STAC2933

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

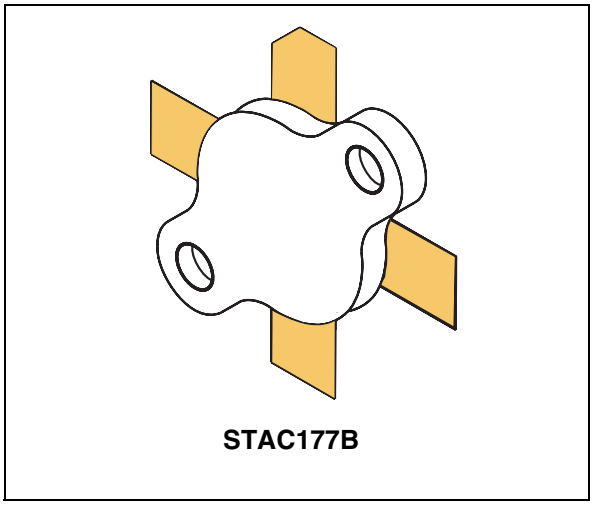
Preliminary data

Features

- Gold metallization
- Excellent thermal stability
- Common source configuration
- P_{OUT} = 300 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.



STAC177B

Figure 1. Pin connection

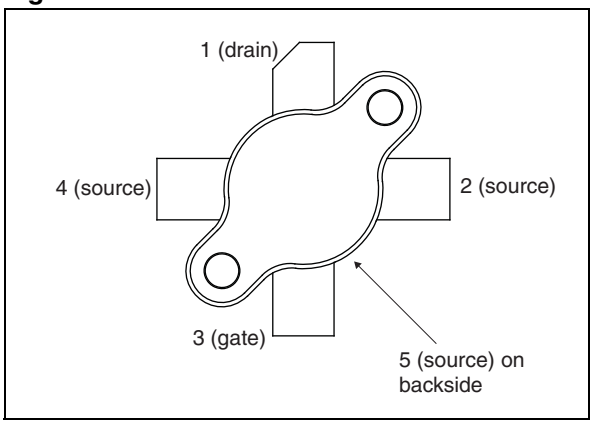


Table 1. Device summary

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.*.

This is preliminary information on a new product now in development or undergoing evaluation. Details are subject to change without notice.

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Content

1 Electrical data

1.1 Maximum rating

T_{CASE} = 25° C

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain source voltage	130	V
V_{DGR}	Drain-gate voltage (R_{GS} = 1MΩ)	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	°C
T_{STG}	Storage temperature	-65 to +150	°C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction -case thermal resistance	0.22	°C/W

2 Electrical characteristics

T_{CASE} = 25°C

Table 4. Static

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 200 mA		130			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				100	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				500	nA
$V_{GS(Q)}$ (1)	V_{DS} = 10 V	I_D = 250 mA		see table below			V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 20 A				3	V
G_{FS} (1)	V_{DS} = 10 V	I_D = 10 A		see table below			mho
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		1000		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		372		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		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 V I_{DQ} = 250 mA f = 30 MHz	300	400		W
G_{PS}	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 MHz	20	23.5		dB
h_D	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 MHz	50	65		%
Load Mismatch	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 300 W f = 30 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

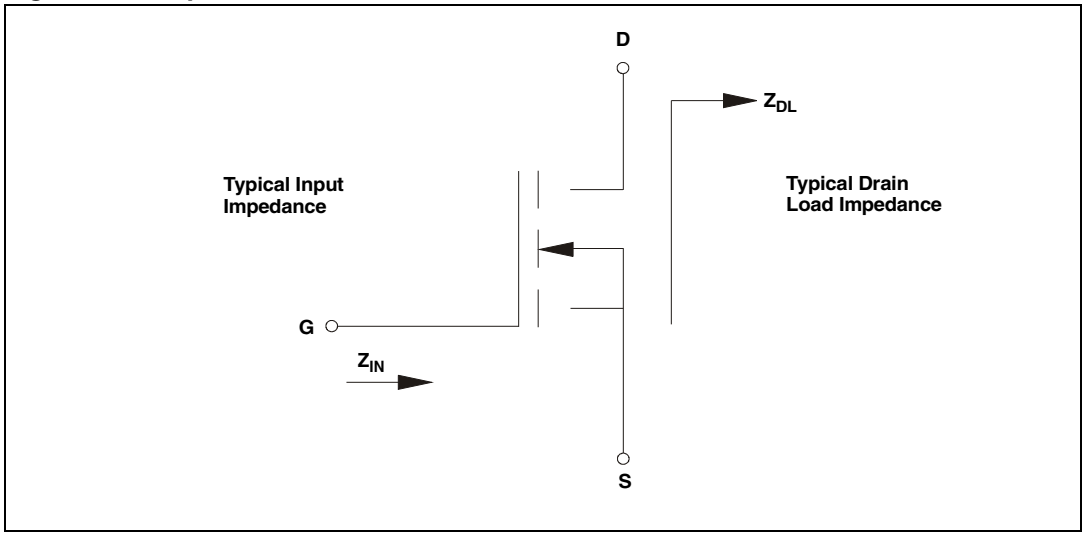


Table 8. Impedance data

FREQ	Z_{IN} (Ω)	Z_{DL} (Ω)
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

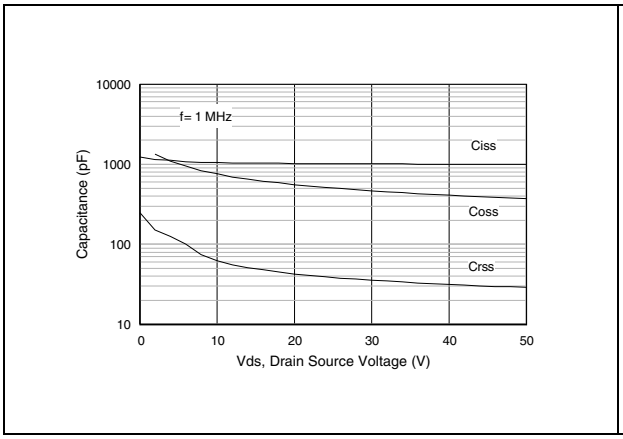


Figure 4. Drain current vs gate voltage

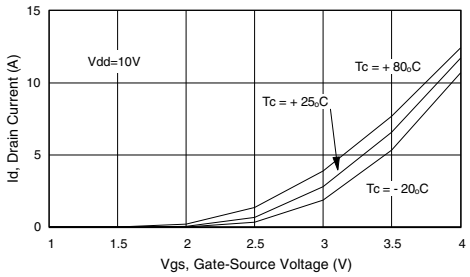
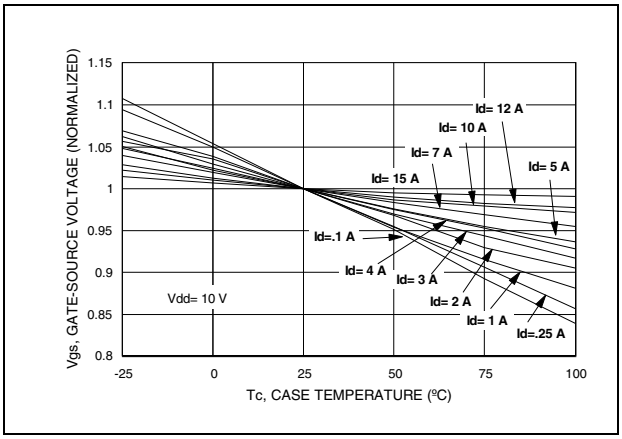


Figure 5. Gate-source voltage vs. case temperature



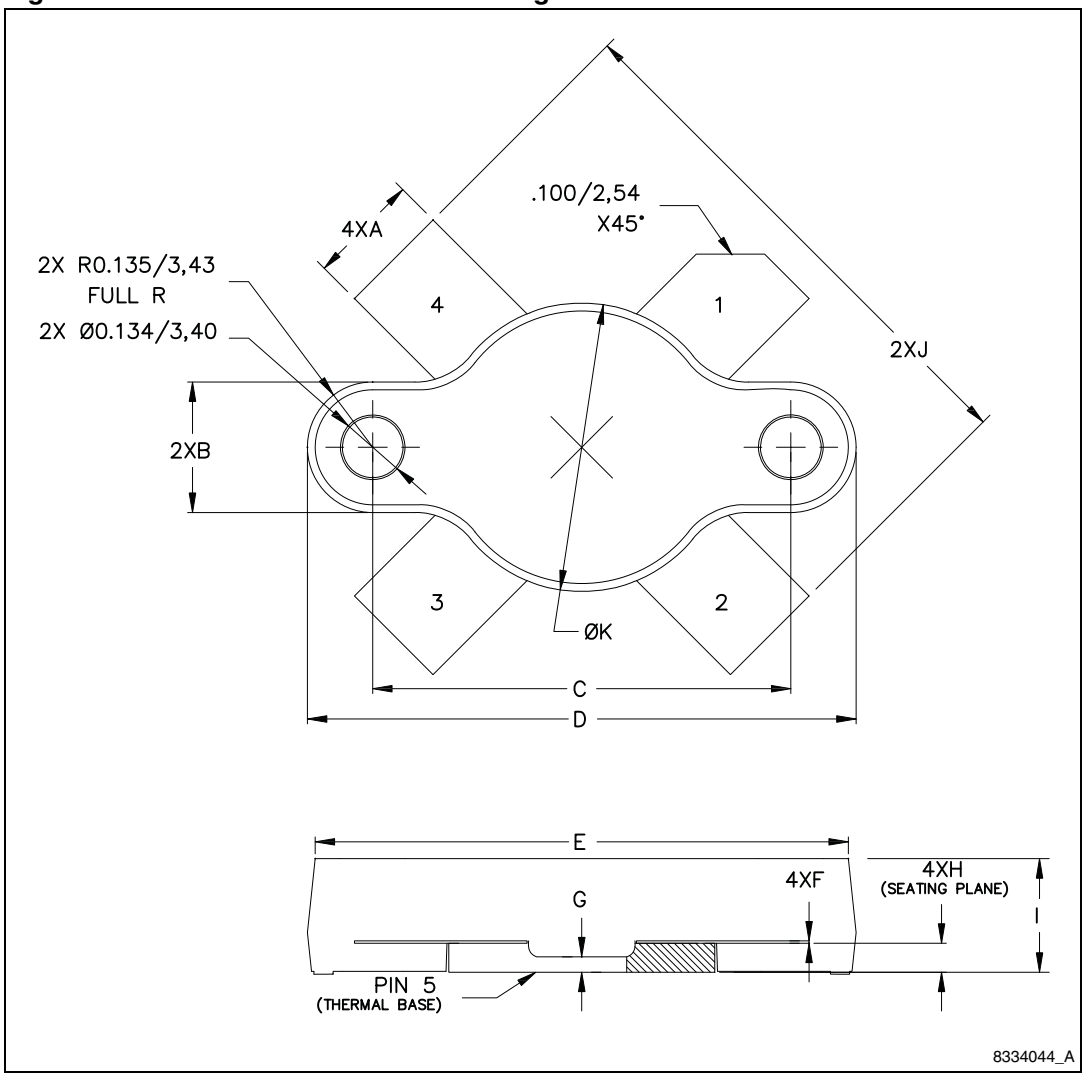
5 Package mechanical data

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

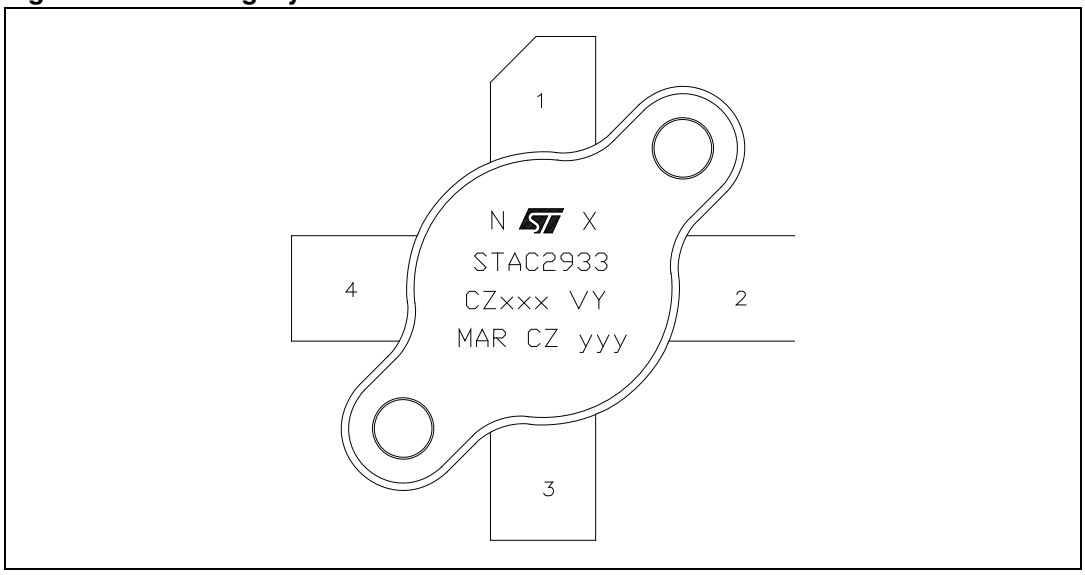


Table 11. Marking specifications

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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