STAC2932F

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

Features

- Gold metallization
- Excellent thermal stability
- Common source push-pull configuration
- P_{OUT} = 300 W min. with 20 dB gain @ 175 MHz
- In compliance with the 2002/95/EC European directive
- ST air cavity packaging technology - STAC™ package

STAC244F
Air cavity

Description

The STAC2932F is a gold metallized N-channel MOS field-effect RF power transistor, intended for use in 50 V DC large signal applications up to 250 MHz.

The STAC2932F benefits from the latest generation of efficient, patent-pending package technology, otherwise known as STAC™.

Figure 1. Pin connection

1. Drain
2. Gate
3. Source (Bottom side)

Table 1. Device summary

Order code	Marking	Base qty.	Package	Packaging
STAC2932FW	STAC2932F(1)	20	STAC244F	Tray

1. For more details please refer to *Chapter 7: Marking, packing and shipping specifications*.

Contents

1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$(1)	Drain source voltage	125	V
V_{DGR}	Drain-gate voltage (R_{GS} = 1 MΩ)	125	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current	40	A
P_{DISS}	Power dissipation	625	W
T_J	Max. operating junction temperature	200	°C
T_{STG}	Storage temperature	-65 to +150	°C

1. T_J = 150 °C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction - case thermal resistance	0.28	°C/W

2 Electrical characteristics

(T_{CASE} = 25 °C)

2.1 Static

Table 4. Static (per side)

Symbol	Test conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 100 mA		125			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				50	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				250	nA
$V_{GS(Q)}$	V_{DS} = 10 V	I_D = 250 mA		1.5	2.5	4.0	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 10 A				3.0	V
G_{FS}	V_{DS} = 10 V	I_D = 5 A		5			S
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		468		pF
C_{OSS}					206		pF
C_{RSS}					16		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 50 V, I_{DQ} = 2 x 250 mA, P_{IN} = 4 W, f = 175 MHz	300	390		W
h_D	V_{DD} = 50 V, I_{DQ} = 2 x 250 mA, P_{IN} = 4 W, f = 175 MHz	55	68		%

3 Impedance

Figure 2. Current conventions

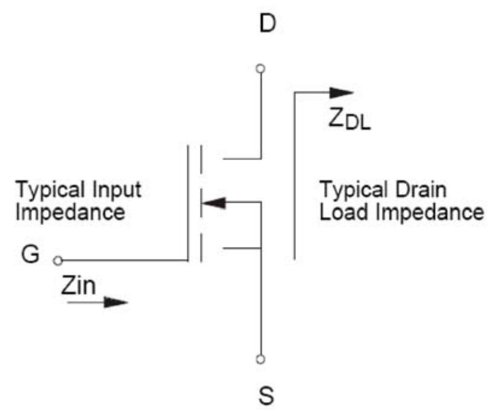


Table 6. Impedance data

Freq. (MHz)	Z_{IN} (Ω)	Z_{DL}(Ω)
175 MHz	2.0 - j2.0	3.5 + j5.2

Note: Measured gate to gate and drain to drain, respectively.

4 Typical performance

Figure 3. Capacitances vs drain supply voltage

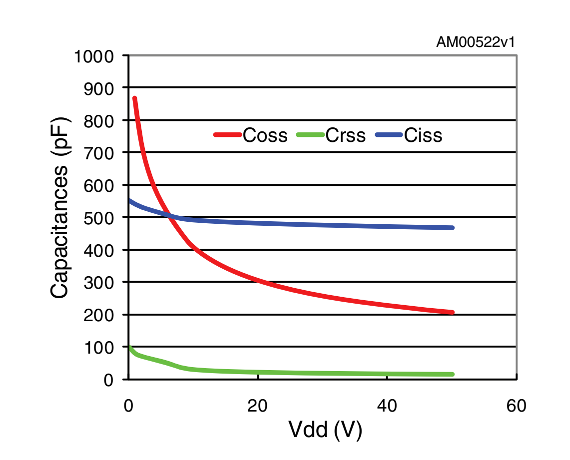


Figure 4. Output power vs drain supply voltage

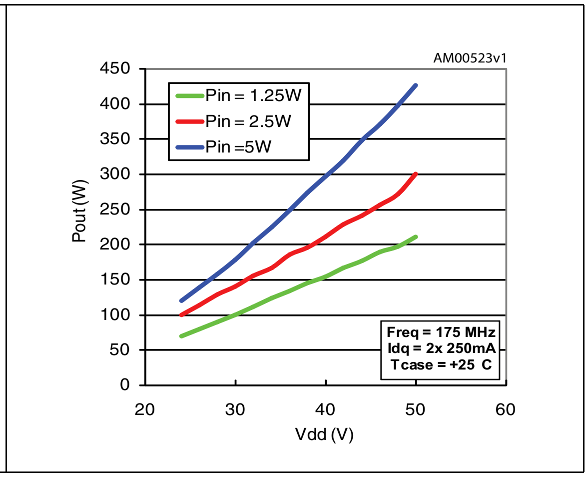


Figure 5. Output power vs gate voltage

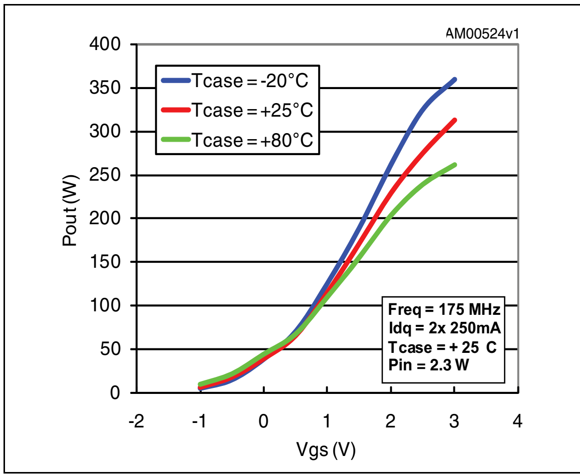


Figure 6. Output power vs input power

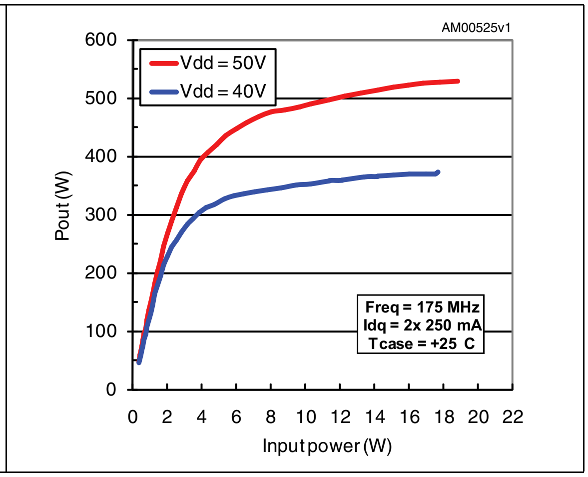


Figure 7. Output power vs input power and case temperature

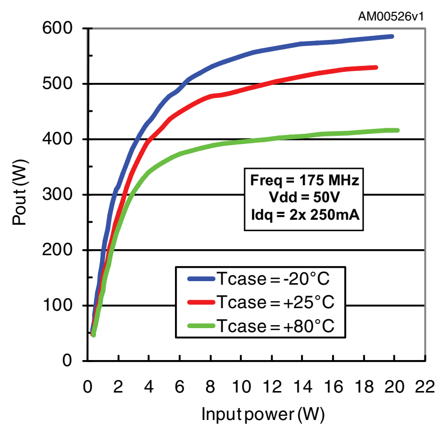
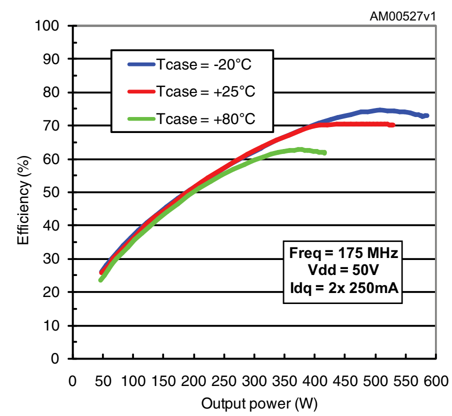


Figure 8. Efficiency vs output power and case temperature



5 Test circuit

Figure 9. 175 MHz schematic (production test circuit)

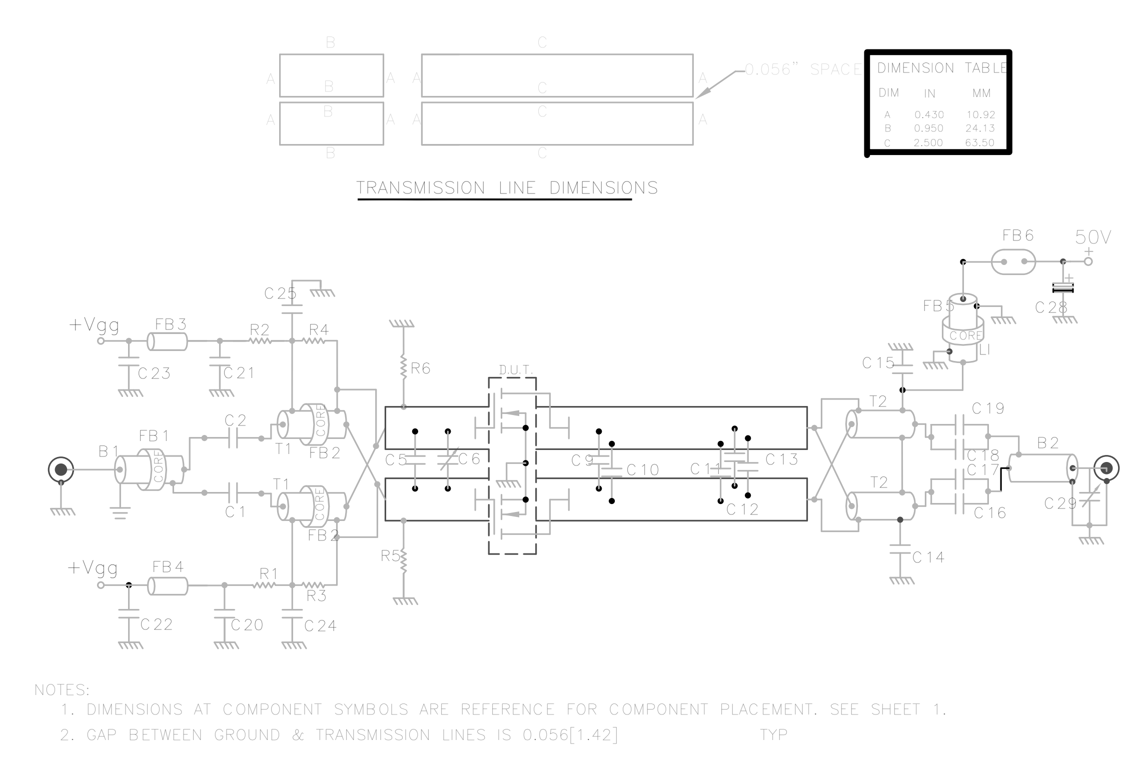


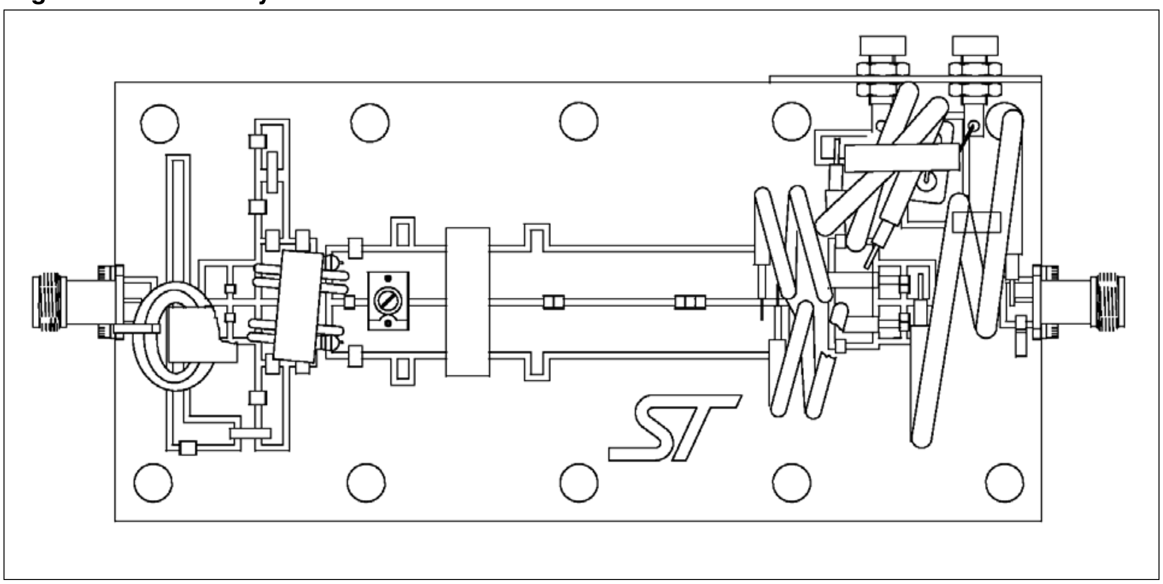
Table 7. 175 MHz part list

Component	Description
C1, C2, C14, C15, C24, C25	1200 pF ATC 700B chip capacitor
C5	75 pF ATC 100B chip capacitor
C6	ST406 variable capacitor
C9, C10	47 pF ATC 100B chip capacitor
C11, C12, C13	43 pF ATC 100B chip capacitor
C16, C18	470 pF ATC 100B chip capacitor
C17, C19, C20, C21	10,000 pF ATC 200B chip capacitor
C22, C23	.1 µF 200 V chip capacitor
C28	10 µF 100 V electrolytic capacitor
C29	.8 - 8 pF variable capacitor
R1, R2, R5, R6	430 Ω, 1/2 W chip resistor

Table 7. 175 MHz part list (continued)

Component	Description
R3, R4	270 Ω 1/2 W axial lead resistor
B1	RG-316 50 Ω 11.8" thru ferrite toroid
B2	RG-142 50 Ω 11.8"
T1	4:1, RG-316 25 Ω, 5.9", 2 turns thru ferrite core
T2	1:4, 25 Ω semi-rigid cable, OD .141", 5.9"
L1	λ/4 inductor, RG-142 50 Ω, 11.8", 3 turns thru ferrite toroid
FB1,FB5	Ferrite toroid
FB2, FB6	Multi-aperture core
FB3, FB4	Surface mount ferrite bead
PCB	Rogers ultralam 2000, Er 2.55, .060"

Figure 10. Circuit layout



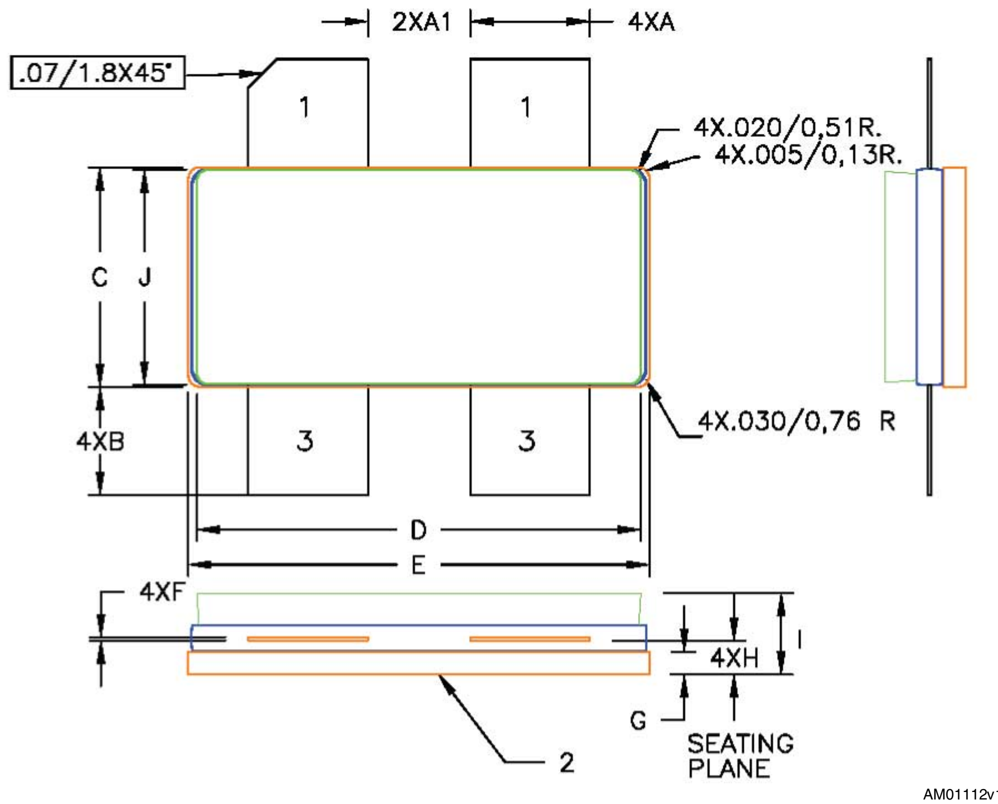
6 Package mechanical data

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 8. STAC244F package dimensions

Dim.	mm.		Inch	
	Min	Max	Min	Max
A	5.10	5.59	200	220
A1	4.32	4.83	170	190
B	4.32	5.33	170	210
C	9.65	9.91	380	390
D	19.61	20.02	772	788
E	20.45	20.70	805	815
F	0.08	1.15	.003	.006
G	0.89	1.14	.035	.045
H	1.45	1.70	.057	.067
I	3.18	4.32	.125	.170
J	9.27	9.53	.365	.375

Figure 11. Package dimensions



7 Marking, packing and shipping specifications

Table 9. Packing and shipping specifications

Order code	Packaging	Pcs per tray	Dry pack humidity	Lot code
STAC2932FW	Tray	20	< 10 %	Not mixed

Figure 12. Marking layout

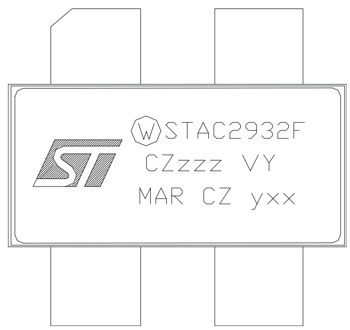


Table 10. Marking specifications

Symbol	Description
W	Wafer process code
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

8 Revision history

Table 11. Document revision history

Date	Revision	Changes
12-Feb-2010	1	First release.
29-Jun-2010	2	Updated features and description on cover page.
12-Jan-2012	3	Inserted *Section 7: Marking, packing and shipping specifications*. Minor text changes.

Please Read Carefully: