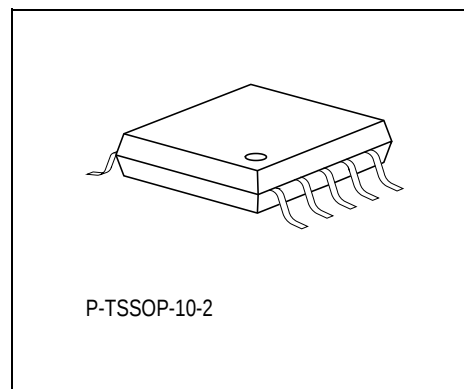


# GaAs MMIC

## Preliminary Data Sheet

**CGY 99**

- Broadband 3-stage Power Amplifier (800 ... 2400 MHz)
- GSM, AMPS, PCN, PCS
- Operating voltage range: 2.7 to 6.0 V
- $P_{out} = 35.0$  dBm at  $V_D = 3.5$  V
- Overall power added efficiency 55%
- Easy external matching

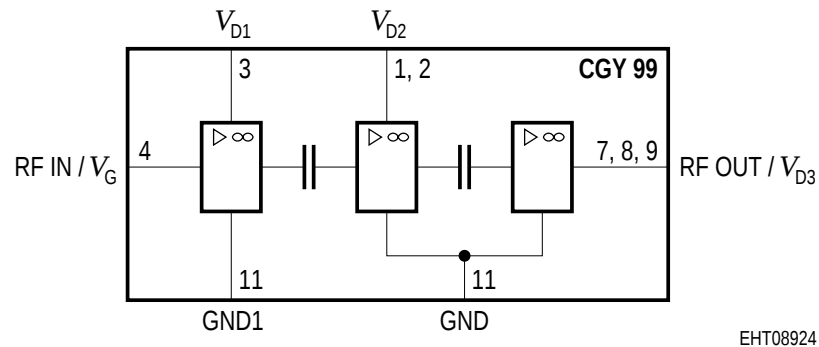


ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!

| Type   | Marking | Ordering Code (taped) | Package      |
|--------|---------|-----------------------|--------------|
| CGY 99 | t.b.d.  | t.b.d.                | P-TSSOP-10-2 |

| Maximum Ratings                                                                       | Symbol      | Value          | Unit |
|---------------------------------------------------------------------------------------|-------------|----------------|------|
| Positive supply voltage                                                               | $V_D$       | 6              | V    |
| Channel temperature                                                                   | $T_{Ch}$    | 150            | °C   |
| Storage temperature                                                                   | $T_{stg}$   | – 55 ... + 150 | °C   |
| Total power dissipation ( $T_s \leq 81$ °C)<br>$T_s$ : Temperature at soldering point | $P_{tot}$   | 4.0            | W    |
| Pulse peak power<br>duty cycle 12.5%, $t_{on} = 0.577$ ms                             | $P_{Pulse}$ | 10.0           | W    |

| Thermal Resistance      | Symbol      | Value | Unit |
|-------------------------|-------------|-------|------|
| Channel-soldering point | $R_{thChS}$ | 14    | K/W  |



EHT08924

**Figure 1 Functional Block Diagram**

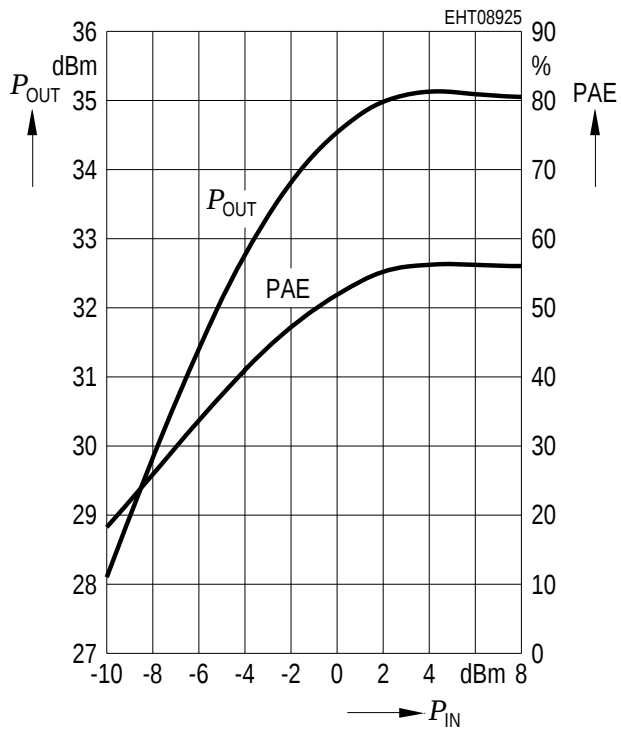
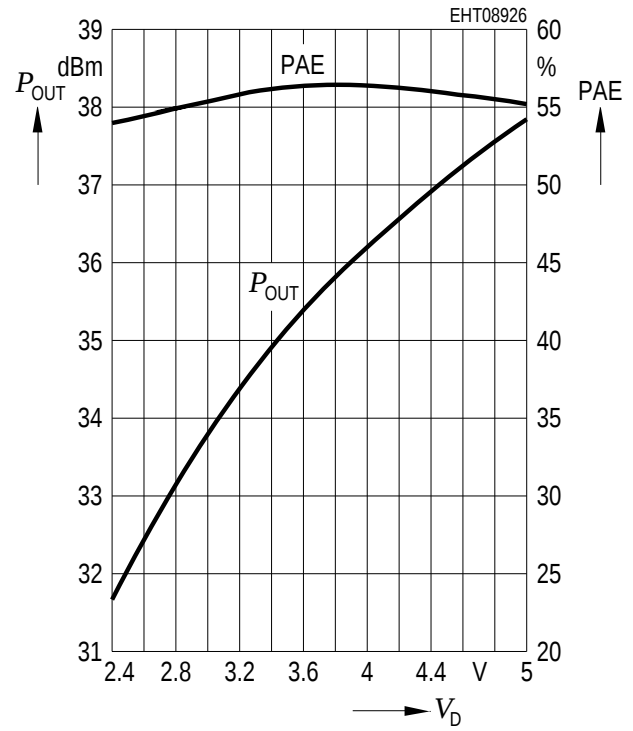
| Pin #   | Name      | Configuration                                                                          |
|---------|-----------|----------------------------------------------------------------------------------------|
| 1,2     | VD2       | Drain voltage 2 <sup>nd</sup> stage                                                    |
| 3       | VD1       | Drain voltage 1 <sup>st</sup> stage                                                    |
| 4       | RFin/VG   | RF input/gate voltage                                                                  |
| 5       | n.c.      | —                                                                                      |
| 6       | n.c.      | —                                                                                      |
| 7, 8, 9 | VD3/RFout | RF output/drain voltage 3 <sup>rd</sup> stage                                          |
| 10      | n.c.      | —                                                                                      |
| 11      | GND       | Ground 2 <sup>nd</sup> and 3 <sup>rd</sup> stage<br>(backside of P-TSSOP-10-2 package) |

## GSM-Operation

### Electrical Characteristics (On GSM Application Board)

$T_A = 25\text{ }^{\circ}\text{C}$ ,  $Z_S = Z_L = 50\text{ }\Omega$ , duty cycle 12.5%,  $t_{on} = 577\text{ }\mu\text{s}$ , unless otherwise specified.

| Parameters                                           | Symbol   | Limit Values                                                         |       |      | Unit | Test Conditions                                                                    |
|------------------------------------------------------|----------|----------------------------------------------------------------------|-------|------|------|------------------------------------------------------------------------------------|
|                                                      |          | min.                                                                 | typ.  | max. |      |                                                                                    |
| Frequency range                                      | $f$      | 880                                                                  | –     | 915  | MHz  | –                                                                                  |
| Supply current                                       | $I_{DD}$ | –                                                                    | 1.6   | –    | A    | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Power Gain                                           | $G$      | –                                                                    | 30    | –    | dB   | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                    | 33.2  | –    | dBm  | $V_D = 2.8\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                    | 34.4  | –    | dBm  | $V_D = 3.2\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                    | 35.0  | –    | dBm  | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Overall Power added Efficiency                       | PAE      | –                                                                    | 55    | –    | %    | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Harmonics                                            | –        | –                                                                    | –     | –    | dBc  | –                                                                                  |
| $2f_0$                                               | –        | –                                                                    | –40   | –    |      |                                                                                    |
| $3f_0$                                               | –        | –                                                                    | –40   | –    |      |                                                                                    |
| Input VSWR                                           | –        | –                                                                    | 2 : 1 | –    | –    | $V_D = 3.5\text{ V}$ or<br>$V_D = 4.8\text{ V}$                                    |
| Load mismatch<br>Load VSWR = 20 : 1<br>for all phase | –        | No module damage for<br>10 s.                                        |       |      | –    | $P_{in} = 5\text{ dBm}$ ,<br>$V_D \leq 4.6\text{ V}$ ,<br>$Z_S = 50\text{ }\Omega$ |
| Stability<br>Load VSWR = 5 : 1<br>for all phase      | –        | All spurious output more<br>than 70 dB below<br>desired signal level |       |      | –    | $P_{in} = 5\text{ dBm}$ ,<br>$V_D = 4.6\text{ V}$ ,<br>$Z_S = 50\text{ }\Omega$    |

**GSM-Measurements**
**CGY 99**
 $f = 900 \text{ MHz}$ ,  $V_D = 3.5 \text{ V}$ ,  $V_G = -0.9 \text{ V}$ 

**CGY 99**
 $f = 900 \text{ MHz}$ ,  $P_{in} = 5 \text{ dBm}$ ,  $V_G = -0.9 \text{ V}$ 


## PCN(DCS1800)-Operation

### Electrical Characteristics (On GSM Application Board)

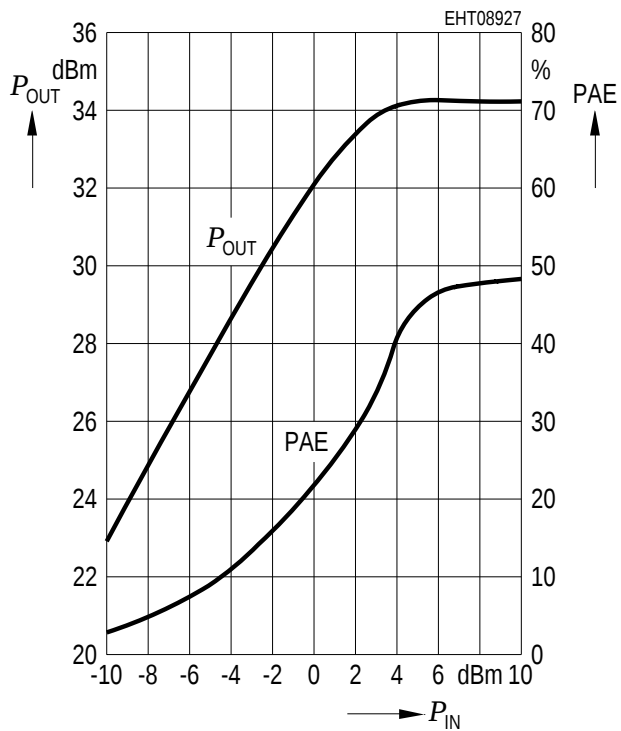
$T_A = 25\text{ }^{\circ}\text{C}$ ,  $Z_S = Z_L = 50\text{ }\Omega$ , duty cycle 12.5%,  $t_{on} = 577\text{ }\mu\text{s}$ , unless otherwise specified.

| Parameters                                           | Symbol   | Limit Values                                                          |       |      | Unit | Test Conditions                                                                    |
|------------------------------------------------------|----------|-----------------------------------------------------------------------|-------|------|------|------------------------------------------------------------------------------------|
|                                                      |          | min.                                                                  | typ.  | max. |      |                                                                                    |
| Frequency range                                      | $f$      | 1710                                                                  | –     | 1785 | MHz  | –                                                                                  |
| Supply current                                       | $I_{DD}$ | –                                                                     | 1.6   | –    | A    | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Power Gain                                           | $G$      | –                                                                     | 29    | –    | dB   | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                     | 32.1  | –    | dBm  | $V_D = 2.8\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                     | 33.4  | –    | dBm  | $V_D = 3.2\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Output Power                                         | $P_o$    | –                                                                     | 34.0  | –    | dBm  | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Overall Power added Efficiency                       | PAE      | –                                                                     | 45    | –    | %    | $V_D = 3.5\text{ V}$ ,<br>$P_{in} = +5\text{ dBm}$                                 |
| Harmonics                                            | –        | –                                                                     | –     | –    | dBc  | –                                                                                  |
| $2f_0$                                               | –        | –                                                                     | –40   | –    |      |                                                                                    |
| $3f_0$                                               | –        | –                                                                     | –40   | –    |      |                                                                                    |
| Input VSWR                                           | –        | –                                                                     | 2 : 1 | –    | –    | $V_D = 3.5\text{ V}$ or<br>$V_D = 4.8\text{ V}$                                    |
| Load mismatch<br>Load VSWR = 20 : 1<br>for all phase | –        | No module damage for<br>10 s.                                         |       |      | –    | $P_{in} = 5\text{ dBm}$ ,<br>$V_D \leq 4.6\text{ V}$ ,<br>$Z_S = 50\text{ }\Omega$ |
| Stability<br>Load VSWR = 5 : 1<br>for all phase      | –        | All spurious output more<br>than 70 dB below<br>desired signal level. |       |      | –    | $P_{in} = 5\text{ dBm}$ ,<br>$V_D = 4.6\text{ V}$ ,<br>$Z_S = 50\text{ }\Omega$    |

## PCN-Measurements (Board Matched for Maximum Output Power)

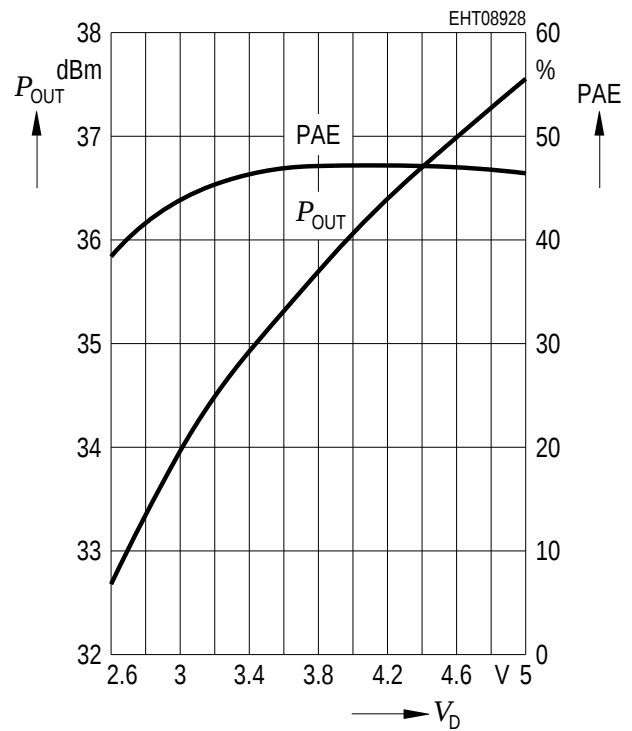
### CGY 99

$f = 1750 \text{ MHz}$ ,  $V_G = -0.58 \text{ V}$ ,  $V_D = 3.15 \text{ V}$



### CGY 99

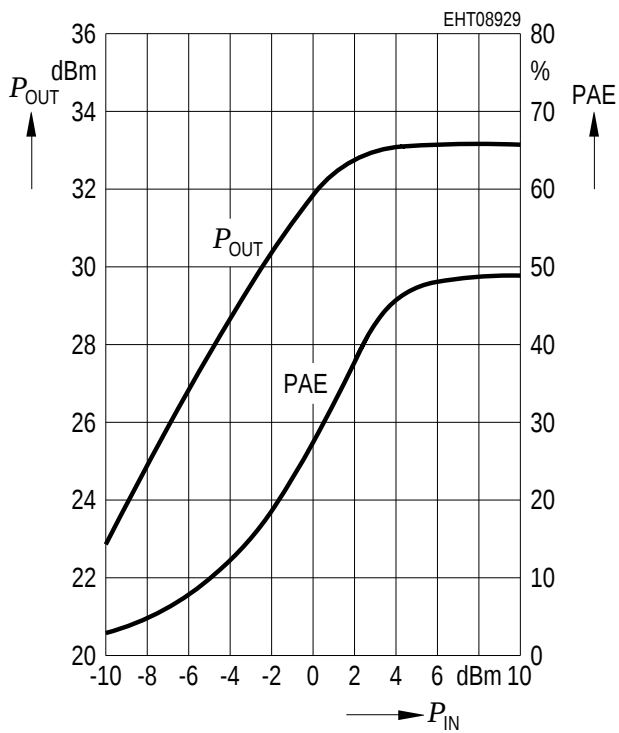
$f = 1750 \text{ MHz}$ ,  $P_{in} = 5 \text{ dBm}$ ,  $V_G = -0.58 \text{ V}$



## PCN-Measurements (Board Matched for Reduced Output Power)

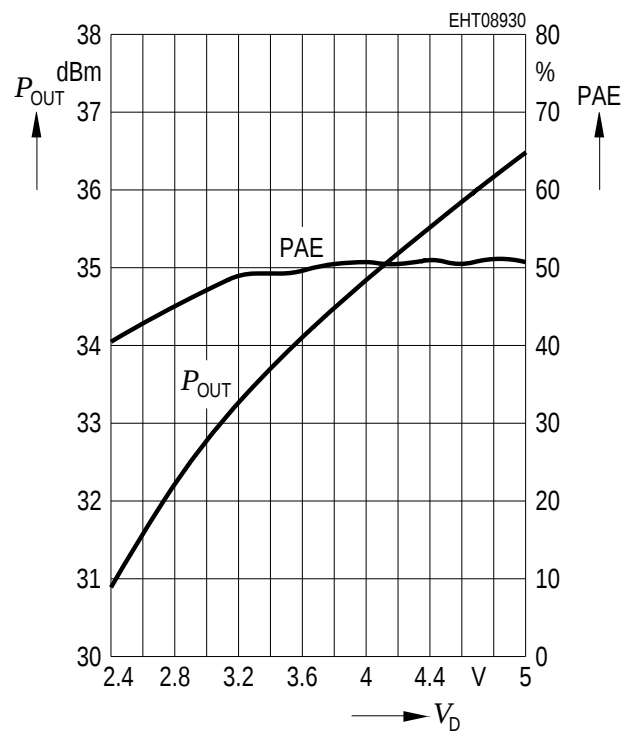
### CGY 99

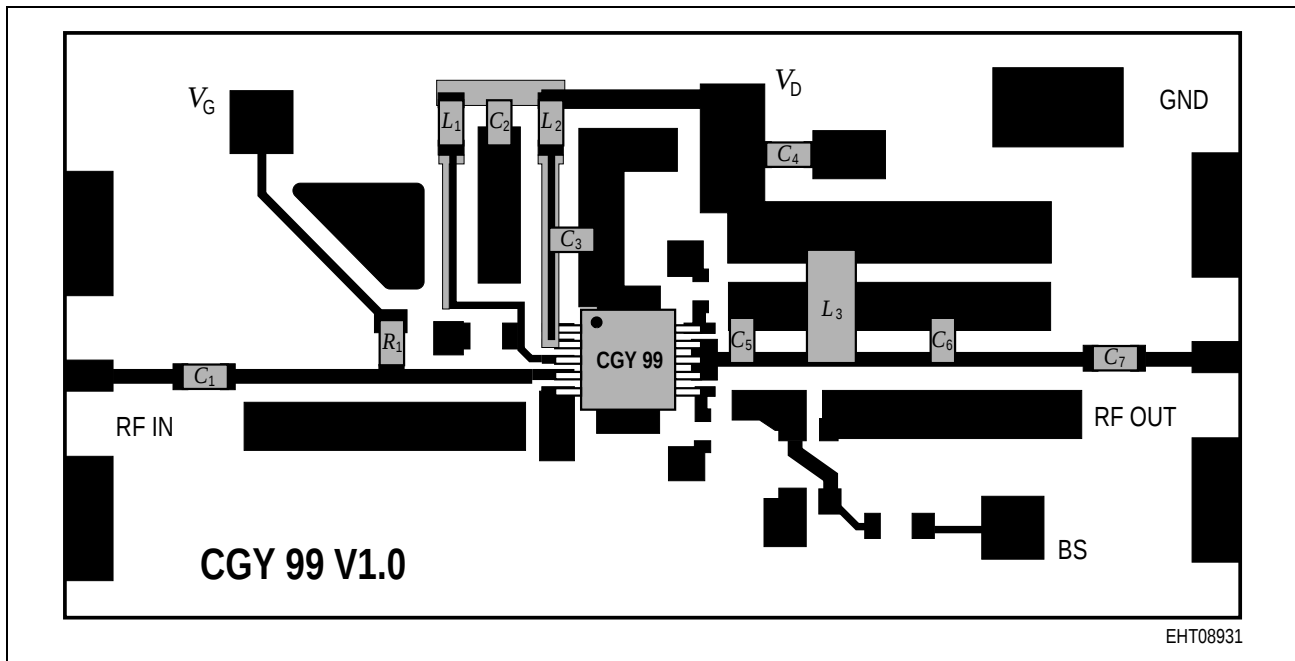
$f = 1750 \text{ MHz}$ ,  $V_G = -0.58 \text{ V}$ ,  $V_D = 3.15 \text{ V}$



### CGY 99

$f = 1750 \text{ MHz}$ ,  $P_{in} = 5 \text{ dBm}$ ,  $V_G = -0.58 \text{ V}$





**Figure 2 CGY 99 GSM Application Board**

Bordmaterial: FR4/0.2 mm

Boardsize: 38 mm × 19 mm

### Part List

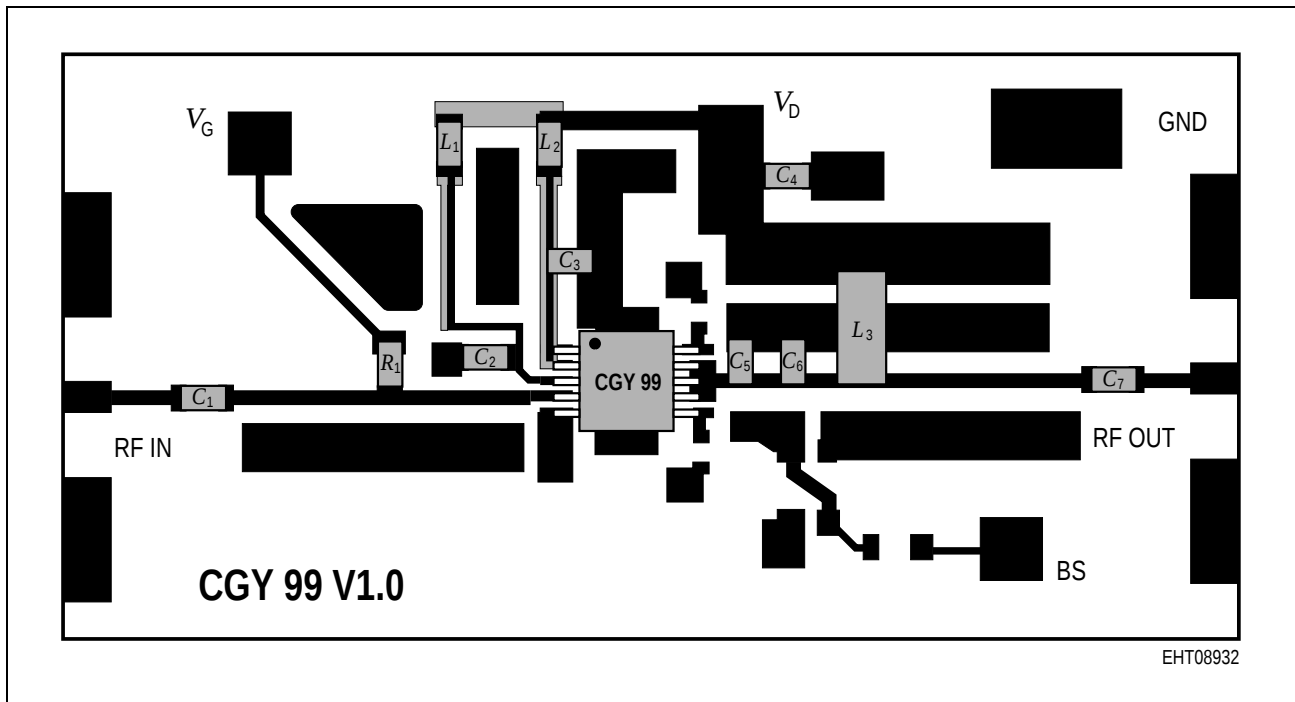
|       | Value  | Part Type     |       | Value        | Part Type          |
|-------|--------|---------------|-------|--------------|--------------------|
| $L_1$ | 1.5 nH | 0603          | $C_5$ | 12 pF        | 0603 <sup>1)</sup> |
| $L_2$ | 39 nH  | 0603          | $C_6$ | 8.2 pF       | 0603 <sup>1)</sup> |
| $L_3$ | 33 nH  | <sup>2)</sup> | $C_7$ | 1 nF         | 0603               |
| $C_1$ | 1 nF   | 0603          | $R_1$ | 150 $\Omega$ | 0603               |
| $C_2$ | 1 nF   | 0603          | —     | —            | —                  |
| $C_3$ | 1 nF   | 0603          | —     | —            | —                  |
| $C_4$ | 100 nF | 0603          | —     | —            | —                  |

<sup>1)</sup> For maximum efficiency use high quality capacitors for the output matching:

Part Number ACCU-P0603, distribution by  
AVX Gmb, 85757 Karlsfeld, Germany  
Phone-No +498131/9004-0

<sup>2)</sup> 33 nH SMD-Inductor for drain3:

Part Number BV1250, distribution by  
Horst David GmbH, 85375 Neufarn, Germany  
Phone-No +498165/9548-0, Fax-No +498165/9548-28



**Figure 3 CGY 99 PCN Application Board**

Bordmaterial: FR4/0.2 mm

Boardsize: 38 mm × 19 mm

### Part List

|       | Value  | Part Type          |       | Value        | Part Type          |
|-------|--------|--------------------|-------|--------------|--------------------|
| $L_1$ | 22 nH  | 0603               | $C_5$ | 4.7 pF       | 0603 <sup>1)</sup> |
| $L_2$ | 22 nH  | 0603               | $C_6$ | 2.0 pF       | 0603 <sup>1)</sup> |
| $L_3$ | 33 nH  | 2)                 | $C_7$ | 1 nF         | 0603               |
| $C_1$ | 1 nF   | 0603               | $R_1$ | 150 $\Omega$ | 0603               |
| $C_2$ | 56 pF  | 0603               | —     | —            | —                  |
| $C_3$ | 4.7 pF | 0603 <sup>1)</sup> | —     | —            | —                  |
| $C_4$ | 100 nF | 0603               | —     | —            | —                  |

<sup>1)</sup> For maximum efficiency use high quality capacitors for the output matching:

Part Number ACCU-P0603, distribution by  
AVX GmbH, 85757 Karlsfeld, Germany  
Phone-No +498131/9004-0

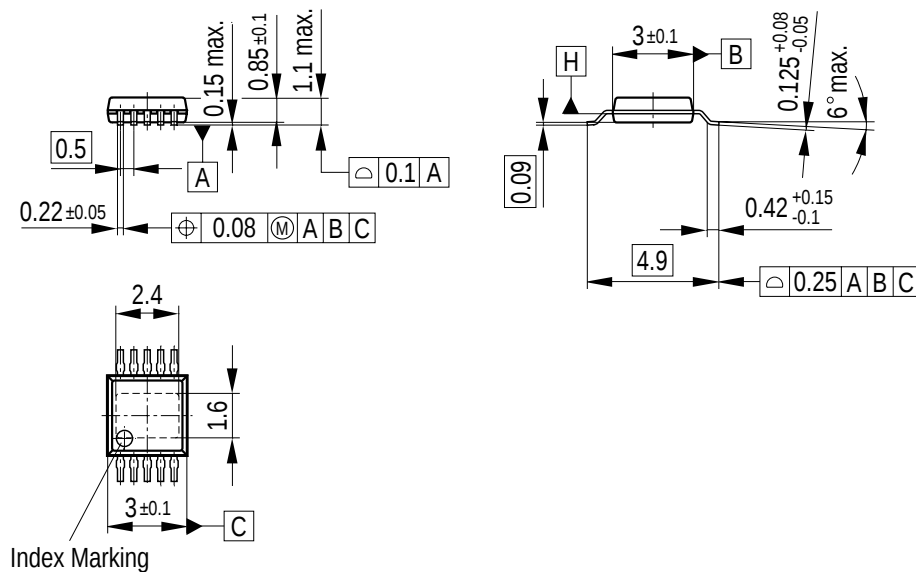
<sup>2)</sup> 33 nH SMD-Inductor for drain3:

Part Number BV1250, distribution by  
Horst David GmbH, 85375 Neufarn, Germany  
Phone-No +498165/9548-0, Fax-No +498165/9548-28

## Package Outlines

### P-TSSOP-10-2

(Plastic Thin Shrink Small Outline Package)



GPS09230

### Sorts of Packing

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

SMD = Surface Mounted Device

Dimensions in mm