STAC1214-250

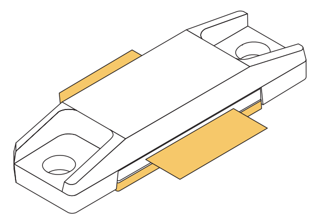
STAC1214-250

RF power transistor from the LdmoST family
of N-channel enhancement-mode lateral MOSFETs

Target specification

Features

- Excellent thermal stability
- Common source configuration push-pull
- P_{OUT} = 250 W with 14 dB gain over 1200 - 1400 MHz
- ST air cavity / STAC® package

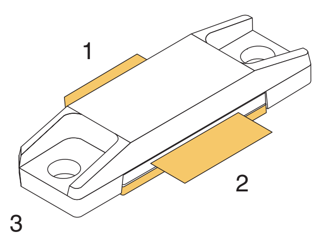


STAC265B
Epoxy sealed

Description

The STAC1214-250 is a common source N-channel enhancement-mode lateral field-effect RF power transistor designed for L band radar applications.

Figure 1. Pin connection



1 - Drain
2 - Gate
3 - Source

Table 1. Device summary

Order code	Package	Branding
STAC1214-250	STAC265B	1214-250

This is preliminary information on a new product foreseen to be developed. Details are subject to change without notice. www.st.com

Contents

1 Electrical data

1.1 Maximum ratings

T_{CASE} = 25 °C

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	80	V
V_{GS}	Gate-source voltage	± 20	V
P_{DISS}	Power dissipation (@ T_C = 70 °C)	928	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(1)

Symbol	Parameter	Value	Unit
R_{thJC}	Junction - case thermal resistance	0.14	°C/W

1. @100 µsec - 10%

2 Electrical characteristics

T_{CASE} = + 25 °C

2.1 Static

Table 4. Static (per section)

Symbol	Test conditions		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 20 V	I_{DS} = 10 mA	80			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 28 V			2	µA
I_{GSS}	V_{GS} = 15 V	V_{DS} = 0 V			1	µA
$V_{GS(Q)}$	V_{DS} = 28 V	I_{DS} = 150 mA	2.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_{DS} = 6 A		0.9	1.2	V
G_{FS}	V_{DS} = 10 V	I_{DS} = 6 A	2.5			mho

2.2 Dynamic

Vdd = 36 V, Idq = 150 mA, pulse width = 100 µs, duty cycle = 10 %

Table 5. Dynamic

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Frequency		1200		1400	MHz
P_{OUT}	P_{IN} = 10 W	250	260		W
G_{PS}	P_{OUT} = 250 W	13	14		dB
η_D	P_{OUT} = 250 W	50			%
T_r	Rise time - P_{OUT} = 250 W			100	ns
T_f	Fall Time - P_{OUT} = 250 W			30	ns
Droop	P_{OUT} = 250 W			0.25	dB
Load mismatch	All phase angles at P_{OUT} = 250 W			10:1	VSWR

3 Impedance data

Figure 2. Impedance data

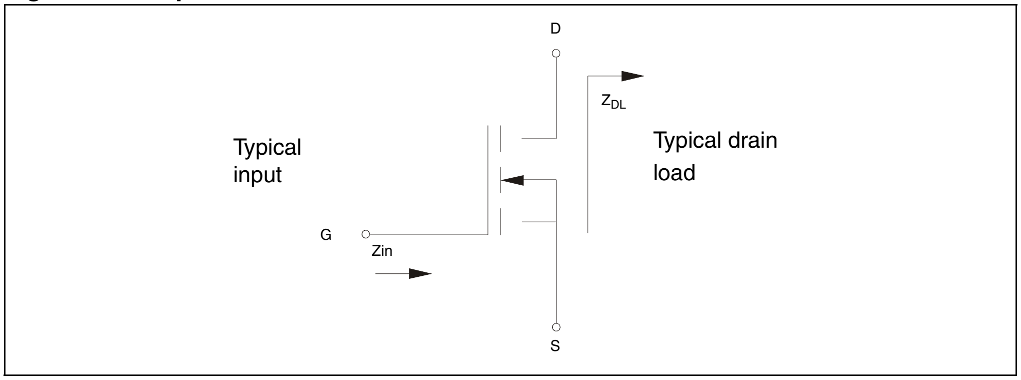


Table 6. Impedance data

Frequency (MHz)	Z_{source} (Ohm)	Z_{load} (Ohm)
1200	1.1+j1.9	1.5+j2.8
1300	1.0+j3.1	1.5+j3.1
1400	1.4+j4.3	1.0+j3.6

4 Typical performances

Figure 3. Output power vs input power

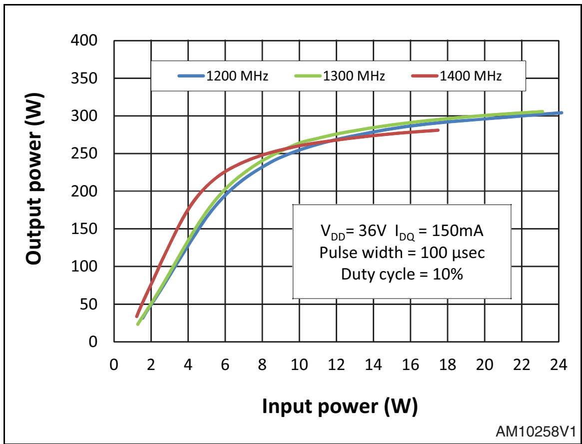


Figure 4. Power gain vs output power

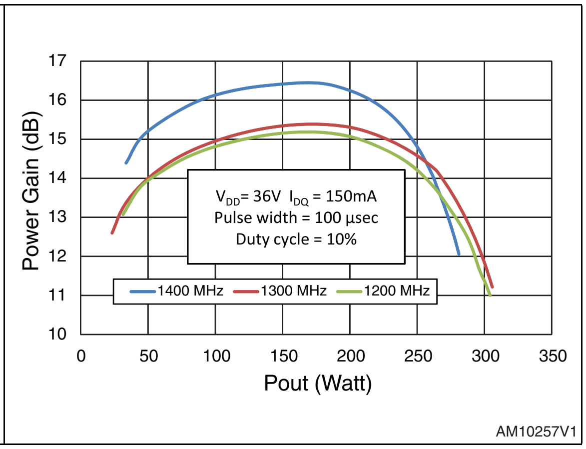


Figure 5. Efficiency vs output power

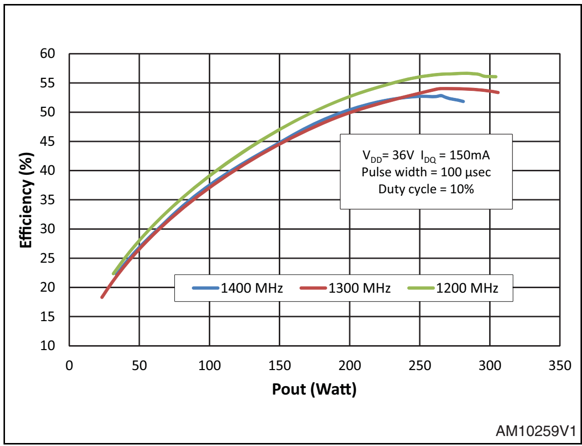
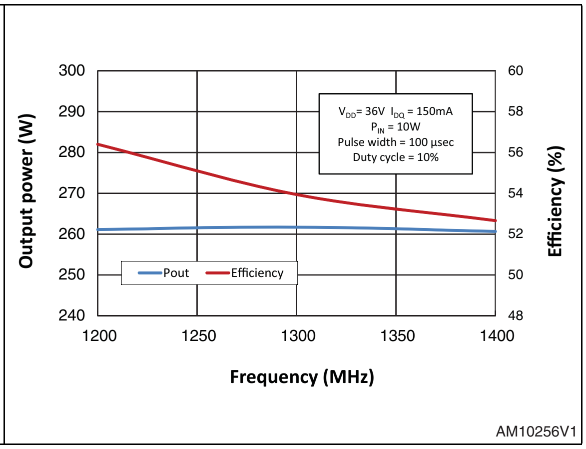


Figure 6. Output power and efficiency vs frequency



5 Circuit and BOM

Figure 7. Circuit

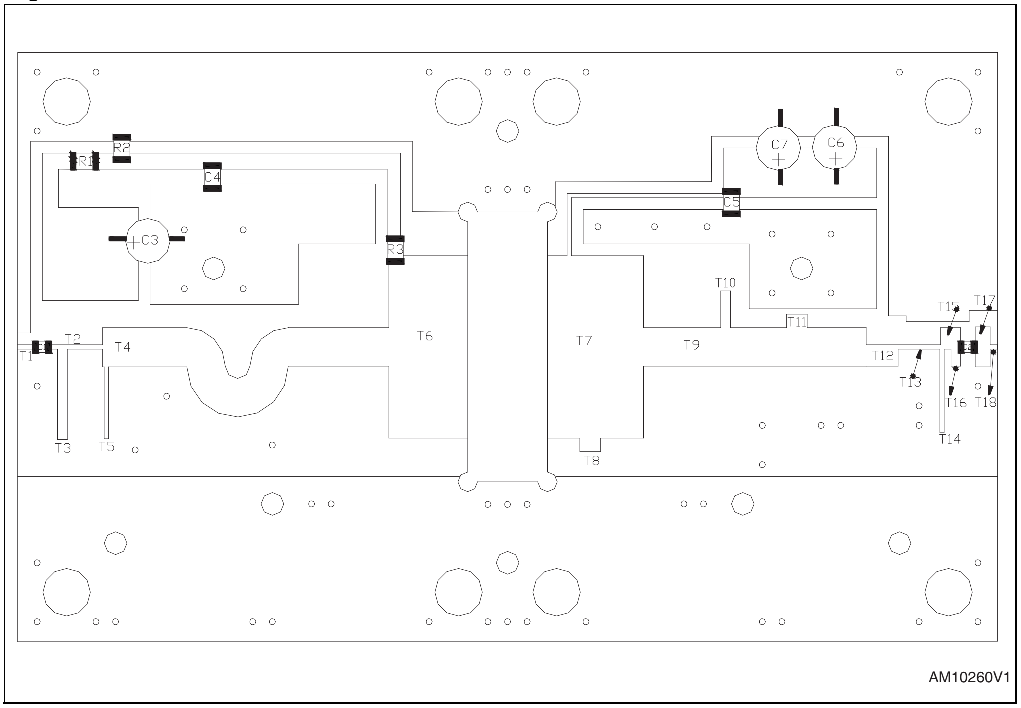


Table 7. Component list

Component	Description	Dimensions (X,Y)	Values
TL1	Stripline	L=0.111" W=0.022"	
TL2	Stripline	L=0.302" W=0.022"	
TL3	Stripline	L=0.050" W=0.461"	
TL4	Stripline	L=1.76" W=0.196"	
TL5	Stripline	L=0.366" W=0.022"	
TL6	Stripline	L=0.402" W=0.929"	
TL7	Stripline	L=0.490" W=0.929"	
TL8	Stripline	L=0.105" W=0.063"	
TL9	Stripline	L=1.136" W?=0.196"	
TL10	Stripline	L=0.050" W=0.187"	
TL11	Stripline	L=0.105" W=0.069"	
TL12	Stripline	L=0.163" W=0.109"	
TL13	Stripline	L=0.318" W=0.022"	
TL14	Stripline	L=0.022" W=0.424"	

Table 7. Component list (continued)

Component	Description	Dimensions (X,Y)	Values
TL15	Stripline	L=0.101" W=0.087"	
TL16	Stripline	L=0.048" W=0.087"	
TL17	Stripline	L=0.076" W=0.204"	
TL18	Stripline	L=0.038" W=0.022"	
C1, C2	ATC100A300J chip capacitor		30pF
C3	220µF, 63V electrolytic capacitor		220µF
C4	ATC100B101 chip capacitor		100pF
C5	ATC100B390 chip capacitor		39 pF
C6	1000µF, 63V electrolytic capacitor		1000µF
C7	100µF, 0-100V electrolytic capacitor		100µF
R1	CR1206-8W-102JB		1 KOhm
R2	CR1206-8W-202JB		2 KOhm
R3	CR1206-8W-501JB		50 Ohm
Board material	Rogers Duroid 6010 Er = 10.2, Th = 0.64mm	3x5 in^2	

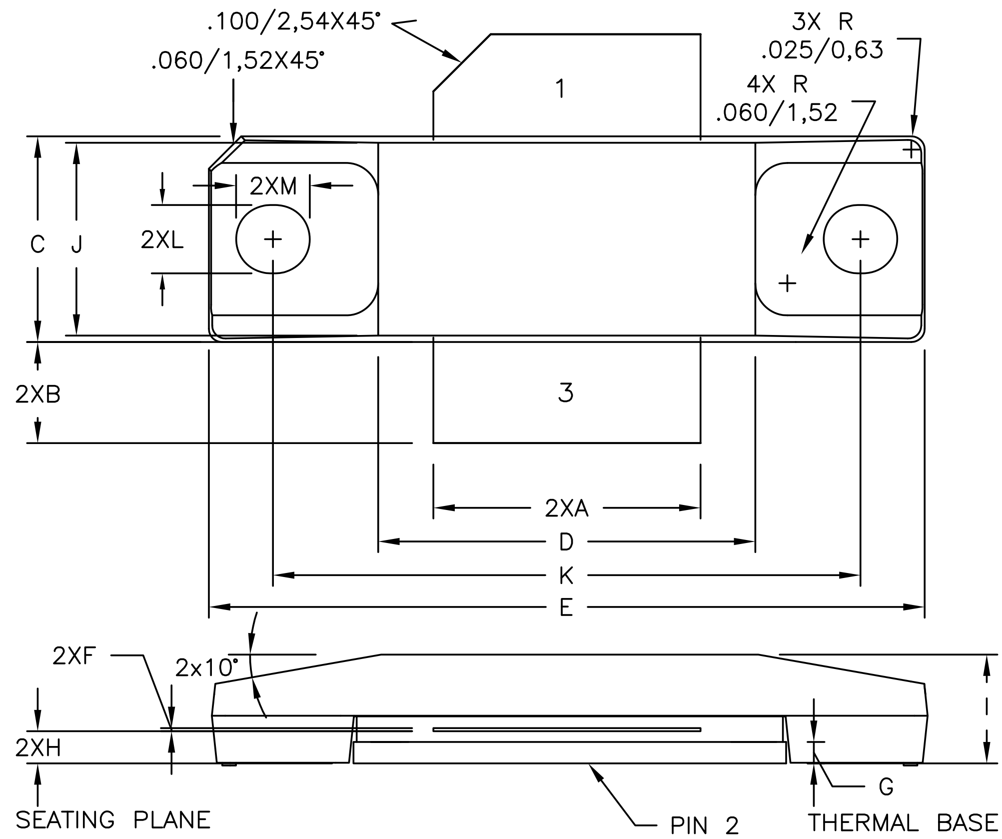
6 Package mechanical data

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.

Table 8. STAC265B mechanical data

Dim.	mm.		
	Min.	Typ.	Max.
A	12.57		12.83
B	4.32		5.33
C	9.65		9.91
D	17.78		18.08
E	33.88		34.19
F	0.10		0.15
G		1.02	
H	1.45		1.70
I	4.83		5.33
J	9.27		9.52
K	27.69		28.19
L		3.23	
M		3.45	

Figure 8. Package dimensions



7 Revision history

Table 9. Document revision history

Date	Revision	Changes
27-Jan-2012	1	First release.