# STAC150V2-350E

## RF power transistor: HF/VHF/UHF RF power N-channel MOSFET

**Datasheet – production data**

## Features

- Operating frequencies up to 40.68 MHz
- Excellent thermal stability
- $P_{OUT}$ = 350 W with 17 dB gain @ 40.68 MHz/150 V
- Designed for class E operation
- $V_{(BR)DSS}$ > 700 V
- STAC air cavity packaging technology - STAC® package
- In compliance with the 2002/95/EC1 European directive

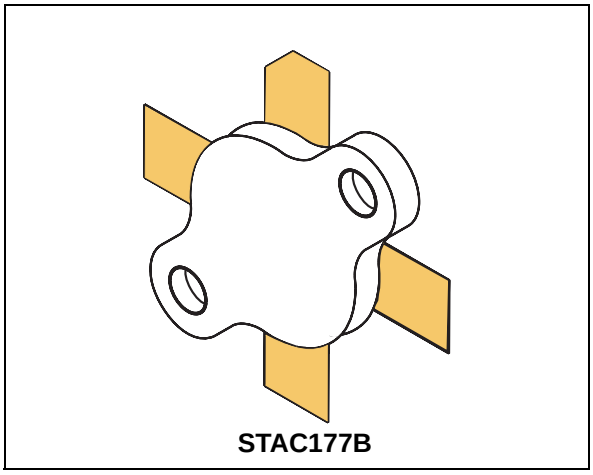
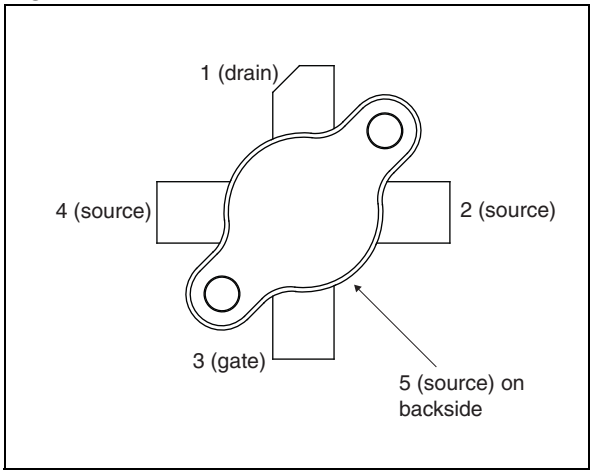



**Figure 1. Pin connection**




## Description

The STAC150V2-350E is a high voltage N-channel MOS field-effect RF power transistor especially designed for 150V Industrial RF power class E generators such as PECVD plasma sputtering, flat panel and solar cells manufacturing equipments. STAC150V2-350E benefits from the latest generation of STAC® air cavity package which exhibits a 25% lower thermal resistance compared to equivalent ceramic package.

**Table 1. Device summary**

| Order code | Marking | Base qty. | Package | Packaging |
|---|---|---|---|---|
| STAC150V2-350E | 150V2-350(1) | 25 pcs | STAC177B | Plastic tray |

1. For more details please refer to *Chapter 6: Marking, packing and shipping specifications*..



This is information on a product in full production. www.st.com

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# 1 Electrical data

## 1.1 Maximum ratings

($T_{CASE}$ = 25 °C)

**Table 2. Absolute maximum ratings**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{(BR)DSS}$ | Drain source voltage | 700 | V |
| $V_{GS}$ | Gate-source voltage | ±20 | V |
| $T_J$ | Max. operating junction temperature | 200 | °C |
| $T_{STG}$ | Storage temperature | -65 to +150 | °C |

## 1.2 Thermal data

**Table 3. Thermal data**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{thJC}$ | Junction - case thermal resistance | TBD | °C/W |

# 2 Electrical characteristics

$T_{CASE}$ = +25 °C

## 2.1 Static

**Table 4. Static**

| Symbol | Test conditions | | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | $I_{DS}$ = 250 µA | | | 700 | | | V |
| $I_{DSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 150 V | | | | 1 | µA |
| $I_{GSS}$ | $V_{GS}$ = 20 V | $V_{DS}$ = 0 V | | | | 0.4 | µA |
| $V_{TH}$ | $I_D$ = 250 µA | | | 3 | | 6.5 | V |
| $V_{DS(ON)}$ | $V_{GS}$ = 10 V | $I_D$ = 7.5 A | | | | 10 | V |
| $G_{FS}$ | $V_{DS}$ = TBD V | $I_D$ = TBD A | | | TBD | | S |
| $C_{ISS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 150 V | f = 1 MHz | | 1300 | | pF |
| $C_{OSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 150 V | f = 1 MHz | | 115 | | pF |
| $C_{RSS}$ | $V_{GS}$ = 0 V | $V_{DS}$ = 150 V | f = 1 MHz | | 15 | | pF |

## 2.2 Dynamic

**Table 5. Dynamic (pulse test: 1ms - 10%)**

| Symbol | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| $P_{OUT}$ | $V_{DD}$ = 150 V, $P_{IN}$ = 12 W, f = 40.68 MHz | 350 | 500 | - | W |
| Gain | $V_{DD}$ = 150 V, $P_{IN}$ = 12 W, f = 40.68 MHz | | 16.5 | - | dB |
| Efficiency | $V_{DD}$ = 150 V, $P_{OUT}$ = 500 W, f = 40.68 MHz | 60 | 70 | - | % |
| Load mismatch | $V_{DD}$ = 150 V, $P_{OUT}$ = 500 W, f = 40.68 MHz | | 65:1 | - | VSWR |

# 3 Impedance data

**Figure 2. Impedance data**

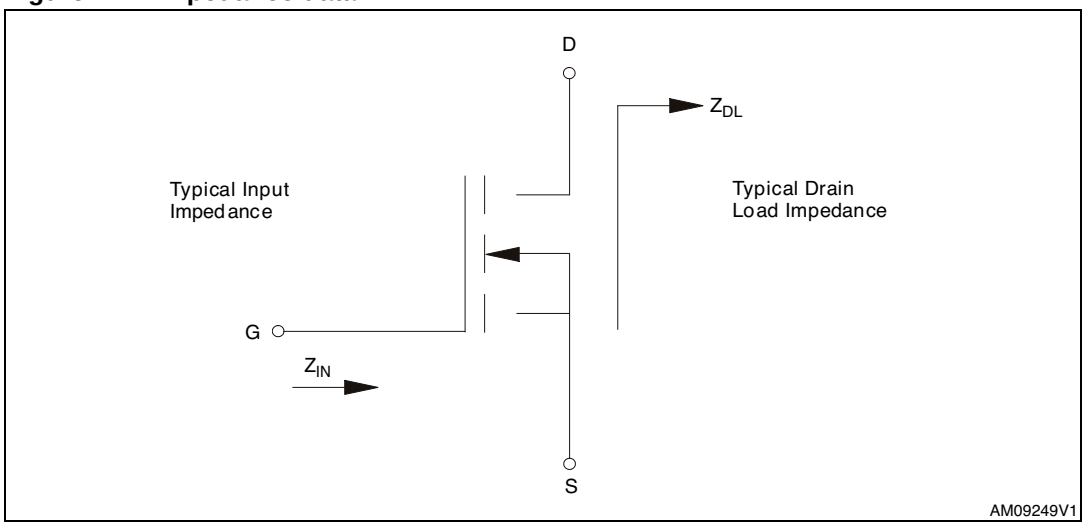



**Table 6. Impedance values**

| Frequecy (MHz) | $Z_{in}$ | $Z_{dl}$ |
|---|---|---|
| 13.56 | TBD | TBD |
| 27.12 | TBD | TBD |
| 40.68 | 0.6 - j1.5 | 11 + j13 |

# 4 Typical performance

**Figure 3. $C_{OSS}$ capacitance vs. drain-source voltage**

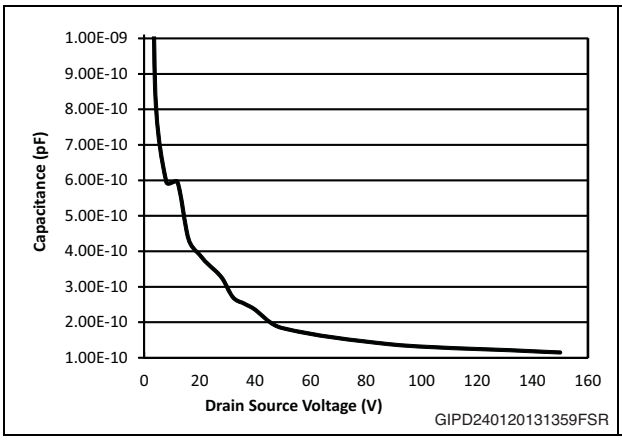



**Figure 4. $C_{RSS}$ capacitance vs. drain-source voltage**

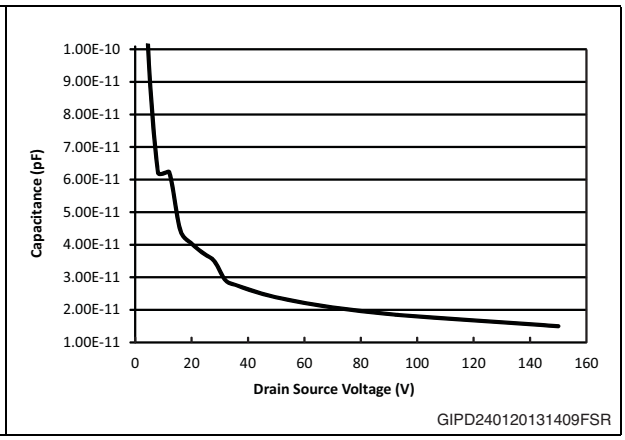



**Figure 5. $C_{ISS}$ capacitance vs. drain-source voltage**

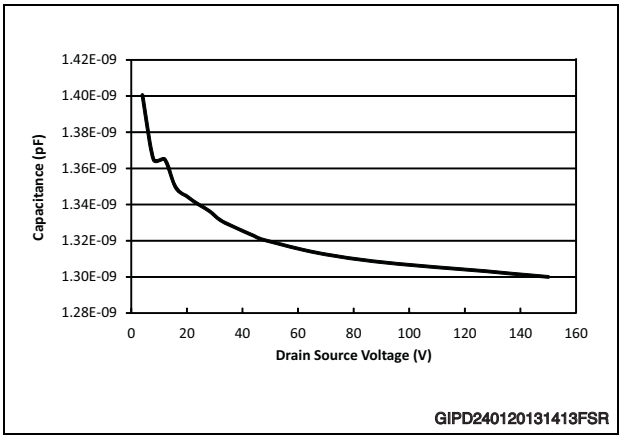
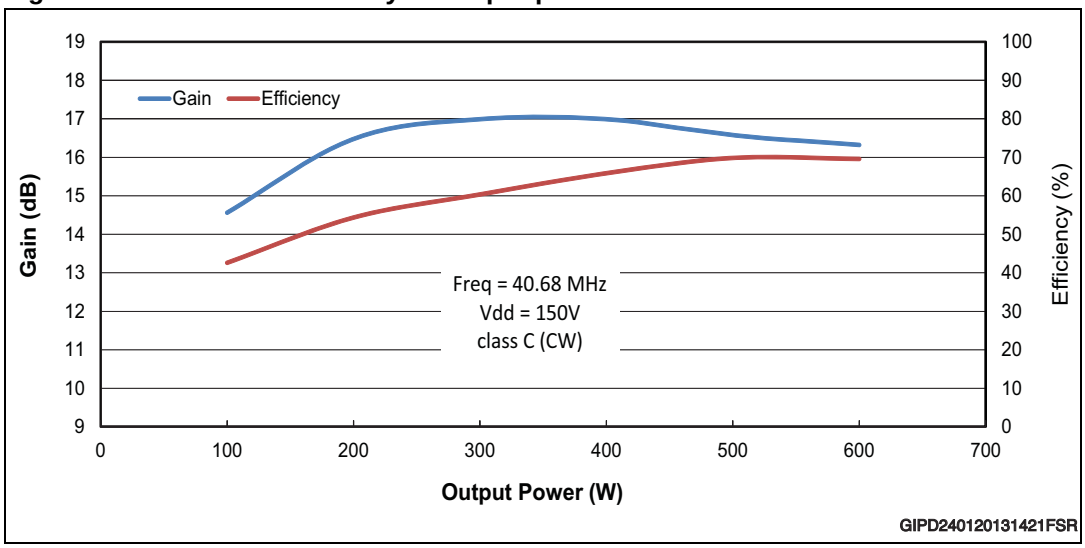


**Figure 6. Gain and efficiency vs output power**



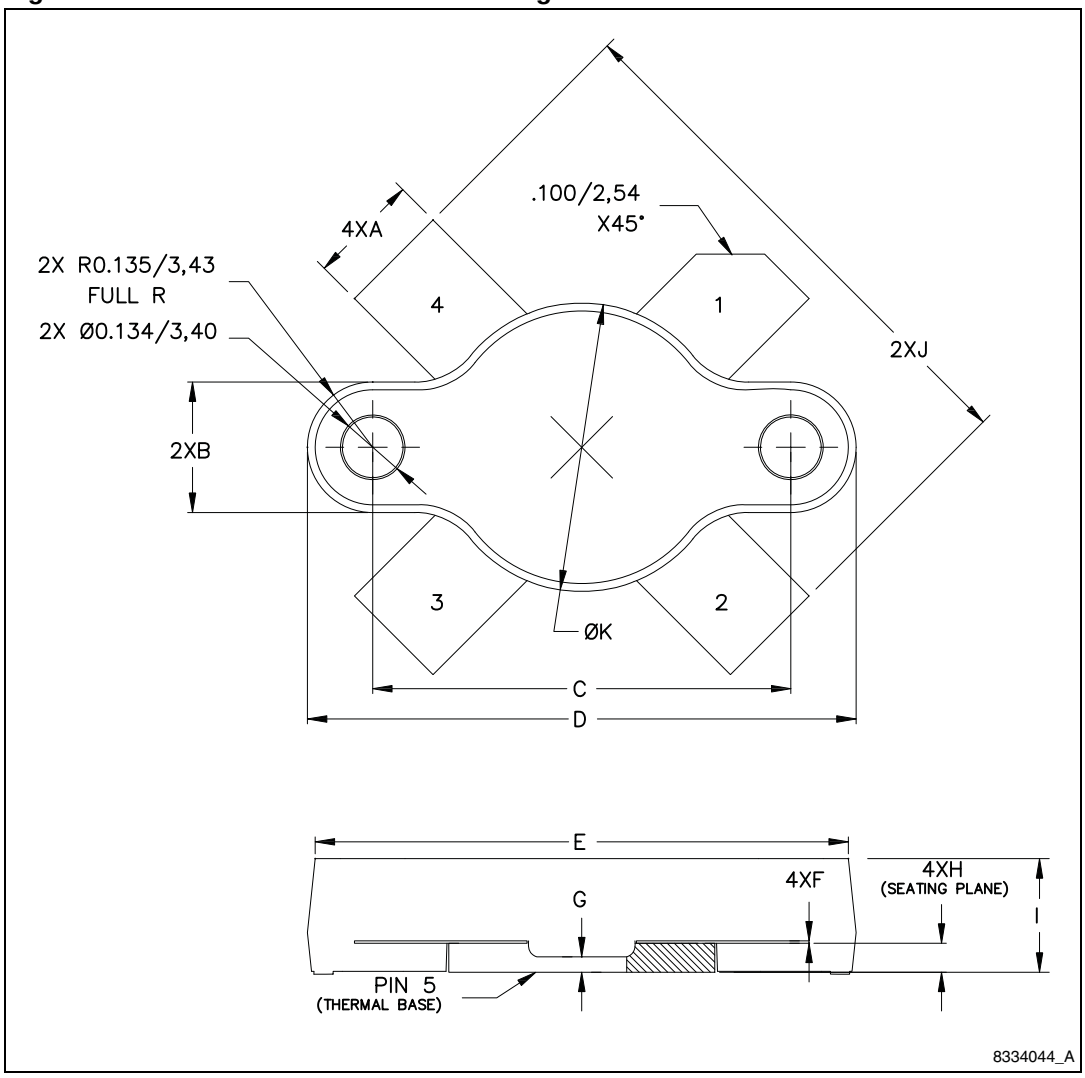
# 5 Package mechanical data

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 7. STAC177B mechanical data**

| Dim | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 5.72 | | 5.97 | 0.225 | | 0.235 |
| B | 6.73 | | 6.99 | 0.265 | | 0.275 |
| C | 21.84 | | 22.10 | 0.860 | | 0.870 |
| D | 28.70 | | 28.96 | 1.130 | | 1.140 |
| E | | 28.02 | | | 1.103 | |
| F | 0.10 | | 0.15 | 0.004 | | 0.006 |
| G | | 0.81 | | | 0.032 | |
| H | 1.45 | | 1.70 | 0.057 | | 0.067 |
| I | 5.79 | | 6.15 | 0.228 | | 0.242 |
| J | 27.43 | | 28.45 | 1.080 | | 1.120 |
| K | 15.01 | | 15.27 | 0.591 | | 0.601 |

**Figure 7. STAC177B mechanical drawing**



# 6 Marking, packing and shipping specifications

**Table 8. Packing and shipping specifications**

| Order code | Packaging | Pcs per tray | Dry pack humidity | Lot code |
|---|---|---|---|---|
| STAC150V2-350E | Plastic tray | 25 | < 10 % | Not mixed |

**Figure 8. Marking layout**

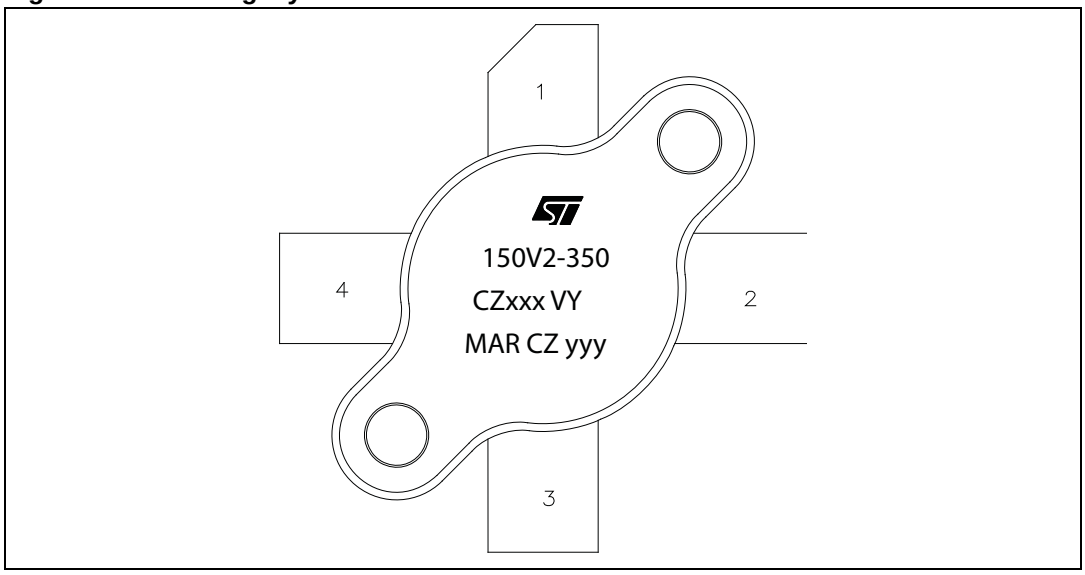



**Table 9. Marking specifications**

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

# 7 Revision history

**Table 10. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 24-Jan-2013 | 1 | Initial release. |

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