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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



24/7 RF

Reference Book
for High Performance
RF Products

Version 2 - 2017



The Leading Global Partner in **RF** Power

Ampleon is a young and innovative company with 50 years of experience in RF Power.

Our name, derived from “amplify” (=enhance) and “eon” (=eternity), reflects the products we stand for and our commitment to “Amplify the future” of RF Power.

Solutions for a Variety of Segments

We are a leading company in the segments of Mobile Broadband; Broadcast; Industrial, Scientific & Medical, Air Traffic Control and Aerospace & Defense (LDMOS).

Furthermore, our technology and our drive in innovation have defined a new market segment for controlling heat and power: RF Energy, which enables us to improve the white goods and industrial landscape with sustainable and overall higher efficiency. Given our comprehensive line-up, we have set-out to exploit the full potential of data and energy transfer in RF.

Global Footprint and Customer Proximity

With our headquarters in Nijmegen/Netherlands and more than 1.250 employees worldwide, we are dedicated to creating optimal value for our customers. In more than 18 locations around the globe our international team of experts is always close to our customers and amplified by our core values of Focus, Excellence and Velocity. Our intention is to always bring our customers a significant step further with the help of outstanding RF power solutions.

Technology and Innovations

We leverage leading edge process technologies for higher performance (GaN, LDMOS) and cost-efficiency to deliver a leading portfolio of options for RF Power. Our product consistency is unprecedented and we drive innovations in traditional as well as new application areas.

Comprehensive Support

We build on decades of RF leadership and related application know-how. Our customers rely on our dedicated experts to help them solve their design challenges. We value high-quality long-term partnerships with our customers and thus create a clear competitive advantage.



Amplify the future

The second edition of **24/7 RF**

24/7 RF is a synonym for our dedication to RF Power: 24 hours, 7 days a week.

We are passionate about walking you through from a sketchy idea to a finished design. This is what we also reflect in this second edition by turning true pictures into the style of a medieval painting – a piece of artwork, just like our products.

This latest edition of our reference book not only includes our recommended product portfolio but also links it to numerous applications it is best suited for. It features product highlights, describes technologies, reveals latest trends, shows explanatory diagrams, lists features and types, packaging and packing data.

Beyond, you will find information about design support, cross references and replacements. We are convinced that 24/7 RF is the ultimate guide to anything you need to know about Ampleon's High Performance RF products.

Enjoy reading!

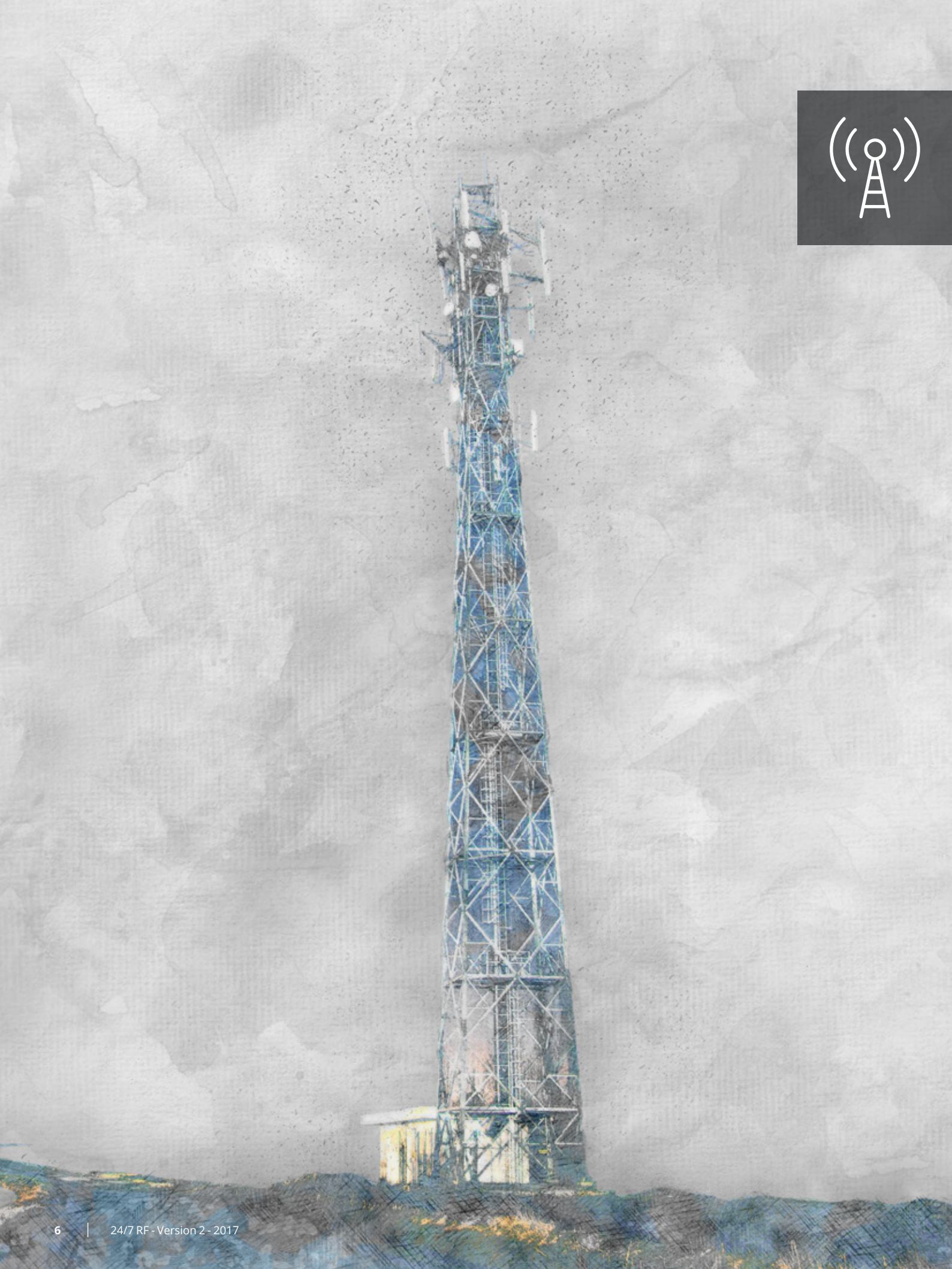


24/7 RF Web Page
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Empowering Next Generation Mobile Communications

1. RF Applications

1.1 Mobile Broadband

1.1.1 Base Stations (all cellular standards and frequencies)

RF Power Transistors for Base Stations

Ampleon is the fastest growing supplier of LDMOS transistors for cellular infrastructure, leading the WCDMA and LTE markets. Our promise is unprecedented performance combined with best-in-class application support and constant innovation. Our design and manufacturing technologies ensure the best PA manufacturing yields in the industry.

Ampleon's latest 9th and 10th generation LDMOS RF transistors offer the best solutions for all cellular frequency bands. With the current industry focus on cost reduction, we are extending our product portfolio with OMP and MMIC product families, which combine high performance with low cost.

Single-Package Asymmetric Doherty (PAD) Transistors and MMICs, Integrated Doherty

PAD devices offer the highest efficiency, smallest footprint, and best cost-effectiveness, and can deliver P1dB power levels up to 550 W. These products are DPD-friendly and developed to offer excellent video bandwidth. Our wide product portfolio covers frequency bands from 450 MHz to 3.8 GHz and average power levels from 2 to 80 W. Discrete single-stage transistors and asymmetric MMICs are available to suit most applications, from picocells to macrocells. We recently introduced 2-stage integrated Doherty IC's to reduce the size of the PAs for power levels of up to 8 W average. They are available in symmetric and asymmetric versions to suit all applications, from driver (symmetric) to massive-MIMO and micro-cell (asymmetric). These Doherty amplifiers integrate both the splitter and combiner inside the package and necessitate minimum external circuitry to minimize cost and board space.



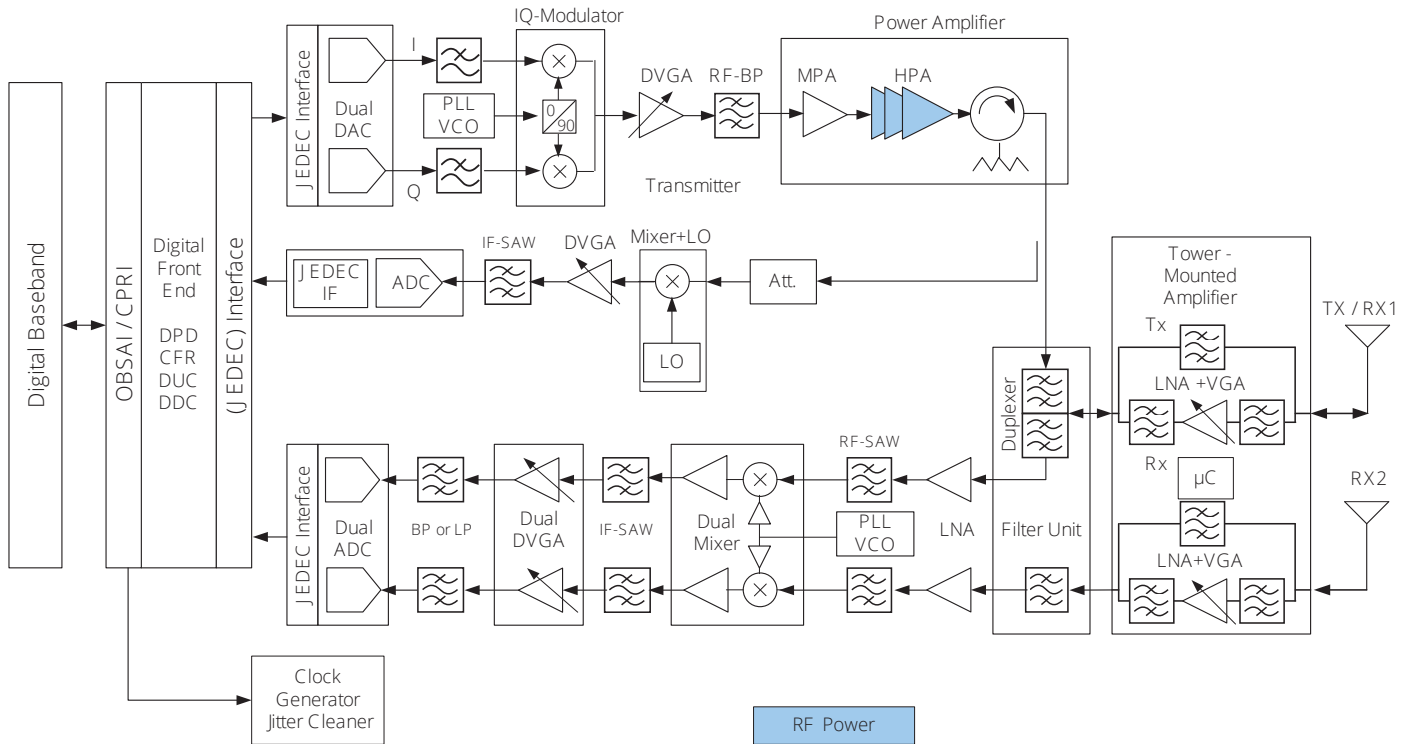
Product Highlight: LDMOS PAD Transistor BLC10G18XS-320AVT

The BLC10G18XS-320AVT is a 320 W LDMOS packaged asymmetric Doherty power transistor for base station applications at frequencies from 1805 MHz to 1880 MHz.

Features

- Excellent ruggedness
- High-efficiency
- Low thermal resistance providing excellent thermal stability
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent digital pre-distortion capability
- Integrated ESD protection

Application Diagram of a Base Station



Recommended Products

Type	F_{min} (MHz)	F_{max} (MHz)	$P_{L(1dB)}$ (W)	V_{DS} (V)
BLP7G22-05	700	2700	5	28
BLP8G27-5	700	2700	5	28
BLP7G22-10	700	2700	10	28
BLP8G27-10	700	2700	10	28
BLF9G38-10G*	3400	3800	10	28
BLM8G0710S-15PB(G)	700	1000	15 ⁽¹⁾	28
BLP9G0722-20(G)	700	2700	20	28
BLM8G1822-20B*	1800	2200	20 ⁽¹⁾	28
BLM7G1822S-20PB(G)	1805	2170	20 ⁽¹⁾	28
BLM9D2325-20AB*	2300	2500	20 ⁽¹⁾	28
BLM9D2527-20AB	2500	2700	20 ⁽¹⁾	28
BLM8D1822-25B*	1800	2200	25 ⁽¹⁾	28

Type	F_{min} (MHz)	F_{max} (MHz)	$P_{L(1dB)}$ (W)	V_{DS} (V)
BLM9D2327-25B*	2300	2700	25 ⁽¹⁾	28
BLM8G0710S-30PB(G)	700	1000	30 ⁽¹⁾	28
BLP9H10S-30*	700	1000	30	50
BLM7G1822S-40ABG	1805	2170	40 ⁽¹⁾	28
BLM7G1822S-40PB(G)	1805	2170	40 ⁽¹⁾	28
BLM7G1822S-40AB	1805	2170	40 ⁽¹⁾	28
BLM8G0710S-45AB(G)	700	1000	45 ⁽¹⁾	28
BLP8G10S-45PG	700	1000	45	28
BLP8G10S-45P	700	1000	45	28
BLM8D1822S-50PB(G)	1805	2170	50 ⁽¹⁾	28
BLM8G0710S-60PB(G)	700	1000	60 ⁽¹⁾	28
BLC9H10XS-60P*	700	1000	60 ⁽¹⁾	50

⁽¹⁾ P3dB

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.2

Product Highlight: 80 W LDMOS Packaged Asymmetric Doherty Power Transistor for Base Station Applications at Frequencies from 1805 MHz to 1880 MHz BLC9G20XS-550AVT

A compact Doherty design based on three BLC9G20XS-550AVT devices achieves 48 % efficiency at 80 W average output power and 15.5 dB gain with a 2-carrier LTE signal. It has a peak power capability (P3dB) of 550 W at 28 V supply voltage.



This Doherty is designed for LTE band 3 operation and is tailored to very high peak power and volume manufacturing with high yields without tuning. The PA features very high video bandwidth, enabling full-band operation.

Recommended Products (continued)

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)
BLC8G27LS-60AV	2300	2690	60 ⁽¹⁾	28
BLF8G38LS-75V	3400	3800	75 ⁽¹⁾	30
BLM7G1822S-80ABG	1805	2170	80 ⁽¹⁾	28
BLM7G1822S-80PBG	1805	2170	80 ⁽¹⁾	28
BLM7G1822S-80PB	1805	2170	80 ⁽¹⁾	28
BLM7G1822S-80AB	1805	2170	80 ⁽¹⁾	28
BLF9G38LS-90P	3400	3600	90	28
BLF8G24LS-100(G)V	2300	2400	100	28
BLF8G27LS-100(G)V	2500	2700	100	28
BLC8G27LS-100AV	2496	2690	100 ⁽¹⁾	28
BLC9G20LS-120V	1805	1995	120 ⁽¹⁾	28
BLF8G22LS-140	2000	2200	140	28
BLF8G27LS-140V	2600	2700	140	32
BLC8G27LS-140AV	2496	2690	140 ⁽¹⁾	28
BLF8G24LS-150(G)V	2300	2400	150	28
BLF8G27LS-150(G)V	2500	2700	150	28
BLC8G27LS-151AV	2496	2690	150 ⁽¹⁾	28
BLF8G10LS-160V	925	960	160	30
BLF8G10L(S)-160	920	960	160	30
BLF8G20LS-160V	1800	2000	160	28
BLC9G20XS-160AV	1805	1880	160 ⁽¹⁾	30
BLC9G20LS-160PV	1805	2000	160 ⁽¹⁾	28
BLC8G21LS-160AV	1805	2025	160 ⁽¹⁾	28
BLF9G20LS-160V	1800	2000	160	28
BLP8G21S-160PV	1880	2025	160	28
BLC8G27LS-160AV	2496	2690	160 ⁽¹⁾	28
BLF8G19LS-170BV	1800	1990	170	32
BLC9G24XS-170AV	2300	2400	170 ⁽¹⁾	30
BLC8G27LS-180AV	2496	2690	180 ⁽¹⁾	28
BLF8G22LS-200(G)V	2110	2170	200	28
BLC8G27LS-210PV	2500	2700	200 ⁽¹⁾	28
BLF8G22LS-205V	2100	2200	205	28
BLF8G20LS-220	1800	2000	220	28
BLF8G22LS-220	2110	2170	220	28
BLF8G20LS-230V	1800	2000	230	28
BLC9G20LS-240PV	1805	1995	240 ⁽¹⁾	28
BLF8G22LS-240	2110	2170	240	28
BLC8G24LS-241AV	2300	2400	240 ⁽¹⁾	28

⁽¹⁾ P3dB

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.2

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)
BLC8G27LS-240AV	2500	2700	240 ⁽¹⁾	28
BLF8G09LS-270W	716	960	270	28
BLF8G10LS-270GV	790	960	270	28
BLF8G10LS-270	820	960	270	28
BLF8G09LS-270GW	716	960	270	28
BLF8G10LS-270V	790	960	270	28
BLP8G10S-270PW	700	900	270	28
BLF8G22LS-270GV	2110	2170	270	28
BLF8G22LS-270	2110	2170	270	28
BLF8G22LS-270V	2110	2170	270	28
BLF8G10LS-300P	700	1000	300	28
BLC9H10XS-300P*	700	1000	300 ⁽¹⁾	50
BLC8G20LS-310AV	1900	2000	310 ⁽¹⁾	28
BLC9G20LS-361AVT	1805	1990	360 ⁽¹⁾	28
BLC9G27XS-380AVT	2500	2700	380 ⁽¹⁾	32
BLC8G09XS-400AVT	859	960	400 ⁽¹⁾	32
BLF8G09LS-400PW	716	960	400	28
BLF8G09LS-400PGW	716	960	400	28
BLC9H10XS-400P*	700	1000	400 ⁽¹⁾	50
BLC9G15LS-400AVT	1452	1511	400 ⁽¹⁾	32
BLC9G15XS-400AVT	1452	1511	400 ⁽¹⁾	32
BLC8G20LS-400AV	1800	2000	400 ⁽¹⁾	32
BLF8G20LS-400PV	1805	1995	400	28
BLF8G20LS-400PGV	1805	1995	400	28
BLC9G20XS-400AVT	1805	1880	400 ⁽¹⁾	32
BLC9G22XS-400AVT	2110	2200	400 ⁽¹⁾	32
BLC8G22LS-450AV	2110	2170	450 ⁽¹⁾	28
BLC9G20LS-470AVT	1805	1990	470 ⁽¹⁾	28
BLC9G20XS-550AVT	1805	1880	550 ⁽¹⁾	28
BLC9H10XS-800P*	700	1000	800 ⁽¹⁾	50
BLC10G20LS-240PWT	1805	1995	240 ⁽¹⁾	28
BLC10G22LS-240PVT	2110	2220	240 ⁽¹⁾	28
BLC10G18XS-320AVT*	1800	1900	320 ⁽¹⁾	32
BLC9H10XS-350A*	600	1000	350 ⁽¹⁾	50
BLC9G21LS-60AV*	2500	2700	380 ⁽¹⁾	32
BLC9H10XS-400A*	700	1000	400 ⁽¹⁾	50
BLC9H10XS-600A*	700	1000	600 ⁽¹⁾	50



Product Highlight: Power LDMOS Transistor BLP9G0722-20G

The BLP9G0722-20G is a 20 W plastic LDMOS discrete driver for base station applications at frequencies from 400 MHz to 2700 MHz.

Features

- High efficiency
- Small footprint
- Excellent ruggedness
- Designed for broadband operation
- Excellent thermal stability
- High power gain
- Integrated ESD protection

Integrated Doherty Amplifiers for State-of-the-Art Wireless Infrastructure

In order to achieve the smallest footprint possible, Ampleon combined its latest generations of LDMOS technology with the Doherty concept. We offer the world's first fully integrated Doherty power amplifiers in a small package. They are available in symmetric and asymmetric versions to suit all applications, from driver (symmetric) to massive-MIMO and micro cell (asymmetric). These 2-stage Doherty amplifiers integrate both the splitter and combiner inside the package and necessitate minimum external circuitry to minimize cost and board space.

The world's first fully integrated Doherty transistor looks like an ordinary class-AB transistor but contains a splitter, dual-stage main and peak devices, delay lines, and a combiner integrated inside the package. With the ease of use of an ordinary class-AB amplifier, it also provides significant space and cost savings. It is ideally suited for space-constrained applications like small cell base stations and massive antenna arrays.

Integrated Doherty Portfolio: 1.8 - 2.2 GHz

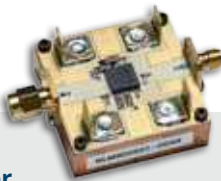
Product	Doherty Configuration	Matching	Band	P _{3dB}	Efficiency @ 8 dB BO	Gain	Technology
BLM9D1822-12B*	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	41 dBm	tbd	tbd	LDMOS MMIC
BLM8D1822-25B*	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	44 dBm	tbd	tbd	LDMOS MMIC
BLM9D1822-25B*	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	44 dBm	tbd	tbd	LDMOS MMIC
BLM9D1822S-25PB(G)*	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	44 dBm	tbd	tbd	LDMOS MMIC
BLM9D18-25AB*	2-way 1:2	50 Ω in	1.8 GHz	44.8 dBm	tbd	tbd	LDMOS MMIC
BLM9D1822S-50PB(G)*	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	47 dBm	tbd	tbd	LDMOS MMIC
BLM8D1822S-50PB(G)	2-way 1:1	50 Ω in	1.8 - 2.2 GHz	48.4 dBm	39 %	27 dB	LDMOS MMIC

Integrated Doherty product portfolio: > 2.3 GHz

Product	Doherty Configuration	Matching	Band	P _{3dB}	Efficiency @ 8 dB BO	Gain	Technology
BLM9D2327-12B*	2-way 1:02	50 Ω in	2.3 - 2.7 GHz	41 dBm	tbd	tbd	LDMOS MMIC
BLM9D2527-20AB	2-way 1:02	50 Ω in	2.5 - 2.7 GHz	43 dBm	43 % ⁽¹⁾	28 dB	LDMOS MMIC
BLM9D2325-20AB	2-way 1:02	50 Ω in	2.3 - 2.5 GHz	43 dBm	tbd	tbd	LDMOS MMIC
BLM9D2327-25B*	2-way 1:1	50 Ω in	2.3 - 2.7 GHz	44 dBm	tbd	tbd	LDMOS MMIC

⁽¹⁾ 8.5 dB back-off

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.2



Product Highlight: 20 W LDMOS Packaged Asymmetric Doherty Power Transistor for Base Station Applications at Frequencies from 2500 MHz to 2700 MHz BLM9D2527-20AB

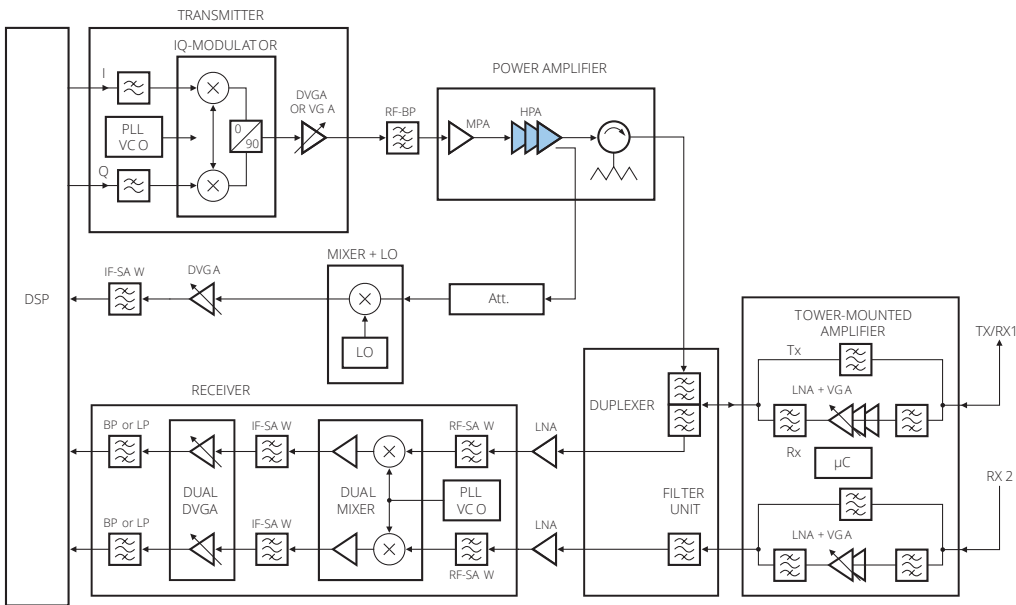
An ultra-compact Doherty design based on BLM9D2527-20AB device achieves 43 % efficiency at 3 W average output power and 28 dB gain with LTE signal. It has a peak power capability (P_{3dB}) of 20 W at 28 V supply voltage.

This Doherty is designed for 4.5G band 41 and is tailored to volume manufacturing with high yields without tuning. The PA features high video bandwidth, enabling full-band operation.

1.1.2 Small Cells

With the explosion of cellular data usage and the limited number of sites available for new macro base stations, operators have to find new ways of offering high data rates and excellent quality of service. One option is to strengthen the macro network with small cells, known as picocells (0.25 to 1 W average) and microcells (2 to 5 W average). Ampleon offers several types of solutions to the small cell PAs designer, optimized for performance, integration, or cost.

Application Diagram of a typical Small Cell Base Station



Recommended Products

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)
BLP8G27-5	700	2700	5	28
BLP7G22-05	700	2700	5	28
BLP7G22-10	700	2700	10	28
BLP8G27-10	700	2700	10	28
BLF9G38-10G*	3400	3800	10	28
BLM8G1822-20B*	1800	2200	20 ⁽¹⁾	28
BLP9G0722-20(G)	700	2700	20	28
BLM7G1822S-20PB(G)	1805	2170	20 ⁽¹⁾	28
BLM9D2325-20AB*	2300	2500	20 ⁽¹⁾	28
BLM9D2527-20AB	2500	2700	20 ⁽¹⁾	28
BLM8D1822-25B*	1800	2200	25 ⁽¹⁾	28

⁽¹⁾ P3dB

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.2

Product Highlight: Power LDMOS Transistor BLM8D1822-25B



The BLM8D1822-25B is a 25 W plastic PQFN LDMOS dual-stage integrated Doherty PA designed for micro cell applications. This cost-efficient, wideband device has an ultra-small footprint and covers all base-station frequencies from 1800 to 2200 MHz.

Features

- High efficiency
- Excellent ruggedness
- Designed for broadband operation
- Excellent thermal stability
- High power gain
- Integrated ESD protection

1.1.3 4.5G and Massive MIMO (multiple-input and multiple-output)

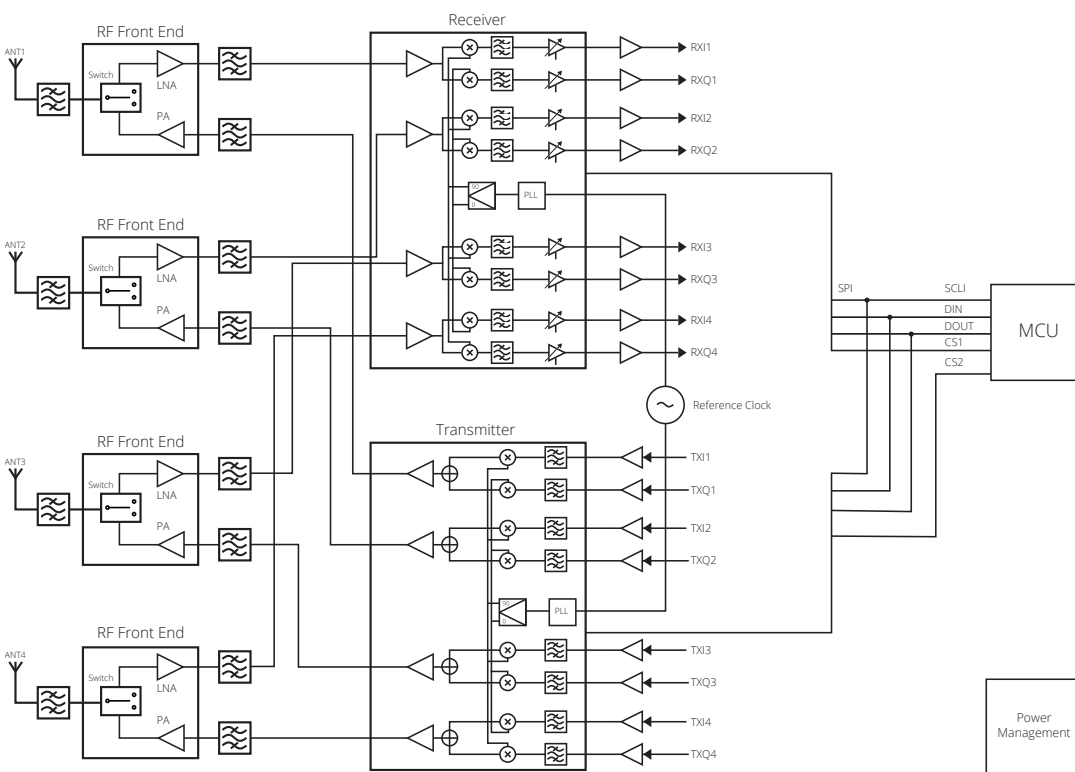
With the increasing need for higher transmission capability and M2M connection, today's 4G network is not capable of meeting the next generation mobile broadband (MBB) requirements. On the other hand, 5G will presumably not be commercially deployed until 2020. Hence there is a need for an in-between technology to fill in the gap. 4.5G, also known as LTE-Advanced Pro, is a smoother evolution of 4G to provide Gigabit transmission capability and massive M2M connection for MBB. It is officially released in the Release-13 version of 3GPP.

4.5G adopts a number of 5G technologies. Massive MIMO is one of the key adoptions. Massive MIMO aims to significantly increase the number of antenna elements and spatial streams in a base transceiver station (BTS) to be much greater than the configurations used in base stations today to enhance reliability and throughput.

Ampleon is one of the market leaders in terms of PA solutions for massive MIMO.

Application Diagram of MIMO

The design diagram with the scheme of zero-IF transceiver is shown below, in which each highly integrated receiver or transmitter chip with built-in PLL supports 4 receiving or transmitting channels respectively.



Product Highlight: LDMOS 2-stage integrated Doherty MMIC BLM8D1822S-50PB(G)

The BLM8D1822S-50PB(G) is a dual section, 2-stage fully integrated Doherty MMIC solution. The carrier and peaking device, input splitter and output combiner are integrated in a single package. This multiband device is perfectly suited as general purpose driver or small cell final in the frequency range from 1805 MHz to 2170 MHz, available in gull wing or flat lead outline.



Features

- High efficiency
- Excellent ruggedness
- Excellent thermal stability
- High power gain
- Integrated ESD protection

Recommended Products

Type	F _{min} (MHz)	F _{max} (MHz)	P _{3dB} (W)	V _{DS} (V)
BLM9D2325-20AB*	2300	2500	20 ⁽¹⁾	28
BLM9D2527-20AB	2500	2700	20 ⁽¹⁾	28
BLM8D1822-25B*	1800	2200	25 ⁽¹⁾	28
BLM9D2327-25B*	2300	2700	25 ⁽¹⁾	28
BLM9D18-25AB*	1800	1880	25 ⁽¹⁾	28
BLM8D1822S-50PB(G)	1805	2170	50 ⁽¹⁾	28

⁽¹⁾ P3dB

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.2

Product Highlight: Power LDMOS Transistor BLM9D18-25AB



The BLM9D18-25AB is a 25 W plastic PQFN LDMOS dual-stage integrated asymmetrical Doherty PA designed for MIMO applications. This cost-efficient device has an ultra-small footprint and covers base-station frequencies from 1800 to 1880 MHz.

Features

- High efficiency
- Excellent ruggedness
- Excellent thermal stability
- High power gain
- Integrated ESD protection



Amplifying the Future of TV & Broadcasting

1.2 Broadcast

Amplifying the Future of TV & Broadcasting

Digital TV accounts for over 70 % of the broadcasting market. With parts of the UHF band reallocated for mobile telephony (e.g. LTE), operators need to make the most efficient use of the remaining spectrum.

LDMOS Solutions from the Industry Leader for all Segments of the Broadcast Market

Addressing these demands for more efficiency, the broadcasting market is moving away from traditional class A-B solutions. Solutions based on narrowband and ultra-wideband Doherty power amplifiers deliver increased efficiency of 50 % and above. In the near future, asymmetrical Doherty amplifiers may provide even higher efficiencies.

We are committed to the UHF-TV industry and continue to invest in UHF-TV LDMOS technology, so that we can deliver products that support increasingly rich content.

VHF, FM, and Analog TV Markets

Ampleon has enabled the market to transition to and reap the benefits of LDMOS-based solutions. And we will continue to support our legacy products through customer product life-cycles. We have recently enhanced our broadcast offering with a full range of eXtremely Rugged (XR) products in our Overmoulded Plastic (OMP) package platform.

Solutions

- FM/HDR/DAB Radio
- UHF/D-TV
- VHF/D-TV



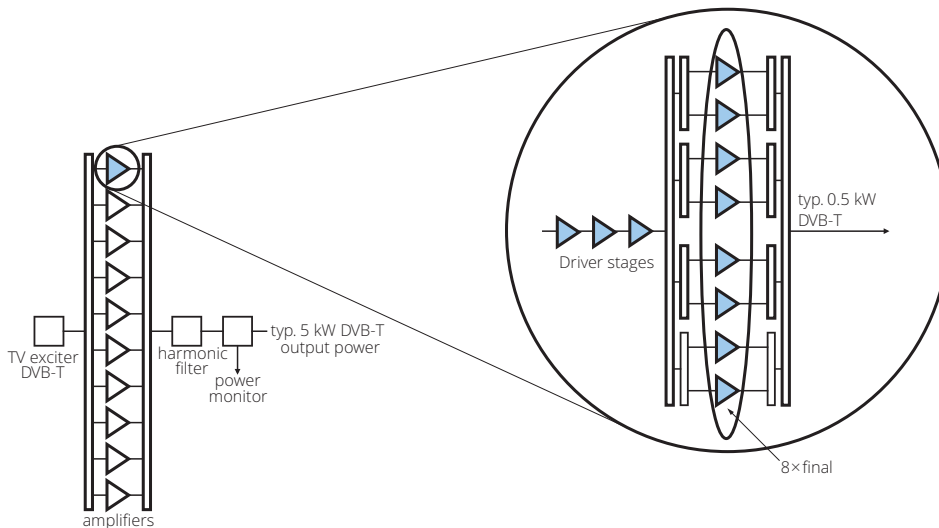
Product Highlight: UHF Power LDMOS Transistor BLF898(S)

Designed for broadcast Doherty transmitter applications, including broadcast transmitters in the UHF band and digital broadcasting systems, this 900 W LDMOS RF power transistor delivers excellent ruggedness and is ideally suited for use in digital and analog environments.

Features

- Designed for symmetric and asymmetric Doherty operation
- High efficiency
- Integrated dual sided ESD protection
- Excellent ruggedness
- High power gain
- Excellent reliability
- Easy power control

Application Diagram of a TV Transmitter



1.2.1 FM/HDR/DAB Radio

FM (88 - 108 MHz)

FM applications need pure power, resulting in high power building blocks. Ampleon's FM solutions not only deliver high power but are highly efficient, with our latest devices exceeding 85 % efficiency.

Furthermore, FM solutions must be capable of operating under the harshest of conditions. Our eXtremely Rugged (XR) packaging, which supports VSWR > 65 : 1, ensures our products and your service keeps going despite severe operational conditions.

DAB and HDR

DAB and HDR radio have the same basic requirements as FM: power and robustness. In addition, as they operate across a broader frequency range, they also need to be highly linear. Ampleon's BLFxxxXR transistor series is both highly linear and stable, making them ideal for these systems.

Ampleon also creates demonstration and reference designs that are optimized in size and performance for radio broadcasting. These designs are often implemented directly by customers into their systems.

Features and Benefits

- Small footprint
- Ready for production designs
- Printed planar balun design instead of coaxial baluns



Product Highlight: Power LDMOS Transistor BLF188XR(S)

This 1400 W high power, extremely rugged LDMOS power transistor is ideal for broadcast and industrial applications in the HF to 600 MHz band.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF to 600 MHz)

Recommended Products for FM/HDR/DAB Bands

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)	η _D (%)	G _o (dB)	Test signal
BLP10H603	10	1400	2.5	50	62	22.8	CW
BLP10H605	10	1400	5	50	59.6	22.4	CW
BLP35M805	10	3500	5	28	17	18	CW pulsed, class-AB
BLP10H610	10	1400	10	50	60	22	CW
BLP27M810	10	2700	10	28	19	17	Pulsed CW
BLF571	10	500	20	50	70	27.5	CW
BLP05H635XR(G)	10	600	35	50	75	27	Pulsed RF
BLP05H675XR(G)	10	600	75	50	75	27	Pulsed RF
BLP05H6110XR(G)	10	600	110	50	75	27	Pulsed RF
BLP05H6150XR (G)	10	600	150	50	75	27	Pulsed RF
BLP05H6250XR(G)	10	600	250	50	75	27	Pulsed RF
BLF182XR(S)	10	600	250	50	75	28	Pulsed RF
BLP05H6350XR(G)	10	600	350	50	75	27.5	Pulsed RF
BLF183XR(S)	10	600	350	50	75	28	Pulsed RF
BLF174XR(S)	10	128	600	50	73	29	Pulsed RF
BLF184XR(S)	10	600	700	50	73.5	23.9	Pulsed RF
BLF184XRG	10	600	700	50	73.5	23.9	Pulsed RF
BLP05H6700XR	10	600	700	50	73	23	Pulsed RF
BLF178P	10	128	1200	50	75	28.5	Pulsed RF
BLF178XR(S)	10	128	1400	50	72	28	Pulsed RF
BLF188XR(S)	10	600	1400	50	73	24.4	Pulsed RF
BLF188XRG	10	600	1400	50	73	24.4	Pulsed RF
BLF189XRA(S)*	1	300	1600	50	tbd	tbd	CW
BLF189XRB(S)*	1	150	1900	50	tbd	tbd	Pulsed

* Check the status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.3

1.2.2 UHF/D-TV

The UHF (470 - 800 MHz) market is diversifying and taking different approaches to the implementation of full band coverage with highest possible efficiency. The two main paths are single band ultra-wideband Doherty (UWB) solutions or classical or wideband Doherty solutions using sub-bands.

Ampleon supports both approaches with dedicated RF power transistors and application designs. For example, our latest BLF888E transistor is a 3-band ultra-wideband Doherty solution achieving 50 % efficiency across the band. This is a unique solution in the market.

For classical Doherty we are also developing solutions based on our upcoming BLF898 transistor which will have the highest DVB-T power capability (180 W average) and will be capable of covering the complete UHF band using a flexible output combiner design with multiple sub-bands. We are also working on an odd-mode Doherty solution based on the upcoming BLF898(S).



Product Highlight: UHF Power LDMOS Transistor BLF888E(S)

The BLF888E is a 750 W LDMOS RF power transistor for UHF broadcast Doherty transmitter applications. The excellent ruggedness of this device makes it ideal for digital and analog transmitter applications.

Features

- Designed for asymmetric Doherty operation
- High efficiency
- Integrated ESD protection
- Excellent ruggedness
- High power gain
- Excellent reliability
- Easy power control

Recommended Products for UHF/D-TV (470 - 800 MHz)

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	P _{L(AV)} (W)	V _{DS} (V)	η _D (%)	G _p (dB)	Test signal
BLP35M805	10	3500	5	-	28	17	18	CW pulsed, class-AB
BLP27M810	10	2700	10	-	28	19	17	Pulsed CW
BLF640	10	2200	10	-	28	31	19.3	1-c W-CDMA
BLF571	10	500	20	-	50	70	27.5	CW
BLP10H630P(G)	10	1000	30	-	50	68	18	Pulsed RF
BLF642	1	1400	35	-	32	63	19	CW
BLP10H660P (G)	10	1000	60	-	50	68	18	Pulsed RF
BLP10H690P(G)	10	1000	90	-	50	68	18	Pulsed RF
BLP10H6120P(G)	10	1000	120	-	50	68	18	Pulsed RF
BLF881(S)	1	1000	140	-	50	49	21	CW
BLP15M7160P	10	1500	160	-	28	59.7	19.4	CW
BLF882(S)	10	860	200	-	50	63	20.6	CW
BLF884P(S)	470	860	300	-	50	46	21	CW
BLF888A(S)	470	860	600	110	50	31	20	DVB-T (8k OFDM)
BLF888B(S)	470	860	650	120	50	33	21	DVB-T (8k OFDM)
BLF888D(S)	470	806	-	115	50	40	17	DVB-T (8k OFDM)
BLF888E(S)	470	790	-	150	50	52	17	DVB-T (8k OFDM)
BLF898(S)*	470	806	900	180	50	32	16	DVB-T (8k OFDM)

* Check status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.3

1.2.3 VHF/D-TV

VHF-TV Band (170 - 250 MHz)

Ampleon's RF solutions for VHF-TV are highly efficient, with our latest solutions exceeding 85 % efficiency. These high power solutions provide the building blocks needed to deliver the necessary broadcast reach. These products also need to be able to operate in extremely harsh conditions, making them the ideal candidates for our eXtremely Rugged offering which supports VSWR > 65 : 1. For design purposes, linearity needs to be pre-correctable.

For VHF-TV applications, Ampleon offers demonstration and reference class-AB applications that are optimized in both size and performance. These designs are often implemented directly by customers into their systems.

Recommended Products VHF-TV Band (170 - 250 MHz)

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)	η _D (%)	G _p (dB)	Test signal
BLP10H603	10	1400	2.5	50	62	22.8	CW
BLP10H605	10	1400	5	50	59.6	22.4	CW
BLP35M805	10	3500	5	28	17	18	CW pulsed, class-AB
BLP10H610	10	1400	10	50	60	22	CW



Product Highlight: Power LDMOS Transistor BLP05H6350XR(G)

The BLP05H6350XR is a 350 W LDMOS RF power transistor for broadcast transmitter and industrial applications. It can deliver 350 W in broadband applications from HF to 600 MHz. Its excellent ruggedness and broadband performance make it ideal for digital transmitter applications.

Features

- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent reliability
- Easy power control

Recommended Products VHF-TV Band (170 - 250 MHz) (continued)

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)	η _D (%)	G _p (dB)	Test signal
BLP27M810	10	2700	10	28	19	17	Pulsed CW
BLF571	10	500	20	50	70	27.5	CW
BLP05H635XR(G)	10	600	35	50	75	27	Pulsed RF
BLP05H675XR(G)	10	600	75	50	75	27	Pulsed RF
BLP05H6110XR(G)	10	600	110	50	75	27	Pulsed RF
BLP05H6150XR(G)	10	600	150	50	75	27	Pulsed RF
BLP05H6250XR(G)	10	600	250	50	75	27	Pulsed RF
BLF182XR(S)	10	600	250	50	75	28	Pulsed RF
BLF573(S)	10	500	300	50	70	27.2	CW
BLP05H6350XR(G)	10	600	350	50	75	27.5	Pulsed RF
BLF183XR(S)	10	600	350	50	75	28	Pulsed RF
BLF574	10	500	600	50	70	26.5	CW
BLF574XR(S)	10	500	600	50	74.7	24	Pulsed RF
BLF184XR(S)	10	600	700	50	73.5	23.9	Pulsed RF
BLF184XRG	10	600	700	50	73.5	23.9	Pulsed RF
BLP05H6700XR(G)	10	600	700	50	73	23	Pulsed RF
BLF578	10	500	1200	50	75	26	CW
BLF578XR(S)	10	500	1400	50	69	23.5	Pulsed RF
BLF188XR(S)	10	600	1400	50	73	24.4	Pulsed RF
BLF188XRG	10	600	1400	50	73	24.4	Pulsed RF
BLF189XRA(S)*	1	300	1600	50	tbd	tbd	CW

* Check the status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.3

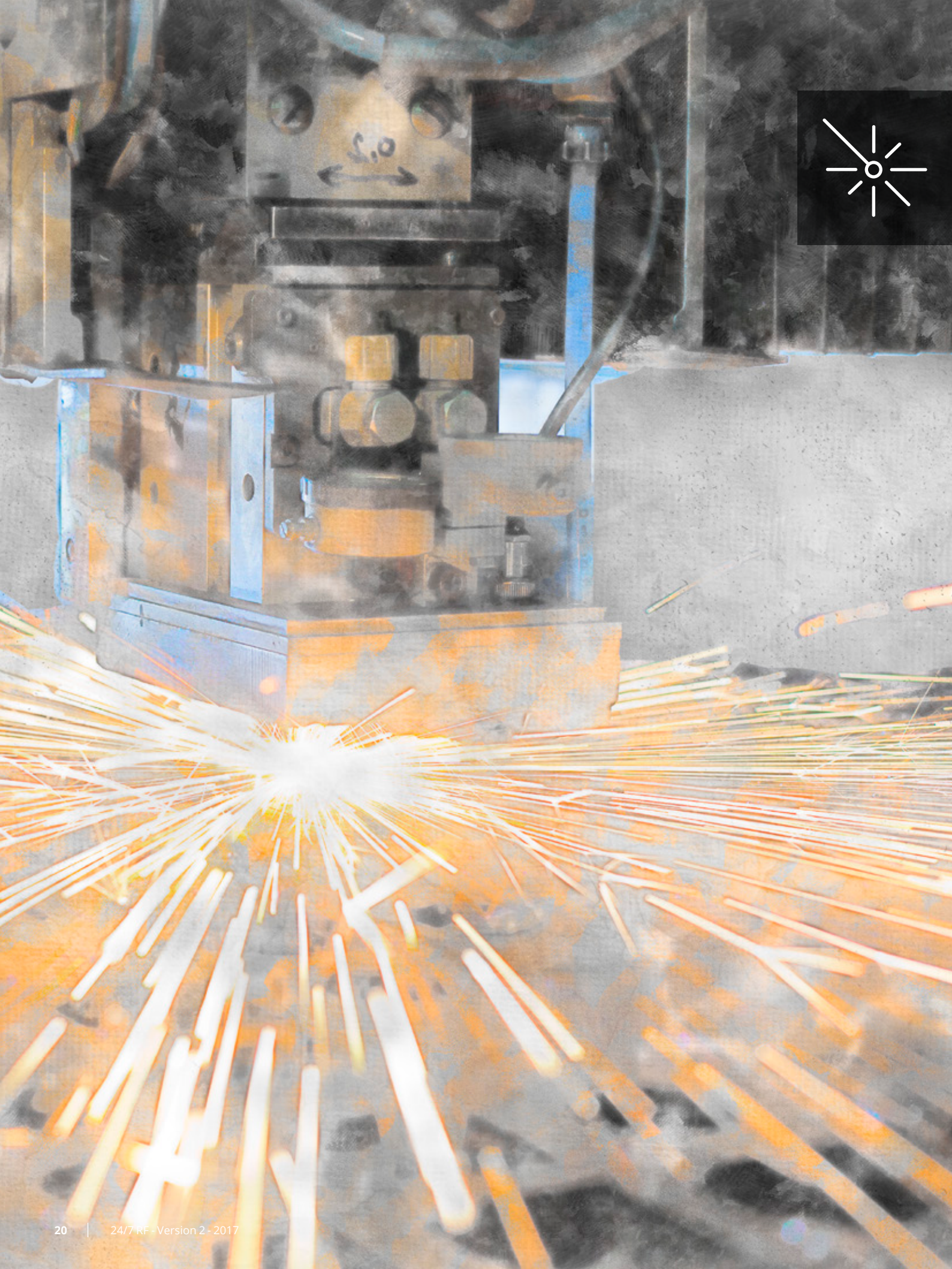


Product Highlight: Power LDMOS Transistor BLP05H6700XR(G)

The BLP05H6700XR is a 700 W extra rugged LDMOS power transistor optimized for broadcast and applications in the HF to 600 MHz band.

Features

- Easy power control
- Integrated dual sided ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal resistance due to copper flange
- Designed for broadband operation (HF to 600 MHz)



Robust Solutions Serving in Harsh and Sensitive Environments

1.3 Industrial, Scientific and Medical (ISM)

The ISM frequency bands feature a diverse range of applications including chemical processing, magnetic resonance imaging (MRI), electro coagulation surgical equipment, precipitation monitoring, and wind profiling. Yet, all these applications share common requirements, such as high output power, high efficiency, robustness and thermal stability.

Rugged Solutions, Harsh Environments

Systems operating in the ISM band need to share their bandwidth with short-range, low-power communications systems and radio-frequency identification (RFID) applications. Many ISM applications suffer from severely unmatched inputs and outputs, demanding very rugged solutions. Whatever the challenge, we have the RF power solutions you need.

RF Power for ISM up to 1600 MHz

Our portfolio includes field-proven LDMOS devices that help developers create ISM systems that deliver high performance and a long lifetime.

RF Power for the ISM 2.45 GHz Band

Due to its global availability, the 2.45 GHz band supports a wide range of ISM applications including medical therapy as well as many RF Energy applications (see section 1.4).

Low Power Transistors

Ranging from 2 W to tens of watts, our complete portfolio of low power RF transistors includes devices across all ISM frequencies and applications. This makes Ampleon the one-stop source for all your ISM RF needs.



Product Highlight: Power LDMOS Driver Transistor BLF189XRB(S)

The BLF189XRB is a 1900 W extremely rugged LDMOS power transistor for industrial applications in the HF to 150 MHz band.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability

Typical Applications

- RF drying
- RF welding
- Citizens' Band (CB) radio communication
- Magnetic Resonance Imaging (MRI)
- CO₂ lasers
- Plasma generators
- Particle accelerators
- RF heating
- RF thawing
- Chemical processing
- Plasma lighting

1.3.1 CO₂ Laser Exciters and Plasma Generators

CO₂ lasers turn electrical energy into concentrated infrared light energy. The plasma is formed by the gas when electrical energy transforms into heat. This same process is used for plasma generators.

High power CO₂ lasers are used for cutting and welding while lower power applications include engraving. Plasma generators are primarily used for power generation or to accelerate particle beams, and for plasma etching or deposition in the semiconductor industry.

These devices need high power amplifiers. High power generates heat. Even highly efficient designs still need to dissipate extra heat effectively and our ACP3 package, with its low thermal resistance, helps doing that even for very high power systems.

1.3.2 Medical and Industrial Imaging

For doctors or clinicians it is necessary to get pictures of the anatomy and the physiological processes of the body in both health and disease. Ampleon works with many established brands in helping improve the world of healthcare through safe, efficient and groundbreaking medical imaging concepts.

However MRI is not only used for medical applications, it can also be used in the industrial market. For example, MRI is used to measure gas flow in the petrochemical industry.

1.3.3 Particle Accelerators

Particle accelerators have endless potential including the development of clean energy, purification of air or water, targeted



Product Highlight: Broadband Power LDMOS Transistor BLF647P

The BLF647P is a 200 W LDMOS RF power transistor for industrial applications in the HF to 1500 MHz frequency range. Its excellent ruggedness and broadband performance make it ideal for digital applications.

Features

- Integrated ESD protection
- Excellent ruggedness
- High power gain
- High efficiency
- Excellent reliability
- Easy power control

cancer treatment, detecting suspicious shipments and of course discovering scientific breakthroughs.

There are three different types of particle accelerators: the synchrotron, linear accelerator (linac) and cyclotron.

A cyclotron accelerates charged particles outwards from the centre along a spiral path, using a rapidly varying (radio frequency) electric field, cyclotrons are widely used to produce particle beams in physics and nuclear medicine.

Synchrotrons are cyclic particle accelerators that enable large-scale facilities, since bending, beam focusing and acceleration can be separated into different components. The 27 km long Large Hadron Collider in CERN Switzerland is the world's largest synchrotron.

Linear accelerators (Linacs) are increasingly being used in the medical industry for cancer treatment and creating radioactive isotopes. Linacs run at high power with multiple amplifiers needed to generate particles.

1.3.4 Instrumentation

Ampleon offers a range of RF transistors and evaluation kits for RF instrumentation applications. Our wideband amplifiers feature low noise and are exceedingly linear, making them particularly suitable for feedback channels in a wide range of measuring equipment including vector signal transceivers, signal generators and RF power meters.

Recommended Products for ISM 0 - 500 MHz

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)	η _D (%)	G _p (dB)	Test signal
BLP10H603	10	1400	2.5	50	62	22.8	CW class-AB @ 860 MHz
BLP10H605	10	1400	5	50	59.6	22.4	CW pulsed class-AB @ 860 MHz
BLP10H610	10	1400	10	50	60	22	CW
BLP05H635XR(G)	10	600	35	50	75	27	Pulsed RF
BLP05H675XR(G)	10	600	75	50	75	27	Pulsed RF
BLP05H6110XR(G)	10	600	110	50	75	27	Pulsed RF
BLP05H6150XR(G)	10	600	150	50	75	27	Pulsed RF
BLF182XR(S)	10	600	250	50	75	28	Pulsed RF
BLP05H6250XR(G)	10	600	250	50	75	27	Pulsed RF
BLF183XR(S)	10	600	350	50	75	28	Pulsed RF
BLP05H6350XR(G)	10	600	350	50	75	27.5	Pulsed RF
BLF184XR(G)	10	600	700	50	73.5	23.9	Pulsed RF
BLF184XRS	10	600	700	50	73.5	23.9	Pulsed RF
BLP05H6700XR(G)	10	600	700	50	73	23	Pulsed RF
BLF188XR(S)	10	600	1400	50	73	24.4	Pulsed RF
BLF188XRG	10	600	1400	50	73	24.4	Pulsed RF
BLF189XRA(S)*	1	300	1600	50	tbd	tbd	CW
BLF189XRB(S)*	1	150	1900	50	tbd	tbd	Pulsed

* Check the status in section 3.1, as this type is not yet released for mass production. For the complete product selection please see section 3.4



Product Highlight: Power LDMOS Transistor BLF188XR(S)

The BLF188XR is a 1400 W extremely rugged LDMOS power transistor for industrial applications, capable of providing an outstanding 1600 W of peak output power. It can operate as high as 50 V and still pass extreme ruggedness testing. The BLF188XR transistor's ruggedness and excellent load properties make it ideal for MRI applications.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability

Recommended Products for ISM 0 - 1600 MHz

Type	F _{min} (MHz)	F _{max} (MHz)	P _{L(1dB)} (W)	V _{DS} (V)	η _D (%)	G _o (dB)	Test signal
BLP35M805	10	3500	5	28	17	18	CW pulsed, class-AB
BLF640	10	2200	10	28	31	19.3	1-c W-CDMA
BLP10H610	10	1400	10	50	60	22	CW
BLP27M810	10	2700	10	28	19	17	Pulsed CW
BLP10H630P(G)	10	1000	30	50	68	18	Pulsed RF
BLF642	1	1400	35	32	63	19	CW
BLP10H660P(G)	10	1000	60	50	68	18	Pulsed RF
BLP10H690P(G)	10	1000	90	50	68	18	Pulsed RF
BLF645	1	1400	100	32	56	18	CW
BLP10H6120P(G)	10	1000	120	50	68	18	Pulsed RF
BLP15M7160P	10	1500	160	28	59.7	19.4	CW
BLF1721M8LS200	1700	2100	200	28	28.5	19	2-c W-CDMA
BLF2324M8LS200P	2300	2400	200	28	32	17.2	1-c W-CDMA
BLF647P(S)	10	1500	200	32	70	18	Pulsed RF
BLF6G13L(S)-250P	1300	1300	250	50	56	17	CW
BLF6G15L(S)-500H	1400	1500	500	50	19	16	DVB-T (8k OFDM)
BLF10H6600P(S)	400	1000	600	50	46	20.8	2-Tone, class-AB

For the complete product selection please see section 3.4



Product Highlight: Power LDMOS Transistor BLP05H6700XR(G)

The BLP05H6700XRG is a 700 W extra rugged LDMOS power transistor optimized for broadcast, industrial, aerospace and defense applications in the HF to 600 MHz band.

Features

- Easy power control
- Integrated dual sided ESD protection enables class C operation and complete switch off of the transistor
- Excellent ruggedness VSWR 65 : 1
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF to 600 MHz)
- 50 V operation for easy broadband matching
- Package available in both straight leads and gull wing form



Product Highlight:
Broadband LDMOS Driver Transistor BLP10H610

The BLP10H610 is a 10 W LDMOS broadband driver transistor in an OMP package that is ideal for ISM applications operating at frequencies from HF to 1400 MHz.

Features

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF to 1400 MHz)