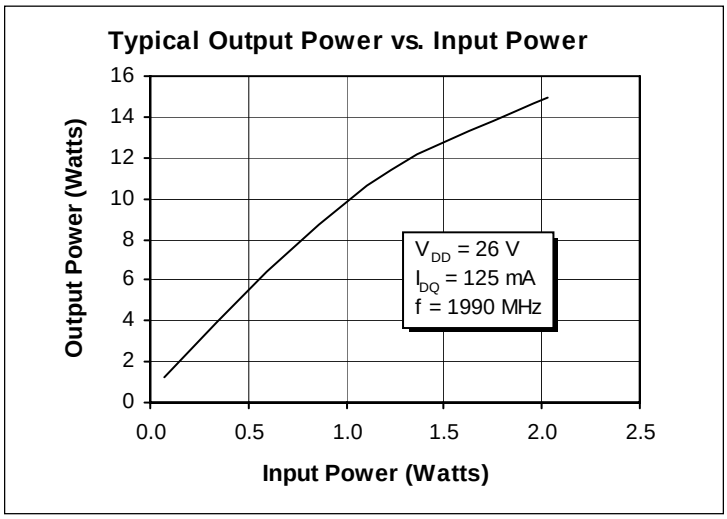
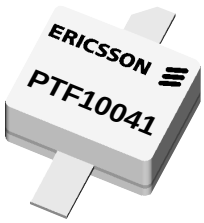
PTF 10041
GOLDMOS® Field Effect Transistor
12 Watts, 1.99 GHz

Description

The PTF 10041 is a 12–watt *GOLDMOS* FET intended for large signal amplifier applications from 1.0 to 2.0 GHz. It operates at 38% efficiency with 10 dB minimum gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **Guaranteed Performance at 1.99 GHz, 26 V_{DS}**
  - **Output Power = 12 Watts Min**
  - **Power Gain = 10 dB Min**
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Excellent Thermal Stability**
- **Back Side Common Source**
- **100% Lot Traceability**





Package 20249

RF Specifications (Guaranteed)

Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 26 V, P_{OUT} = 3 W, I_{DQ} = 125 mA, f = 1930, 1990 MHz)	G_{ps}	10	—	—	dB
Output Power at 1 dB Compression (V_{DD} = 26 V, I_{DQ} = 125 mA, f = 1990 MHz)	P-1dB	12	—	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 125 mA, f = 1990 MHz)	η	38	—	—	%
Load Mismatch Tolerance (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 125 mA, f = 1990 MHz —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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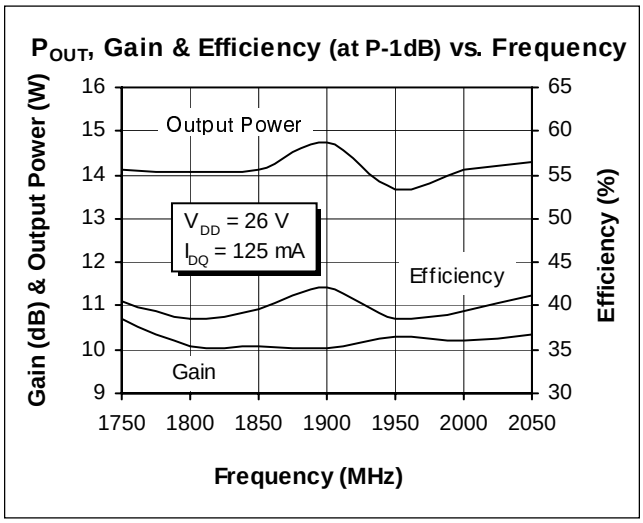
Electrical Characteristics (Guaranteed)

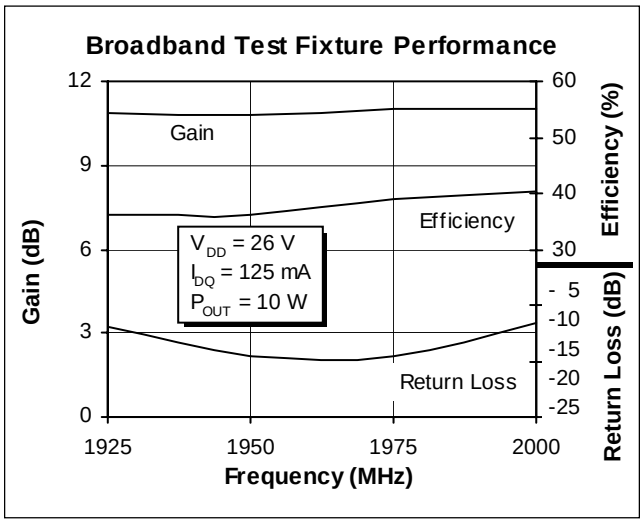
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1.8 mA	BV_{DSS}	65	—	—	Volts
Drain-Source Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
Gate On Voltage	V_{DS} = 26 V, I_D = 125 mA	$V_{GS(on)}$	3.0	—	5.0	Volts

Maximum Ratings

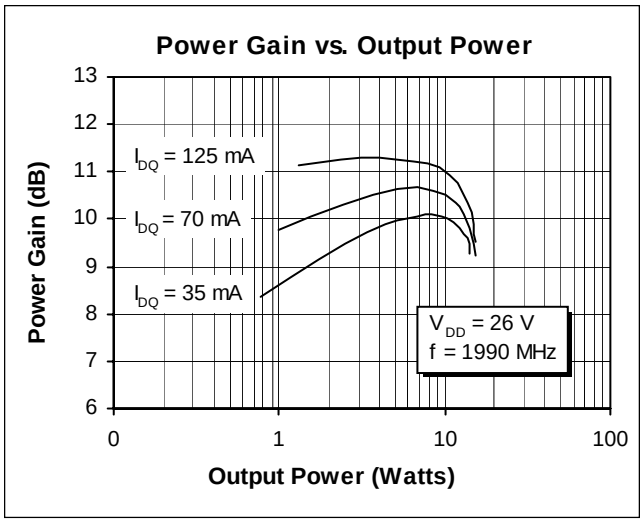
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	58 0.33	Watts W/°C
Storage Temperature	T_{STG}	150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	3.0	°C/W

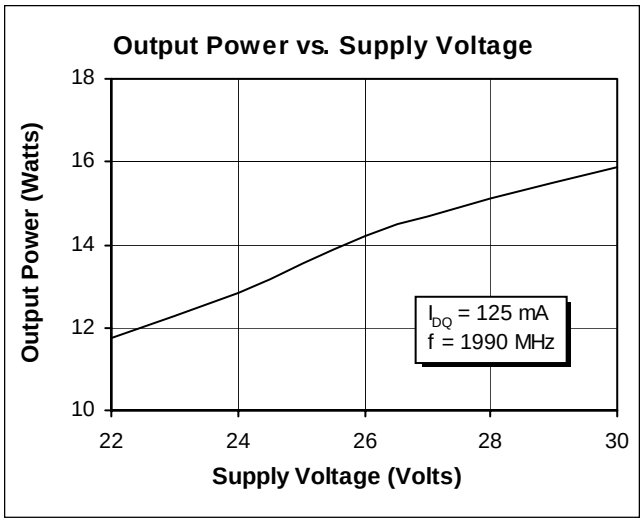
Typical Performance

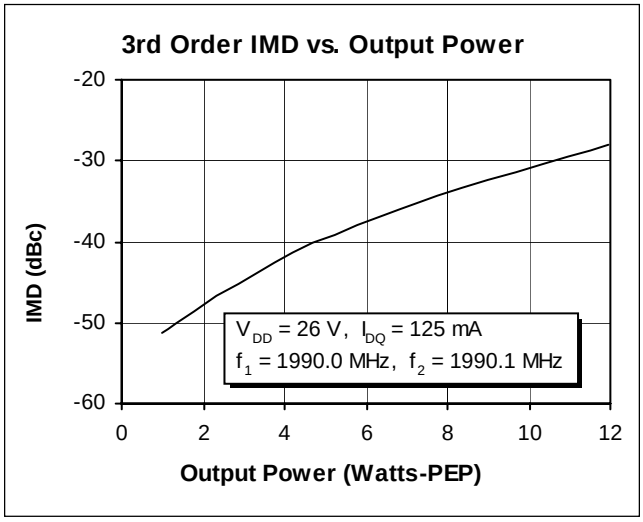


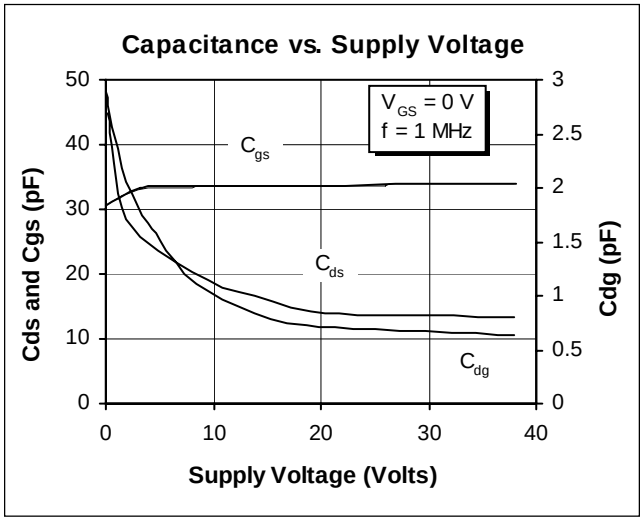


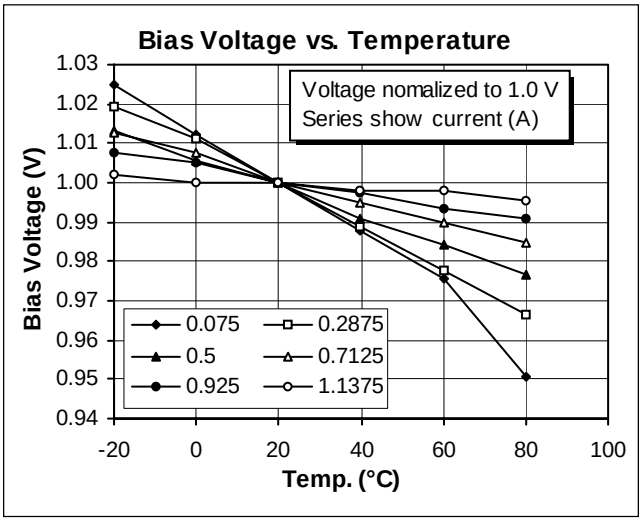
Typical Performance (cont.)





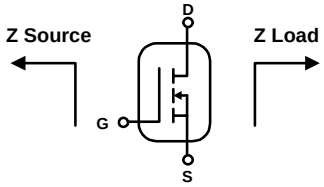


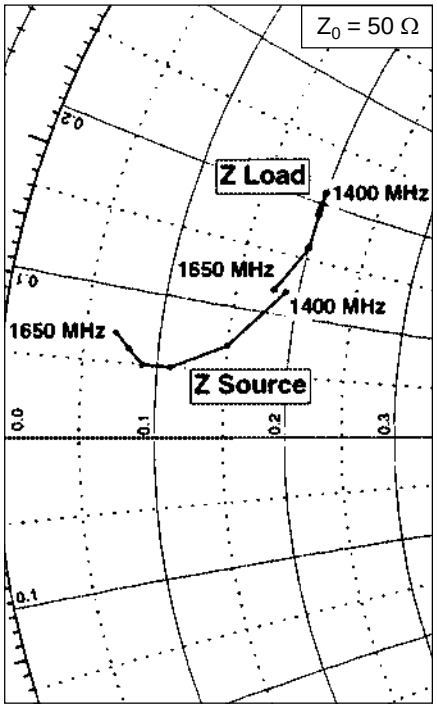




Impedance Data

V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 125 mA





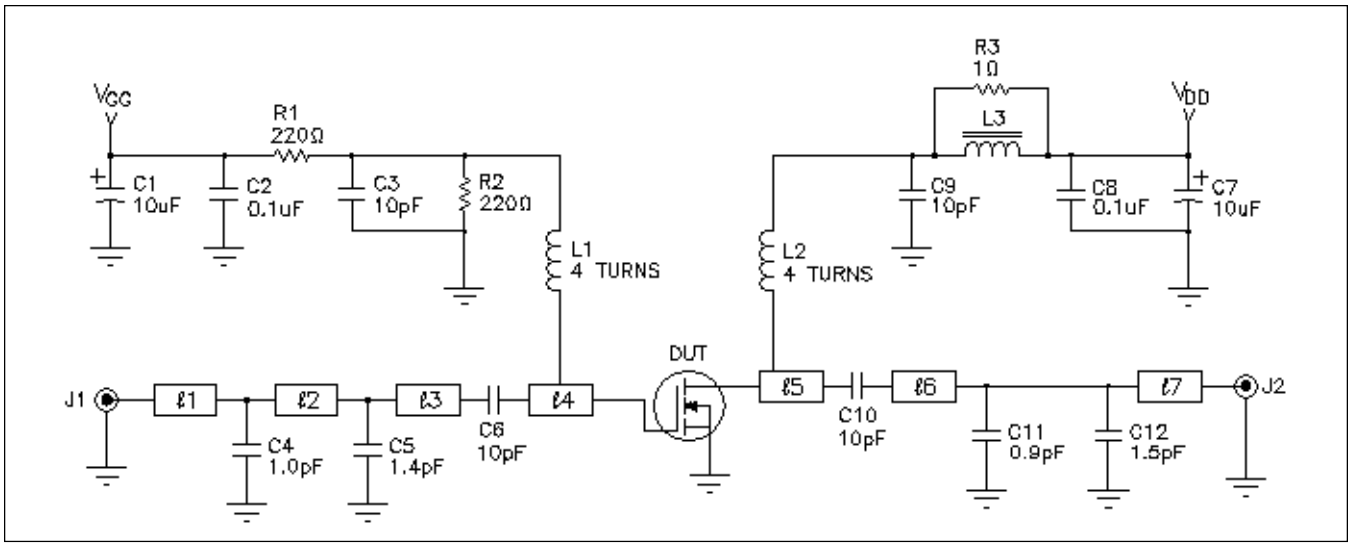
Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
1750	2.80	-3.2	3.9	-0.4
1800	3.10	-3.0	4.2	-1.1
1850	2.50	-3.5	3.5	-1.5
1900	2.55	-3.8	2.7	-1.4
1950	2.60	-4.2	3.2	-0.9
2000	2.50	-4.8	3.1	-1.8
2050	2.60	-5.2	2.7	-1.8

Typical Scattering Parameters

(V_{DS} = 26 V, I_D = 500 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.820	-115	27.4	105	0.012	14	0.584	-80
200	0.814	-126	22.3	98	0.012	6	0.583	-90
300	0.865	-147	12.9	71	0.012	-11	0.653	-112
400	0.892	-156	8.73	57	0.010	-20	0.730	-124
500	0.913	-161	6.34	46	0.008	-26	0.791	-132
600	0.927	-165	4.79	37	0.007	-29	0.851	-139
700	0.938	-168	3.70	29	0.005	-25	0.887	-146
800	0.945	-171	2.92	23	0.003	-13	0.895	-152
900	0.954	-173	2.36	17	0.003	7	0.908	-156
1000	0.960	-175	1.94	12	0.003	36	0.914	-159
1100	0.970	-177	1.62	8	0.003	55	0.933	-161
1200	0.974	-179	1.38	3	0.004	67	0.944	-164
1300	0.977	180	1.18	-1	0.005	72	0.953	-166
1400	0.977	178	1.02	-5	0.006	75	0.959	-169
1500	0.977	177	0.894	-9	0.007	76	0.963	-171
1600	0.978	176	0.788	-13	0.008	78	0.964	-173
1700	0.983	174	0.702	-16	0.009	80	0.970	-174
1800	0.987	173	0.631	-20	0.010	79	0.973	-176
1900	0.991	172	0.571	-23	0.011	78	0.976	-178
2000	0.994	171	0.520	-27	0.012	77	0.978	-179
2100	0.992	169	0.477	-31	0.013	76	0.978	179
2200	0.991	168	0.440	-35	0.014	74	0.980	178

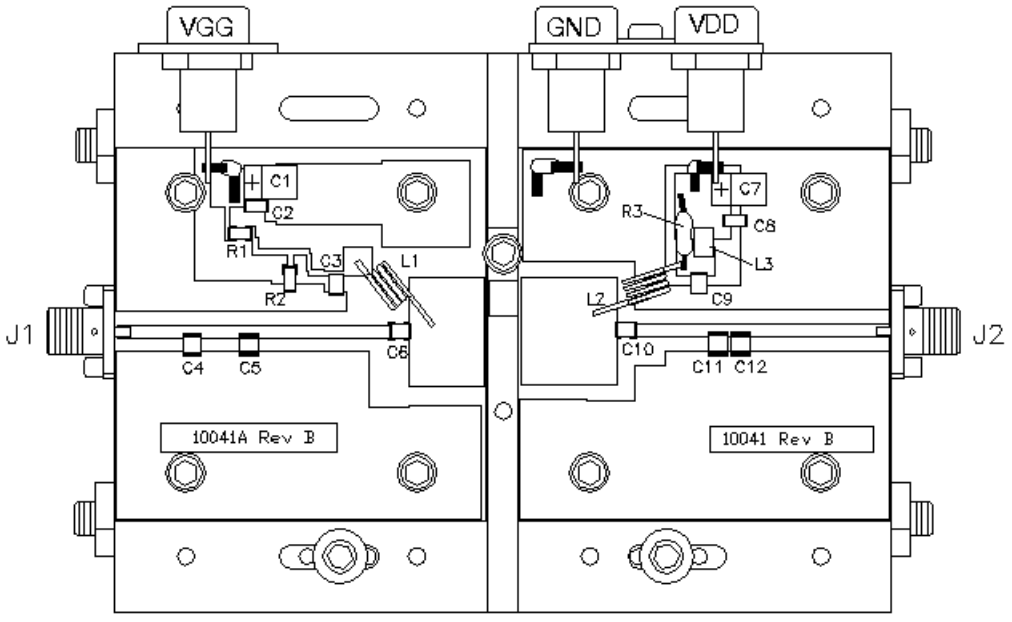
Test Circuit



Block Diagram for f = 2 GHz

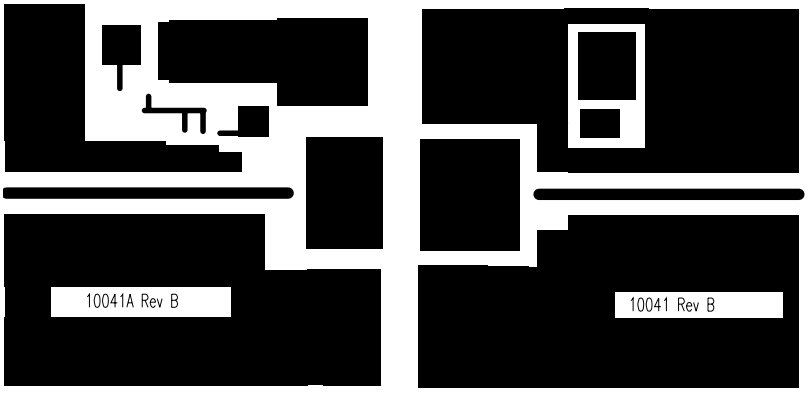
DUT	PTF 10041	LDMOS Transistor
ℓ1	0.141 λ 2 GHz	Microstrip 51.1 Ω
ℓ2	0.082 λ 2 GHz	Microstrip 51.1 Ω
ℓ3	0.041 λ 2 GHz	Microstrip 51.1 Ω
ℓ4	0.130 λ 2 GHz	Microstrip 8.77 Ω
ℓ5	0.169 λ 2 GHz	Microstrip 8.77 Ω
ℓ6	0.141 λ 2 GHz	Microstrip 51.1 Ω
ℓ7	0.269 λ 2 GHz	Microstrip 51.1 Ω

C1,C7	10uF, 35 V	Capacitor, Digi-Key PCS6106
C2,C8	0.1uF, 50 V	Capacitor, Digi-Key PCC 103 BCT
C3,C6, C9, C10	10 pF	Capacitor, 100 B 100
C4	1.0 pF	Capacitor, 100 B 1R0
C5	1.4 pF	Capacitor, 100 B 1R4
C11	0.9 pF	Capacitor, 100 B 0R9
C12	1.5 pF	Capacitor, 100 B 1R5
J1,J2	Connector, SMA, Female, Panel Mount	
L1, L2	4 Turns, 20 AWG, .120 DIA I.D.	
L3	Ferrite, 6mm	Phillips 53/3/4.6-452
R1, R2	Resistor, 220ohm	Digi-Key 220ZTR
R3	Resistor, 1ohm, Leaded	Digi-Key 1.0QBK
Circuit Board	.031" thick, ε_r = 4.0, G200, AlliedSignal, 2 oz. copper	



Assembly Diagram (not to scale)

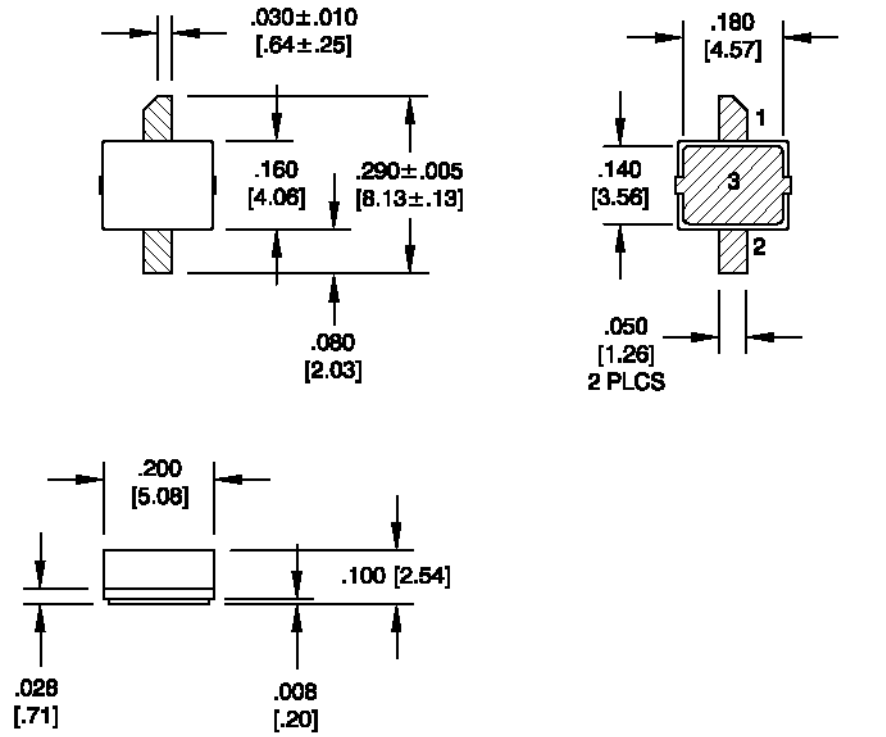
Test Circuit (cont.)



Artwork (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]

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