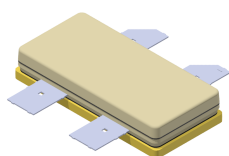


500 W, 50 V, 700 to 1200 MHz RF power LDMOS transistor



STAC780-4F

Features

Order code	F _{REQ}	V _{DD}	P _{OUT} typ.	G _{ain}	N _D
STAC1011-500	1030 to 1090 MHz	50 V	500 W	16 dB	59%

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

Applications

- Avionics

Description

The STAC1011-500 is a 50 V common-source N-channel enhancement-mode lateral field-effect RF power transistor designed for avionics applications at frequencies up to 1250 MHz.



Product status link

[STAC1011-500](#)

Product summary

Order code	STAC1011-500
Marking	1011-500 ES
Package	STAC780-4F
Packing	TBD

1 Electrical ratings

Table 1. Absolute maximum ratings (+25 °C)

Symbol	Parameter	Value	Unit
B_{VDSS}	Drain-source voltage	110	V
V_{GS}	Gate-source voltage	-8/+10	V
V_{DD}	Drain supply voltage	50	V
T_{STG}	Storage temperature range	-65 to +150	°C
T_J	Junction temperature	+200	°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Junction-case thermal resistance $T_{CASE} = +85\text{ °C}$, $T_J = +200\text{ °C}$, DC test	TBD	°C/W

Table 3. ESD protection

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

2 Electrical characteristics

($T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Table 4. Static (per side)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$, $I_D = 100\text{ }\mu\text{A}$	110			V
I_{DSS}	Zero-gate voltage drain current	$V_{GS} = 0\text{ V}$, $V_{DS} = 50\text{ V}$			1	μA
I_{GSS}	Gate-body leakage current	$V_{DS} = 0\text{ V}$, $V_{GS} = 6\text{ V}$			1	μA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = 50\text{ V}$, $I_D = 50\text{ mA}$	1.0		3.0	V
$V_{DS(on)}$	Static drain-source on-voltage	$V_{GS} = 10\text{ V}$, $I_D = 5\text{ A}$			1.4	V
C_{ISS}	Common source input capacitance	$V_{GS} = 0\text{ V}$, $V_{DD} = 50\text{ V}$, $F_{REQ} = 1\text{ MHz}$		TBD		pF
C_{RSS}	Common source feedback capacitance			2		pF
C_{OSS}	Common source output capacitance			44		pF

Table 5. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
P_{OUT}	Output power	$V_{DD} = 50\text{ V}$, $I_{DQ} = 0.02\text{ A}$, $P_{in} = 14\text{ W}$, $F_{REQ} = 1030\text{ to }1090\text{ MHz}$	-	500	-	W
Gain	Power gain		-	16	-	dB
Efficiency	Drain efficiency		-	59	-	%
IMD3	3rd order intermodulation		-	TBD	-	dBc
VSWR	Load mismatch	$P_{OUT} = 500\text{ W}$, all phases	-	10:1	-	

Table 6. Impedance data

Frequency (in MHz)	Input impedance (Z_{IN})	Drain load impedance (Z_{DL})
1030	$1.527 + 1.687j$	$1.451 - 0.115j$
1060	$1.376 + 1.128j$	$1.436 - 0.186j$
1090	$1.266 - 0.570j$	$1.389 - 0.256j$

2.1 Electrical characteristics (curves)

Figure 1. Power gain vs output power

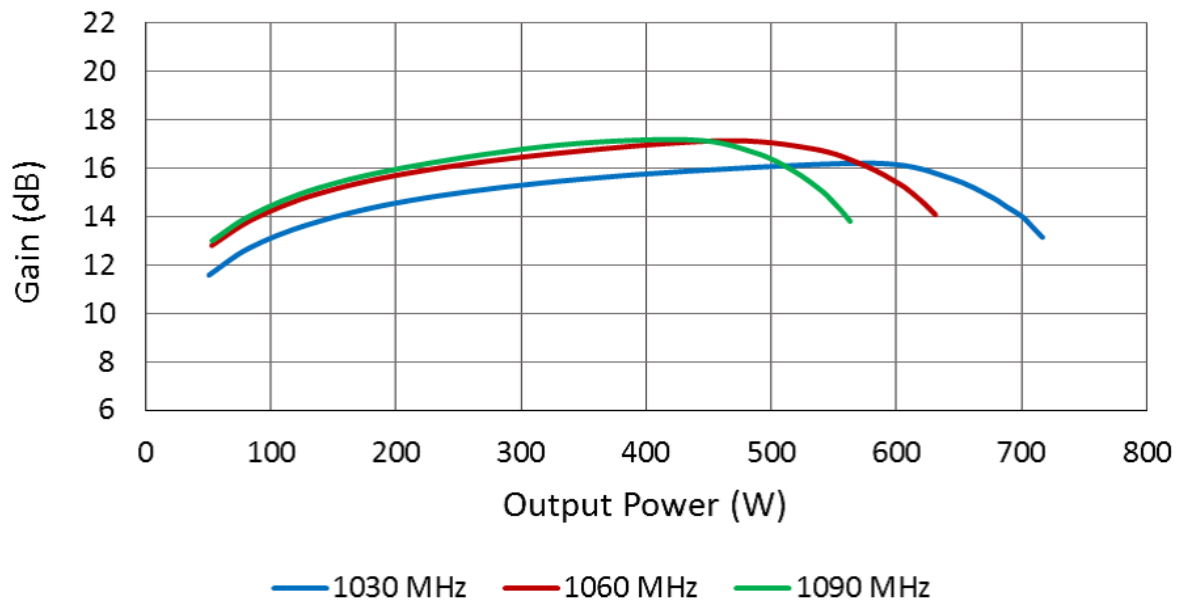
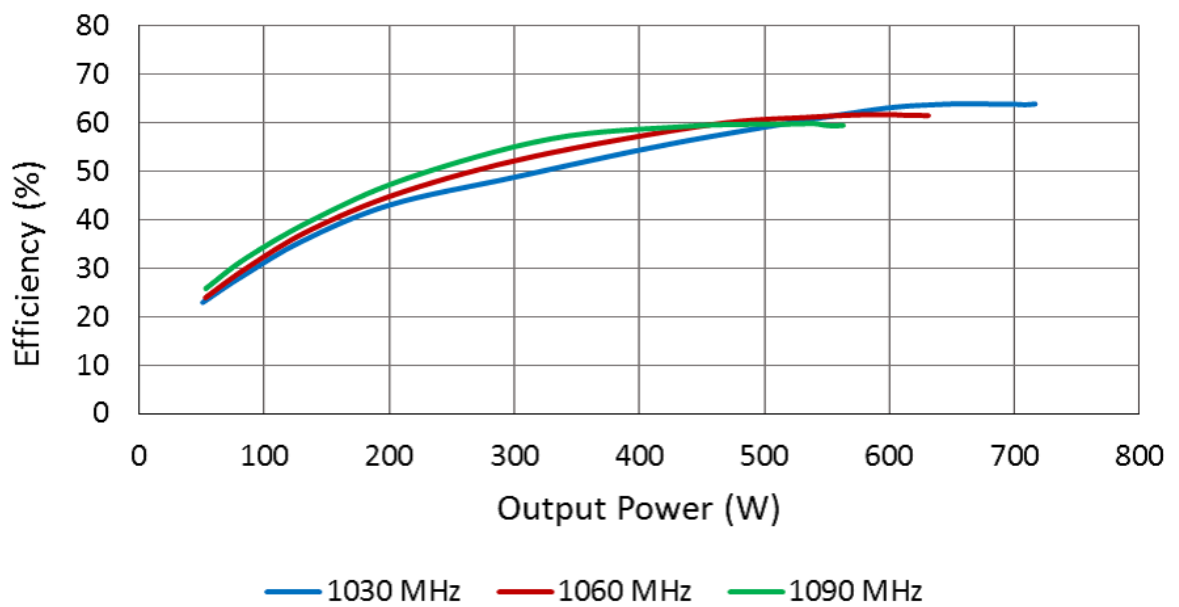


Figure 2. Drain efficiency vs output power

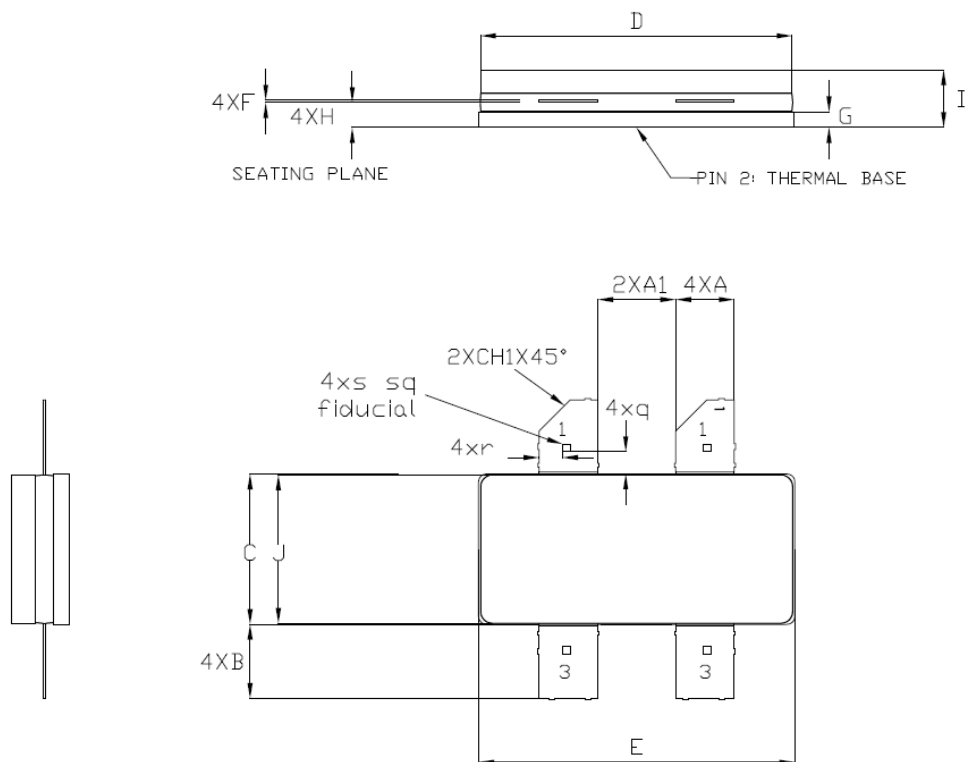


3 Package information

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.

3.1 STAC780-4F package information

Figure 3. STAC780-4F package outline



PIN	CONNECTIO N
1	DRAIN
2	SOURCE
3	GATE

DM00481940-1

Table 7. STAC780-4F mechanical data

Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	3.76		3.86	0.148		0.152
A1	5.03		5.13	0.198		0.202
B	4.57		5.08	0.180		0.200
C	9.65		9.91	0.380		0.390
D	20.17		20.37	0.794		0.802
E	20.45		20.70	0.805		0.815
F	0.11		0.17	0.005		0.007
G	0.97		1.14	0.038		0.045
H	1.52		1.70	0.060		0.067
I	3.18		4.32	0.125		0.170
J	9.52		9.78	0.375		0.385
q		1.37			0.057	
r		1.52			0.060	
s		0.51			0.020	
CH1		2.03			0.08	

Revision history

Table 8. Document revision history

Date	Version	Changes
06-Sep-2018	1	Initial release
22-Mar-2019	2	Updated Table 4 .
26-Sep-2019	3	Changed silhouette on cover page.

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