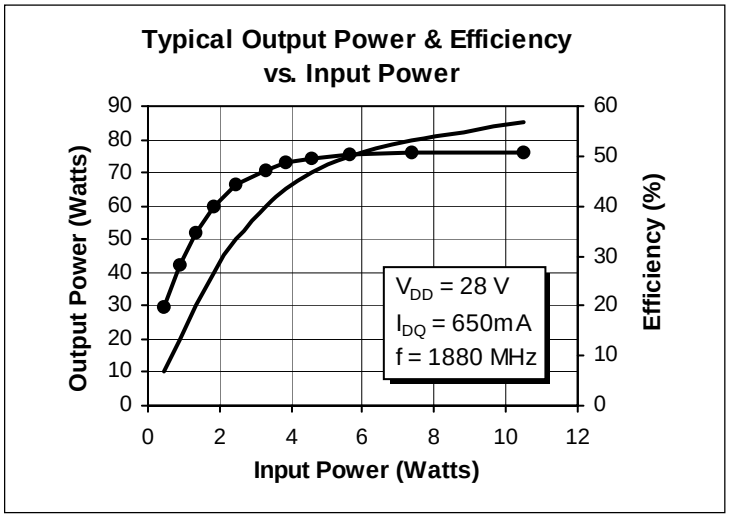
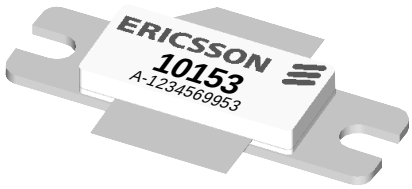
PTF 10153
60 Watts, 1.8–2.0 GHz
GOLDMOS® Field Effect Transistor

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 V, P_{OUT} = 60 W, I_{DQ} = 650 mA, f = 1805, 1843, 1880 MHz)	G_{ps}	11.5	—	—	dB
Power Output at 1 dB Compression (V_{DD} = 28 V, I_{DQ} = 650 mA, f = 1880 MHz)	P-1dB	60	—	—	Watts
Drain Efficiency (V_{DD} = 28 V, P_{OUT} = 60 W, I_{DQ} = 650 mA, f = 1805, 1843, 1880 MHz)	η_D	40	—	—	%
Return Loss (V_{DD} = 28 V, P_{OUT} = 60 W, I_{DQ} = 650 mA, f = 1805, 1843, 1880 MHz)	—	—	—	–9.5	dB
Load Mismatch Tolerance (V_{DD} = 28 V, P_{OUT} = 60 W, I_{DQ} = 650 mA, f = 1805 —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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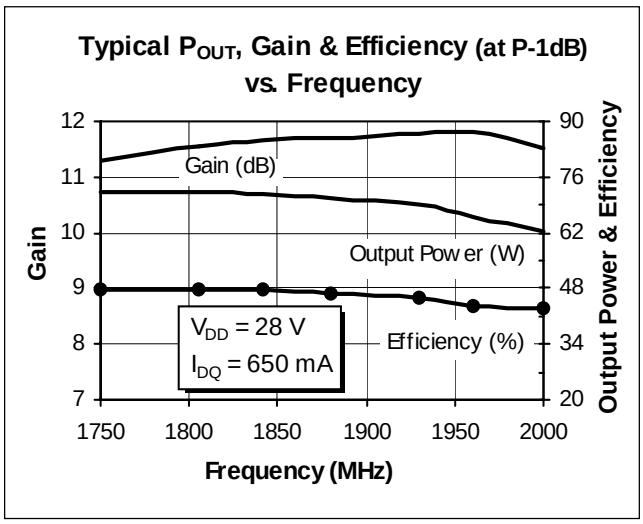
Electrical Characteristics (100% Tested)

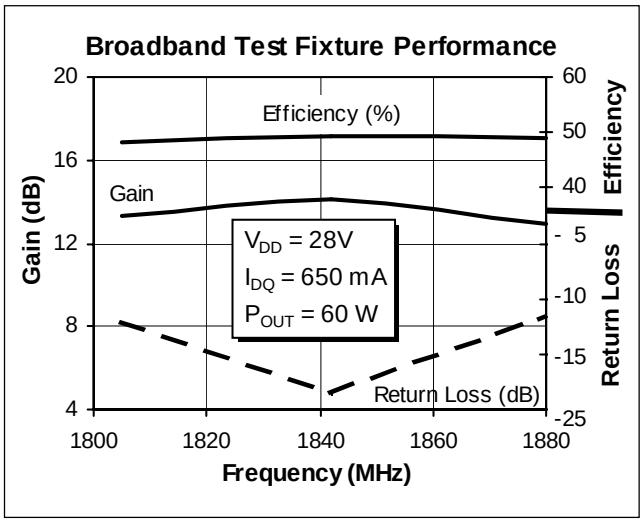
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 25 mA	$V_{(BR)DSS}$	65	—	—	Volts
Zero Gate Voltage Drain Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1	mA
Gate Threshold Voltage	V_{DS} = 10 V, I_D = 75 mA	$V_{GS(th)}$	3.0	—	5.0	Volts
Forward Transconductance	V_{DS} = 10 V, I_D = 0.5 A	g_{fs}	1.0	—	—	Siemens

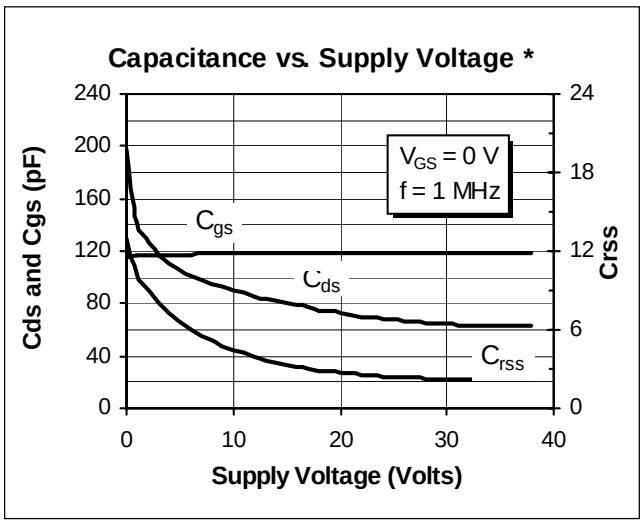
Maximum Ratings

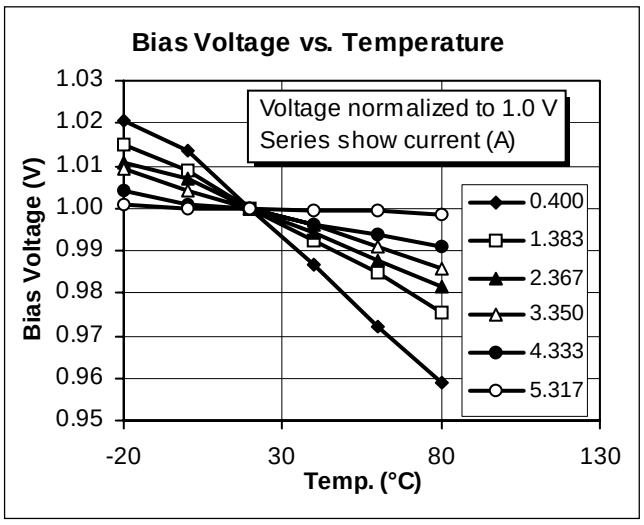
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	±20	Vdc
Operating Junction Temperature	T_J	200	°C
Total Device Dissipation at Above 25°C derate by	P_D	237 1.35	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	0.74	°C/W

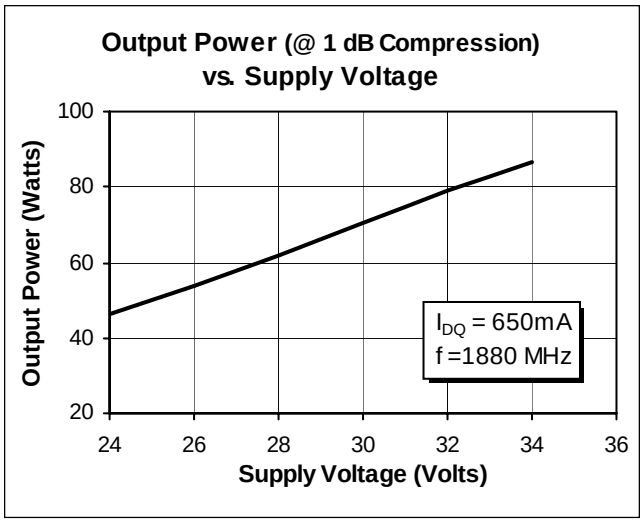
Typical Performance

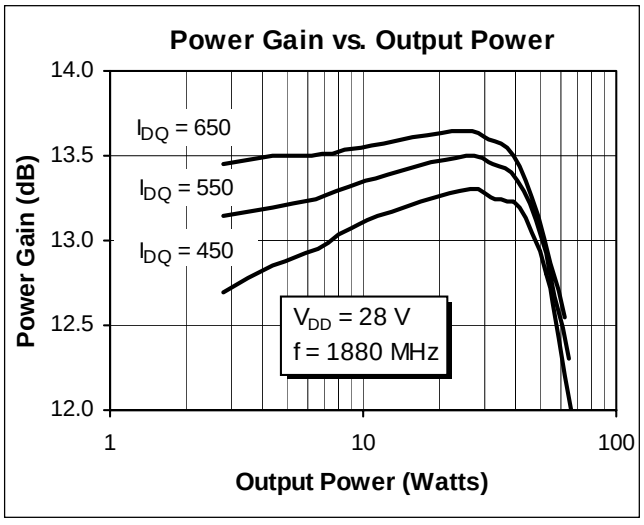


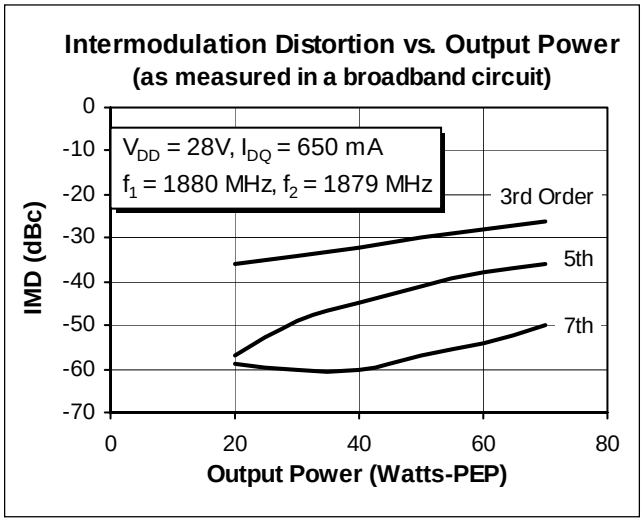


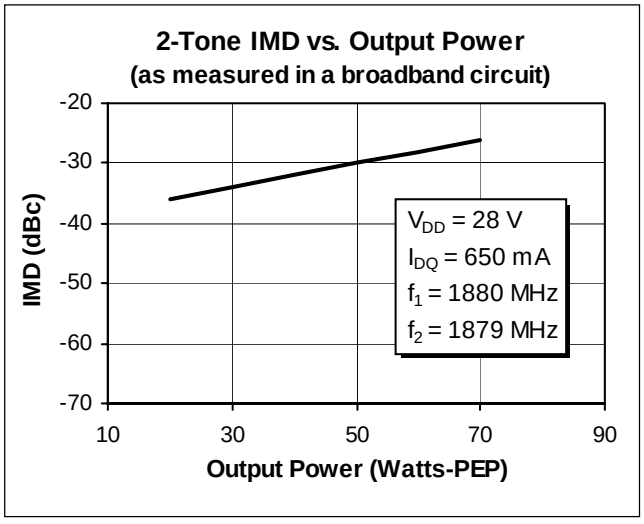








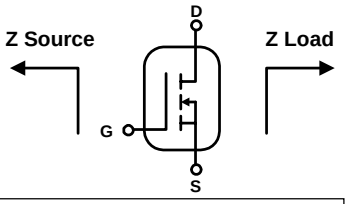


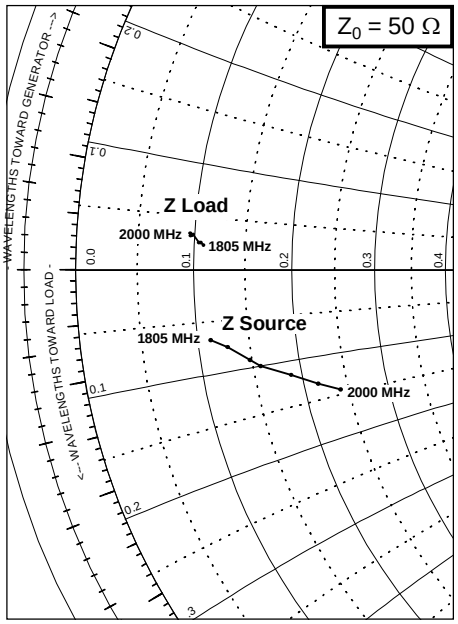


* This part is internally matched. Measurements of the finished product will not yield these results.

Impedance Data

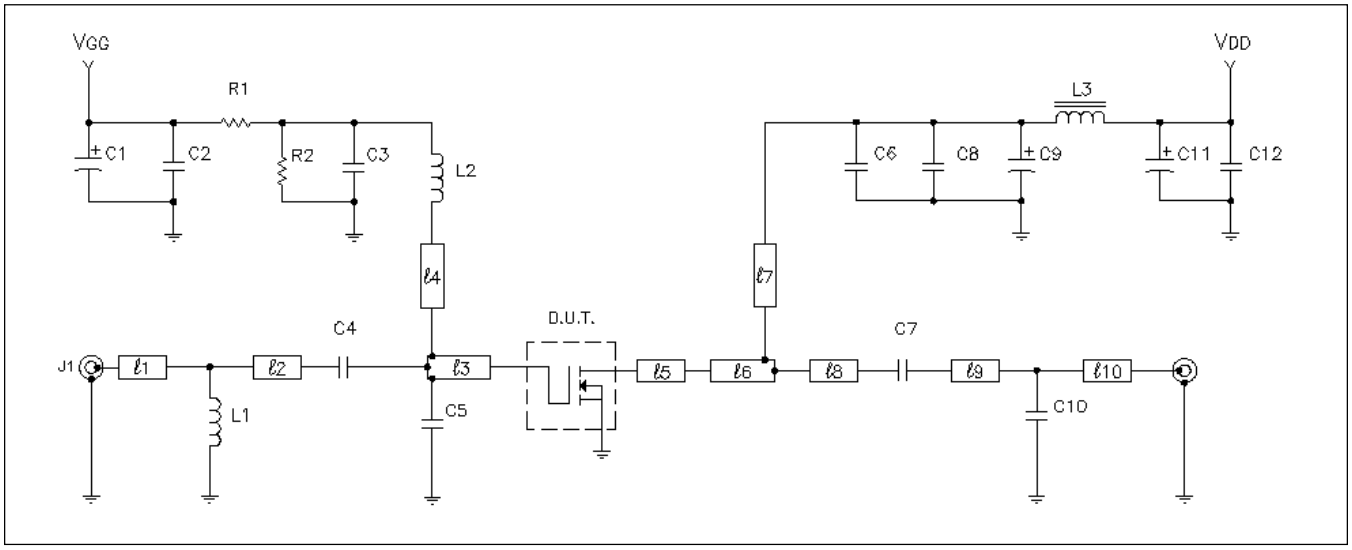
V_{DD} = 28 V, P_{OUT} = 60 W, I_{DQ} = 650 mA





Frequency	Z Source Ω		Z Load Ω	
MHz	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

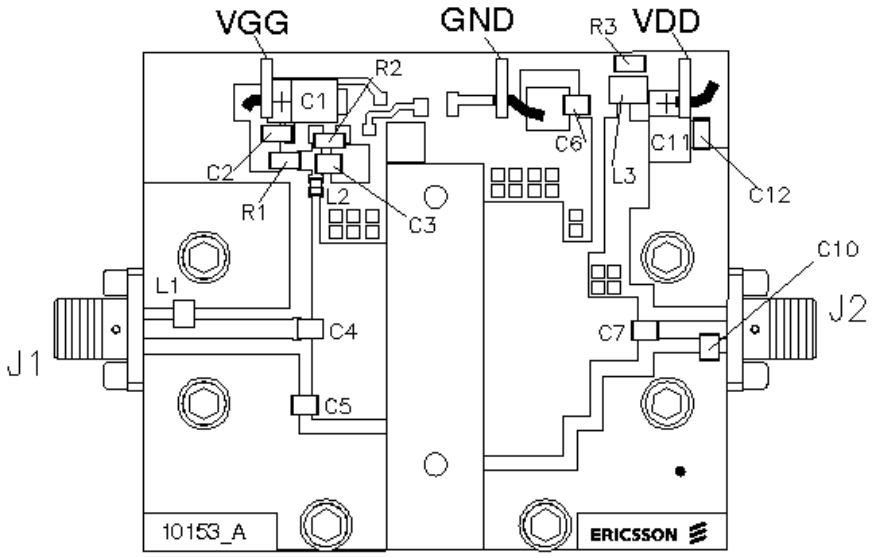
Test Circuit



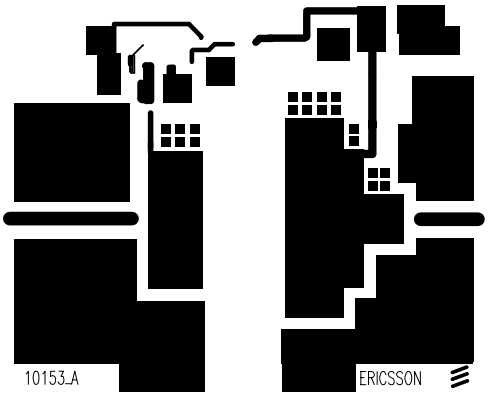
Block Diagram for f = 2 GHz

D.U.T.	PTF 10153	NPN RF Transistor	
ℓ1	0.086 λ 2 GHz	Microstrip	50 Ω
ℓ2	0.132 λ 2 GHz	Microstrip	50 Ω
ℓ3	0.112 λ 2 GHz	Microstrip	9.24 Ω
ℓ4	0.064 λ 2 GHz	Microstrip	78 Ω
ℓ5	0.127 λ 2 GHz	Microstrip	6.64 Ω
ℓ6	0.041 λ 2 GHz	Microstrip	9.24 Ω
ℓ7	0.206 λ 2 GHz	Microstrip	65 Ω
ℓ8	0.077 λ 2 GHz	Microstrip	21.87 Ω
ℓ9	0.070 λ 2 GHz	Microstrip	50 Ω
ℓ10	0.028 λ 2 GHz	Microstrip	50 Ω

C1, C11	Capicitor, 10 µF	ATC 100 B
C2	Capicitor, 0.1 µF, 50 V	Digi-Key PCC103BCT
C3, C6, C4, C7	Capicitor, 10 pF	ATC 100 B
C5	Capicitor, 1.1 pF	ATC 100 B
C10	Capicitor, 0.30 pF	ATC 100 B
C12	Capicitor, 0.1 µF	ATC 100 B
R1, R2	Resistor, 220 Ω	Digi-Key 2.2QBK
R3	Resistor, 1.0 Ω	Digi-Key, # P1OCT
L1	Chip Inductor, 8 µH	Coilcraft A03T
L2	Chip Inductor, 2.7 µH	N/A
L3	Ferrite, 6 mm	N/A
PCB	0.050", ε_r = 6.0, 2 oz. Copper, TMM6, Rogers Corporation	



Assembly Diagram (not to scale)



Artwork (not to scale)

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