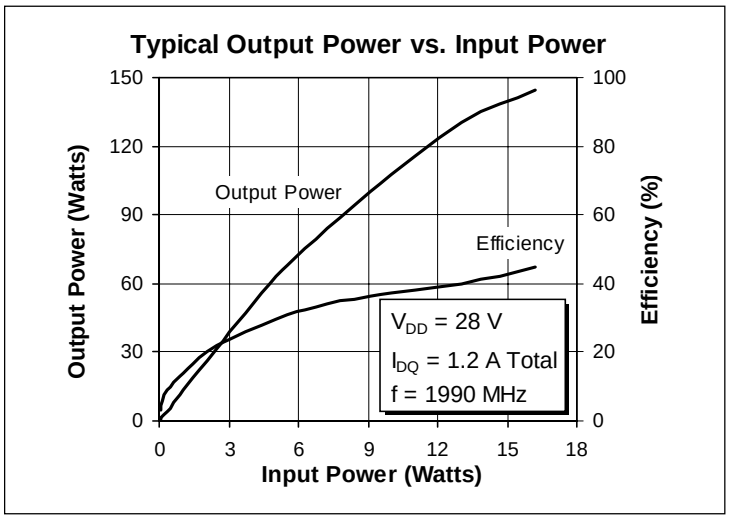
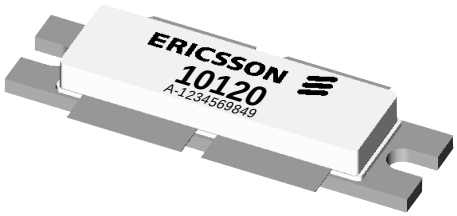
PTF 10120
120 Watts, 1.8–2.0 GHz
GOLDMOS™ Field Effect Transistor

Description

The PTF 10120 is an internally matched common source N-channel enhancement-mode lateral MOSFET intended for CDMA and TDMA applications from 1.8 to 2.0 GHz. It is rated at 120 watts power output. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- ***INTERNALLY MATCHED***
- **Guaranteed Performance at 1.99 GHz, 28 V**
  - Output Power = 120 Watts Min
  - Power Gain = 11 dB Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Back Side Common Source**
- **Excellent Thermal Stability**
- **100% Lot Traceability**





Package 20250

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{DD} = 28 V, P_{OUT} = 30 W, I_{DQ} = 1.2 A Total, f = 1.99 GHz)	G_{ps}	10	11	—	dB
Power Output at 1 dB Compression (V_{DD} = 28 V, I_{DQ} = 1.2 A Total, f = 1.99 GHz)	P-1dB	120	—	—	Watts
Drain Efficiency (V_{DD} = 28 V, P_{OUT} = 120 W, I_{DQ} = 1.2 A Total, f = 1.99 GHz)	η_D	—	40	—	%
Load Mismatch Tolerance (V_{DD} = 28 V, P_{OUT} = 60 W, I_{DQ} = 1.2 A Total, 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 (100% Tested—characteristics, conditions and limits shown per side)

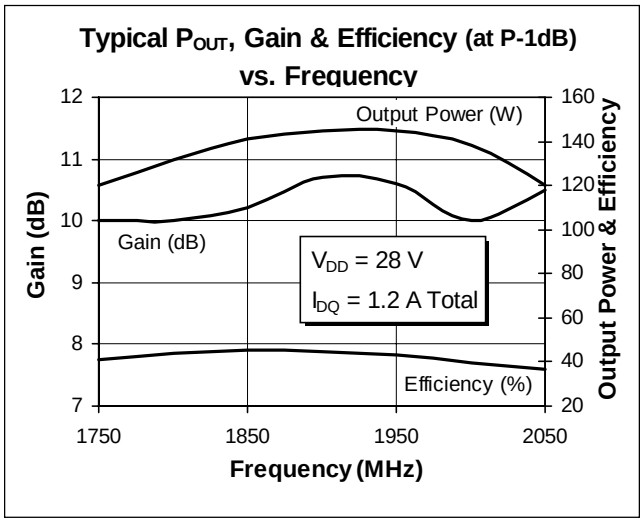
Characteristic (per side)	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 100 mA	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	5.0	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 150 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	V_{DS} = 10 V, I_D = 2 A	g_{fs}	—	4.0	—	Siemens

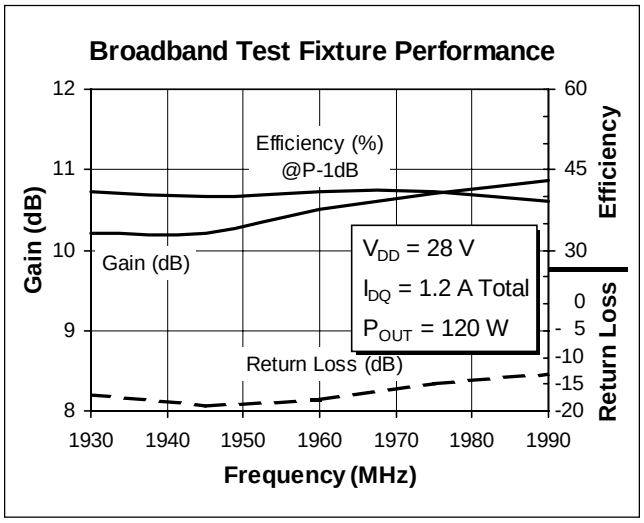
Maximum Ratings

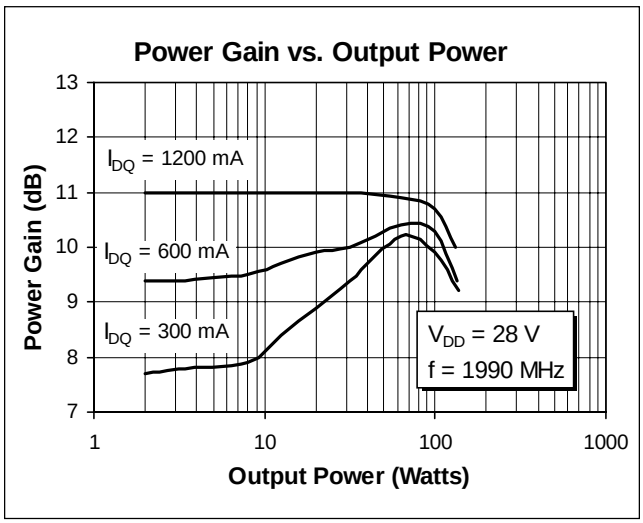
Parameter	Symbol	Value	Unit
Drain-Source Voltage(1)	V_{DSS}	65	Vdc
Gate-Source Voltage(1)	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation at Above 25°C derate by	P_D	440 2.51	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	0.39	°C/W

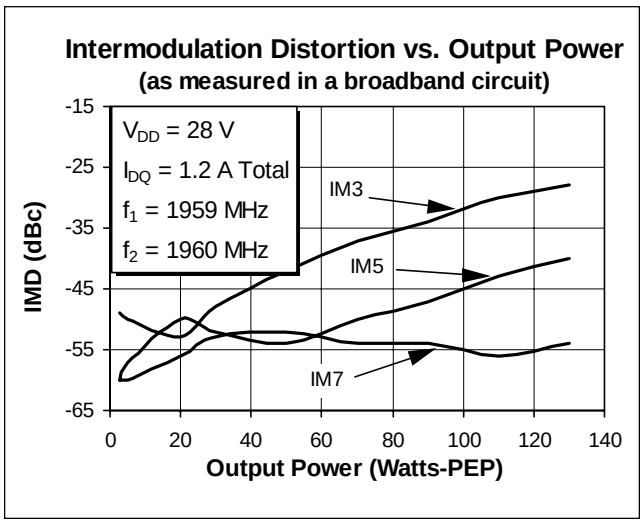
(1) per side

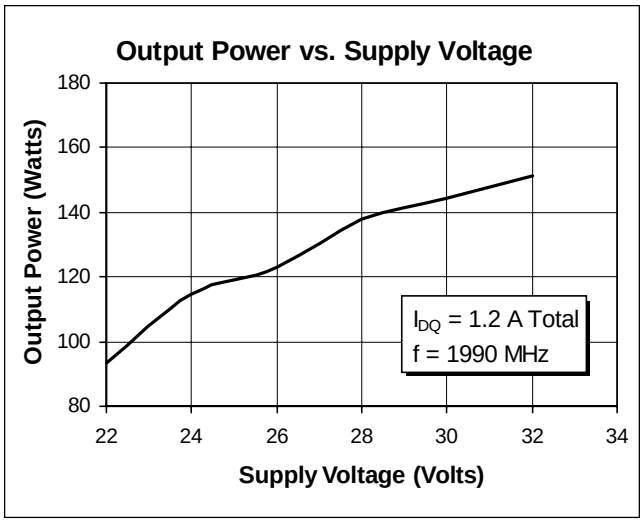
Typical Performance

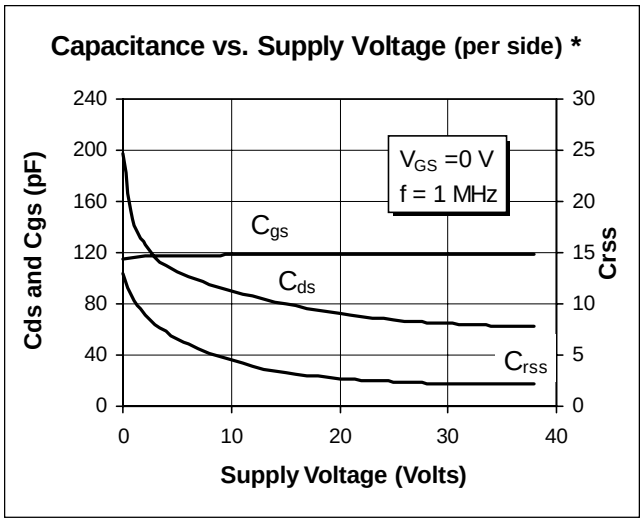








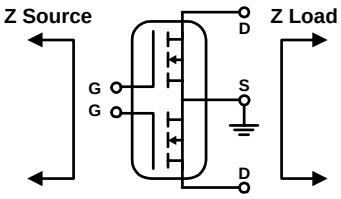




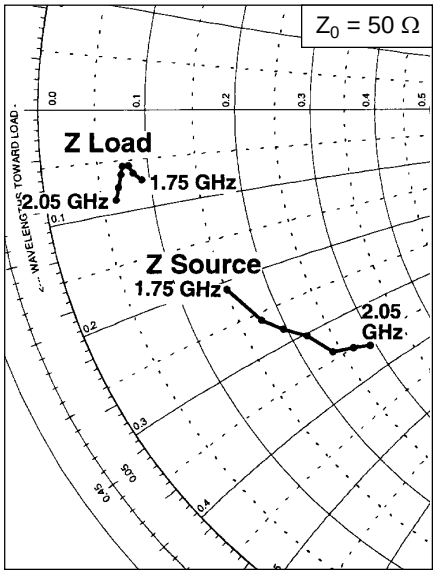
* This part is internally matched. Measurements of the finished product will not yield these results.

Impedance Data

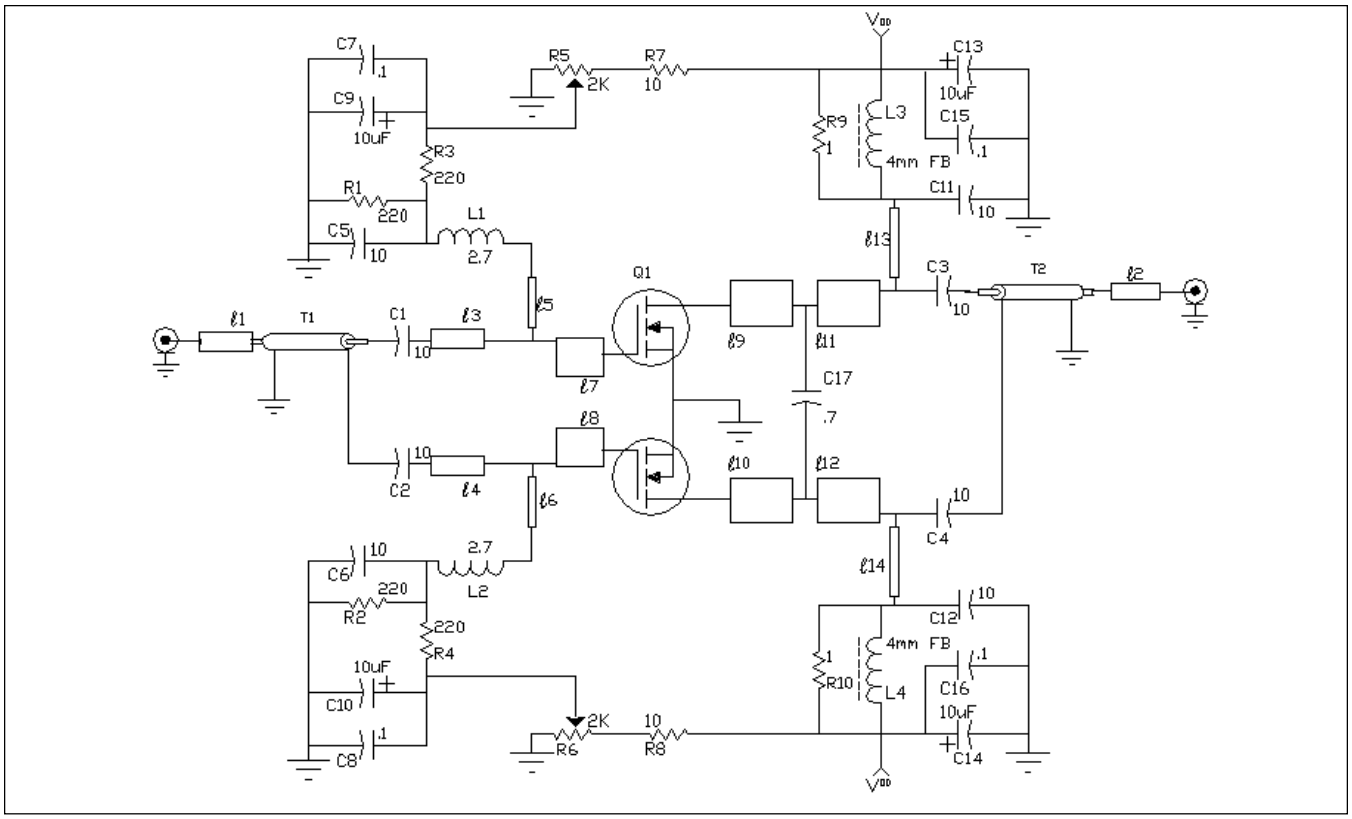
(V_{DD} = 28 V, P_{OUT} = 120 W,
I_{DQ} = 1.2 A Total)



Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.75	7.6	-10.5	4.6	-3.6
1.80	8.8	-13.0	4.2	-3.2
1.85	9.8	-14.1	4.0	-2.8
1.90	11.0	-15.2	3.7	-2.8
1.95	12.0	-17.0	3.6	-3.2
2.00	13.4	-17.5	3.4	-3.8
2.05	14.6	-18.0	3.2	-4.4



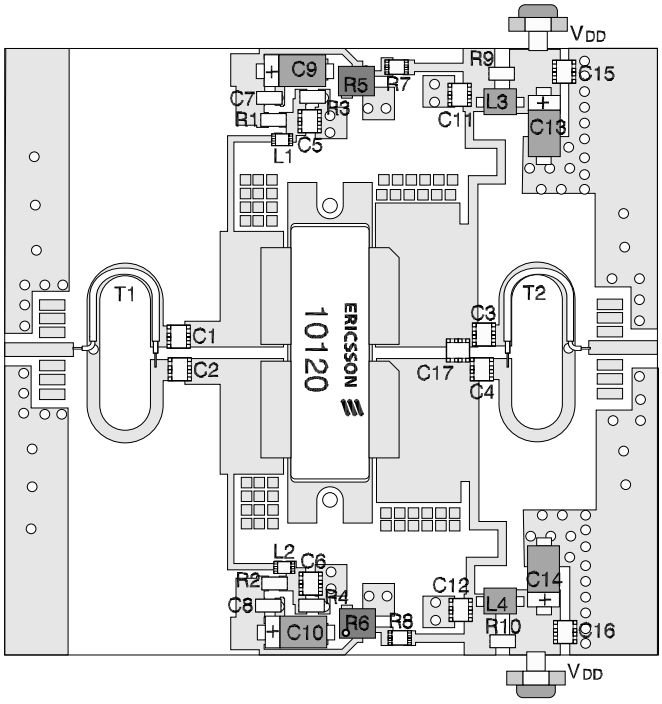
Test Circuit



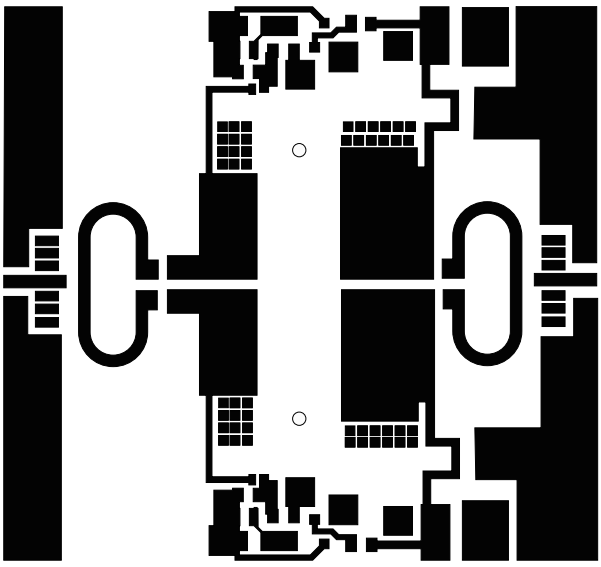
Test Circuit Block Diagram for f = 2.0 GHz

Q1	PTF 10120	LDMOS RF Transistor
ℓ1, ℓ2		Microstrip 50 Ω
ℓ3, ℓ4	.048 λ @ 2.0 GHz	Microstrip 31.7 Ω
ℓ5, ℓ6	.18 λ @ 2.0 GHz	Microstrip 70 Ω
ℓ7, ℓ8	.097 λ @ 2.0 GHz	Microstrip 9.35 Ω
ℓ9, ℓ10	.129 λ @ 2 GHz	Microstrip 7.6 Ω
ℓ11, ℓ12	.031 λ @ 2 GHz	Microstrip 8.8 Ω
ℓ13, ℓ14	.25 λ @ 2 GHz	Microstrip 65 Ω
C1, C2, C3, C4, C5, C6, C11, C12	10 pF Chip Cap	ATC 100 B
C7, C8, C15, C16	0.1 μF Chip Cap	K1206
C9, C10, C13, C14	10 μF SMT Tantalum Cap	
C17	0.7 pF Chip Cap	ATC 100 B

L1, L2	2.7 nh	SMT Coil
L3, L4	4 mm	SMT Ferrite Bead
R1, R2, R3, R4	220 Ω	Chip Resistor K1206
R5, R6	2K	SMT Potentiometer
R7, R8	10 Ω	Chip Resistor K1206
R9, R10	1 Ω	Chip Resistor K1206
T1, T2	50 Ω Coaxial Balun	
Circuit Board	.028" Dielectric Thickness, ε_r = 4.0, AlliedSignal, G200, 2 oz. copper	



Parts Layout (not to scale)



Artwork (1 inch)

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