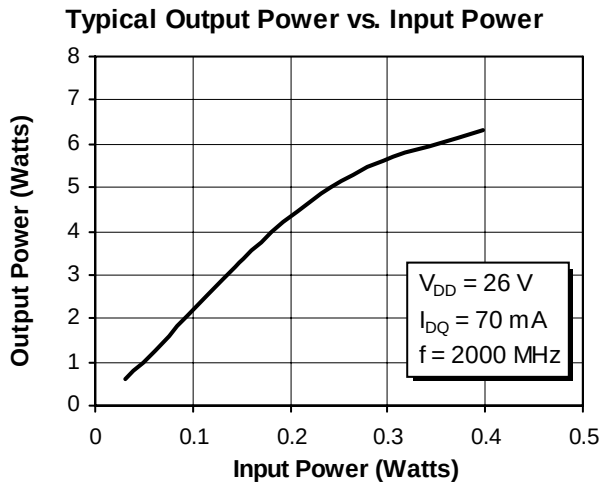
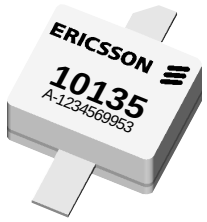
PTF 10135
5 Watts, 2.0 GHz
GOLDMOS™ Field Effect Transistor

Description

The PTF 10135 is a common source N-channel enhancement-mode lateral MOSFET intended for large signal applications from 1.0 to 2.0 GHz. It is rated at 5 watts minimum output power. Nitride surface passivation and gold metallization ensure excellent device lifetime and reliability. 100% lot traceability is standard.

- **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

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 at T_{flange} = 25°C 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_{flange} = 70°C)	$R_{\theta JC}$	4.5	°C/W

ERICSSON

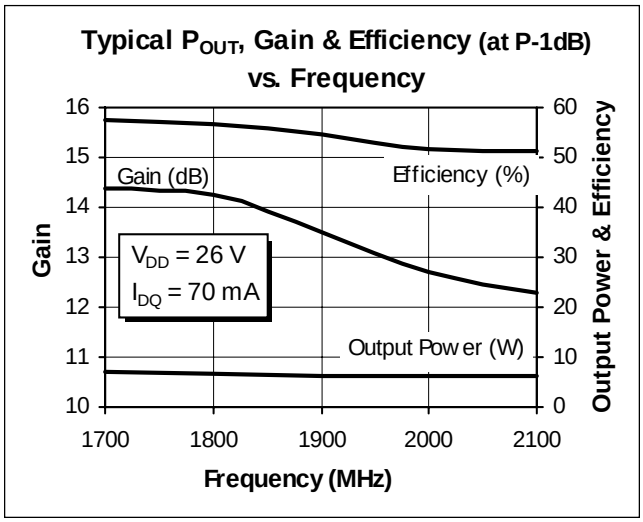
Electrical Characteristics (100% Tested)

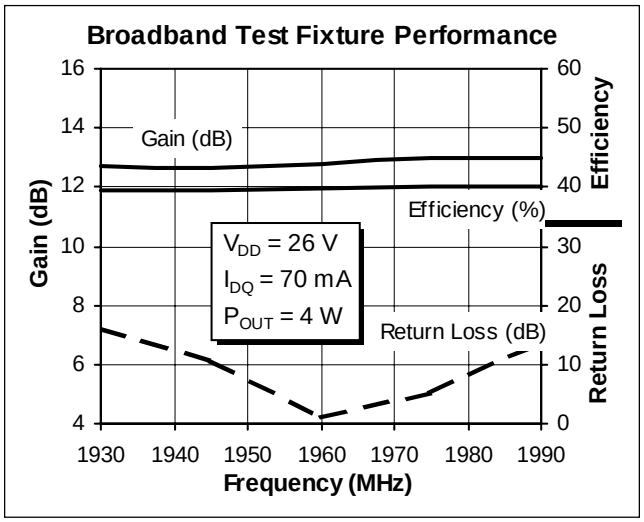
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 5 mA	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	V_{DS} = 26 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 75 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	V_{DS} = 10 V, I_D = 2 A	g_{fs}	—	0.8	—	Siemens

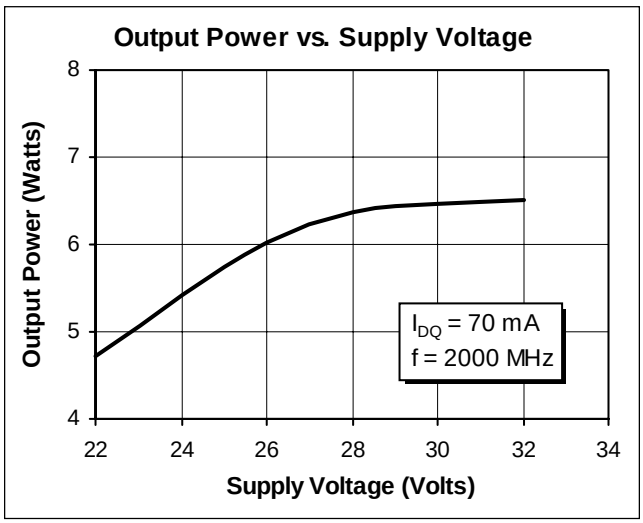
RF Specifications (100% Tested)

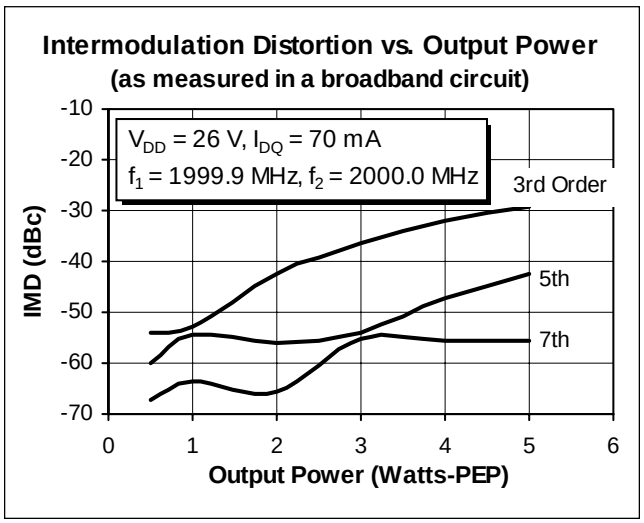
Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 26 V, P_{OUT} = 1 W, I_{DQ} = 70 mA, f = 1.93, 1.99 GHz)	G_{ps}	11	—	—	dB
Power Output at 1 dB Compression (V_{DD} = 26 V, I_{DQ} = 70 mA, f = 1.99 GHz)	P-1dB	5	—	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 5 W, I_{DQ} = 70 mA, f = 1.99 GHz)	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	—

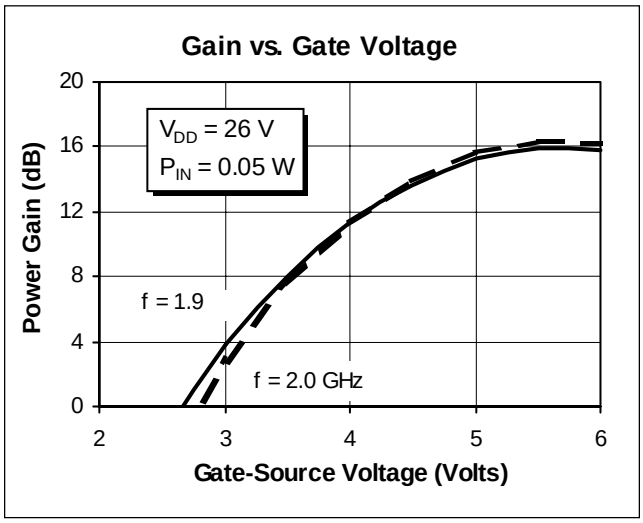
Typical Performance

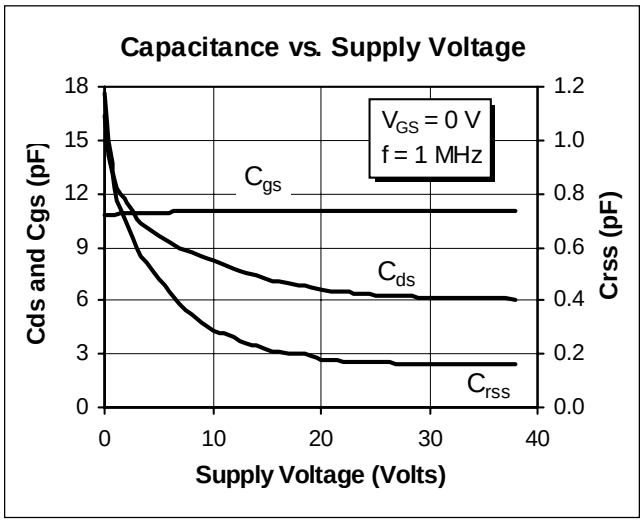


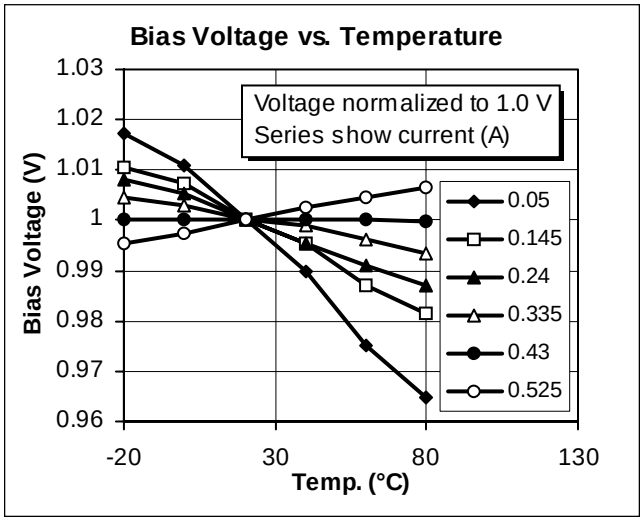



Output Power vs. Supply Voltage
Output Power (Watts)
Supply Voltage (Volts)
I_DQ = 70 mA
f = 2000 MHz


Intermodulation Distortion vs. Output Power
(as measured in a broadband circuit)
V_DD = 26 V, I_DQ = 70 mA
f_1 = 1999.9 MHz, f_2 = 2000.0 MHz
3rd Order
5th
7th
IMD (dBc)
Output Power (Watts-PEP)


Gain vs. Gate Voltage
V_DD = 26 V
P_IN = 0.05 W
f = 1.9
f = 2.0 GHz
Power Gain (dB)
Gate-Source Voltage (Volts)

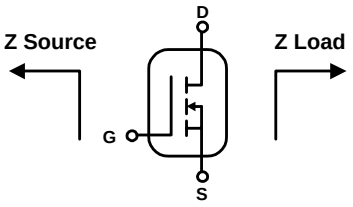

Capacitance vs. Supply Voltage
V_GS = 0 V
f = 1 MHz
C_gs
C_ds
C_rss
Cds and Cgs (pF)
Crss (pF)
Supply Voltage (Volts)

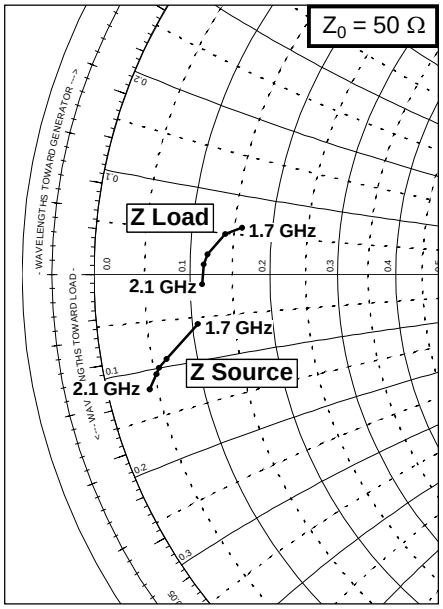

Bias Voltage vs. Temperature
Voltage normalized to 1.0 V
Series show current (A)
0.05
0.145
0.24
0.335
0.43
0.525
Bias Voltage (V)
Temp. (°C)

ERICSSON

Impedance Data

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





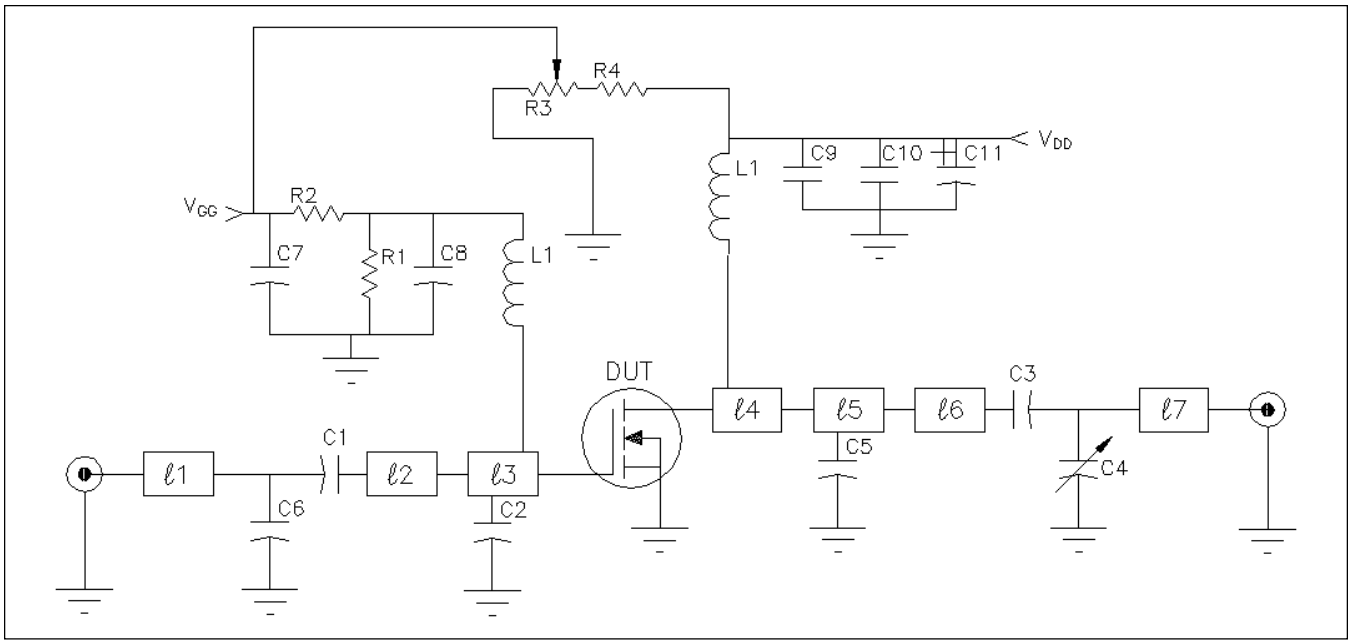
Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.7	5.3	-2.9	8.0	3.0
1.8	3.3	-4.6	7.0	2.5
1.9	2.8	-5.0	6.0	1.2
2.0	2.6	-5.3	5.8	0.6
2.1	2.1	-6.0	5.7	-0.6

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
100	0.874	-58	24.1	137	0.009	46	0.770	-35
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

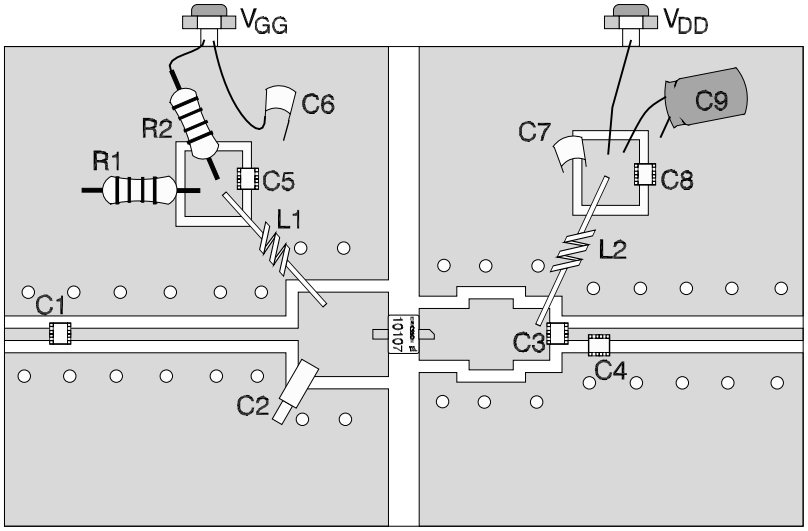
Test Circuit



Block Diagram for f = 1.96 GHz

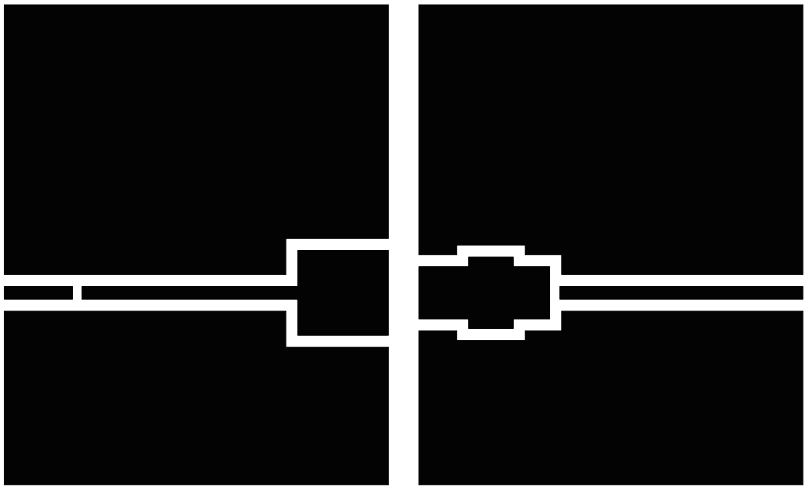
Q1	PTF 10135	LDMOS RF FET
ℓ1, ℓ2, ℓ7		Microstrip 50 Ω
ℓ3	0.149 λ 1.96 GHz	Microstrip 10.4 Ω
ℓ4	0.081 λ 1.96 GHz	Microstrip 15.9 Ω
ℓ5	0.073 λ 1.96 GHz	Microstrip 12.1 Ω
ℓ6	0.06 λ 1.96 GHz	Microstrip 15.9 Ω
C1, C3, C8, C9	33 pF	Chip Cap
C2, C5	0.7 pF	Chip Cap

C4	0.3–3.5 pF	Variable Capacitor
C6	0.3 pF	Chip Cap
C7, C10	0.1 µF	Chip Cap
C11	10 µF	SMT Tantalum
L1, L2	4 Turn	#20 AWG, .120" I.D.
R1, R2	220 Ω	Chip Resistor K1206
R3	2K	SMT Potentiometer
R4	10 Ω	Chip Resistor K1206
Circuit Board	.028" Dielectric Thickness, ε_r = 4.0, AlliedSignal, G200, 2 oz. copper	



Parts Layout (not to scale)

ERICSSON



Artwork (1 inch)

Ericsson Microelectronics
RF Power Products
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

Specifications subject to change without notice.
L3
© 1998 Ericsson Inc.
EUS/KR 1301-PTF 10135 Uen Rev. A 11-24-98