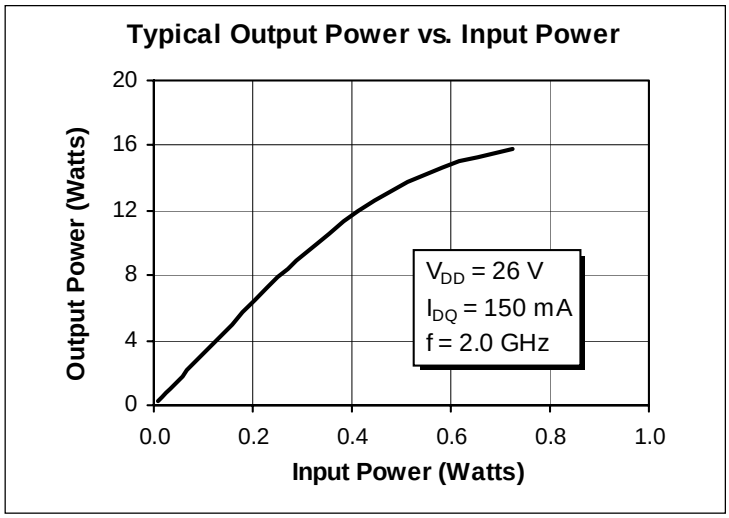
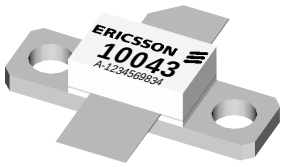
PTF 10043
12 Watts, 1.9–2.0 GHz
GOLDMOS® Field Effect Transistor

Description

The PTF 10043 is an internally matched *GOLDMOS* FET intended for large signal amplifier applications from 1.9 to 2.0 GHz. Rated at 12 watts, it operates at 45% efficiency with 12 dB gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- ***INTERNALLY MATCHED***
- **Performance at 2.0 GHz, 26 Volts**
  - **Output Power = 12 Watts Min**
  - **Power Gain = 12 dB Typ at 3 Watts**
  - **Efficiency = 45% Typ**
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Back Side Common Source**
- **Excellent Thermal Stability**
- **100% Lot Traceability**





Package 20222

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 26 V, P_{OUT} = 3 W, I_{DQ} = 150 mA, f = 1.93, 2.0 GHz)	G_{ps}	11	12	—	dB
Power Output at 1 dB Compressed (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 150 mA, f = 2.0 GHz)	p-1dB	12	14	—	Watts
Drain Efficiency (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 150 mA, f = 2.0 GHz)	η_D	40	45	—	%
Load Mismatch Tolerance (V_{DD} = 26 V, P_{OUT} = 12 W, I_{DQ} = 150 mA, f = 2.0 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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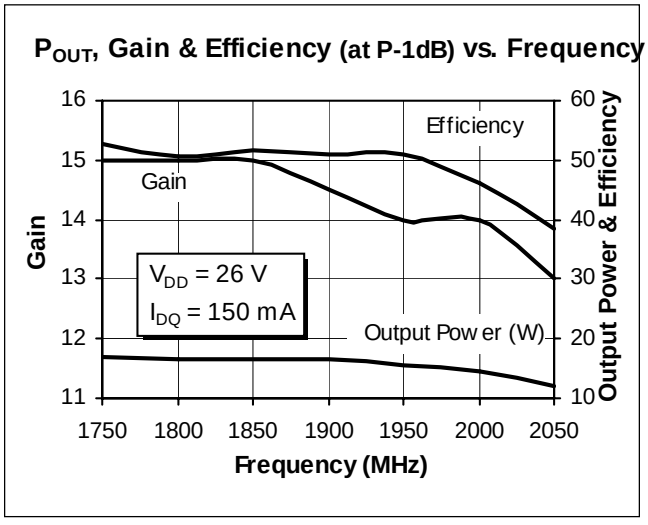
Electrical Characteristics (100% Tested)

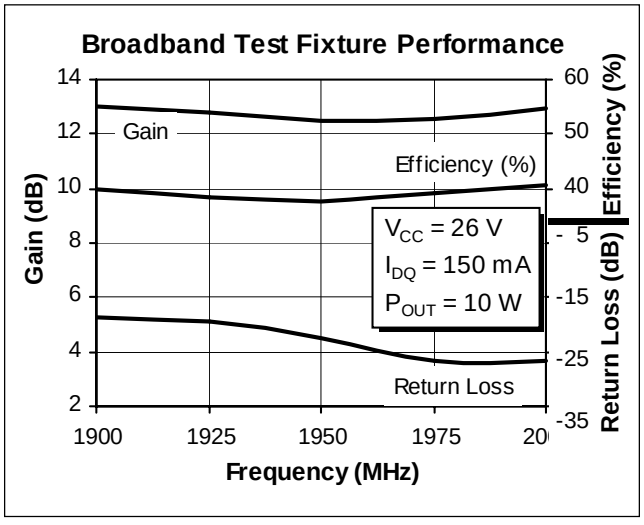
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 5 mA	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	V_{DS} = 26 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 75 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance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

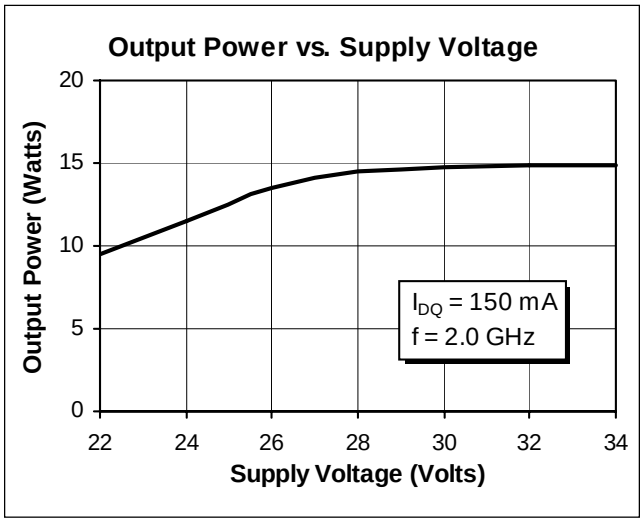
Maximum Ratings

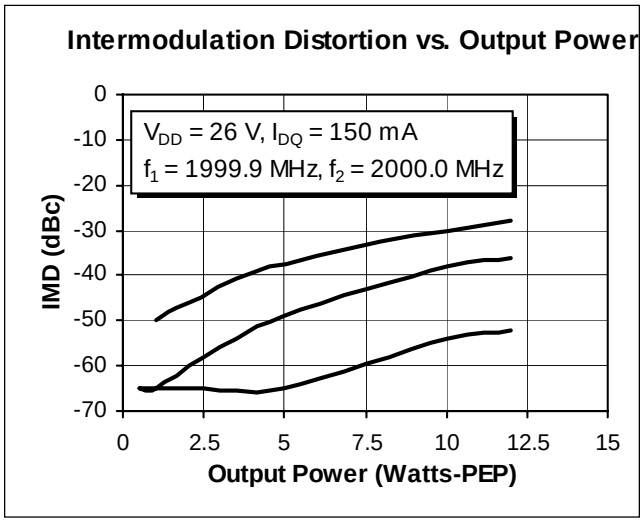
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation Above 25°C derate by	P_D	55 0.31	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	3.2	°C/W

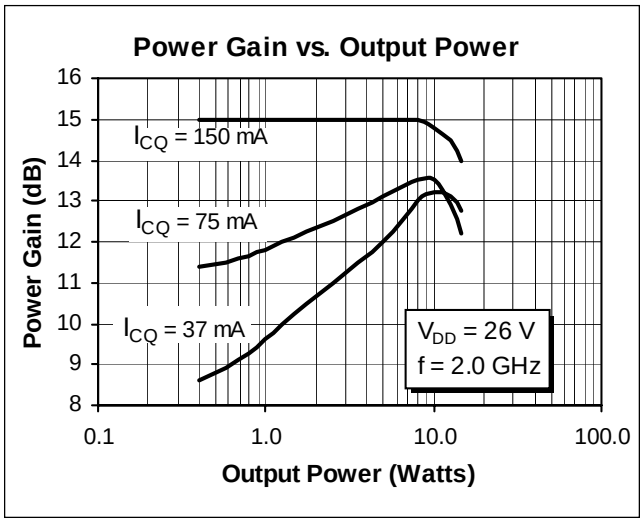
Typical Performance

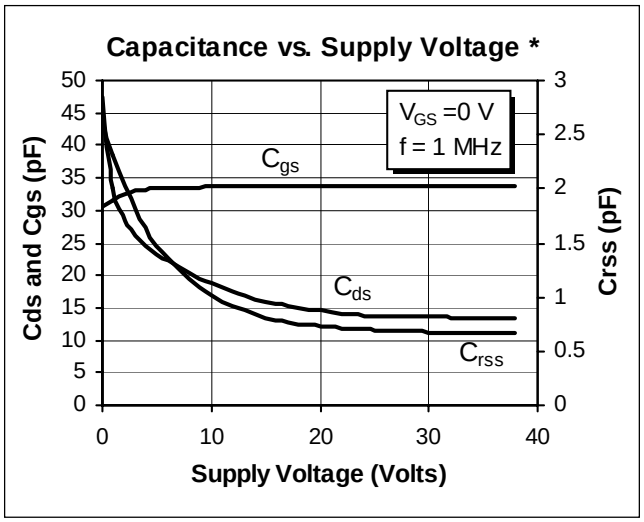




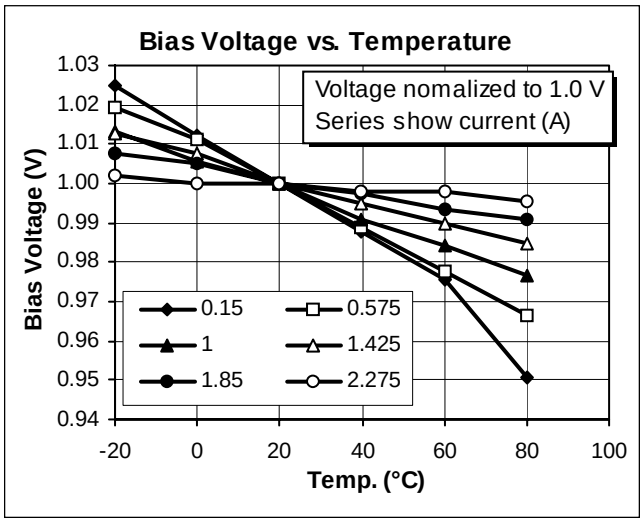








*This part is internally matched. Measurements of the finished product will not yield these figures.



PTF 10043

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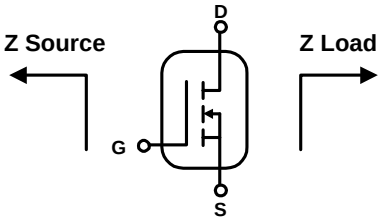
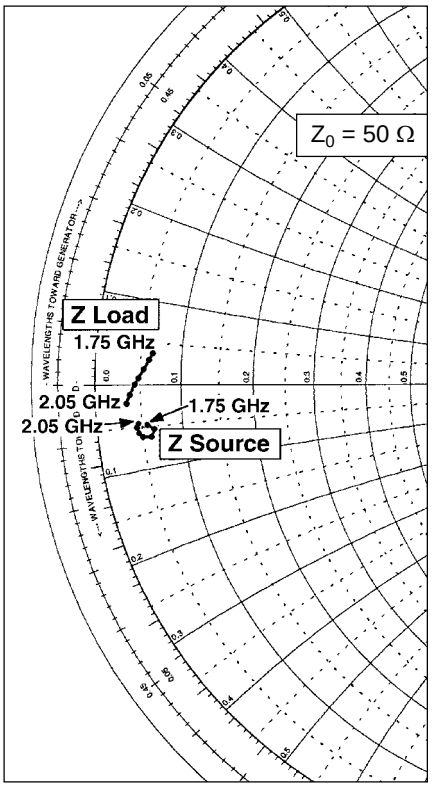
Impedance Data

V_{DS} = 26 V, P_{OUT} = 12 W, I_{DQ} = 150 mA





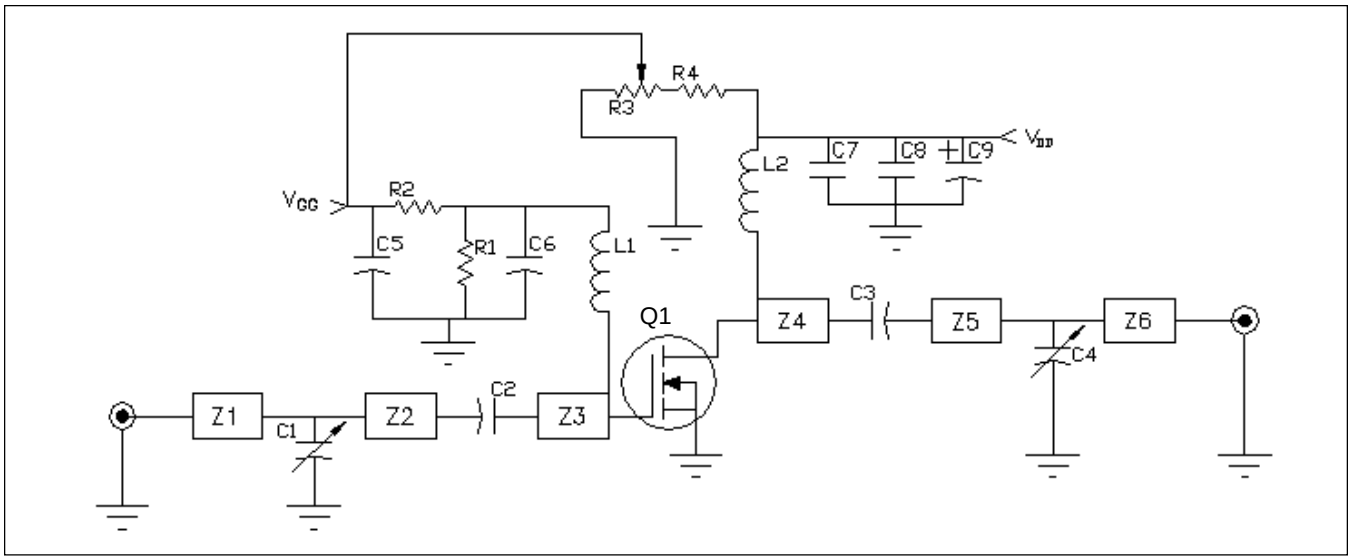
Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.75	2.8	-2.4	3.2	1.9
1.80	3.2	-2.7	3.0	1.5
1.85	3.0	-3.2	2.7	0.9
1.90	2.5	-3.1	2.4	0.4
1.95	2.3	-2.8	2.2	0.0
2.00	2.2	-2.5	1.9	-0.6
2.05	2.3	-2.3	1.7	-1.1

Typical Scattering Parameters

(V_{DS} = 28 V, I_D = 500 mA)

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.912	-143	14.7	86	0.007	0	0.641	-70
200	0.917	-150	11.5	80	0.006	-5	0.650	-82
300	0.951	-163	5.83	53	0.004	-16	0.750	-107
400	0.964	-168	3.71	39	0.002	0	0.824	-122
500	0.971	-171	2.63	28	0.002	65	0.881	-132
600	0.974	-174	1.99	20	0.003	94	0.931	-139
700	0.975	-175	1.56	12	0.006	98	0.952	-146
800	0.975	-177	1.26	6	0.008	95	0.950	-151
900	0.980	-178	1.07	0	0.010	93	0.951	-155
1000	0.979	-179	0.932	-5	0.012	92	0.948	-158
1100	0.981	180	0.846	-11	0.014	89	0.959	-160
1200	0.977	179	0.790	-16	0.015	86	0.965	-162
1300	0.975	177	0.763	-23	0.017	83	0.970	-164
1400	0.965	176	0.759	-30	0.019	82	0.972	-166
1500	0.951	175	0.782	-39	0.021	80	0.974	-168
1600	0.929	174	0.828	-51	0.023	78	0.975	-169
1700	0.904	174	0.880	-68	0.025	74	0.986	-170
1800	0.885	175	0.884	-89	0.027	70	1.00	-171
1900	0.892	177	0.802	-113	0.029	67	1.02	-173
2000	0.918	177	0.650	-134	0.030	61	1.02	-175
2100	0.942	177	0.489	-151	0.028	54	1.01	-177
2200	0.964	176	0.366	-162	0.025	56	1.01	-178

Test Circuit

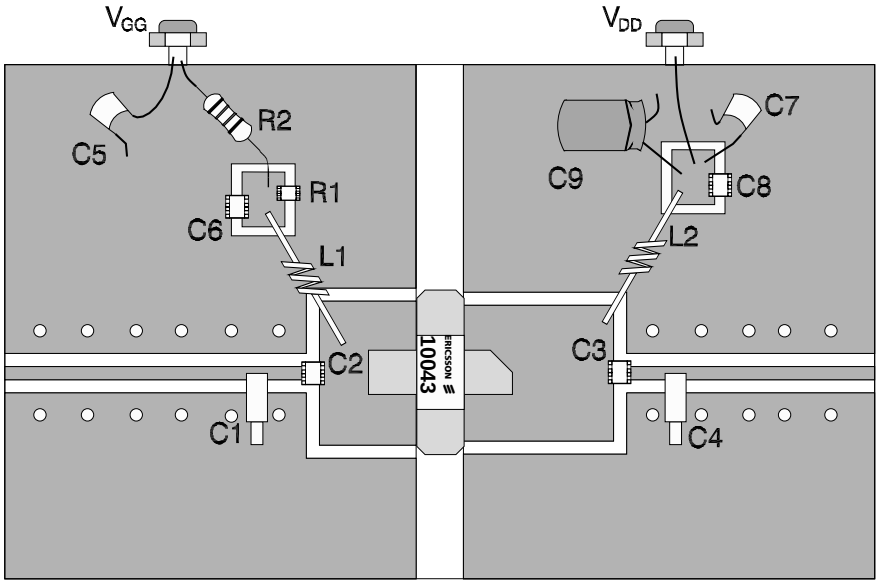


Block Diagram for f = 2.0 GHz

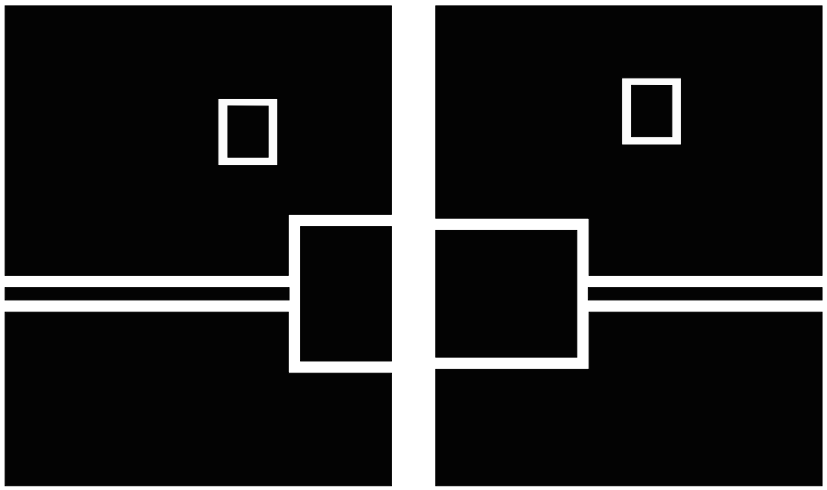
Q1	PTF 10043	RF LDMOS FET
Z1, Z6	50 Ω	Microstrip
Z2, Z5	50 Ω, 0.085 λ	Microstrip
Z3	7.5 Ω, 0.154 λ	Microstrip
Z4	7.9 Ω, 0.238 λ	Microstrip
C1, C4	0.3–3.5	Trim Capacitor
C2, C3, C6, C8	33 pF	Capacitor ATCB
C5, C7	0.1 μF, 50 V	Capacitor Digi-Key P4917-ND
C9	100 μF, 50V	Electrolytic Capacitor Digi-Key P5276
L1, L2	#20 AWG	3 Turn, 0.12" I.D.
R1, R2	500 Ω	Resistor
Circuit Board	.031" thick, ε_r = 4.0, G200, AlliedSignal, 2 oz. copper	

Bias Parts (not shown on layout)

R3	2 K	Potentiometer
R4	10 Ω	Resistor



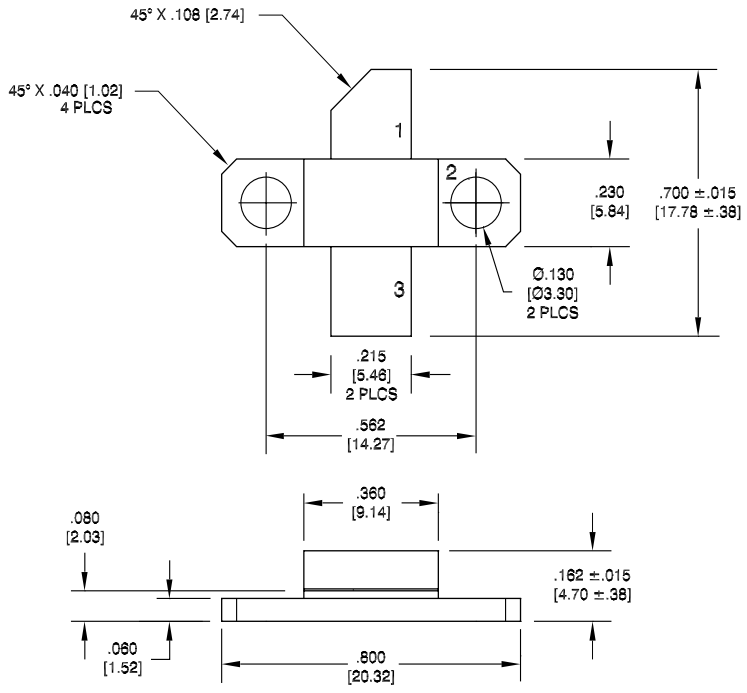
Parts Layout (not to scale)



Artwork (not to scale)

Package Mechanical Specifications

Package 20222



Unless Otherwise Specified
all tolerance ±0.005" [0.13mm]

Pins: 1. Drain 2. Source 3. Gate
Lead Thickness: 0.004±0.001" [0.10±0.03mm]

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EUS/KR 1522-PTF 10043 Uen Rev. A 01-16-01