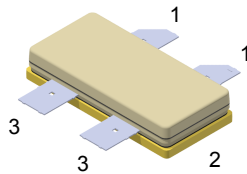


RF power transistors HF/VHF/UHF N-channel MOSFET


STAC780-4F

| Pin connection | |
|----------------|----------------------|
| Pin | Connection |
| 1 | Drain |
| 2 | Source (bottom side) |
| 3 | Gate |

Features

| Order code | Frequency | V _{DD} | P _{OUT} | Gain | Efficiency |
|------------|-----------|-----------------|------------------|-------|------------|
| STAC4932F | 123 MHz | 100 V | 1000 W | 26 dB | 60 % |

- Excellent thermal stability
- Common source push-pull configuration
- P_{OUT} = 1000 W min. (1200 W typ.) with 26 dB gain at 123 MHz
- Pulse conditions: 1ms, 10%
- In compliance with the 2002/95/EC European directive
- ST air-cavity STAC packaging technology

Description

The **STAC4932F** is a N-channel MOS field-effect RF power transistor. It is intended for 100 V pulse applications up to 250 MHz. This device is suitable for use in industrial, scientific and medical applications.

The **STAC4932F** benefits from the latest generation of efficient, patent-pending package technology, otherwise known as STAC.



| Product status link |
|---------------------------|
| STAC4932F |

| Product summary | |
|-----------------|------------|
| Order code | STAC4932F |
| Marking | STAC4932F |
| Package | STAC780-4F |
| Packing | Box |
| Base / Bulk qty | 20 / 80 |

1 Electrical data

1.1 Maximum ratings

Table 1. Absolute maximum ratings (T_{CASE} = 25 °C)

| Symbol | Parameter | Value | Unit |
|----------------------|---|-------------|------|
| V _{(BR)DSS} | Drain source voltage (V _{GS} = 0 V, T _J = 150 °C) | 200 | V |
| V _{DGR} | Drain-gate voltage (R _{GS} = 1 MΩ) | 200 | V |
| V _{GS} | Gate-source voltage | ±20 | V |
| T _J | Maximum operating junction temperature | 200 | °C |
| T _{STG} | Storage temperature range | -65 to +150 | °C |

1.2 Thermal data

Table 2. Thermal data (1ms, 10%)

| Symbol | Parameter | Value | Unit |
|-------------------|----------------------------------|-------|------|
| R _{thJC} | Junction-case thermal resistance | 0.075 | °C/W |

1.3 ESD protection characteristics

Table 3. ESD protection

| Symbol | Test Methodology | Class |
|--------|------------------------------------|-------|
| HBM | Human Body Model (per JESD22-A114) | 2 |

2 Electrical characteristics

$T_{CASE} = +25\text{ °C}$ (unless otherwise specified)

2.1 Static

Table 4. Static

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---------------|---|---|------|------|------|------|
| $V_{(BR)DSS}$ | Drain - source Breakdown voltage | $V_{GS} = 0\text{ V}$, $I_{DS} = 100\text{ mA}$, $T_J = 150\text{ °C}$ | 200 | 250 | | V |
| I_{DSS} | Zero gate voltage drain leakage current | $V_{GS} = 0\text{ V}$, $V_{DS} = 100\text{ V}$ | | | 1 | mA |
| I_{GSS} | Gate - source leakage current | $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$ | | | 250 | nA |
| V_{TH} | Gate - source threshold voltage | $I_{DS} = 250\text{ mA}$ | 2 | | 4 | V |
| $V_{DS(ON)}$ | Drain - source on voltage | $V_{GS} = 10\text{ V}$, $I_D = 10\text{ A}$ | | | 3.6 | V |
| G_{FS} | Forward transconductance | $V_{DS} = 10\text{ V}$, $I_D = 2.5\text{ A}$ | | 6 | | S |
| C_{ISS} | Input capacitance | $V_{GS} = 0\text{ V}$, $V_{DS} = 100\text{ V}$, $f = 1\text{ MHz}$ | | 570 | | pF |
| C_{OSS} | Output capacitance | | | 134 | | pF |
| C_{RSS} | Reverse transfer capacitance | | | 8 | | pF |

2.2 Dynamic

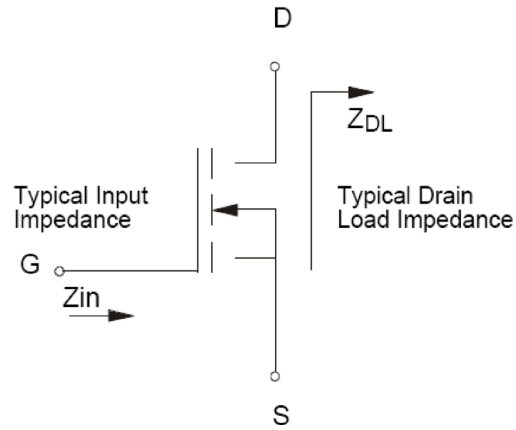
Table 5. Dynamic ⁽¹⁾

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------|------------------|---------------------------|------|------|------|------|
| P_{OUT} | Output power | | 1000 | 1200 | - | W |
| η_D | Drain efficiency | $P_{OUT} = 1000\text{ W}$ | | 60 | - | % |
| G_{ps} | Power gain | $P_{OUT} = 1000\text{ W}$ | | 26 | - | dB |

1. $V_{DD} = 100\text{ V}$, $I_{DQ} = 2 \times 250\text{ mA}$, $f = 123\text{ MHz}$, $PW = 1\text{ ms}$, $DC = 10\%$

3 Impedance

Figure 1. Current conventions



GADG170720191138MT

Table 6. Impedance data

| Freq. (MHz) | Z_{IN} (Ω) | Z_{DL} (Ω) |
|-------------|-----------------------|-----------------------|
| 123 | TBD | $7.63 + j 2.92$ |

Note: Measured gate-to-gate and drain-to-drain, respectively (balanced configuration).

4 Typical performance

Figure 2. Safe operating area

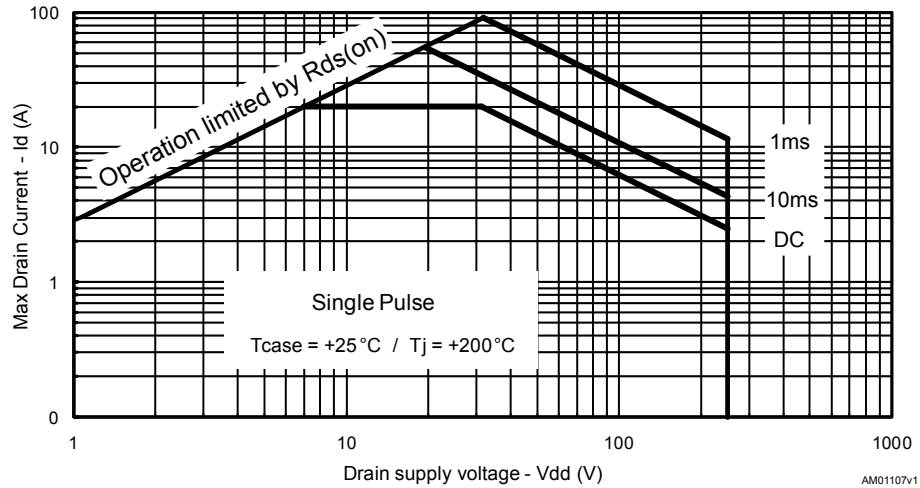


Figure 3. Transient thermal impedance

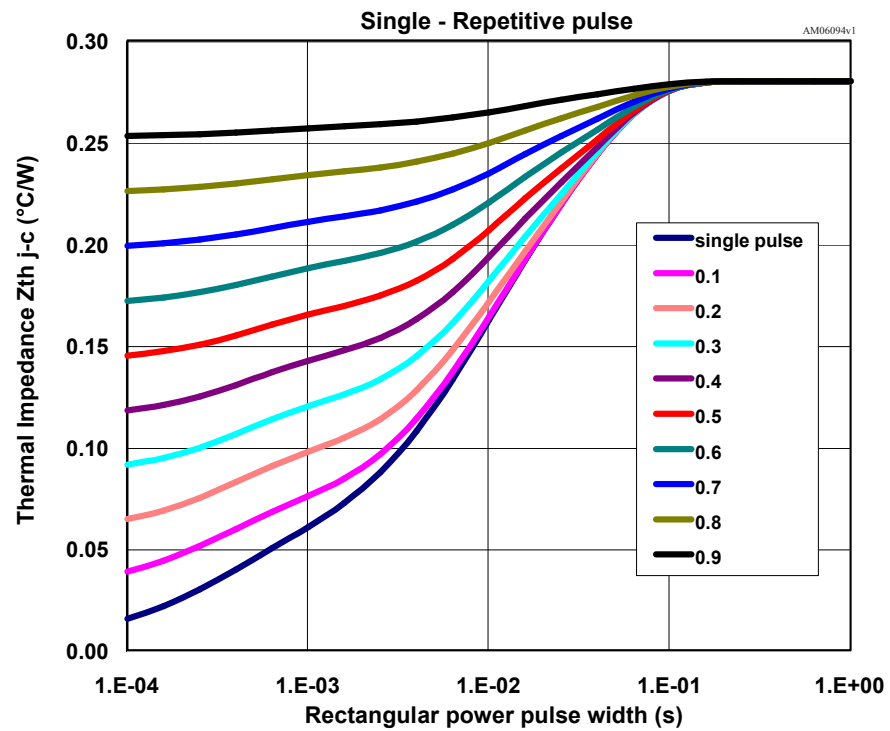
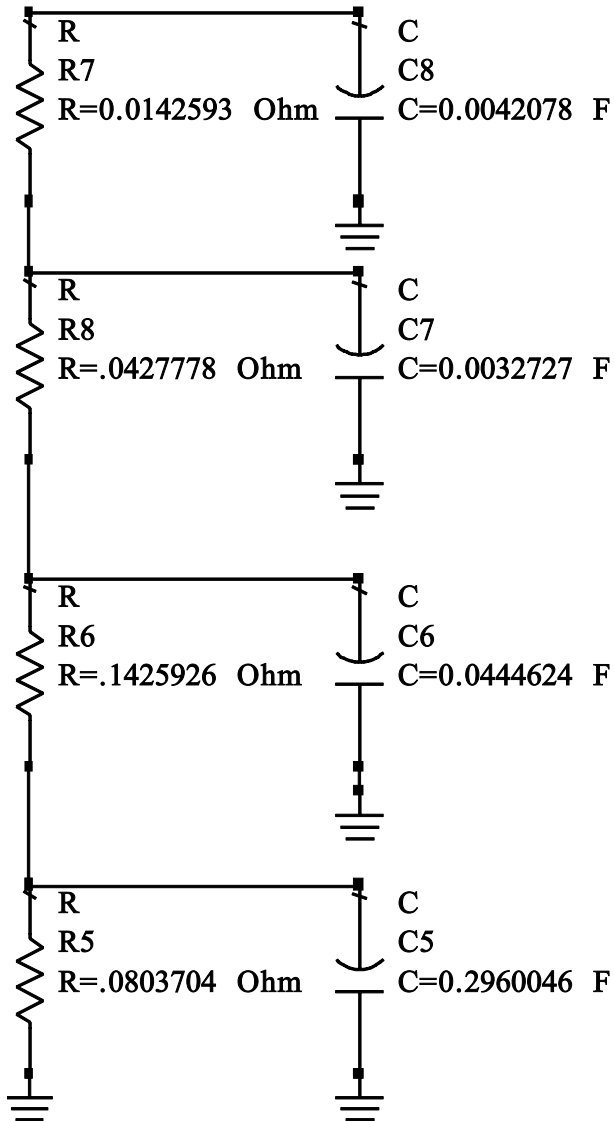


Figure 4. Transient thermal model



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Figure 5. Power gain versus output power

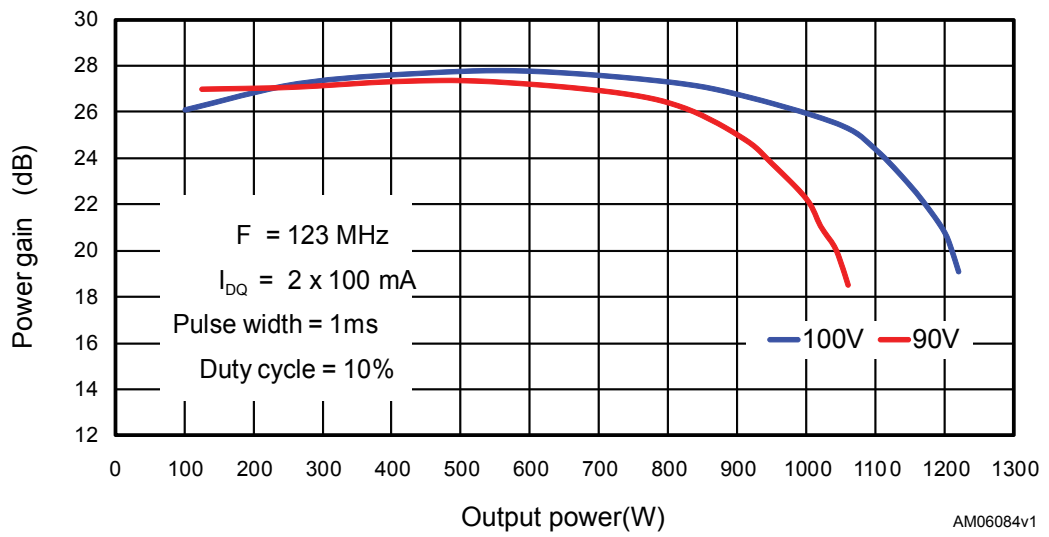
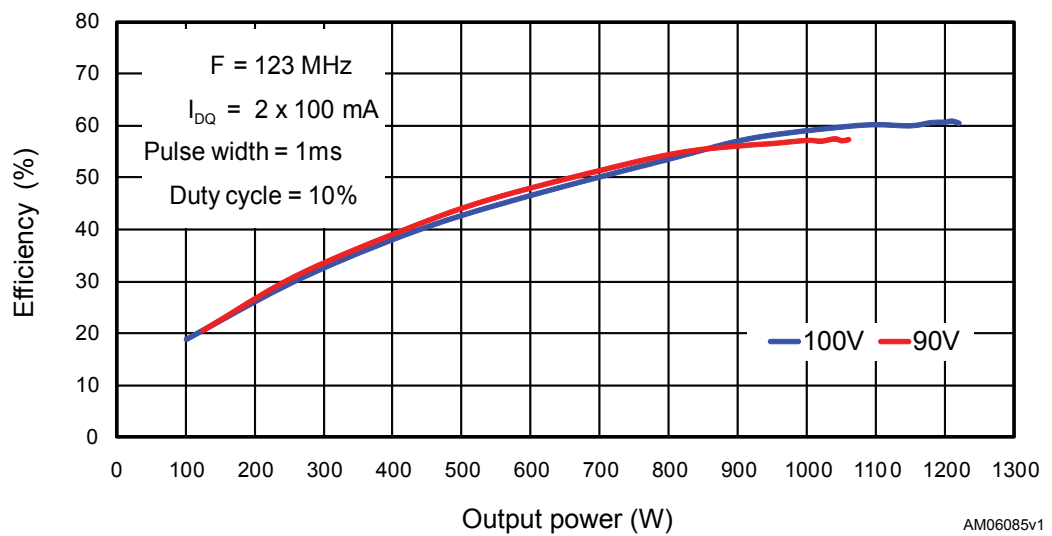


Figure 6. Efficiency versus output power

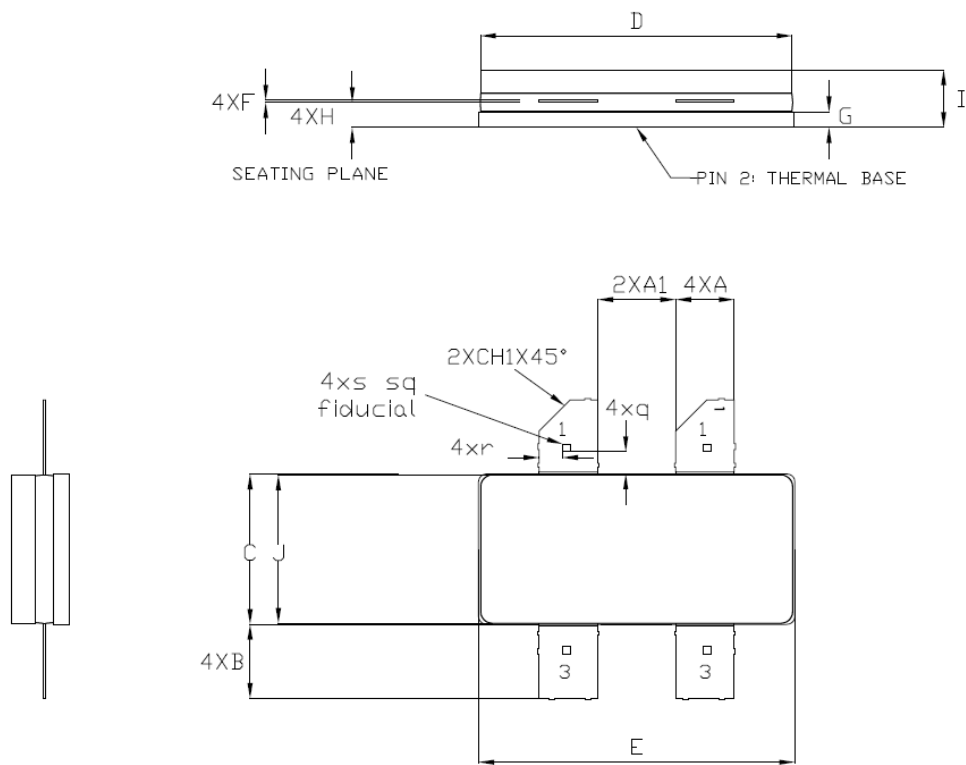


5 Package information

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.

5.1 STAC780-4F package information

Figure 7. STAC780-4F package outline



| PIN | CONNECTIO N |
|-----|----------------|
| 1 | DRAIN |
| 2 | SOURCE |
| 3 | GATE |

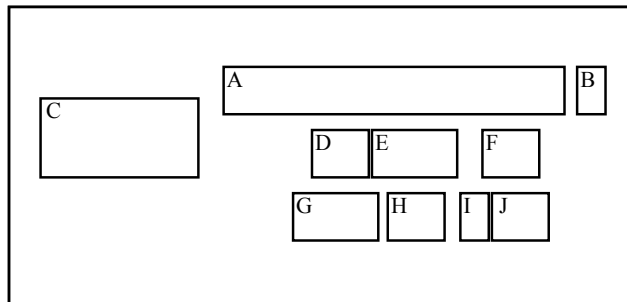
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Table 7. STAC780-4F mechanical data

| Ref. | Millimeters | | |
|------|-------------|------|-------|
| | Min. | Typ. | Max. |
| A | 3.76 | | 3.86 |
| A1 | 5.03 | | 5.13 |
| B | 4.57 | | 5.08 |
| C | 9.65 | | 9.91 |
| D | 20.17 | | 20.37 |
| E | 20.45 | | 20.70 |
| F | 0.11 | | 0.17 |
| G | 0.97 | | 1.14 |
| H | 1.52 | | 1.70 |
| I | 3.18 | | 4.32 |
| J | 9.52 | | 9.78 |
| q | | 1.37 | |
| r | | 1.52 | |
| s | | 0.51 | |
| CH1 | | 2.03 | |

5.2 Marking information

PACKAGE FACE TOP



LEGEND

- Marking Composition Field
- A - MARKING AREA
- B - ADDITIONAL INFORMATION
(MAX CHAR ALLOWED = 1)
- C - STANDARD ST LOGO
- D - Assy Plant
(PP)
- E - FE Sequence
(nnn)
- F - Diffusion Traceability Plant
(WX)
- G - COUNTRY OF ORIGIN
(MAX CHAR ALLOWED = 3)
- H - Test and Finishing Plant
(TF)
- I - Assy Year
(Y)
- J - Assy Week
(WW)

Revision history

Table 8. Document revision history

| Date | Version | Changes |
|-------------|---------|---|
| 22-Feb-2010 | 1 | First release. |
| 03-Aug-2010 | 2 | Updated description on cover page and Table 3. |
| 02-Sep-2010 | 3 | Updated Figure 8. Added Figure 3, 4 and 5. |
| 10-Apr-2020 | 4 | Updated package information. Added Section 1.3 ESD protection characteristics . |

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