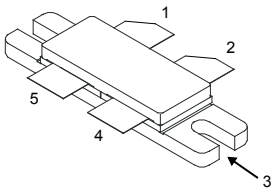
RF2L16180CB4

Datasheet

180 W, 28 V, 1.3 to 1.6 GHz RF power LDMOS transistor



B4E

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

Product status link
RF2L16180CB4

Product summary	
Order code	RF2L16180CB4
Marking	2L16180
Package	B4E
Packing	Tape and reel 13”
Base/bulk Quantity	120/120

Features

Order code	f (MHz)	V_{DD}	P_{OUT}	G_{ain}	Efficiency
RF2L16180CB4	1450	28 V	180 W	14 dB	60%

- High efficiency and linear gain operations
- Integrated ESD protection
- Internally matched for ease of use
- Optimized for Doherty applications
- Large positive and negative gate-source voltage range for improved class C operation
- In compliance with the European Directive 2002/95/EC

Applications

- Multicarrier base station
- Industrial, scientific and medical

Description

The RF2L16180CB4 is 180 W, 28 V internally matched LDMOS transistor designed for multicarrier WCDMA/PCS/DCS/LTE base station and ISM applications with frequencies from 1300 to 1600 MHz. Four leads can be configured as single ended, 180 degree push-pull or 90 degree hybrid or Doherty with proper external matching network.

1 Electrical ratings

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

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	65	V
V_{GS}	Gate-source voltage	-6 to 10	V
V_{DD}	Maximum operating voltage	32	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)	Thermal resistance, junction-to-case	0.38	°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 (according to ANSI/ESDA/JEDEC JS001-2017)	1C
CDM	Charge device model (according to ANSI/ESDA/JEDEC JS-002-2014)	C3

2 Electrical characteristics

T_C = 25 °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 V, I_{DS} = 100 µA	65			V
I_{DSS}	Zero-gate voltage drain current	V_{GS} = 0 V, V_{DS} = 28 V			1	µA
		V_{GS} = 0 V, V_{DS} = 50 V				
I_{GSS}	Gate-body leakage current	V_{GS}=-6/10 V, V_{DS}=0 V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = 28 V, I_{DS} = 600 µA	1.5		2.5	V
$V_{GS(Q)}$	Gate quiescent voltage	V_{DS}= 28 V, I_{DS} = 100 mA	1.5		4	
$V_{DS(on)}$	Static drain-source on-voltage	V_{GS} = 10 V, I_{DS} = 3 A			0.5	
$R_{DS(on)}$	Drain-source on-state resistance	V_{GS}= 10 V, V_{DS}=100 mV			1	Ω
$I_{DS(on)}$	Static drain-source on-current				2.5	A

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
f	Frequency		1.3		1.6	GHz
P_{OUT}	Output power	f = 1450 MHz at 1dB compression point in Doherty amplifier test circuit, pulsed CW		180		W
G_{PS}	Power gain			14		dB
η_D	Drain efficiency			60		%

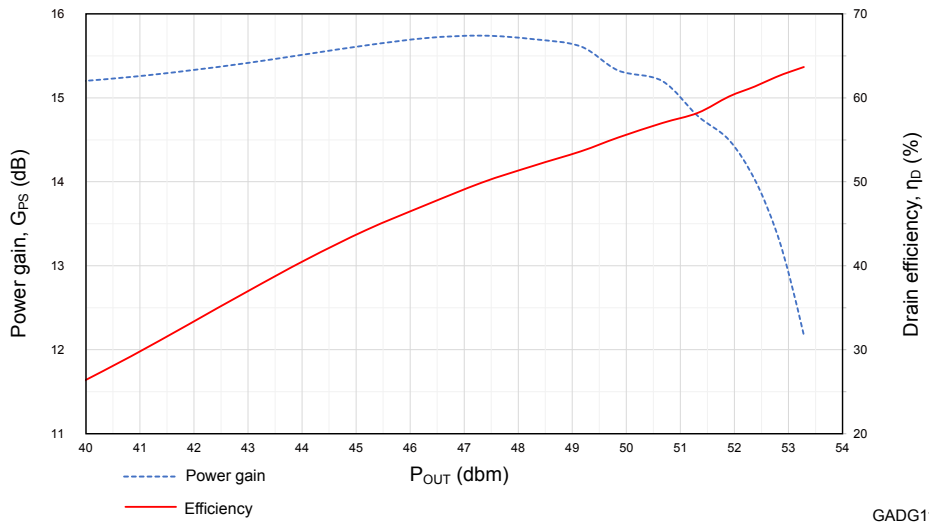
Note: V_{DD} = 28 V, I_{DQMain} = 600 mA, V_{Gpeak} = 0.9 V, pulse width = 10 µs, duty cycle = 12%.

3 Typical performance

Table 6. Output power, power gain and drain efficiency vs input power (f = 1450 MHz)

P_{IN} (dBm)	P_{OUT} (dBm)	P_{OUT} (W)	I_{DS} (A)	G_{PS} (dB)	η_D(%)
24.6	39.8	9.5	1.3	15.2	25.7
25.6	40.8	12.1	1.5	15.2	29.2
26.6	41.9	15.4	1.7	15.3	33.0
27.6	43.0	19.9	1.9	15.4	36.9
28.6	44.1	25.6	2.2	15.5	40.8
29.6	45.2	33.0	2.7	15.6	44.2
30.6	46.3	42.6	3.2	15.7	47.3
31.6	47.3	53.9	3.9	15.7	49.9
32.6	48.3	67.2	4.6	15.7	51.9
33.5	49.2	82.3	5.5	15.6	53.6
34.5	49.9	96.6	6.2	15.3	55.3
35.5	50.7	116.5	7.3	15.2	57.0
36.5	51.3	135.6	8.3	14.8	58.2
37.4	51.9	154.8	9.2	14.5	60.2
38.4	52.4	172.9	10.1	14.0	61.4
39.3	52.8	188.9	10.8	13.4	62.5
40.2	53.0	200.6	11.4	12.9	63.1
41.1	53.3	213.1	12.0	12.2	63.7

Figure 1. Power Gain and drain efficiency vs output power at 1450 MHz (on Doherty test fixture)



Note: V_{DD} = 28 V, I_{DQMain} = 600 mA, pulsed CW, pulse width = 10 µs, duty cycle = 12%

4 Test circuits

Figure 2. **Test circuit layout**

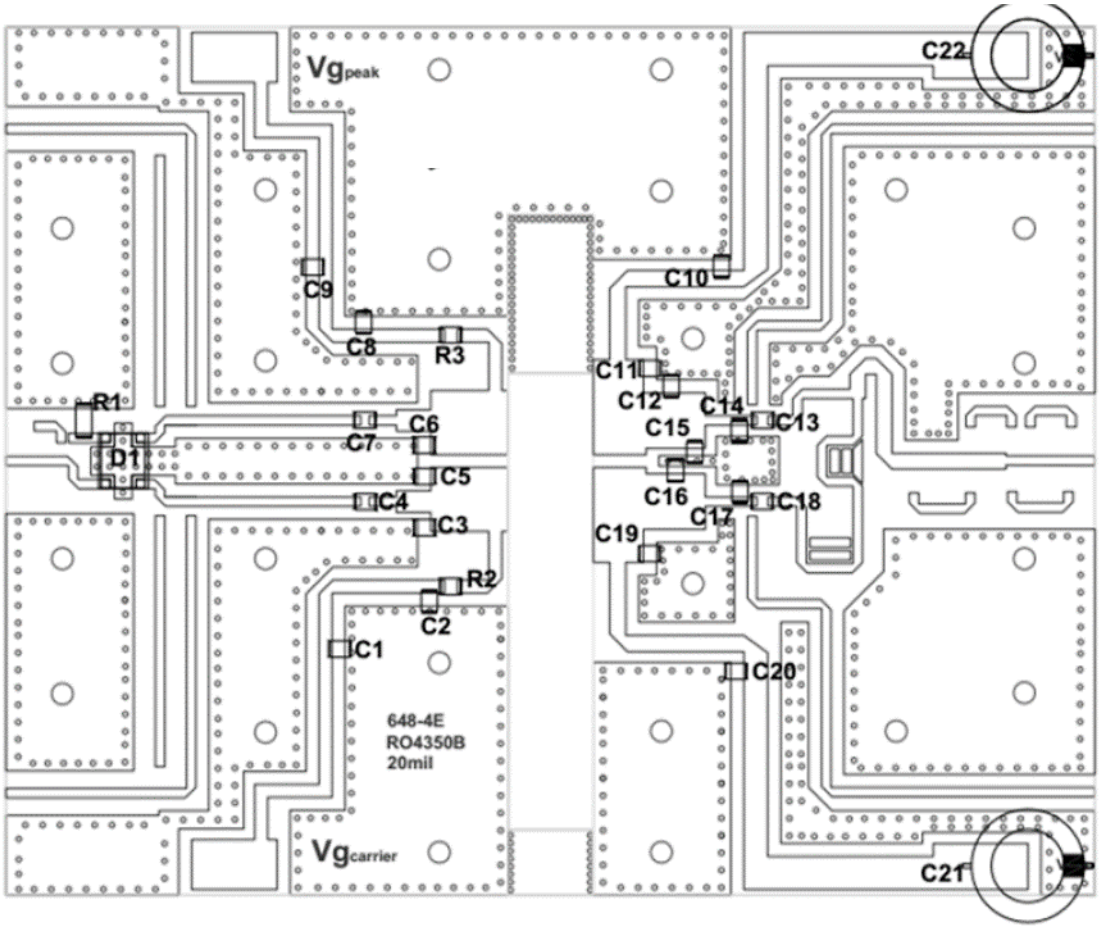


Figure 3. **Test circuit photo**

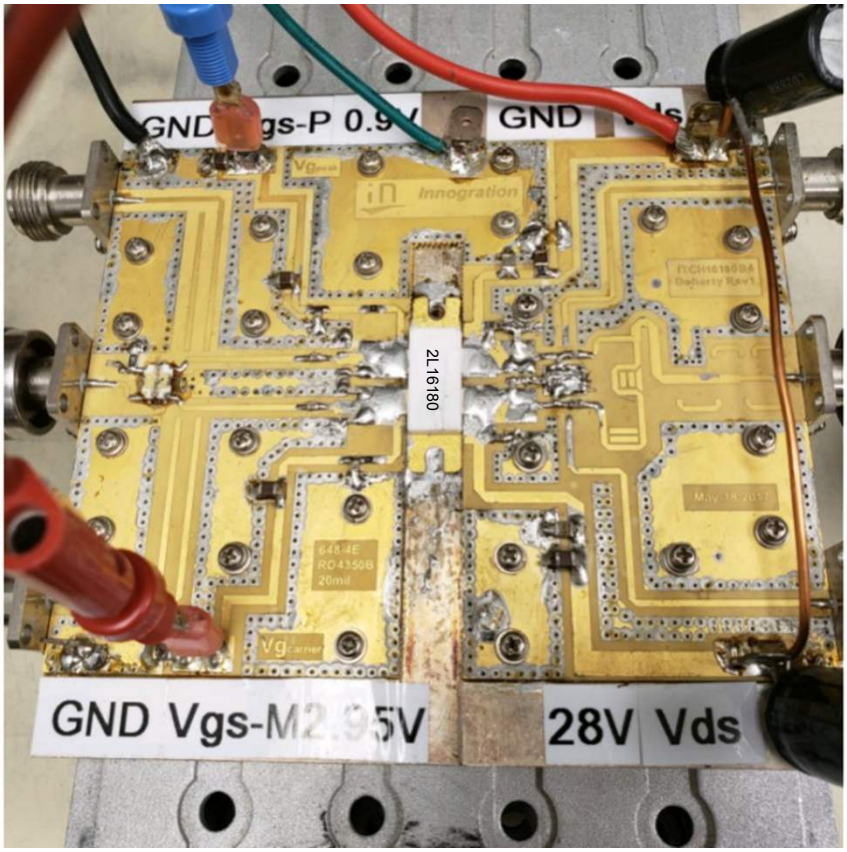


Table 7. **Component list**

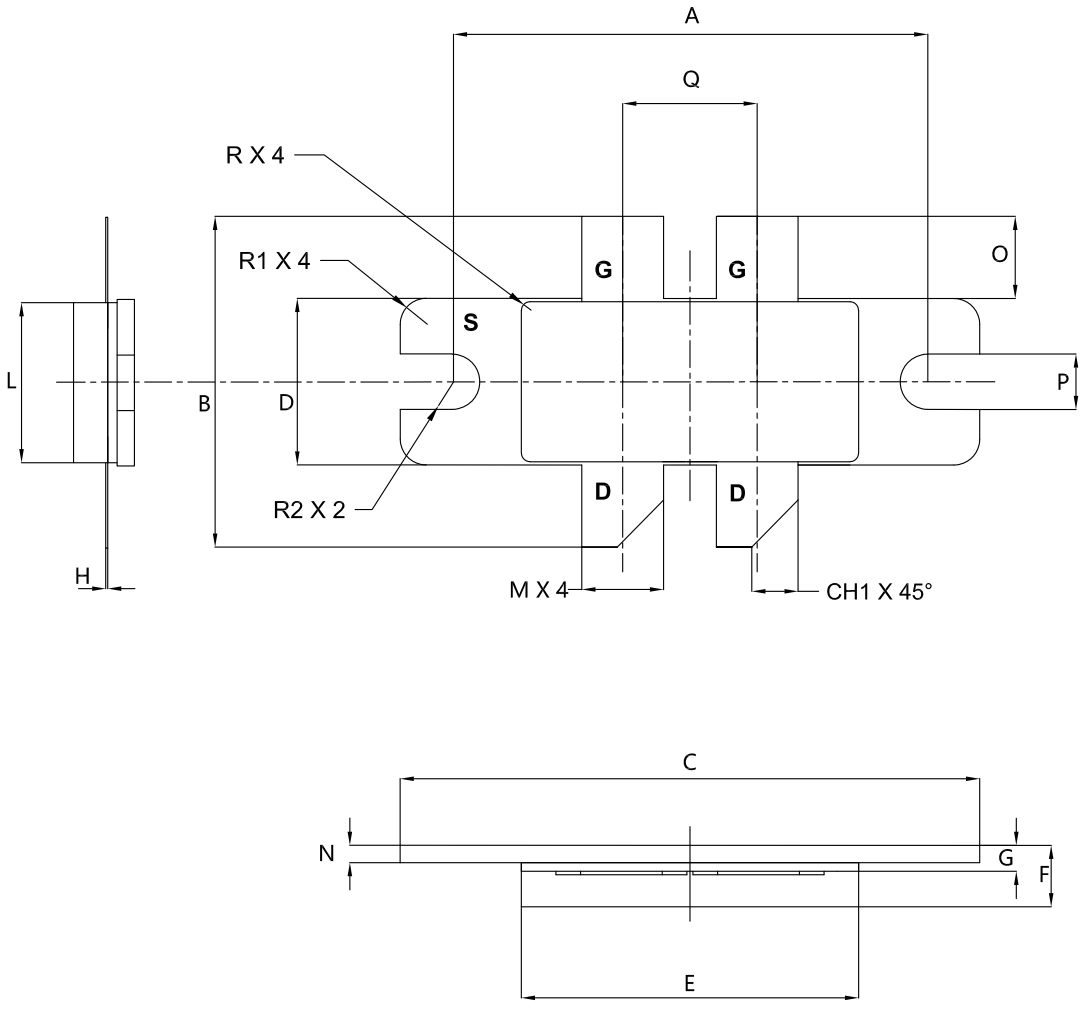
Component	Value	Size	Reference
C2, C8, C13, C18	Ceramic capacitor, 28 pF	0805	ATC600F
C3, C16	Ceramic capacitor, 3.3 pF	0805	ATC600F
C4, C7, C11, C19	Ceramic capacitor, 5.6 pF	0805	ATC600F
C5	Ceramic capacitor, 0.7 pF	0805	ATC600F
C6, C14, C15, C17	Ceramic capacitor, 2.7 pF	0805	ATC600F
C12	Ceramic capacitor, 1.0 pF	0805	ATC600F
C1, C9, C10, C20	10 µF	1210	100 V ceramic multilayer capacitor
C21, C22	220 µF		63 V electrolytic capacitor
D1			Spliter
R1	50 Ω	0805	4 W chip resistor
R2, R3	10 Ω	0805	Chip resistor
PCB	0.508 mm [0.020"] thick, εr = 3.48, Rogers RO4350B, 1 oz. copper		

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 B4E package information

Figure 4. B4E package outline



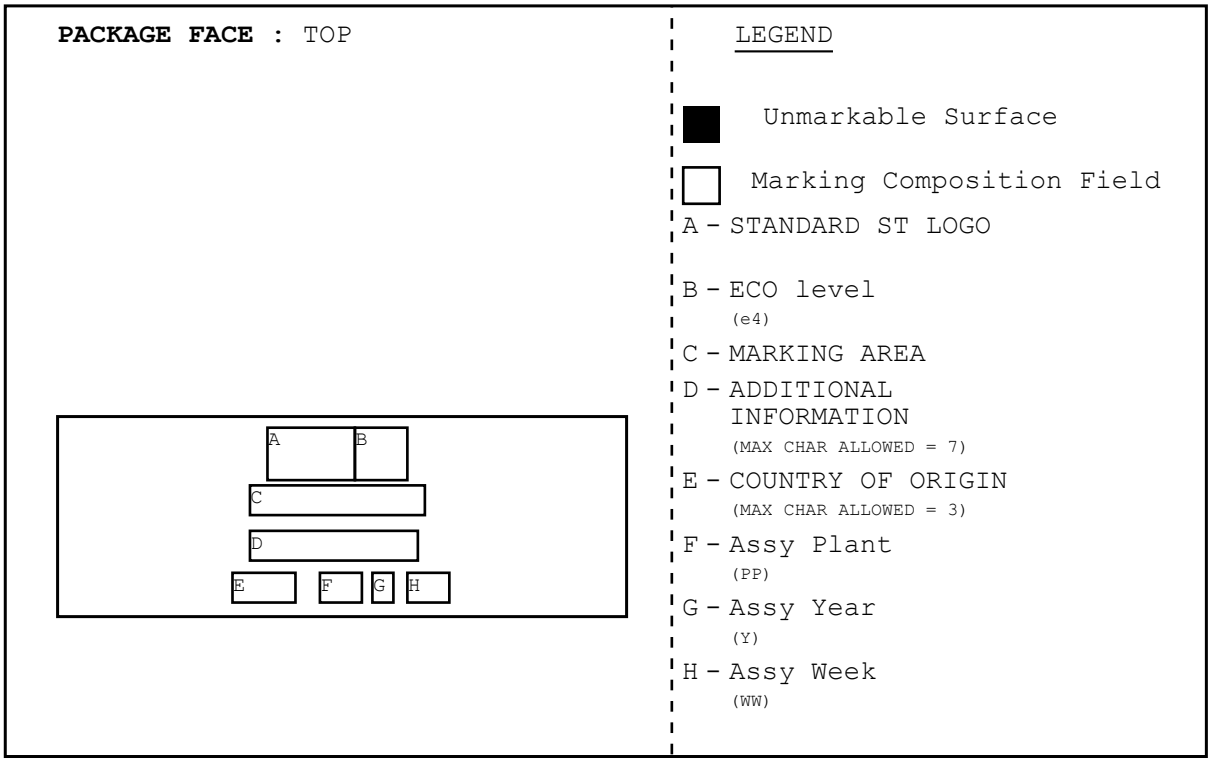
DM00418520_2

Table 8. **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	

6 Marking information

Figure 5. Marking composition



GADG040220211644GT

Revision history

Table 9. Document revision history

Date	Version	Changes
02-Jul-2020	1	First release.
21-Apr-2021	2	Modified marking on cover page. Modified Table 1. Absolute maximum ratings (T_C= 25 °C), Table 2. Thermal data, Table 3. ESD protection. Modified Table 4. Static (per side). Modified Figure 1. Power Gain and drain efficiency vs output power at 1450 MHz (on Doherty test fixture). Added Section 6 Marking information. 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.