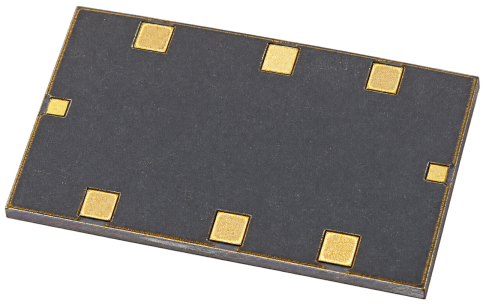
ERA75110S28 | W-band Power Amplifier MMIC

75–110 GHz • Bare die • Engineering datasheet

Key features

- Frequency range: 75–110 GHz
- Small-signal gain: 20 dB (feature summary)
- Saturated output power: 28 dBm
- DC supply: Vd = 15 V, Id = 300 mA (Vg = –1.5 V)
- Die size: 4.48 × 3.03 × 0.05 mm



Product description

ERA75110S28 is a wideband W-band power amplifier die covering 75–110 GHz. The source overview specifies 20 dB typical small-signal gain, 28 dBm typical saturated output power and 7% typical PAE. Its electrical table separately specifies 18 dB gain; both are retained.

Electrical characteristics

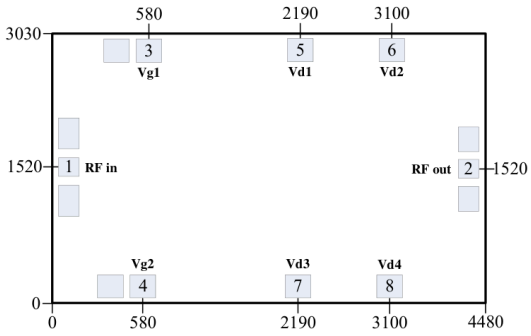
Vd = 15 V, Id = 300 mA, TA = +25 °C

Parameter	Min	Typ	Max	Unit
Frequency range	75		110	GHz
Small-signal gain		18		dB
Power gain flatness		±1		dB
Saturated output power		28		dBm
Power-added efficiency		7		%
Power gain		11		dB
Input VSWR		2		–
Output VSWR		2		–
Saturated drain current		600		mA

Operating limits

Parameter	Limit
Gate negative voltage	–5 V
Drain positive voltage	24 V
Input power	28 dBm
Storage temperature	–65 to +150 °C
Operating temperature	–55 to +85 °C

Authentic die outline



Dimensions (µm unless noted)

Overall outline tolerance: ±50 µm. Thickness: 50 µm (0.05 mm). All positional dimensions shown in µm.

Package technology

Unpackaged MMIC die; wire-bond contacts. Contact geometry is defined by the source drawing.

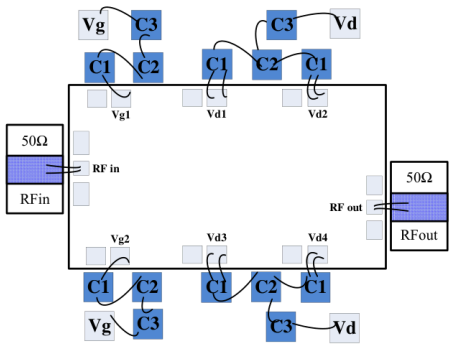
ERA75110S28 | Bond pads and assembly

Contact identification • Recommended external bypass components

Bond-pad definitions

Pin(s)	Symbol	Function / connection	Pad size (µm²)
1	RFin	RF input; external 50 Ω system; no DC-blocking capacitor required.	70 × 70
2	RFout	RF output; external 50 Ω system; no DC-blocking capacitor required.	70 × 70
3, 4	Vg1, Vg2	Gate bias pads; external 100 pF, 10000 pF and 10 µF bypass capacitors.	100 × 100
5, 6, 7, 8	Vd1, Vd2, Vd3, Vd4	Drain bias pads; external 100 pF, 10000 pF and 10 µF bypass capacitors.	100 × 100

Recommended assembly layout



Bypass components

C1 = 100 pF; C2 = 10000 pF; C3 = 10 µF. Use a single-layer capacitor for C1 where possible, installed as close as possible to the die bond pad.

Both RF ports connect to a 50 Ω system without external DC-blocking capacitors.

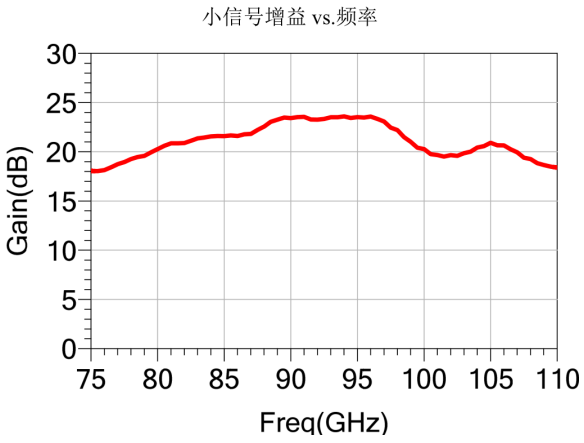
Measurement conditions

The RF performance curves on the following page were obtained at TA = +25 °C, Vd = 15 V and Id = 300 mA. PAE and drain-current graphs use Pin = 16 dBm.

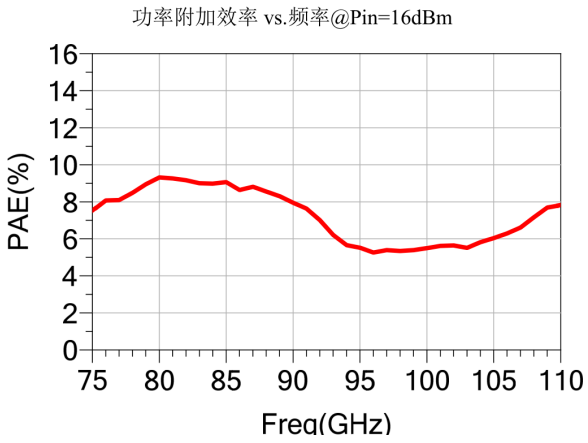
ERA75110S28 | RF performance plots

RF measurements at TA = +25 °C; Vd = 15 V, Id = 300 mA

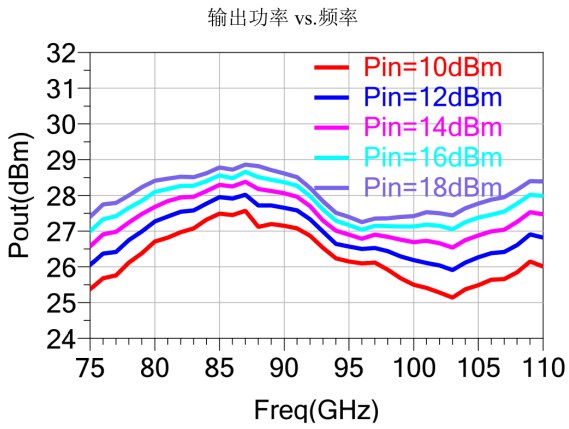
Small-signal gain vs. frequency



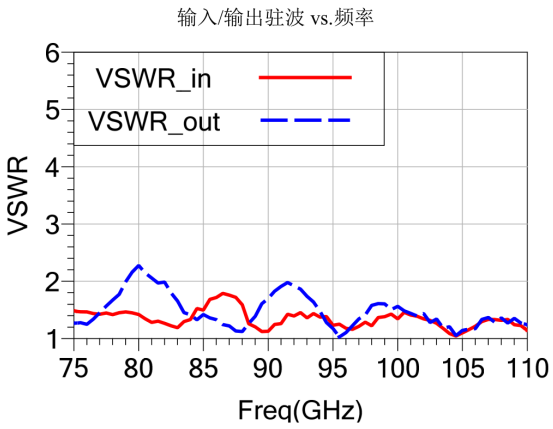
PAE vs. frequency (Pin = 16 dBm)



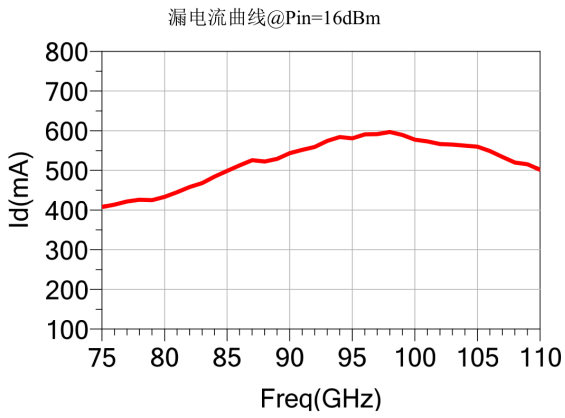
Output power vs. frequency (Pin = 10–18 dBm)



Input / output VSWR vs. frequency



Drain current vs. frequency (Pin = 16 dBm)



ERA75110S28 | Handling and installation

Source engineering precautions • Bare semiconductor MMIC

Handling and safety requirements

01 Storage

Keep the die in an ESD-protected container and store in a nitrogen atmosphere.

02 Cleaning

Handle bare die in a clean environment. Do not use liquid cleaning agents.

03 ESD protection

Strictly observe ESD handling procedures to avoid electrostatic damage.

04 Handling tools

Use a vacuum pick-up tool or precision pointed tweezers; do not touch the die surface with fingers or tools.

05 Bias sequence

At power-up, apply gate voltage before drain voltage. At power-down, remove drain voltage before gate voltage.

06 Die attachment

Use AuSn eutectic soldering or conductive adhesive. The mounting face must be flat and clean and the RF substrate gap minimized. For 80/20 AuSn, keep sintering temperature below 300 °C, duration at or below 20 s and scrubbing time at or below 3 s. For conductive adhesive, apply as little as possible and follow the adhesive vendor cure conditions.

07 Wire bonding

Unless otherwise stated, use two 25 µm-diameter gold wires for each RF input and output bond. Keep the wires short. Thermosonic bonding temperature: 150 °C, with the lowest feasible ultrasonic energy. Ball-bond capillary force: 40–50 gf; wedge-bond capillary force: 18–22 gf.

08 Support

Contact the supplier if there are technical questions.

Source notation