOT 89	QPB7425
5-700	Digital Controlled VGA	44 (Var)	23	40	3.5	5	240	Target Q3 2018	6x6 MCM	QPB0066
45-1000	Low EINC Optical Rec. TIA	32	–	–	–	5	110	Target Q3 2018	SOT 89	QPB7432

*Data sheet has graphs out to 1200 MHz

Control Products

Switches

Table (H)

Freq Range (MHz)	Description	Impedance (Ω)	Insertion Loss (dB)	Isolation (dB)	P1/0.1dB (dBm)	IP3 (dBm)	Vcc (V)	Release Status	Package	Part Number
5-2500	SPDT Reflective Switch	75	0.3	36	–	75	3-5	Production	2x2 QFN	RFSW1012
5-6000	SPDT Reflective Switch	50	0.25	46	–	73	5	Production	1.1x1.5 LGA	QPC1022
5-3000	SPDT Absorptive Switch	75	0.82	66	36/36	61	3-5	Production	4x4 QFN	QPC3024
5-2000	SP4T Reflective Switch	75	0.4	30	40.2/34	82	3-5	Production	1.8x1.8 QFN	QPC6742
5-2000	SP6T Reflective Switch	75	0.4	34	37/33	75	3-5	Production	2x2 QFN	QPC6762

Voltage Controlled Attenuators (VCAs)

Table (I)

Freq Range (MHz)	Description	Impedance (Ω)	Insertion Loss (dB)	P1dB (dB)	Range (dBm)	IP3 (dBm)	Vcc (V)	Release Status	Package	Part Number
5-3000	Voltage Controlled Attenuator	75	1.5	30	30	50	3-5	Production	3x3 QFN	RFSA3043
50-3000	Voltage Controlled Attenuator	75	2.7	30	30	50	3.3	Production	3x3 QFN	RFSA3023
50-3000	Voltage Controlled Attenuator	75	2.5	30	30	50	5	Production	3x3 QFN	RFSA3013

Digital Step Attenuators (DSAs)

Table (J)

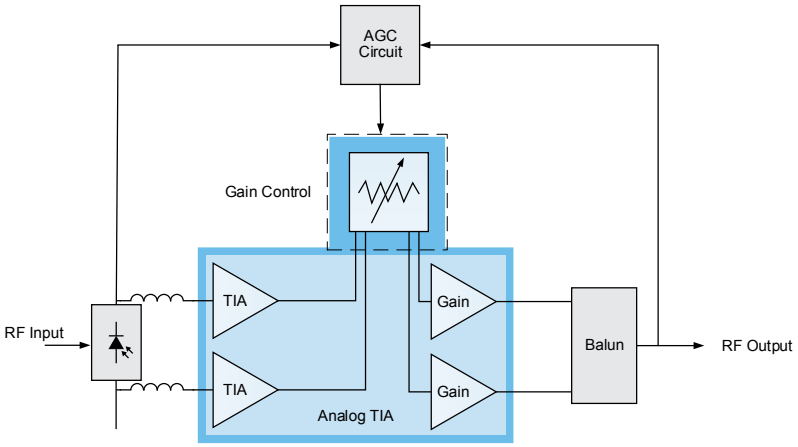
Freq Range (MHz)	Description	Impedance (Ω)	Insertion Loss (dB)	Step Size (dB)	Range (dBm)	IP3 (dBm)	Vcc (V)	Release Status	Package	Part Number
47-2000	6 Bit Digital Step Attenuator	75	1.2	0.5	31.5	55	3.3	Production	4x4 QFN	QPC3624
5-1500	6 Bit Digital Step Attenuator	75	1.2	0.5	31.5	65	5	Production	4.2x4.2 QFN	QPC3614

Voltage Controlled Equalizer

Table (K)

Freq Range (MHz)	Description	Impedance (Ω)	Insertion Loss (dB)	Return Loss (dB)	Tilt Range (dBm)	IP3 (dBm)	Vcc (V)	Release Status	Package	Part Number
45-1218	Voltage Controlled Equalizer	75	2.75	16	5 to 15	50	5	Production	6x6 MCM	QPC7336
45-1218	Voltage Controlled Equalizer	75	2.75	16	12 to 24	50	5	Target Q4 2018	6x6 MCM	QPC7337
45-1000	Voltage Controlled Equalizer	75	2.75	16	5 to 15	50	5	Target Q4 2018	6x6 MCM	QPC7335

Optical Video RCVR for RFoG or XPON Receiver: Fiber to the Home



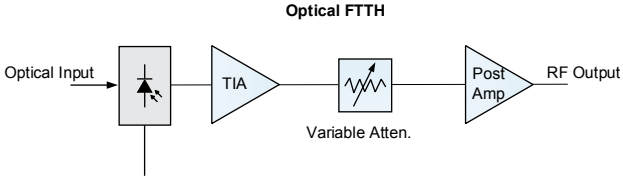
Optical

FTTH Optical Receive Amplifiers

Table (L)

Freq Range (MHz)	Optical Rx	Gain (dB)	Power Consumption Current (mA)	Power Consumption Voltage (V)	P_{OUT} dBmV/ Channel (dBmV)	Optical Input Power MIN/MAX (dBm)	Equivalent Input Noise (pA/rtHz)	Release Status	Package	Part Number
47-1000	Optical Video Receiver	38	100	12	14	-12/-2	3	Production	4x4 QFN	TAT6254B
47-1000	Optical Video Receiver	33	120	12	23	-10/+2	3.9	Production	4x4 QFN	TAT6254C
45-1218	Optical Video Receiver	37	130	12	23	-10/+2	3.5	Production	4x4 QFN	QPB8888
45-1218	xPON Optical Video Receiver with Integrated Attenuator	37	300	5	23	-10/+2	3.5	Production	11x11 MCM	QPB9015
45-1218	xPON Optical Video Receiver with Integrated Attenuator	37	135	12	23	-10/+2	3.5	Production	11x11 MCM	QPB9010

Optical Reference Design



Transformers and Protection

Transformers

Table (M)

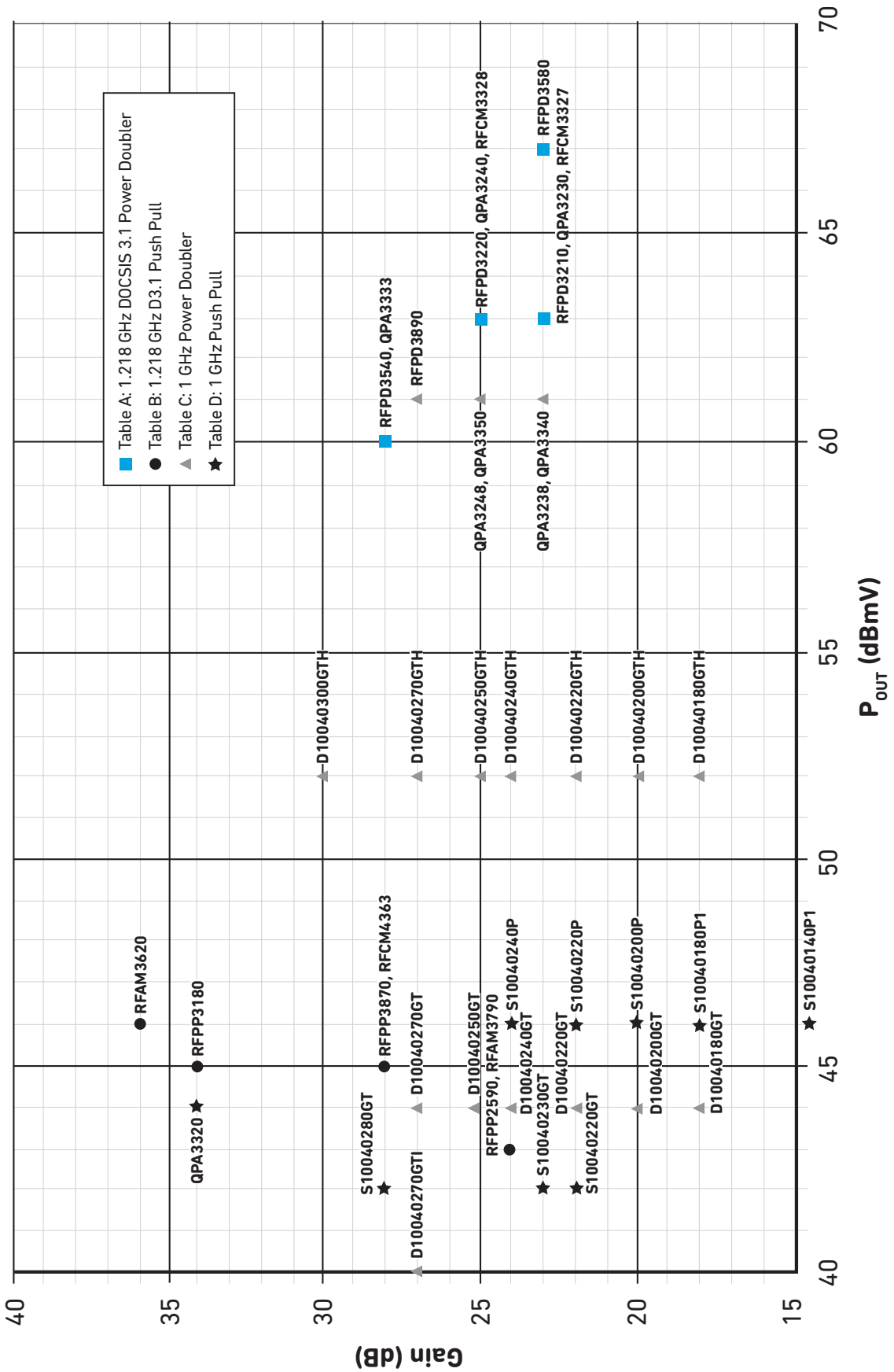
Freq Range (MHz)	Description	Insertion Loss (dB)	Amplitude Balance (dB)	Phase Balance (deg)	Impedance Ratio	Input Return Loss (dB)	Type-Transmission Line	Release Status	Package	Part Number
45-1200	SMT Transformer, 75 Ω	1.3	0.4	4	1:1	15	Unbalanced to Balanced	Production	SP5	RFXF0006
45-1200	SMT Transformer, 75 Ω	0.4	1.4	7	1:1	13	Unbalanced to Balanced	Production	SP5	RFXF0007
45-1218	SMT Transformer, 75 Ω	1.6	0.3	2	1:2.78	14	Balanced to Balanced	Production	SP6	RFXF0008
45-1200	SMT Transformer, 75 Ω	0.4	1.3	5	1:1	25	Unbalanced to Balanced	Production	SP5	RFXF0009
45-1200	SMT Transformer, 75 Ω	1.1	0.2	0.8	1:1	16	Unbalanced to Balanced	Production	SP5	RFXF0010

Protection

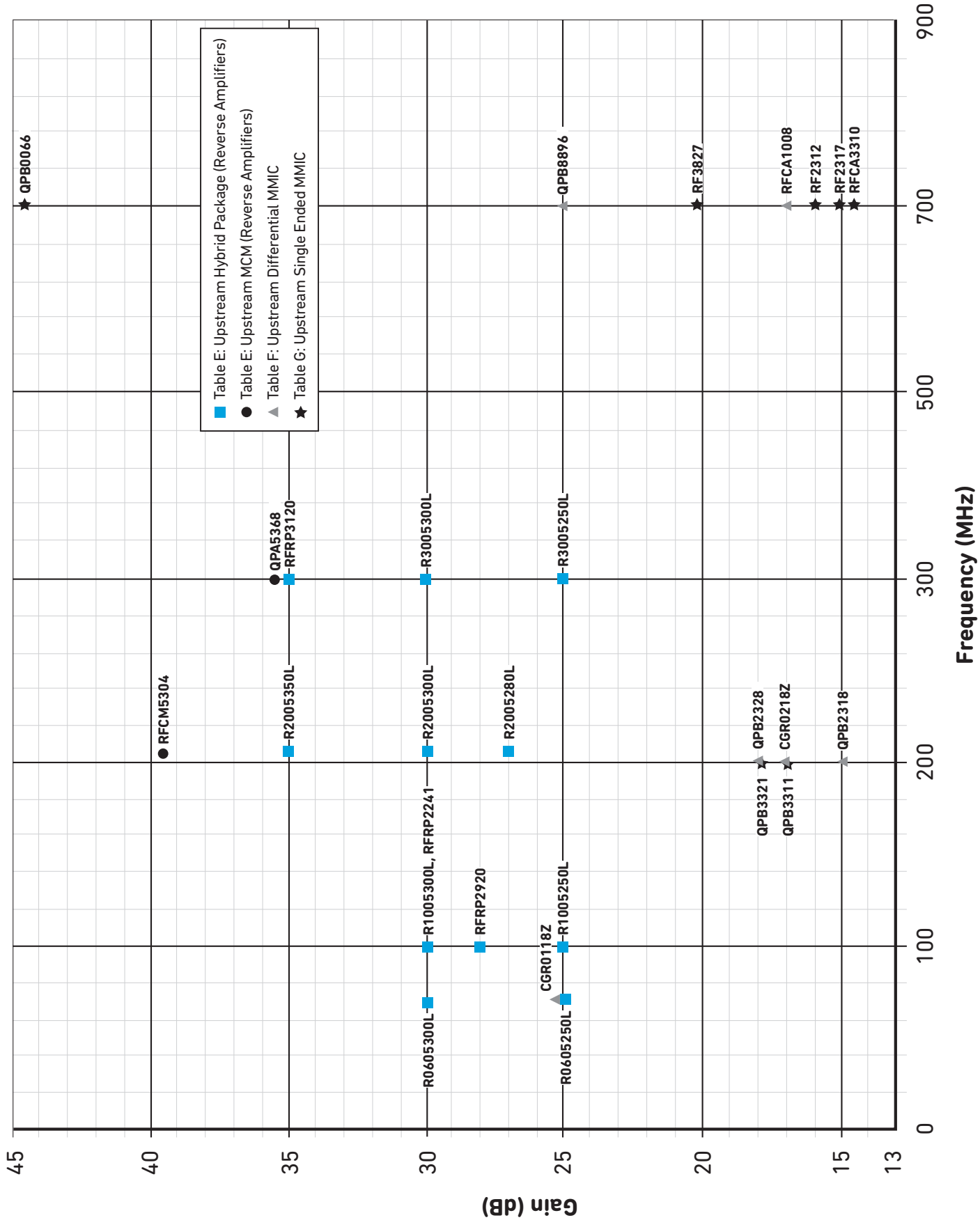
Table (N)

Freq Range (MHz)	Description	Insertion Loss (dB)	Trigger Voltage (V)	CTB (dBc)	CSO (dBc)	Leakage Current (nA)	Capacitance (fF)	Release Status	Package	Part Number
50-1200	ESD Protection Diode	0.3	41	-52	-63	15@1V 300@15V	220@1V, 10 MHz	Production	DFN (TSLP-3)	TQP200002

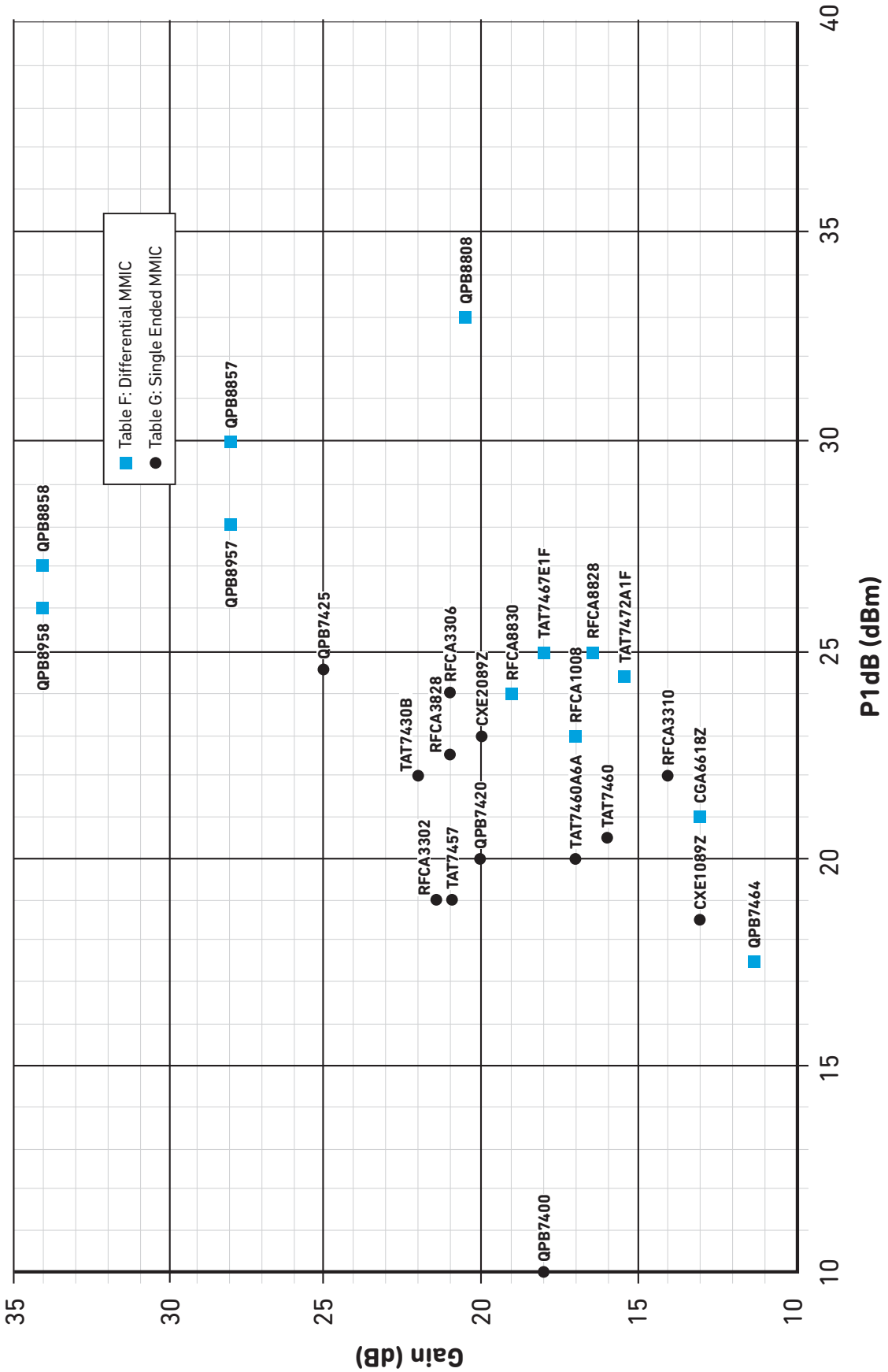
Downstream High-Power (40-67 dBmV)



Upstream Amplifiers



Downstream MMIC

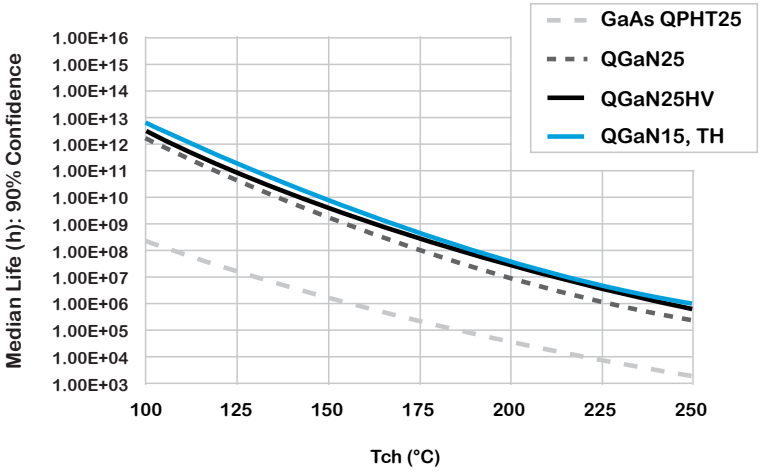


Gallium Nitride Innovation

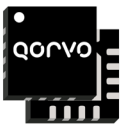
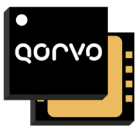
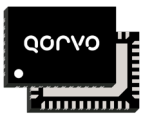
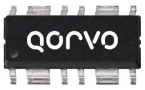
Qorvo has driven innovation and development of gallium nitride (GaN) products and technologies that enable next-generation systems for over 15 years. With Qorvo, not only are you getting world-class electrical performance, our partners also benefit from a 'trusted' supplier with industry-leading GaN reliability. Qorvo is also the only GaN supplier to reach manufacturing readiness level (MRL) 9.

Key Qorvo GaN attributes:

- >65 million device hours on 16,900 devices in the field, with less than 0.013% failures per million hours
- Applications from DC through W-band
- High power density
- 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)



Guide to Qorvo CATV Product Packages

 LGA	 4x4 QFN	 SP5	 SP6
 MCM	 SOT115J	 5x7 QFN	 DFN (T/SLP-3)
 CJ2BATO	 SOIC16W	 SOIC8	 SOT89

1) All values are typical except where otherwise indicated.
2) Refer to individual product datasheets for test conditions.

www.qorvo.com/cable
info-catv@qorvo.com