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# STAC4933

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

Preliminary data

### Features

- Improved ruggedness  $V_{(BR)DSS} > 200\text{ V}$
- Excellent thermal stability
- $P_{OUT} = 300\text{ W}$  min. with 24 dB gain @ 30 MHz
- STAC air cavity packaging technology - STAC<sup>®</sup> package

### Description

The STAC4933 is an N-channel MOS field-effect RF power transistor, intended for use in 50 V ISM applications up to 100 MHz.

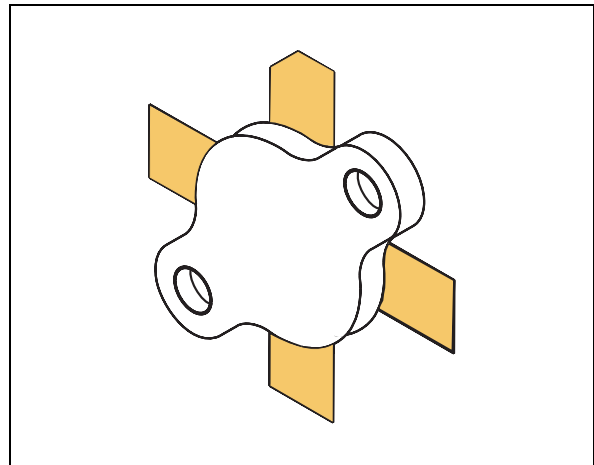


Figure 1. Pin connection

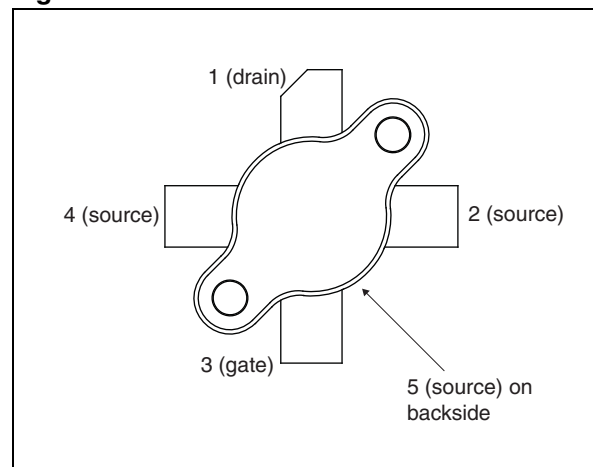


Table 1. Device summary

Order code	Marking	Base qty.	Package	Packaging
STAC4933	STAC4933 <sup>(1)</sup>	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	200	V
$V_{DGR}$	Drain-gate voltage ( $R_{GS} = 1\text{ M}\Omega$ )	200	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D$	Drain current	40	A
$P_{DISS}$	Power dissipation	795	W
$E_{AS}$	Avalanche energy Single pulse ( $I_D = 56\text{ A} - 800\text{ }\mu\text{H}$ coil)	1200	mJ
$T_J$	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	0.22	$^{\circ}\text{C}/\text{W}$

## 2 Electrical characteristics

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

### 2.1 Static

**Table 4. Static**

Symbol	Test conditions		Min	Typ	Max	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 100\text{ mA}$	200	240		V
$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 100\text{ V}$			2	mA
$I_{GSS}$	$V_{GS} = 20\text{ V}$	$V_{DS} = 0\text{ V}$			500	nA
$V_{TH}$	$I_D = 250\text{ mA}$		1.5	2.5	4.0	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$		3.5	4.0	V
$G_{FS}$	$V_{DS} = 10\text{ V}$	$I_D = 5\text{ A}$	5	8		S
$C_{ISS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		1000		pF
$C_{OSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		400		pF
$C_{RSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		16		pF

### 2.2 Dynamic

**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		-	W
$G_{PS}$	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	20	24	-	dB
$h_D$	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	50	58	-	%
Load mismatch	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$ all phase angles	10:1	25:1	-	VSWR

Table 6. VGS/GFS sorts

Marking	Vgs(min)	Vgs(max)	Gfs(min)	Gfs(max)
A1	1.50	1.75	5	6
A2	1.50	1.75	6	7
A3	1.50	1.75	7	8
A4	1.50	1.75	8	9
A5	1.50	1.75	9	10
A6	1.50	1.75	10	11
A7	1.50	1.75	11	12
A8	1.50	1.75	12	13
A9	1.50	1.75	13	14
B1	1.75	2.00	5	6
B2	1.75	2.00	6	7
B3	1.75	2.00	7	8
B4	1.75	2.00	8	9
B5	1.75	2.00	9	10
B6	1.75	2.00	10	11
B7	1.75	2.00	11	12
B8	1.75	2.00	12	13
B9	1.75	2.00	13	14
C1	2.00	2.25	5	6
C2	2.00	2.25	6	7
C3	2.00	2.25	7	8
C4	2.00	2.25	8	9
C5	2.00	2.25	9	10
C6	2.00	2.25	10	11
C7	2.00	2.25	11	12
C8	2.00	2.25	12	13
C9	2.00	2.25	13	14
D1	2.25	2.50	5	6
D2	2.25	2.50	6	7
D3	2.25	2.50	7	8
D4	2.25	2.50	8	9
D5	2.25	2.50	9	10
D6	2.25	2.50	10	11
D7	2.25	2.50	11	12



Table 6. VGS/GFS sorts (continued)

Marking	Vgs(min)	Vgs(max)	Gfs(min)	Gfs(max)
D8	2.25	2.50	12	13
D9	2.25	2.50	13	14
E1	2.50	2.75	5	6
E2	2.50	2.75	6	7
E3	2.50	2.75	7	8
E4	2.50	2.75	8	9
E5	2.50	2.75	9	10
E6	2.50	2.75	10	11
E7	2.50	2.75	11	12
E8	2.50	2.75	12	13
E9	2.50	2.75	13	14
F1	2.75	3.00	5	6
F2	2.75	3.00	6	7
F3	2.75	3.00	7	8
F4	2.75	3.00	8	9
F5	2.75	3.00	9	10
F6	2.75	3.00	10	11
F7	2.75	3.00	11	12
F8	2.75	3.00	12	13
F9	2.75	3.00	13	14
G1	3.00	3.25	5	6
G2	3.00	3.25	6	7
G3	3.00	3.25	7	8
G4	3.00	3.25	8	9
G5	3.00	3.25	9	10
G6	3.00	3.25	10	11
G7	3.00	3.25	11	12
G8	3.00	3.25	12	13
G9	3.00	3.25	13	14
H1	3.25	3.50	5	6
H2	3.25	3.50	6	7
H3	3.25	3.50	7	8
H4	3.25	3.50	8	9
H5	3.25	3.50	9	10
H6	3.25	3.50	10	11



Table 6. VGS/GFS sorts (continued)

Marking	Vgs(min)	Vgs(max)	Gfs(min)	Gfs(max)
H7	3.25	3.50	11	12
H8	3.25	3.50	12	13
H9	3.25	3.50	13	14
I1	3.50	3.75	5	6
I2	3.50	3.75	6	7
I3	3.50	3.75	7	8
I4	3.50	3.75	8	9
I5	3.50	3.75	9	10
I6	3.50	3.75	10	11
I7	3.50	3.75	11	12
I8	3.50	3.75	12	13
I9	3.50	3.75	13	14
J1	3.75	4.00	5	6
J2	3.75	4.00	6	7
J3	3.75	4.00	7	8
J4	3.75	4.00	8	9
J5	3.75	4.00	9	10
J6	3.75	4.00	10	11
J7	3.75	4.00	11	12
J8	3.75	4.00	12	13
J9	3.75	4.00	13	14



### 3 Impedance data

Figure 2. Impedance data

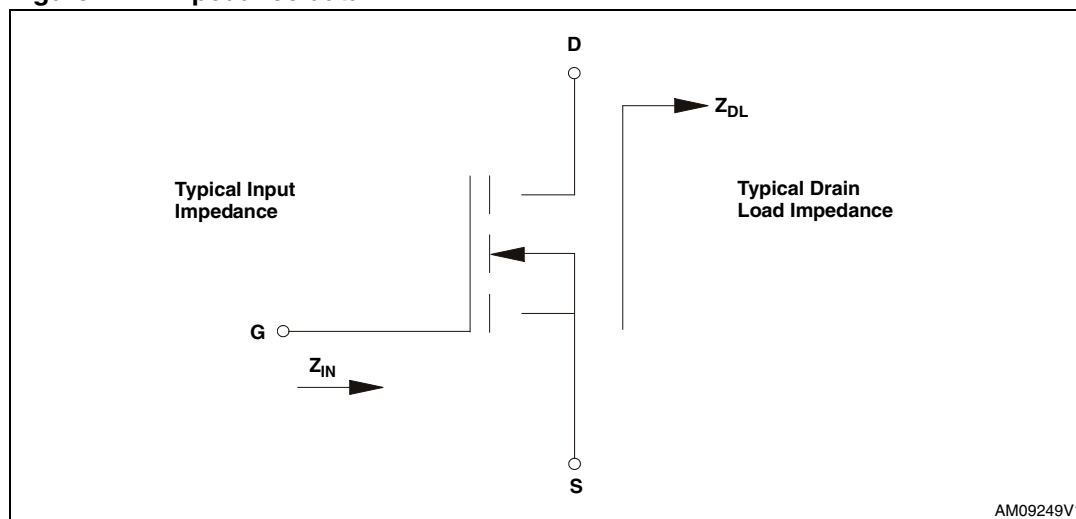


Table 7. Impedance values

$Z_{in}$	$Z_{dl}$
1.6 - j 5.0	3.3 + j 1.0

## 4 Typical performance

Figure 3. Capacitance vs. drain voltage

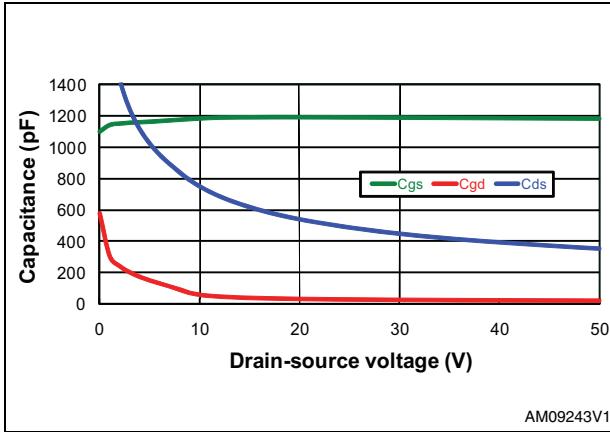


Figure 4. Drain current vs. drain-source voltage

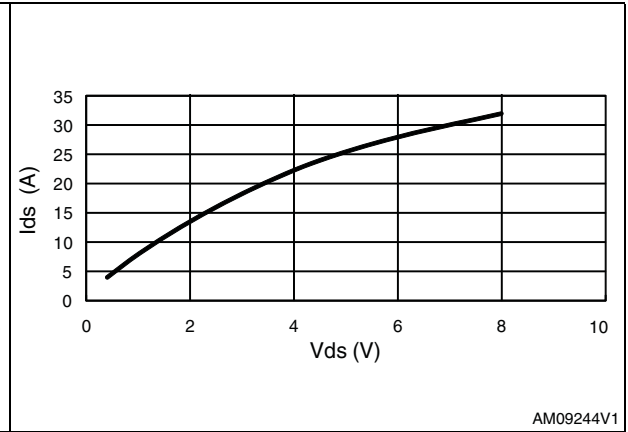
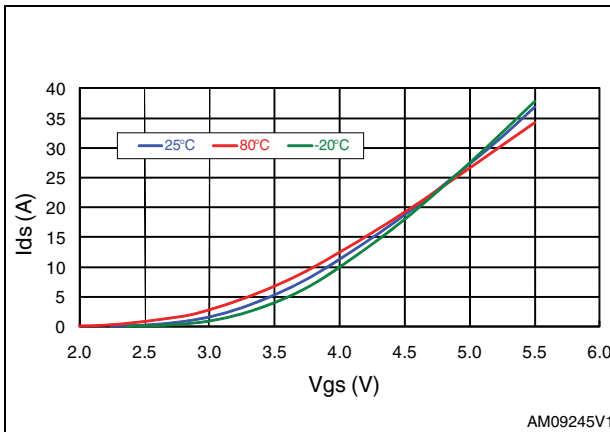


Figure 5. Drain current vs. drain-source voltage at different temperatures



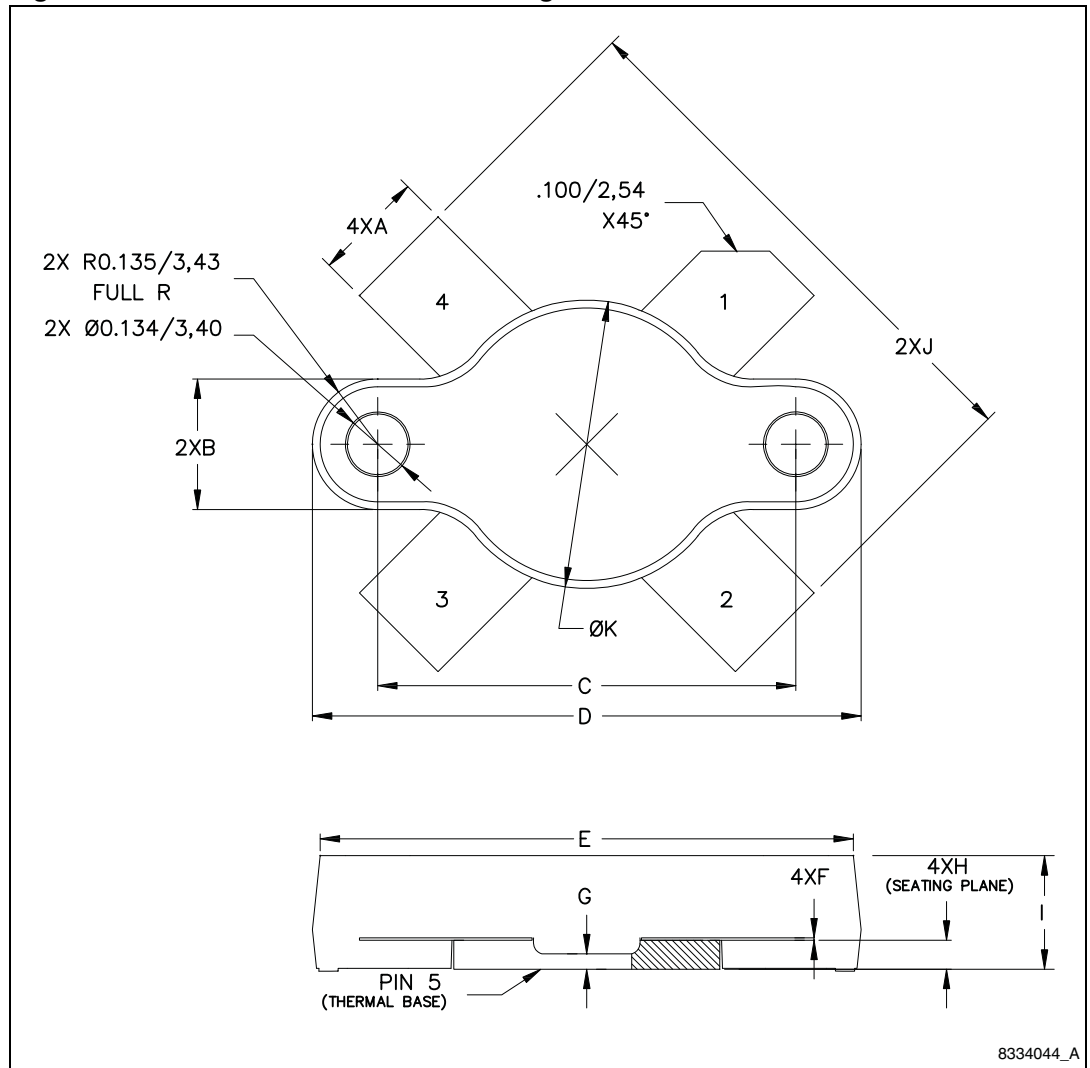
## 5 Package mechanical data

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](http://www.st.com). ECOPACK is an ST trademark.

**Table 8. 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

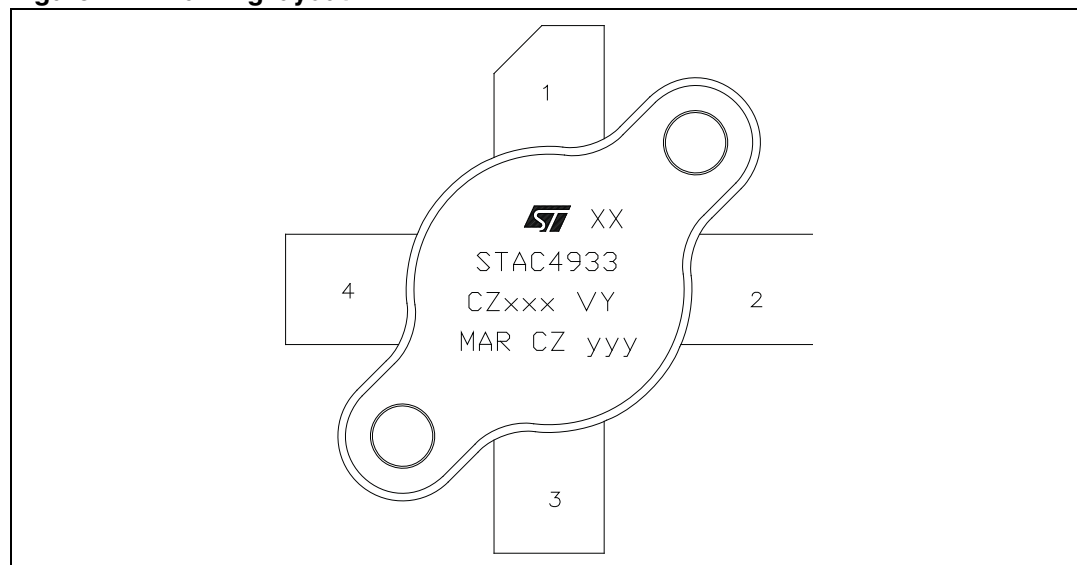


## 6 Marking, packing and shipping specifications

**Table 9. Packing and shipping specifications**

Order code	Packaging	Pcs per tray	Dry pack humidity	Vgs and Gfs code	Lot code
STAC4933	Plastic tray	25	< 10 %	Not mixed	Not mixed

**Figure 7. Marking layout**



**Table 10. Marking specifications**

Symbol	Description
XX	V <sub>GS</sub> and G <sub>FS</sub> sort
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 11. Document revision history**

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

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