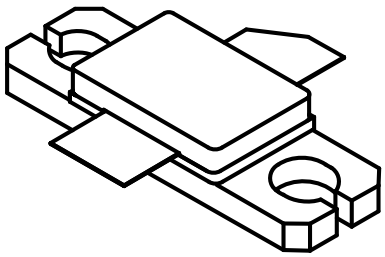
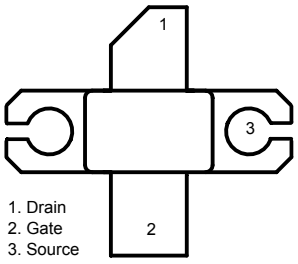
ST9060C

Datasheet

RF Power LDMOS transistor HF up to 1.5 GHz



M243
Epoxy sealed



1. Drain
2. Gate
3. Source

GADG310120180952IG

Product status link
ST9060C

Product summary	
Order code	ST9060C
Package	M243
Branding	ST9060C

Features

- Excellent thermal stability
- Common source configuration
- Integrated ESD protection – HBM Class 2
- P_{OUT} (@28 V) = 80 W with 17 dB gain / 70% efficiency @945 MHz
- BeO free package
- In compliance with European Directive 2002/95/EC

Description

The ST9060C is a 28/32 V common source N-channel enhancement-mode lateral field-effect RF power transistor designed for broadband commercial, avionics and industrial applications at frequencies up to 1.5 GHz. The device can be used in Class A, AB and C for all typical modulation formats.

1 Maximum ratings

(T_{CASE} = 25 °C)

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	90	V
V_{GS}	Gate-source voltage	-10 +13	V
I_D	Drain current	12	A
P_{DISS}	Power dissipation (@ T_C = 70 °C)	170	W
T_J	Maximum operating junction temperature	200	°C
T_{STG}	Storage temperature	-65 to +150	°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction-case thermal resistance	0.75	°C/W

2 Electrical characteristics

(T_{CASE} = 25 °C)

Table 3. Static

Symbol	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V, I_{DS} = 10 mA	90	94		V
I_{DSS}	V_{GS} = 0 V, V_{DS} = 28 V			1	µA
I_{GSS}	V_{GS} = 12 V, V_{DS} = 0 V			1	µA
$V_{GS(Q)}$	V_{DS} = 28 V, I_{DS} = 300 mA	2	2.9	5	V
$V_{DS(ON)}$	V_{GS} = 10 V, I_{DS} = 3 A		0.74	1.0	V
G_{FS}	V_{DS} = 10 V, I_{DS} = 3 A	3			S
C_{ISS}	V_{GS} = 0 V, V_{DS} = 28 V, f = 1 MHz		73		pF
C_{OSS}	V_{GS} = 0 V, V_{DS} = 28 V, f = 1 MHz		24		pF
C_{RSS}	V_{GS} = 0 V, V_{DS} = 28 V, f = 1 MHz		1.6		pF

Table 4. Dynamic (RF spec @ 945 MHz)

Symbol	Test conditions	Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 28 V, I_{DQ} = 300 mA, P_{IN} = 1.5 W		80	-	W
Gain	V_{DD} = 28 V, I_{DQ} = 300 mA, P_{IN} = 1.5 W		17.3	-	dB
Efficiency	V_{DD} = 28 V, I_{DQ} = 300 mA, P_{IN} = 1.5 W		70	-	%
Load mismatch	V_{DD} = 28 V, I_{DQ} = 300 mA, P_{OUT} = 60 W All phase angles	20:1		-	VSWR

3 Impedance data

Figure 1. **Impedance data**

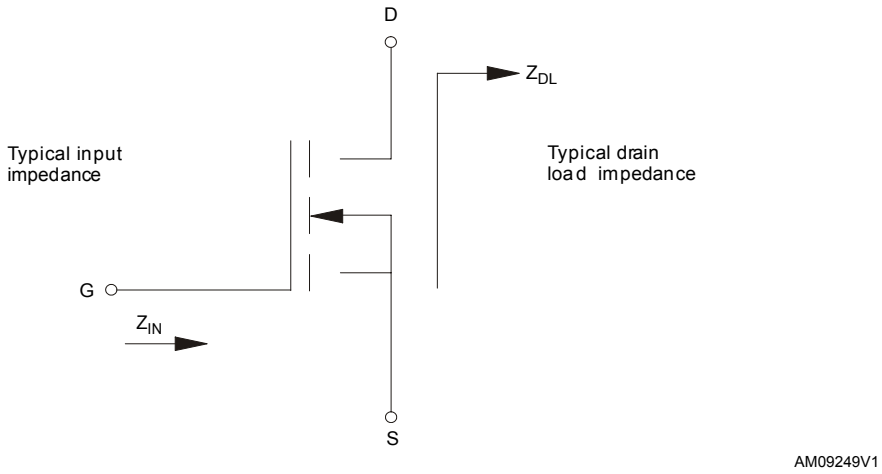


Table 5. **Impedance data**

Frequency (MHz)	$Z_{IN}\Omega$	$Z_{DL}\Omega$
100	1.04 - j 17.7	5.2 + j 0.3
200	0.97 - j 8.9	5.1 + j 0.7
300	0.88 - j 5.8	4.9 + j 0.9
400	0.58 - j 4.3	4.6 + j 1.2
500	0.76 - j 3.1	4.4 + j 1.3
600	0.97 - j 2.3	4.1 + j 1.4
700	0.94 - j 1.8	3.8 + j 1.5
800	0.88 - j 1.5	3.5 + j 1.5
900	0.90 - j 1.2	3.2 + j 1.5
1000	0.90 - j 1.0	3.0 + j 1.4
1100	0.89 - j 0.7	2.7 + j 1.3
1200	0.86 - j 0.5	2.5 + j 1.2
1300	0.85 - j 0.3	2.3 + j 1.0
1400	0.83 - j 0.2	2.1 + j 0.9
1500	0.82 + j 0.03	2.0 + j 0.7

4 Typical performance

Figure 2. Power gain and efficiency vs output power and I_{dq} (V_{DD} = 28 V, f_o = 945 MHz)

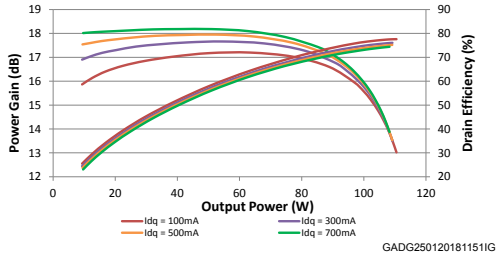


Figure 3. Power gain and efficiency vs output power and V_{DD} (I_{dq} = 300 mA, f_o = 945 MHz tuned at V_{DD} = 28 V)

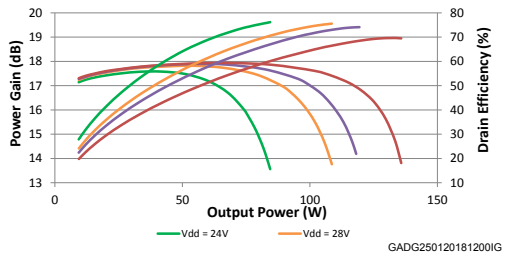


Figure 4. Output power vs V_{DD} and input power (I_{dq} = 300 mA, f_o = 945 MHz tuned at V_{DD} = 28 V)

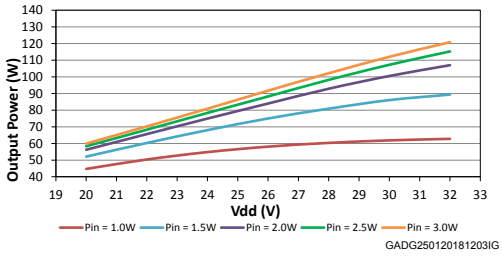
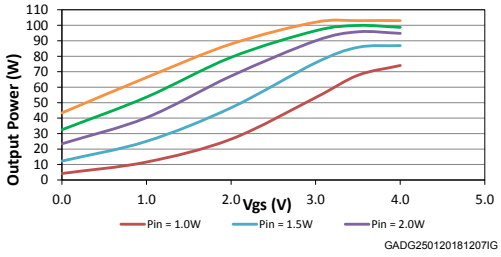


Figure 5. Output power vs V_{GS} and input power (V_{DD} = 28 V, f_o = 945 MHz)



5 Test circuit

Figure 6. **Test circuit**

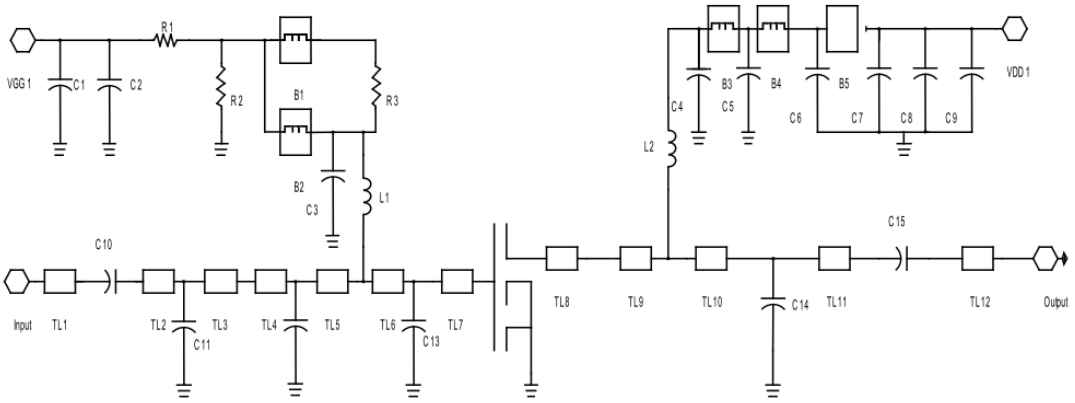
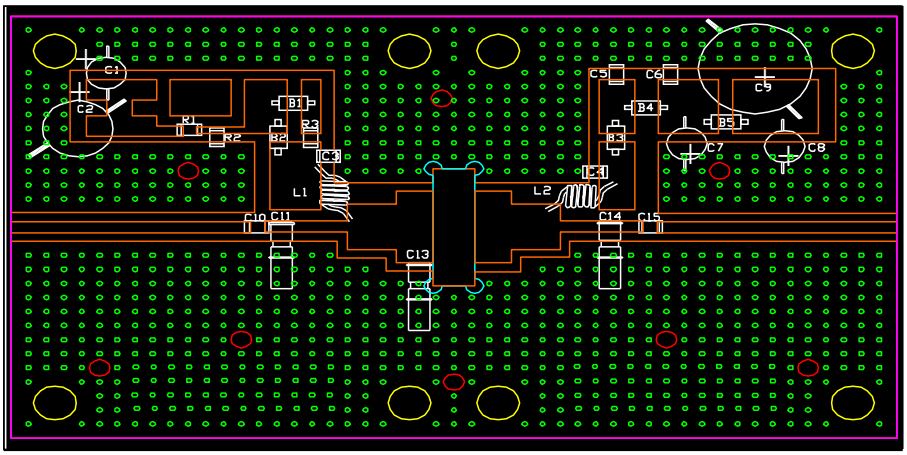


Table 6. **ST9060C components list**

Item	Quantity	Part number	Vendor	Description
R1, R2	2	CR1206-8W-112JB	VENKEL	1.1 kΩ 1/8 W surface mount chip resistor
R3	1	CR1206-8W-100JB	VENKEL	10 Ω 1/8 W surface mount chip resistor
Coil	2		BELDEN	Inductor 5 turn air wound #20 AWG ID = 0.130 inches (3.3 mm) nylon coated
B1, B2, B3, B4, B5	5	2743021447	Fair-Rite Products	Surface mount EMI shield bead
C1, C7, C8	3	T491D106K035AT	KEMET	10 µF 35 V tantalum capacitors
C2	1			100 µF 63 V electrolytic capacitor
C3, C4, C10, C15	4	ATC100B470XXXX	ATC	47 pF chip capacitor
C5, C6	2	ATC200B393MW	ATC	39000 pF chip capacitor
C9	1			330 µF 50 V electrolytic capacitor
C11, C13, C14	3	27291PC	Johanson Technology	0.8 to 8 pF giga-trim variable capacitor
TL1				L = 1.350 inches [34.29 mm] W = 0.082 inches [02.08 mm]
TL2				L = 0.144 inches [3.65 mm] W = 0.082 inches [02.08 mm]
TL3				L = 0.311 inches [7.91 mm] W = 0.082 inches [02.08 mm]
TL4				L = 00.82 inches [2.09 mm] W = 0.323 inches [08.21 mm]
TL5				L = 0.194 inches [4.94 mm] W = 0.323 inches [08.21 mm]
TL6				L = 0.059 inches [1.49 mm] W = 0.506 inches [12.85 mm]

Item	Quantity	Part number	Vendor	Description
TL7				L = 0.144 inches [3.65 mm] W = 0.506 inches [12.85 mm]
TL8				L = 0.208 inches [5.28 mm] W = 0.506 inches [12.85 mm]
TL9				L = 0.275 inches [6.98 mm] W = 0.323 inches [08.21 mm]
TL10				L = 0.210 inches [5.33 mm] W = 0.082 inches [02.08 mm]
TL11				L = 0.260 inches [6.60 mm] W = 0.082 inches [02.08 mm]
TL12				L = 1.350 inches [34.29 mm] W = 0.082 inches [02.08 mm]
Board 3X5	1		ROGERS	Er = 2.55, t = 0.0026 inches, h = 0.030 inches

Figure 7. Circuit layout



6 Package information

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.

6.1 M243 (.230 x .360 2L N/HERM W/FLG) package information

Figure 8. **M243 (.230 x .360 2L N/HERM W/FLG) package outline**

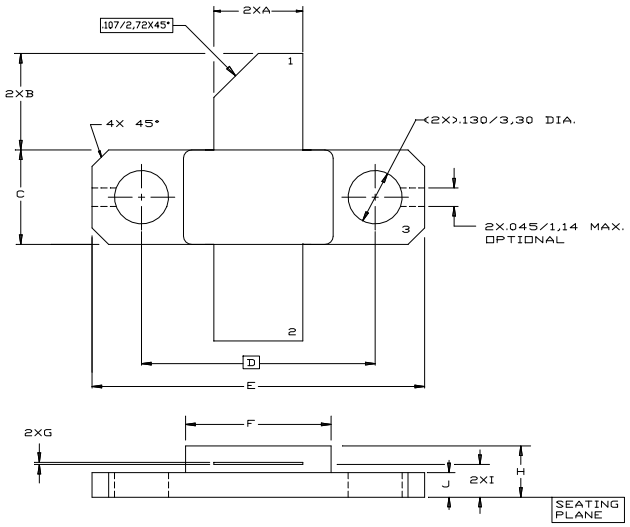


Table 7. **M243 (.230 x .360 2L N/HERM W/FLG) package mechanical data**

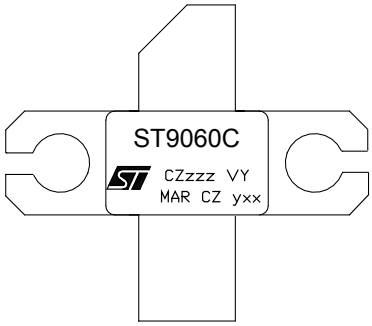
Dim.	mm		
	Min.	Typ.	Max.
A	5.21		5.72
B	5.46		6.48
C	5.59		6.1
D		14.27	
E	20.07		20.57
F	8.89		9.4
G	0.1		0.15
H	3.18		4.45
I	1.83		2.24
J	1.27		1.78

7 Marking, packing and shipping specifications

Table 8. Packing and shipping specifications

Order code	Packing	Pieces per tray	Dry pack humidity	Lot code
ST9060C	Plastic tray	25	< 10%	Two codes max.

Figure 9. Marking layout



GADG250120181223IG

Table 9. Marking specifications

Symbol	Description
CZ	Assembly plant
zzz	Last 3 digits of diffusion lot
VY	Diffusion plant
MAR	Country of origin
CZ	Test and finishing plant
y	Assembly year
xx	Assembly week

Revision history

Table 10. **Document revision history**

Date	Revision	Changes
02-Feb-2018	1	Initial release
30-Mar-2018	2	Removed maturity status indication from cover page. The document status is production data. Updated Section 7 Marking, packing and shipping specifications. Minor text changes.

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