

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

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.

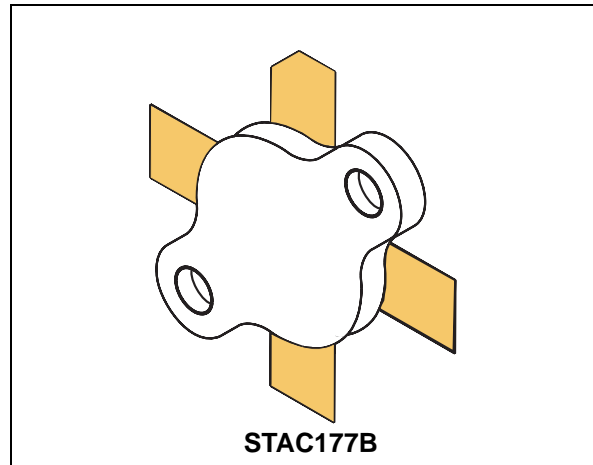


Figure 1. Pin connection

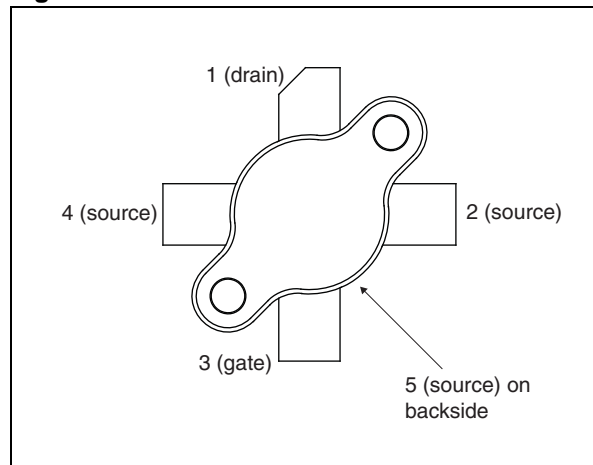


Table 1. Device summary

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](#).

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1 Electrical data

1.1 Maximum ratings

($T_{CASE} = 25\text{ °C}$)

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	$^{\circ}\text{C}$
T_{STG}	Storage temperature	-65 to +150	$^{\circ}\text{C}$

1.2 Thermal data

Table 3. Thermal data

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

2 Electrical characteristics

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

2.1 Static

Table 4. Static

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

2.2 Dynamic

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

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

3 Impedance data

Figure 2. Impedance data

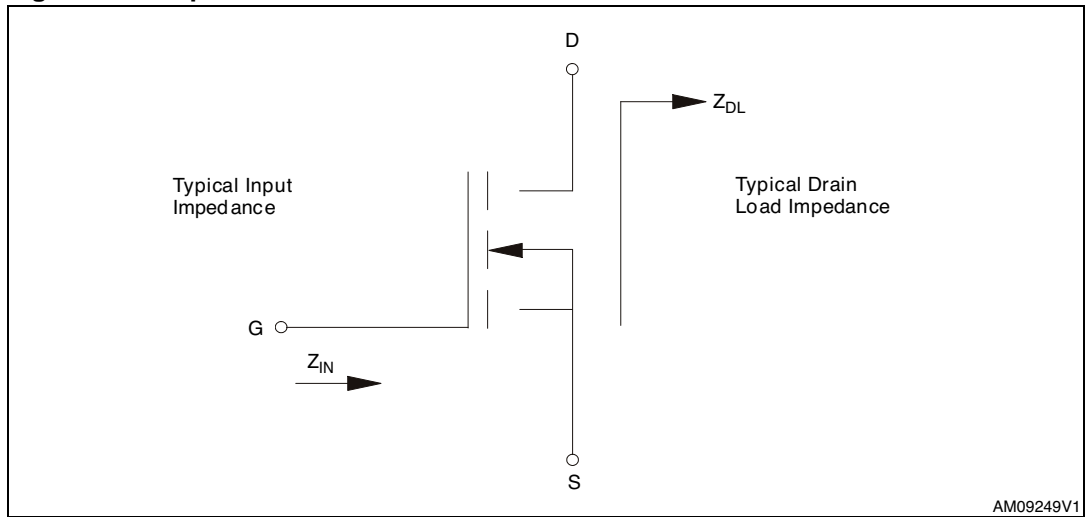


Table 6. Impedance values

Frequency (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

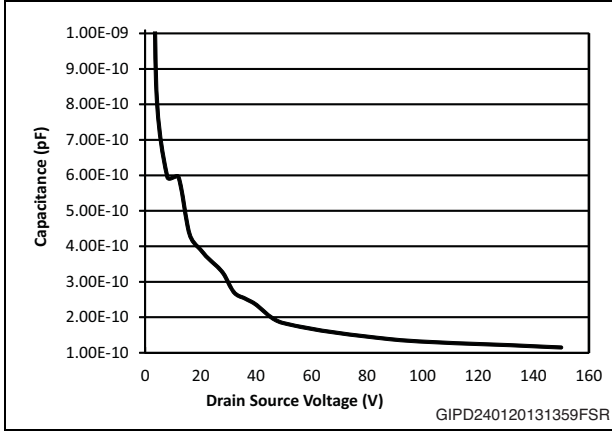


Figure 4. C_{RSS} capacitance vs. drain-source voltage

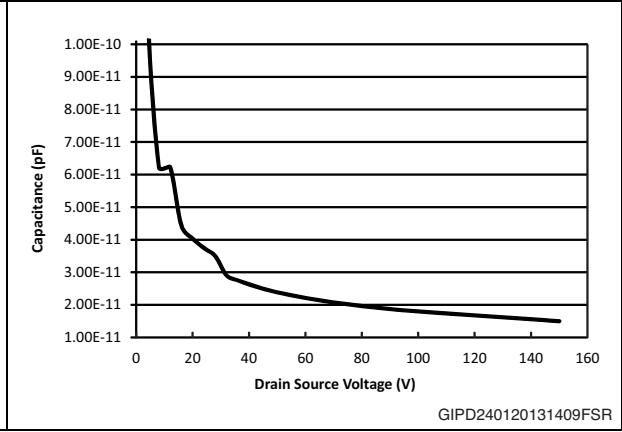


Figure 5. C_{ISS} capacitance vs. drain-source voltage

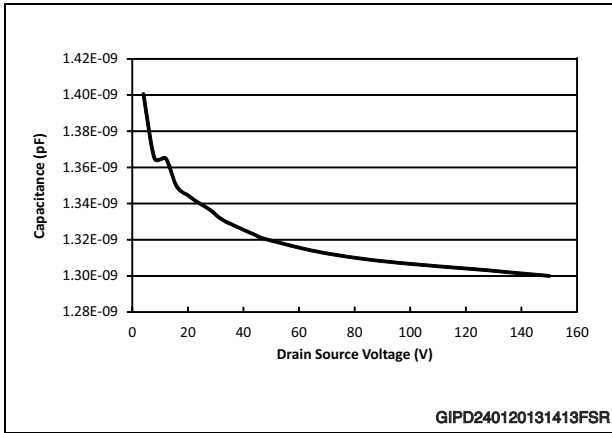
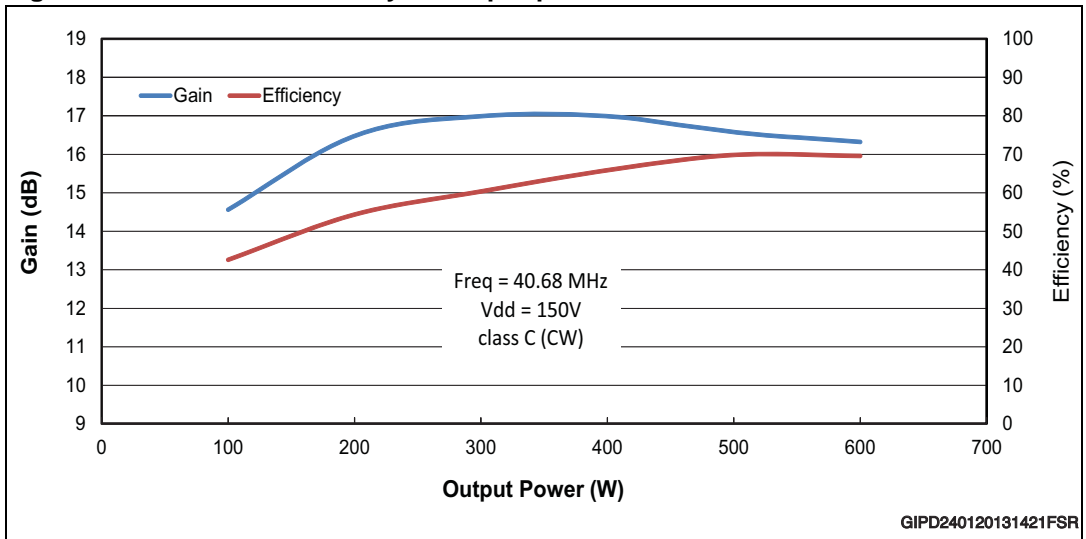


Figure 6. Gain and efficiency vs output power



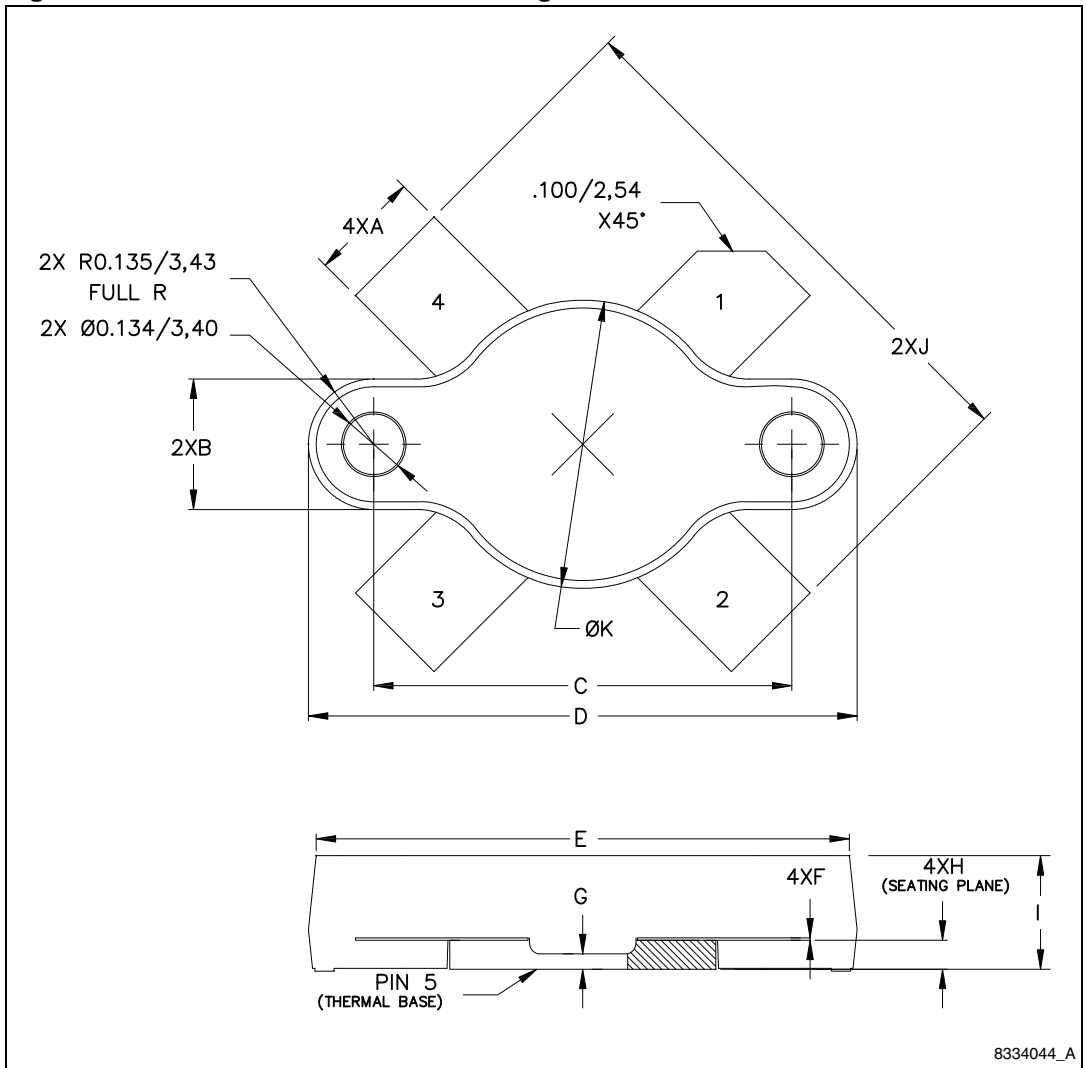
5 Package mechanical data

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

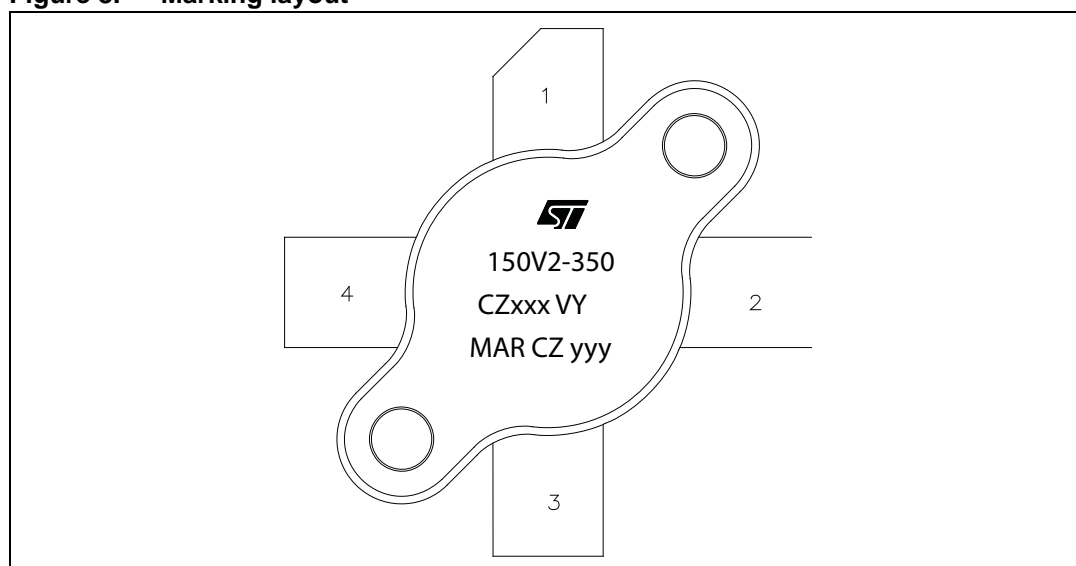


Table 9. Marking specifications

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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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9