

# BGS8424

## WLAN LNA + Switch

Rev. 1.3 — 6 May 2019 Product data sheet

## 1 General description

The BGS8424 is, also known as the WLAN3101H, a fully integrated MMIC low-noise amplifier, and SP3T switch for Bluetooth path and transmit path. For WLAN applications in the 2.4 GHz to 2.5 GHz ISM band. Manufactured using the high performance QUBiC eighth generation SiGe:C technology of NXP.

The BGS8424 couples best-in-class noise figure, linearity, efficiency, low insertion loss. Also the CMOS switches with the process stability and ruggedness are the hallmarks of the SiGe:C technology.

The BGS8424 has a 1.5 mm × 1.5 mm footprint HX2SON8 package and a maximum thickness of 330 µm.

## 2 Features and benefits

- Covers full ISM low band 2400 MHz to 2500 MHz
- Noise figure = 2 dB
- Gain 15.7 dB
- High input 1 dB compression point $P_{i(1dB)}$ of -4.5 dBm
- High in of band $IP3_i$ of 6 dBm
- Supply voltage 2.7 V to 5.25 V
- Bypass mode current consumption of 4 µA at a supply voltage of 3.6 V
- Optimized performance at low supply current of 8.4 mA
- Integrated concurrent 5 GHz notch filter
- 4 modes of operation (high gain receive, bypass receive, transmit, and Bluetooth modes)
- Integrated matching for input and output
- Requires only one supply decoupling capacitor
- ESD protection on all pins (HBM > 2 kV)
- Small 8-pin leadless package 1.5 mm × 1.5 mm × 0.32 mm; 0.4 mm pitch

## 3 Applications

- IEEE 802.11b/g/n WiFi, WLAN
- Smartphones, tablets, netbooks, and other portable computing devices
- Access points, routers, gateways
- Wireless video
- General-purpose ISM applications

# 4 Quick reference data

**Table 1. Quick reference data**

*$V_{CC}$ = 3.6 V; $T_{amb}$ = 25 °C; $V_{IH}$ = 3.3 V; $V_{IL}$ = 0 V; $Z_S$ = $Z_L$ = 50 Ω; $P_{i\ =}$ -30 dB; unless otherwise specified. All measurements done on application board (DC-decoupling capacitor 100 pF placed nearby the $V_{CC}$ pin 5) with SMA connectors as reference plane.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| RF performances at ANT-RX path in, high-gain receive mode [1] | | | | | | |
| $I_{CC}$ | supply current | high-gain receive mode [1] | - | 8.4 | 11.5 | mA |
| $G_{tr}$ | transducer power gain | | 14 | 15.7 | 18 | dB |
| NF | noise figure | | - | 2 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | in-band | - | -4.5 | - | dBm |
| $RL_{in}$ | input return loss | | - | 14 | - | dB |
| $RL_{out}$ | output return loss | | - | 12 | - | dB |
| RF performance at ANT-RX path in, bypass receive mode [1] | | | | | | |
| $I_{CC}$ | supply current | bypass receive mode [1] | - | 4 | 8 | µA |
| $G_{tr}$ | transducer power gain | | -8 | -6.5 | -4 | dB |
| RF performance at ANT-TX path in, transmit mode [1] | | | | | | |
| $\alpha_{ins}$ | insertion loss | | - | 0.7 | - | dB |
| RF performance at ANT-BT path in, Bluetooth mode [1] | | | | | | |
| $\alpha_{ins}$ | insertion loss | | - | 0.95 | - | dB |

[1] See Table 11 for the appropriate control signal settings.

# 5 Ordering information

**Table 2. Ordering information**

| Type number | Orderable part number | Package | | |
|---|---|---|---|---|
| | | Name | Description | Version |
| BGS8424 | BGS8424Z | HX2SON8 | plastic, thermal enhanced super thin small outline package; no leads; 8 terminals; body 1.5 × 1.5 × 0.32 mm | SOT1260C |

# 6 Marking

**Table 3. Marking code**

| Type number | Marking code |
|---|---|
| BGS8424 | 24 |
| | YWW: Year & Week code |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 7 Functional diagram

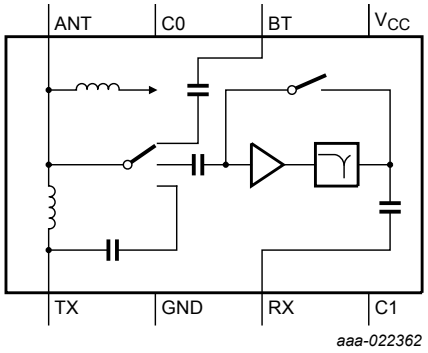



**Figure 1. Functional diagram**

# 8 Pinning information

## 8.1 Pinning

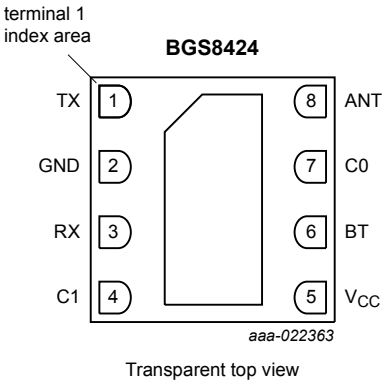



**Figure 2. Pin configuration**

## 8.2 Pin description

**Table 4. Pin description**

| Symbol | Pin | Description |
|---|---|---|
| TX | 1 | transmit input |
| GND | 2 | ground |
| RX | 3 | receive output |
| C1 | 4 | C1 control pin |
| $V_{CC}$ | 5 | supply voltage |
| BT | 6 | Bluetooth input / output |
| C0 | 7 | C0 control pin |
| ANT | 8 | antenna input / output |
| GND | exposed die pad | ground |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 9 Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134). Do not combine following conditions.*

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | -0.3 | 6 | V |
| $I_{CC}$ | supply current | worst case up to $P_{1dB}$ | - | 15 | mA |
| $V_{I(C0)}$ | input voltage pin C0 | | -0.3 | 4 | V |
| $V_{I(C1)}$ | input voltage pin C1 | | -0.3 | 4 | V |
| $P_{i(ANT)}$ | input power pin ANT | high-gain receive mode | - | 7 | dBm |
| | | bypass receive mode | - | 19 | dBm |
| $P_{i(TX)}$ | input power pin TX | CW; transmit mode ZL = 50 Ω | - | 32 | dBm |
| $P_{i(BT)}$ | input power pin BT | CW; Bluetooth mode ZL = 50 Ω | - | 22 | dBm |
| $T_{amb}$ | ambient temperature | air temperature | -40 | +85 | °C |
| $T_j$ | junction temperature | | -40 | +150 | °C |
| $T_{stg}$ | storage temperature | | -40 | +150 | °C |
| $V_{ESD}$ | electrostatic discharge voltage | Human Body Model (HBM) according to ANSI/ESDA/JEDEC standard JS-001 | - | ±2000 | V |
| | | Charged Device Model (CDM) according to JEDEC standard JESD22-C101 | - | ±500 | V |

# 10 Recommended operating conditions

**Table 6. Recommended operating conditions**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| f | frequency | | 2400 | - | 2500 | MHz |
| $V_{CC}$ | supply voltage | | 2.7 | 3.6 | 5.25 | V |
| $V_{IH}$ | HIGH-level input voltage | [1] | 1.62 | - | 3.6 | V |
| $V_{IL}$ | LOW-level input voltage | | 0 | - | +0.4 | V |

[1] Input voltage $V_{IH}$ on that specific pin between 1.62 V and $V_{CC1}$ -0.2 V and 3.6 V maximum.

# 11 Thermal characteristics

**Table 7. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | | 250 | K/W |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 12 Characteristics

**Table 8. DC characteristics**

*$V_{CC}$ = 3.6 V; $T_{amb}$ = 25 °C; $V_{IH}$ = 3.3 V; $V_{IL}$ = 0 V; $Z_S$ = $Z_L$ = 50 Ω; $P_{i\ =}$ -30 dBm, unless otherwise specified. All measurements done on application board (DC-decoupling capacitor 100 pF placed nearby the $V_{CC}$ pin 5) with SMA connectors as reference plane.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{CC}$ | supply current | high-gain receive mode [1] | - | 8.4 | 11.5 | mA |
| | | bypass receive mode [1] | - | 4 | 8 | µA |
| | | transmit mode [1] | - | 150 | 300 | µA |
| | | Bluetooth mode [1] | - | 4 | 8 | µA |
| $I_{ctrl(C0)}$ | control current on pin C0 | | - | 10 | 15 | µA |
| $I_{ctrl(C1)}$ | control current on pin C1 | | - | 3 | 10 | µA |

[1] See Table 11 for the appropriate control signal settings.

**Table 9. Transient characteristics**

*$V_{CC}$ = 3.6 V; $T_{amb}$ = 25 °C; $V_{IH}$ = 3.3 V; $V_{IL}$ = 0 V; $Z_S$ = $Z_L$ = 50 Ω; $P_{i\ =}$ -30 dBm, unless otherwise specified. All measurements done on application board (DC-decoupling capacitor 100 pF placed nearby the $V_{CC}$ pin 5) with SMA connectors as reference plane.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $t_{on}$ | turn-on time | From 90 % of control signal to 90 % LNA output level [1] | - | - | 500 | ns |
| $t_{off}$ | turn-off time | From 10 % of control signal to 90 % Bypass output level [1] | - | - | 500 | ns |
| $t_d$ | delay time | LNA to Bypass mode | - | 110 | - | ns |

[1] From any of four operating modes (except LNA to bypass mode, see $t_d$) to another and from within 10 % of the initial gain to within 10 % of the final gain.

**Table 10. RF characteristics**

*$V_{CC}$ = 3.6 V; $T_{amb}$ = 25 °C; $V_{IH}$ = 3.3 V; $V_{IL}$ = 0 V; $Z_S$ = $Z_L$ = 50 Ω; $P_{i\ =}$ -30 dBm; unless otherwise specified. All measurements done on application board (DC-decoupling capacitor 100 pF placed nearby the $V_{CC}$ pin 5) with SMA connectors as reference plane.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| RF performance at ANT-RX path in, high-gain receive mode [1] | | | | | | |
| $G_{tr}$ | transducer power gain | | 14 | 15.7 | 18 | dB |
| $G_{p(flat)}$ | power gain flatness | peak-to-peak over any 40 MHz band | - | - | 0.5 | dB |
| NF | noise figure | | - | 2 | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | in-band | - | -4.5 | - | dBm |
| $IP3_i$ | input third-order intercept point | 20 MHz tone spacing; $P_i$ = -20 dBm per tone | - | 6 | - | dBm |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $RL_{in}$ | input return loss | | - | 14 | - | dB |
| $RL_{out}$ | output return loss | | - | 12 | - | dB |
| RF performance at ANT-RX path in, bypass receive mode [1] | | | | | | |
| $G_{tr}$ | transducer power gain | | -8 | -6.5 | -4 | dB |
| $G_{p(flat)}$ | power gain flatness | peak-to-peak over any 40 MHz band | - | - | 0.5 | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | in-band | - | 11.5 | - | dBm |
| $IP3_i$ | input third-order intercept point | 20 MHz tone spacing; $P_i$ = -3 dBm per tone | - | 30 | - | dBm |
| $RL_{in}$ | input return loss | | - | 9 | - | dB |
| $RL_{out}$ | output return loss | | - | 13 | - | dB |
| RF performance at ANT-TX path in, transmit mode [1] | | | | | | |
| $\alpha_{ins}$ | insertion loss | | - | 0.7 | - | dB |
| $G_{p(flat)}$ | power gain flatness | peak-to-peak over any 40 MHz band | - | - | 0.2 | dB |
| ISL | isolation | measured between pin RX and pin TX | 35 | - | - | dB |
| $P_{i(1dB)}$ | input power at 1 dB gain compression | in-band | - | 32 | - | dBm |
| $RL_{in}$ | input return loss | | - | 17 | - | dB |
| $RL_{out}$ | output return loss | | - | 17 | - | dB |
| RF performance at ANT-BT path in, Bluetooth mode [1] | | | | | | |
| $\alpha_{ins}$ | insertion loss | | - | 0.95 | - | dB |
| $G_{p(flat)}$ | power gain flatness | peak-to-peak over any 40 MHz band | - | - | 0.2 | dB |
| $RL_{in}$ | input return loss | | - | 16 | - | dB |
| $RL_{out}$ | output return loss | | - | 16 | - | dB |

[1] See Table 11 for the appropriate control signal settings.


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

**Table 11. Control signal truth table**

*Other modes than the ones given in this table are not allowed.*

| Control signal setting [1] | | Mode of operation | | | | |
|---|---|---|---|---|---|---|
| $V_{C0}$ | $V_{C1}$ | SP2T switch | | | | |
| (pin 7) | (pin 4) | ANT-RX | ANT-TX | ANT-BT | LNA | Mode name |
| HIGH | HIGH | ON | OFF | OFF | ON | high-gain receive mode |
| HIGH | LOW | ON | OFF | OFF | OFF | bypass receive mode |
| LOW | HIGH | OFF | ON | OFF | OFF | transmit mode |
| LOW | LOW | OFF | OFF | ON | OFF | Bluetooth mode |

[1] A logic LOW is the result of an input voltage on that specific pin between 0 V and 0.4 V.
A logic HIGH is the result of an input voltage on that specific pin between 1.62 V and 3.6 V.

# 13 Application information

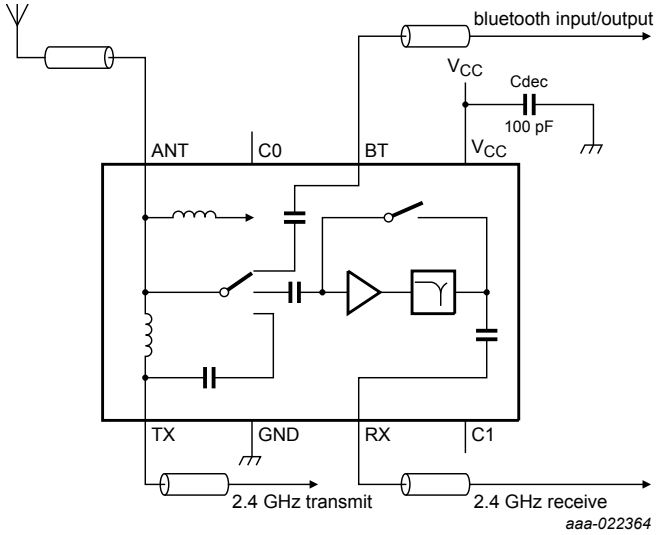


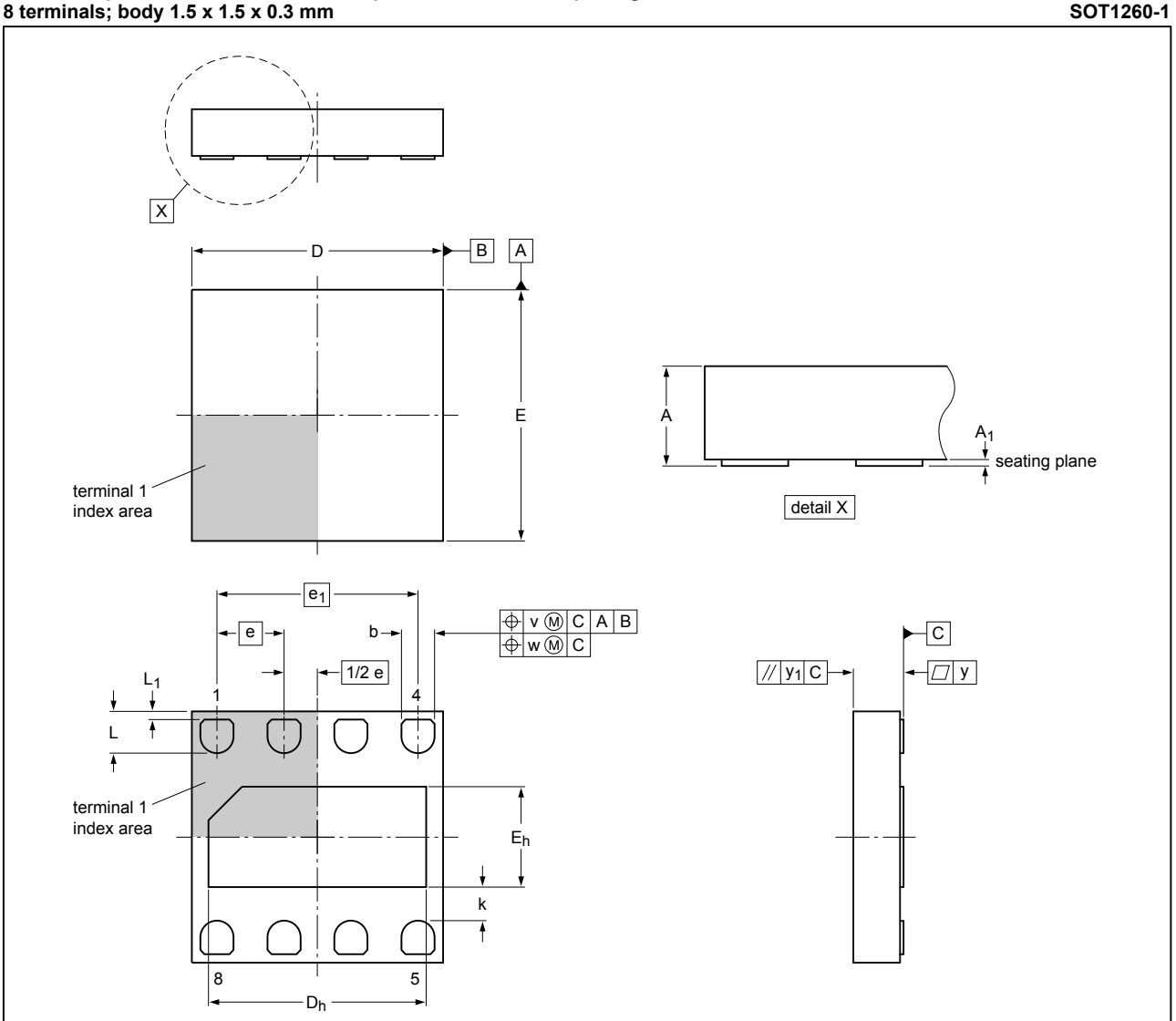

**Figure 3. Application information**


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

## 14 Package outline

**HX2SON8: plastic, thermal enhanced super thin small outline package; no leads; 8 terminals; body 1.5 x 1.5 x 0.3 mm** **SOT1260-1**




Dimensions: (mm are the orginal dimensons)

| Unit | | A | $A_1$ | b | $D^{(1)}$ | $D_h$ | $E^{(1)}$ | $E_h$ | e | $e_1$ | k | L | $L_1$ | v | w | y | $y_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | max | 0.33 | 0.05 | 0.25 | 1.55 | 1.40 | 1.55 | 0.70 | | | | 0.35 | 0.10 | | | | |
| mm | nom | 0.30 | 0.02 | 0.20 | 1.50 | 1.30 | 1.50 | 0.60 | 0.4 | 1.2 | 0.20 | 0.25 | 0.05 | 0.07 | 0.05 | 0.05 | 0.05 |
| | min | 0.28 | 0.00 | 0.15 | 1.45 | 1.15 | 1.45 | 0.45 | | | 0.15 | 0.15 | 0.00 | | | | |

Note
1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

*sot1260-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1260-1 | | MO-255 | | | | ~~14-06-11~~ 16-01-13 |

**Figure 4. Package outline SOT1260C (HX2SON8)**


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 15 Handling information

## 15.1 ElectroStatic Discharge (ESD)

**CAUTION**



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.
Such precautions are described in the *ANSI/ESD S20.20, IEC/ST 61340-5, JESD625-A* or equivalent standards.

## 15.2 Moisture sensitivity

**Table 12. Moisture sensitivity level**

| Test methodology | Class |
|---|---|
| JESD-22-A113 | 1 |

# 16 Abbreviations

**Table 13. Abbreviations**

| Acronym | Description |
|---|---|
| CMOS | complementary metal-oxide semiconductor |
| CW | continuous wave |
| ESD | electrostatic discharge |
| HBM | human body model |
| ISM | industrial, scientific, and medical |
| LAN | local area network |
| LNA | low-noise amplifier |
| MMIC | monolithic microwave-integrated circuit |
| SiGe:C | silicon germanium carbon |
| SMA | SubMiniature version A |
| SP2T | single pole 2 throw |
| WLAN | wireless local area network |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 17 Revision history

**Table 14. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BGS8424 v.1.3 | 20190506 | Product data sheet | - | BGS8424 v.1.2 |
| modification | • changed security status into public | | | |
| BGS8424 v.1.2 | 20190503 | Product data sheet | - | BGS8424 v.1.1 |
| modification | • added LNA to bypass mode switch delay time to the Transient characteristics table<br>• updated conditions and max values for $P_{i(TX)}$ and $P_{i(BT)}$ in Limiting values table<br>• removed $P_{i(1dB)}$ from Bluetooth mode characteristics | | | |
| BGS8424 v.1.1 | 20181214 | Product data sheet | - | BGS8424 v.1 |
| modification | • modified Ordering information with Orderable part number | | | |
| BGS8424 v.1 | 20170505 | Product data sheet | - | - |


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# 18 Legal information

## 18.1 Data sheet status

| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

## 18.2 Definitions

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

**Short data sheet** — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification** — The information and data provided in a Product data sheet shall define the specification of the product as agreed between NXP Semiconductors and its customer, unless NXP Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the NXP Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

## 18.3 Disclaimers

**Limited warranty and liability** — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors. In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory. Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

**Right to make changes** — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

**Suitability for use** — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification. Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products. NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

**Limiting values** — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

**Terms and conditions of commercial sale** — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nxp.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Quick reference data** — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

**Non-automotive qualified products** — Unless this data sheet expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications. In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

## 18.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.


All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2019. All rights reserved.

# Contents

**1 General description ..... 1**
**2 Features and benefits ..... 1**
**3 Applications ..... 1**
**4 Quick reference data ..... 2**
**5 Ordering information ..... 2**
**6 Marking ..... 2**
**7 Functional diagram ..... 3**
**8 Pinning information ..... 3**
8.1 Pinning ..... 3
8.2 Pin description ..... 3
**9 Limiting values ..... 4**
**10 Recommended operating conditions ..... 4**
**11 Thermal characteristics ..... 4**
**12 Characteristics ..... 5**
**13 Application information ..... 7**
**14 Package outline ..... 8**
**15 Handling information ..... 9**
15.1 ElectroStatic Discharge (ESD) ..... 9
15.2 Moisture sensitivity ..... 9
**16 Abbreviations ..... 9**
**17 Revision history ..... 10**
**18 Legal information ..... 11**

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

**© NXP B.V. 2019.** **All rights reserved.**

For more information, please visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

**Date of release: 6 May 2019**
**Document identifier: BGS8424**
**Document number:**