

BLC6G22-100; BLC6G22LS-100

UHF power LDMOS transistor

Rev. 01 — 30 January 2006

Objective data sheet

1. Product profile

1.1 General description

100 W LDMOS power transistor for base station applications at frequencies from 2000 MHz to 2200 MHz.

Table 1: Typical performance

RF performance at $T_{case} = 25\text{ }^{\circ}\text{C}$ in a common source class-AB production test circuit.

| Mode of operation | f (MHz) | V_{DS} (V) | $P_{L(AV)}$ (W) | G_p (dB) | η_D (%) | IMD3 (dBc) | ACPR (dBc) |
|-------------------|--------------|-----------------|--------------------|---------------|-----------------|---------------|---------------|
| 2-carrier W-CDMA | 2110 to 2170 | 28 | 25 | 18 | 32 | -37 [1] | -40 [1] |

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 7 dB at 0.01 % probability on CCDF per carrier; carrier spacing 10 MHz.

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features

- Typical 2-carrier W-CDMA performance at frequencies of 2110 MHz and 2170 MHz, a supply voltage of 28 V and an I_{DQ} of 950 mA:
 - ◆ Output power = 25 W (AV)
 - ◆ Gain = 18 dB
 - ◆ Efficiency = 32 %
 - ◆ IMD3 = -37 dBc
 - ◆ ACPR = -40 dBc
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2000 MHz to 2200 MHz)
- Internally matched for ease of use

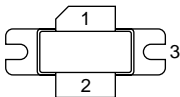
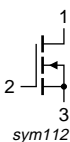
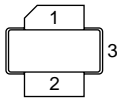
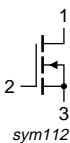
PHILIPS

1.3 Applications

- RF power amplifiers for W-CDMA base stations and multi carrier applications in the 2000 MHz to 2200 MHz frequency range.

2. Pinning information

Table 2: Pinning

| Pin | Description | Simplified outline | Symbol |
|---------------------------------|-------------|--|--|
| BLC6G22-100 (SOT895-1) | | | |
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |
| BLC6G22LS-100 (SOT896-1) | | | |
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |

[1] Connected to flange

3. Ordering information

Table 3: Ordering information

| Type number | Package | | |
|---------------|---------|---|----------|
| | Name | Description | Version |
| BLC6G22-100 | - | plastic flanged cavity package; 2 mounting slots; 2 leads | SOT895-1 |
| BLC6G22LS-100 | - | plastic earless flanged cavity package; 2 leads | SOT896-1 |

4. Limiting values

Table 4: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|----------------------|------------|------|--------|------|
| V_{DS} | drain-source voltage | | - | 65 | V |
| V_{GS} | gate-source voltage | | -0.5 | +13 | V |
| I_D | drain current | | - | <tbid> | A |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| T_j | junction temperature | | - | 225 | °C |

5. Thermal characteristics

Table 5: Thermal characteristics

| Symbol | Parameter | Conditions | Type | Min | Typ | Max | Unit |
|------------------|--|---|---------------|--------|--------|--------|------|
| $R_{th(j-case)}$ | thermal resistance from junction to case | $T_{case} = 80\text{ °C};$ $P_L = 25\text{ W}$ | BLC6G22-100 | <tbid> | <tbid> | <tbid> | K/W |
| | | | BLC6G22LS-100 | <tbid> | 0.45 | 0.54 | K/W |

6. Characteristics

Table 6: Characteristics

$T_j = 25\text{ °C}$ unless otherwise specified

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|----------------------------------|--|--------|--------|--------|---------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$ | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}; I_D = 150\text{ mA}$ | <tbid> | 2 | <tbid> | V |
| V_{GSq} | gate-source quiescent voltage | $V_{DS} = 28\text{ V}; I_D = 950\text{ mA}$ | <tbid> | <tbid> | <tbid> | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$ | - | - | 5 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$ | 23 | 27 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 13\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 450 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}; I_D = 7.5\text{ A}$ | - | 10.5 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 5.25\text{ A}$ | - | 0.1 | - | Ω |
| C_{rs} | feedback capacitance | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V};$ $f = 1\text{ MHz}$ | - | <tbid> | - | pF |

7. Application information

Table 7: Application information

Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH; $f_1 = 2112.5\text{ MHz}; f_2 = 2122.5\text{ MHz}; f_3 = 2157.5\text{ MHz}; f_4 = 2167.5\text{ MHz};$ RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 950\text{ mA}; T_{case} = 25\text{ °C};$ unless otherwise specified; in a class-AB production test circuit

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|--|---------------------------|--------|-----|--------|------|
| $P_{L(AV)}$ | average output power | | - | 25 | - | W |
| G_p | power gain | $P_{L(AV)} = 25\text{ W}$ | <tbid> | 18 | - | dB |
| IRL | input return loss | $P_{L(AV)} = 25\text{ W}$ | - | -9 | <tbid> | dB |
| η_D | drain efficiency | $P_{L(AV)} = 25\text{ W}$ | <tbid> | 32 | - | % |
| IMD3 | third order intermodulation distortion | $P_{L(AV)} = 25\text{ W}$ | - | -37 | <tbid> | dBc |
| ACPR | adjacent channel power ratio | $P_{L(AV)} = 25\text{ W}$ | - | -40 | <tbid> | dBc |

7.1 Ruggedness in class-AB operation

The BLC6G22-100 and BLC6G22LS-100 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 950\text{ mA}; P_L = 100\text{ W (CW)}; f = 2170\text{ MHz}.$

8. Package outline

Plastic flanged cavity package; 2 mounting slots; 2 leads

SOT895-1

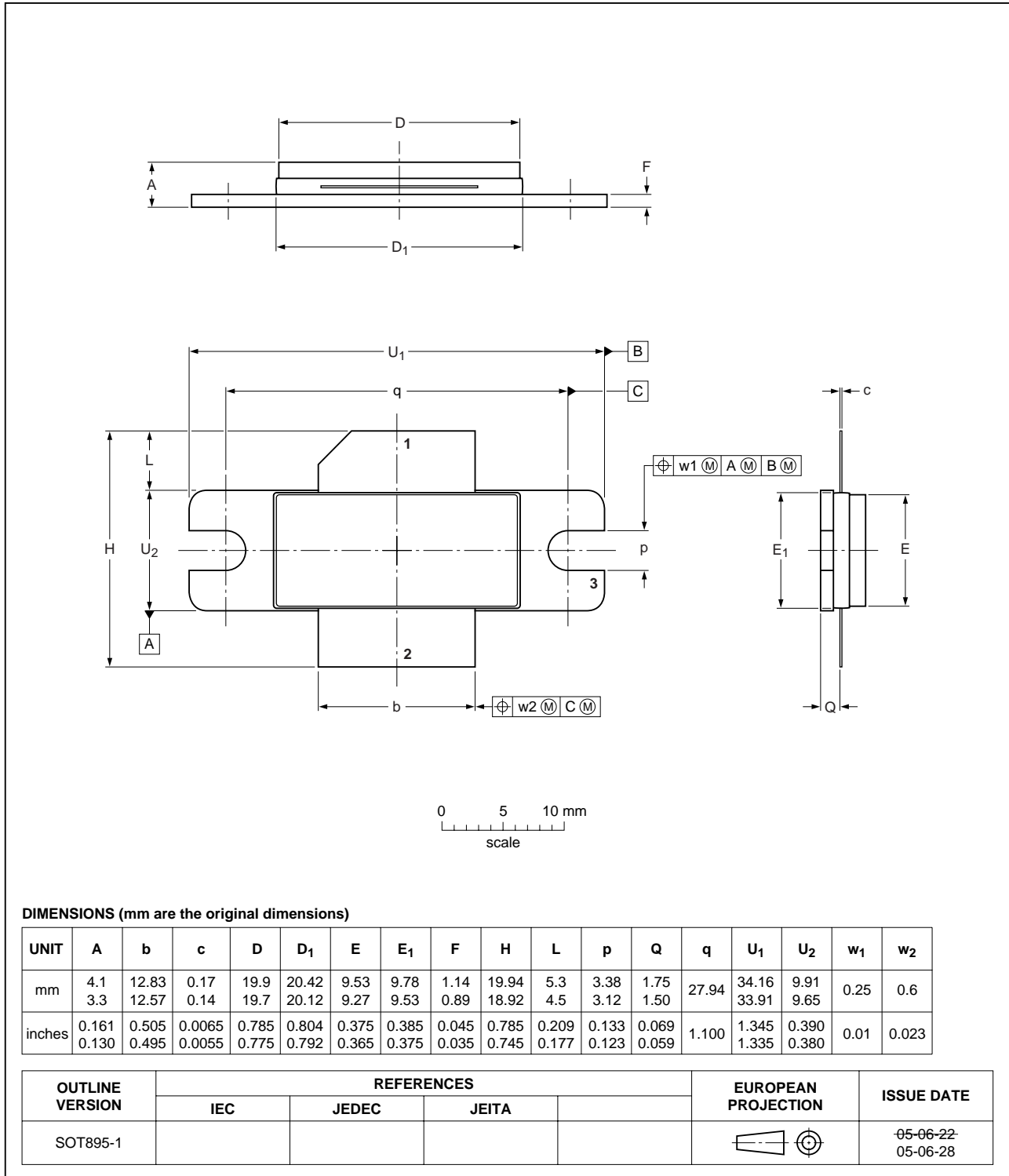


Fig 1. Package outline SOT895-1

Plastic earless flanged cavity package; 2 leads

SOT896-1

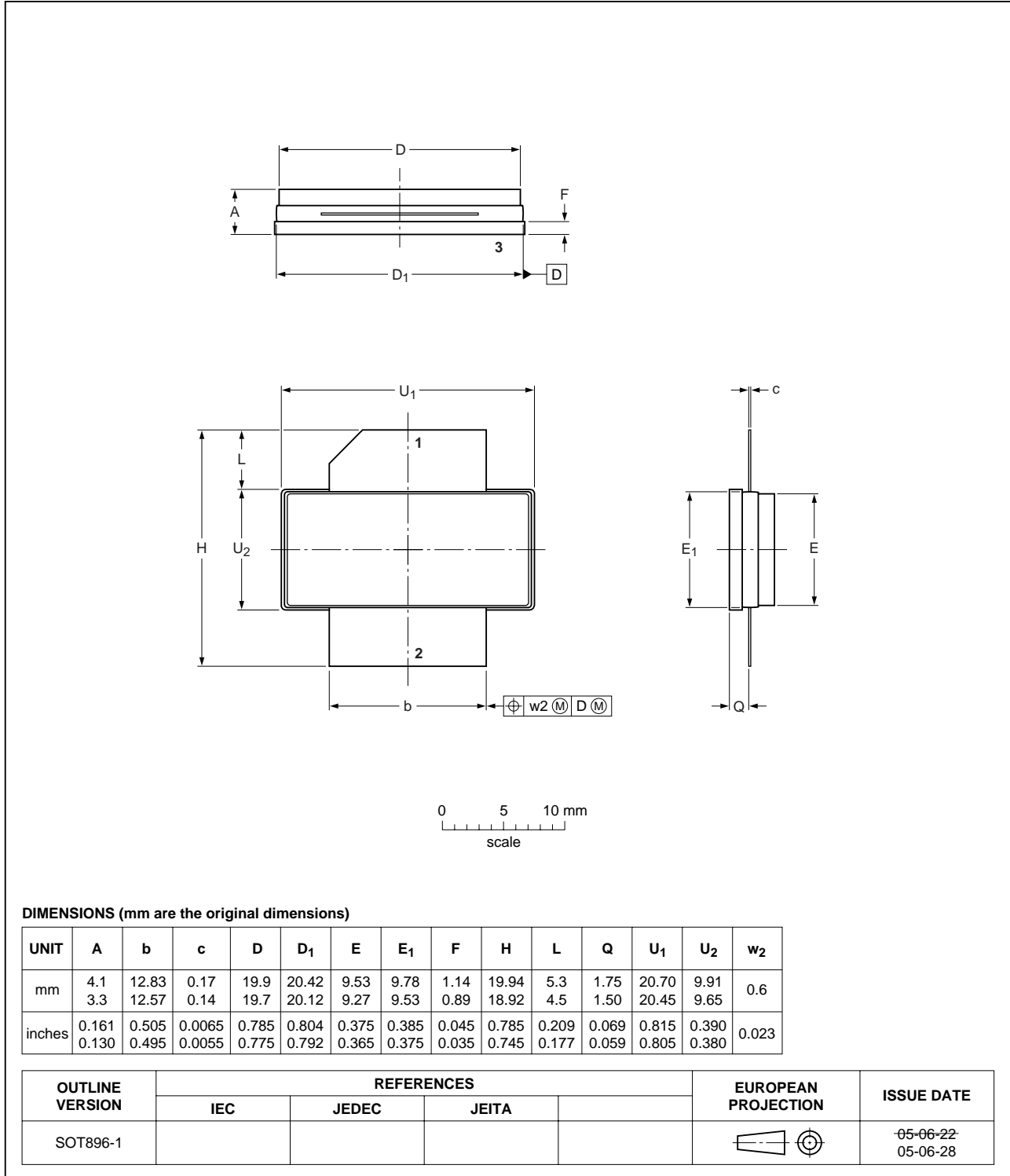


Fig 2. Package outline SOT896-1

9. Abbreviations

Table 8: Abbreviations

| Acronym | Description |
|----------------|--|
| 3GPP | Third Generation Partnership Project |
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| DPCH | Dedicated Physical CHannel |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| PAR | Peak-to-Average power Ratio |
| PDPCH | transmission Power of the Dedicated Physical CHannel |
| RF | Radio Frequency |
| VSWR | Voltage Standing Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

10. Revision history

Table 9: Revision history

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|------------------------------|--------------|----------------------|---------------|-------------|------------|
| BLC6G22-100_6G22 LS-100_1 | 20060130 | Objective data sheet | - | - | - |

11. Data sheet status

| Level | Data sheet status ^[1] | Product status ^[2] ^[3] | Definition |
|-------|----------------------------------|--|--|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
| II | Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| III | Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). |

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

12. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

13. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors

15. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com

customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

14. Trademarks

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

16. Contents

| | | |
|-----------|--|----------|
| 1 | Product profile | 1 |
| 1.1 | General description | 1 |
| 1.2 | Features | 1 |
| 1.3 | Applications | 2 |
| 2 | Pinning information | 2 |
| 3 | Ordering information | 2 |
| 4 | Limiting values | 2 |
| 5 | Thermal characteristics | 3 |
| 6 | Characteristics | 3 |
| 7 | Application information | 3 |
| 7.1 | Ruggedness in class-AB operation | 3 |
| 8 | Package outline | 4 |
| 9 | Abbreviations | 6 |
| 10 | Revision history | 7 |
| 11 | Data sheet status | 8 |
| 12 | Definitions | 8 |
| 13 | Disclaimers | 8 |
| 14 | Trademarks | 8 |
| 15 | Contact information | 8 |



© Koninklijke Philips Electronics N.V. 2006

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 30 January 2006
Document number: BLC6G22-100_6G22LS-100_1

Published in The Netherlands