

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

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Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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2 W Ku-BAND POWER GaAs FET

N-CHANNEL GaAs MES FET

DESCRIPTION

The NEZ1414-2E is power GaAs FET which provides high gain, high efficiency and high output power in Ku-band.

The internal input and output matching enables guaranteed performance to be achieved with only a 50 Ω external circuit.

To reduce thermal resistance, the device has a PHS (Plated Heat Sink) structure.

The device incorporates WSi (tungsten silicide) gate for high reliability and SiO₂ glassivation for surface stability.

FEATURES

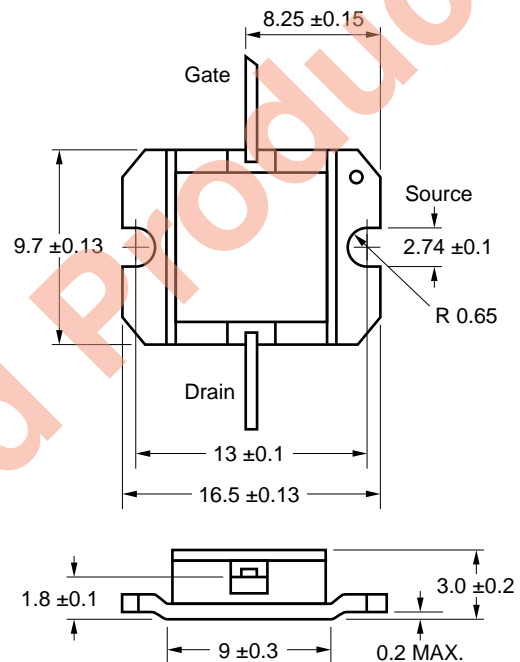
- Class A operation
- High output power: 34 dBm (typ)
- High gain: 7.5 dB (typ)
- High power added efficiency: 27 % (typ)
- Internally matched
- High reliability

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V _{DS}	15	V
Gate to Source Voltage	V _{GS}	-7	V
Drain Current	I _{DS}	2.5	A
Gate Forward Current	I _{GF}	20	mA
Gate Reverse Current	I _{GR}	-20	mA
Total Power Dissipation	P _T	15	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-65 to +175	°C

Caution Please handle this device at a static-free workstation, because this is an electrostatic sensitive device.

PACKAGE DIMENSIONS (UNIT: mm)



RECOMMENDING OPERATION RANGE

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Drain to Source Voltage	V _{DS}	9	9	9	V
Channel Temperature	T _{ch}	–	–	130	°C
Input Power	G _{comp}	–	–	3	dB _{comp}

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Saturated Drain Current	I _{DSS}	0.7	1.6	3.0	A	V _{DS} = 1.5 V, V _{GS} = 0 V
Pinch-off Voltage	V _P	–3.0	–1.3	–0.5	V	V _{DS} = 2.5 V, I _{DS} = 10 mA
Gate To Drain Breakdown Voltage	BV _{GD}	–	15	–	V	I _{GD} = 10 mA
Thermal Resistance	R _{th}	–	5.5	7.0	°C/W	Channel to Case

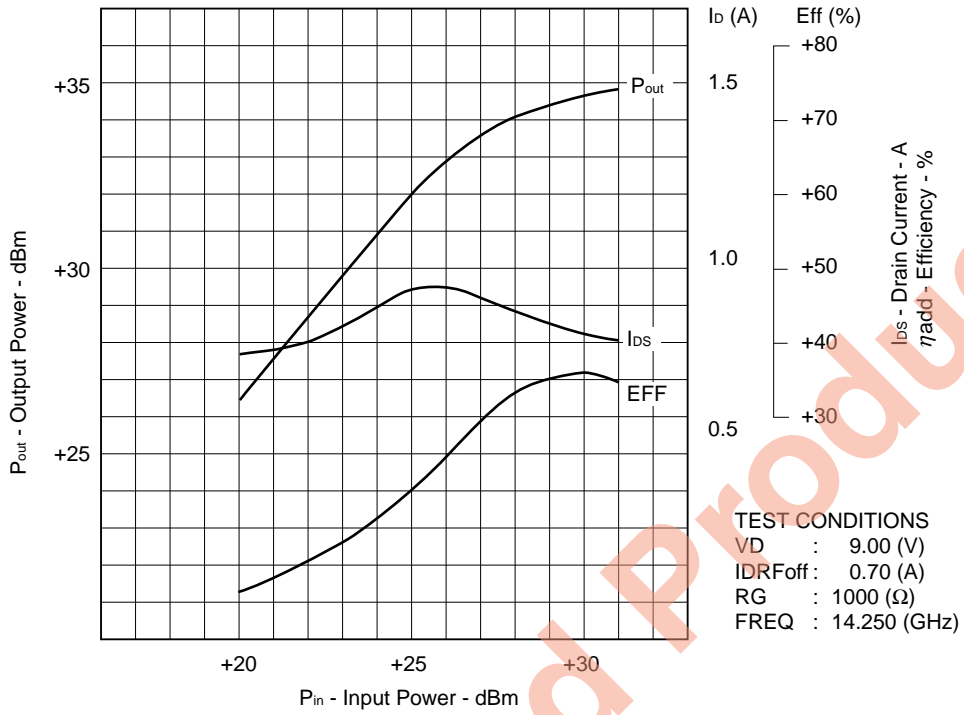
PERFORMANCE SPECIFICATIONS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Output Power at 1dB G.C.P. (*)	P (1 dB)	33.0	34.0	–	dBm	f = 14.0 to 14.5 GHz V _{DS} = 9 V I _{DS} = 0.7 A (RF OFF) R _g = 1 kΩ
Linear Gain	G _L	7.0	7.5	–	dB	
Drain Current at 1dB G.C.P. (*)	I _D (1 dB)	–	0.90	0.95	A	
Power added Efficiency at 1dB G.C.P. (*)	η _{add} (1 dB)	–	27	–	%	

* G.C.P.: Gain Compression Point

TYPICAL CHARACTERISTICS (TA = 25 °C)

OUTPUT POWER, DRAIN CURRENT AND EFFICIENCY vs. INPUT POWER



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S-PARAMETER

V_{DS} = 9.0 V, I_{BS} = 700 mA, V_{GS} = -1.057 V, I_G = 0.0 mA, R_G = 1 kΩ

FREQUENCY GHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
1.000	0.911	172.3	2.276	48.1	0.010	-24.2	0.689	168.6
1.500	0.926	157.8	1.412	24.2	0.008	-36.3	0.730	159.6
2.000	0.937	147.0	1.022	4.3	0.008	-45.0	0.788	151.9
2.500	0.938	137.3	0.817	-14.2	0.007	-48.4	0.848	143.6
3.000	0.927	126.2	0.693	-32.7	0.007	-48.9	0.899	134.9
3.500	0.908	112.0	0.638	-50.7	0.008	-59.0	0.920	124.2
4.000	0.886	94.0	0.610	-71.5	0.008	-60.2	0.827	109.5
4.500	0.871	72.7	0.586	-94.0	0.009	-63.1	0.791	88.3
5.000	0.873	50.9	0.564	-116.9	0.011	-75.9	0.787	68.0
5.500	0.888	30.4	0.541	-140.9	0.012	-91.9	0.812	47.2
6.000	0.902	11.5	0.512	-163.9	0.013	-108.9	0.845	27.6
6.500	0.904	-6.7	0.483	173.5	0.014	-125.5	0.866	9.8
7.000	0.885	-25.2	0.475	154.4	0.014	-144.0	0.895	-4.8
7.500	0.854	-44.7	0.478	133.1	0.014	-163.6	0.843	-19.3
8.000	0.830	-65.5	0.497	110.3	0.014	177.4	0.815	-35.7
8.500	0.818	-87.2	0.512	87.6	0.014	155.4	0.810	-52.9
9.000	0.815	-109.4	0.534	65.6	0.013	131.0	0.821	-68.0
9.500	0.801	-130.5	0.586	45.6	0.014	105.2	0.831	-79.7
10.000	0.755	-149.8	0.688	23.9	0.016	63.3	0.817	-92.4
10.500	0.732	-167.5	0.879	0.4	0.018	19.6	0.786	-108.7
11.000	0.708	160.3	1.204	-31.5	0.026	-28.0	0.730	-128.3
11.500	0.628	113.7	1.576	-70.6	0.037	-76.0	0.638	-152.9
12.000	0.595	56.3	1.856	-113.7	0.051	-127.3	0.488	174.3
12.200	0.604	35.7	1.934	-131.1	0.058	-146.7	0.409	158.8
12.400	0.611	18.0	1.981	-148.7	0.063	-166.5	0.350	139.0
12.600	0.613	2.7	2.046	-165.8	0.069	174.7	0.295	116.2
12.800	0.605	-10.8	2.073	176.8	0.076	156.1	0.254	86.8
13.000	0.582	-23.8	2.108	159.4	0.080	139.0	0.241	54.3
13.200	0.542	-36.5	2.126	142.0	0.085	121.0	0.248	22.6
13.400	0.481	-49.6	2.124	124.4	0.088	103.4	0.278	-3.1
13.600	0.404	-64.0	2.110	106.8	0.090	85.8	0.308	-23.5
13.800	0.321	-80.1	2.087	89.8	0.093	70.2	0.335	-39.5
13.900	0.277	-9.2	2.080	80.9	0.093	61.4	0.345	-46.0
14.000	0.234	-102.4	2.067	72.2	0.096	53.4	0.352	-52.1
14.100	0.197	-117.1	2.053	63.5	0.096	45.0	0.354	-57.2
14.200	0.166	-136.8	2.043	54.9	0.097	37.6	0.352	-63.0
14.300	0.147	-160.7	2.036	46.1	0.099	28.7	0.346	-68.0
14.400	0.148	172.3	2.026	37.4	0.102	20.4	0.333	-72.9
14.500	0.168	147.8	2.010	28.2	0.102	12.4	0.317	-78.5
14.600	0.197	127.2	2.020	19.1	0.103	2.8	0.298	-84.4
14.800	0.283	95.5	2.014	-0.3	0.106	-16.2	0.239	-94.8
15.000	0.378	68.7	1.966	-21.3	0.105	-35.9	0.157	-104.5
15.200	0.474	43.2	1.868	-44.0	0.101	-57.1	0.063	-98.5
15.400	0.562	19.7	1.679	-66.4	0.093	-77.1	0.068	-6.3
15.600	0.624	-1.9	1.455	-88.2	0.081	-97.1	0.167	-0.1
15.800	0.676	-19.9	1.214	-108.2	0.071	-116.2	0.265	-10.2
16.000	0.714	-33.9	0.990	-126.0	0.059	-131.1	0.357	-21.0
16.500	0.790	-57.7	0.610	-161.9	0.036	-167.0	0.562	-43.3
17.000	0.859	-71.4	0.395	167.3	0.023	161.8	0.706	-58.4
17.500	0.900	-82.7	0.269	139.0	0.016	132.9	0.787	-71.1
18.000	0.899	-94.8	0.182	110.8	0.014	103.1	0.832	-84.2

[MEMO]

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Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

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