

PTF 10052

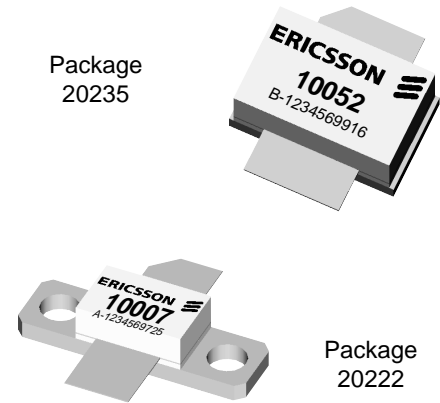
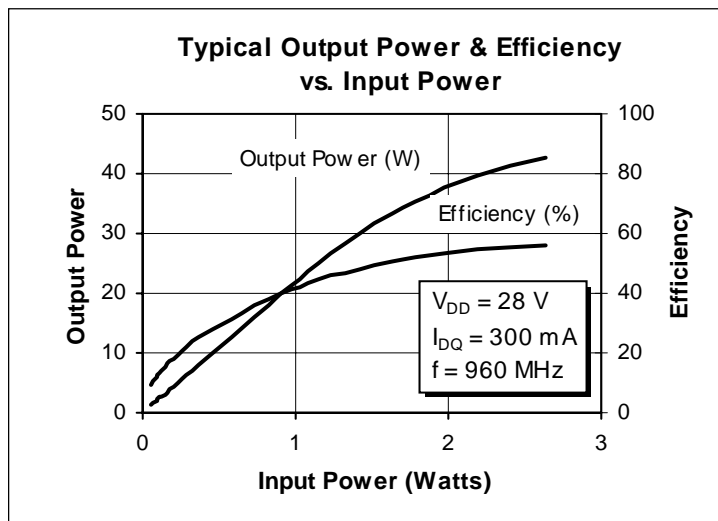
35 Watts, 1.0 GHz

GOLDMOS™ Field Effect Transistor

Description

The PTF 10052 is a 35 Watt LDMOS FET intended for large signal amplifier applications to 1.0 GHz. It operates at 55% efficiency and 13.5 dB of gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- Performance at 960 MHz, 28 Volts
 - Output Power = 35 Watts
 - Power Gain = 13.5 dB Typ
 - Efficiency = 55% Typ
- Full Gold Metallization
- Silicon Nitride Passivated
- Back Side Common Source
- 100% Lot Traceability
- Available in Package 20222 as PTF 10007



RF Specifications (100% Tested)

| Characteristic | Symbol | Min | Typ | Max | Units |
|--|----------|------|------|------|-------|
| Gain ($V_{DD} = 28\text{ V}$, $P_{OUT} = 35\text{ W}$, $I_{DQ} = 300\text{ mA}$, $f = 960\text{ MHz}$) | G_{ps} | 12.0 | 13.5 | — | dB |
| Power Output at 1 dB Compression ($V_{DD} = 28\text{ V}$, $I_{DQ} = 300\text{ mA}$, $f = 960\text{ MHz}$) | P-1dB | 35 | — | — | Watts |
| Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{OUT} = 35\text{ W}$, $I_{DQ} = 300\text{ mA}$, $f = 960\text{ MHz}$) | η | 50 | 55 | — | % |
| Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{OUT} = 35\text{ W}$, $I_{DQ} = 300\text{ mA}$, $f = 960\text{ MHz}$ — all phase angles at frequency of test) | Ψ | — | — | 10:1 | — |

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

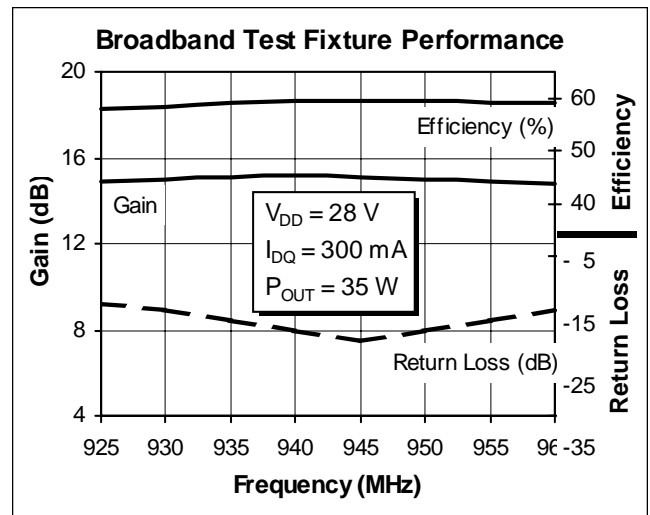
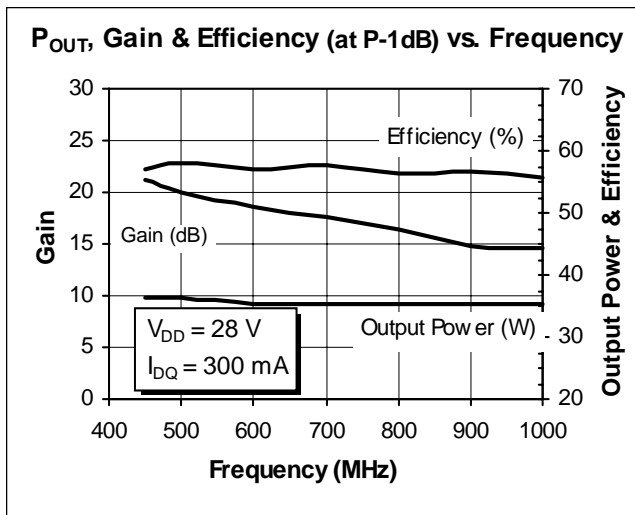
Electrical Characteristics (100% Tested)

| Characteristic | Conditions | Symbol | Min | Typ | Max | Units |
|--------------------------------|---|---------------|-----|-----|-----|---------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 5\text{ mA}$ | $V_{(BR)DSS}$ | 65 | 70 | — | Volts |
| Drain-Source Leakage 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 | $V_{DS} = 10\text{ V}, I_D = 3\text{ A}$ | g_{fs} | — | 2.8 | — | Siemens |

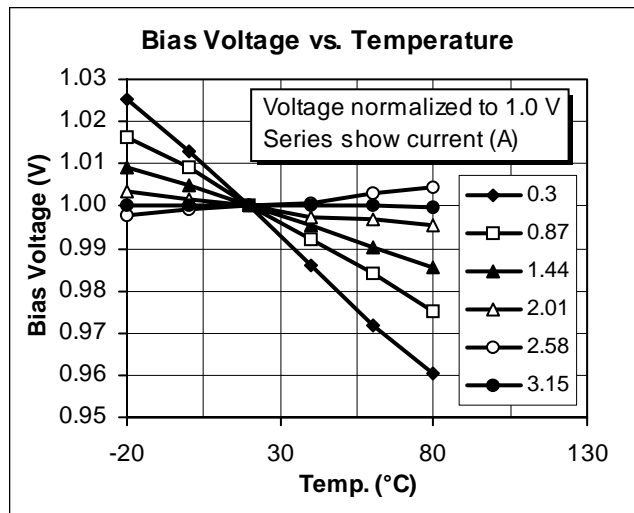
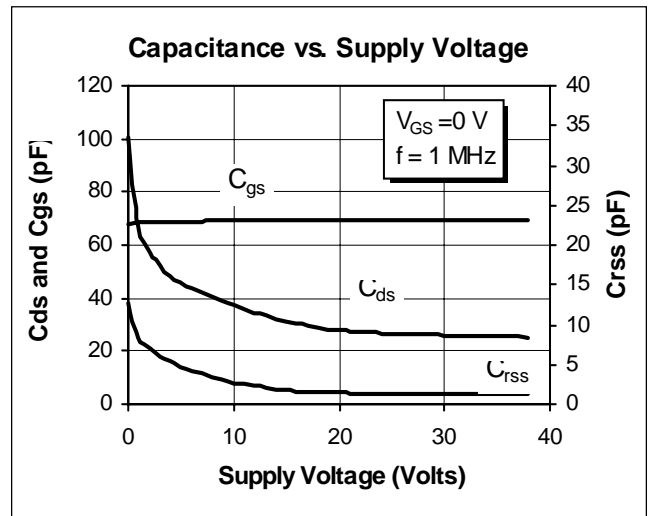
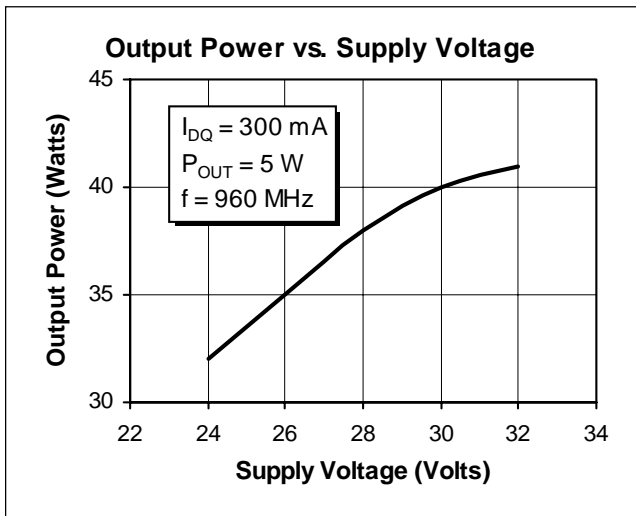
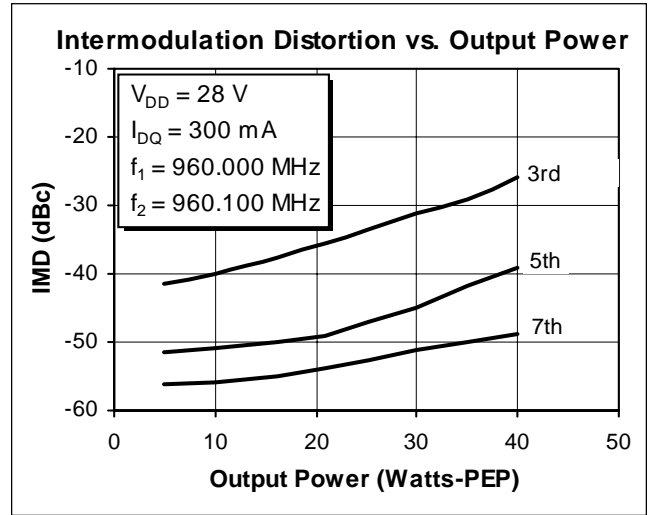
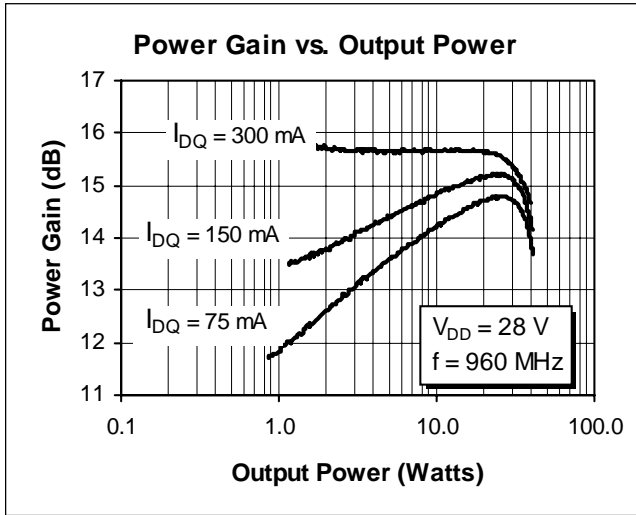
Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------------------------|
| Drain-Source Voltage | V_{DSS} | 60 | 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 | $^{\circ}\text{C}/\text{W}$ |

Typical Performance



Typical Performance

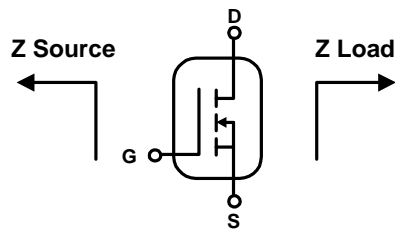


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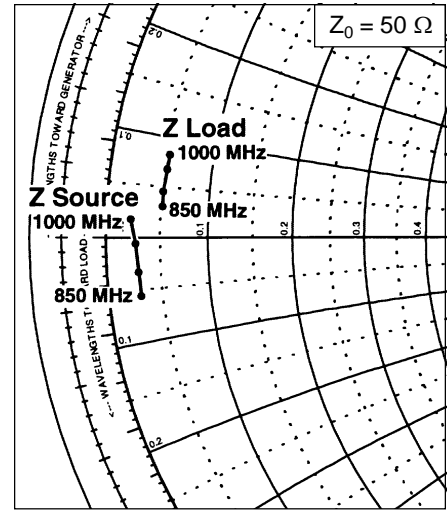


Impedance Data (shown for fixed-tuned broadband circuit)

$V_{DD} = 28\text{ V}$, $P_{OUT} = 35\text{ W}$, $I_{DQ} = 300\text{ mA}$



| Frequency MHz | Z Source Ω | | Z Load Ω | |
|------------------|-------------------|-------|-----------------|------|
| | R | jX | R | jX |
| 850 | 1.48 | -2.80 | 2.60 | 1.55 |
| 900 | 1.45 | -1.65 | 2.60 | 2.30 |
| 950 | 1.35 | -0.30 | 2.68 | 3.40 |
| 1000 | 1.10 | 0.88 | 2.70 | 4.15 |

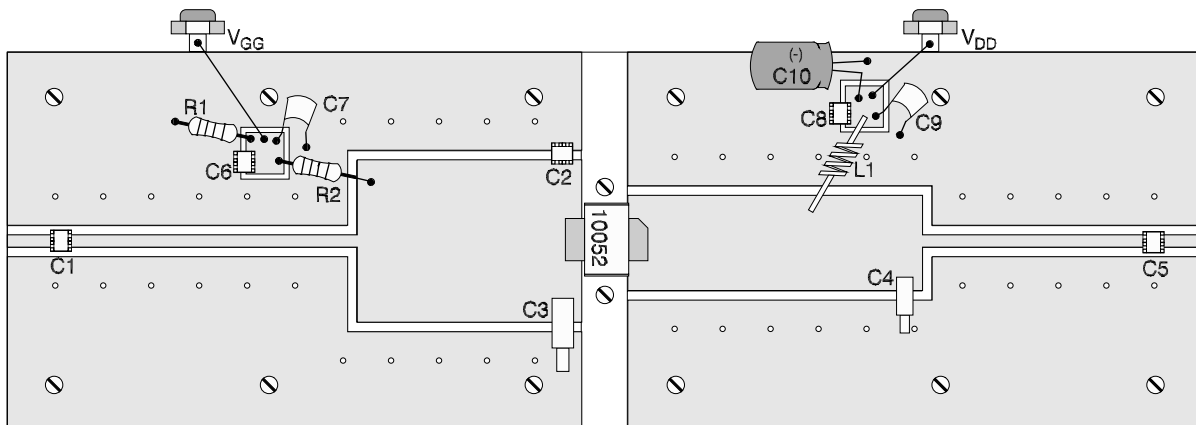


Typical Scattering Parameters

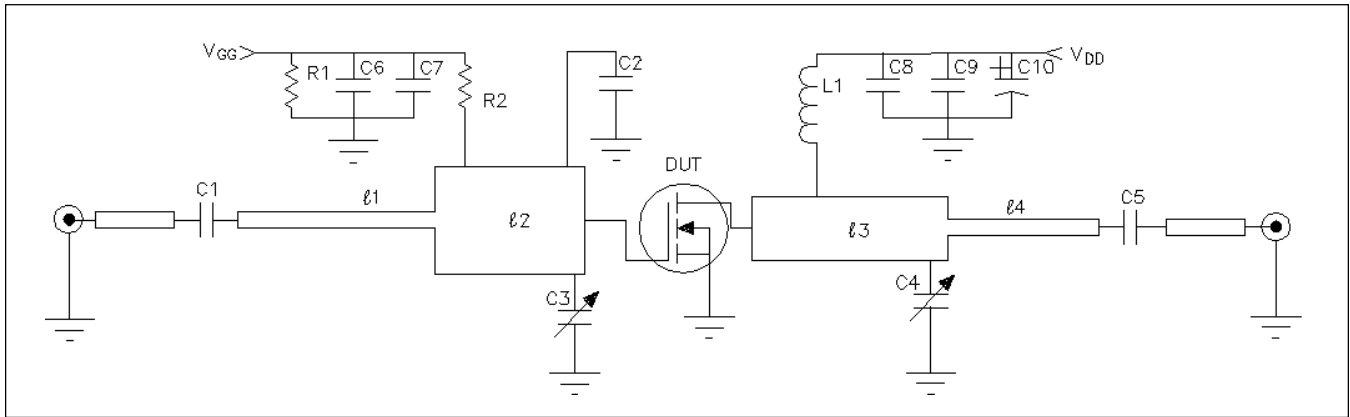
($V_{DS} = 28\text{ V}$, $I_D = 2.0\text{ A}$)

| f (MHz) | S11 | | S21 | | S12 | | S22 | |
|------------|-------|------|-------|-----|-------|-----|-------|------|
| | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 400 | 0.948 | -167 | 3.668 | 33 | 0.006 | -37 | 0.858 | -149 |
| 420 | 0.951 | -168 | 3.403 | 32 | 0.005 | -37 | 0.866 | -150 |
| 440 | 0.955 | -168 | 3.161 | 30 | 0.005 | -37 | 0.877 | -151 |
| 460 | 0.956 | -168 | 2.943 | 29 | 0.005 | -36 | 0.886 | -152 |
| 480 | 0.957 | -168 | 2.745 | 28 | 0.004 | -38 | 0.892 | -152 |
| 500 | 0.959 | -168 | 2.575 | 27 | 0.004 | -35 | 0.898 | -153 |
| 520 | 0.960 | -169 | 2.421 | 26 | 0.004 | -34 | 0.903 | -153 |
| 540 | 0.962 | -169 | 2.282 | 25 | 0.004 | -30 | 0.907 | -154 |
| 560 | 0.963 | -169 | 2.151 | 24 | 0.003 | -29 | 0.911 | -155 |
| 580 | 0.964 | -169 | 2.024 | 22 | 0.003 | -28 | 0.913 | -155 |
| 600 | 0.964 | -169 | 1.907 | 22 | 0.003 | -23 | 0.919 | -156 |
| 620 | 0.965 | -169 | 1.806 | 21 | 0.002 | -20 | 0.925 | -156 |
| 640 | 0.967 | -169 | 1.72 | 21 | 0.002 | -13 | 0.929 | -156 |
| 660 | 0.966 | -170 | 1.636 | 20 | 0.002 | -6 | 0.929 | -157 |
| 680 | 0.967 | -170 | 1.558 | 19 | 0.002 | 3 | 0.929 | -157 |
| 700 | 0.967 | -170 | 1.483 | 18 | 0.002 | 8 | 0.928 | -157 |
| 720 | 0.968 | -170 | 1.413 | 18 | 0.002 | 21 | 0.930 | -158 |
| 740 | 0.968 | -170 | 1.345 | 17 | 0.002 | 25 | 0.932 | -158 |
| 760 | 0.967 | -170 | 1.281 | 17 | 0.002 | 33 | 0.935 | -159 |
| 780 | 0.966 | -170 | 1.228 | 17 | 0.002 | 44 | 0.937 | -159 |
| 800 | 0.967 | -170 | 1.179 | 16 | 0.002 | 51 | 0.938 | -159 |
| 820 | 0.968 | -170 | 1.134 | 16 | 0.002 | 55 | 0.939 | -159 |
| 840 | 0.967 | -170 | 1.088 | 15 | 0.002 | 59 | 0.938 | -160 |
| 860 | 0.967 | -170 | 1.039 | 15 | 0.003 | 67 | 0.938 | -160 |
| 880 | 0.967 | -170 | 0.993 | 14 | 0.003 | 68 | 0.938 | -160 |
| 900 | 0.966 | -170 | 0.957 | 14 | 0.003 | 73 | 0.941 | -161 |
| 920 | 0.966 | -171 | 0.922 | 14 | 0.003 | 75 | 0.943 | -161 |
| 940 | 0.966 | -171 | 0.890 | 14 | 0.003 | 79 | 0.941 | -161 |
| 960 | 0.966 | -171 | 0.859 | 13 | 0.004 | 81 | 0.942 | -161 |
| 980 | 0.966 | -171 | 0.827 | 13 | 0.004 | 83 | 0.943 | -161 |
| 1000 | 0.965 | -171 | 0.794 | 12 | 0.004 | 86 | 0.942 | -162 |

Test Circuit



Parts Layout (not to scale)



Test Circuit Schematic for $f = 960 \text{ MHz}$

| | | |
|---------------|---|--------------------------|
| DUT | PTF 10052 | |
| C1, C5 | 39 pF, Capacitor ATC 100 B | |
| C2 | 7.5 pF, Capacitor ATC 100 B | |
| C3 | 0.6–6.0 pF, Trimmer Capacitor, Johanson, 5701-PC | |
| C4 | 0.35–3.5 pF, Trimmer Capacitor, Johanson, 5801-PC | |
| C6, C8 | 51 pF, Capacitor ATC 100 B | |
| C7, C9 | 0.1 μF , 50 V, Capacitor, Digi-Key P4917-ND | |
| C10 | 100 μF , 50 V, Electrolytic Capacitor, Digi-Key P5276 | |
| L1 | 4 Turn, #20 AWG, .120" I.D. | |
| R1 | 1 K, 1/4 W Resistor | |
| R2 | 10 K, 1/4 W Resistor | |
| l1, l4 | Microstrip | 50 Ω |
| l2 | 0.185 λ 960 MHz | Microstrip 5.70 Ω |
| l3 | 0.240 λ 960 MHz | Microstrip 9.30 Ω |
| Circuit Board | .028" Dielectric Thickness, $\epsilon_r = 4.0$, AlliedSignal, G200, 2 oz. copper | |



Artwork (1 inch )