

PTF 10111

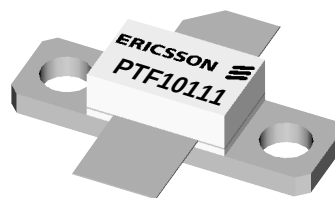
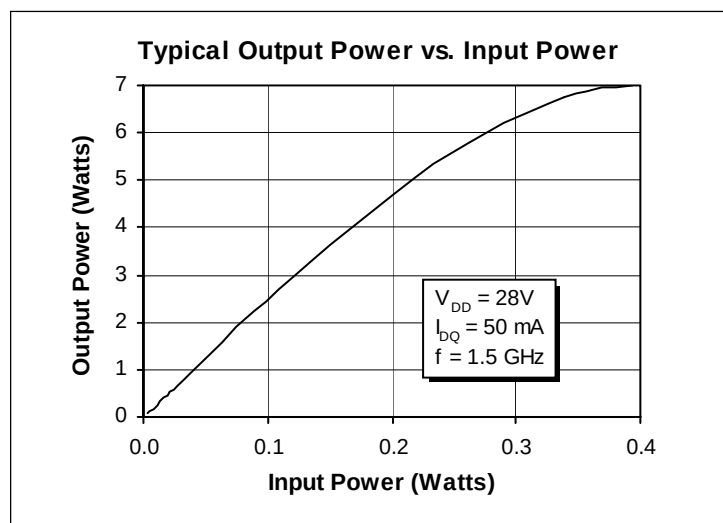
GOLDMOS[®] Field Effect Transistor

6 Watts, 1.5 GHz

Description

The PTF 10111 is a 6-watt **GOLDMOS** FET intended for large signal amplifier applications to 1.5 GHz. It operates at 50% efficiency with 16 dB gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **Performance at 1.5 GHz, 28 Volts**
 - Output Power = 6 Watts
 - Efficiency = 50% Typ
 - Power Gain = 16 dB Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **100% Lot Traceability**



Package 20222

RF Specifications (Guaranteed)

Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain ($V_{DD} = 28 \text{ V}$, $P_{OUT} = 6 \text{ W}$, $I_{DQ} = 50 \text{ mA}$, $f = 1.5 \text{ GHz}$)	G_{ps}	15.0	16	—	dB
Output Power at 1 dB Compressed ($V_{DD} = 28 \text{ V}$, $I_{DQ} = 50 \text{ mA}$, $f = 1.5 \text{ GHz}$)	P-1dB	6	7	—	Watts
Drain Efficiency ($V_{DD} = 28 \text{ V}$, $P_{OUT} = 6 \text{ W}$, $I_{DQ} = 50 \text{ mA}$, $f = 1.5 \text{ GHz}$)	η_D	45	50	—	%
Load Mismatch Tolerance ($V_{DD} = 28 \text{ V}$, $P_{OUT} = 6 \text{ W}$, $I_{DQ} = 50 \text{ mA}$, $f = 1.5 \text{ GHz}$ — all phase angles at frequency of test)	Ψ	—	—	30:1	—

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

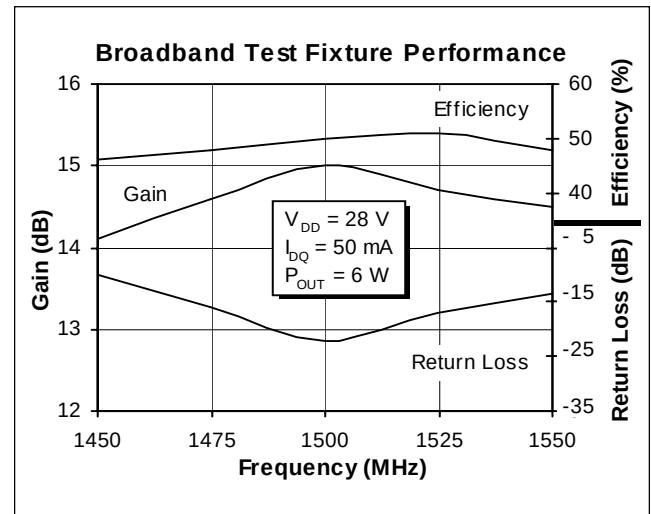
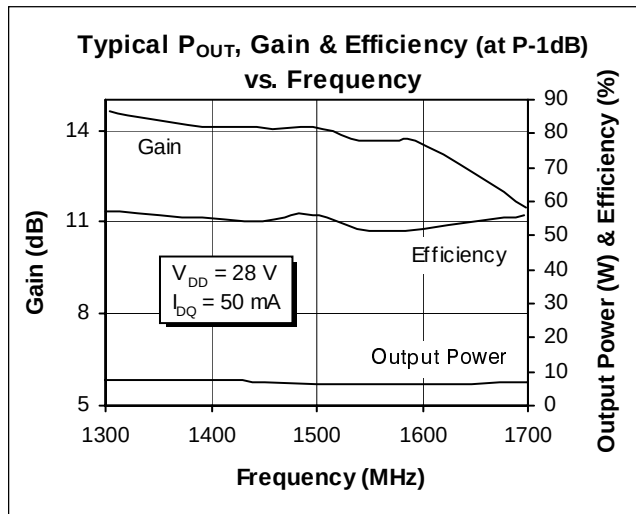
Electrical Characteristics (Guaranteed)

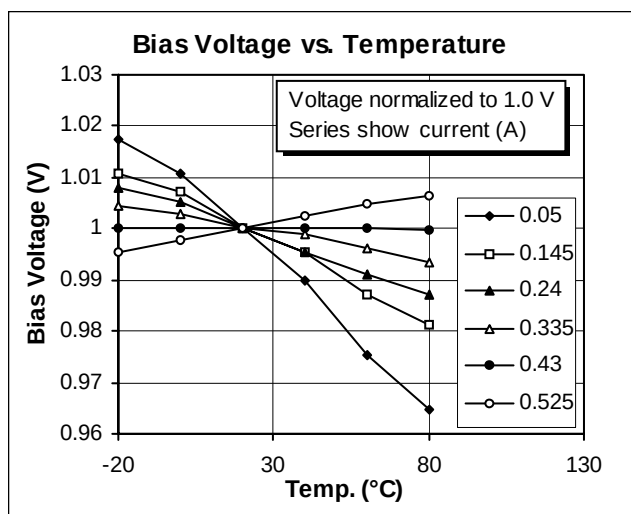
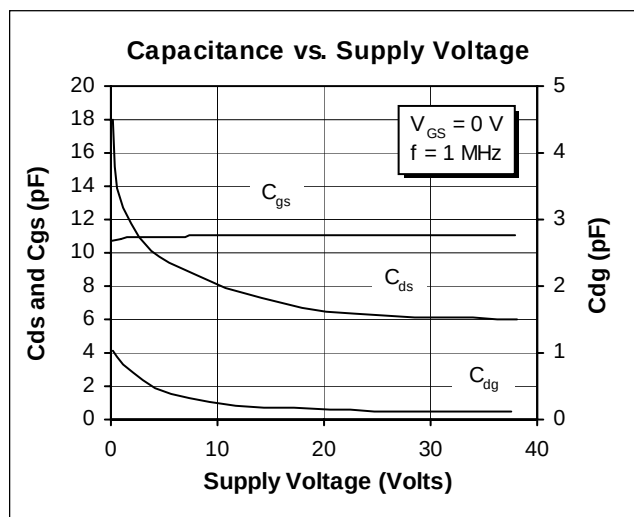
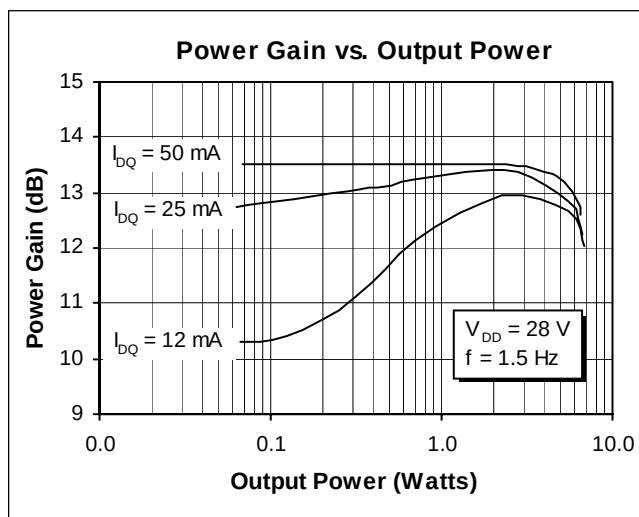
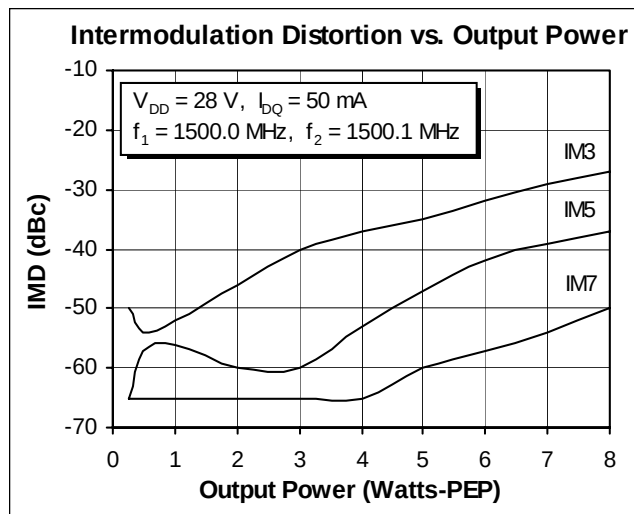
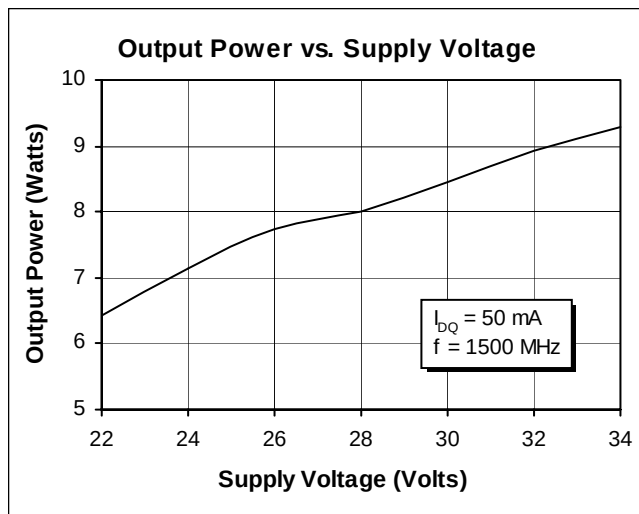
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 0.7\text{ mA}$	BV_{DSS}	65	68	—	Volts
Drain-Source Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	μA
Gate On Voltage	$V_{DS} = 28\text{ V}$, $I_D = 50\text{ mA}$	$V_{GS(on)}$	3.0	—	5.0	Volts

Maximum Ratings

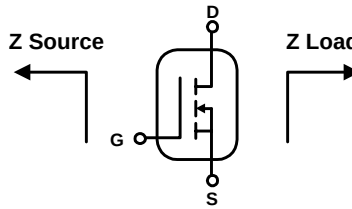
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	± 20	Vdc
Operating Junction Temperature	T_J	200	$^{\circ}\text{C}$
Total Device Dissipation Above 25°C derate by	P_D	36 0.208	Watts $\text{W}/^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to $+150$	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	4.8	$^{\circ}\text{C}/\text{W}$

Typical Performance

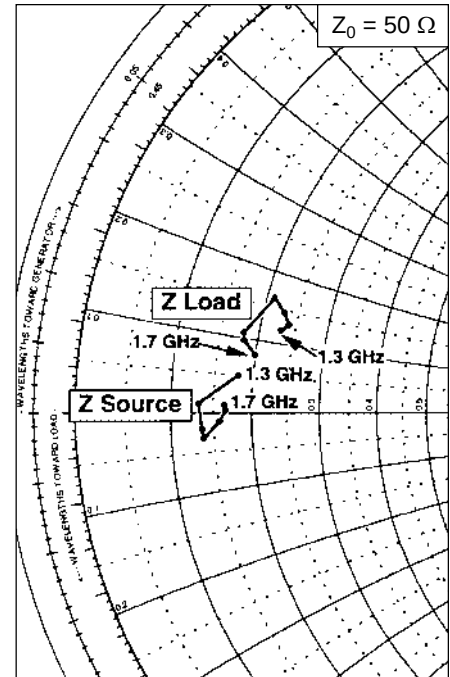


Typical Performance (cont.)


Impedance Data

 $(V_{DD} = 28 \text{ V}, I_{DQ} = 50 \text{ mA}, P_{OUT} = 6 \text{ W})$ 

Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.30	9.0	2.5	11.5	6.0
1.40	6.6	0.6	12.0	6.5
1.45	6.8	-1.0	11.5	7.3
1.50	6.9	-1.6	10.5	8.2
1.55	7.9	-0.6	9.0	5.4
1.60	8.3	0.2	9.1	4.9
1.70	8.2	0.5	10.0	4.0

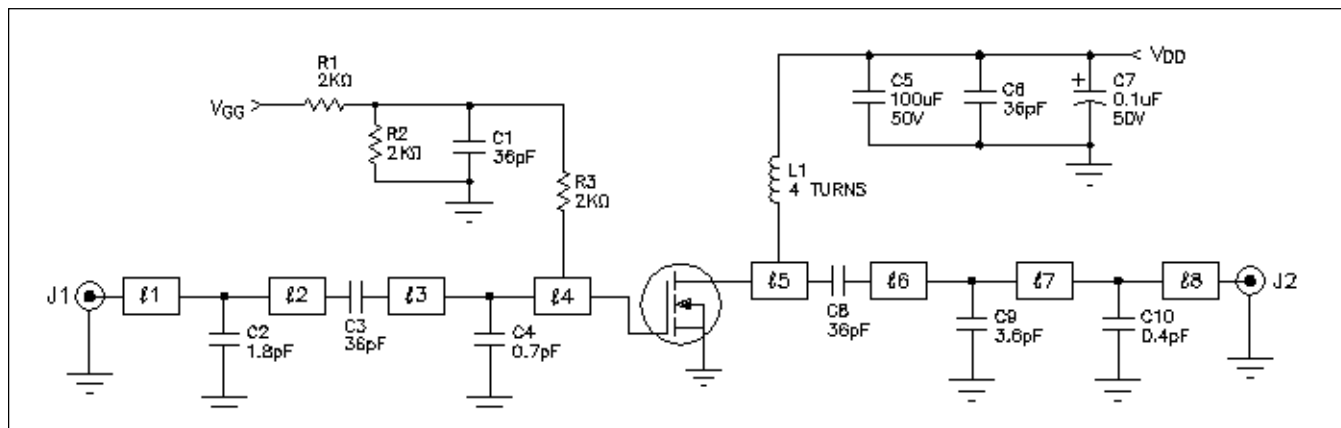


Typical Scattering Parameters

 $(V_{DS} = 28 \text{ V}, I_D = 300 \text{ mA})$

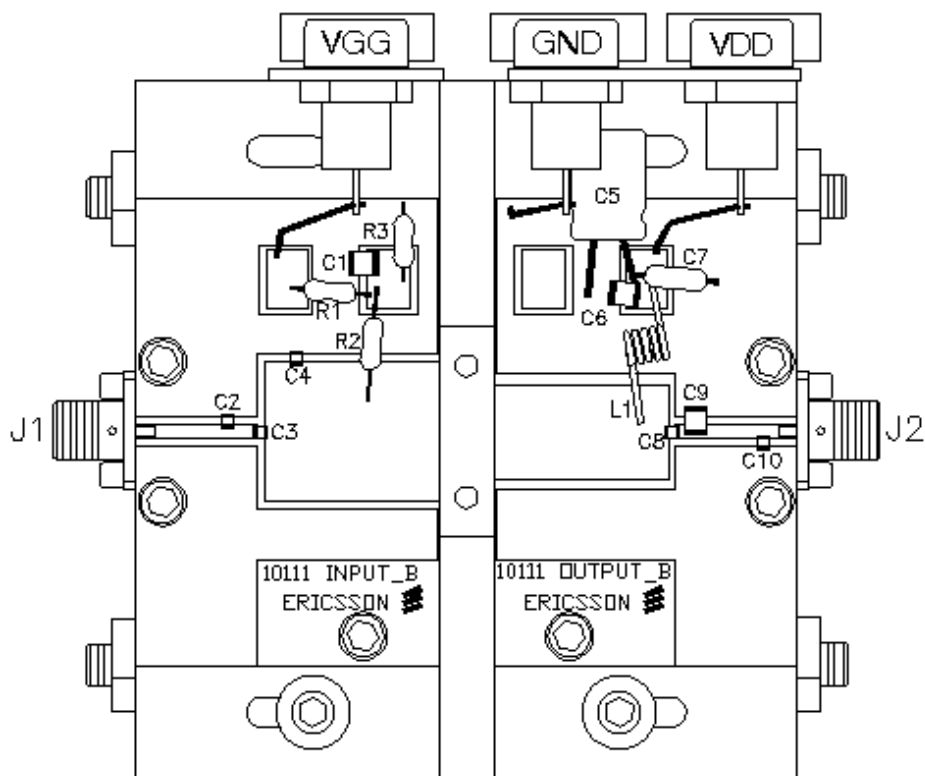
f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.867	-65	21.8	131	0.010	42	0.801	-41
200	0.832	-77	19.2	123	0.011	34	0.765	-50
300	0.843	-106	14.4	97	0.013	18	0.740	-72
400	0.844	-123	11.0	81	0.014	4	0.744	-88
500	0.852	-133	8.71	69	0.013	-7	0.774	-98
600	0.862	-140	7.08	59	0.011	-15	0.815	-107
700	0.868	-146	5.79	50	0.009	-19	0.836	-116
800	0.874	-151	4.80	42	0.007	-19	0.851	-123
900	0.882	-155	4.05	35	0.006	-16	0.861	-129
1000	0.886	-158	3.48	29	0.004	-7	0.869	-133
1100	0.893	-161	3.04	24	0.003	20	0.885	-137
1200	0.899	-164	2.69	19	0.003	57	0.897	-141
1300	0.907	-167	2.43	14	0.005	74	0.912	-145
1400	0.905	-170	2.19	9	0.007	80	0.921	-148
1500	0.903	-173	2.00	4	0.008	83	0.928	-151
1600	0.898	-175	1.83	0	0.011	85	0.929	-154
1700	0.896	-177	1.71	-5	0.013	86	0.933	-157
1800	0.892	-179	1.60	-9	0.016	83	0.934	-159
1900	0.889	-178	1.52	-13	0.020	78	0.937	-161
2000	0.885	-176	1.45	-17	0.023	69	0.940	-163
2100	0.882	-173	1.40	-21	0.023	59	0.944	-165
2200	0.880	-171	1.37	-25	0.021	60	0.950	-168

Test Circuit



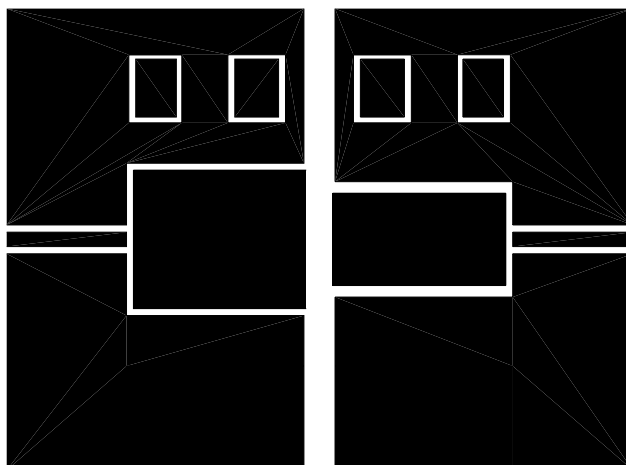
Test Circuit Block Diagram for $f = 1.5$ GHz

DUT	PTF 10111	C1, C6	36 pF,	Capacitor, 100 B 360
$\ell 1$	0.084λ 1.5 GHz Microstrip 50 Ω	C2	1.8 pF,	Capacitor, 100 A 1R8
$\ell 2$	0.034λ 1.5 GHz Microstrip 50 Ω	C3, C8	36 pF	Capacitor, 100 A 360
$\ell 3$	0.034λ 1.5 GHz Microstrip 8.45 Ω	C4	0.7 pF,	Capacitor, 100 A 0R7
$\ell 4$	0.148λ 1.5 GHz Microstrip 8.45 Ω	C5	100 μ F, 50 V	Capacitor, Digi-Key P5182
$\ell 5$	0.176λ 1.5 GHz Microstrip 12.13 Ω	C7	0.1 μ F, 50 V,	Capacitor, RJE 999 0003
$\ell 6$	0.025λ 1.5 GHz Microstrip 50 Ω	C9	3.6 pF	Capacitor, 100 B 3R6
$\ell 7$	0.056λ 1.5 GHz Microstrip 50 Ω	C10	0.4 pF	Capacitor, 100 A 0R4
$\ell 8$	0.043λ 1.5 GHz Microstrip 50 Ω	J1, J2	Connector, SMA, Female, Panel Mount	
		L1	4 Turns, 22 AWG, 0.120" I.D.	
		R1, R2, R3	2K ohm Resistor	
		Circuit Board	.031" thick, G200, $\epsilon_r = 4.0$, AlliedSignal, 2 oz. copper	



Placement Diagram (not to scale)

Test Circuit



Artwork (not to scale)

Case Outline Specifications

