

# PTF 10149

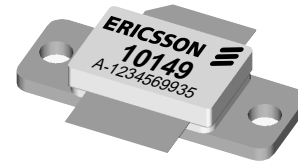
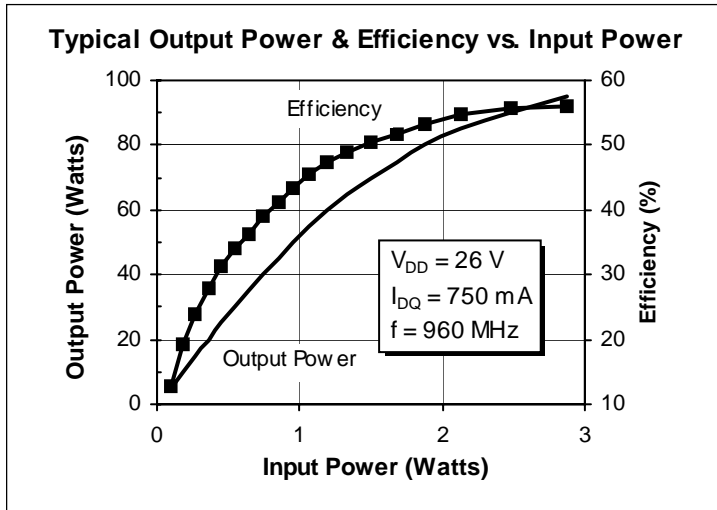
## 70 Watts, 921–960 MHz

### GOLDMOS Field Effect Transistor

#### Description

The PTF 10149 is an internally matched 70-watt GOLDMOS FET intended for cellular and GSM amplifier applications from 921 to 960 MHz. It operates with 50% efficiency and 16 dB typical gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **INTERNALLY MATCHED**
- **Performance at 960 MHz, 26 Volts**
  - Output Power = 70 Watts
  - Power Gain = 16.0 dB Typ
  - Efficiency = 50% Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Excellent Thermal Stability**
- **100% Lot Traceability**



Package 20252

#### RF Specifications (100% tested)

| Characteristic  | Symbol   | Min  | Typ  | Max | Units |
|---|----------|------|------|-----|-------|
| <b>Gain</b><br>( $V_{DD} = 26\text{ V}$ , $P_{OUT} = 70\text{ W}$ , $I_{DQ} = 750\text{ mA}$ , $f = 960\text{ MHz}$ )   | $G_{pe}$ | 15.0 | 16.0 | —   | dB    |
| <b>Power Output at 1 dB Compression</b><br>( $V_{DD} = 26\text{ V}$ , $I_{DQ} = 750\text{ mA}$ , $f = 960\text{ MHz}$ )   | P-1dB    | 70   | 75   | —   | Watts |
| <b>Drain Efficiency</b><br>( $V_{DD} = 26\text{ V}$ , $P_{OUT} = 70\text{ W}$ , $I_{DQ} = 750\text{ mA}$ , $f = 960\text{ MHz}$ )   | $\eta$   | 47   | 50   | —   | %     |
| <b>Load Mismatch Tolerance</b><br>( $V_{DD} = 26\text{ V}$ , $P_{OUT} = 70\text{ W}$ , $I_{DQ} = 750\text{ mA}$ , $f = 921\text{ MHz}$<br>—all phase angles at frequency of test) | $\Psi$   | —    | —    | 5:1 | —     |

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

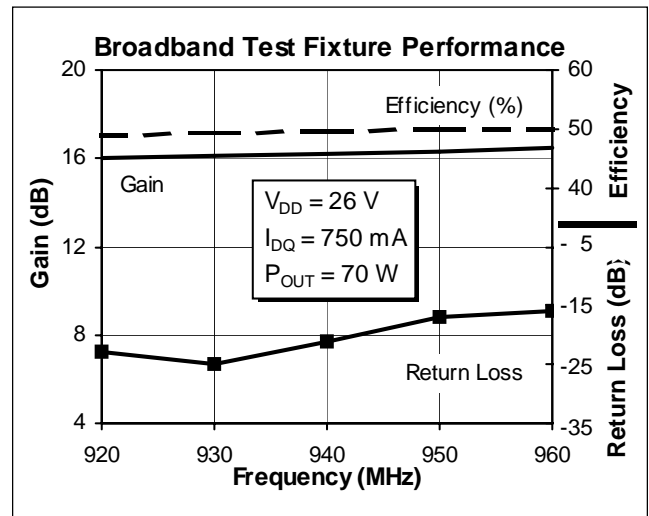
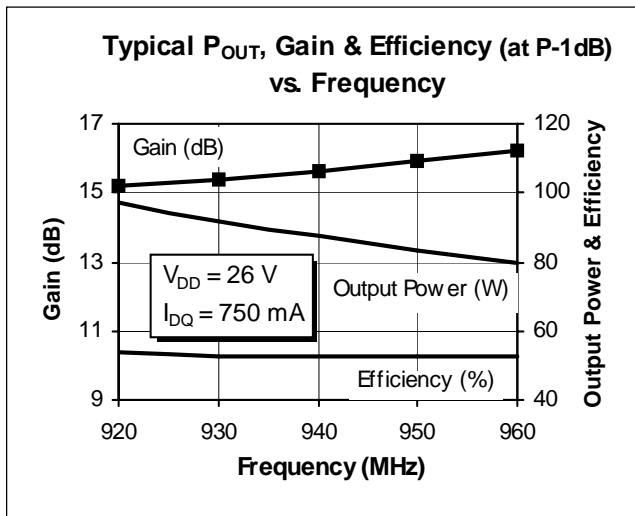
## Electrical Characteristics (100% Tested)

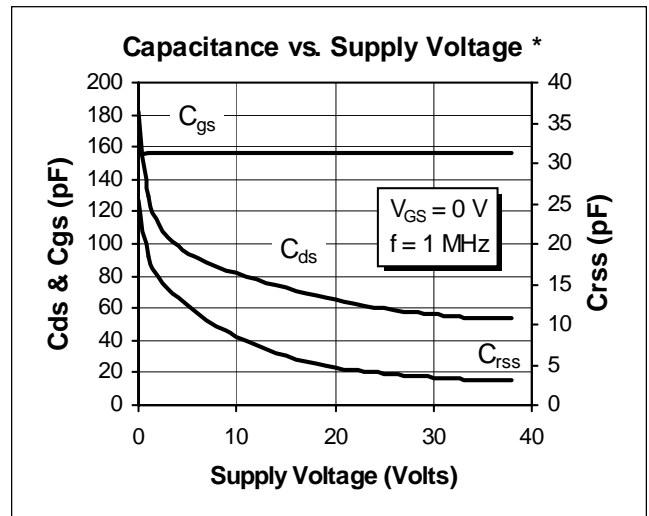
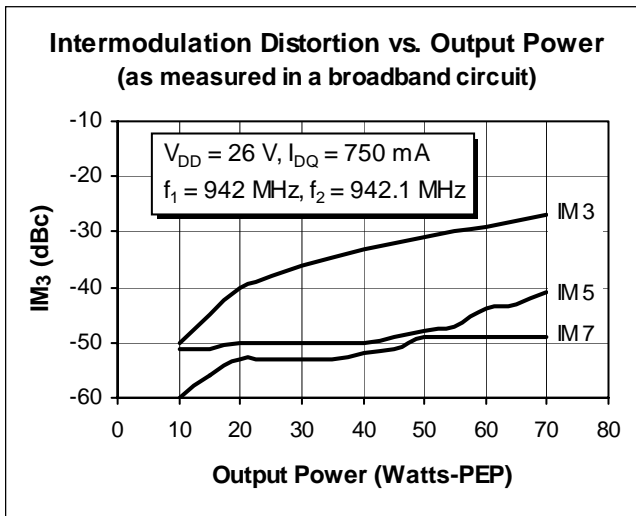
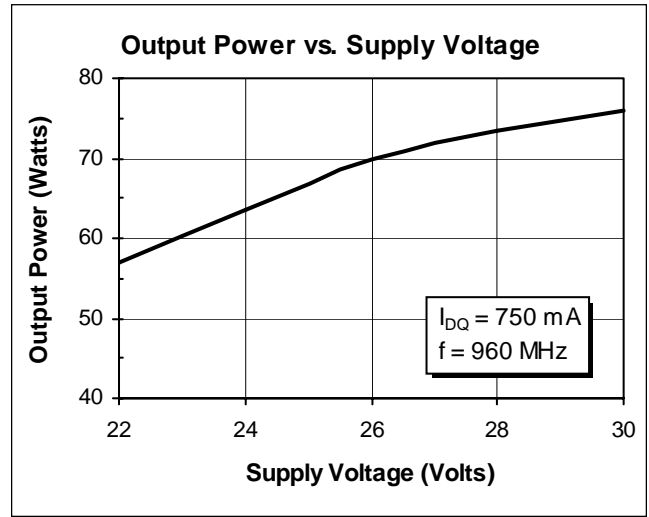
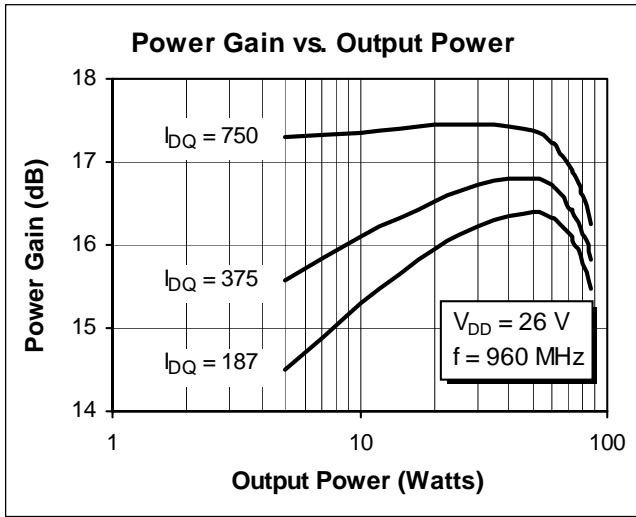
| Characteristic                 | Conditions                                  | Symbol        | Min | Typ | Max | Units   |
|--------------------------------|---|---------------|-----|-----|-----|---------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}, I_D = 25\text{ mA}$   | $V_{(BR)DSS}$ | 65  | —   | —   | Volts   |
| Drain-Source Leakage Current   | $V_{DS} = 26\text{ V}, V_{GS} = 0\text{ V}$ | $I_{DSS}$     | —   | —   | 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       | $V_{DS} = 10\text{ V}, I_D = 3\text{ A}$    | $g_{fs}$      | —   | 3.0 | —   | Siemens |

## Maximum Ratings

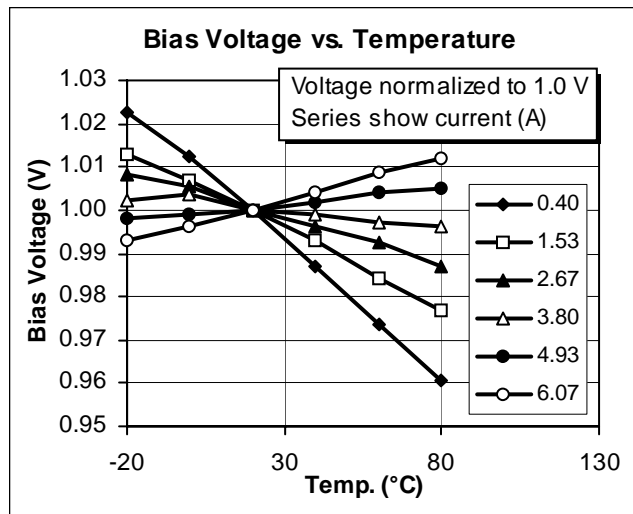
| Parameter   | Symbol          | Value       | Unit                           |
|---|-----------------|-------------|--------------------------------|
| Drain-Source Voltage  | $V_{DSS}$       | 65          | Vdc                            |
| Gate-Source Voltage   | $V_{GS}$        | $\pm 20$    | Vdc                            |
| Operating Junction Temperature                                    | $T_J$           | 200         | $^{\circ}\text{C}$             |
| Total Device Dissipation<br>Above 25 $^{\circ}\text{C}$ derate by | $P_D$           | 197<br>1.12 | Watts<br>W/ $^{\circ}\text{C}$ |
| Storage Temperature Range   | $T_{STG}$       | -40 to +150 | $^{\circ}\text{C}$             |
| Thermal Resistance ( $T_{CASE} = 70^{\circ}\text{C}$ )            | $R_{\theta JC}$ | 0.89        | $^{\circ}\text{C}/\text{W}$    |

## Typical Performance



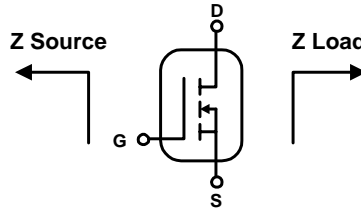


\* This part is internally matched. Measurements of the finished product will not yield these figures.

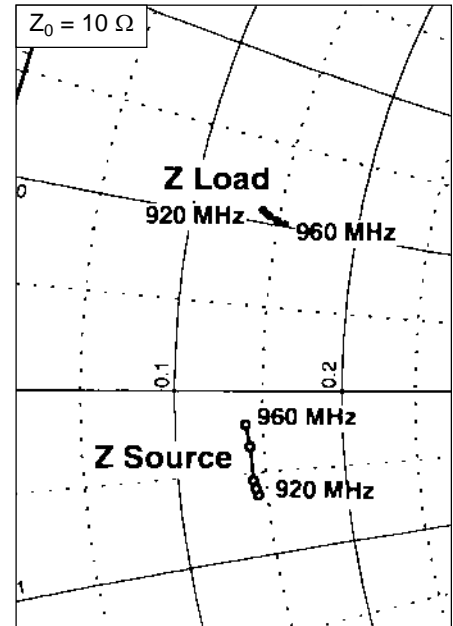


## Impedance Data

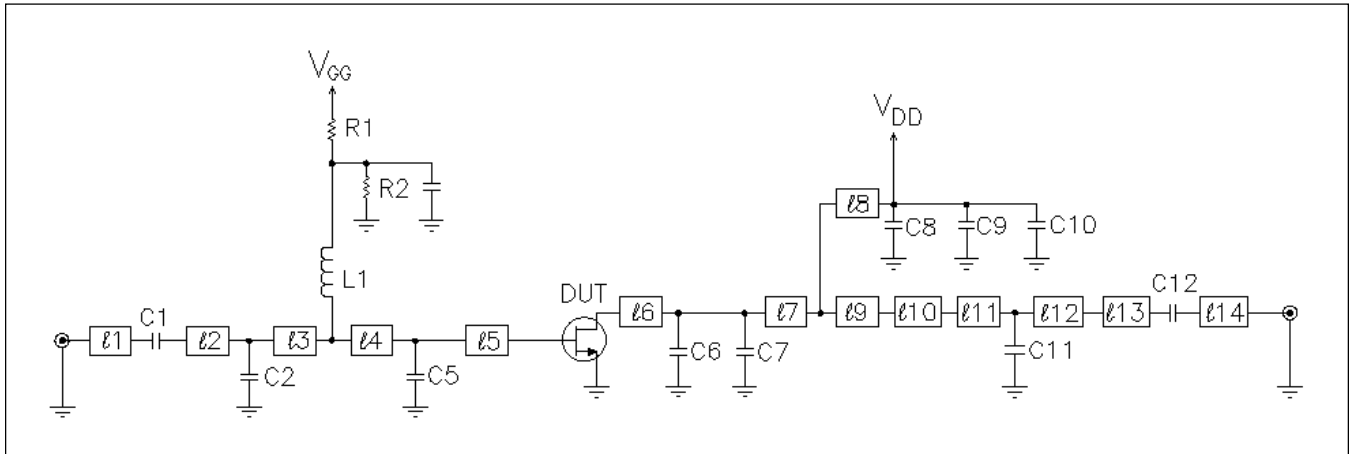
( $V_{DD} = 26\text{ V}$ ,  $P_{OUT} = 70\text{ W}$ ,  $I_{DQ} = 700\text{ mA}$ )



| Frequency<br>MHz | Z Source $\Omega$ |       | Z Load $\Omega$ |      |
|------------------|-------------------|-------|-----------------|------|
|                  | R                 | jX    | R               | jX   |
| 920              | 1.45              | -0.64 | 1.40            | 1.08 |
| 930              | 1.44              | -0.60 | 1.43            | 1.06 |
| 940              | 1.43              | -0.55 | 1.45            | 1.05 |
| 950              | 1.42              | -0.34 | 1.50            | 1.03 |
| 960              | 1.40              | -0.21 | 1.55            | 1.02 |



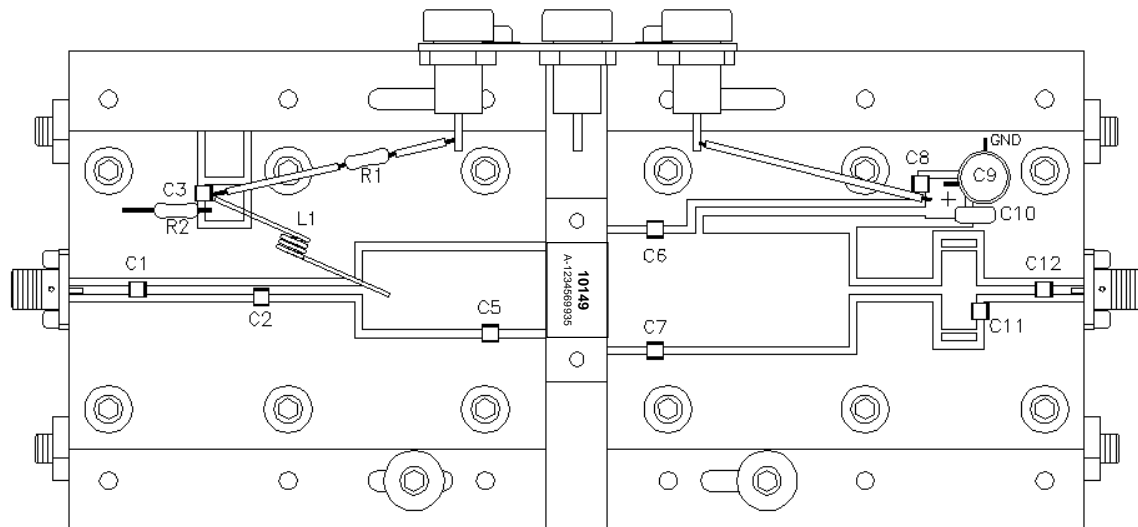
## Test Circuit



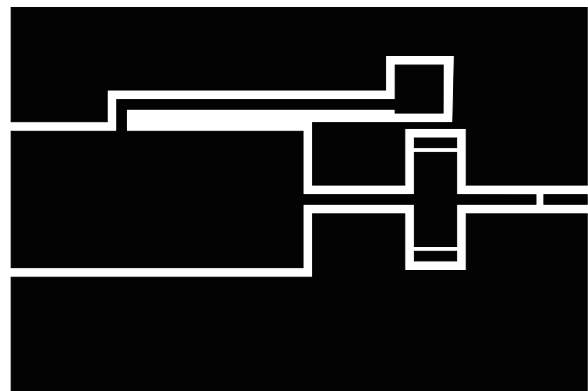
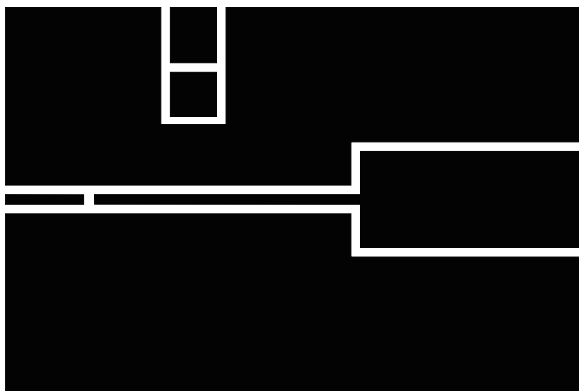
Test Circuit Schematic for  $f = 960\text{ MHz}$

|       |                           |                               |
|-------|---------------------------|-------------------------------|
| DUT   | PTF 10149                 | LDMOS Field Effect Transistor |
| $l1$  | $0.0633\ \lambda$ 960 GHz | Microstrip $50\ \Omega$       |
| $l2$  | $0.1142\ \lambda$ 960 GHz | Microstrip $50\ \Omega$       |
| $l3$  | $0.0821\ \lambda$ 960 GHz | Microstrip $50\ \Omega$       |
| $l4$  | $0.1294\ \lambda$ 960 GHz | Microstrip $9.18\ \Omega$     |
| $l5$  | $0.0468\ \lambda$ 960 GHz | Microstrip $9.18\ \Omega$     |
| $l6$  | $0.0481\ \lambda$ 960 GHz | Microstrip $6.79\ \Omega$     |
| $l7$  | $0.0441\ \lambda$ 960 GHz | Microstrip $6.79\ \Omega$     |
| $l8$  | $0.2500\ \lambda$ 960 GHz | Microstrip $59\ \Omega$       |
| $l9$  | $0.1398\ \lambda$ 960 GHz | Microstrip $6.79\ \Omega$     |
| $l10$ | $0.0821\ \lambda$ 960 GHz | Microstrip $50\ \Omega$       |
| $l11$ | $0.0226\ \lambda$ 960 GHz | Microstrip $9.69\ \Omega$     |
| $l12$ | $0.0109\ \lambda$ 960 GHz | Microstrip $9.69\ \Omega$     |
| $l13$ | $0.0504\ \lambda$ 960 GHz | Microstrip $50\ \Omega$       |
| $l14$ | $0.034\ \lambda$ 960 GHz  | Microstrip $50\ \Omega$       |

|                   |  |                              |
|-------------------|--|------------------------------|
| $C1, C3, C8, C12$ | $33\text{ pF}$   | Capacitor ATC 100 B          |
| $C2$              | $1.3\text{ pF}, 50\text{ V}$   | Capacitor, ATC 100 B         |
| $C4$              | Not Used   |                              |
| $C5, C6, C7$      | $7.5\text{ pF}$  | Capacitor, ATC 100 B         |
| $C9$              | $100\ \mu\text{F}, 50\text{ V}$  | Capacitor, Digi-Key P5182-ND |
| $C10$             | $0.1\ \mu\text{F}, 50\text{ V}$  | Capacitor, Digi-Key P4525-ND |
| $C11$             | $0.3\text{ pF}$  | Capacitor ATC 100 B          |
| $R1, R2$          | $1\text{ K}$   | Resistor, Digi-Key 1KQBK     |
| $L1, L2$          | $4\text{ Turn}, 20\text{ AWG}, .120''\text{ I.D.}$   |                              |
| Circuit Board     | $.031''\text{ thick}, \epsilon_r = 4.0, \text{G200}, \text{AlliedSignal}, 2\text{ oz. copper}$ |                              |



Assembly Diagram



Artwork (not to scale)

## Case Outline Specifications

