

PTF 10153

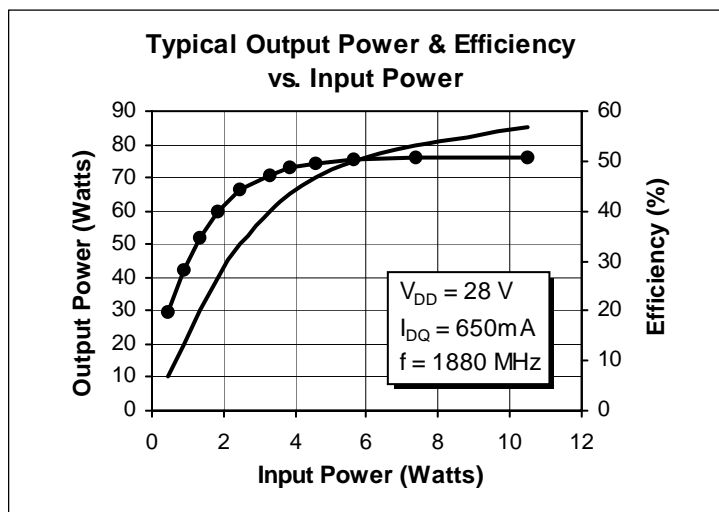
60 Watts, 1.8–2.0 GHz

GOLDMOS® Field Effect Transistor

Description

The PTF 10153 is an internally matched 60-watt GOLDMOS FET intended for CDMA and TDMA applications from 1.8 to 2.0 GHz. It operates with 40% efficiency and 11.5 dB minimum gain. Nitride surface passivation and full gold metallization ensure excellent device lifetime and reliability.

- **INTERNALLY MATCHED**
- **Guaranteed Performance at 1805, 1843, 1880 MHz, 28 V**
 - Output Power = 60 Watts Min
 - Power Gain = 11.5 dB Min
- **Full Gold Metallization**
- **Silicon Nitride Passivated**
- **Back Side Common Source**
- **Excellent Thermal Stability**
- **100% Lot Traceability**



Package 20248

RF Specifications (100% Tested)

Characteristic	Symbol	Min	Typ	Max	Units
Gain ($V_{DD} = 28\text{ V}$, $P_{OUT} = 60\text{ W}$, $I_{DQ} = 650\text{ mA}$, $f = 1805, 1843, 1880\text{ MHz}$)	G_{ps}	11.5	—	—	dB
Power Output at 1 dB Compression ($V_{DD} = 28\text{ V}$, $I_{DQ} = 650\text{ mA}$, $f = 1880\text{ MHz}$)	P-1dB	60	—	—	Watts
Drain Efficiency ($V_{DD} = 28\text{ V}$, $P_{OUT} = 60\text{ W}$, $I_{DQ} = 650\text{ mA}$, $f = 1805, 1843, 1880\text{ MHz}$)	η_D	40	—	—	%
Return Loss ($V_{DD} = 28\text{ V}$, $P_{OUT} = 60\text{ W}$, $I_{DQ} = 650\text{ mA}$, $f = 1805, 1843, 1880\text{ MHz}$)	—	—	—	-9.5	dB
Load Mismatch Tolerance ($V_{DD} = 28\text{ V}$, $P_{OUT} = 60\text{ W}$, $I_{DQ} = 650\text{ mA}$, $f = 1805$ —all phase angles at frequency of test)	Ψ	—	—	10:1	—

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

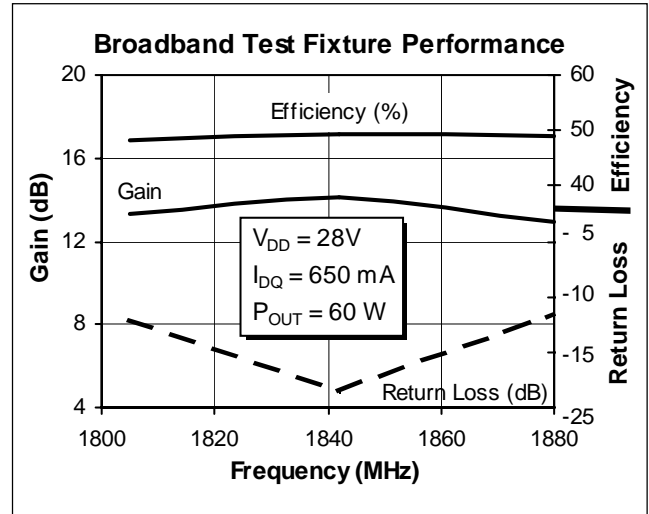
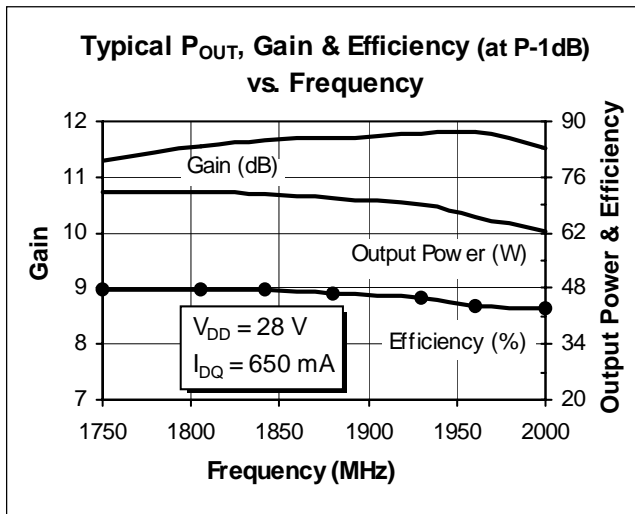
Electrical Characteristics (100% Tested)

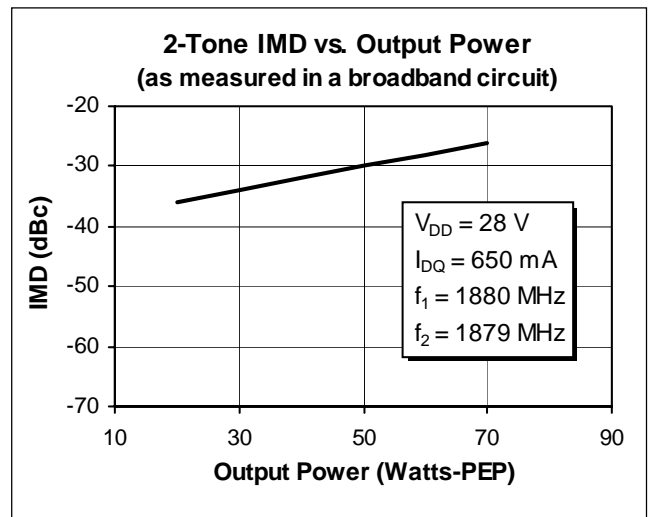
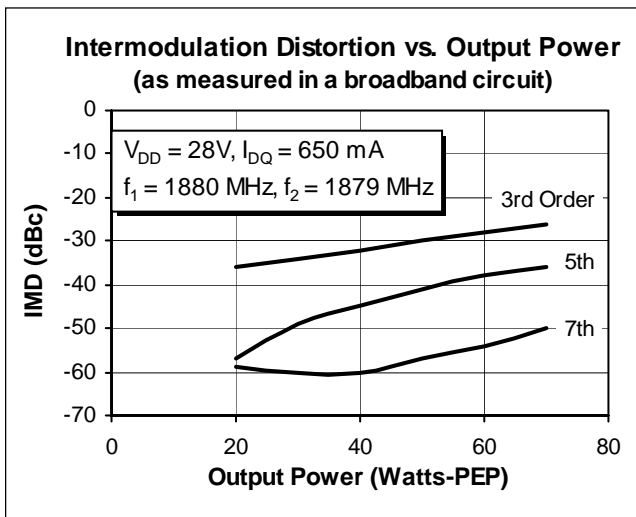
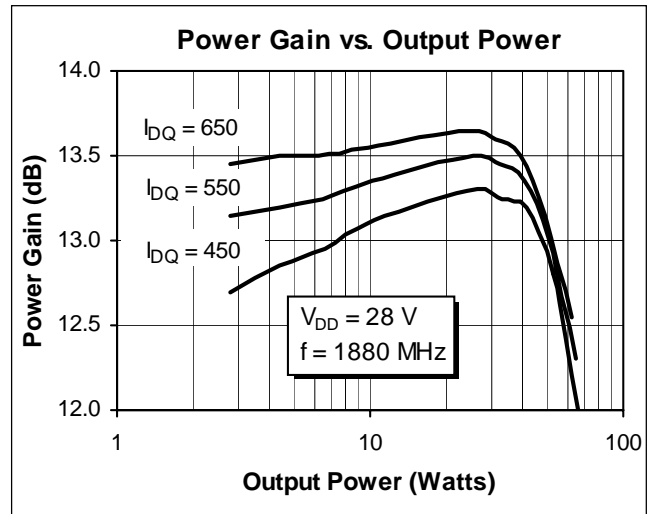
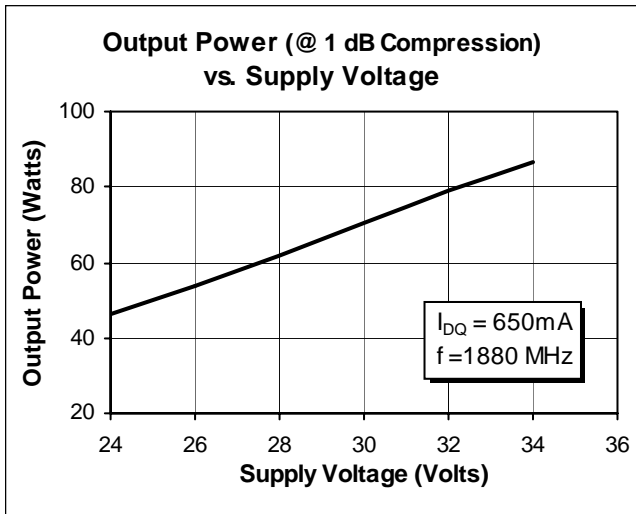
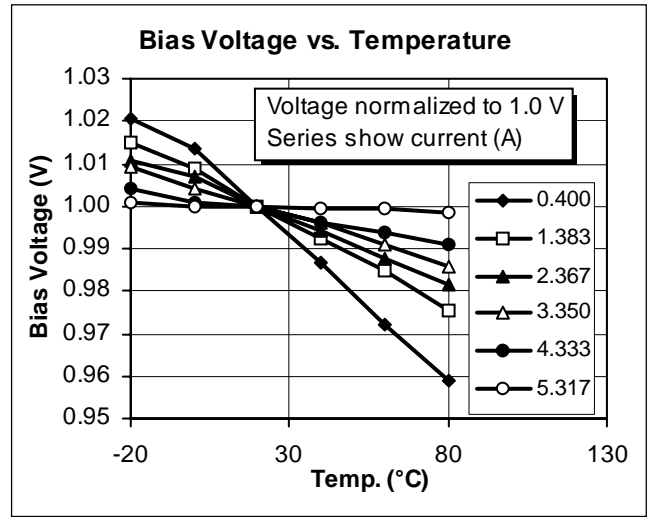
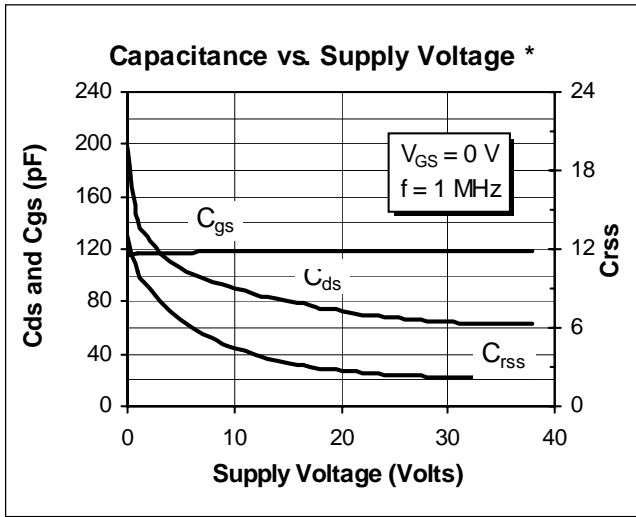
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 25\text{ mA}$	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	mA
Gate Threshold Voltage	$V_{DS} = 10\text{ V}, I_D = 75\text{ mA}$	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$	g_{fs}	1.0	—	—	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 at Above 25°C derate by	P_D	237 1.35	Watts $\text{W}/^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	0.74	$^{\circ}\text{C}/\text{W}$

Typical Performance

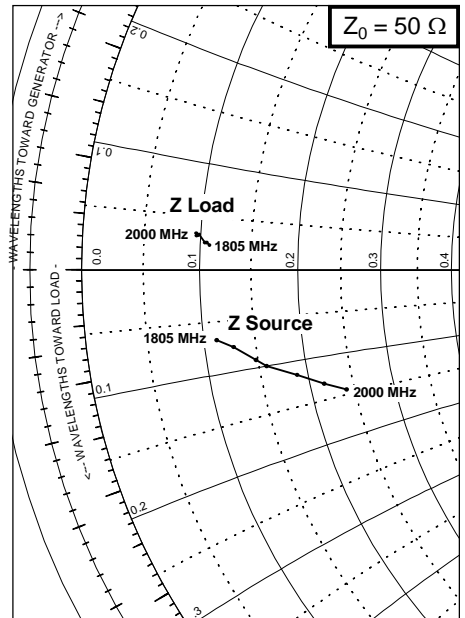
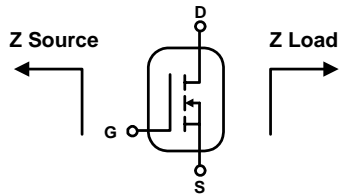




* This part is internally matched. Measurements of the finished product will not yield these results.

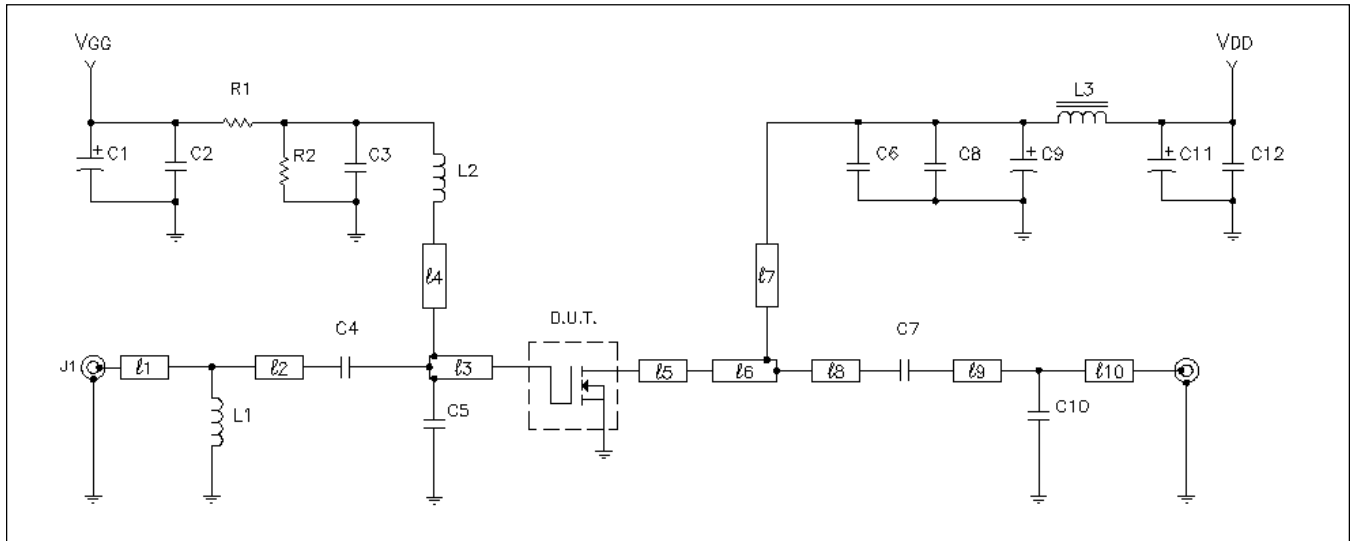
Impedance Data

$V_{DD} = 28\text{ V}$, $P_{OUT} = 60\text{ W}$, $I_{DQ} = 650\text{ mA}$



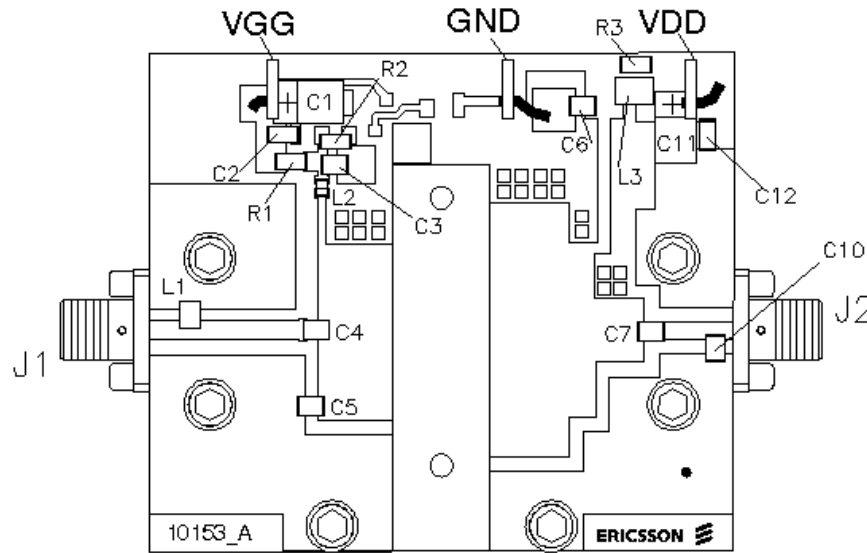
Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1805	2.27	-3.40	2.12	1.20
1842	3.05	-3.86	1.97	1.31
1880	4.07	-4.04	1.88	1.31
1930	4.56	-5.10	1.59	1.68
1960	6.10	-5.90	1.46	1.74
1990	7.50	-6.75	1.48	1.61
2000	8.75	-7.40	1.53	1.64

Test Circuit

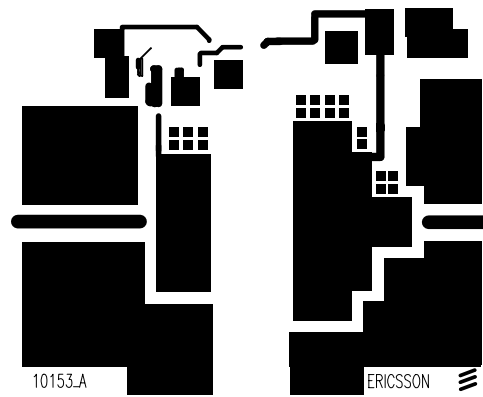


Block Diagram for $f = 2\text{ GHz}$

D.U.T.	PTF 10153	NPN RF Transistor	C1, C11	Capacitor, 10 μF	ATC 100 B
$\ell 1$	0.086λ 2 GHz	Microstrip 50 Ω	C2	Capacitor, 0.1 μF , 50 V	Digi-Key PCC103BCT
$\ell 2$	0.132λ 2 GHz	Microstrip 50 Ω	C3, C6, C4, C7	Capacitor, 10 pF	ATC 100 B
$\ell 3$	0.112λ 2 GHz	Microstrip 9.24 Ω	C5	Capacitor, 1.1 pF	ATC 100 B
$\ell 4$	0.064λ 2 GHz	Microstrip 78 Ω	C10	Capacitor, 0.30 pF	ATC 100 B
$\ell 5$	0.127λ 2 GHz	Microstrip 6.64 Ω	C12	Capacitor, 0.1 μF	ATC 100 B
$\ell 6$	0.041λ 2 GHz	Microstrip 9.24 Ω	R1, R2	Resistor, 220 Ω	Digi-Key 2.2QBK
$\ell 7$	0.206λ 2 GHz	Microstrip 65 Ω	R3	Resistor, 1.0 Ω	Digi-Key, # P1OCT
$\ell 8$	0.077λ 2 GHz	Microstrip 21.87 Ω	L1	Chip Inductor, 8 μH	Coilcraft A03T
$\ell 9$	0.070λ 2 GHz	Microstrip 50 Ω	L2	Chip Inductor, 2.7 μH	N/A
$\ell 10$	0.028λ 2 GHz	Microstrip 50 Ω	L3	Ferrite, 6 mm	N/A
PCB	0.050", $\epsilon_r = 6.0$, 2 oz. Copper, TMM6, Rogers Corporation				



Assembly Diagram (not to scale)



Artwork (not to scale)