

PTF 10161

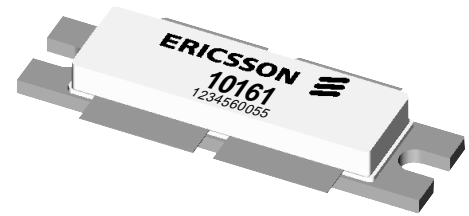
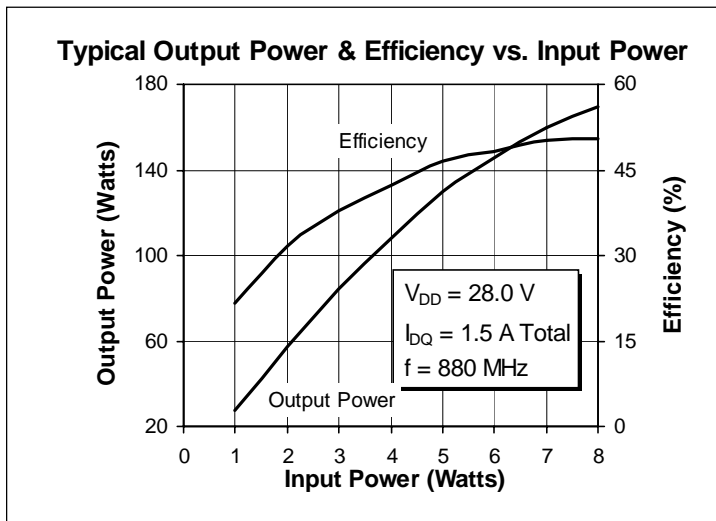
165 Watts, 869–894 MHz

GOLDMOS® Field Effect Transistor

Description

The PTF 10161 is an internally matched, 165 watt GOLDMOS FET intended for large signal amplifier applications from 869 to 894 MHz. It typically operates with 50% efficiency and 16 db of gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **INTERNALLY MATCHED**
- **Performance at 894 MHz, 28 Volts**
 - Output Power = 165 Watts
 - Power Gain = 16.0 dB Typ
 - Drain Efficiency = 50% Typ
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Back Side Common Source**
- **100% Lot Traceability**



Package 20250

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain ($V_{DD} = 28\text{ V}$, $P_{OUT} = 165\text{ W}$, $I_{DQ} = 1.5\text{ A Total}$, $f = 894\text{ MHz}$)	G_{ps}	15.0	16.0	—	dB
Power Output at 1 dB Compression ($V_{DD} = 28\text{ V}$, $I_{CQ} = 1.5\text{ A Total}$, $f = 880\text{ MHz}$)	P-1dB	165	180	—	Watts
Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{OUT} = 165\text{ W}$, $I_{DQ} = 1.5\text{ A Total}$, $f = 894\text{ MHz}$)	h	45	50	—	%
Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{OUT} = 165\text{ W}$, $I_{DQ} = 1.5\text{ A Total}$, $f = 893.9, 894\text{ MHz}$ —all phase angles at frequency of test)	Ψ	—	—	10:1	—

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

Electrical Characteristics (per side) (100% Tested)

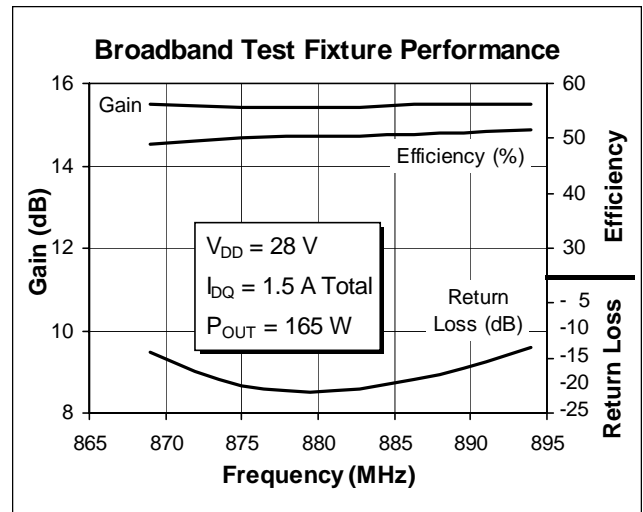
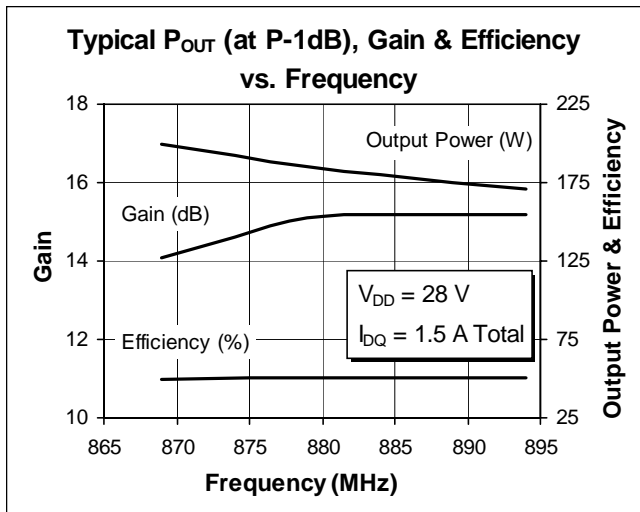
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 5\text{ mA}$	$V_{(BR)DSS}$	65	—	—	Volts
Drain-Source Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	$V_{DS} = 10\text{ V}, I_D = 75\text{ mA}$	$V_{GS(th)}$	3.0	4.3	5.0	Volts
Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 3\text{ A}$	g_{fs}	—	2.5	—	Siemens

Maximum Ratings

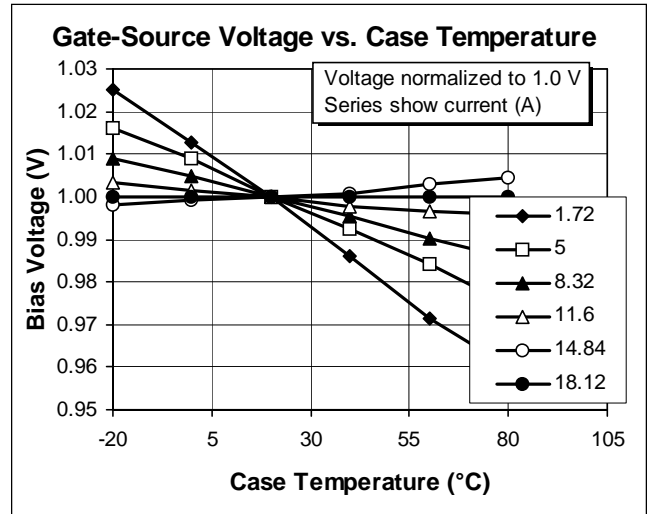
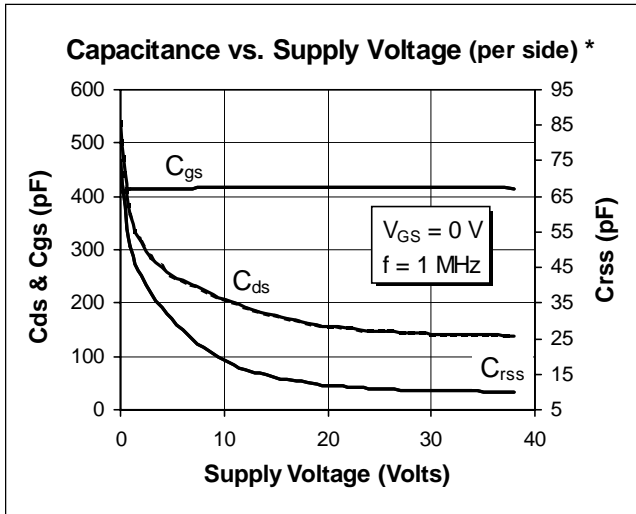
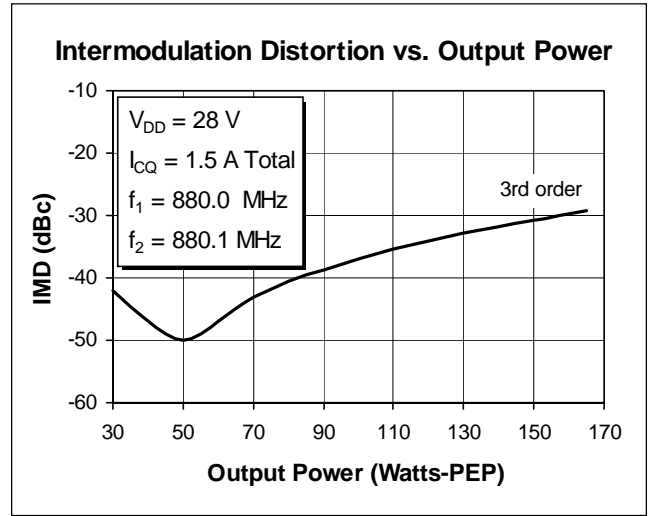
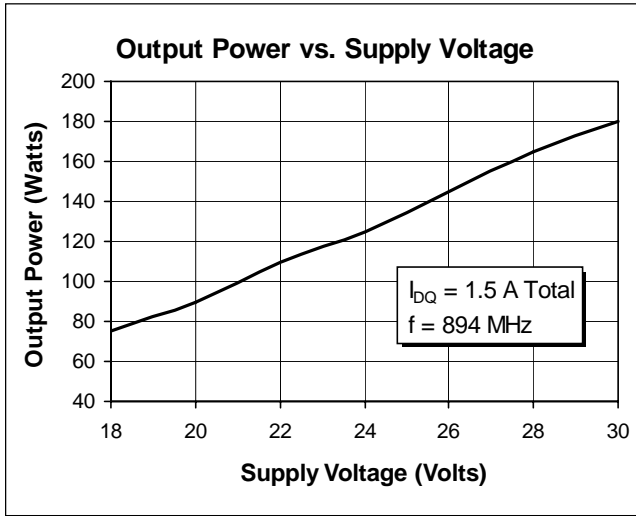
Parameter	Symbol	Value	Unit
Drain-Source Voltage ⁽¹⁾	V_{DSS}	65	Vdc
Gate-Source Voltage ⁽¹⁾	V_{GS}	± 20	Vdc
Operating Junction Temperature	T_J	200	$^{\circ}\text{C}$
Total Device Dissipation at Above 25 $^{\circ}\text{C}$ derate by	P_D	500 2.85	Watts W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	0.35	$^{\circ}\text{C}/\text{W}$

⁽¹⁾ per side

Typical Performance



Typical Performance (cont.)



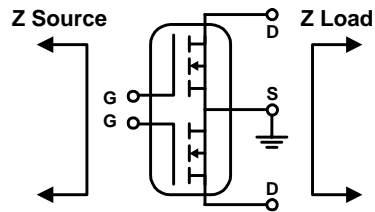
*This part is internally matched. Measurements of the finished product will not yield these figures.

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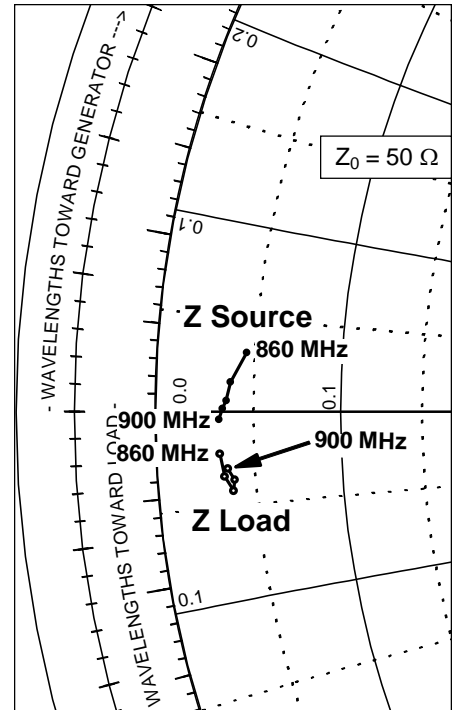


Impedance Data

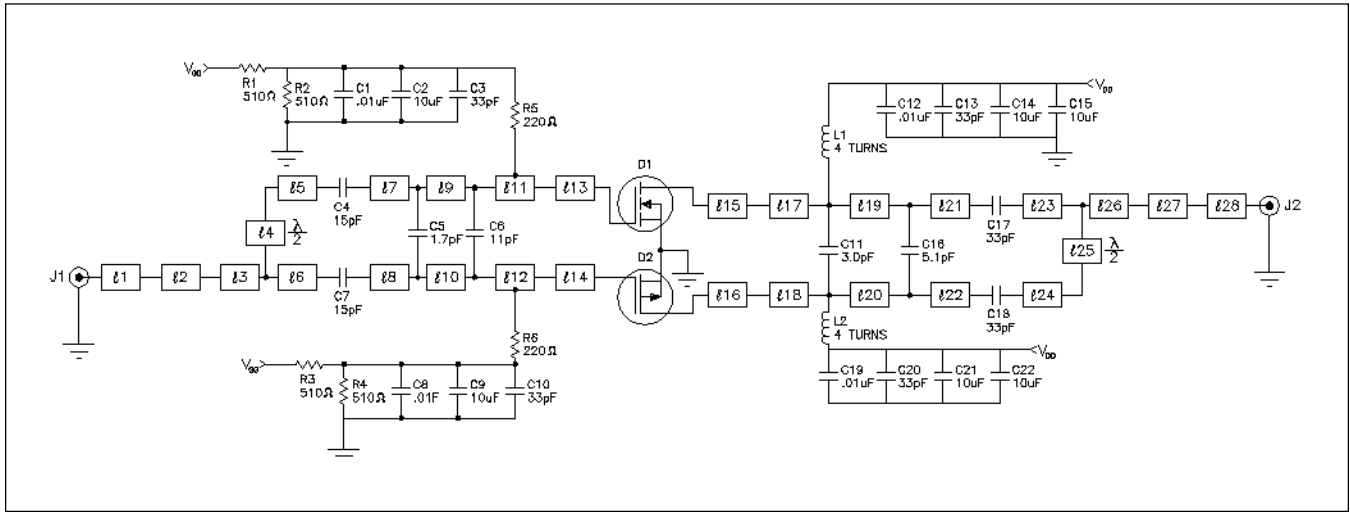
$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.5\text{ A Total}$, $P_{OUT} = 165\text{ W}$



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
860	2.3	1.6	1.60	-1.1
870	1.9	0.8	1.70	-1.7
880	1.8	0.3	1.90	-2.1
890	1.7	0.1	1.95	-1.8
900	1.6	-0.2	1.80	-1.5



Test Circuit

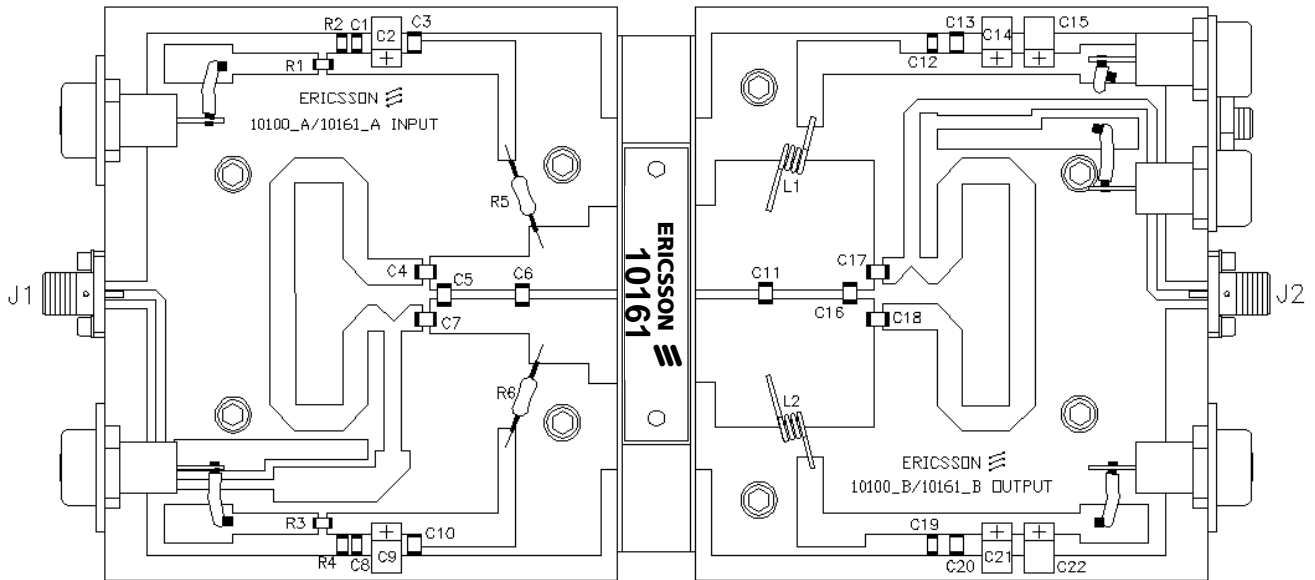


Schematic for $f = 894 \text{ MHz}$

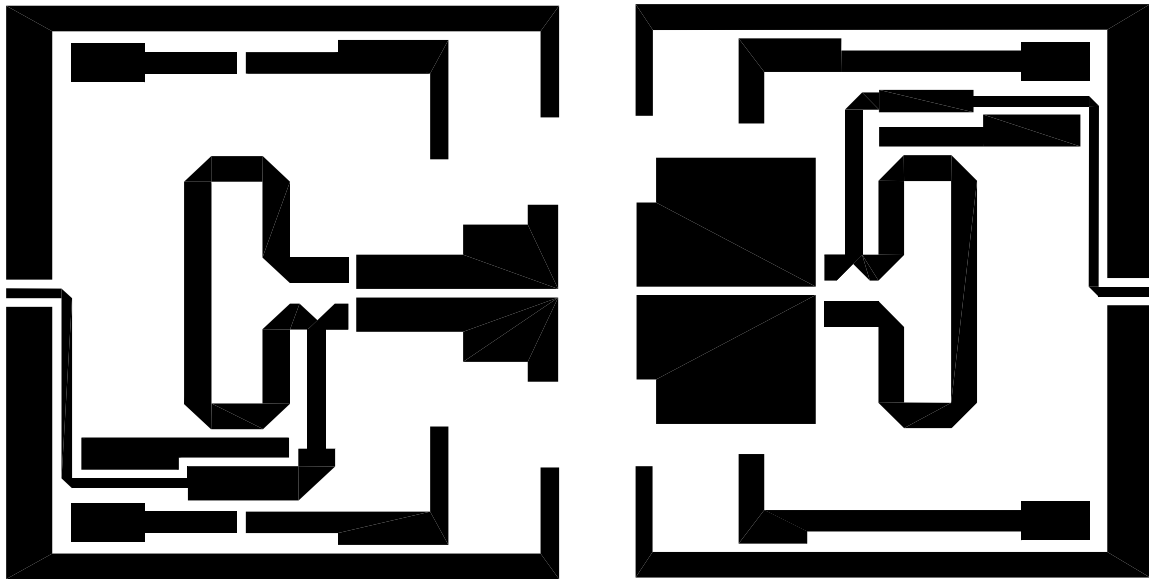
D1, D2	PTF 10161
l1, l28	0.255 λ 894 MHz Microstrip 52.3 Ω
l2	0.121 λ 894 MHz Microstrip 22.1 Ω
l3	0.097 λ 894 MHz Microstrip 37.3 Ω
l4, l25	0.482 λ 894 MHz Microstrip 27.8 Ω
l5, l24	0.016 λ 894 MHz Microstrip 27.8 Ω
l6, l23	0.052 λ 894 MHz Microstrip 27.8 Ω
l7, l8	0.013 λ 894 MHz Microstrip 22.2 Ω
l9, l10	0.065 λ 894 MHz Microstrip 22.2 Ω
l11, l12	0.048 λ 894 MHz Microstrip 13.1 Ω
l13, l14	0.024 λ 894 MHz Microstrip 10.4 Ω
l15, l16	0.017 λ 894 MHz Microstrip 10.3 Ω
l17, l18	0.105 λ 894 MHz Microstrip 8.4 Ω
l19, l20	0.080 λ 894 MHz Microstrip 8.4 Ω
l21, l22	0.010 λ 894 MHz Microstrip 8.4 Ω
l26	0.120 λ 894 MHz Microstrip 37.3 Ω
l27	0.093 λ 894 MHz Microstrip 28.9 Ω
Circuit Board	.031" Thick, $\epsilon_r = 4.0$, 2 oz. Copper, G200, Cirexx

C1, C8, C12, C19	Capacitor, Ceramic Chip, .01 μF Digi-Key PCC103BNCT-ND
C2, C9, C14, C15, C21, C22	Capacitor, 10 μF , 35V, Tantalum TE series SMD Digi-Key PCS6 106TR-ND
C3, C10, C13, C17, C18, C20	Capacitor, 33 pF 100B 330
C4, C7	Capacitor, 15 pF 100B 150
C6	Capacitor, 11 pF 100B 110
C5	Capacitor, 1.7 pF 100B 1R7
C11	Capacitor, 3.0 pF 100B 3R0
C16	Capacitor, 5.1 pF 100B 5R0
J1, J2	Connector, SMA, Female, Panel Mount 1301-RPM 513 412/53
L1, L2	4 Turns, 22 AWG, .120" I.D.
R1, R2, R3, R4	Chip Resistor 1/8W-5% SMD, 510 ohm 1206 Digi-Key PXX*KECT-ND
R5, R6	Resistor, 220 ohm Digi-Key 220QBK-ND

Test Circuit (cont.)



Assembly Diagram (not to scale)



Artwork (not to scale)

Case Outline Specifications

