

PTF 10035

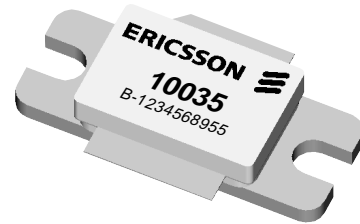
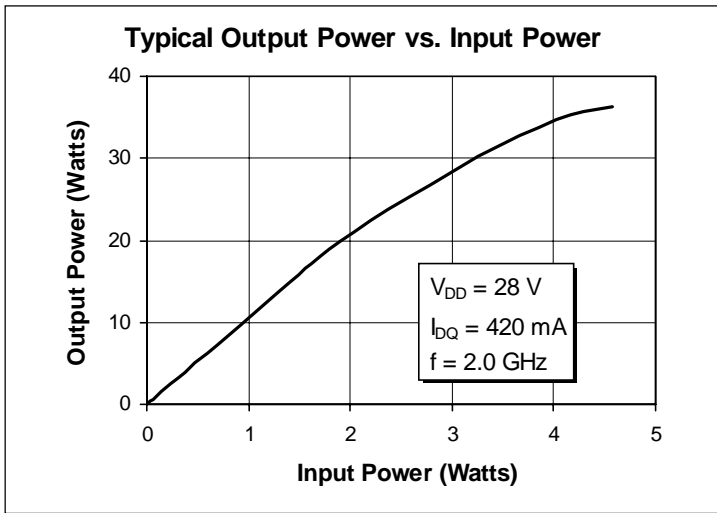
30 Watts, 1.9–2.0 GHz

GOLDMOS™ Field Effect Transistor

Description

The PTF 10035 is an internally matched common source N-channel enhancement-mode lateral MOSFET intended for large signal amplifier applications from 1.9 to 2.0 GHz. It is rated at 30 watts power output. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **INTERNALLY MATCHED**
- **Guaranteed Performance at 2.0 GHz, 28 V**
- Output Power = 30 Watts Min
- Gain = 12.5 dB Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Excellent Thermal Stability**
- **100% Lot Traceability**



Package 20237

RF Specifications (100% Tested)

| Characteristic | Symbol | Min | Typ | Max | Units |
|---|----------|-----|------|------|-------|
| Gain ($V_{DD} = 28\text{ V}$, $P_{OUT} = 10\text{ W}$, $I_{DQ} = 420\text{ mA}$, $f = 2.0\text{ GHz}$) | G_{ps} | 11 | 12.5 | — | dB |
| Power Output at 1 dB Compression ($V_{DD} = 28\text{ V}$, $I_{DQ} = 420\text{ mA}$, $f = 2.0\text{ GHz}$) | P-1dB | 30 | 35 | — | Watts |
| Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{OUT} = 30\text{ W}$, $I_{DQ} = 420\text{ mA}$, $f = 2.0\text{ GHz}$) | η | 35 | 40 | — | % |
| Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{OUT} = 30\text{ W}$, $I_{DQ} = 420\text{ mA}$, $f = 2.0\text{ GHz}$ —all phase angles at frequency of test) | Ψ | — | — | 10:1 | — |

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated.

Electrical Characteristics (100% Tested)

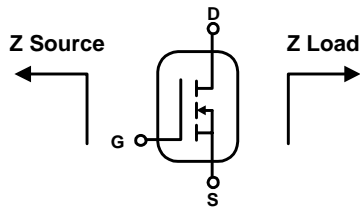
| Characteristic | Conditions | Symbol | Min | Typ | Max | Units |
|---------------------------------|---|---------------|-----|-----|-----|---------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 100\text{ mA}$ | $V_{(BR)DSS}$ | 65 | 65 | — | Volts |
| Zero Gate Voltage Drain Current | $V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 1.0 | mA |
| Gate Threshold Voltage | $V_{DS} = 10\text{ V}, I_D = 75\text{ mA}$ | $V_{GS(th)}$ | 3.0 | — | 5.0 | Volts |
| Forward Transconductance | $V_{DS} = 10\text{ V}, I_D = 6\text{ A}$ | g_{fs} | — | 1.8 | — | Siemens |

Maximum Ratings

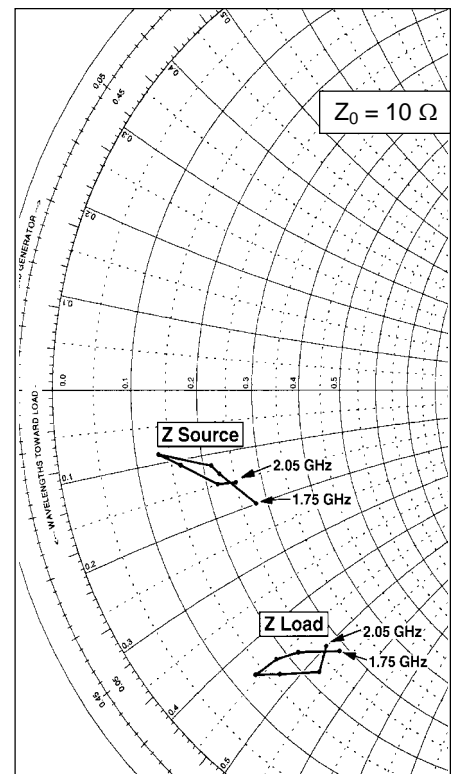
| Parameter | Symbol | Value | Unit |
|--|-----------------|-----------------|--------------------------------------|
| Drain-Source Voltage | V_{DSS} | 65 | Vdc |
| Gate-Source Voltage | V_{GS} | ± 20 | Vdc |
| Operating Junction Temperature | T_J | 200 | $^{\circ}\text{C}$ |
| Total Device Dissipation Above 25°C derate by | P_D | 120 0.7 | Watts $\text{W}/^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -40 to $+150$ | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$) | $R_{\theta JC}$ | 1.4 | $^{\circ}\text{C}/\text{W}$ |

Impedance Data

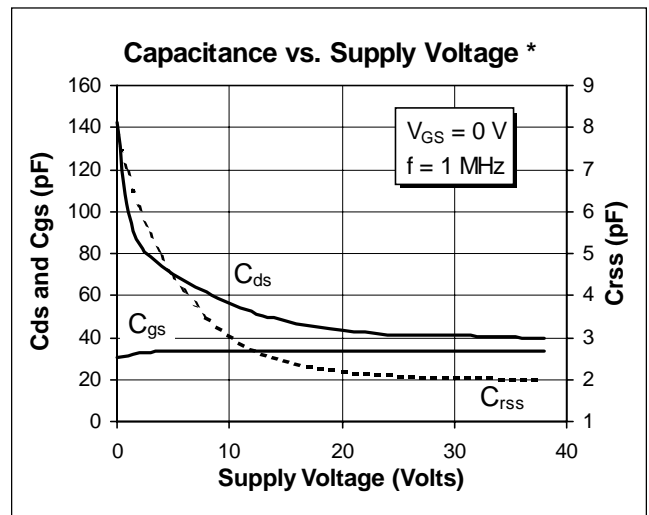
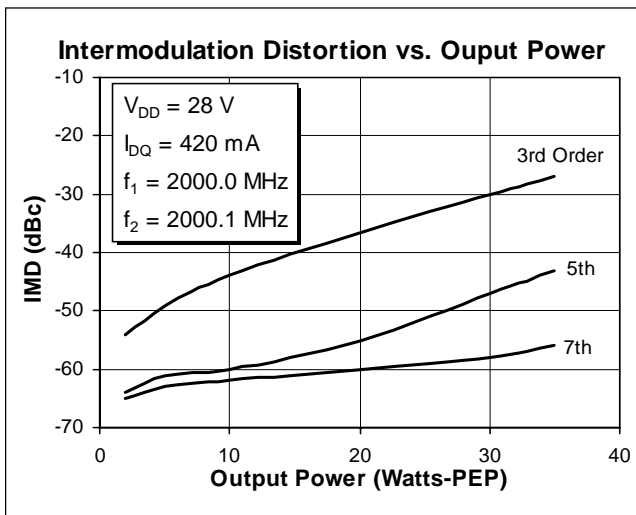
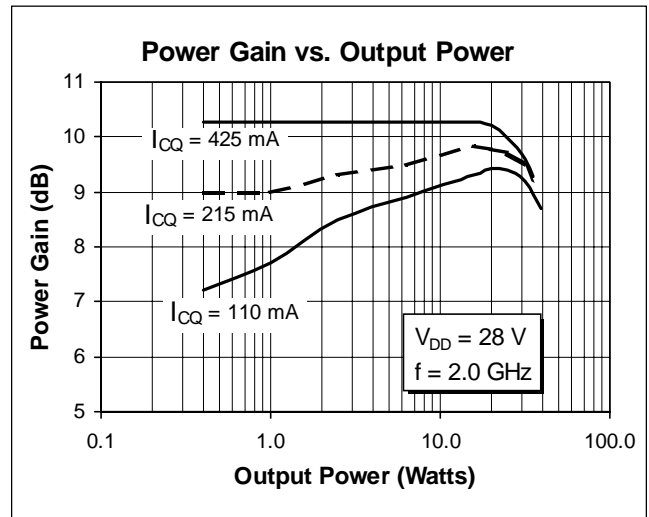
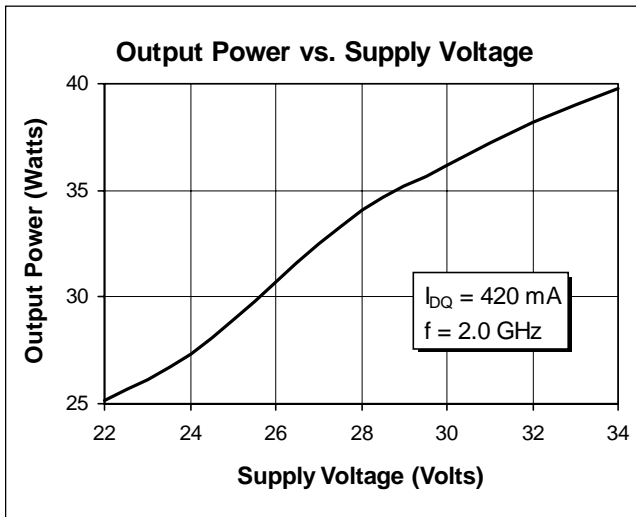
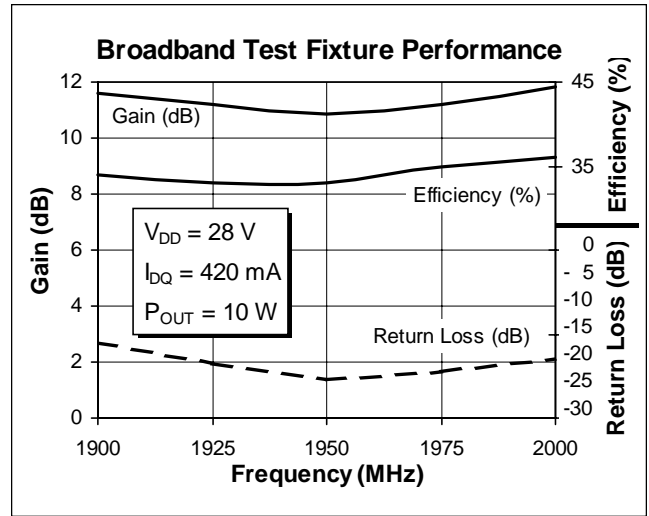
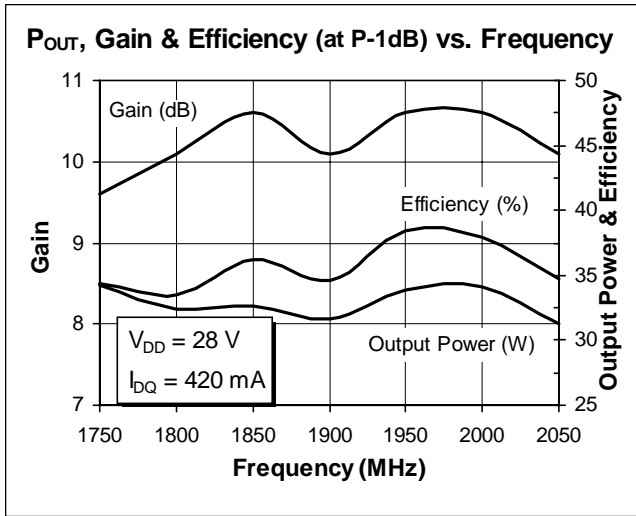
($V_{DD} = 28\text{ V}, P_{OUT} = 30\text{ W}, I_{DQ} = 420\text{ mA}$)



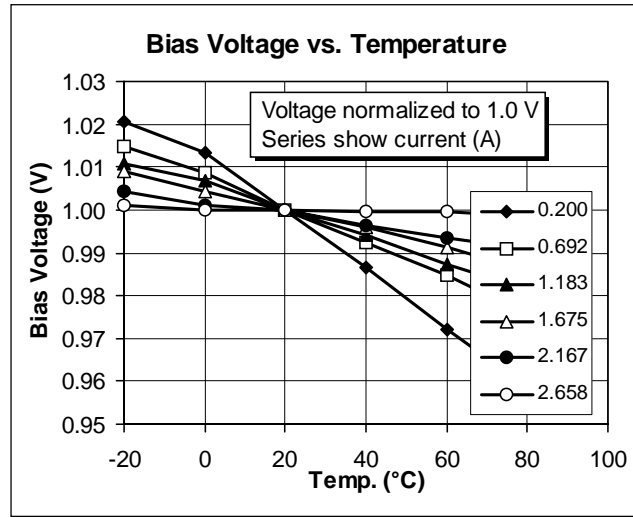
| Frequency GHz | Z Source Ω | | Z Load Ω | |
|------------------|-------------------|-------|-----------------|-------|
| | R | jX | R | jX |
| 1.75 | 2.78 | -1.99 | 2.84 | -5.27 |
| 1.80 | 2.25 | -1.34 | 2.19 | -4.69 |
| 1.85 | 2.14 | -1.18 | 1.80 | -4.50 |
| 1.90 | 1.33 | -0.88 | 1.36 | -4.43 |
| 1.95 | 1.64 | -1.08 | 1.68 | -4.72 |
| 2.00 | 2.19 | -1.49 | 2.25 | -5.24 |
| 2.05 | 2.51 | -1.54 | 2.70 | -5.00 |



Typical Performance



*This part is internally matched. Measurements of the finished product will not yield these figures.

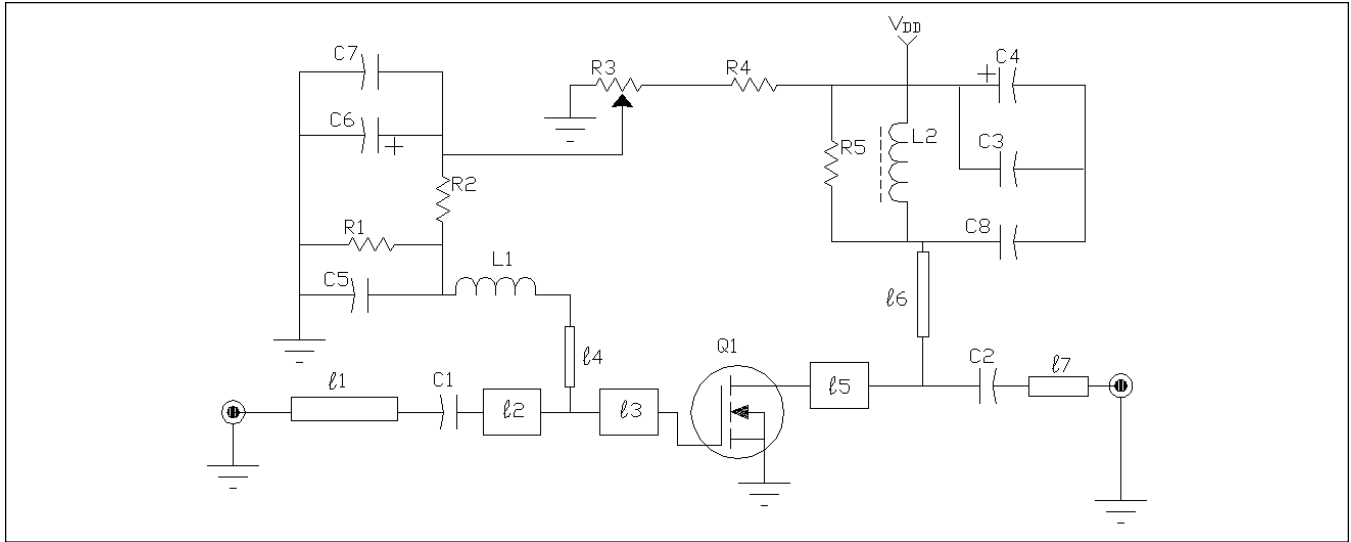


Typical Scattering Parameters

($V_{DS} = 28\text{ V}$, $I_D = 1.0\text{ A}$)

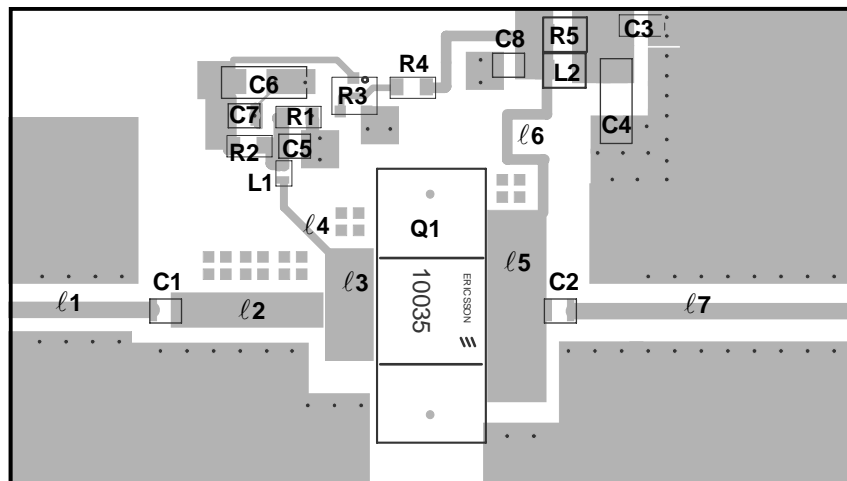
| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|------------|-------|------|-------|------|-------|-----|-------|------|
| | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 100 | 0.934 | -159 | 4.19 | 36 | 0.001 | 78 | 0.765 | -158 |
| 200 | 0.947 | -163 | 2.97 | 32 | 0.002 | 90 | 0.795 | -164 |
| 300 | 0.979 | -172 | 0.814 | 13 | 0.004 | 95 | 0.870 | -170 |
| 400 | 0.983 | -176 | 0.380 | 6 | 0.006 | 94 | 0.914 | -174 |
| 500 | 0.982 | -179 | 0.202 | 3 | 0.008 | 92 | 0.929 | -177 |
| 600 | 0.980 | 179 | 0.102 | 7 | 0.011 | 88 | 0.978 | -179 |
| 700 | 0.980 | 177 | 0.038 | 38 | 0.013 | 84 | 1.00 | 175 |
| 800 | 0.982 | 176 | 0.046 | 119 | 0.015 | 81 | 0.933 | 170 |
| 900 | 0.987 | 174 | 0.092 | 135 | 0.018 | 79 | 0.890 | 169 |
| 1000 | 0.987 | 172 | 0.145 | 137 | 0.021 | 75 | 0.847 | 168 |
| 1100 | 0.989 | 171 | 0.212 | 136 | 0.024 | 69 | 0.846 | 169 |
| 1200 | 0.990 | 169 | 0.321 | 136 | 0.025 | 65 | 0.849 | 167 |
| 1300 | 0.998 | 166 | 0.537 | 130 | 0.028 | 63 | 0.837 | 164 |
| 1400 | 1.00 | 162 | 0.970 | 114 | 0.034 | 58 | 0.794 | 159 |
| 1500 | 0.952 | 157 | 1.72 | 80 | 0.040 | 41 | 0.623 | 154 |
| 1600 | 0.838 | 154 | 2.20 | 37 | 0.036 | 20 | 0.476 | 170 |
| 1700 | 0.749 | 157 | 2.40 | -5 | 0.024 | 7 | 0.605 | -174 |
| 1800 | 0.720 | 160 | 2.13 | -43 | 0.016 | 27 | 0.804 | -177 |
| 1900 | 0.668 | 162 | 1.86 | -73 | 0.020 | 41 | 0.871 | 177 |
| 2000 | 0.643 | 170 | 1.63 | -103 | 0.021 | 39 | 0.889 | 172 |
| 2100 | 0.717 | 177 | 1.33 | -132 | 0.019 | 44 | 0.881 | 169 |
| 2200 | 0.838 | 178 | 1.00 | -158 | 0.021 | 60 | 0.883 | 167 |

Test Circuit



Test Circuit Block Diagram for $f = 2.0$ GHz

| | | | | | |
|----------------|---------------------------|---------------------------|---------------|--|----------|
| Q1 | 10035 | LDMOS RF Transistor | L1 | 2.7 nH | SMT Coil |
| $l1, l7$ | | Microstrip 50 Ω | L2 | 4mm SMT Ferrite Bead | |
| $l2$ | .1784 λ @ 2.0 GHz | Microstrip 29.18 Ω | R1, R2 | 220 Ω Chip Resistor | K1206 |
| $l3$ | .0612 λ @ 2.0 GHz | Microstrip 16.63 Ω | R3 | 2K SMT Potentiometer | |
| $l4$ | .08 λ @ 2.0 GHz | Microstrip 70 Ω | R4 | 10 Ω Chip Resistor | K1206 |
| $l5$ | .0752 λ @ 2.0 GHz | Microstrip 7.23 Ω | R5 | 1 Ω Chip Resistor | K1206 |
| $l6$ | .224 λ @ 2.0 GHz | Microstrip 65 Ω | Circuit Board | .028" Dielectric Thickness, $\epsilon_r = 4.0$, AlliedSignal, G200, 2 oz. copper | |
| C1, C2, C5, C8 | 33 pF Chip Cap | ATC 100 B | | | |
| C3, C7 | 0.1 μ F Chip Cap | | | | |
| C4, C6 | 10 μ F SMT Tantalum | | | | |

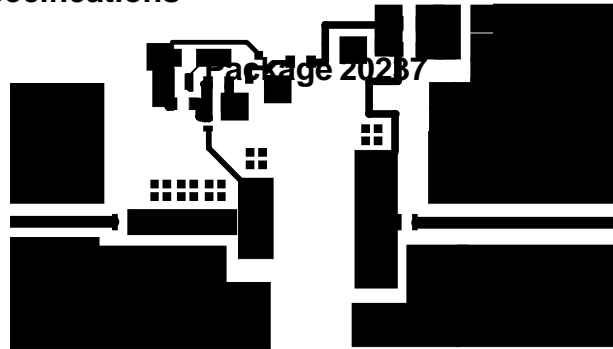



Assembly Diagram (not to scale)

PTF 10035



Package Mechanical Specifications



Artwork (approx. 1 inch )