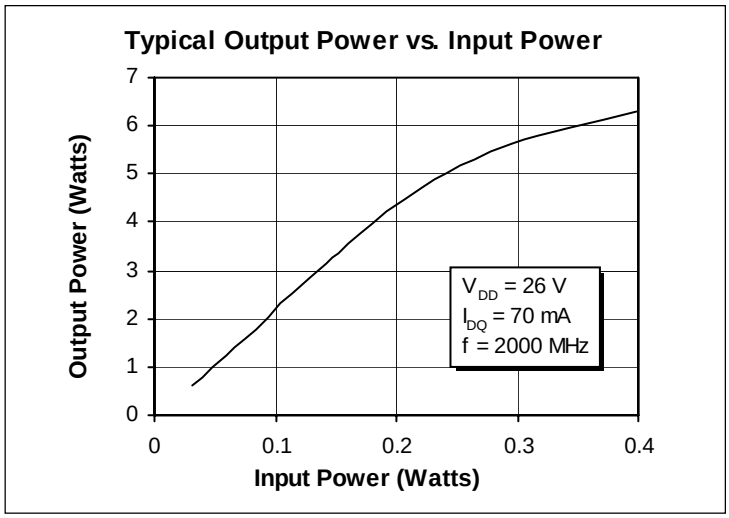
PTF 10135
GOLDMOS® Field Effect Transistor
5 Watts, 2.0 GHz

Description

The PTF 10135 is a 5–watt *GOLDMOS* FET intended for large signal applications from 1.0 to 2.0 GHz. It operates at 40% efficiency with 11 dB minimum gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **Guaranteed Performance at 1.99 GHz, 26 V**
  - Output Power = 5 Watts Min
  - Power Gain = 11 dB Min
- **Gold Metallization**
- **Silicon Nitride Passivated**
- **Back Side Common Source**
- **Excellent Thermal Stability**



Package 20249

RF Specifications (Guaranteed)

Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 26 V, P_{OUT} = 1 W, I_{DQ} = 70 mA, f = 1.93, 1.99 GHz)	G_{ps}	11	—	—	dB
Output Power at 1 dB Compression (V_{DD} = 26 V, I_{DQ} = 70 mA, f = 1.99 GHz)	P-1dB	5	—	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 5 W, I_{DQ} = 70 mA, f = 1.99 GHz)	η_D	40	—	—	%
Load Mismatch Tolerance (V_{DD} = 26 V, P_{OUT} = 5 W, I_{DQ} = 70 mA, f = 1.99 GHz —all phase angles at frequency of test)	Ψ	—	—	10:1	—

All published data at T_{CASE} = 25°C unless otherwise indicated.

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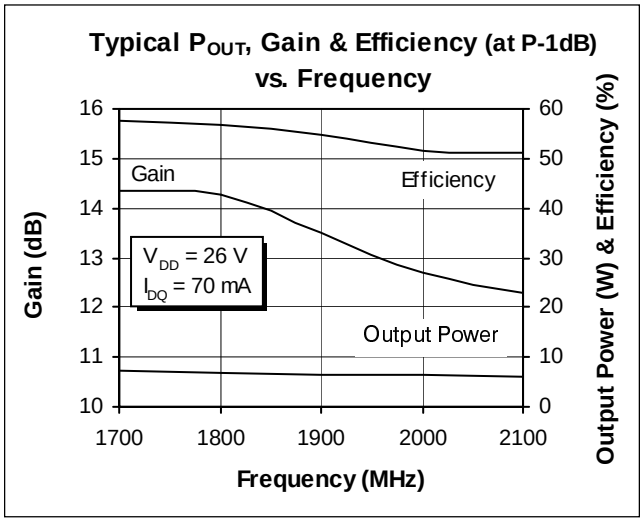
Electrical Characteristics (Guaranteed)

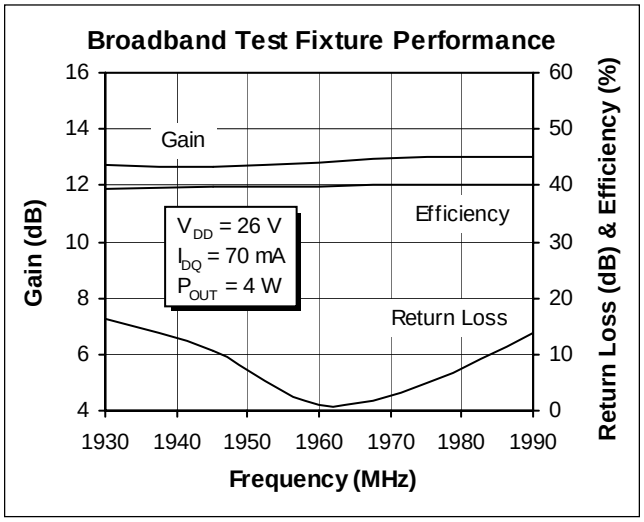
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 5 mA	BV_{DSS}	65	—	—	Volts
Drain Source Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
Gate on Voltage	V_{DS} = 26 V, I_D = 70 mA	$V_{GS(on)}$	3.0	—	5.0	Volts

Maximum Ratings

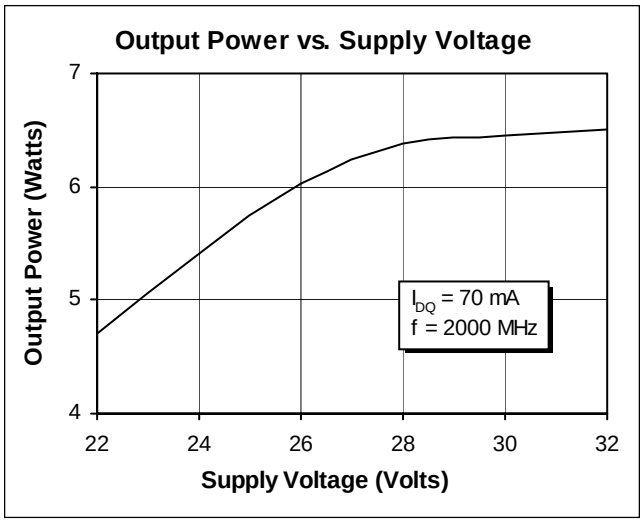
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	39 0.22	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	4.5	°C/W

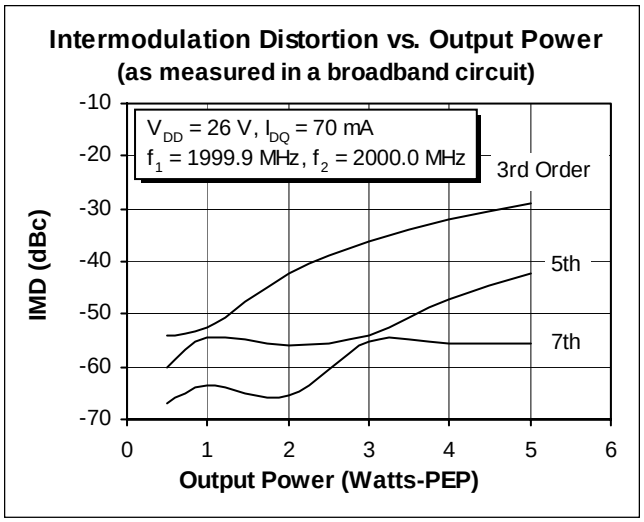
Typical Performance

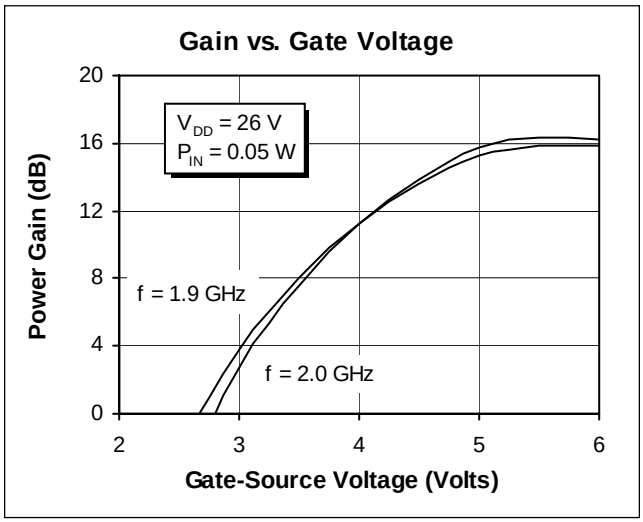


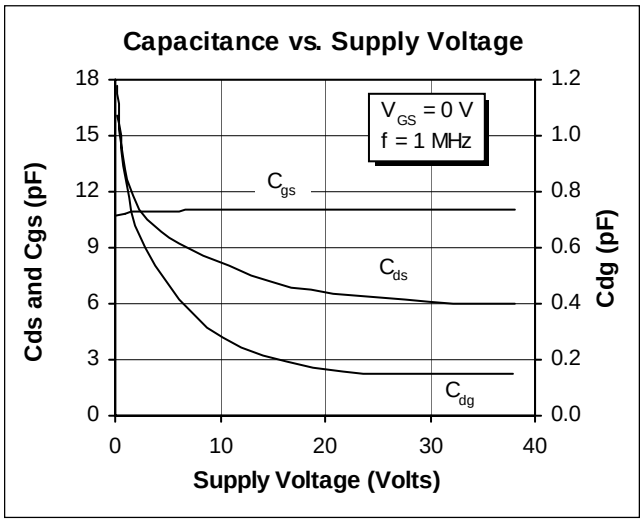


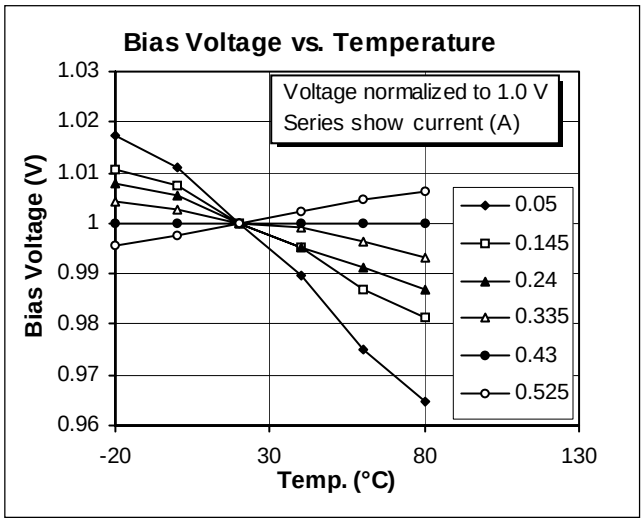
Typical Performance (cont.)











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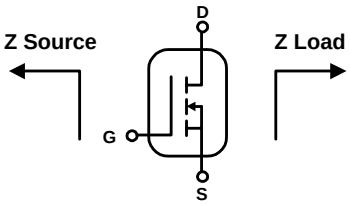
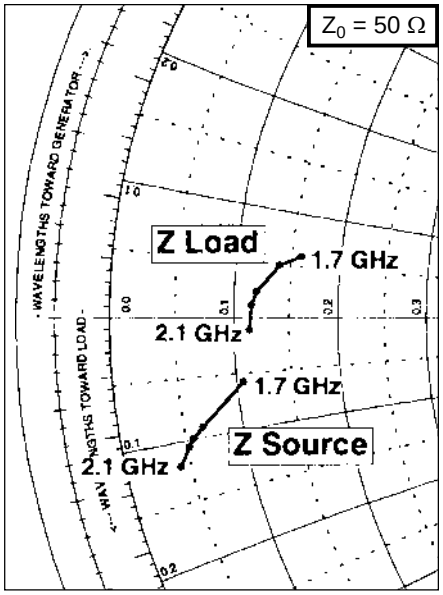
Impedance Data

V_{DD} = 26 V, P_{OUT} = 5 W, I_{DQ} = 70 mA





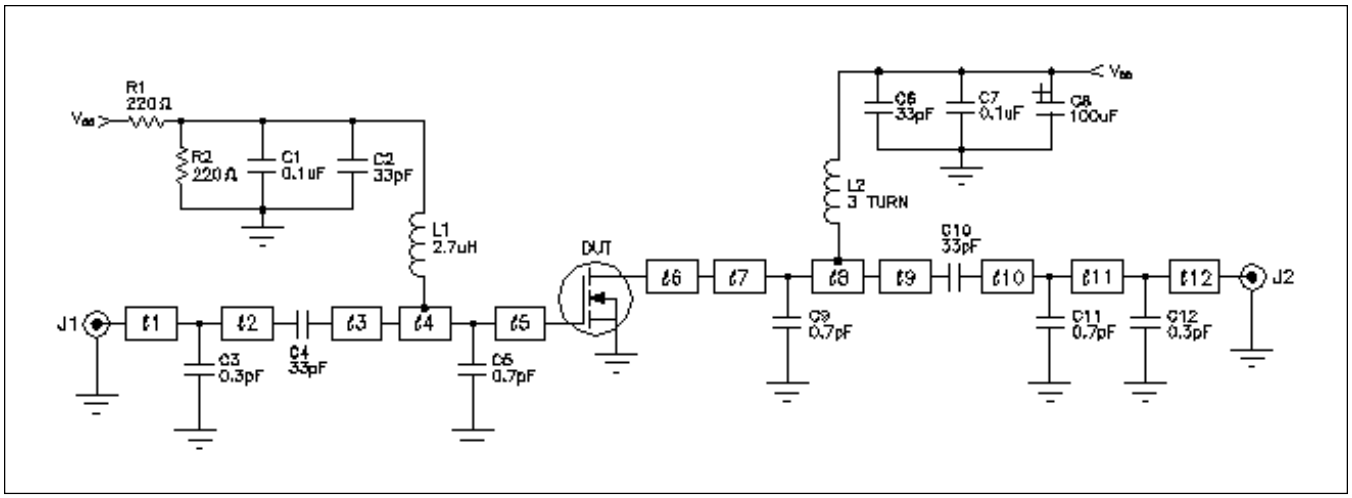
Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.7	5.3	-2.9	8.0	3.0
1.8	3.3	-4.6	7.0	2.5
1.9	2.8	-5.0	6.0	1.2
2.0	2.6	-5.3	5.8	0.6
2.1	2.1	-6.0	5.7	-0.6

Typical Scattering Parameters

(V_{DS} = 26 V, I_{DQ} = 300 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
400	0.889	-115.5	12.707	89.0	0.016	9.1	0.759	-73.3
500	0.892	-128.2	10.388	76.6	0.015	1.1	0.768	-83.2
600	0.897	-138.1	8.626	66.5	0.013	-5.3	0.798	-92.6
700	0.903	-148.6	7.283	54.4	0.011	-11.1	0.833	-103.7
800	0.860	-154.5	5.853	46.3	0.008	-14.7	0.825	-112.5
900	0.873	-159.3	4.977	39.6	0.006	2.4	0.837	-119.4
1000	0.873	-162.8	4.262	33.4	0.005	10.7	0.853	-126.7
1100	0.891	-166.9	3.736	27.5	0.004	42.5	0.861	-132.7
1200	0.890	-169.6	3.264	22.7	0.005	70.3	0.863	-137.9
1300	0.904	-173.1	2.911	17.1	0.007	82.9	0.875	-143.1
1400	0.896	-174.7	2.583	13.5	0.010	87.4	0.866	-146.7
1500	0.932	-177.4	2.395	8.3	0.013	87.3	0.896	-150.4
1600	0.932	179.2	2.155	3.6	0.015	88.4	0.905	-155.0
1700	0.950	175.8	1.988	-1.6	0.018	87.5	0.930	-158.7
1800	0.955	171.8	1.808	-6.4	0.021	84.4	0.944	-162.9
1900	0.959	167.4	1.656	-12.0	0.023	81.5	0.972	-167.9
2000	0.945	164.0	1.487	-16.2	0.026	78.8	0.955	-172.4
2100	0.946	160.4	1.354	-21.3	0.027	76.6	0.963	-176.8
2200	0.949	159.3	1.250	-24.5	0.030	72.6	0.948	-180.0
2300	0.953	156.3	1.152	-29.2	0.032	69.4	0.961	175.9
2400	0.946	155.4	1.050	-31.0	0.034	68.6	0.931	173.8

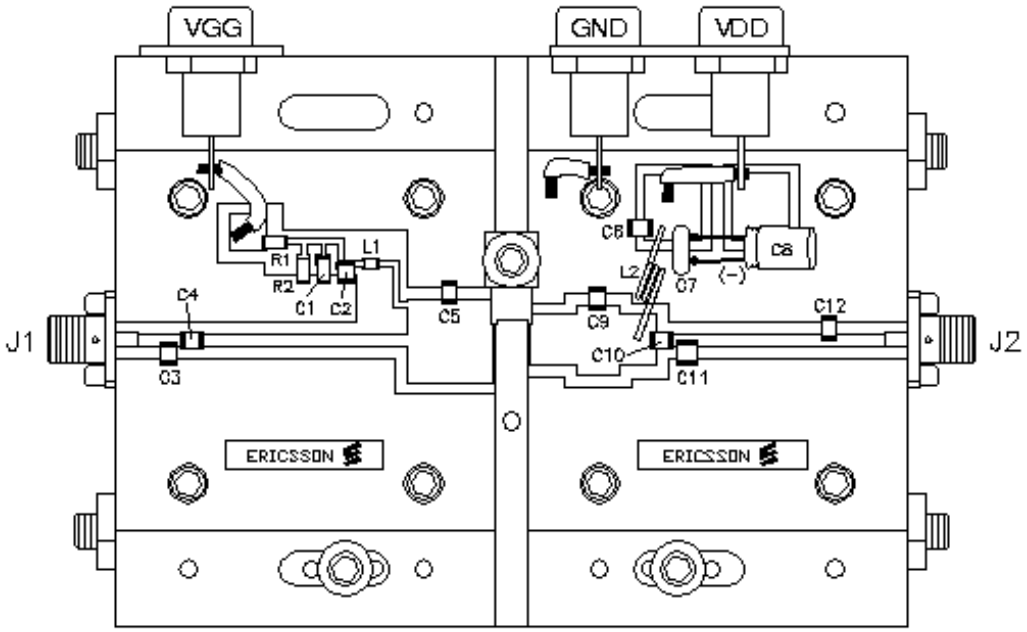
Test Circuit



Test Circuit Schematic for f = 1.99 GHz

DUT	*PTF 10135*	*LDMOS RF FET*
ℓ1	0.074 λ 1.99 GHz	Microstrip 50 Ω
ℓ2	0.039 λ 1.99 GHz	Microstrip 50 Ω
ℓ3	0.333 λ 1.99 GHz	Microstrip 50 Ω
ℓ4	0.064 λ 1.99 GHz	Microstrip 11.12 Ω
ℓ5	0.082 λ 1.99 GHz	Microstrip 11.12 Ω
ℓ6	0.078 λ 1.99 GHz	Microstrip 17.15 Ω
ℓ7, ℓ8	0.043 λ 1.99 GHz	Microstrip 13.05 Ω
ℓ9	0.058 λ 1.99 GHz	Microstrip 17.15 Ω
ℓ10	0.059 λ 1.99 GHz	Microstrip 50 Ω
ℓ11	0.195 λ 1.99 GHz	Microstrip 50 Ω
ℓ12	0.128 λ 1.99 GHz	Microstrip 50 Ω

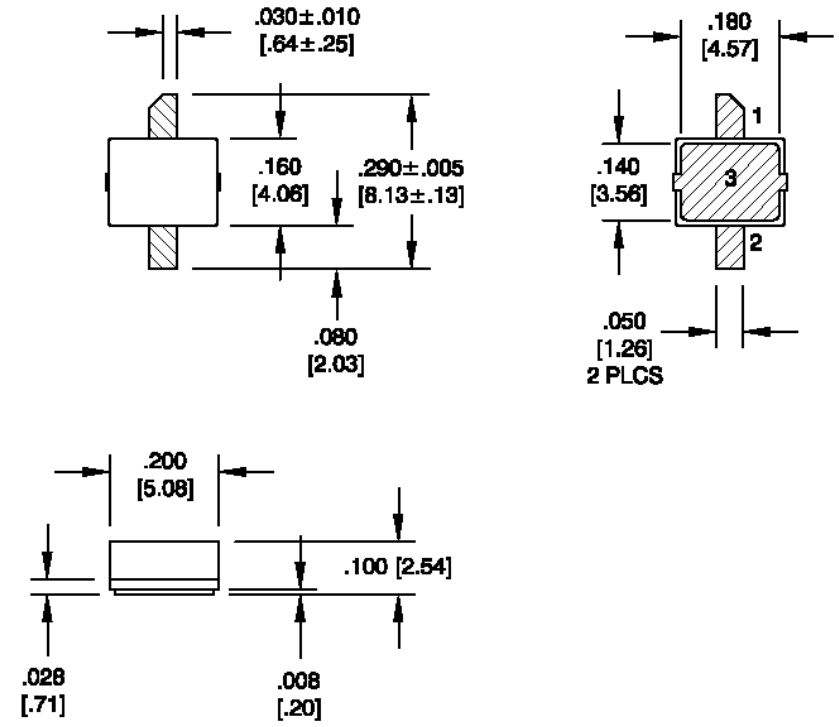
C1	0.1 µF	Capacitor, RJE 999 0002
C2, C4, C6, C10	33 pF	Capacitor, 100 B 330
C3, C12	0.3 pF	Capacitor, 100 B 0R3
C5, C9, C11	0.7 pF	Capacitor, 100 B 0R7
C7	0.1 µF, 50 V	Capacitor, RJE 999 0003
C8	100 µF, 50 V	Capacitor, Digi-Key P5182
J1, J2	Connector, SMA, Female, Panel Mount	
L1	2.7 µH	Chip Inductor, REG 903 0002
L2	3 Turns, 20 AWG, .120" Dia	
R1, R2	220 ohm, 1/4 W Resistor ROH 101 0042	
Circuit Board	.031" thick, ε_r = 4.0, AlliedSignal, G200, 2 oz. copper	



Parts Layout (not to scale)

Case Outline Specifications

Case 20249



Unless otherwise specified
all tolerances ±.005" [0.13mm]

Pins: 1. Drain 2. Gate 3. Source
Lead Thickness: .008±.001" [0.20±0.03mm]

Ericsson Inc.
Microelectronics
Morgan Hill, CA 95037 USA

1-877-GOLDMOS (465-3667) United States
+46 8 757 4700 International
e-mail: rfpower@ericsson.com
www.ericsson.com/rfpower

EUS/KR 1522-PTF 10135 Uen Rev. B 04-10-02