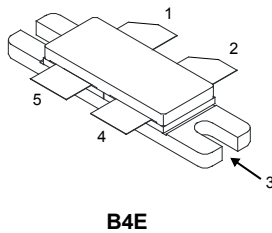


250 W, 28/32 V RF Power LDMOS transistor from HF to 1 GHz


Pin connection

Pin	Connection
1	Drain A
2	Drain B
3	Source (bottom side)
4	Gate B
5	Gate A

Product status link

ST05250

Product summary

Order code	ST05250
Marking	ST05250
Package	B4E
Packing	Tape and reel 13"
Base / Bulk qty	120 / 120

Features

Order code	Frequency	V _{DD}	P _{OUT}	Gain	Efficiency
ST05250	945 MHz	28 V	250 W	13.4 dB	52%

- High efficiency and linear gain operations
- Integrated ESD protection
- Large positive and negative gate / source voltage range
- In compliance with the 2002/95/EC European directive

Applications

- 2-30 MHz HF or Short wave communication
- 30 – 88 MHz ground communication
- 118 – 140 MHz Avionics
- 136 – 174 MHz commercial ground communication
- 30 – 512 MHz Jammer, ground / air communication
- HF to 1000 MHz ISM - Instrumentation

Description

The **ST05250** is a 250 W 28/32 V LDMOS FETs, designed for wideband communication and ISM applications with frequencies from HF to 1000 MHz. It can be used in class AB/B and class C for all typical modulation formats.

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
BV_{DSS}	Drain-source voltage	90	V
V_{GS}	Gate-source voltage	-8 / +10	V
V_{DD}	Drain voltage operating voltage	36	V
T_{STG}	Storage temperature range	-65 to +150	°C
T_J	Junction temperature	+200	°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case, $T_J = +200$ °C, DC test	0.32	°C/W

Table 3. ESD protection

Symbol	Parameter	Class
HBM	Human body model (per JESD22-A114)	2

2 Electrical characteristics

($T_C = 25\text{ °C}$ unless otherwise specified).

Table 4. Static (per side)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = 1\text{ mA}$	90			V
I_{DSS}	Zero-gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = 28\text{ V}$			1	μA
		$V_{GS} = 0\text{ V}$, $V_{DS} = 75\text{ V}$			10	
I_{GSS}	Gate-body leakage current	$V_{DS} = 0\text{ V}$, $V_{GS} = 10\text{ V}$			1	μA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = 28\text{ V}$, $I_D = 650\text{ }\mu\text{A}$	1		3	V
$V_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\text{ V}$, $I_D = 0.7\text{ A}$			0.21	V
C_{iss}	Common source input capacitance	$V_{GS} = 0\text{ V}$, $V_{DD} = 28\text{ V}$, $f = 1\text{ MHz}$		123		pF
C_{oss}	Common source output capacitance			2.5		
C_{rss}	Common source feedback capacitance			40		

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
P_{OUT}	Output power	$V_{DD} = 28\text{ V}$, $I_{DQ} = 0.5\text{ A}$, $f = 945\text{ MHz}$, $PW = 20\text{ }\mu\text{s}$, $DC = 10\%$	-	250		W
Gain	Power gain		-	13.4		dB
Efficiency	Drain efficiency		-	52		%
VSWR	Load mismatch	At $P_{OUT} = 250\text{ W}$ all phases	-		10:1	

2.1 Electrical characteristics (curves)

Figure 1. Output power and efficiency vs frequency

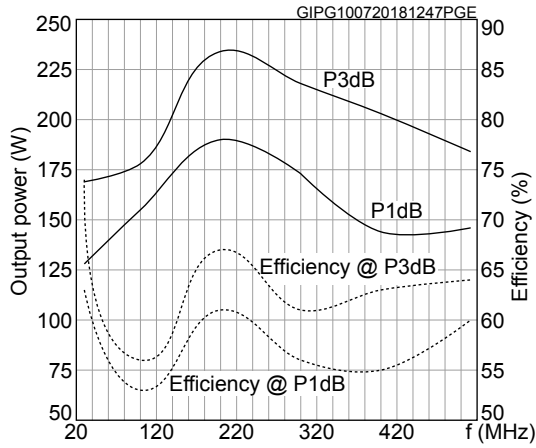


Figure 2. Capacitance vs drain voltage

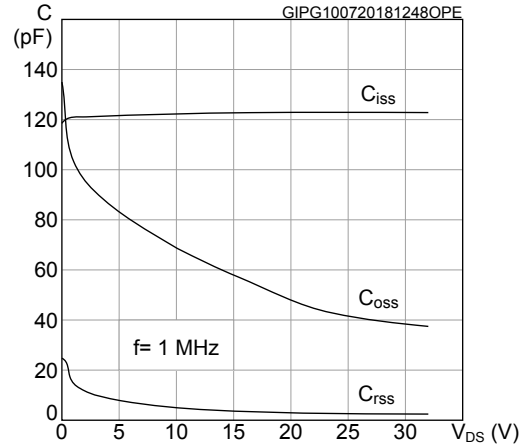
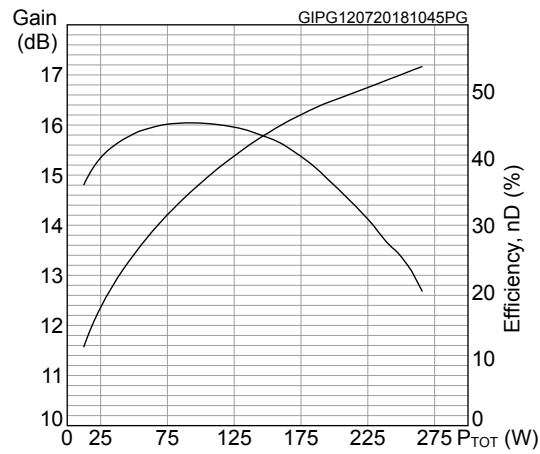


Figure 3. Power gain and efficiency versus output power ($f = 945$ MHz, $V_{DD} = 28$ V, $I_{DQ} = 0.5$ A/20 μ s - 10%)



3 Test circuits

Figure 4. Circuit layout at 930 MHz

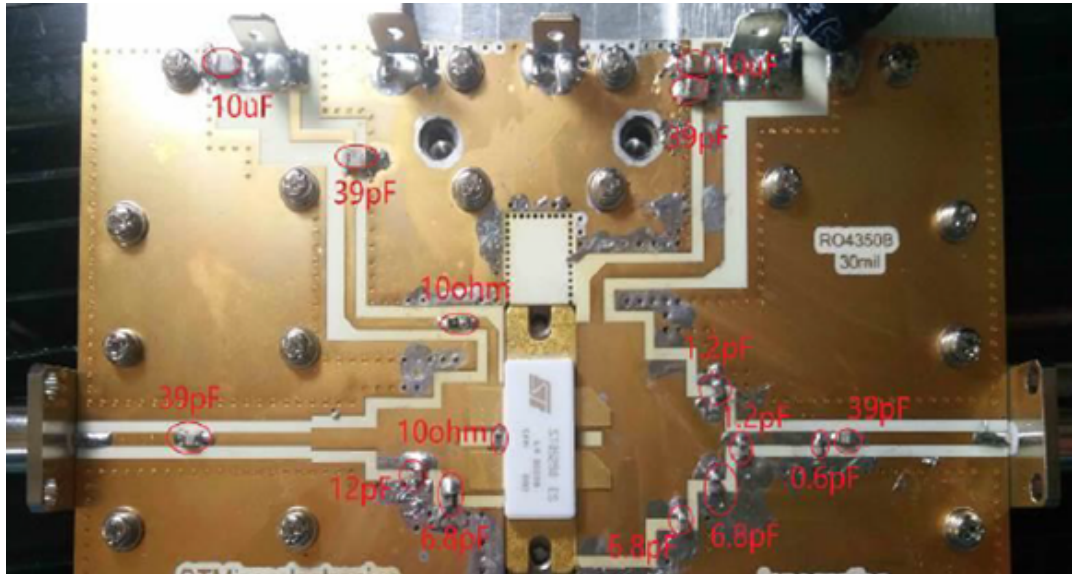


Figure 5. Circuit layout: broadband 30 - 512 MHz

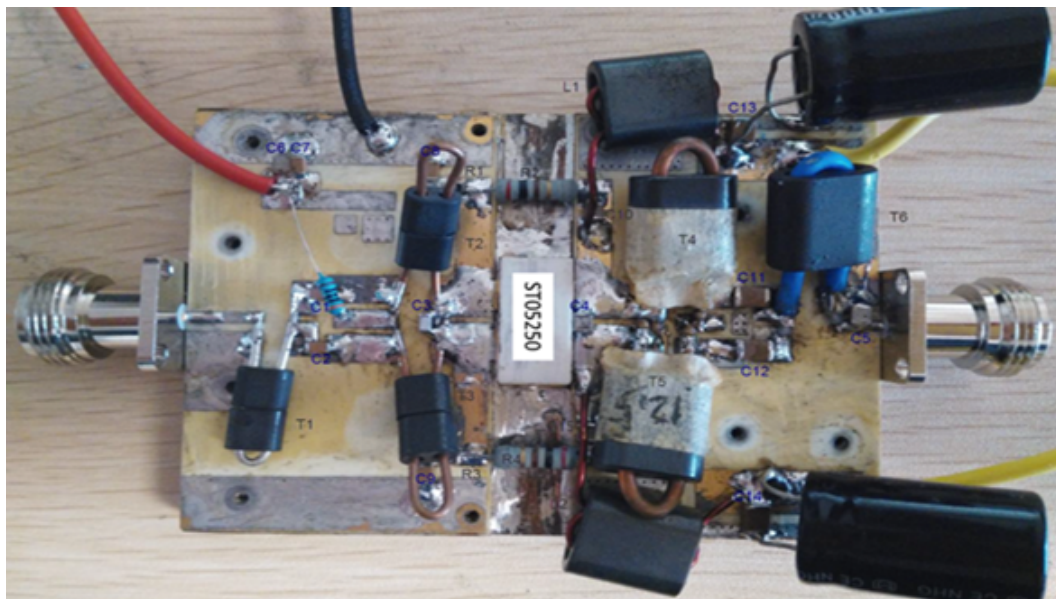


Table 6. Components list: 30 – 512 MHz

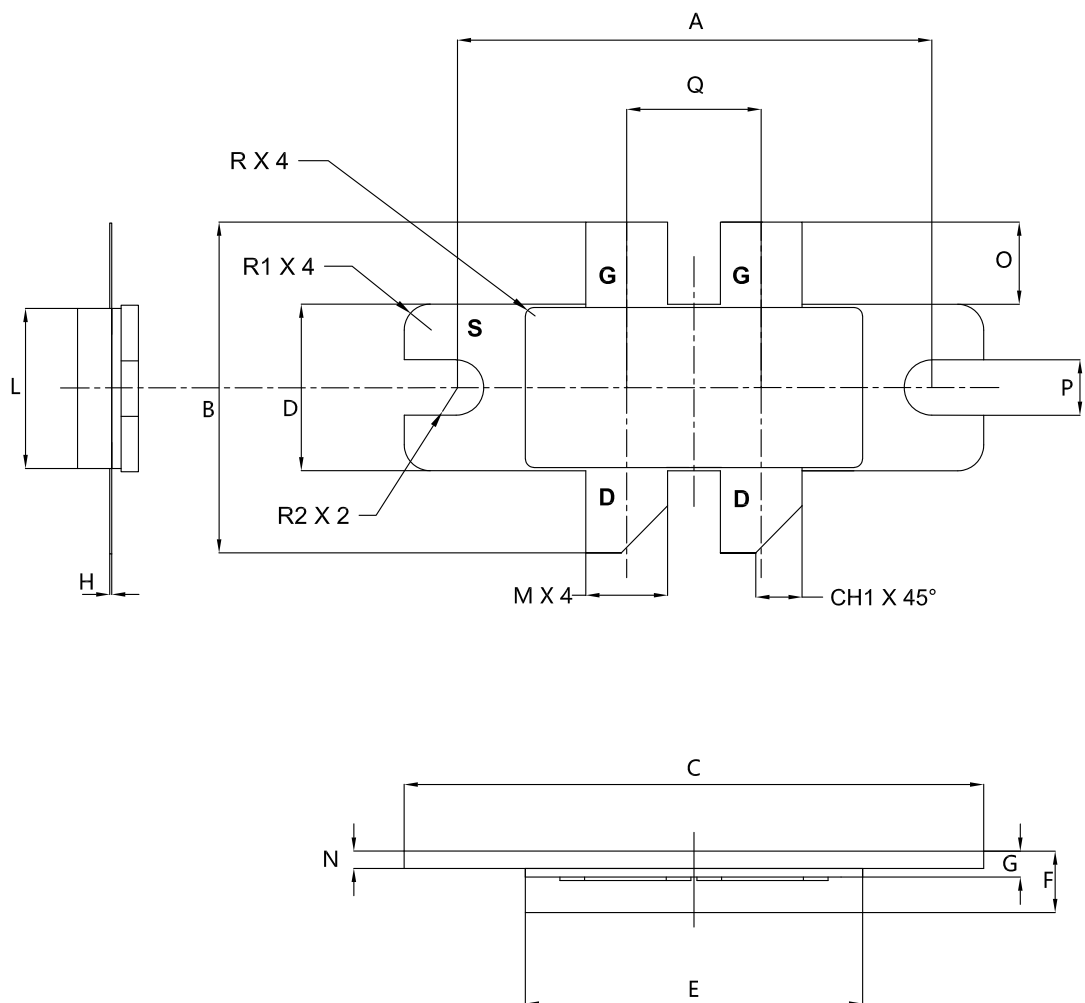
Item	Value	Description
C1, C2, C7, C8, C9	1 μ F	
C3	18 pF	ATC800B
C4	10 pF	ATC800B
C5	2.7 pF	ATC800B
C6	1000 pF	ATC800B
C10, C15	470 pF	ATC800B
C11, C12, C13, C14	10 μ F	
R1, R3	10 Ω	
R2, R4	200 Ω	
T1	55 mm 50 Ω	fair-rite 2861002402
T2, T3	70 mm 12 Ω	fair-rite 2861002402
T4, T5	70 mm 12 Ω	fair-rite 2861002402
T6	70 mm 50 Ω	fair-rite 2861002402
L1, L2	2 turns	fair-rite 2861002402

4 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.

4.1 B4E package information

Figure 6. B4E package outline



DM00418520_2

Table 7. B4E package mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	27.81	27.94	28.07
B	18.93	19.43	19.93
C	33.91	34.04	34.17
D	9.65	9.78	9.91
E	19.56	19.81	20.06
F	3.23	3.61	3.99
G	1.40	1.53	1.66
H	0.07		0.15
L	9.20	9.40	9.60
M	4.67	4.80	4.93
N	0.89	1.02	1.15
O	4.70	4.83	4.96
P	3.13	3.26	3.39
Q	7.77	7.90	8.03
R		0.50	
R1		1.52	
R2		1.63	
CH1		2.72	

Revision history

Table 8. Document revision history

Date	Version	Changes
01-Aug-2018	1	Initial release.
09-Sep-2020	2	Updated Section Product status / summary, Table 5. Dynamic and Section 4.1 B4E package information.

Contents

1	Electrical ratings	2
2	Electrical characteristics	3
2.1	Electrical characteristics (curves)	4
3	Test circuits	5
4	Package information	7
4.1	B4E package information	7
	Revision history	9

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, please refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2020 STMicroelectronics – All rights reserved