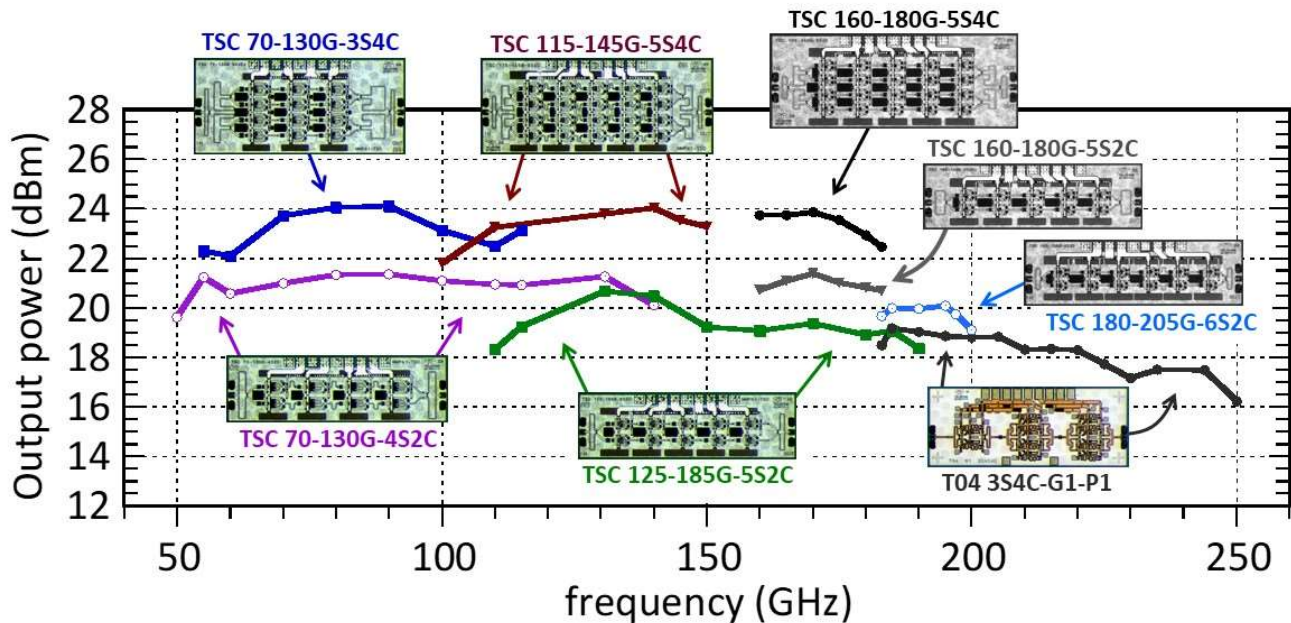


## 50-250 GHz Broadband, High Power Amplifier MMICs in InP HBT



- Amplifier ID: **TSC 70-130G-4S2C**
- 22-25 dB  $S_{21}$  gain from 55-130 GHz, typical.
- 100-120 mW saturated RF output power,  $P_{sat}$ .
  - 16-18 dB power gain at  $P_{sat}$  with 7.5-8% PAE.
- DC bias,  $P_{DC} = 1.4$ -W. Size: 1.86-mm x 0.64-mm.

- Amplifier ID: **TSC 70-130G-3S4C**
- 16-20 dB  $S_{21}$  gain from 70-130 GHz, typical.
- 160-240 mW saturated RF output power,  $P_{sat}$ .
  - 13-14 dB power gain at  $P_{sat}$  with 7-10% PAE.
- DC bias,  $P_{DC} = 2.1$ -W. Size: 1.86-mm x 0.92-mm.

- Amplifier ID: **TSC 115-145G-5S4C**
- 23-25 dB  $S_{21}$  gain from 115-145 GHz, typical.
- 210-225 mW saturated RF output power,  $P_{sat}$ .
  - 14-16 dB power gain at  $P_{sat}$  with 5-6.5% PAE.
- DC bias,  $P_{DC} = 3.5$ -W. Size: 2.05-mm x 0.92-mm.

- Amplifier ID: **TSC 125-185G-5S2C**
- 20-22 dB  $S_{21}$  gain from 125-185 GHz, typical.
- 75-100 mW saturated RF output power,  $P_{sat}$ .
  - 13-14 dB power gain at  $P_{sat}$  with 5-7.5% PAE.
- DC bias,  $P_{DC} = 1.4$ -W. Size: 1.86-mm x 0.64-mm.

- Amplifier ID: **TSC 160-180G-5S2C**
- 20-23 dB  $S_{21}$  gain from 160-180 GHz, typical.
- 100-125 mW saturated RF output power,  $P_{sat}$ .
  - 13-14 dB power gain at  $P_{sat}$  with 6-8% PAE.
- DC bias,  $P_{DC} = 1.5$ -W. Dimensions: 1.86-mm x 0.64-mm.

- Amplifier ID: **TSC 160-180G-5S4C**
- 19-21 dB  $S_{21}$  gain from 160-180 GHz, typical.
- 175-225 mW saturated RF output power,  $P_{sat}$ .
  - 12.5-14 dB power gain at  $P_{sat}$  with 5-7% PAE.
- DC bias,  $P_{DC} = 3.0$ -W. Dimensions: 2.05-mm x 0.86-mm.

- Amplifier ID: **TSC 185-205G-6S2C**
- 20-22 dB  $S_{21}$  gain from 185-205 GHz, typical.
- 80-90 mW saturated RF output power,  $P_{sat}$ .
  - 12-13 dB power gain at  $P_{sat}$  with 4-4.5% PAE.
- DC bias,  $P_{DC} = 1.8$ -W. Dimensions: 1.86-mm x 0.64-mm.

- Amplifier ID: **T04 3S4C-G1-P1 (190-245 GHz)**
- 23-28 dB  $S_{21}$  gain from 190-245 GHz, typical.
- 50-80 mW saturated RF output power  $P_{sat}$ .
  - 16-18 dB power gain at  $P_{sat}$  with 3-4.5% PAE.
- DC bias,  $P_{DC} = 1.6$ -W. Dimensions: 1.92-mm x 0.80-mm.

For additional information, pricing and quotation, and to order, contact Teledyne at [tsi.electronics@teledyne.com](mailto:tsi.electronics@teledyne.com)

For custom PA design services using the InP HBT technology, contact Teledyne at [zach.griffith@teledyne.com](mailto:zach.griffith@teledyne.com)

**Packaged versions** of the Teledyne MMICs shown are available from VDI: <https://vadiodes.com/en/products-6/amplifier>

For additional packaged power amplifier information from Virginia Diodes (VDI), contact: [vdirfq@vadiodes.com](mailto:vdirfq@vadiodes.com)

**Additional amplifier MMICs from Teledyne:**

**TSC 70-130G-3S2C power amplifier.** Its performance is very similar to the **TSC 70-130G-4S2C PA**, only lower gain.

- 16-20 dB  $S_{21}$  gain from 70-130 GHz, typical.
- 100-120 mW saturated RF output power,  $P_{sat}$ .
  - 13-14 dB power gain at  $P_{sat}$  with 10-11% PAE.
- DC bias,  $P_{DC} = 1.1 \cdot W$ . Size: 1.86-mm x 0.64-mm.

**TSC 70-130G-3S1C power amplifier.** Its performance is very similar to the **TSC 70-130G-3S2C PA**, less output power.

- 16-20 dB  $S_{21}$  gain from 70-130 GHz, typical.
- 55-65 mW saturated RF output power,  $P_{sat}$ .
  - 14.5-15 dB power gain at  $P_{sat}$  with 11-12% PAE.
- DC bias,  $P_{DC} = 0.55 \cdot W$ . Size: 1.30-mm x 0.50-mm.

**TSC 94G-3S2C-E20 power amplifier.** An **88-104 GHz, 26-30 dB gain, high-efficiency power amplifier.**

- 26-30 dB  $S_{21}$  gain from 88-104 GHz, typical.
- 100-110 mW saturated RF output power,  $P_{sat}$ .
  - 18-20 dB power gain at  $P_{sat}$  with 19-23% PAE.
- DC bias,  $P_{DC} = 0.42 \cdot W$ . Size: 1.86-mm x 0.64-mm.

**TSC 190G-5S1C amplifier.** A **190-GHz, 25-dB gain, low-power amplifier.**

- 23-25 dB  $S_{21}$  gain from 185-200 GHz, typical.
- 9-10 dBm saturated RF output power,  $P_{sat}$ .
  - 16 dB power gain at  $P_{sat}$  with 9-9.5% PAE.
  - Output 1-dB gain compression power,  $OP_{1dB} = 3$ -dBm.
- DC bias,  $P_{DC} = 80$ -mW. Size: 0.93-mm x 0.48-mm.

**Publication list summarizing Teledyne's 50 – 250 GHz power amplifiers:**

1. Z. Griffith et al., "50–250 GHz High-Gain Power Amplifier MMICs in 250-nm InP HBT", *Proc. IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, Nashville, TN, Nov. 3 – 6, 2019.
2. Z. Griffith et al., "A 160–183 GHz 0.24-W (7.5% PAE) PA and 0.14-W (9.5% PAE) PA: High-Gain, G-band Power Amplifier MMICs in 250-nm InP HBT", *MTTS-IEEE Int. Microwave Symposium*, Los Angeles, CA, June 21 – 27, 2020.
3. Z. Griffith et al., "A W-band SSPA with 100-140 mW  $P_{out}$ , > 20% PAE, and 26-30 dB  $S_{21}$  gain Across 88-104 GHz", *IEEE Microwave and Wireless Component Letters*, Vol. 30, No. 2, February 2020.
4. Z. Griffith et al., "A 115–185 GHz 75-115 mW High-Gain PA MMIC in 250-nm InP HBT", *EuMA European Microwave Conference*, Paris, France, Sept. 29 – Oct. 4, 2019.
5. Z. Griffith et al., "A 140-GHz 0.25-W PA and a 55-135 GHz 115-135 mW PA: High-Gain, Broadband Power Amplifier MMICs in 250-nm InP HBT", *MTTS-IEEE Int. Microwave Symposium*, Boston, MA, June 2 – 7, 2019.
6. Z. Griffith et al., "A Compact 140-GHz 150-mW High-Gain Power Amplifier MMIC in 250-nm InP HBT", *IEEE Microwave and Wireless Components Letters*, Vol. 29, No. 4, April-2019.
7. Z. Griffith et al., "A 190-GHz High-Gain, 3-dBm  $OP_{1dB}$  Low DC-Power Amplifier in 250-nm InP HBT", *IEEE Microwave Wireless and Components Letters*, Vol. 27, No. 12, pp. 1128-1130, 2017.
8. Z. Griffith et al., "A 50-80 mW SSPA from 190.8-244 GHz at 0.5-mW  $P_{in}$ ", *IEEE MTT-S International Microwave Symposium*, Tampa, FL, June 1-6, 2014.