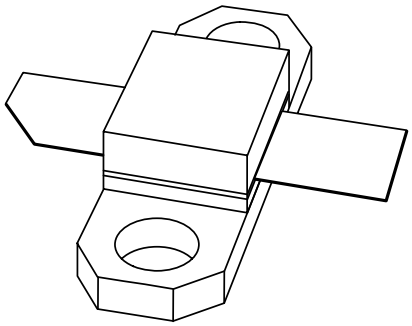
DATA SHEET



BLL1214-35
L-band radar LDMOS driver transistor

Product specification

2002 Sep 27

Philips
Semiconductors

L-band radar LDMOS driver transistor BLL1214-35

FEATURES

- High power gain
- Easy power control
- Excellent ruggedness
- Source on mounting base eliminates DC isolators, reducing common mode inductance.

APPLICATIONS

- L-band radar applications in the 1200 to 1400 MHz frequency range.

DESCRIPTION

Silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 2-lead flange package (SOT467C) with a ceramic cap. The common source is connected to the flange.

PINNING - SOT467C

PIN	DESCRIPTION
1	drain
2	gate
3	source, connected to flange

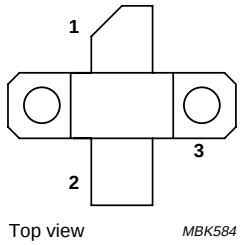


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_h = 25 °C in a common source test circuit.

MODE OF OPERATION	f (MHz)	V_{DS} (V)	P_L (W)	G_p (dB)	η_D (%)
Pulsed class-AB; t = 1 ms; δ = 10 %	1200 to 1400	36	35	>13	>43

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	75	V
V_{GS}	gate-source voltage		–	±15	V
P_{tot}	total power dissipation	under RF conditions; $T_h \leq 25$ °C	–	110	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$Z_{th\ j\text{-}h}$	thermal impedance from junction to heatsink	T_h = 25 °C; note 1	1.1	K/W

Note

1. Thermal resistance is determined under RF operating conditions; t_p = 1 ms, δ = 10 %.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0; I_D = 0.7 mA	75	–	–	V
V_{GSth}	gate-source threshold voltage	V_{DS} = 10 V; I_D = 70 mA	4.5	–	5.5	V
I_{DSS}	drain-source leakage current	V_{GS} = 0; V_{DS} = 36 V	–	–	10	μA
I_{DSX}	on-state drain current	V_{GS} = V_{GSth} + 9 V; V_{DS} = 10 V	10	–	–	A
I_{GSS}	gate leakage current	V_{GS} = ±20 V; V_{DS} = 0	–	–	125	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 2.5 A	–	2	–	S
R_{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 2.5 A	–	300	–	mΩ

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. T_h = 25 °C; $Z_{th\ mb\text{-}h}$ = 0.65 K/W, unless otherwise specified.

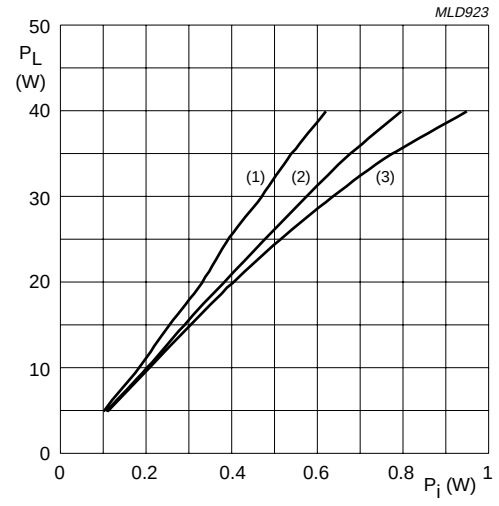
MODE OF OPERATION	f (MHz)	V_{DS} (V)	I_{DQ} (mA)	P_L (W)	G_p (dB)	η_D (%)
Pulsed class-AB; t = 1 ms; δ = 10 %	1200 to 1400	36	50	35	>13	>43

Ruggedness in class-AB operation

The BLL1214-35 is capable of withstanding a load mismatch corresponding to VSWR = 5 : 1 through all phases under the following conditions: V_{DS} = 36 V; frequency from 1200 MHz to 1400 MHz at rated load power.

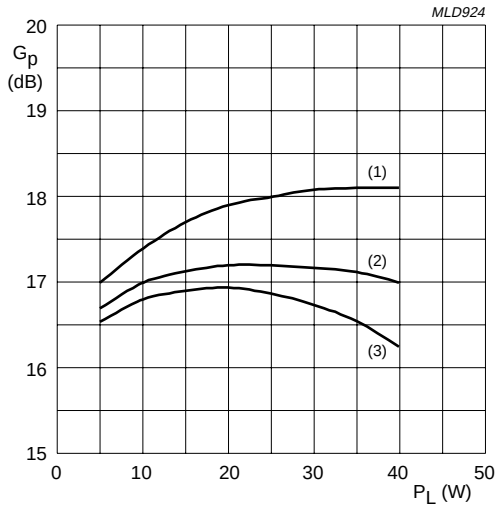
Typical impedance

FREQUENCY (GHZ)	Z_S (Ω)	Z_L (Ω)
1.20	6.48 – j 3.9	1.95 + j 3.27
1.25	3.88 – j 3.2	1.90 + j 2.57
1.30	3.28 – j 2.4	2.01 + j 2.27
1.35	2.55 – j 1.48	2.20 + j 2.26
1.40	1.69 – j 0.51	1.72 + j 2.35



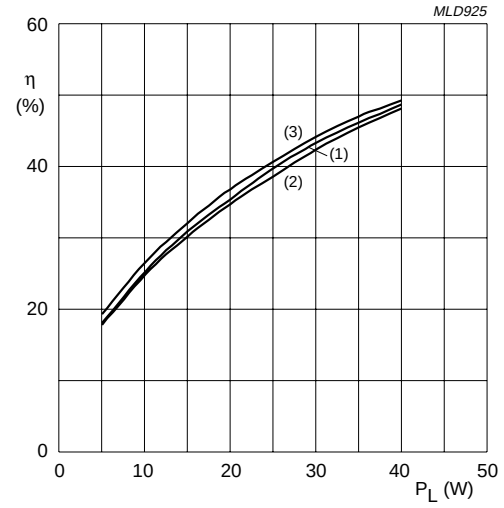
(1) f = 1.2 GHz. (2) f = 1.3 GHz. (3) f = 1.4 GHz.
t_p = 1 ms; δ = 10%.

Fig.2 Load power as a function of input power; typical values.



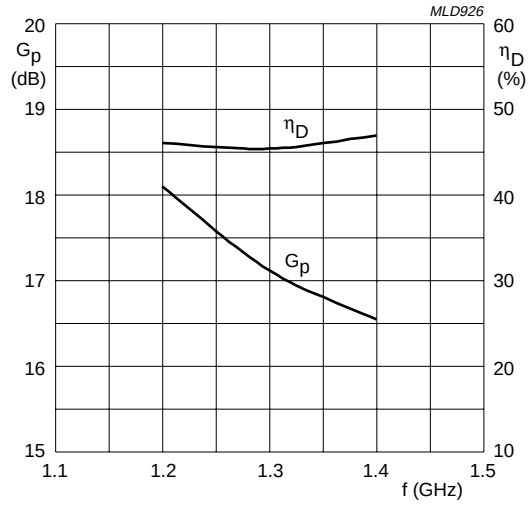
(1) f = 1.2 GHz. (2) f = 1.3 GHz. (3) f = 1.4 GHz.
t_p = 1 ms; δ = 10%.

Fig.3 Power gain as a function of load power; typical values.



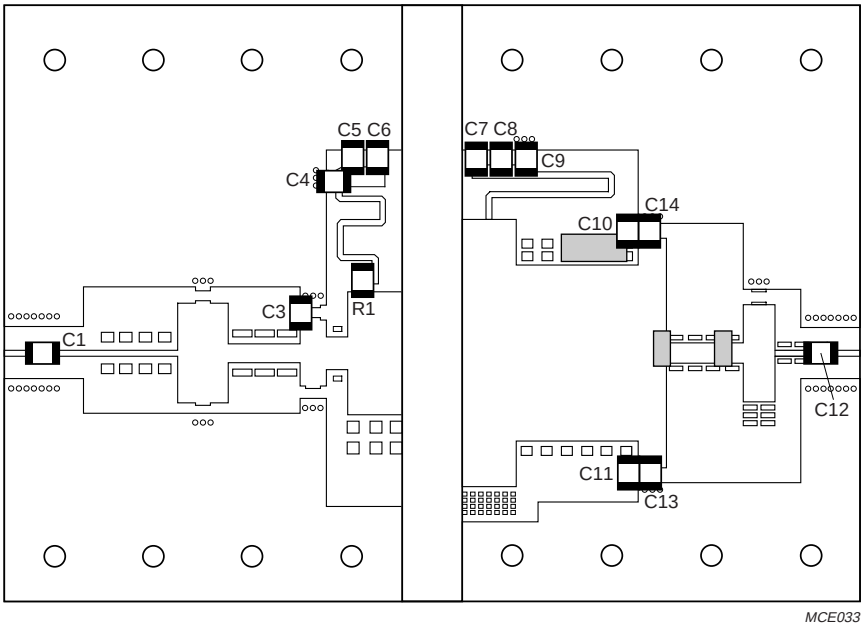
(1) f = 1.2 GHz. (2) f = 1.3 GHz. (3) f = 1.4 GHz.
t_p = 1 ms; δ = 10%.

Fig.4 Efficiency as a function of load power; typical values.



t_p = 1 ms; δ = 10%.

Fig.5 Power gain and efficiency as functions of frequency; typical values.



Shaded areas indicate tuning stubs.

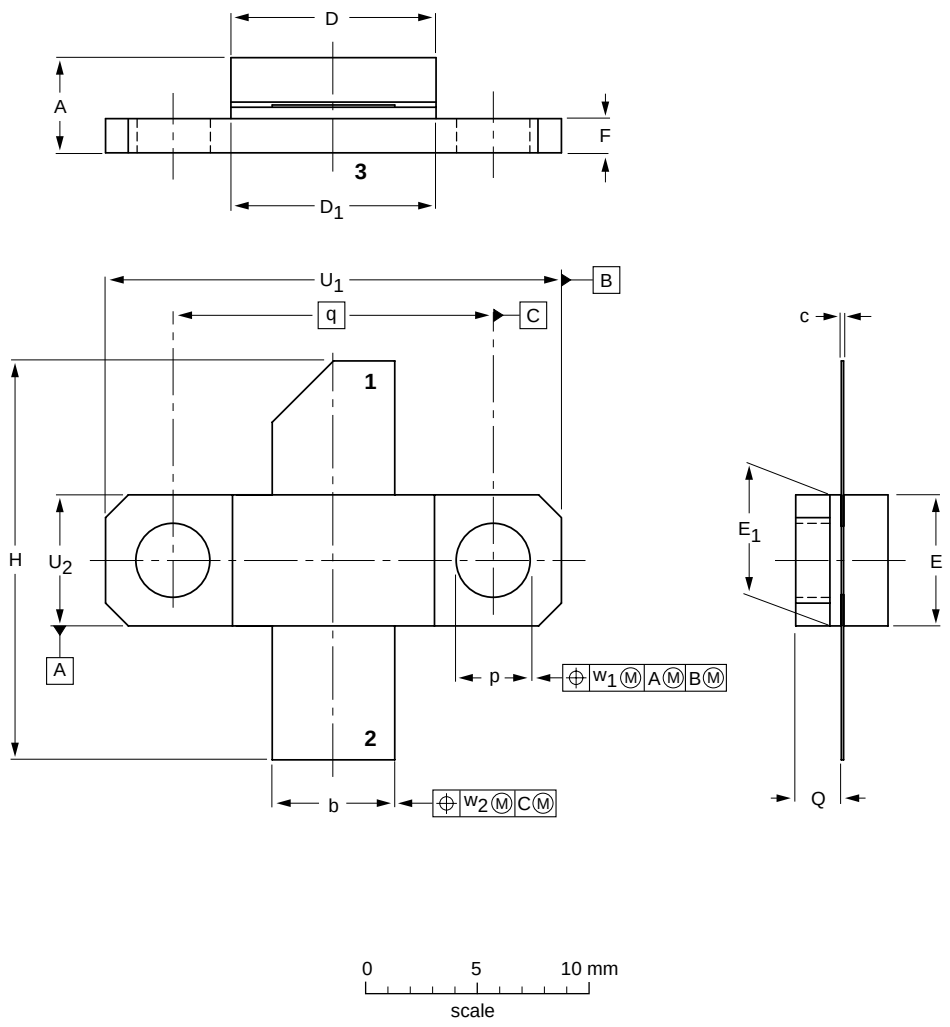
Fig.6 Component layout.

List of components (see Fig.6)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C12	capacitor	51 pF	ATC100A
C3	capacitor	6.8 pF	ATC100A
C4, C9	capacitor	47 pF	ATC100A
C6, C7	capacitor	4.7 µF/50 V	475 50k 952
C5, C8	capacitor	2.3 nF	ATC100B
C10	capacitor	2.7 pF	ATC100A
C11	capacitor	1.0 pF	ATC100A
C13, C14	capacitor	1.5 pF	ATC100A
R1	chip resistor	82 Ω	

PACKAGE OUTLINE

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads **SOT467C**



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_1	E	E_1	F	H	p	Q	q	U_1	U_2	w_1	w_2
mm	4.67 3.94	5.59 5.33	0.15 0.10	9.25 9.04	9.27 9.02	5.92 5.77	5.97 5.72	1.65 1.40	18.54 17.02	3.43 3.18	2.21 1.96	14.27	20.45 20.19	5.97 5.72	0.25	0.51
inch	0.184 0.155	0.220 0.210	0.006 0.004	0.364 0.356	0.365 0.355	0.233 0.227	0.235 0.225	0.065 0.055	0.73 0.67	0.135 0.125	0.087 0.077	0.562	0.805 0.795	0.235 0.225	0.010	0.020

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT467C						~~99-12-06~~ 99-12-28

DATA SHEET STATUS

DATA SHEET STATUS[1]	PRODUCT STATUS[2]	DEFINITIONS
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