

PTF 10045

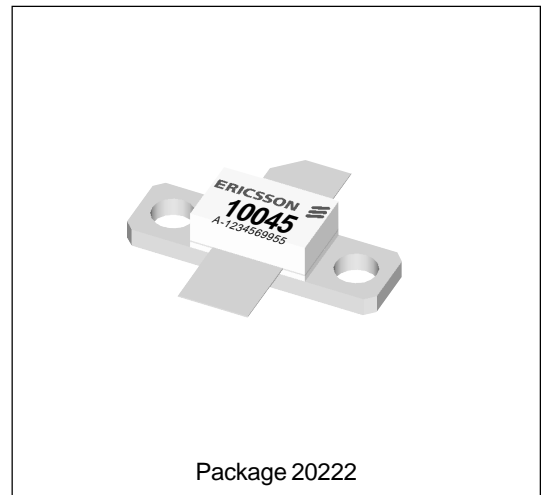
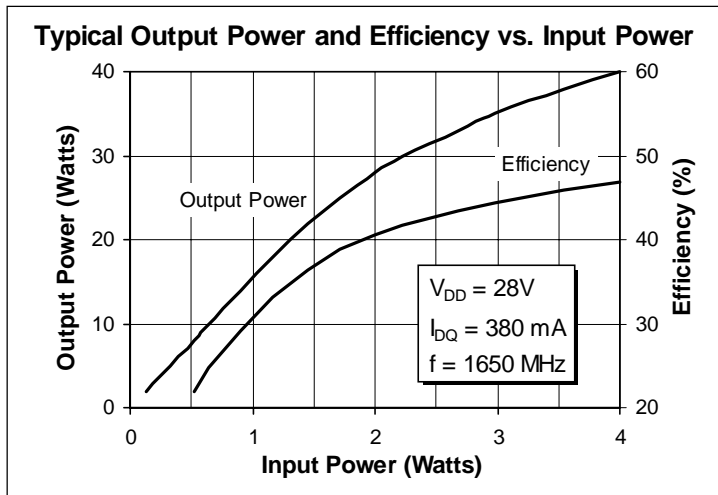
30 Watts, 1.60–1.65 GHz

GOLDMOS™ Field Effect Transistor

Description

The PTF 10045 is a common source N-channel enhancement-mode lateral MOSFET intended for large signal amplifier applications to 1.65 GHz. It is rated at 30 watts power output. Nitride surface passivation and gold metallization ensure excellent device lifetime and reliability.

- Performance at 1650 MHz, 28 Volts
 - Output Power = 30 Watts
 - Power Gain = 11.5 dB Typ
- Full Gold Metallization
- Silicon Nitride Passivated
- Excellent Thermal Stability
- Back Side Common Source
- 100% Lot Traceability



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	$^{\circ}C$
Total Device Dissipation at $T_{flange} = 25^{\circ}C$ Above $25^{\circ}C$ derate by	P_D	120 0.7	Watts $W/^{\circ}C$
Storage Temperature	T_{STG}	150	$^{\circ}C$
Thermal Resistance ($T_{flange} = 70^{\circ}C$)	$R_{\theta JC}$	1.4	$^{\circ}C/W$

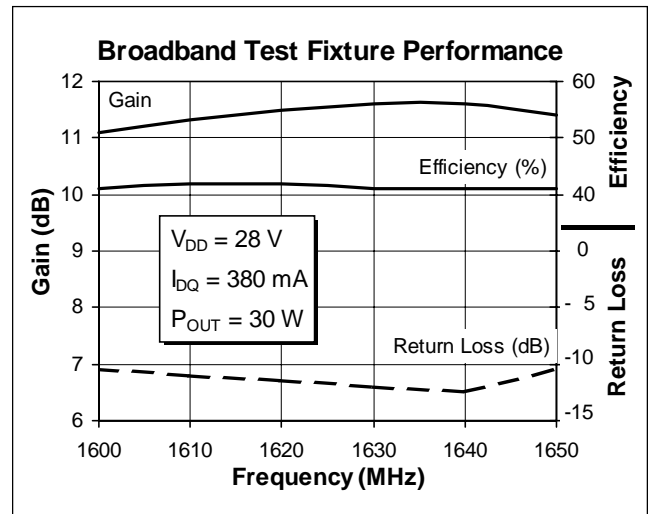
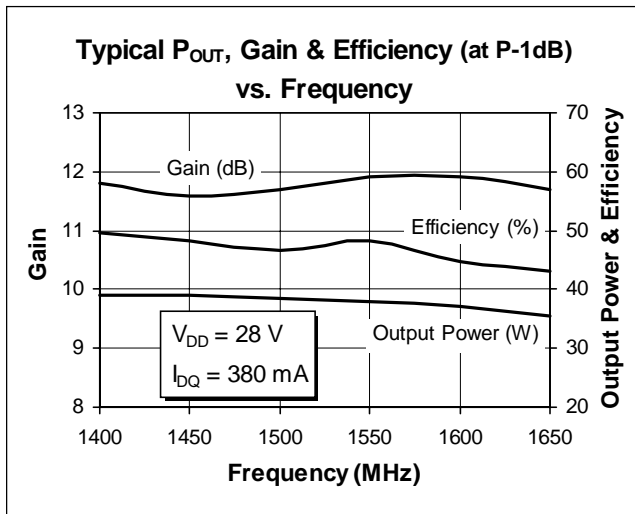
Electrical Characteristics (100% Tested)

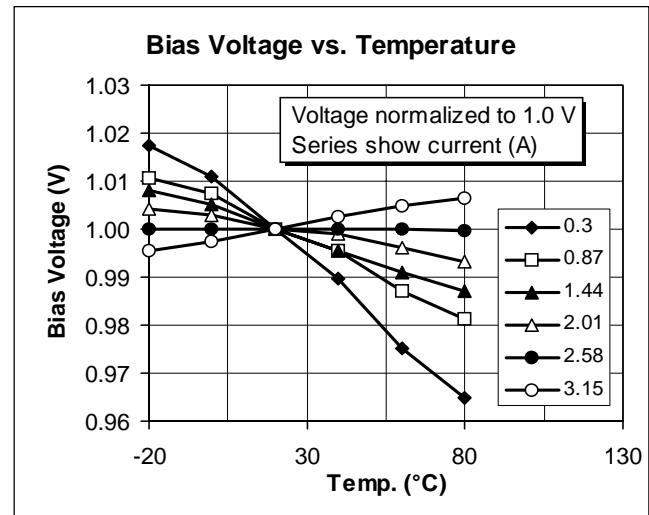
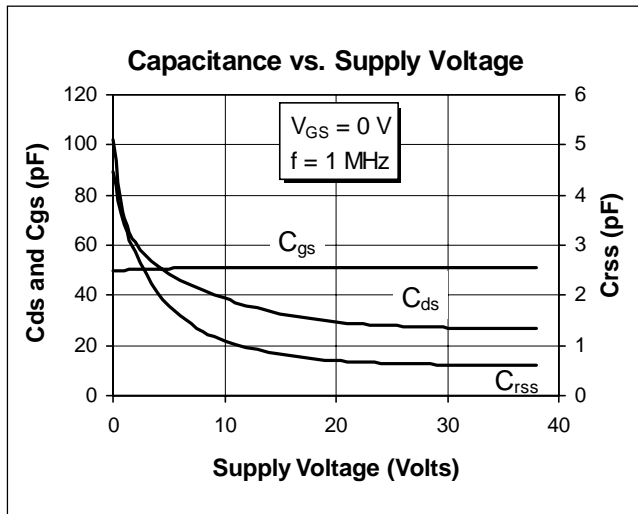
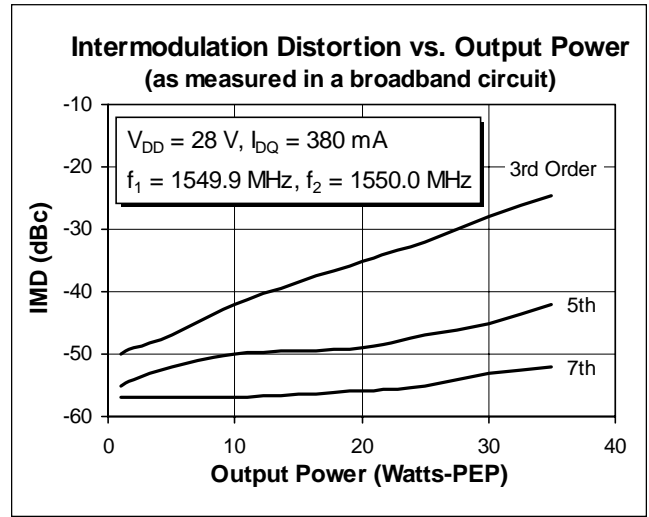
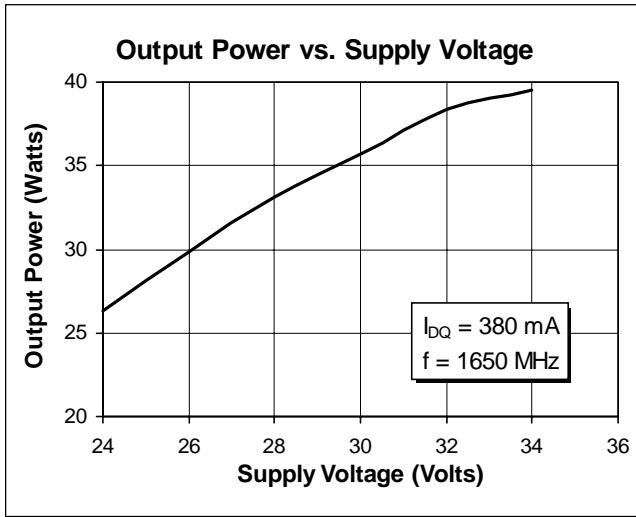
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 25\text{ mA}$	$V_{(BR)DSS}$	65	—	—	Volts
Drain-Source Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	mA
Gate Threshold Voltage	$V_{DS} = 10\text{ V}$, $I_D = 75\text{ mA}$	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	$V_{DS} = 10\text{ V}$, $I_D = 3\text{ A}$	g_{fs}	—	2.0	—	Siemens

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Common Source Power Gain ($V_{DD} = 28\text{ V}$, $P_{OUT} = 30\text{ W}$, $I_{DQ} = 380\text{ mA}$, $f = 1650\text{ MHz}$)	G_{ps}	10.0	11.5	—	dB
Power Output at 1 dB Compression ($V_{DD} = 28\text{ V}$, $I_{DQ} = 380\text{ mA}$, $f = 1650\text{ MHz}$)	P-1dB	30	35	—	Watts
Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{OUT} = 30\text{ W}$, $I_{DQ} = 380\text{ mA}$, $f = 1650\text{ MHz}$)	η	40	43	—	%
Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{OUT} = 30\text{ W}$, $I_{DQ} = 380\text{ mA}$, $f = 1650\text{ MHz}$ — all phase angles at frequency of test)	Ψ	—	—	10:1	—

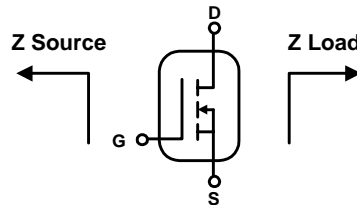
Typical Performance



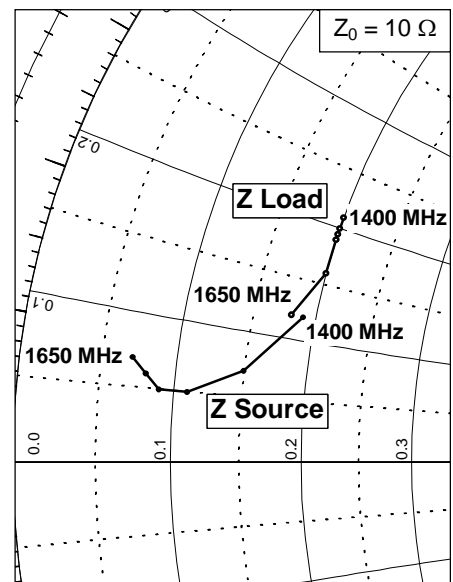


Impedance Data

$V_{DD} = 28 \text{ V}$, $P_{OUT} = 30 \text{ W}$, $I_{DQ} = 380 \text{ mA}$



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1400	1.9	1.2	2.0	2.1
1450	1.5	0.7	2.0	2.0
1500	1.1	0.5	2.0	2.0
1550	0.9	0.5	2.0	1.9
1600	0.8	0.6	2.0	1.6
1650	0.7	0.7	1.8	1.2

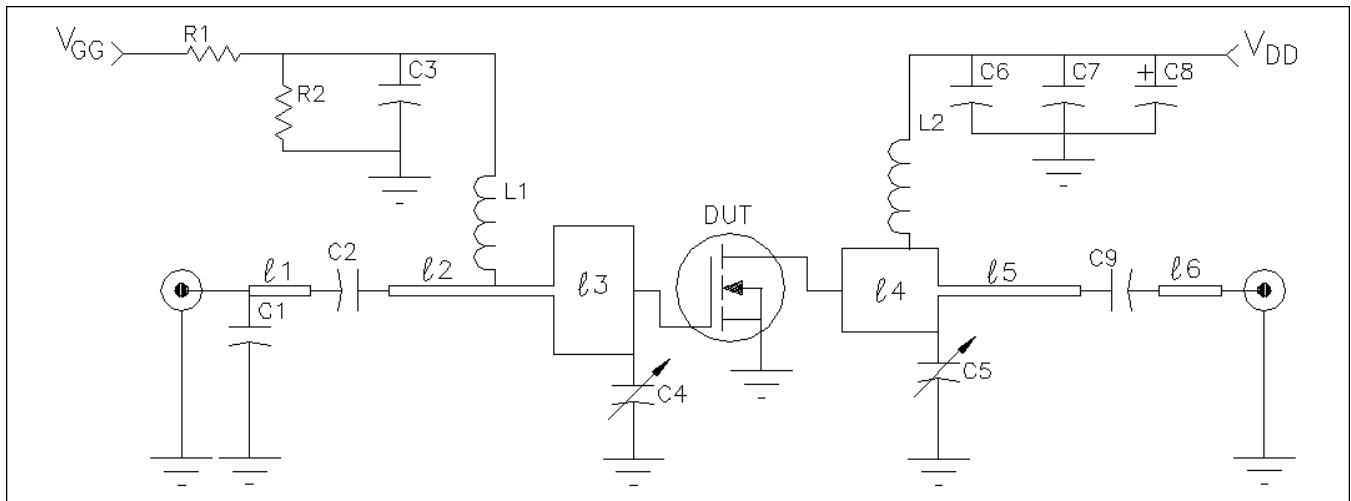


Typical Scattering Parameters

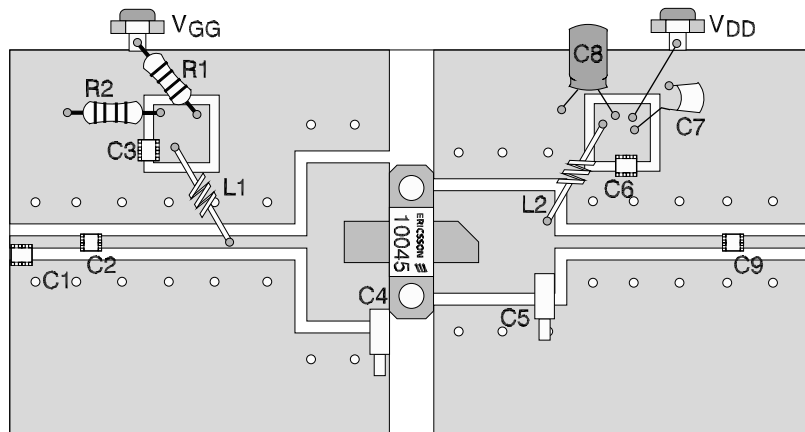
($V_{DS} = 28\text{ V}$, $I_D = 1\text{ A}$)

f (MHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
400	0.933	-169	4.28	37.8	0.005	-18.1	0.833	-154
450	0.933	-170	3.48	32.9	0.004	-10.1	0.859	-157
500	0.951	-171	2.98	33.4	0.003	0.014	0.936	-153
550	0.937	-172	2.63	26.3	0.002	11.2	0.940	-157
600	0.971	-172	2.20	22.6	0.003	41.0	0.924	-161
650	0.952	-175	1.91	20.5	0.003	58.5	0.935	-166
700	0.968	-174	1.76	19.7	0.004	71.2	0.946	-165
750	0.949	-176	1.49	11.5	0.005	66.9	0.946	-171
800	0.975	-175	1.30	13.0	0.006	77.9	0.951	-168
850	0.982	-178	1.21	10.4	0.007	78.2	0.945	-172
900	0.964	-176	1.05	9.64	0.007	78.1	0.917	-173
950	0.972	-179	0.923	5.00	0.008	82.7	0.931	-176
1000	0.971	-177	0.887	8.43	0.010	85.2	0.949	-171
1050	0.983	-180	0.793	3.80	0.011	77.2	0.958	-174
1100	0.962	-179	0.736	0.10	0.011	79.0	0.931	-173
1150	0.996	-178	0.672	0.37	0.013	81.5	0.970	-176
1200	0.959	-180	0.642	3.62	0.012	75.5	0.956	-175
1250	0.989	178	0.585	-2.34	0.013	75.4	0.965	-177
1300	0.971	178	0.553	0.68	0.014	76.0	0.961	-176
1350	0.981	178	0.516	-3.51	0.015	75.4	0.967	-177
1400	0.983	177	0.492	-0.82	0.014	71.1	0.977	-178
1450	0.968	177	0.443	-6.53	0.015	78.4	0.952	-178
1500	0.965	176	0.444	-2.30	0.017	74.3	0.985	-179
1550	0.960	176	0.405	-5.00	0.017	78.7	0.962	-180
1600	0.950	176	0.391	-4.08	0.019	76.9	0.998	-180
1650	0.950	174	0.360	-9.41	0.019	81.1	0.950	179
1700	0.950	175	0.365	-6.95	0.022	77.3	0.955	179
1750	0.952	173	0.330	-9.70	0.022	77.9	0.950	178
1800	0.950	175	0.317	-9.64	0.025	79.0	0.960	179
1850	0.954	171	0.299	-11.4	0.026	74.3	0.947	175
1900	0.960	173	0.314	-10.6	0.030	73.5	0.950	177
1950	0.960	170	0.285	-13.8	0.030	64.7	0.948	174
2000	0.960	173	0.290	-13.1	0.034	63.2	0.980	177

Test Circuit

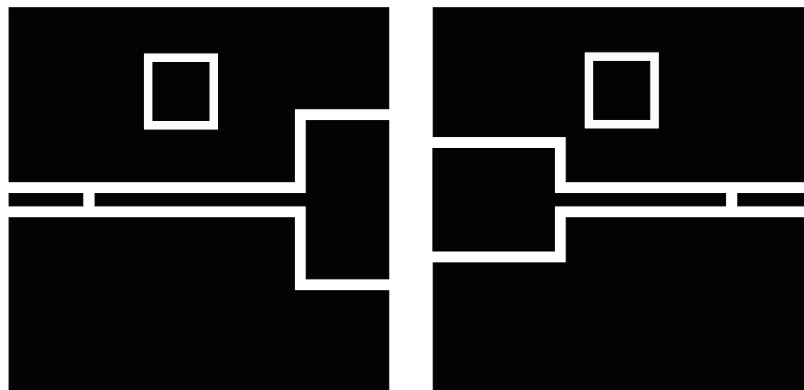


Test Circuit Schematic for $f = 1650\text{ MHz}$



Placement Diagram (not to scale)

DUT	PTF 10045	
<i>l</i> 1	.090 λ @ 1650 MHz	Microstrip 50 Ω
<i>l</i> 2	.265 λ @ 1650 MHz	Microstrip 50 Ω
<i>l</i> 5	.215 λ @ 1650 MHz	Microstrip 50 Ω
<i>l</i> 6	.100 λ @ 1650 MHz	Microstrip 50 Ω
<i>l</i> 3	.115 λ @ 1650 MHz	Microstrip 6.4 Ω
<i>l</i> 4	.170 λ @ 1650 MHz	Microstrip 9.2 Ω
C1	0.6 pF, Capacitor ATC 100 B	
C2, C3, C6, C9	33 pF, Capacitor ATC 100 B	
C4, C5	0.6–3.6 pF, Variable Capacitor, Johanson	
C7	0.1 μF, 50 V, Capacitor Digi-Key P4917-ND	
C8	100 μF, 50 V, Electrolytic Capacitor, Digi-Key P5276	
L1, L2	3 Turn, #20 AWG, .120" I.D.	
R1, R2	220 Ω, 1/4 W Resistor	
Circuit Board	.028" Dielectric Thickness, ε _r = 4.0, AlliedSignal, G200, 2 oz. copper	



Artwork (1 inch )

Notes: