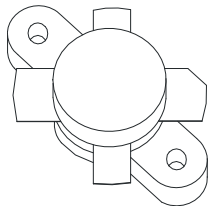
SD4931

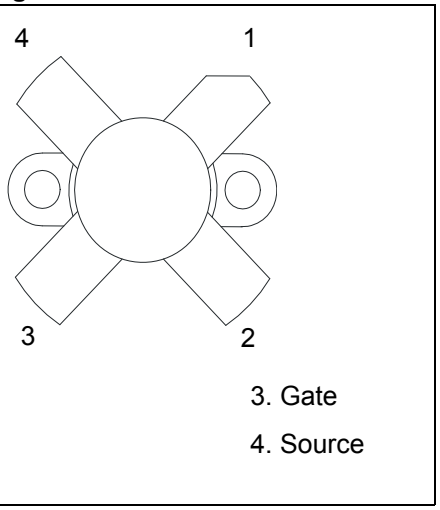
HF/VHF/UHF RF power N-channel MOSFET

Datasheet - production data



M174
Epoxy sealed

Figure 1. Pin connection



Features

- Improved ruggedness $V_{(BR)DSS}$ > 200 V
- Excellent thermal stability
- 20:1 all phases load mismatch capability
- P_{OUT} = 150 W min. with 14.8 dB gain @ 175 MHz
- In compliance with the 2002/95/EC European directive

Description

The SD4931 is an N-channel MOS field-effect RF power transistor. It is intended for use in 50 V DC large signal applications up to 250 MHz.

Table 1. Device summary

Order code	Marking	Base qty.	Package	Packaging[1]
SD4931	SD4931[1]	25 pcs	M174	Plastic tray

1. For more details please refer to *Chapter 5: 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
$V_{(BR)DSS}$	Drain source voltage	200	V
V_{DGR}	Drain-gate voltage (R_{GS} = 1 MΩ)	200	V
V_{GS}	Gate-source voltage	±20	V
I_D	Drain current	20	A
P_{DISS}	Power dissipation	389	W
T_J	Max. operating junction temperature	200	°C
T_{STG}	Storage temperature	-65 to +150	°C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction - case thermal resistance	0.45	°C/W

2 Electrical characteristics

T_{CASE} = +25 °C

2.1 Static

Table 4. Static

Symbol	Test conditions			Min	Typ	Max	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 100 mA		200			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 100 V				1	mA
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			3.5	5.0	V
G_{FS}	V_{DS} = 10 V	I_D = 2.5 A		2.5	4.0		S
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		500		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		200		pF
CRSS	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		8		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min	Typ	Max	Unit
P_{1dB}	V_{DD} = 50 V I_{DQ} = 250 mA f = 175 MHz	150	175		W
G_{PS}	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz	13	14.8		dB
n_D	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz	50	56		%
Load mismatch	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz All phase angles	10:1	20:1		VSWR

3 Typical performance

Figure 2. Transient thermal impedance

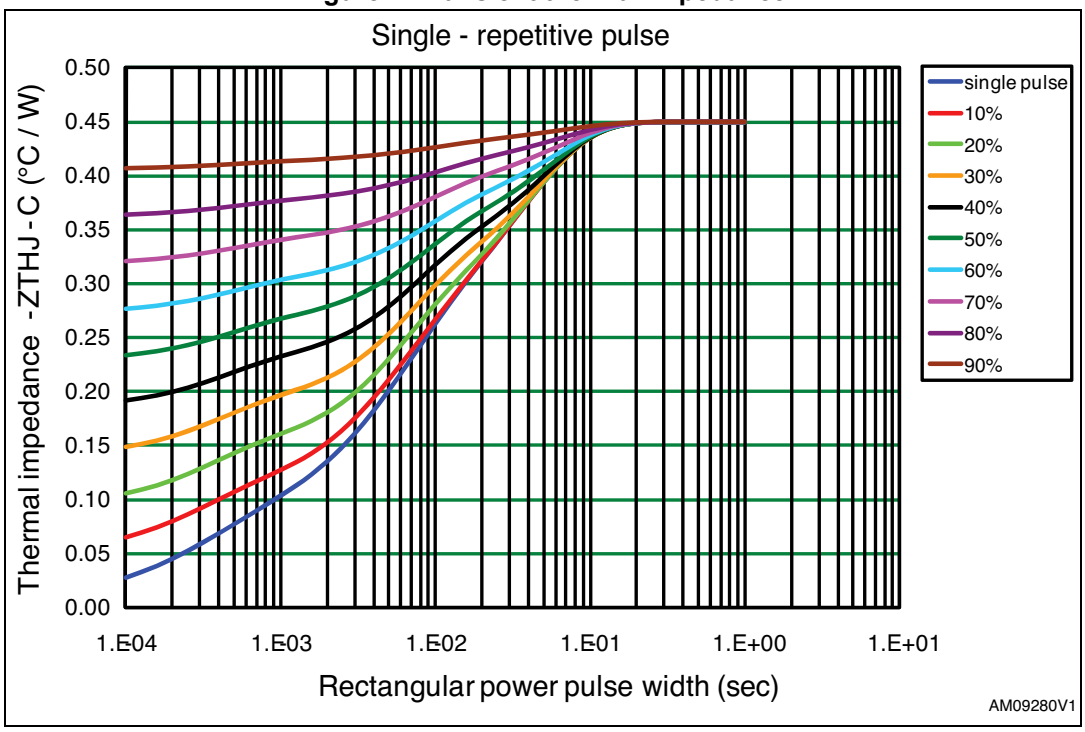


Figure 3. Transient thermal impedance model

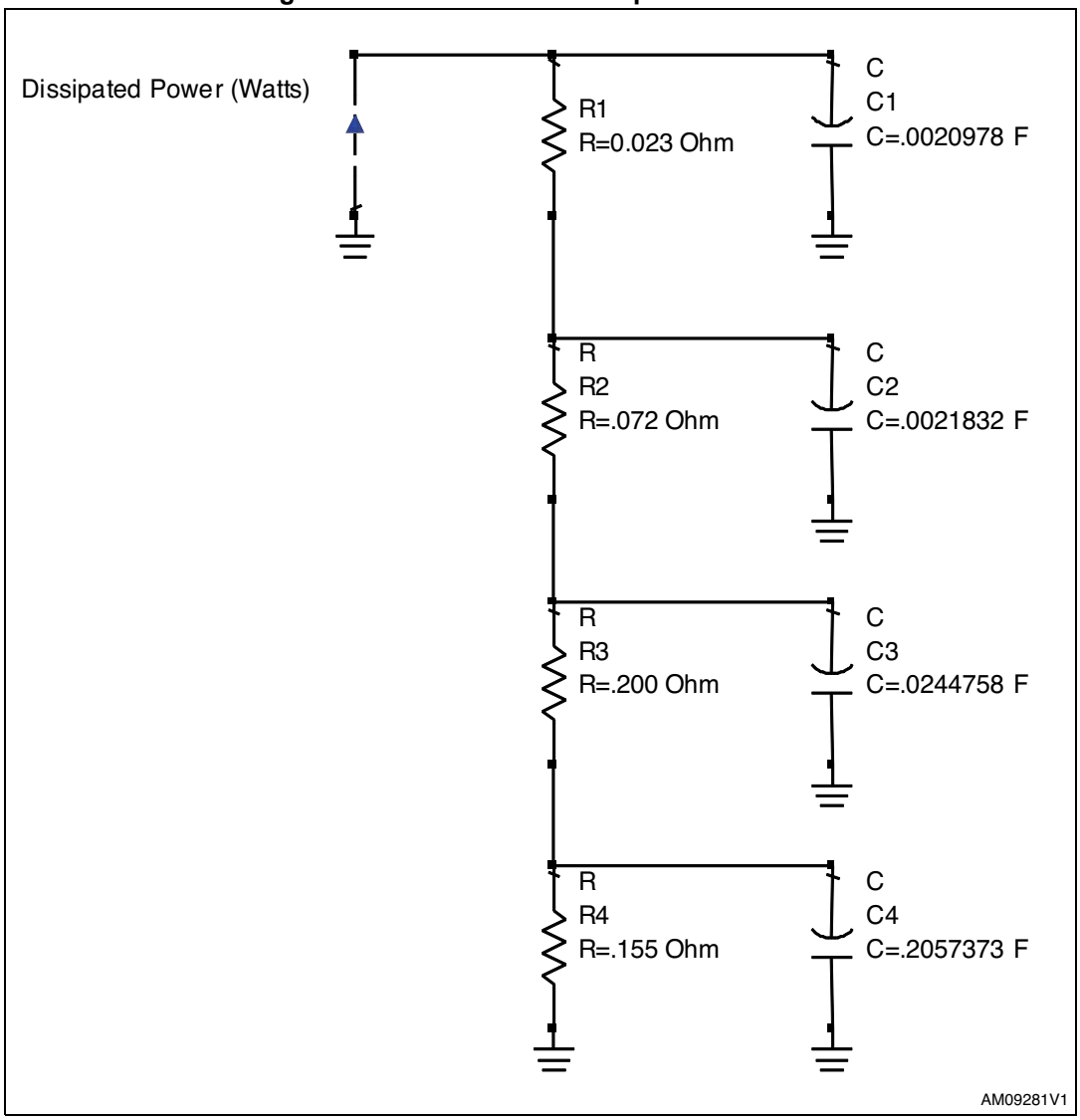


Figure 4. Power gain and efficiency vs output power_Vdd = 50 V, Idq = 250 mA, Freq = 175 MHz

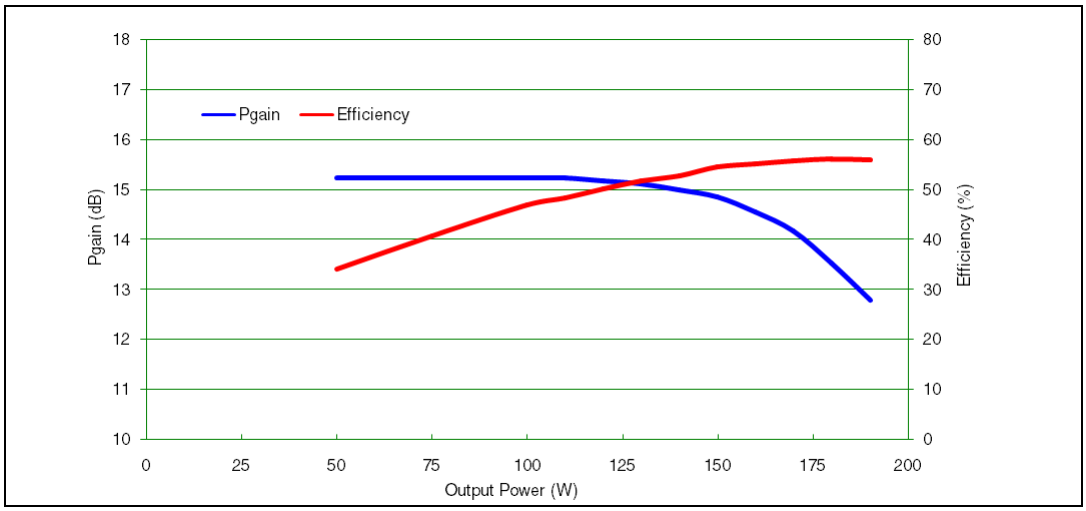


Table 6. Vgs sort (@250 mA)

Marking	Min.	Max.
DD	1.5	1.6
EE	1.6	1.7
FF	1.7	1.8
A	1.8	1.9
B	1.9	2
C	2	2.1
D	2.1	2.2
E	2.2	2.3
F	2.3	2.4
G	2.4	2.5
H	2.5	2.6
I	2.6	2.7
J	2.7	2.8
K	2.8	2.9
L	2.9	3
M	3	3.1
N	3.1	3.2
O	3.2	3.3
P	3.3	3.4
Q	3.4	3.5

Table 6. Vgs sort (@250 mA) (continued)

Marking	Min.	Max.
R	3.5	3.6
S	3.6	3.7
T	3.7	3.8
U	3.8	3.9
V	3.9	4

4 Package mechanical data

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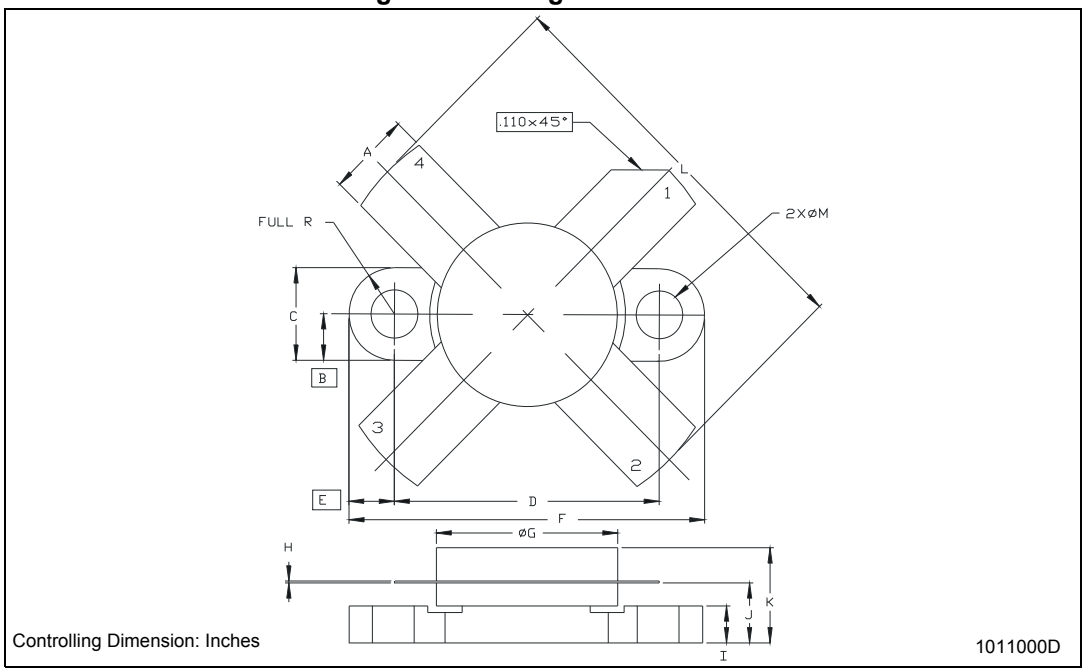
Table 7. M174 (0.500 DIA 4/L N/HERM W/FLG) mechanical data

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A	5.56		5.584	0.219		0.230
B		3.18			0.125	
C	6.22		6.48	0.245		0.255
D	18.28		18.54	0.720		0.730
E		3.18			0.125	
F	24.64		24.89	0.970		0.980
G	12.57		12.83	0.495		0.505
H	0.08		0.18	0.003		0.007
I	2.11		3.00	0.083		0.118
J	3.81		4.45	0.150		0.175
K			7.11			0.280
L	25.53		26.67	1.005		1.050
M	3.05		3.30	0.120		0.130

Figure 5. Package dimensions



5 Marking, packing and shipping specifications

Table 8. Packing and shipping specifications

Order code	Packaging	Pcs per tray	Dry pack humidity	V_{GS} sort	Lot code
SD4931	Plastic tray	25	< 10%	Not mixed	Not mixed

Figure 6. Marking layout

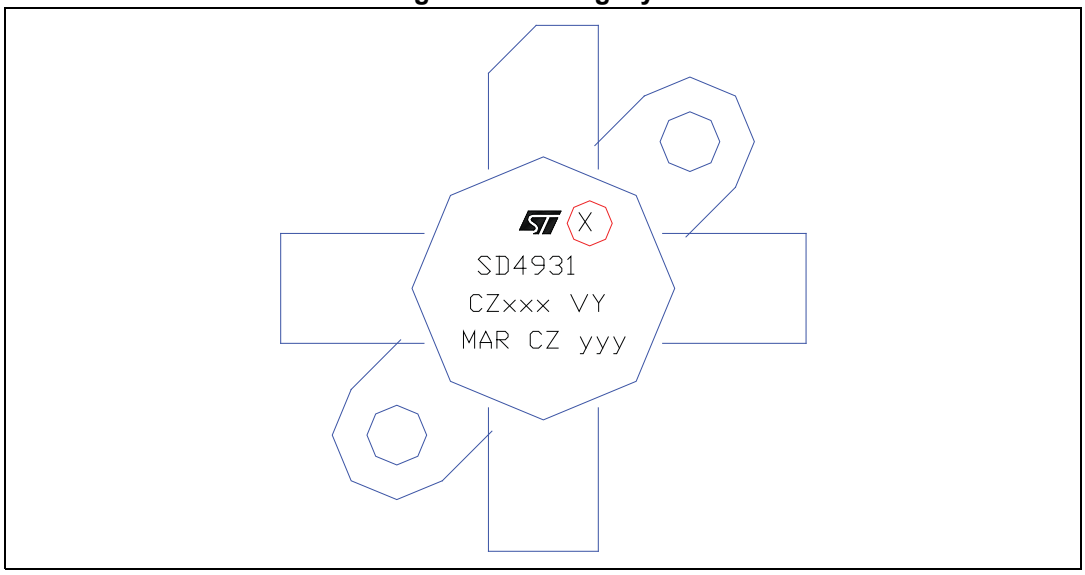


Table 9. Marking specifications

Symbol	Description
X	V_{GS} 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

6 Revision history

Table 10. Document revision history

Date	Revision	Changes
17-Mar-2008	1	Initial release.
14-Jan-2010	2	Updated test conditions in *Table 5: Dynamic*.
23-May-2011	3	Inserted *Figure 2: Transient thermal impedance*, *Figure 3: Transient thermal impedance model* and *Section 5: Marking, packing and shipping specifications*.
10-Jun-2013	4	– Modified document title to “HF/VHF/UHF RF power N-channel MOSFET” – Corrected error in $V_{GS(Q)}$ symbol and test conditions in *Table 4: Static*. – Minor text edits.

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