

T-31-25

Features

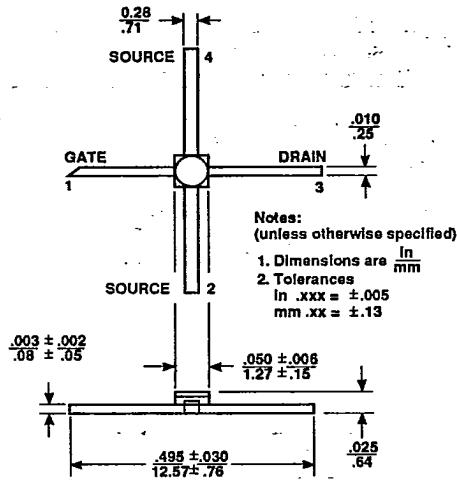
- High Associated Gain: 8.0 dB typical at 12 GHz
- High Output Power: 18.0 dBm typical $P_{1\text{ dB}}$ at 12 GHz
- Low Noise Figure: 2.5 dB typical at 12 GHz
- Hermetic Gold-Ceramic Microstrip Package

Description

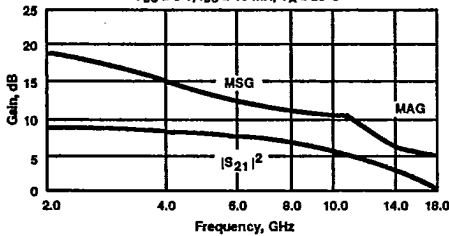
Avantek's ATF-26550 is a high performance gallium arsenide Schottky-barrier-gate field effect transistor housed in a hermetic, high reliability package. Its noise figure makes this device appropriate for use in the gain stages of low noise amplifiers operating in the 2-16 GHz frequency range.

This GaAs FET device has a nominal 0.3 micron gate length with a total gate periphery of 250 microns. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device.

Avantek 50 mil Package



INSERTION POWER GAIN, MAXIMUM AVAILABLE GAIN AND MAXIMUM STABLE GAIN vs. FREQUENCY
 $V_{DS} = 3\text{ V}$, $I_{DS} = 10\text{ mA}$, $T_A = 25^\circ\text{C}$



Electrical Specifications, $T_A = 25^\circ\text{C}$

| Symbol | Parameters and Test Conditions | Units | Min. | Typ. | Max. |
|-------------------|---|-----------------------|------|------|------|
| NFO | Optimum Noise Figure: $V_{DS} = 3\text{ V}$, $I_{DS} = 10\text{ mA}$ | dB | | 2.2 | 2.8 |
| GA | Gain @ NFO: $V_{DS} = 3\text{ V}$, $I_{DS} = 10\text{ mA}$ | $f = 8.0\text{ GHz}$ | | 2.5 | |
| | | $f = 12.0\text{ GHz}$ | | 2.7 | |
| | | $f = 14.0\text{ GHz}$ | | 7.0 | 10.0 |
| $P_{1\text{ dB}}$ | Output Power @ 1 dB Gain Compression: $V_{DS} = 5\text{ V}$, $I_{DS} = 30\text{ mA}$ | dBm | | 18.0 | |
| $G_{1\text{ dB}}$ | 1 dB Compressed Gain: $V_{DS} = 5\text{ V}$, $I_{DS} = 30\text{ mA}$ | dB | | 7.5 | |
| g_m | Transconductance: $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$ | mmho | 20 | 40 | |
| I_{DSS} | Saturated Drain Current: $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$ | mA | 25 | 50 | 90 |
| V_p | Pinchoff Voltage: $V_{DS} = 3\text{ V}$, $I_{DS} = 1\text{ mA}$ | V | -3.0 | -1.7 | -0.8 |

AVANTEK INC

Absolute Maximum Ratings

| Parameter | Symbol | Absolute Maximum ¹ |
|----------------------------------|------------------|-------------------------------|
| Drain-Source Voltage | V _{DS} | +7 V |
| Gate-Source Voltage | V _{GS} | -4 V |
| Drain Current | I _{DS} | I _{DSS} |
| Power Dissipation ^{2,3} | P _T | 275 mW |
| Channel Temperature | T _{CH} | 175°C |
| Storage Temperature | T _{STG} | -65°C to +175°C |

Thermal Resistance: $\theta_{JC} = 325^\circ\text{C/W}$; T_{CH} = 150°C
 Liquid Crystal Measurement; 1 μm Spot Size⁴

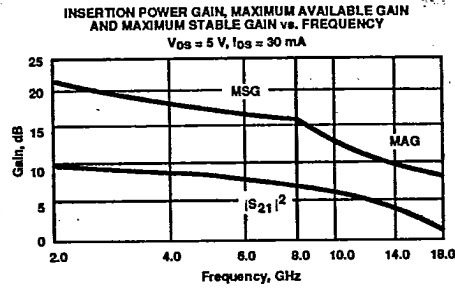
Notes:

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Case Temperature = 25°C.
3. Derate at 3 mW/°C for T_{CASE} > 86°C.
4. The small spot size of this technique results in a higher, though more accurate determination of θ_{JC} than do alternate methods. See MEASUREMENTS section for more information.

Typical Performance, T_A = 25°C

(unless otherwise noted)

T-31-25



Typical Scattering Parameters: Common Source, Z₀ = 50 Ω

T_A = 25°C, V_{DS} = 3 V, I_{DS} = 10 mA

| Freq. GHz | S ₁₁ | | S ₂₁ | | | S ₁₂ | | | S ₂₂ | |
|-----------|-----------------|------|-----------------|------|-----|-----------------|------|-----|-----------------|------|
| | Mag | Ang | dB | Mag | Ang | dB | Mag | Ang | Mag | Ang |
| 2.0 | .95 | -36 | 8.1 | 2.53 | 148 | -28.0 | .040 | 64 | .75 | -18 |
| 3.0 | .92 | -51 | 7.6 | 2.41 | 133 | -24.7 | .058 | 55 | .71 | -26 |
| 4.0 | .90 | -67 | 7.2 | 2.30 | 118 | -22.4 | .076 | 43 | .68 | -39 |
| 5.0 | .87 | -82 | 6.8 | 2.18 | 102 | -20.5 | .094 | 34 | .64 | -49 |
| 6.0 | .84 | -97 | 6.3 | 2.06 | 87 | -19.0 | .112 | 24 | .60 | -58 |
| 7.0 | .80 | -118 | 6.4 | 2.08 | 70 | -18.2 | .123 | 7 | .55 | -71 |
| 8.0 | .73 | -140 | 6.2 | 2.04 | 53 | -17.4 | .135 | -5 | .47 | -85 |
| 9.0 | .71 | -161 | 5.8 | 1.95 | 35 | -17.0 | .142 | -17 | .43 | -103 |
| 10.0 | .67 | -178 | 5.2 | 1.81 | 18 | -16.7 | .146 | -27 | .42 | -120 |
| 11.0 | .66 | 167 | 4.4 | 1.66 | 5 | -16.8 | .144 | -39 | .41 | -134 |
| 12.0 | .64 | 150 | 4.0 | 1.59 | -10 | -17.1 | .140 | -49 | .40 | -144 |
| 13.0 | .63 | 133 | 3.6 | 1.51 | -23 | -17.4 | .135 | -59 | .38 | -154 |
| 14.0 | .63 | 115 | 3.0 | 1.42 | -38 | -17.5 | .133 | -66 | .36 | -172 |
| 15.0 | .62 | 99 | 2.5 | 1.34 | -53 | -17.7 | .130 | -74 | .35 | -158 |
| 16.0 | .62 | 89 | 1.7 | 1.22 | -67 | -17.9 | .128 | -88 | .40 | 134 |
| 17.0 | .63 | 81 | 1.0 | 1.11 | -79 | -17.9 | .127 | -91 | .44 | 123 |
| 18.0 | .62 | 70 | 0.1 | 1.01 | -92 | -17.8 | .129 | -94 | .48 | 118 |

T_A = 25°C, V_{DS} = 5 V, I_{DS} = 30 mA

| | | | | | | | | | | |
|------|-----|------|-----|------|-----|-------|------|-----|-----|------|
| 2.0 | .96 | -38 | 9.0 | 2.82 | 144 | -32.8 | .023 | 69 | .75 | -20 |
| 3.0 | .92 | -52 | 8.4 | 2.62 | 130 | -30.2 | .031 | 70 | .75 | -28 |
| 4.0 | .89 | -66 | 7.9 | 2.48 | 116 | -27.5 | .042 | 68 | .76 | -36 |
| 5.0 | .85 | -82 | 7.8 | 2.46 | 100 | -25.4 | .054 | 65 | .76 | -47 |
| 6.0 | .78 | -102 | 7.7 | 2.43 | 84 | -24.0 | .063 | 46 | .71 | -57 |
| 7.0 | .71 | -124 | 7.5 | 2.38 | 66 | -23.9 | .064 | 30 | .66 | -68 |
| 8.0 | .68 | -144 | 7.2 | 2.30 | 52 | -23.6 | .066 | 25 | .63 | -78 |
| 9.0 | .64 | -163 | 7.0 | 2.23 | 37 | -23.2 | .069 | 19 | .62 | -86 |
| 10.0 | .62 | -178 | 6.4 | 2.08 | 21 | -23.2 | .069 | 12 | .61 | -99 |
| 11.0 | .60 | 165 | 5.7 | 1.93 | 8 | -23.1 | .070 | 5 | .61 | -112 |
| 12.0 | .60 | 149 | 5.2 | 1.82 | -6 | -23.1 | .070 | -3 | .60 | -124 |
| 13.0 | .59 | 131 | 4.7 | 1.71 | -21 | -23.1 | .070 | -8 | .60 | -138 |
| 14.0 | .59 | 122 | 4.1 | 1.60 | -34 | -22.5 | .075 | -15 | .60 | -152 |
| 15.0 | .62 | 105 | 3.3 | 1.47 | -48 | -21.9 | .080 | -20 | .59 | -162 |
| 16.0 | .61 | 93 | 3.0 | 1.42 | -60 | -21.5 | .084 | -25 | .58 | 175 |
| 17.0 | .62 | 83 | 2.2 | 1.29 | -74 | -21.1 | .088 | -31 | .60 | 161 |
| 18.0 | .63 | 73 | 1.1 | 1.13 | -85 | -20.3 | .097 | -40 | .65 | 145 |

A model for this device is available in the DEVICE MODELS section.