



STAC2933

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

Preliminary data

Features

- Gold metallization
- Excellent thermal stability
- Common source configuration
- $P_{OUT}=300\text{ W}$ min. with 20 dB gain @ 30 MHz
- STAC air cavity packaging technology - STAC[®] package

Description

The STAC2933 is a gold metallized N-channel MOS field-effect RF power transistor, intended for use in 50 V dc large signal applications up 150 MHz. Its special low thermal-resistance package makes it ideal for ISM applications where reliability and ruggedness are critical factors.

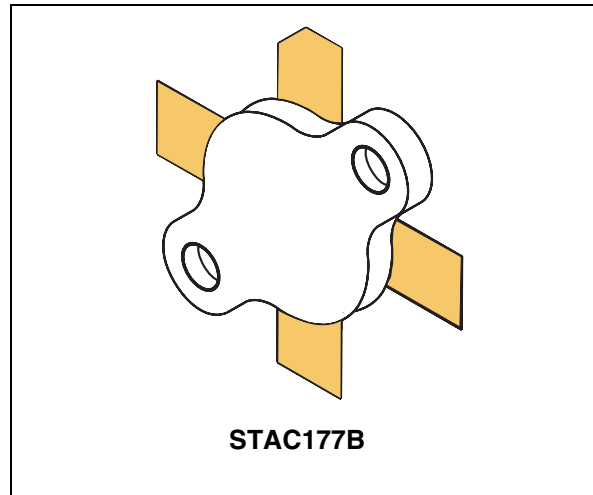


Figure 1. Pin connection

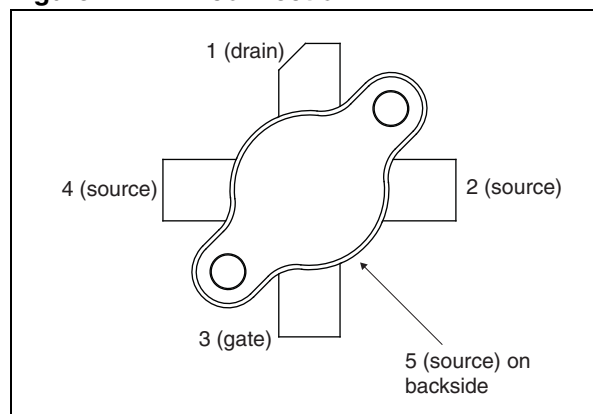


Table 1. Device summary

Order code	Marking	Base qty.	Package	Packaging ⁽¹⁾
STAC2933	STAC2933 ⁽¹⁾	25 pcs	STAC177B	Plastic tray

1. For more details please refer to [Chapter 6: Marking, packing and shipping specifications](#).

Content

1 **Electrical data** 3

 1.1 Maximum rating 3

 1.2 Thermal data 3

2 **Electrical characteristics** 4

3 **Impedance** 6

4 **Typical performance** 7

5 **Package mechanical data** 8

6 **Marking, packing and shipping specifications** 10

7 **Revision history** 11



1 Electrical data

1.1 Maximum rating

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

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
$V_{(\text{BR})\text{DSS}}$	Drain source voltage	130	V
V_{DGR}	Drain-gate voltage ($R_{\text{GS}} = 1\text{M}\Omega$)	130	V
V_{GS}	Gate-Source voltage	± 20	V
I_{D}	Drain current	40	A
P_{DISS}	Power dissipation	795	W
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
$R_{\text{th(j-c)}}$	Junction -case thermal resistance	0.22	$^{\circ}\text{C/W}$

2 Electrical characteristics

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

Table 4. Static

Symbol	Test conditions		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 200\text{ mA}$	130			V
I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$			100	μA
I_{GSS}	$V_{GS} = 20\text{ V}$	$V_{DS} = 0\text{ V}$			500	nA
$V_{GS(Q)}^{(1)}$	$V_{DS} = 10\text{ V}$	$I_D = 250\text{ mA}$	see table below			V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$			3	V
$G_{FS}^{(1)}$	$V_{DS} = 10\text{ V}$	$I_D = 10\text{ A}$	see table below			mho
C_{ISS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		1000		pF
C_{OSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		372		pF
C_{RSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		29		pF

1. V_{GS} and G_{FS} sort for each unit.

Table 5. Dynamic

Symbol	Test conditions		Min.	Typ.	Max.	Unit
P_{OUT}	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $f = 30\text{ MHz}$	300	400		W
G_{PS}	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	20	23.5		dB
h_D	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	50	65		%
Load Mismatch	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$ All phase angles	3:1			VSWR

Table 6. G_{FS} sort

G_{FS} sort	Value	G_{FS} sort	Value
A	10 - 10.99	E	14 - 14.99
B	11 - 11.99	F	15 - 15.99
C	12 - 12.99	G	16 - 16.99
D	13 - 13.99	H	17 - 18

Table 7. V_{GS} sort

V_{GS} sort	Value
1	1.5 - 2.0
2	2.0 - 2.5
3	2.5 - 3.0
4	3.0 - 3.5
5	3.5 - 4.0

3 Impedance

Figure 2. Impedance data schematic

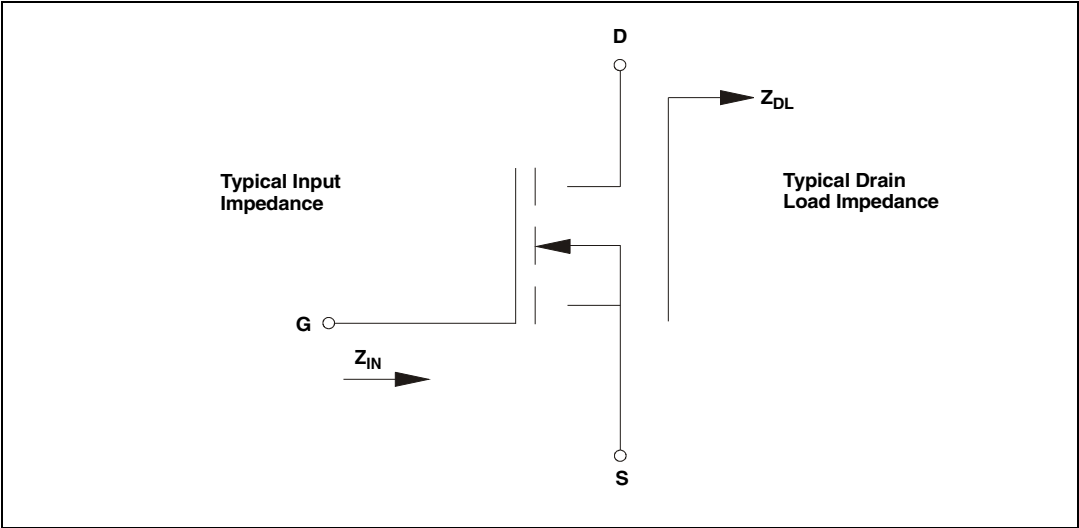


Table 8. Impedance data

FREQ	$Z_{IN} (\Omega)$	$Z_{DL} (\Omega)$
30 MHz	$1.8 - j 0.2$	$2.8 + j 2.3$
108 MHz	$1.9 + j 0.2$	$1.6 + j 1.4$
175 MHz	$1.9 + j 0.3$	$1.5 + j 1.6$

4 Typical performance

Figure 3. Capacitance vs drain voltage

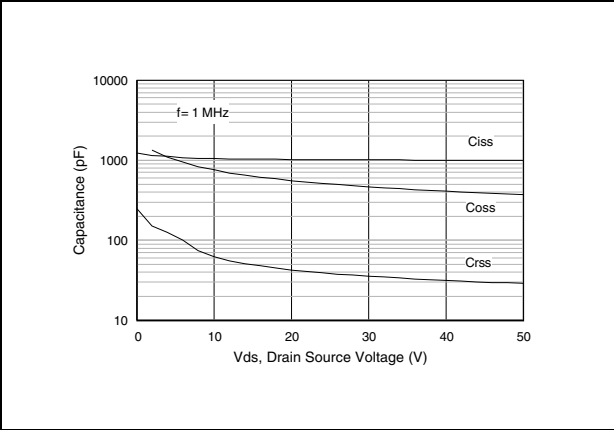


Figure 4. Drain current vs gate voltage

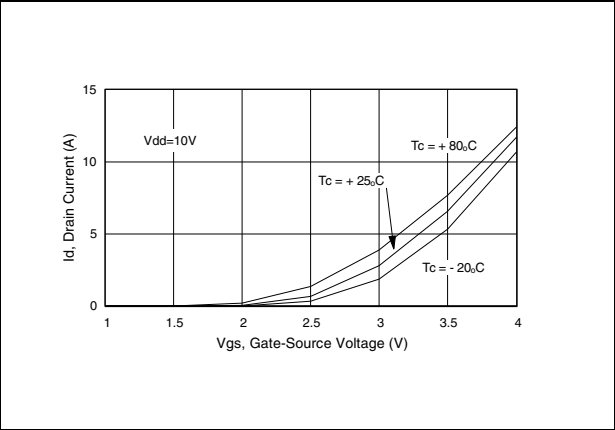
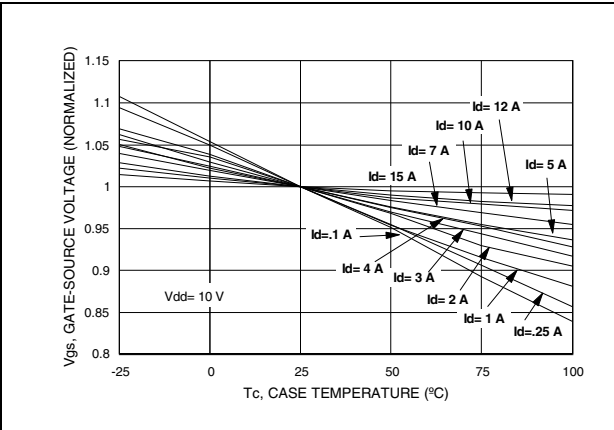


Figure 5. Gate-source voltage vs. case temperature



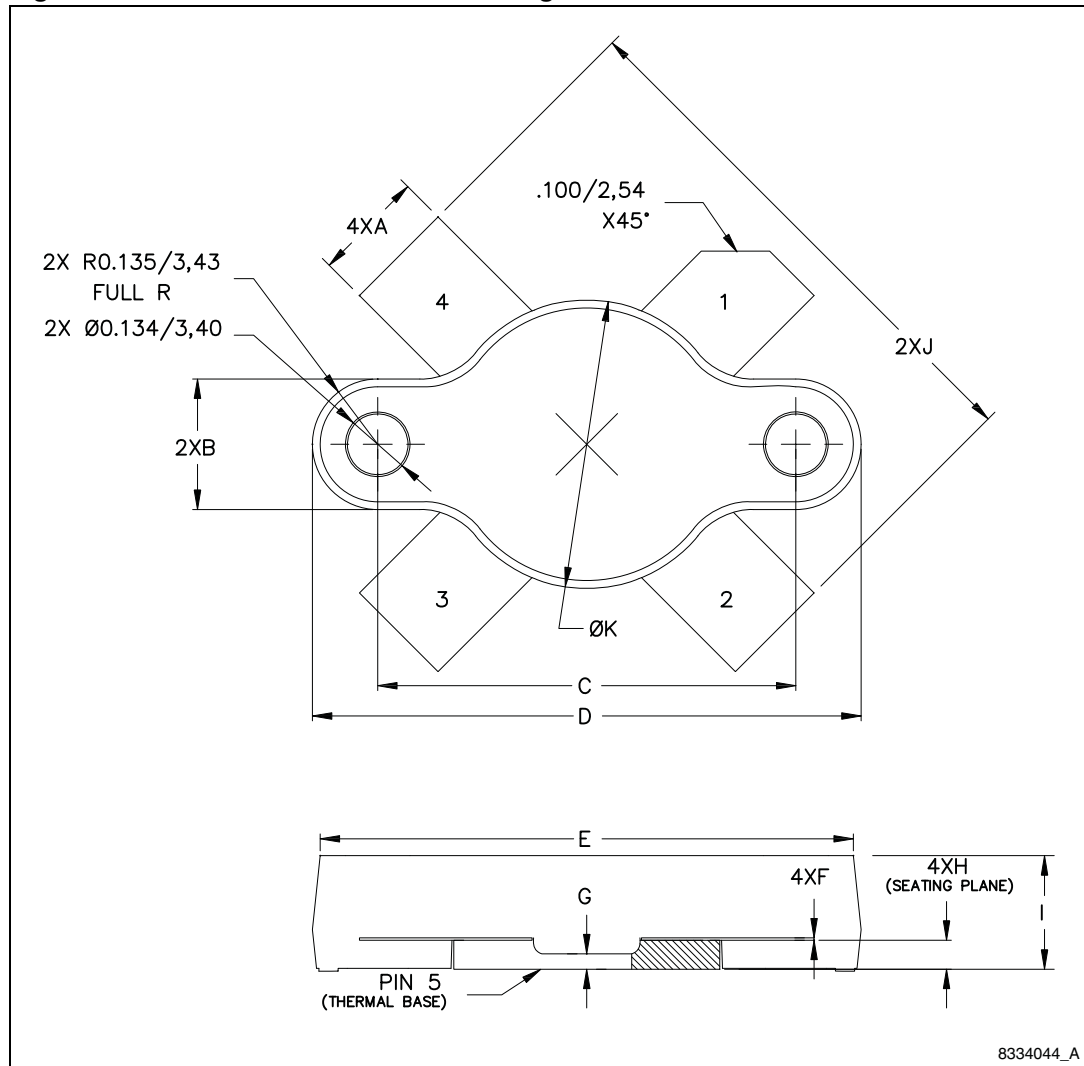
5 Package mechanical data

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 9. 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 6. STAC177B mechanical drawing



6 Marking, packing and shipping specifications

Table 10. Packing and shipping specifications

Order code	Packaging	Pcs per tray	Dry pack humidity	V _{GS} and G _{FS} code	Lot code
STAC2933	Plastic tray	25	< 10 %	Not mixed	Not mixed

Figure 7. Marking layout

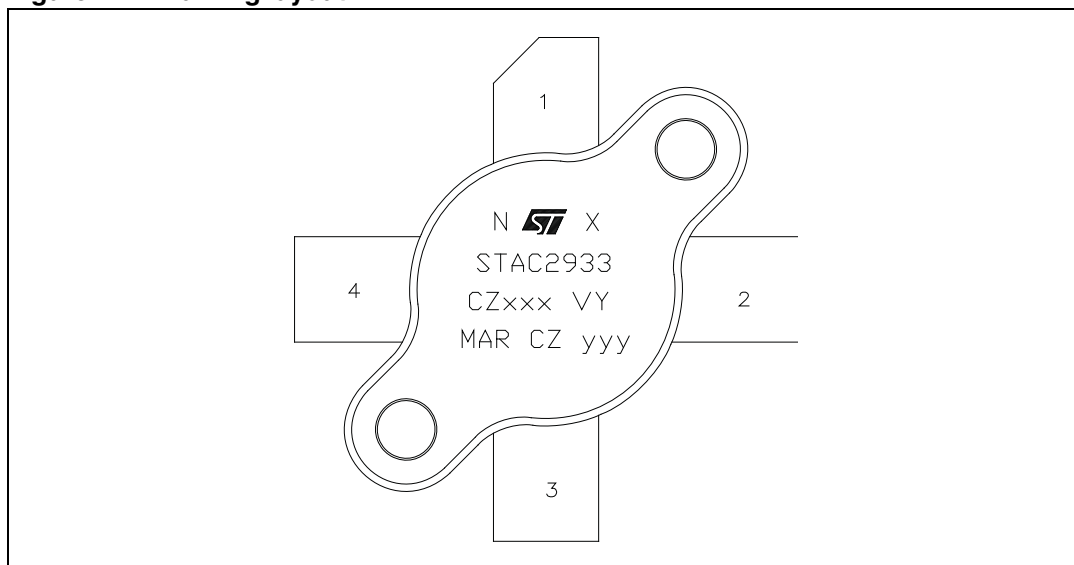


Table 11. Marking specifications

Symbol	Description
X	G _{FS} sort
N	V _{GS} sort
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

7 Revision history

Table 12. Document revision history

Date	Revision	Changes
16-Jan-2012	1	Initial release.

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