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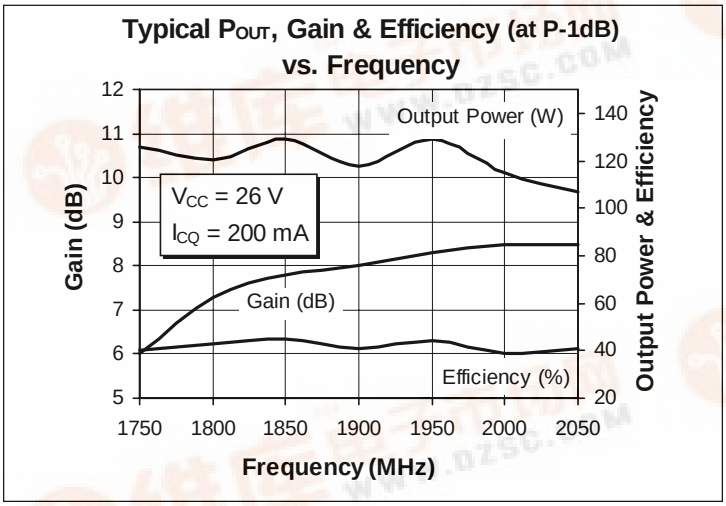
PTB 20125
100 Watts, 1.8–2.0 GHz
PCN/PCS Power Transistor

Description

The 20125 is an NPN, push-pull RF power transistor intended for 26 Vdc class AB operation from 1.8 to 2.0 GHz. Rated at 100 watts PEP minimum output power, it is specifically intended for operation as a final stage in CDMA or TDMA systems. Ion implantation, nitride surface passivation and gold metallization ensure excellent device reliability. 100% lot traceability is standard.

- 100 Watts, 1.8–2.0 GHz
- Class AB Characteristics
- 40% Collector Efficiency at 100 Watts
- Gold Metallization
- Silicon Nitride Passivated



Package 20225 *

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CER}	55	Vdc
Collector-Base Voltage	V_{CBO}	55	Vdc
Emitter-Base Voltage (collector open)	V_{EBO}	4.0	Vdc
Collector Current (continuous)	I_C	14	Adc
Total Device Dissipation at T_{flange} = 25°C Above 25°C derate by	P_D	400 2.3	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{flange} = 70°C)	$R_{\theta JC}$	0.44	°C/W

* This product not recommended or specified for CW or class A operation. Recommend two PTB 20175 for these applications.

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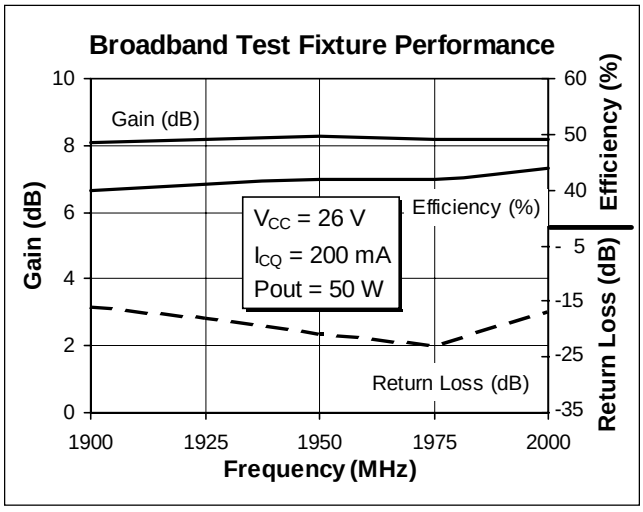
Electrical Characteristics (100% Tested)

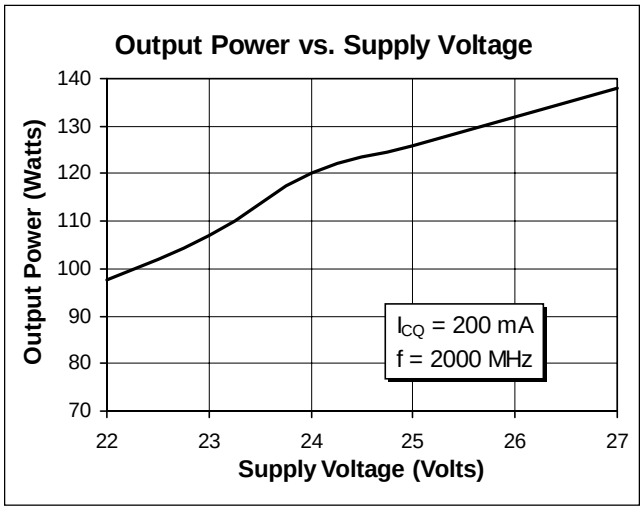
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Breakdown Voltage C to E	V_{BE} = 0 V, I_C = 100 mA	$V_{(BR)CES}$	55	—	—	Volts
Breakdown Voltage E to B	I_C = 0 A, I_E = 20 mA	$V_{(BR)EBO}$	4.0	5.0	—	Volts
DC Current Gain	V_{CE} = 10 V, I_C = 1.5 A	h_{FE}	30	50	120	—

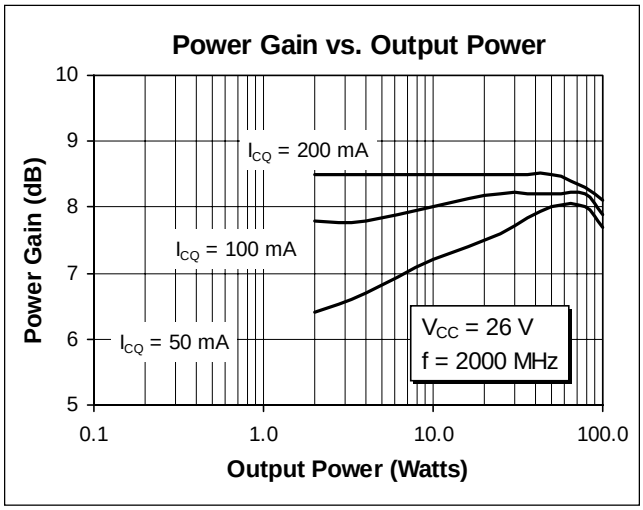
RF Specifications (100% Tested)

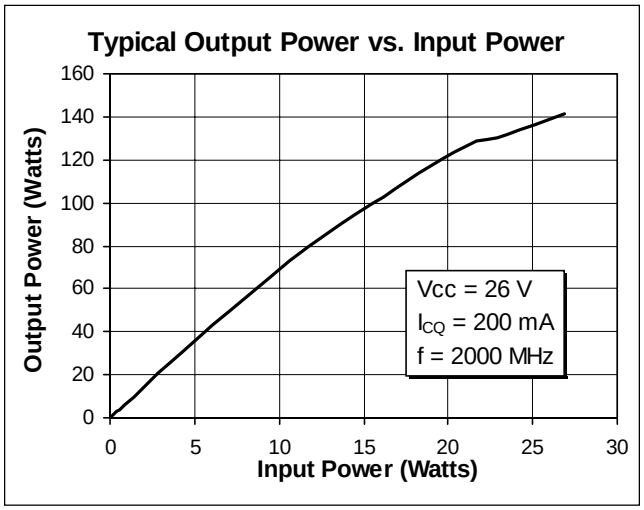
Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{CC} = 26 Vdc, P_{out} = 40 W(PEP), I_{CQ} = 2 x 100 mA, f = 2 GHz)	G_{pe}	7.0	8.0	—	dB
Collector Efficiency (V_{CC} = 26 Vdc, P_{out} = 100 W, I_{CQ} = 2 x 100 mA, f = 2 GHz)	η_C	40	45	—	%
Load Mismatch Tolerance (V_{CC} = 26 Vdc, P_{out} = 100 W(PEP), I_{CQ} = 2 x 100 mA, f = 2 GHz —at all phase angles)	Ψ	—	—	5:1	—

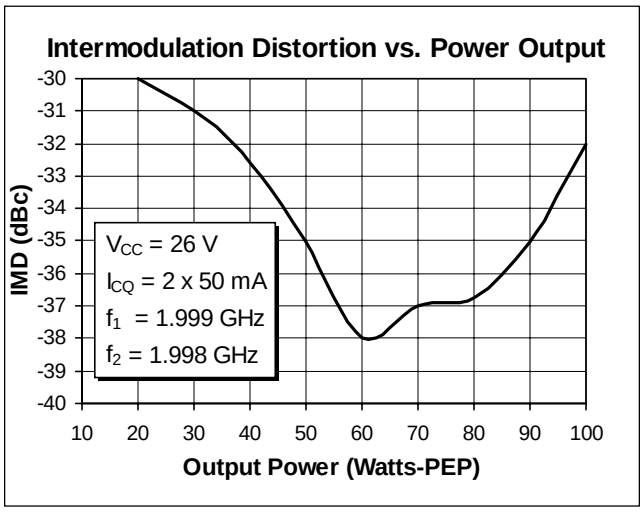
Typical Performance





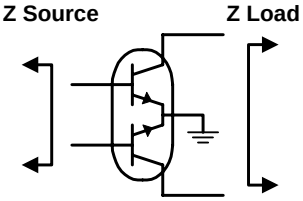




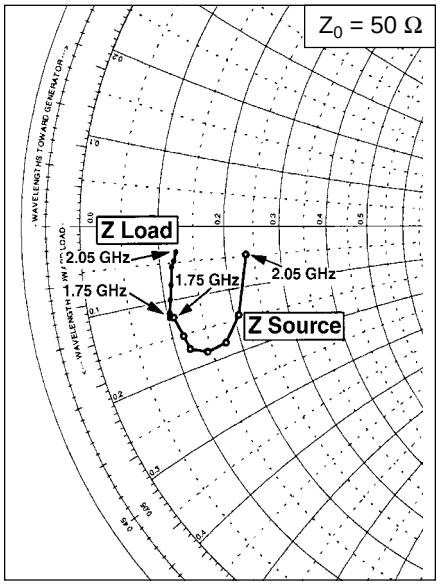


Impedance Data

(V_{CC} = 26 Vdc, Pout = 100 W, I_{CQ} = 2 x 100 mA)



Frequency	Z Source		Z Load	
GHz	R	jX	R	jX
1.75	5.4	-6.2	5.1	-6.2
1.80	5.8	-7.6	5.2	-5.8
1.85	6.0	-8.6	5.4	-5.0
1.90	7.2	-9.2	5.6	-4.0
1.95	8.8	-9.0	5.8	-2.8
2.00	10.4	-7.2	6.0	-2.4
2.05	11.8	-2.4	6.2	-1.8



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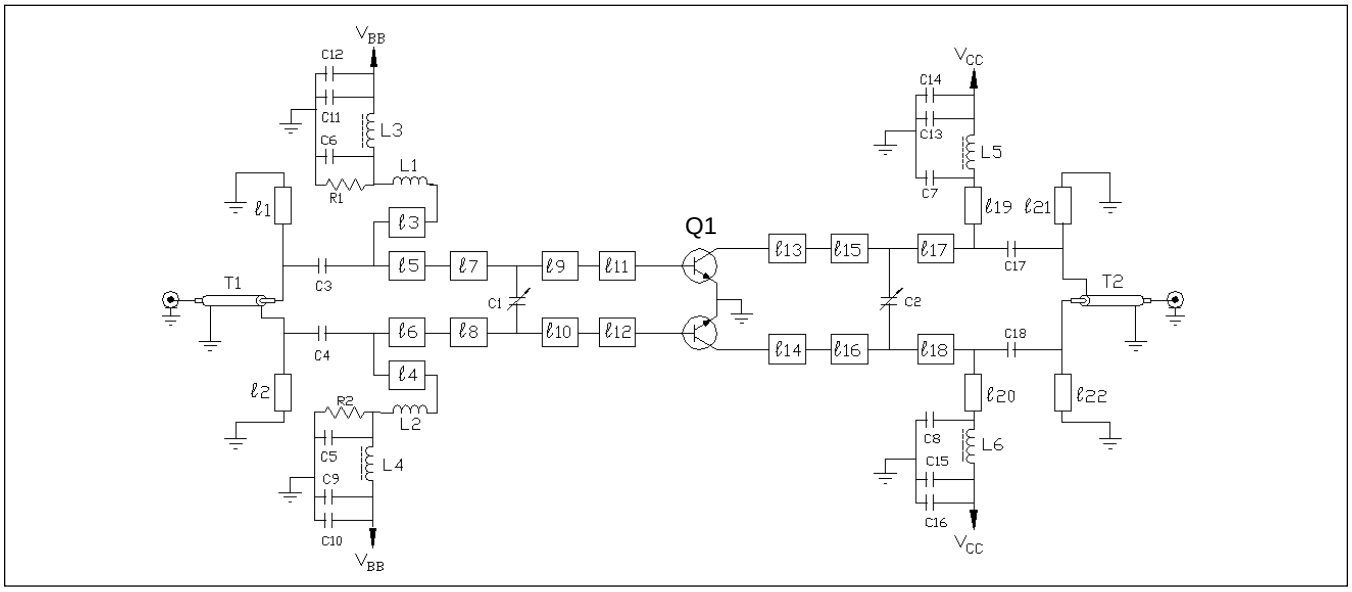
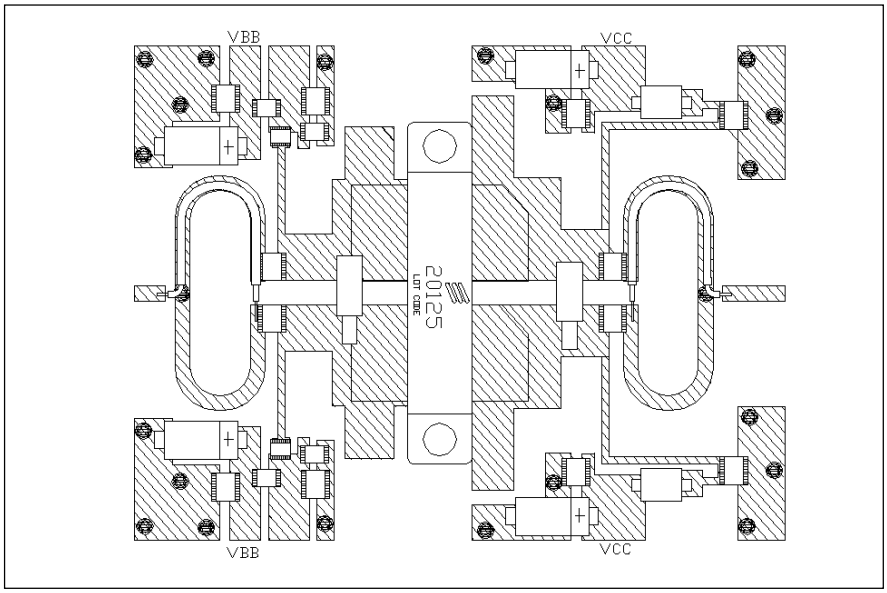
Test Circuit



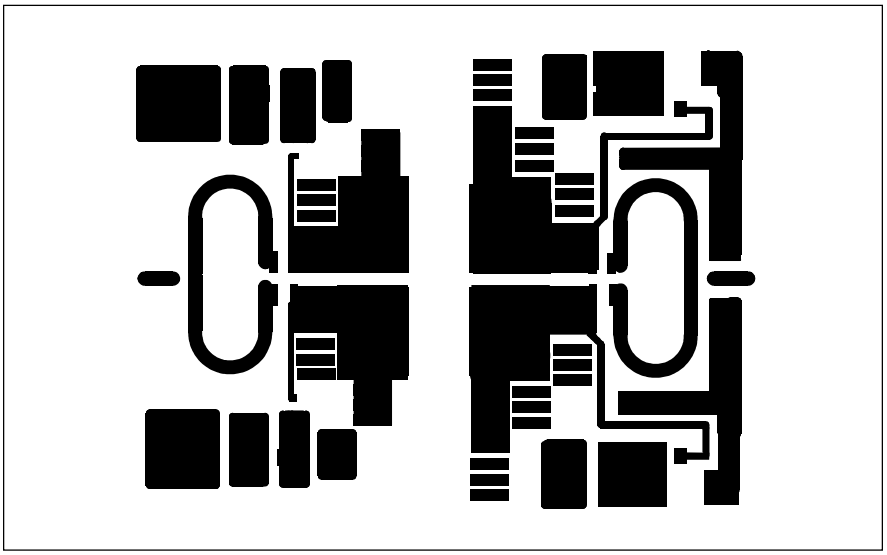
Block Diagram for f = 2 GHz

Q1	PTB 20125 NPN RF Transistor
ℓ1, ℓ2, ℓ21, ℓ22	.25λ 2GHz Microstrip 50 Ω
ℓ3, ℓ4	.085λ 2GHz Microstrip 80 Ω
ℓ5, ℓ6	.067λ 2GHz Microstrip 20 Ω
ℓ7, ℓ8, ℓ11, ℓ12	.0217λ 2GHz Microstrip 11.7 Ω
ℓ9, ℓ10	.053λ 2GHz Microstrip 8.15 Ω
ℓ13, ℓ14	.055λ 2GHz Microstrip 6.7 Ω
ℓ15, ℓ16	.052λ 2GHz Microstrip 11.45 Ω
ℓ17, ℓ18	.060λ 2GHz Microstrip 16.9 Ω
ℓ19, ℓ20	.252λ 2GHz Microstrip 75 Ω

L1, L2	6.8 nh SMT Inductor
L3, L4	56 nh SMT Inductor
L5, L6	4 mm. SMT Ferrite
C1, C2	0–4 pF Johanson Piston Trimmer
C3-8, C17, C18	33 pF (B ATC 100)
C9, C11, C13, C15	.1 µF 1206
C10, C12, C14, C16	10 µF SMT Tantalum
R1, R2	22 Ω SMT
T1, T2	UT 70-50
Board	0.031: G200, Solid Copper Bottom, AlliedSignal



Placement Diagram (not to scale)



Artwork (1 inch)

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