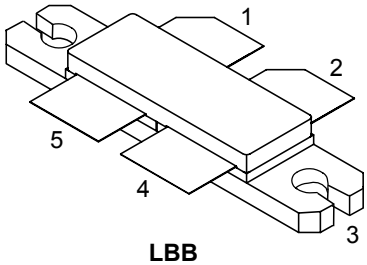
RF3L05150CB4

Datasheet

150 W, 28/32 V RF power LDMOS transistor from HF to 1 GHz



LBB

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

Product status link
RF3L05150CB4

Product summary	
Order code	RF3L05150CB4
Marking	RF3L05150CB4
Package	LBB
Packing	Tape and reel 13"
Base/bulk quantity	100/100

Features

Order code	Frequency	V_{DD}	P_{OUT}	Gain	Efficiency
RF3L05150CB4	520 MHz	28 V	150 W	23 dB	60 %

- High efficiency and linear gain operations
- Integrated ESD protection
- Large positive and negative gate-source voltage range for improved class C operation
- In compliance with the european directive 2002/95/EC

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 RF3L05150CB4 is a 150 W, 28/32 V LDMOS FET designed for wide-band communication and ISM applications with frequencies from HF to 1 GHz. It can be used in class AB, B or C for all typical modulation formats.

1 Electrical ratings

Table 1. Absolute maximum ratings (T_C = 25 °C)

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

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{THJC} (1)	Junction-case thermal resistance	0.4	°C/W

1. *T_C = 85 °C , T_J = 200 °C, DC test.*

Table 3. ESD protection

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

2 Electrical characteristics

(T_C = 25 °C unless otherwise specified)

Table 4. Static

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	V_{GS} = 0 V, I_{DS} = 100 µA	90			V
I_{DSS}	Zero gate voltage drain leakage current	V_{GS} = 0 V, V_{DS} = 75 V			1	µA
I_{GSS}	Gate-source leakage current	V_{GS} = 10 V, V_{DS} = 0 V			100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = 42 V, I_{DS} = 600 µA	1.75		2.50	V
$V_{GS(Q)}$	Gate quiescent voltage	V_{DS} = 1 V, I_{DS} = 800 mA	2.0	3.8	5.0	V
$V_{DS(on)}$	Static drain-source on-voltage	V_{GS} = 10 V, I_{DS} = 2 A			650	mV
$I_{DS(on)}$	Static drain-source on-current	V_{GS} = 10 V, V_{DS} = 100 mV			2.5	A
$R_{DS(on)}$	Drain-source on-state resistance	V_{GS} = 10 V, V_{DS} = 100 mV			1	Ω
C_{ISS}	Common source input capacitance	V_{GS} = 0 V, V_{DD} = 28 V, f = 1 MHz		70		pF
C_{RSS}	Common source feedback capacitance			1.1		pF
C_{OSS}	Common source output capacitance			30		pF

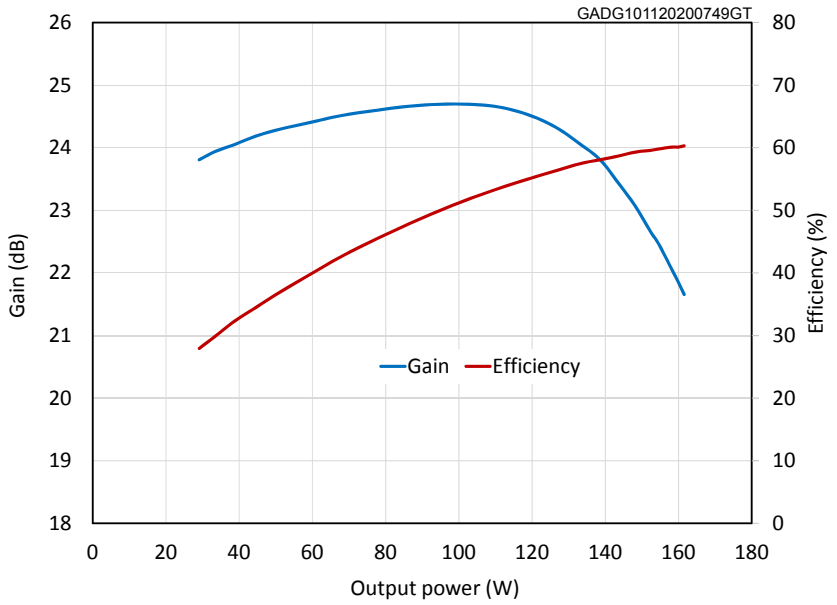
Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
f	Frequency				1000	MHz
P_{OUT}	Output power	f = 520 MHz		150		W
G_{PS}	Power gain			23		dB
η_D	Drain efficiency			60		%
VSWR	Load mismatch	At 150 W pulsed CW output power, all phase angles			20:1	

Note: V_{DD} = 28 V, I_{DQ} = 500 mA, pulse width = 20 µs, duty cycle = 10%.

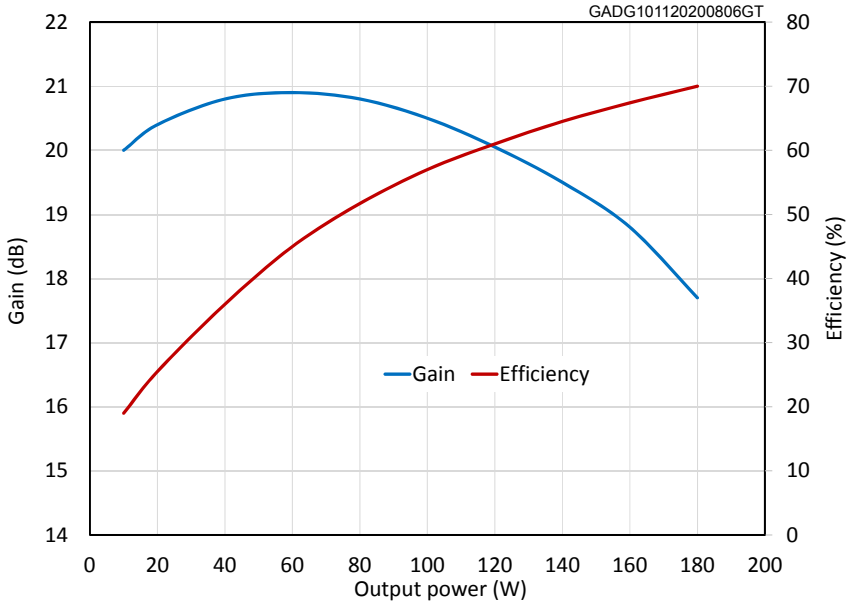
3 Typical performances

Figure 1. Power gain and drain efficiency versus output power (f = 520 MHz)



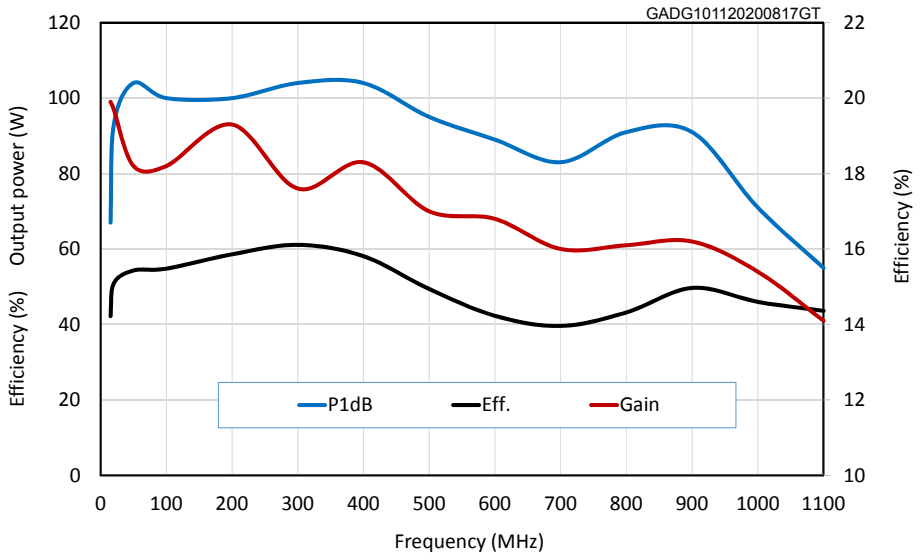
Note: V_{DD} = 28 V, I_{DQ} = 500 mA, pulse width = 20 µs, duty cycle = 10%.

Figure 2. Power gain and drain efficiency versus output power (f = 860 MHz)



Note: V_{DD} = 32 V, I_{DQ} = 400 mA, pulse width = 20 µs, duty cycle = 10%.

Figure 3. Gain, efficiency and output power versus frequency (typical broadband data)



Note: V_{DD} = 28 V, I_{DQ} = 400 mA, pulse width = 20 µs, duty cycle = 10%.

4 Test circuit (f = 650 MHz)

Figure 4. Test circuit layout

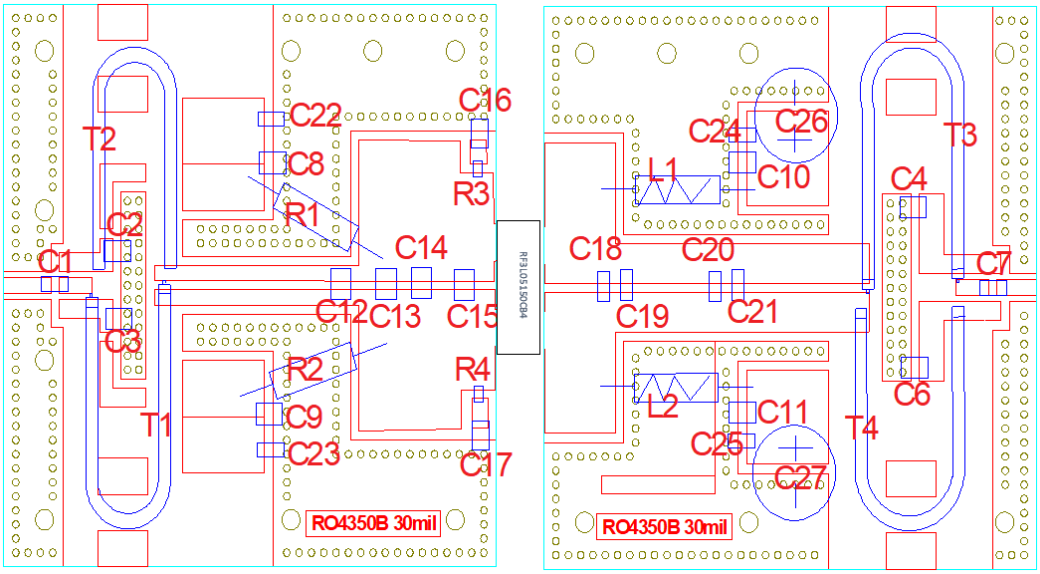


Figure 5. Test circuit photo

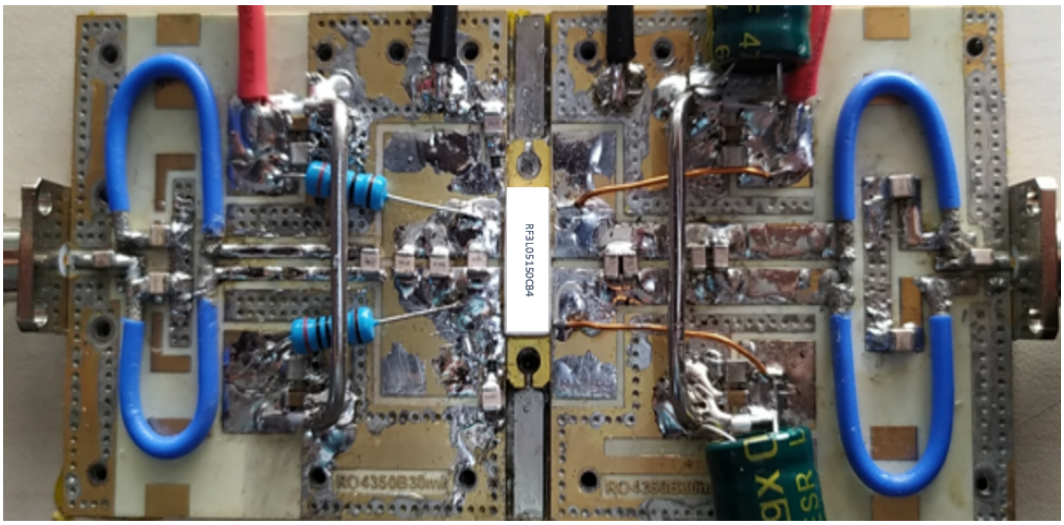


Table 6. Components list

Component	Value	Order code
C1~C7	47 pF	DLC70B
C8~C11	68 pF	ATC800B
C12,C13,14	18 pF	DLC70B
C15	20 pF	DLC70B
C16,C17	1000 pF	DLC70B
C18	2.2 pF	DLC70B
C19	5.6 pF	DLC70B
C20	12 pF	DLC70B
C21	5.6 pF	DLC70B
C22~C25	110 µF	100V/10µF
C26,C27	470 µF	63V/470µF
R1,R2	200 Ω	
R3,R4	Chip resistor, 15 Ω, 0805	
L1,L2	ϕ0.5, 30 mm, enameled wire	
T1,T2,T3,T4	25 Ω, 50 mm	SF-086-1.5
PCB	30mil Rogers4350B	

5 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.

5.1 LBB package information

Figure 6. LBB package outline

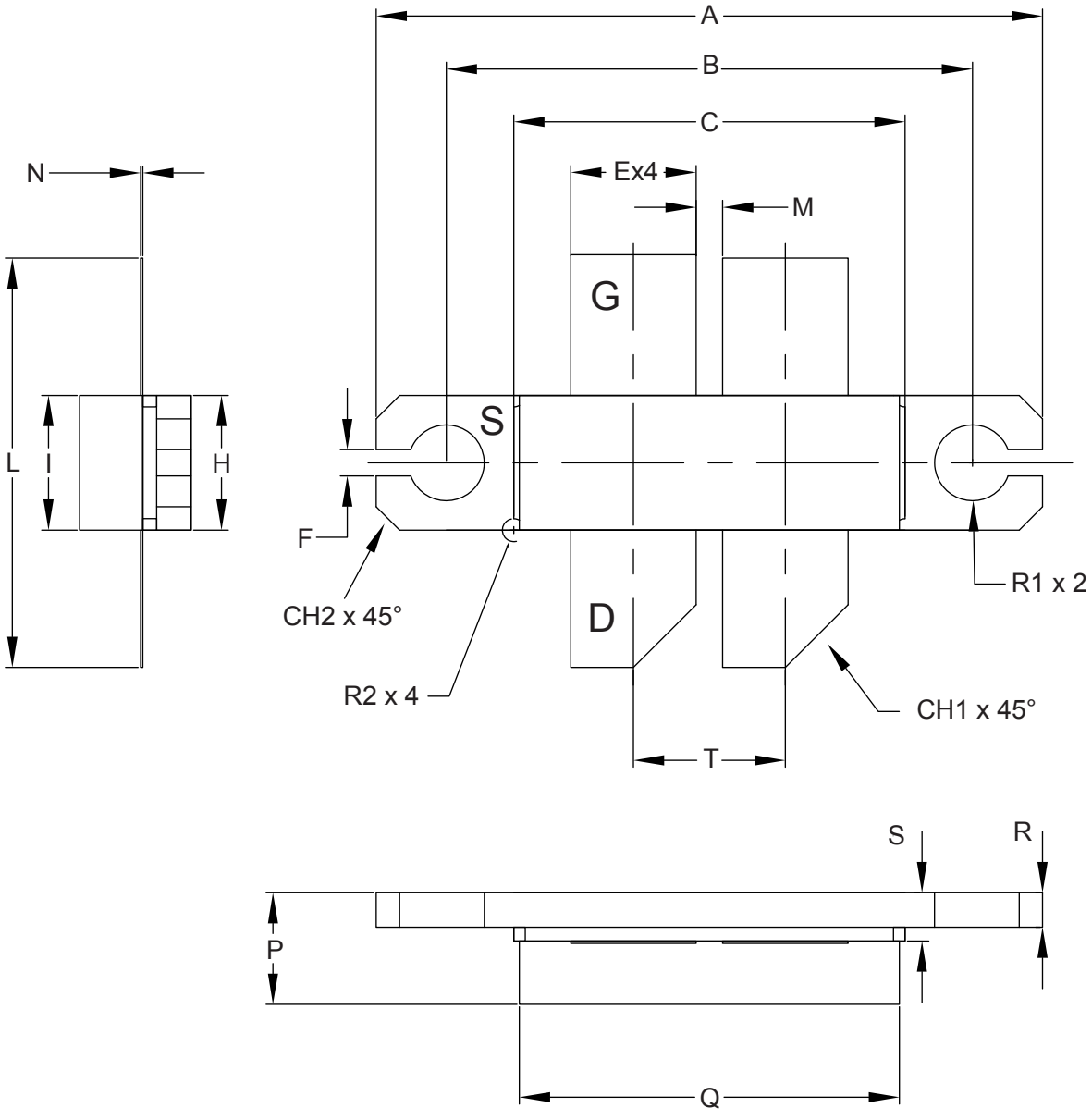


Table 7. **LBB mechanical data**

Symbol	Millimeters		
	Min.	Typ.	Max.
A	28.82	28.95	29.08
B	22.73	22.86	22.99
C	16.87	17.00	17.13
E	5.32	5.45	5.58
F	1.01	1.14	1.27
H	5.72	5.85	5.98
I	5.72	5.85	5.98
L	17.65	17.78	17.91
M	1.02	1.15	1.28
N		0.10	
P	4.72	4.85	4.98
Q	16.38	16.51	16.64
R	1.37	1.50	1.63
S	1.97	2.10	2.23
T		6.60	
CH1		2.72	
CH2		1.02	
R1		1.65	
R2		0.50	

Revision history

Table 8. **Document revision history**

Date	Version	Changes
08-Jun-2020	1	First release
12-Nov-2020	2	Updated Features. Updated Table 5. Dynamic. Updated Section 3 Typical performances. Updated Section 4 Test circuit (f = 650 MHz). Minor text changes.

Contents

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.