



STAC2932F

RF power transistor
HF/VHF/UHF RF power N-channel MOSFETs

Features

- Gold metallization
- Excellent thermal stability
- Common source push-pull configuration
- $P_{OUT} = 300\text{ W}$ min. with 20 dB gain @ 175 MHz
- In compliance with the 2002/95/EC European directive
- ST air cavity packaging technology - STAC™ package

Description

The STAC2932F is a gold metallized N-channel MOS field-effect RF power transistor, intended for use in 50 V DC large signal applications up to 250 MHz.

The STAC2932F benefits from the latest generation of efficient, patent-pending package technology, otherwise known as STAC™.



Figure 1. Pin connection

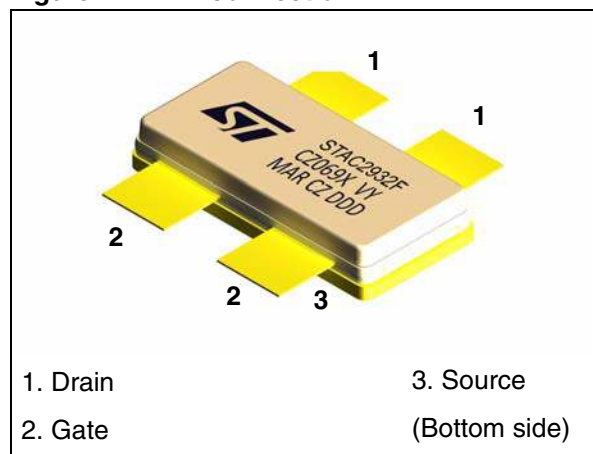


Table 1. Device summary

| Order code | Marking | Base qty. | Package | Packaging |
|------------|--------------------------|-----------|----------|-----------|
| STAC2932FW | STAC2932F ⁽¹⁾ | 20 | STAC244F | Tray |

1. For more details please refer to [Chapter 7: Marking, packing and shipping specifications](#).

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1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings ($T_{CASE} = 25\text{ °C}$)

| Symbol | Parameter | Value | Unit |
|---------------------|--|-------------|--------------------|
| $V_{(BR)DSS}^{(1)}$ | Drain source voltage | 125 | V |
| V_{DGR} | Drain-gate voltage ($R_{GS} = 1\text{ M}\Omega$) | 125 | V |
| V_{GS} | Gate-source voltage | ± 20 | V |
| I_D | Drain current | 40 | A |
| P_{DISS} | Power dissipation | 625 | W |
| T_J | Max. operating junction temperature | 200 | $^{\circ}\text{C}$ |
| T_{STG} | Storage temperature | -65 to +150 | $^{\circ}\text{C}$ |

1. $T_J = 150\text{ °C}$

1.2 Thermal data

Table 3. Thermal data

| Symbol | Parameter | Value | Unit |
|------------|------------------------------------|-------|----------------------|
| R_{thJC} | Junction - case thermal resistance | 0.28 | $^{\circ}\text{C/W}$ |

2 Electrical characteristics

($T_{CASE} = 25\text{ }^{\circ}\text{C}$)

2.1 Static

Table 4. Static (per side)

| Symbol | Test conditions | | | Min. | Typ. | Max. | Unit |
|---------------|---|--------------------------|--|------|------|------|---------------|
| $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}$ | $I_{DS} = 100\text{ mA}$ | | 125 | | | V |
| I_{DSS} | $V_{GS} = 0\text{ V}$ | $V_{DS} = 50\text{ V}$ | | | | 50 | μA |
| I_{GSS} | $V_{GS} = 20\text{ V}$ | $V_{DS} = 0\text{ V}$ | | | | 250 | nA |
| $V_{GS(Q)}$ | $V_{DS} = 10\text{ V}$ | $I_D = 250\text{ mA}$ | | 1.5 | 2.5 | 4.0 | V |
| $V_{DS(ON)}$ | $V_{GS} = 10\text{ V}$ | $I_D = 10\text{ A}$ | | | | 3.0 | V |
| G_{FS} | $V_{DS} = 10\text{ V}$ | $I_D = 5\text{ A}$ | | 5 | | | S |
| C_{ISS} | $V_{GS} = 0\text{ V}$ $V_{DS} = 50\text{ V}$ $f = 1\text{ MHz}$ | | | | 468 | | pF |
| C_{OSS} | | | | | 206 | | pF |
| C_{RSS} | | | | | 16 | | pF |

2.2 Dynamic

Table 5. Dynamic

| Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|---|------|------|------|------|
| P_{OUT} | $V_{DD} = 50\text{ V}$, $I_{DQ} = 2 \times 250\text{ mA}$, $P_{IN} = 4\text{ W}$, $f = 175\text{ MHz}$ | 300 | 390 | | W |
| h_D | $V_{DD} = 50\text{ V}$, $I_{DQ} = 2 \times 250\text{ mA}$, $P_{IN} = 4\text{ W}$, $f = 175\text{ MHz}$ | 55 | 68 | | % |

3 Impedance

Figure 2. Current conventions

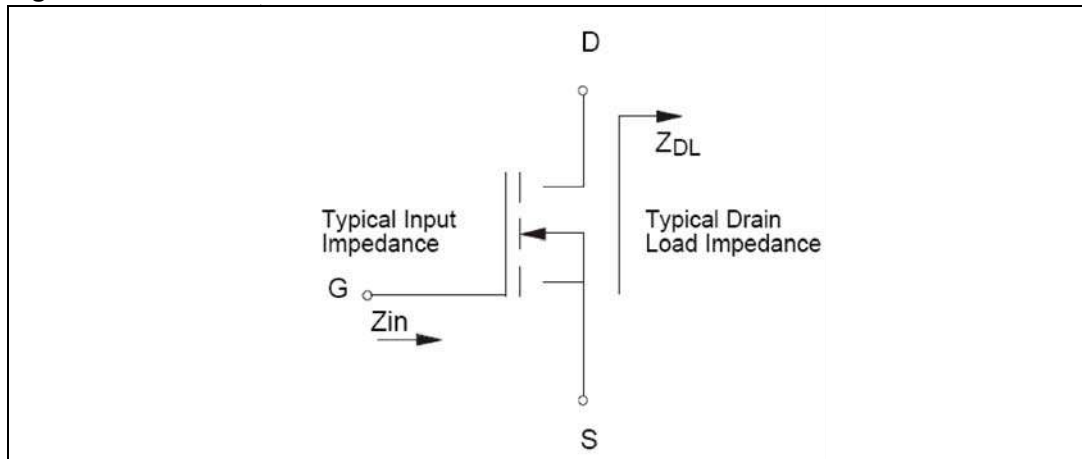


Table 6. Impedance data

| Freq. (MHz) | Z_{IN} (Ω) | Z_{DL} (Ω) |
|-------------|-----------------------|-----------------------|
| 175 MHz | $2.0 - j2.0$ | $3.5 + j5.2$ |

Note: Measured gate to gate and drain to drain, respectively.

4 Typical performance

Figure 3. Capacitances vs drain supply voltage

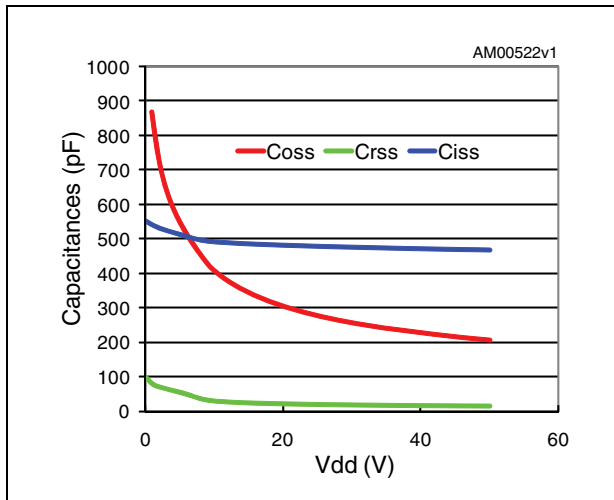


Figure 4. Output power vs drain supply voltage

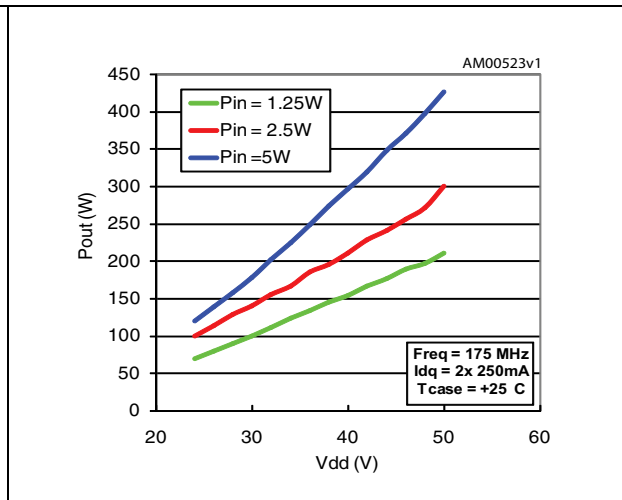


Figure 5. Output power vs gate voltage

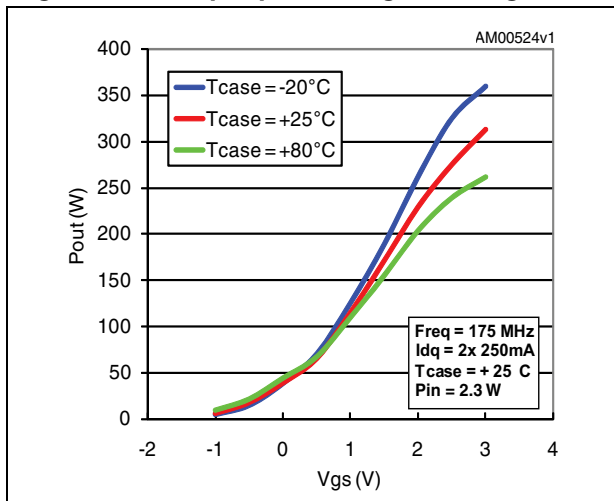


Figure 6. Output power vs input power

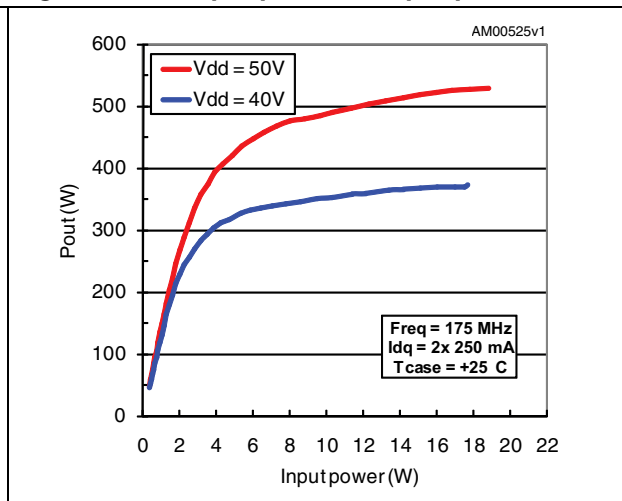


Figure 7. Output power vs input power and case temperature

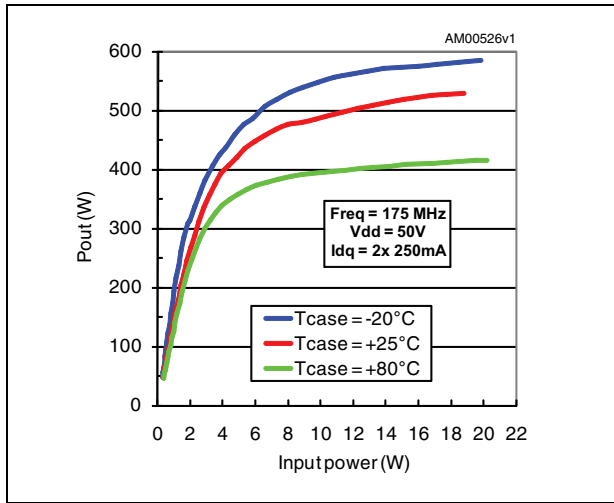
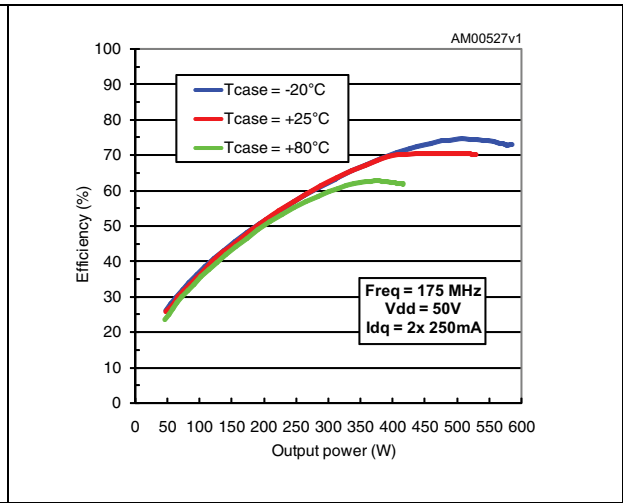


Figure 8. Efficiency vs output power and case temperature



5 Test circuit

Figure 9. 175 MHz schematic (production test circuit)

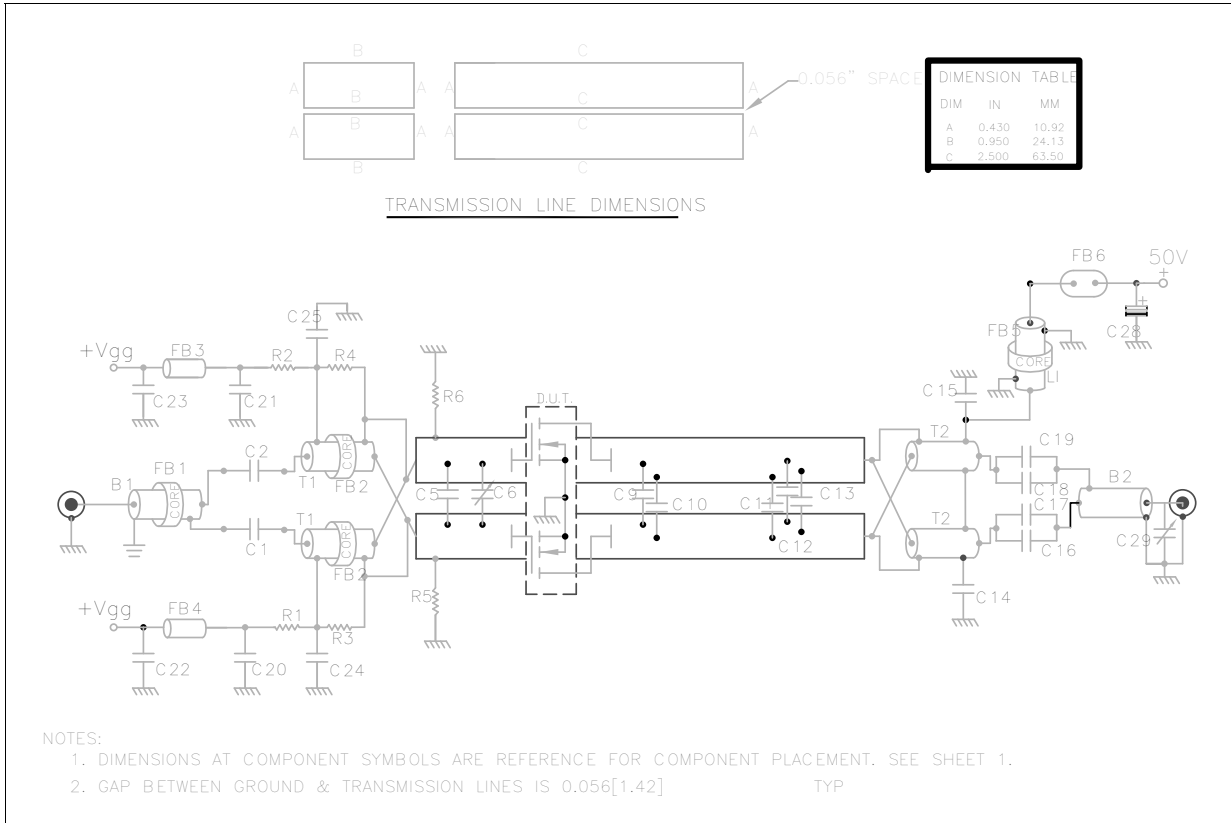


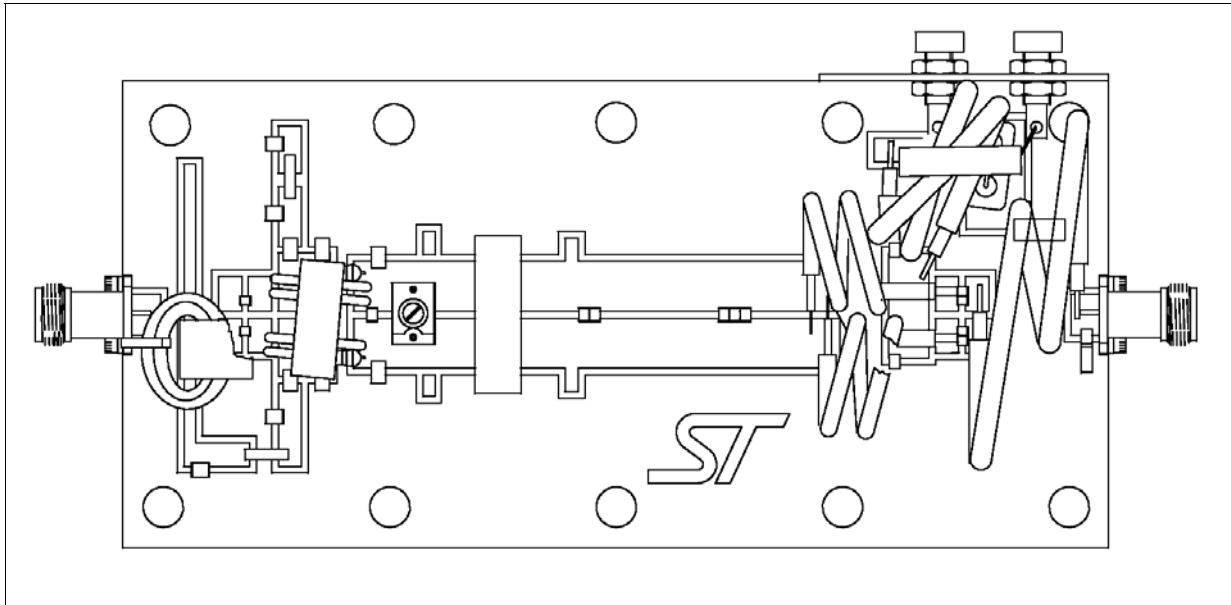
Table 7. 175 MHz part list

| Component | Description |
|----------------------------|---|
| C1, C2, C14, C15, C24, C25 | 1200 pF ATC 700B chip capacitor |
| C5 | 75 pF ATC 100B chip capacitor |
| C6 | ST406 variable capacitor |
| C9, C10 | 47 pF ATC 100B chip capacitor |
| C11, C12, C13 | 43 pF ATC 100B chip capacitor |
| C16, C18 | 470 pF ATC 100B chip capacitor |
| C17, C19, C20, C21 | 10,000 pF ATC 200B chip capacitor |
| C22, C23 | .1 μ F 200 V chip capacitor |
| C28 | 10 μ F 100 V electrolytic capacitor |
| C29 | .8 - 8 pF variable capacitor |
| R1, R2, R5, R6 | 430 Ω 1/2 W chip resistor |

Table 7. 175 MHz part list (continued)

| Component | Description |
|-----------|---|
| R3, R4 | 270 Ω 1/2 W axial lead resistor |
| B1 | RG-316 50 Ω 11.8" thru ferrite toroid |
| B2 | RG-142 50 Ω 11.8" |
| T1 | 4:1, RG-316 25 Ω , 5.9", 2 turns thru ferrite core |
| T2 | 1:4, 25 Ω semi-rigid cable, OD .141", 5.9" |
| L1 | $\lambda/4$ inductor, RG-142 50 Ω 11.8", 3 turns thru ferrite toroid |
| FB1,FB5 | Ferrite toroid |
| FB2, FB6 | Multi-aperture core |
| FB3, FB4 | Surface mount ferrite bead |
| PCB | Rogers ultralam 2000, Er 2.55, .060" |

Figure 10. Circuit layout



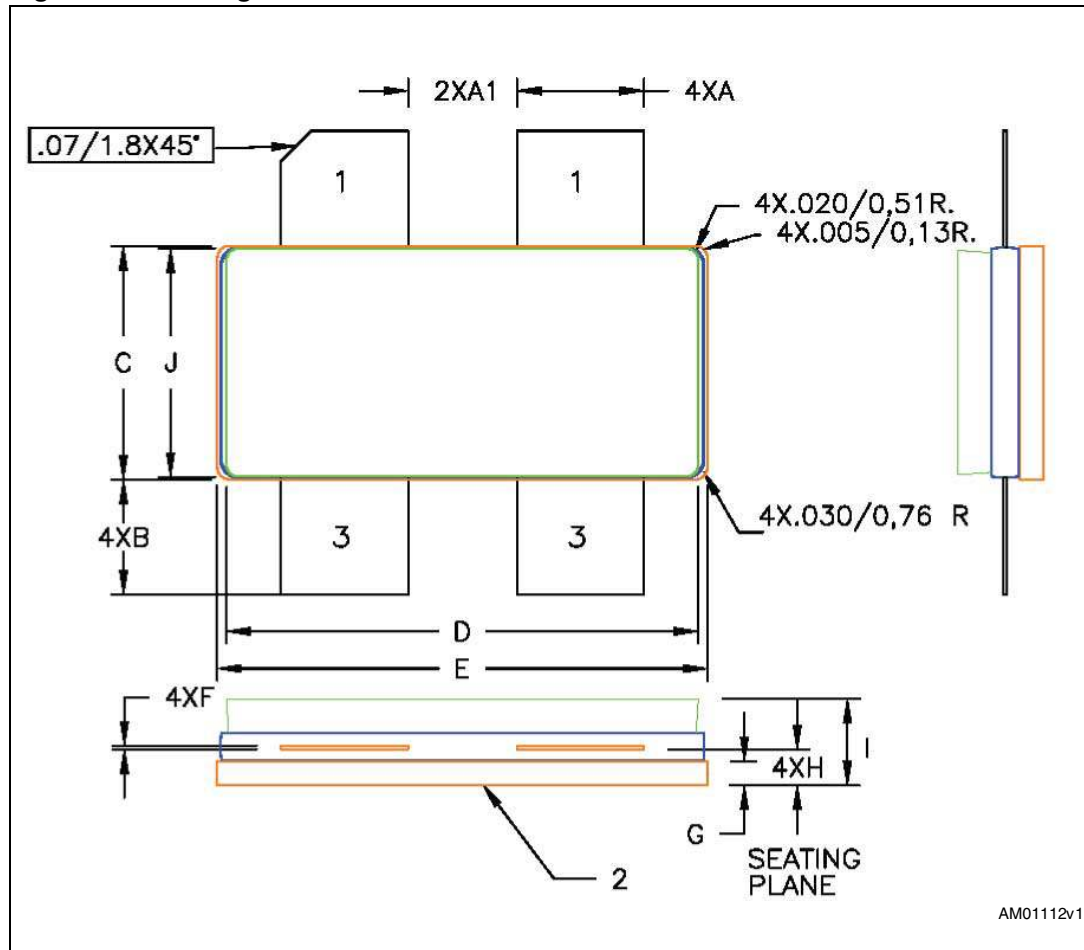
6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 8. STAC244F package dimensions

| Dim. | mm. | | Inch | |
|------|-------|-------|------|------|
| | Min | Max | Min | Max |
| A | 5.10 | 5.59 | 200 | 220 |
| A1 | 4.32 | 4.83 | 170 | 190 |
| B | 4.32 | 5.33 | 170 | 210 |
| C | 9.65 | 9.91 | 380 | 390 |
| D | 19.61 | 20.02 | 772 | 788 |
| E | 20.45 | 20.70 | 805 | 815 |
| F | 0.08 | 1.15 | .003 | .006 |
| G | 0.89 | 1.14 | .035 | .045 |
| H | 1.45 | 1.70 | .057 | .067 |
| I | 3.18 | 4.32 | .125 | .170 |
| J | 9.27 | 9.53 | .365 | .375 |

Figure 11. Package dimensions



7 Marking, packing and shipping specifications

Table 9. Packing and shipping specifications

| Order code | Packaging | Pcs per tray | Dry pack humidity | Lot code |
|------------|-----------|--------------|-------------------|-----------|
| STAC2932FW | Tray | 20 | < 10 % | Not mixed |

Figure 12. Marking layout

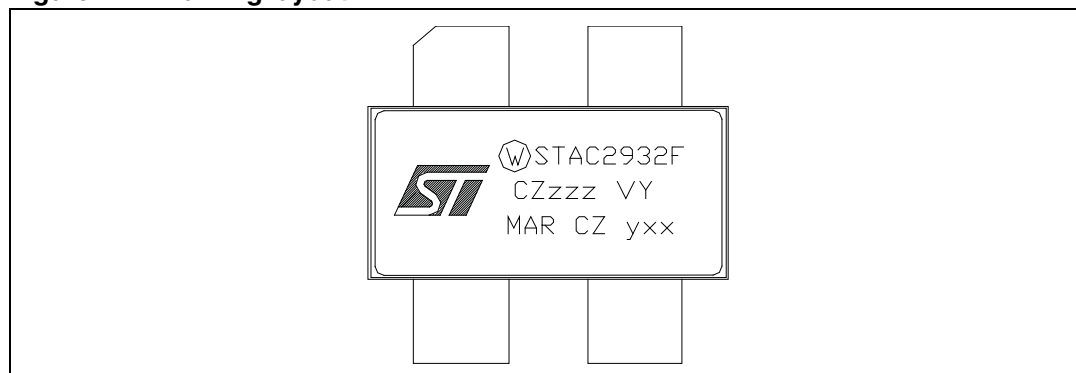


Table 10. Marking specifications

| Symbol | Description |
|--------|-------------------------------|
| W | Wafer process code |
| CZ | Assembly plant |
| xxx | Last 3 digit of diffusion lot |
| VY | Diffusion plant |
| MAR | Country of origin |
| CZ | Test and finishing plant |
| y | Assembly year |
| yy | Assembly week |

8 Revision history

Table 11. Document revision history

| Date | Revision | Changes |
|-------------|-----------------|---|
| 12-Feb-2010 | 1 | First release. |
| 29-Jun-2010 | 2 | Updated features and description on cover page. |
| 12-Jan-2012 | 3 | Inserted Section 7: Marking, packing and shipping specifications . Minor text changes. |

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