STAC2932B

RF power transistors
HF/VHF/UHF 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

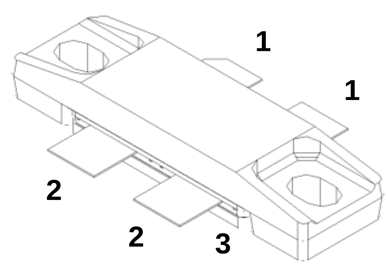
STAC244B
Air cavity

Description

The STAC2932B is a gold metallized N-channel MOS field-effect RF power transistor. It is intended for use in 50 V DC large signal applications up to 250 MHz.

The STAC2932B 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)

Contents

1 Electrical data

1.1 Maximum ratings

(T_{CASE} = 25 °C)

Table 2. Absolute maximum ratings

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

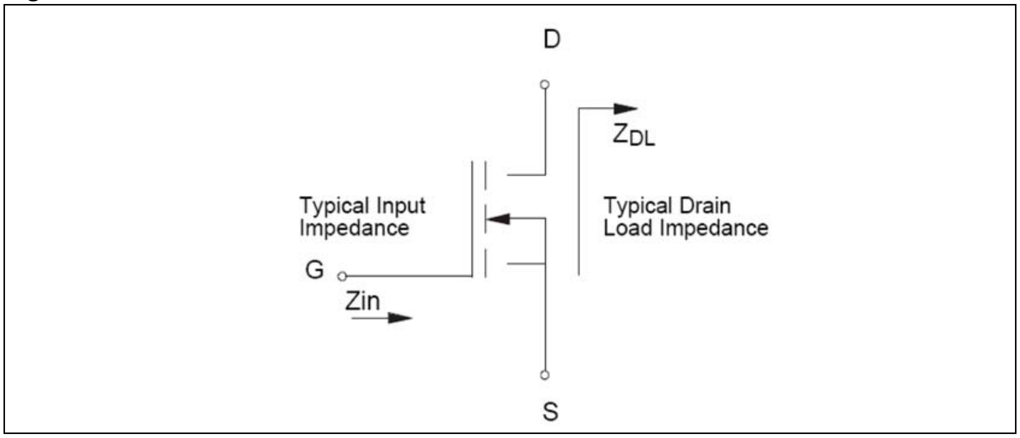


Table 6. Impedance data

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

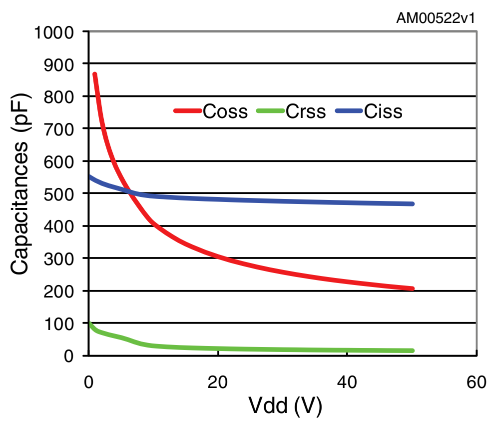


Figure 4. Output power vs drain supply voltage

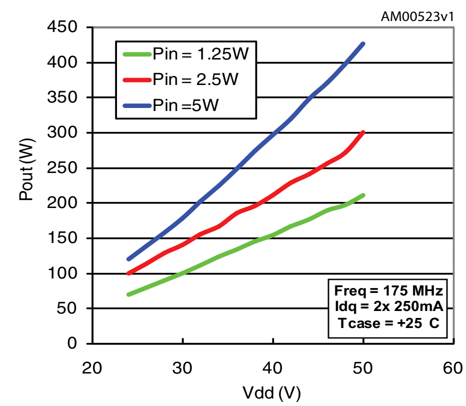


Figure 5. Output power vs gate voltage

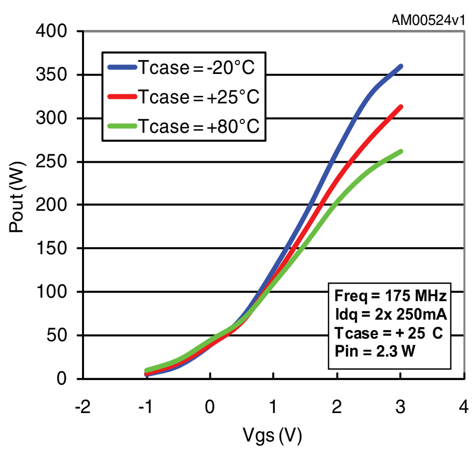


Figure 6. Output power vs input power

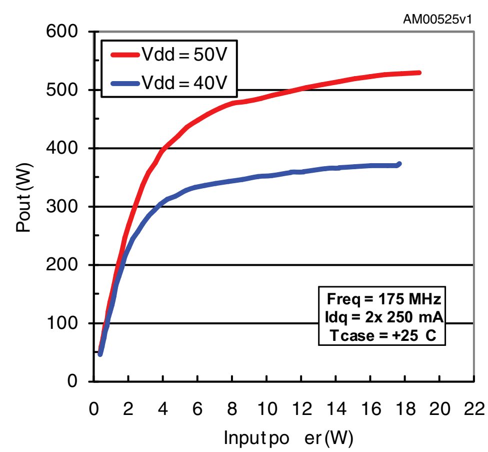


Figure 7. Output power vs input power and case temperature

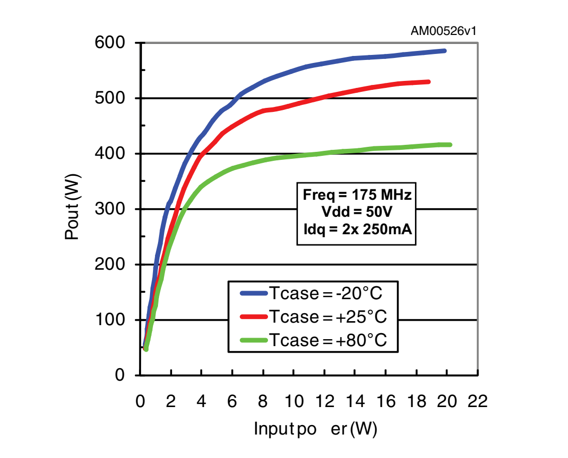
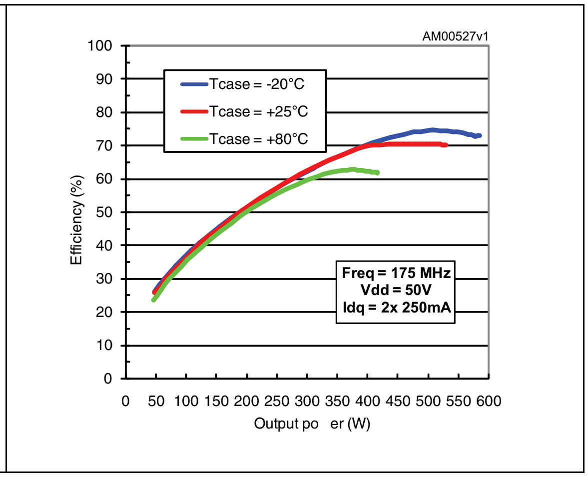


Figure 8. Efficiency vs output power and case temperature



5 Test circuit

Figure 9. 175 MHz test circuit schematic (production test circuit)

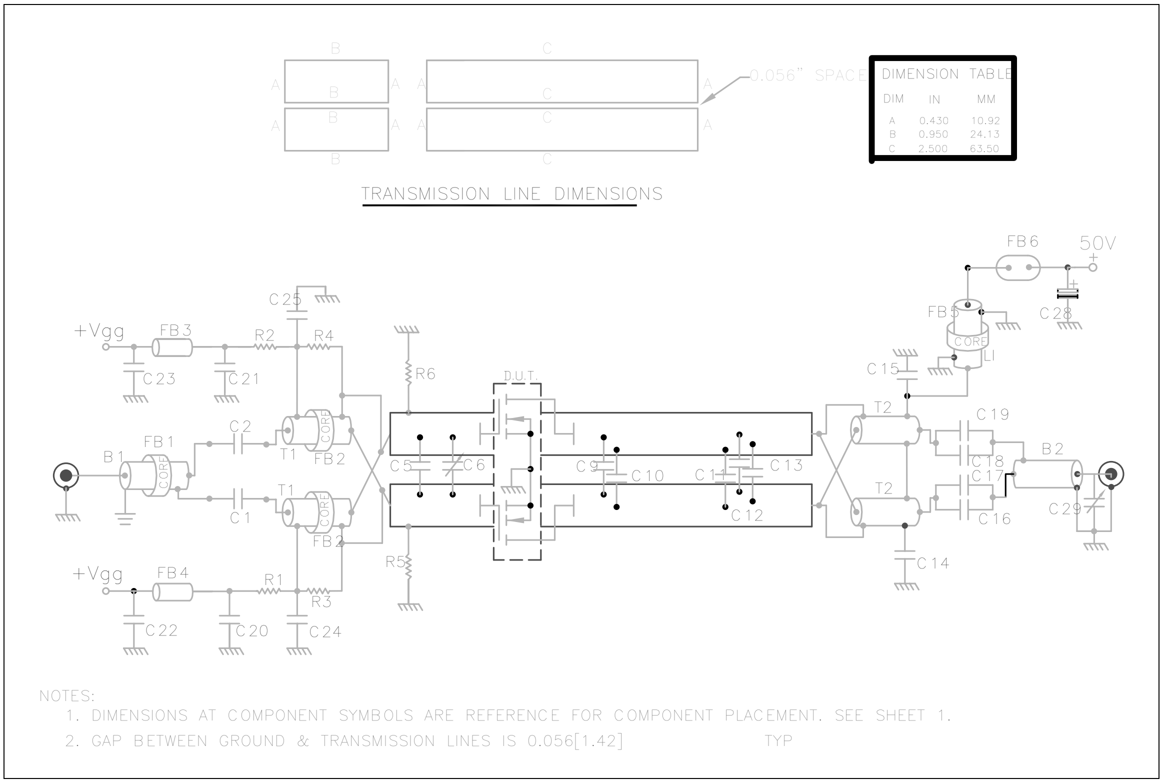


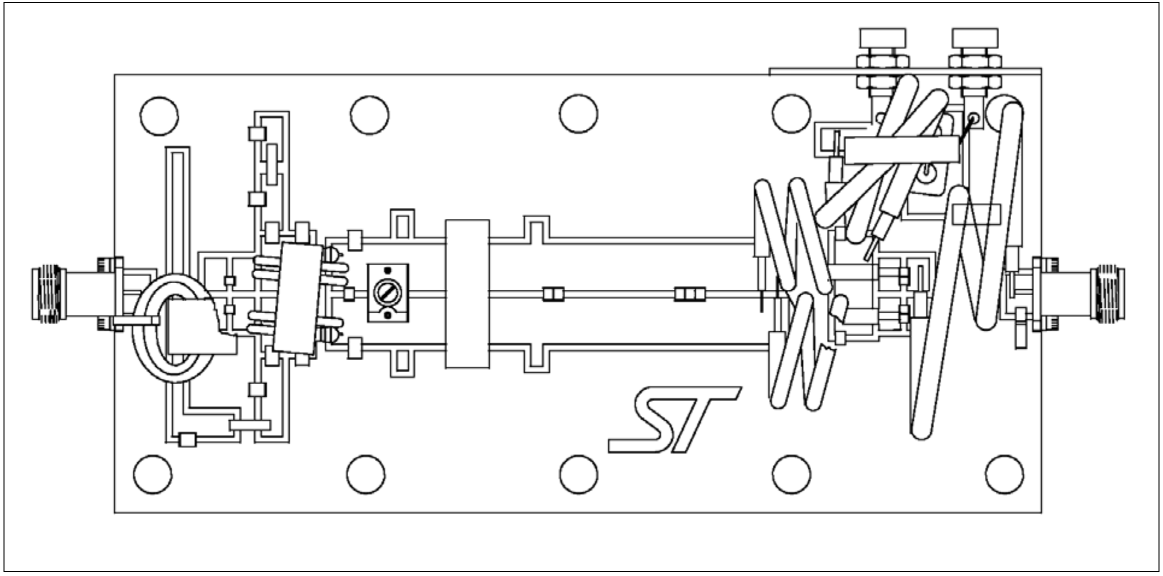
Table 7. 175 MHz test circuit component part list

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	0.1 µF 200 V chip capacitor
C28	10 µF 100 V electrolytic capacitor
C29	0.8 - 8 pF variable capacitor
R1, R2, R5, R6	430 Ω, 1/2 W chip resistor

Table 7. 175 MHz test circuit component part list (continued)

Component	Description
R3, R4	270 Ω 1/2 W axial lead resistor
B1	RG-316 50 Ω 11.8" thru ferrite toroidal
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 toroidal
FB2, FB6	multi-aperture core
FB3, FB4	surface mount ferrite bead
PCB	Rogers ultralam 2000, Er 2.55, 0.060"

Figure 10. Circuit layout



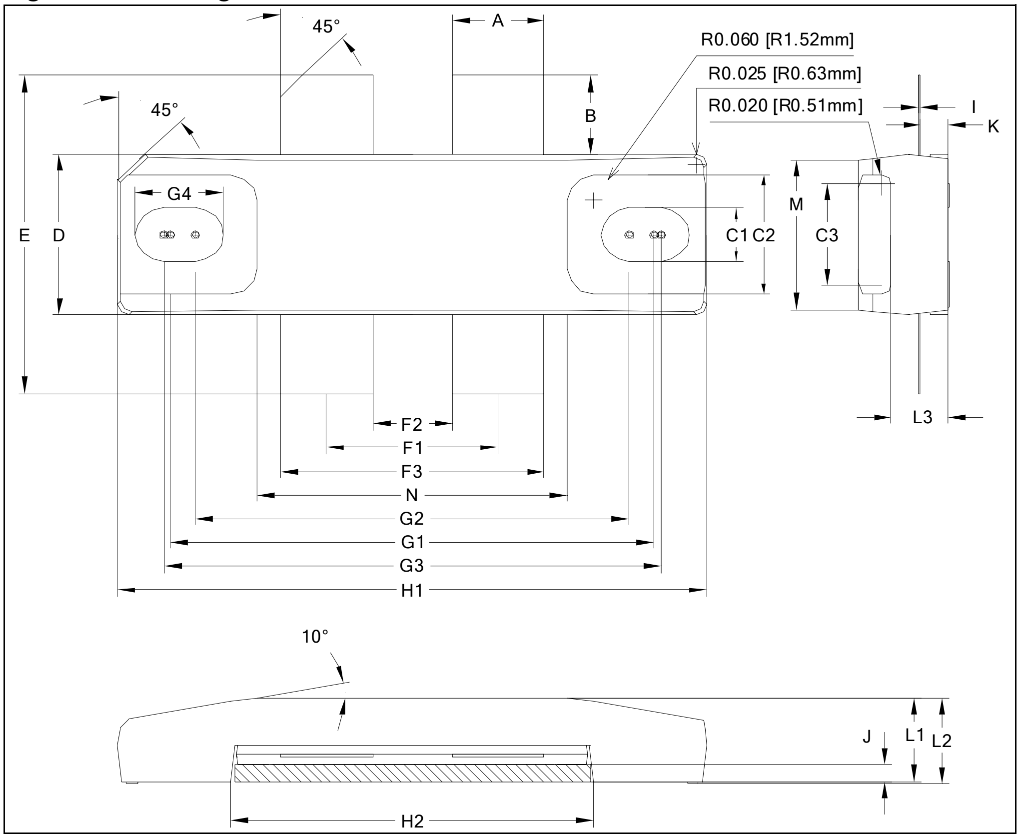
6 Package mechanical data

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. STAC244B package dimensions

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A		5.33			0.210	
B		4.83			0.190	
C1		3.25			0.128	
C2		7.24			0.285	
C3		6.22			0.245	
D		9.78			0.385	
E		19.43			0.765	
F1		9.91			0.390	
F2		4.57			0.180	
F3		15.24			0.600	
G1		27.94			1.100	
G2		25.10			0.988	
G3		28.75			1.132	
G4		5.08			0.200	
H1		34.04			1.340	
H2		20.96			0.825	
I		0.15			0.006	
J		1.02			0.040	
K		1.57			0.062	
L1		5.21			0.205	
L2		5.33			0.210	
L3		3.25			0.128	
M		9.14			0.360	
N		17.91			0.705	
Controlling dimension: inches						

Figure 11. Package dimensions



7 Revision history

Table 9. Document revision history

Date	Revision	Changes
20-Mar-2009	1	First release.
29-Jun-2010	2	Updated features and description on cover page.

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