STAC2943

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

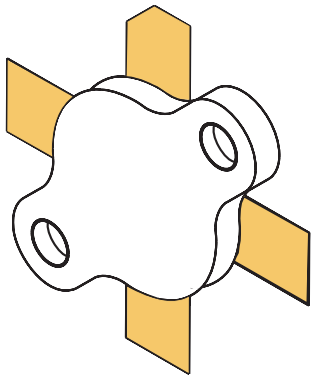
Preliminary data

Features

- High power capability
- P_{OUT} = 350 W min. with 22dB gain @ 30 MHz
- P_{SAT} = 450 W
- Low $R_{DS(on)}$
- STAC air cavity packaging technology - STAC® package
- Gold metallization
- Excellent thermal stability
- Common source configuration

Description

The STAC2943 is a gold metallized N-channel MOS field-effect RF power transistor, intended for use in 50 V dc large signal applications up to 150 MHz. This device offers a 20% higher power saturation than the SD2933, and is ideal for ISM applications where reliability and ruggedness are critical factors.



STAC177B

Figure 1. Pin connection

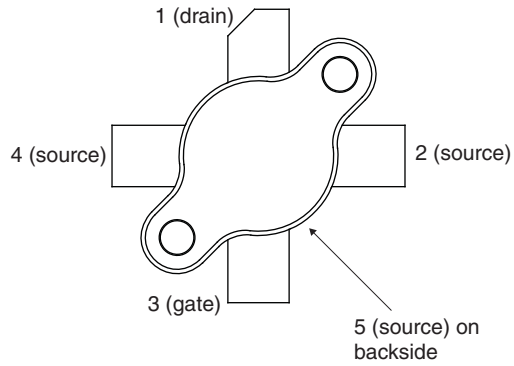


Table 1. Device summary

Order code	Marking	Base qty.	Package	Packaging[1]
STAC2943	STAC2943[1]	25 pcs	STAC177B	Plastic tray

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

Contents

1 Electrical data

(T_{CASE} = 25° C)

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$(1)	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
E_{AS}	Avalanche energy, single pulse (I_D = 53A, 800µH coil)	1100	mJ
T_{STG}	Storage temperature	-65 to +150	°C

1. T_J = 150 °C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction to case thermal resistance	0.22	° C/W

2 Electrical characteristics

(T_{CASE} = 25°C)

Table 4. Static

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$ (1)	V_{GS} = 0 V	I_{DS} = 200 mA		130			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				200	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				500	nA
$V_{GS(Q)}$ (2)	V_{DS} = 10 V	I_D = 250 mA				see table below	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 20 A				2	V
G_{FS} (2)	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		830		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		470		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		35		pF

1. T_J = 150° C
2. V_{GS} and G_{FS} sorts for each unit see *Table 6* and *Table 7*.

Table 5. Dynamic

Symbol	Test conditions				Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 50 V	I_{DQ} = 250 mA		f = 30 MHz	350	450		W
G_{PS}	V_{DD} = 50 V	I_{DQ} = 250 mA	P_{OUT} = 350 W	f = 30 MHz	22	25		dB
h_D	V_{DD} = 50 V	I_{DQ} = 250 mA	P_{OUT} = 350 W	f = 30 MHz	60	65		%
Load Mismatch	V_{DD} = 50 V All phase angles	I_{DQ} = 250 mA	P_{OUT} = 350 W	f = 30 MHz	3:1			VSWR

Table 6. G_{FS} sorts

Symbol	Value
A	10 - 10.99
B	11 - 11.99
C	12 - 12.99
D	13 - 13.99
E	14 - 14.99
F	15 - 15.99

Table 6. G_{FS} sorts (continued)

Symbol	Value
G	16 - 16.99
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

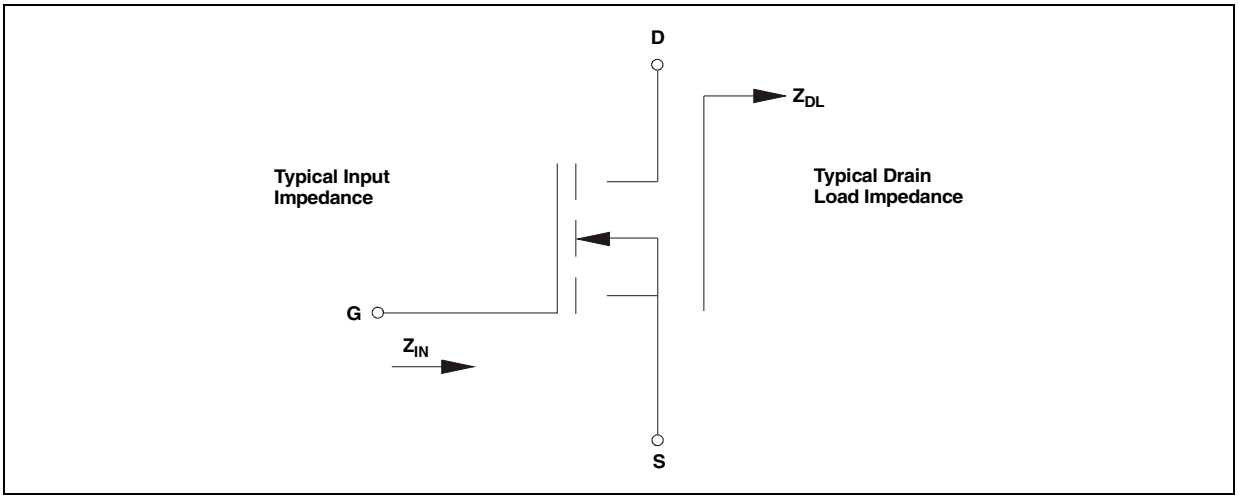


Table 8. Impedance data

f	Z_{IN} (Ω)	Z_{DL} (Ω)
30 MHz	1.3 - j 2.9	3.1 + j 2.3
108 MHz	1.4 - j 2.4	1.9 + j 1.4
175 MHz	1.4 - j 2.2	1.7 +j 1.6

4 Typical performance

Figure 3. Capacitance vs drain voltage

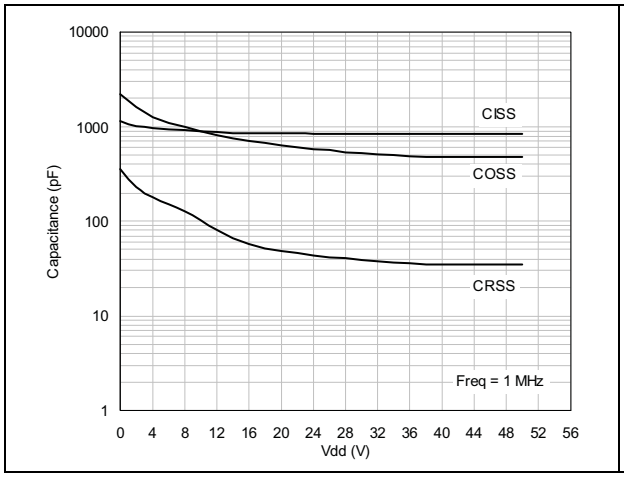


Figure 4. Drain current vs gate voltage

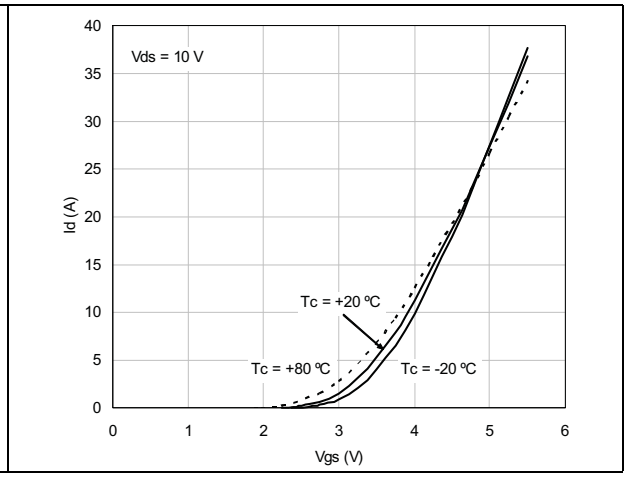
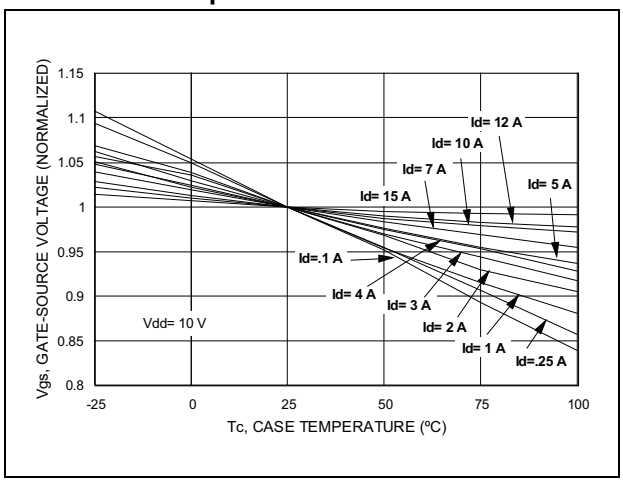


Figure 5. Gate-source voltage vs case temperature



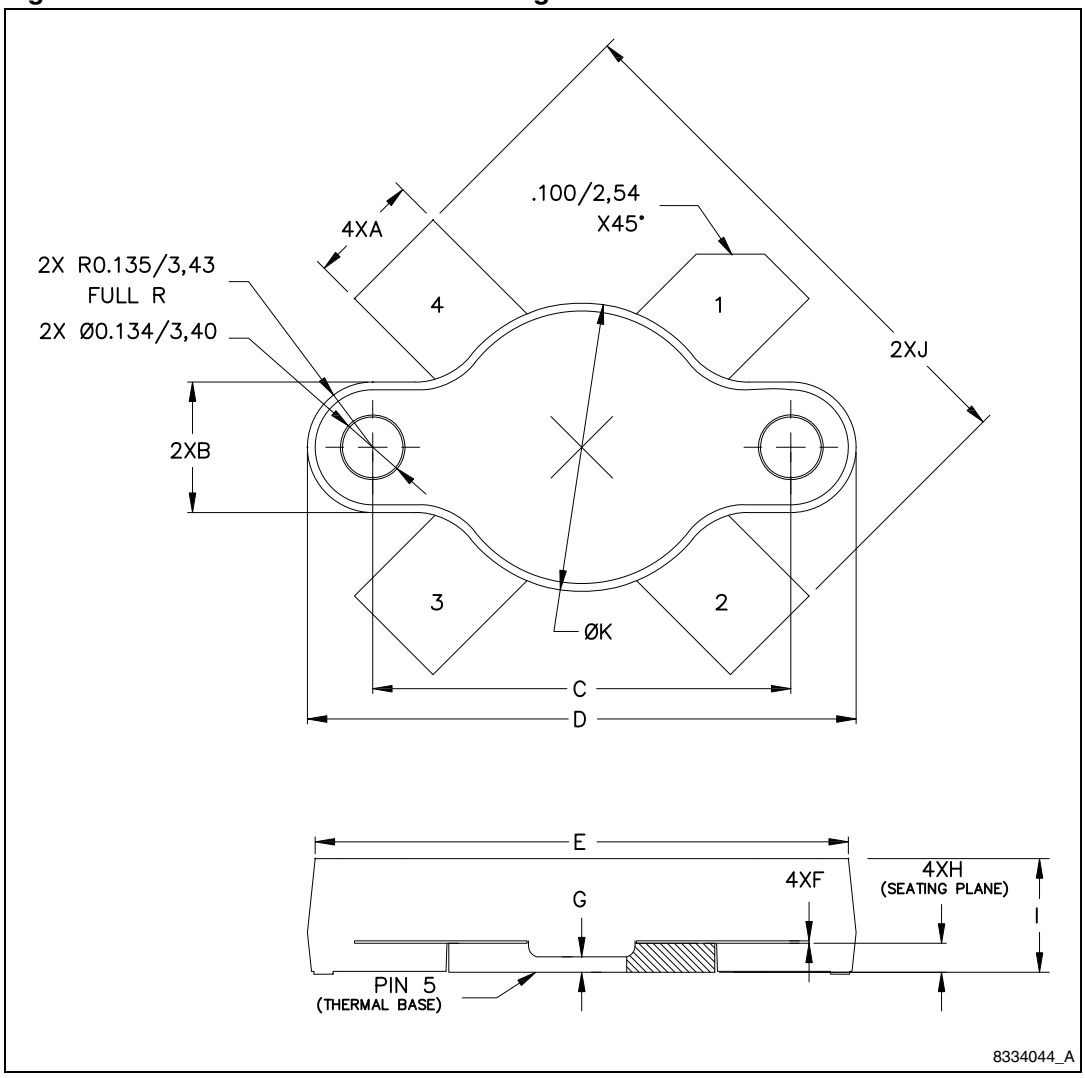
5 Package mechanical data

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
STAC2943	Plastic tray	25	< 10 %	Not mixed	Not mixed

Figure 7. Marking layout

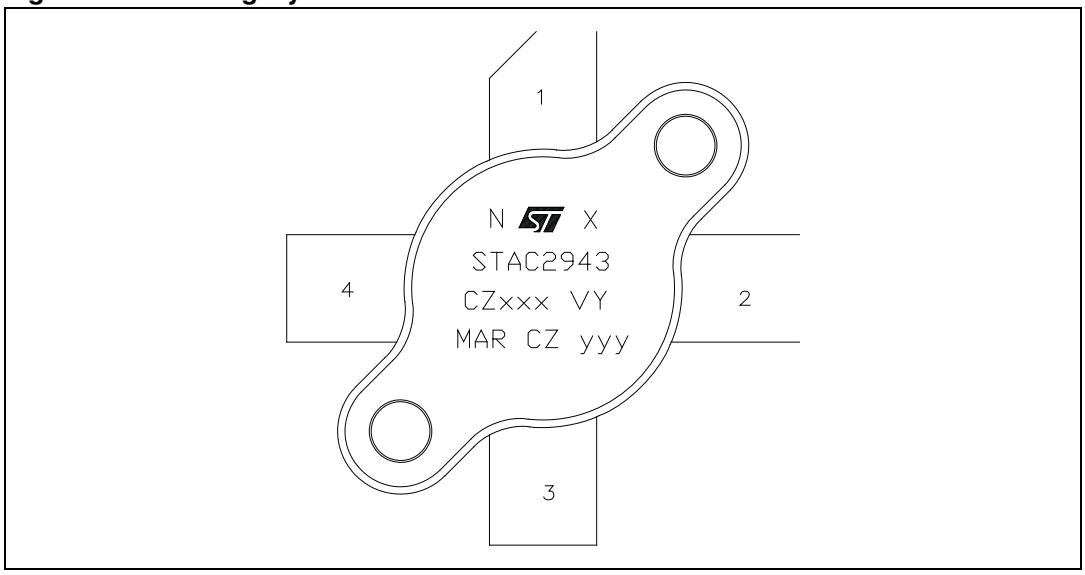


Table 11. Marking specifications

Symbol	Description
N	V_{GS} sort
X	G_{FS} 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	Description of Changes
16-Jan-2012	1	First Issue.

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