

CONNECTING, PROTECTING AND POWERING THE WORLD

Solutions

RFID READERS



INDUSTRIAL TRACKING



HEALTHCARE ASSETS



RETAIL LOGISTICS



SECURE ACCESS

FEATURING

RF Front End
Wi-Fi Connectivity
Power Management



qorvo



CONNECTING,

PROTECTING

AND POWERING

THE WORLD

RFID APPLICATIONS

SECURE ACCESS



HEALTHCARE ASSETS



INDUSTRIAL TRACKING



RETAIL LOGISTICS



High Level Design Considerations

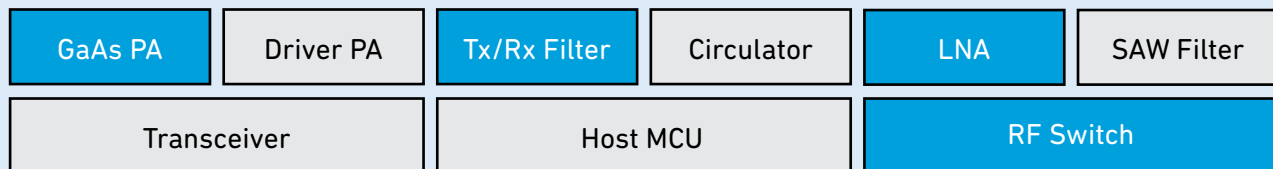
- ✓ **Read Range:** Tx power • Receiver sensitivity • Antenna efficiency
- ✓ **Throughput:** Anti-collision • Reader coexistence • Inventory speed
- ✓ **Connectivity:** UHF link • Ethernet/Wi-Fi • Cloud integration
- ✓ **Power:** Efficiency • Thermal • Rail stability
- ✓ **Filtering:** Harmonic control • Jammer rejection • Blocking
- ✓ **Compliance:** EPC Gen2 • FCC/ETSI • EIRP limits

RFID

BLOCK DIAGRAM

RFID READER

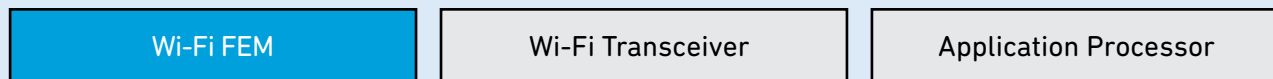
UHF RFID READER FRONT END (EPC Gen2/RAIN/ISO 18000-63)



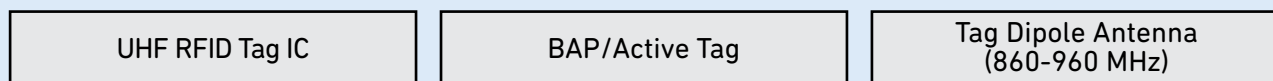
POWER INTEGRITY PLATFORM



HOST/NETWORK



RFID TAGS

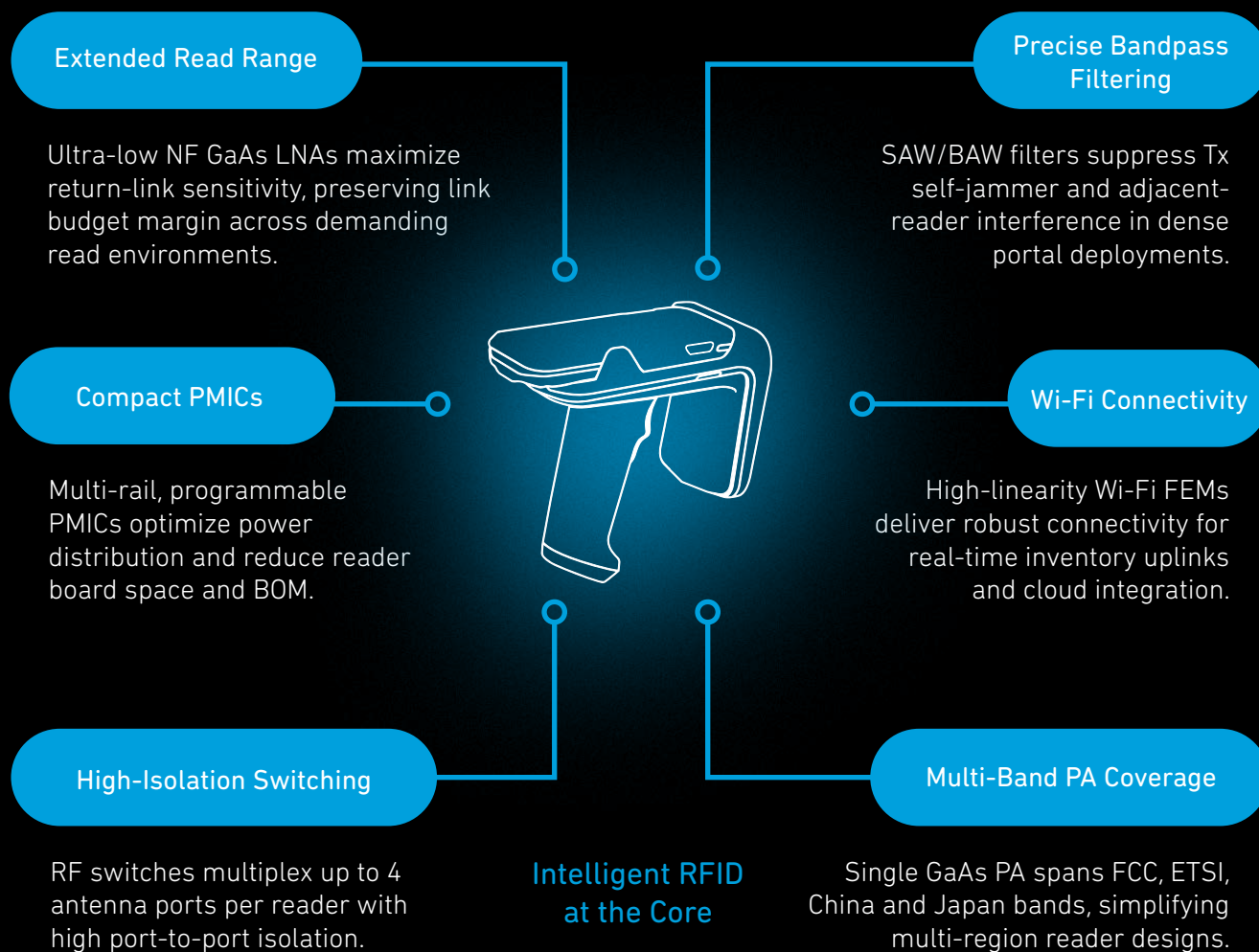


Look for
blue blocks!

Qorvo® content shown in blue blocks

BRIDGING GAPS WITH INNOVATIVE SOLUTIONS

For Today's Challenges





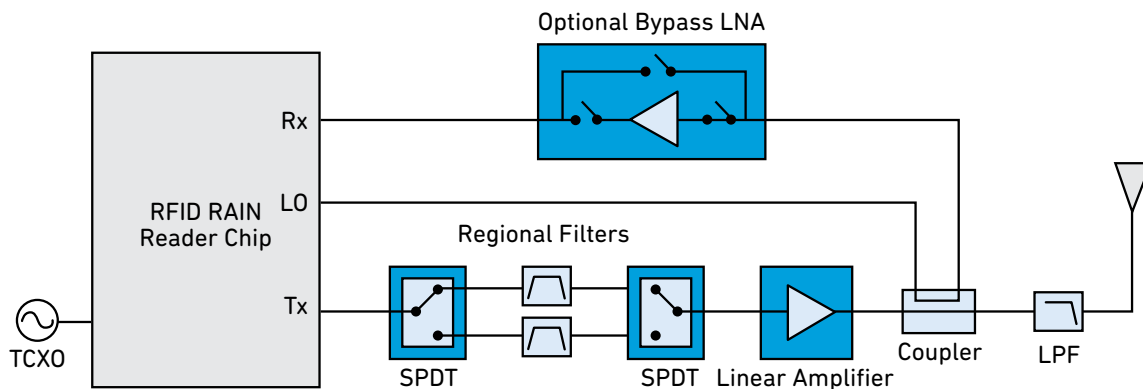
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RFID READERS

RF Front-End

UHF RFID readers operate in one of the most demanding RF environments in commercial electronics; simultaneously transmitting a high-power carrier to activate passive tags while receiving extremely weak backscattered replies in the same band. Modern deployments span fixed portals, conveyor tunnels and handheld terminals, each with strict regional regulatory requirements.

Qorvo offers a broad portfolio of SOI switches, GaAs LNAs, GaAs PAs, PMICs, Wi-Fi FEMs and filters, designed to meet these demands; optimized across all major global regulatory bands to maximize read performance and simplify multi-region reader designs.



RF Switches

Fixed RFID portals can use RF switches to multiplex one reader across multiple antennas and read zones. SP4T switches support 2–4 antenna paths, while SPDT switches can handle two-antenna selection or region-select filter routing. High isolation (>34–70 dB) helps protect the LNA and maintain receiver sensitivity.

Part Number	Frequency (GHz)	Switch Type	IL (dB) @900 MHz	Isolation (dB) @900 MHz	P_IN Max (dBm)	Voltage (V)	Package (mm)
QPC6044	0.005–6	SP4T	0.91	61	37	3–5	4x4
QPC1022	0.005–6	SPDT	0.2	46	37	3–5	1.1x1.5
RFSW6024	0.005–6	SPDT	0.6	63	36	3–5	4x4
QPC6324	0.005–6	SPDT	0.9	62	37	5	4x4
RFSW1012	0.005–6	SPDT	0.25	45	37	3–5	2x2



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Low-Noise Amplifiers

Qorvo's ultra-low NF GaAs LNAs are optimized for the UHF RFID receive path, where return-link sensitivity directly determines read range. Designed for fixed portal, conveyor tunnel and handheld readers across all global RFID bands.

Part Number	Frequency (GHz)	NF (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Vd (V)	Package (mm)
QPL9547	0.1-6	0.3	19.3	22.7	39	5	2x2
TQL9092	0.6-4.2	0.6	22.6	19	39.5	5	2x2
TQL9093	0.6-4.2	0.7	20	21.7	41.5	5	2x2
QPL9504	0.6-6	0.7	21.5	18.7	34	5	2x2
QPL9057	0.6-4.2	0.5	22.8	19	32	5	2x2
QPL9058	0.5-6	0.6	18	20.5	36	5	2x2

High-Efficiency Power Amplifiers

Qorvo's GaAs power amplifiers drive the transmit carrier that powers passive tags at range. High efficiency reduces heat dissipation in fixed readers and extends battery life in handheld terminals, while wide dynamic range output control supports precise compliance with regional EIRP limits across FCC, ETSI and other global bands.

Part Number	Frequency (GHz)	Process	Gain (dB)	P1dB/P3dB (dBm)	Voltage (V)	Control	Package (mm)
QPA9510	0.1-1	GaAs	34	32 (P1dB)	3.8	Analog	3x3
QPA9908	0.85-0.96	GaAs	32.6	35.5 (P3dB)	5	Analog	5x5
QPA9909	0.75-0.8	GaAs	31.5	36.6 (P3dB)	5	Analog	5x5
QPA9442	0.6-5	GaAs	15.5	30 (P1dB)	5	Analog	4x4
TQP7M9106	0.05-1.5	GaAs	20.8	33 (P1dB)	5	Analog	4x4

Bypass Low-Noise Amplifiers

Qorvo's bypass LNAs integrate an ultra-low NF gain stage with a switchable bypass path, giving designers the flexibility to optimize for maximum receiver sensitivity or high-linearity operation without adding external switching components.

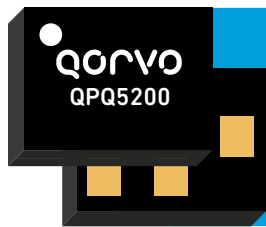
Part Number	Frequency (GHz)	NF (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Vd (V)	Package (mm)
QPL9095	0.5-1	0.6	22	20	33	4.2	2x2
QPL9065	0.45-3.8	0.5	37.5	18	35	5	3.5x3.5
TQL9063	0.5-4	0.7	19	21	36	5	2x2



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RFID READERS

Wi-Fi Front-End



2.4 GHz Wi-Fi CH1-11 edgeBoost™ BAW Bandpass Filter

QPQ5200 is a high-performance BAW bandpass filter purpose-built for the 2.4 GHz Wi-Fi uplink path in RFID reader gateways and handheld terminals. Its steep band-edge skirts suppress adjacent LTE/TD-LTE interference before it reaches the Wi-Fi FEM, preserving link reliability in dense industrial RF environments. High power handling and an ultra-compact laminate package simplify integration across fixed portal and handheld reader designs.

edgeBoost Technology

Without a bandedge filter, Wi-Fi systems must reduce transmit power by up to 10 dB on channels 1 and 11 to meet FCC 15.205 restricted band limits, cutting range and concentrating traffic on channel 6. Qorvo's edgeBoost BAW filters suppress out-of-band emissions with steep skirt selectivity, allowing RFID reader gateways to transmit at full rated power across all 2.4 GHz channels.

Key Features

- 2402.5-2471.5 MHz passband
- +30 dBm avg. power handling
- ≤ 1.1 dB insertion loss
- 1.1x0.9x0.50 mm package
- ≥ 25 dB adjacent-band rejection
- -20 to +95 °C operating range



RFID READERS

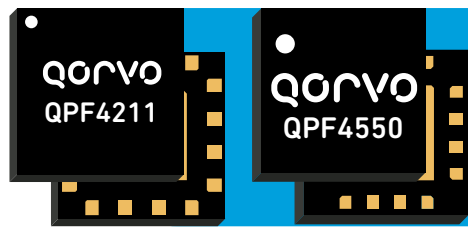
Wi-Fi Front-End



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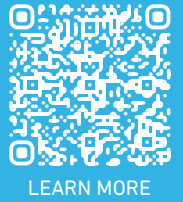
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High Linearity & High Efficiency,
Wi-Fi 6, 2.4/5 GHz FEM

QPF4211 and QPF4550 deliver robust 2.4/5 GHz Wi-Fi 6 connectivity for RFID reader gateways and handheld terminals by integrating a linear PA, low-noise LNA and T/R switch in one compact front-end module. The high-linearity PA and sensitive LNA maintain margin for both high-throughput inventory uplinks and long-reach network bridges. A compact, single-supply design simplifies layout and reuse across fixed portal and mobile reader SKUs.

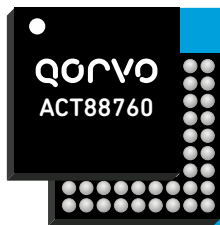
	QPF4211	QPF4550
Frequency Band	2.4 GHz	5 GHz
Voltage Supply	5V	5V
Tx Gain (typ)	33 dB	33 dB
Rx NF	1.8 dB	2.1 dB
O/P @ 11n MCS7	+23.5 dB	+22 dB
O/P @ 11n MCS0	+25.5 dB	+24 dB
DC Power @ P _{OUT}	<1.7W P _{dc} @ 26 dBm	<1.0W P _{dc} @ 26 dBm
Control/Detect Pins	VDET, Tx/Rx enables, LNA_EN	PDET, PA_EN, Tx/Rx enables, LNA_EN
Package	2.5x2.5 mm	2.5x2.5 mm



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RFID READERS

Power Management

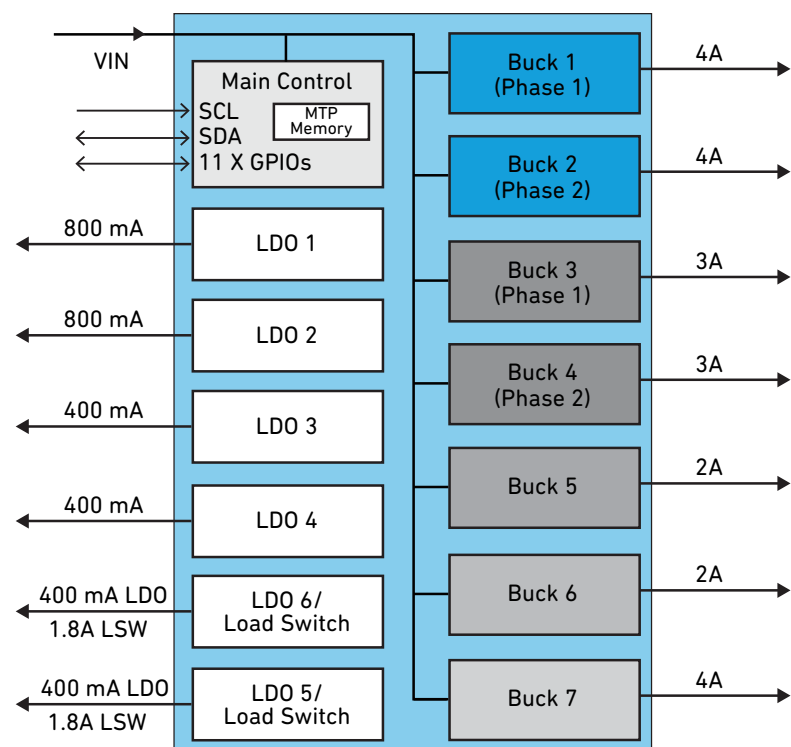


13 Voltage Rail PMIC with Dual-Phase Bucks, High PSSR LDOs/LSW

ACT88760 is an ideal power management solution for fixed UHF RFID reader and portal infrastructure, providing 13 independently programmable rails to power the reader transceiver, PA bias, LNA supply, digital baseband, Wi-Fi FEM and system MCU from a single, compact device. Fast constant-on-time regulation and low rail impedance maintain stable supplies during high-current PA transmit bursts, protecting receiver sensitivity and read-range consistency. Programmable sequencing, I2C monitoring, 10 GPIOs and fault interrupts reduce BOM and speed bring-up across fixed portal, conveyor tunnel and dock-door reader platforms.

Key Features

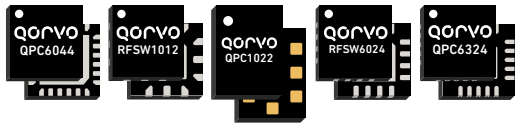
- Input 2.7-5.8V
- MTP memory for sequencing config
- 10 GPIOs
- 6 LDOs/load switches
- I2C control interface
- 3.85x3.85 mm 81-ball WLCSP
- 7 buck regulators (up to 25A aggregate)
- Interrupt + nRESET/PG



PARTS OVERVIEW

RFID Readers

RF



High-isolation SOI SPDT/SP4T switches (0.005-6 GHz)

RF



Ultra-low NF (0.3-0.75 dB)
GaAs LNAs and
bypass LNAs

RF



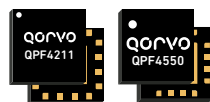
GaAs PAs (0.05-5 GHz)

Wi-Fi



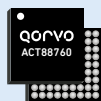
edgeBoost BAW filter

Wi-Fi



Wi-Fi 6 2.4/5 GHz FEMs

Power Management



13-rail PMIC with up to 25A



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