

PTF 10053

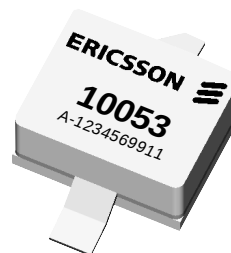
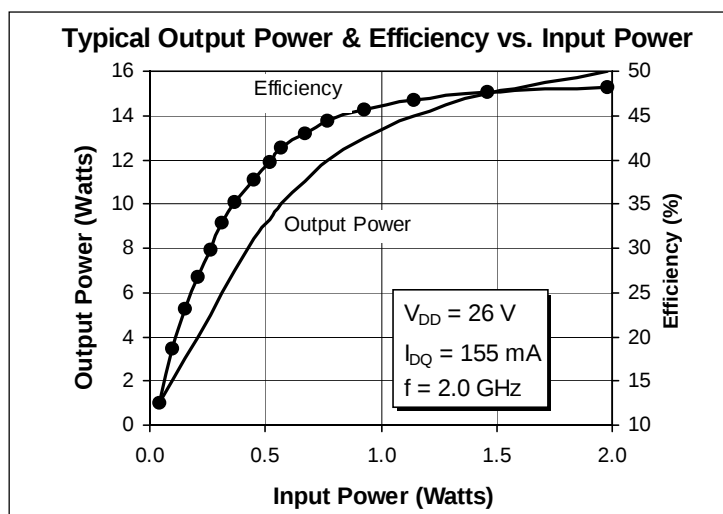
12 Watts, 2.0 GHz

GOLDMOS[®] Field Effect Transistor

Description

The PTF 10053 is a 12-watt **GOLDMOS** FET intended for large signal applications from 1.0 to 2.0 GHz. It operates at 40% efficiency with 12 dB typical gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

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



Package 20244

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain ($V_{DD} = 26\text{ V}$, $P_{OUT} = 3\text{ W}$, $I_{DQ} = 155\text{ mA}$, $f = 1.93, 1.99\text{ GHz}$)	G_{ps}	10	12	—	dB
Power Output at 1 dB Compression ($V_{DD} = 26\text{ V}$, $I_{DQ} = 155\text{ mA}$, $f = 1.99\text{ GHz}$)	P-1dB	12	—	—	Watts
Drain Efficiency ($V_{DD} = 26\text{ V}$, $P_{OUT} = 12\text{ W}$, $I_{DQ} = 155\text{ mA}$, $f = 1.99\text{ GHz}$)	η_D	40	—	—	%
Load Mismatch Tolerance ($V_{DD} = 26\text{ V}$, $P_{OUT} = 12\text{ W}$, $I_{DQ} = 155\text{ mA}$, $f = 1.99\text{ GHz}$ —all phase angles at frequency of test)	Ψ	—	—	10:1	—

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

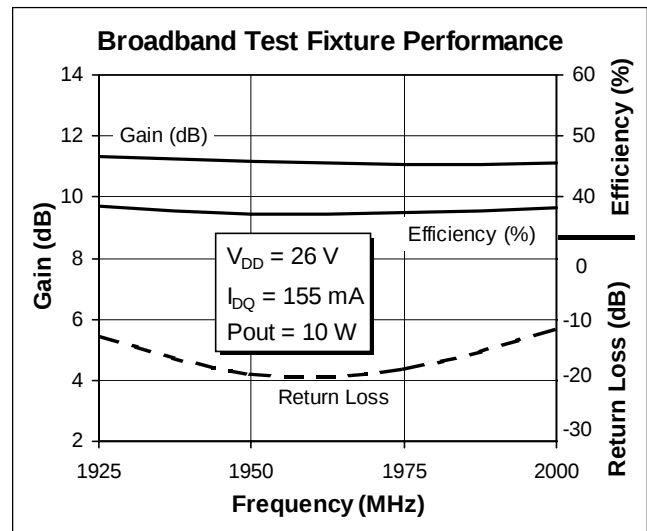
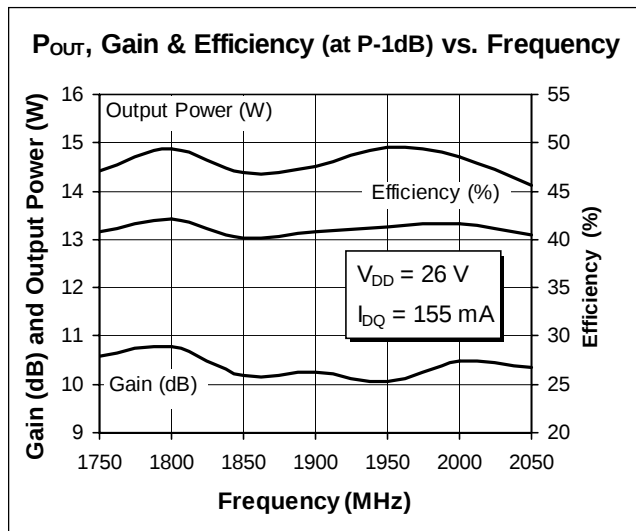
Electrical Characteristics (100% Tested)

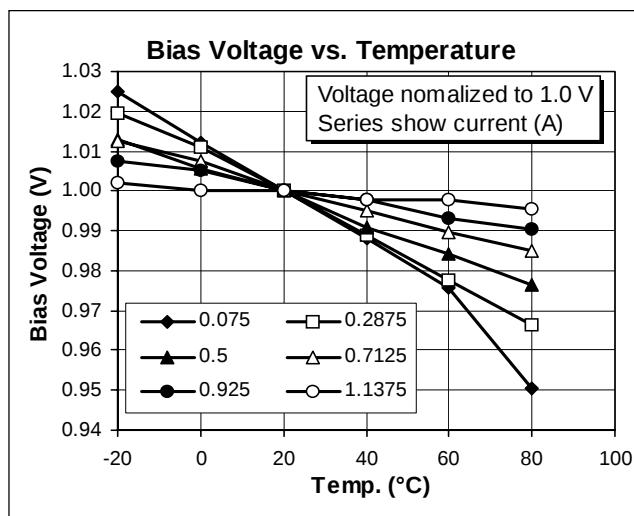
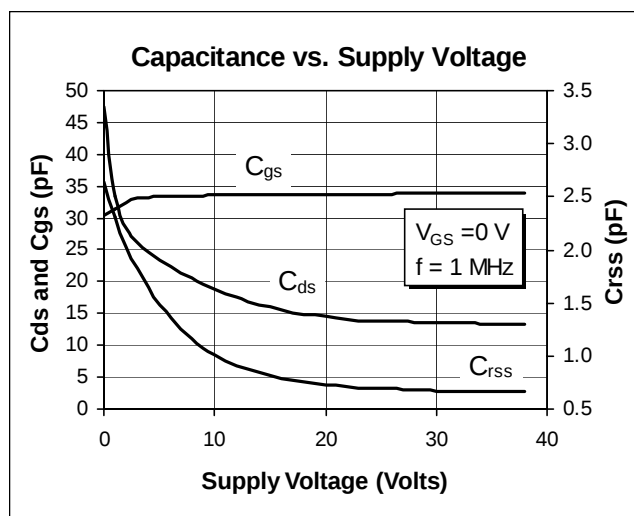
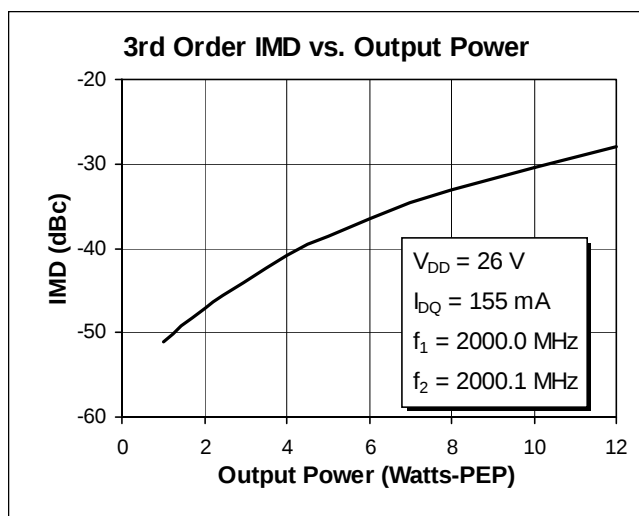
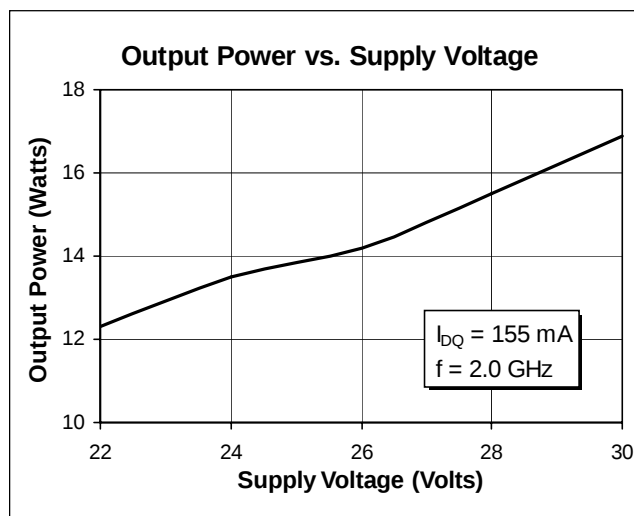
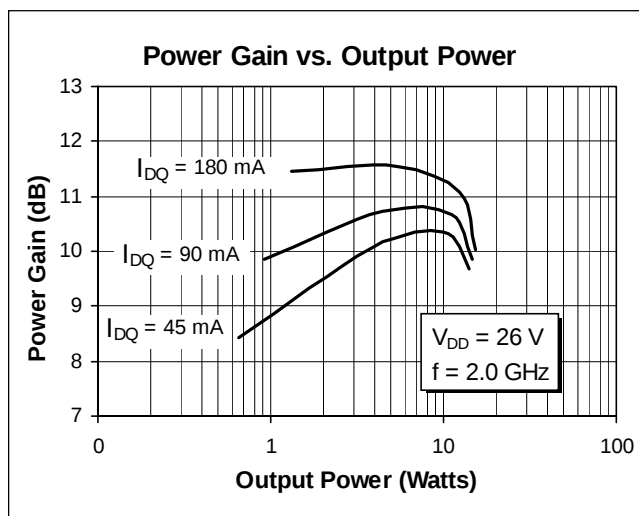
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 50\text{ mA}$	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	$V_{DS} = 26\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	$V_{DS} = 10\text{ V}$, $I_D = 75\text{ mA}$	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	$V_{DS} = 10\text{ V}$, $I_D = 2\text{ A}$	g_{fs}	—	0.8	—	Siemens

Maximum Ratings

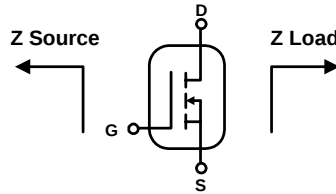
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	± 20	Vdc
Operating Junction Temperature	T_J	200	$^{\circ}\text{C}$
Total Device Dissipation Above 25°C derate by	P_D	58 0.33	Watts $\text{W}/^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to $+150$	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	3.0	$^{\circ}\text{C}/\text{W}$

Typical Performance

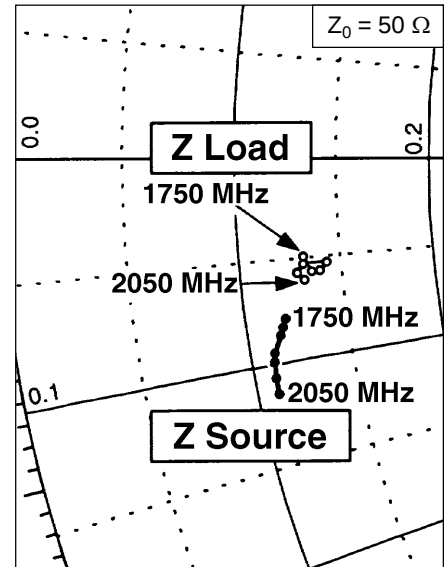




Impedance Data

 $V_{DD} = 26 \text{ V}$, $P_{OUT} = 12 \text{ W}$, $I_{DQ} = 155 \text{ mA}$


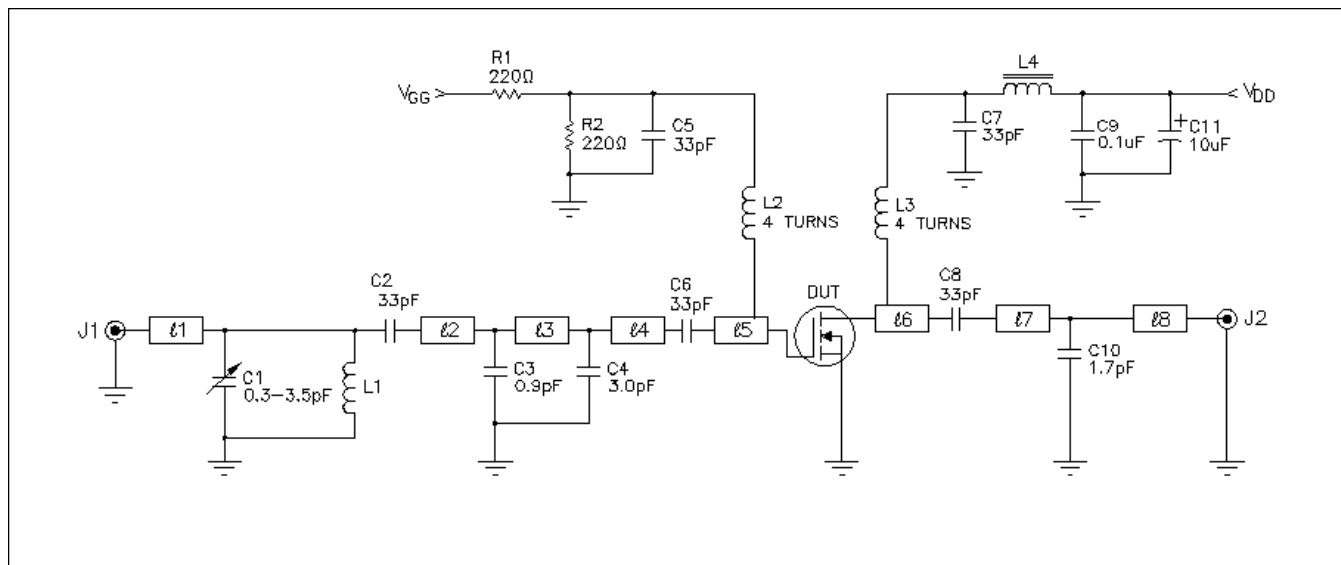
Frequency	Z Source Ω		Z Load Ω	
GHz	R	jX	R	jX
1.75	2.70	-4.0	3.3	-2.5
1.80	2.60	-4.2	3.5	-2.9
1.85	2.50	-4.4	3.7	-2.9
1.90	2.30	-4.8	3.9	-2.7
1.95	2.25	-5.0	3.3	-2.7
2.00	2.20	-5.4	3.1	-2.9
2.05	2.20	-5.8	3.3	-3.1



Typical Scattering Parameters

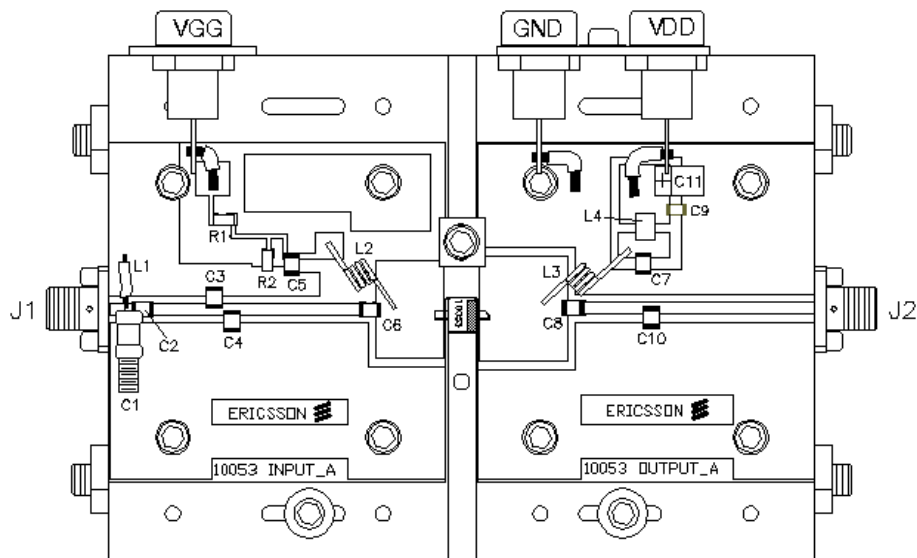
 $(V_{DS} = 26 \text{ V}, I_D = 500 \text{ mA})$

f	S11		S21		S12		S22	
(MHz)	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.806	-117	25.9	103	0.012	12	0.578	-80
200	0.800	-127	21.1	96	0.012	4	0.577	-90
300	0.850	-149	12.1	69	0.011	-15	0.650	-113
400	0.878	-158	8.19	54	0.010	-25	0.729	-125
500	0.900	-163	5.94	43	0.008	-31	0.791	-134
600	0.914	-168	4.49	33	0.006	-35	0.851	-142
700	0.925	-171	3.46	25	0.004	-31	0.888	-150
800	0.932	-174	2.73	18	0.003	-16	0.896	-156
900	0.941	-177	2.20	12	0.002	16	0.909	-160
1000	0.947	-180	1.81	6	0.003	52	0.915	-164
1100	0.957	178	1.52	1	0.004	66	0.933	-167
1200	0.961	176	1.29	-4	0.005	73	0.944	-170
1300	0.963	173	1.11	-9	0.006	74	0.953	-173
1400	0.963	171	0.957	-14	0.007	75	0.959	-176
1500	0.963	170	0.839	-19	0.008	75	0.963	-178
1600	0.964	168	0.741	-23	0.009	75	0.964	179
1700	0.968	166	0.664	-27	0.010	75	0.968	177
1800	0.972	165	0.600	-31	0.011	74	0.972	175
1900	0.976	163	0.546	-36	0.012	72	0.974	173
2000	0.978	161	0.499	-40	0.013	71	0.976	171
2100	0.976	159	0.460	-44	0.014	69	0.975	169
2200	0.975	157	0.427	-48	0.015	67	0.977	167

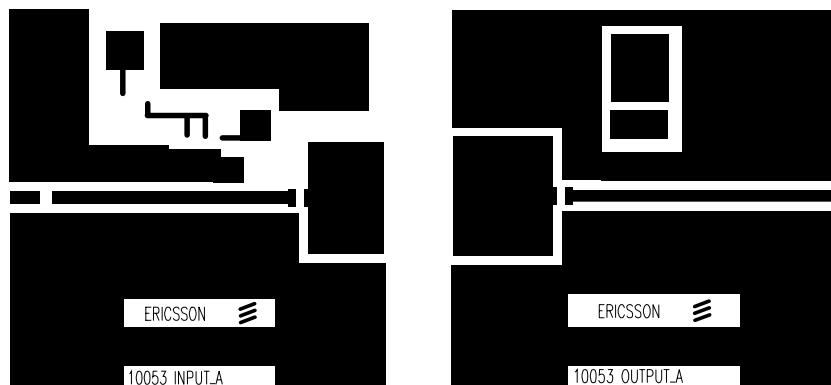
Test Circuit


Schematic for $f = 1.990 \text{ GHz}$

DUT	PTF 10053	RF Transistor	C9	Capacitor, 0.1 μF	Digi-Key
$\ell 1$	0.312 λ 1.990 GHz	Microstrip 46.6 Ω	C10	P4525-ND	
$\ell 2$	0.161 λ 1.990 GHz	Microstrip 46.6 Ω	C11	Capacitor, 1.7 pF	100B 2R0
$\ell 3$	0.312 λ 1.990 GHz	Microstrip 46.6 Ω		Capacitor, 10 μF , 35V	Digi-Key
$\ell 4$	0.248 λ 1.990 GHz	Microstrip 46.6 Ω	J1, J2	PCS6106-ND	
$\ell 5$	0.118 λ 1.990 GHz	Microstrip 9.42 Ω		Connector, SMA, Female, Panel Mount	
$\ell 6$	0.177 λ 1.990 GHz	Microstrip 8.92 Ω	L4	Ericsson, #RPM 513 412/53	
$\ell 7$	0.129 λ 1.990 GHz	Microstrip 46.6 Ω		Ferrite, 6 mm	
$\ell 8$	0.312 λ 1.990 GHz	Microstrip 46.6 Ω	L2, L3	Phillips 53/3/4.6-452	
C1	Capacitor, Variable, .3-3.5 pF		L1	4 Turns, 22 AWG, .120 DIA I.D.	
	JACO JMC5701		R1, R2	Inductor, 22 AWG Buss Wire	
C2, C5, C6, C7, C8	Capacitor, 33 pF	100B 330		Resistor, 220 Ω , 1/4W	
C3	Capacitor, 0.9 pF	100B R9		Digi-Key 220QBK-ND	
C4	Capacitor, 3.0 pF	100B 3R0	Circuit Board	TMM4, .030" Dielectric Thickness, 2 oz. copper, $\epsilon_r = 4.5$, Rogers	



Assembly Diagram (not to scale)



Artwork (not to scale)