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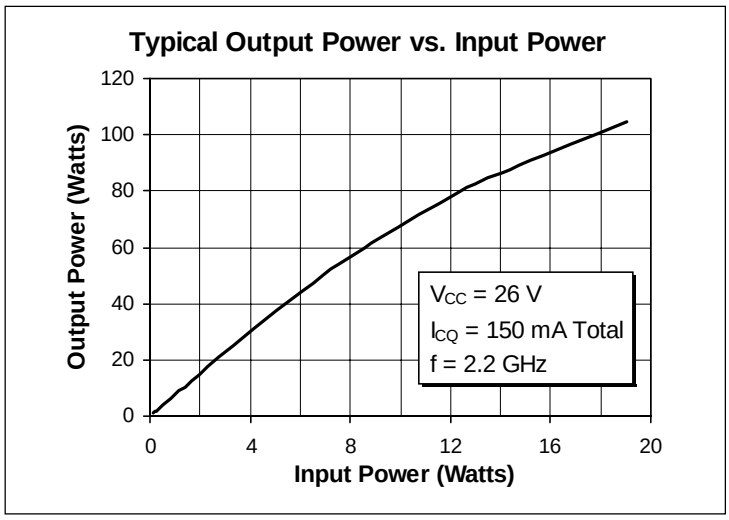
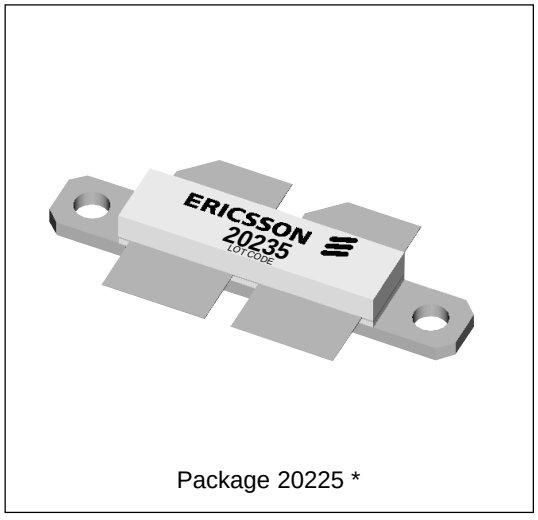
PTB 20235
70 Watts, 2.1–2.2 GHz
Wideband CDMA Power Transistor

Description

The 20235 is a class AB, NPN, push-pull RF power transistor intended for 26 Vdc operation from 2.1 to 2.2 GHz. Rated at 70 watts PEP minimum output power, it is specifically intended for operation as a final stage in Wide CDMA systems. Ion implantation, nitride surface passivation and gold metallization ensure excellent device reliability. 100% lot traceability is standard.

- 70 Watts, 2.1–2.2 GHz
- Class AB Characteristics
- 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}	3.5	Vdc
Collector Current (continuous)	I_C	12	Adc
Total Device Dissipation at T_{flange} = 25°C Above 25°C derate by	P_D	320 1.83	Watts W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{flange} = 70°C)	$R_{\theta JC}$	0.547	°C/W

* This package not recommended for class A or CW operation. Two PTB 20245s recommended for CW operation.

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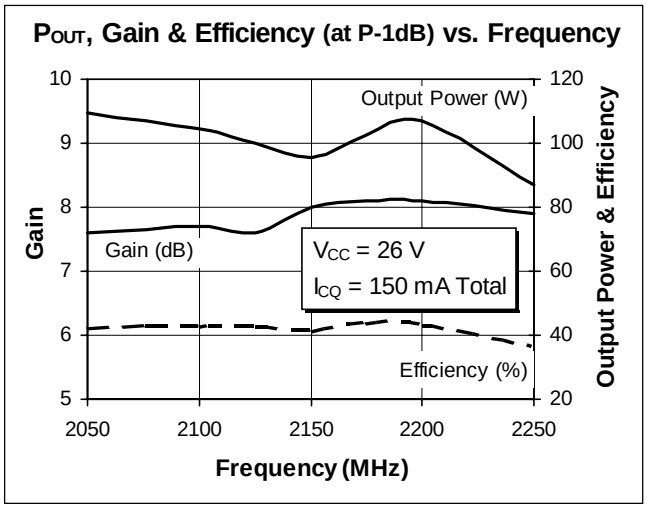
Electrical Characteristics (100% Tested)

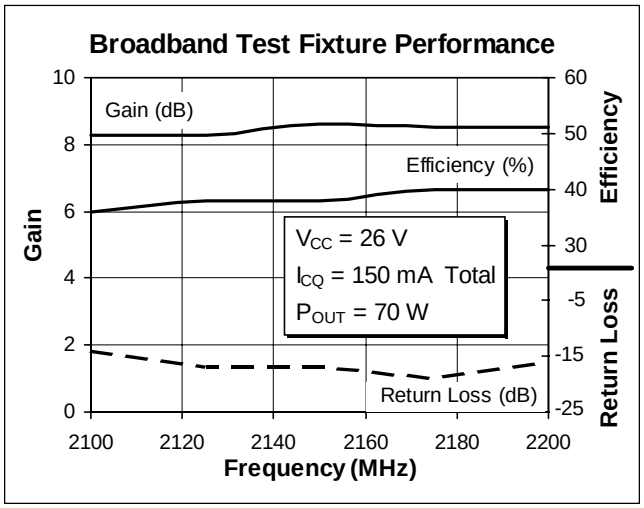
Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Breakdown Voltage C to E	V_{BE} = 0 V, I_C = 20 mA	$V_{(BR)CES}$	55	—	—	Volts
Breakdown Voltage E to B	I_C = 0 A, I_E = 20 mA	$V_{(BR)EBO}$	3.5	4.0	—	Volts
DC Current Gain	V_{CE} = 10 V, I_C = 1.5 A	h_{FE}	30	50	120	—

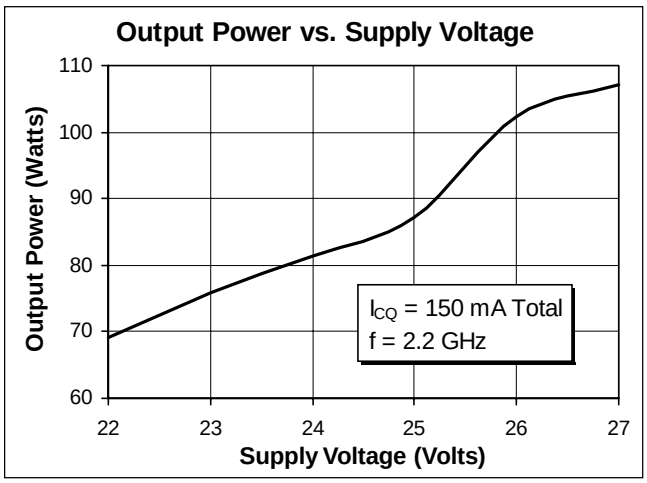
RF Specifications (100% Tested)

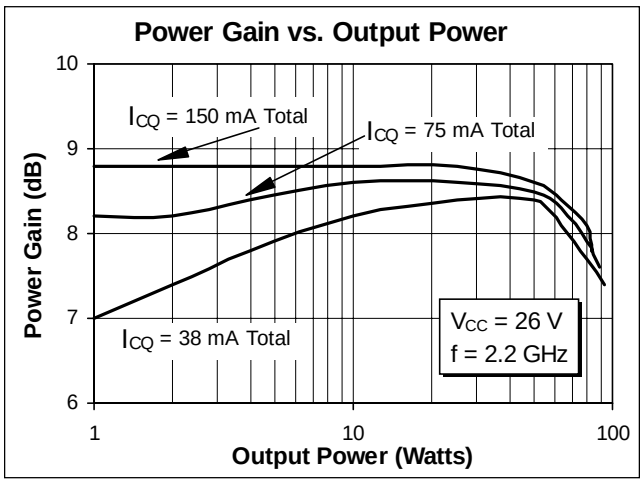
Characteristic	Symbol	Min	Typ	Max	Units
Gain (V_{CC} = 26 Vdc, P_{OUT} = 15 W, I_{CQ} = 150 mA, f = 2.2 GHz)	G_{pe}	7.5	8.0	—	dB
Gain Compression (V_{CC} = 26 Vdc, I_{CQ} = 150 mA, f = 2.2 GHz)	P-1dB	70	—	—	Watts
Collector Efficiency (V_{CC} = 26 Vdc, P_{OUT} = 70 W, I_{CQ} = 150 mA, f = 2.2 GHz)	η_C	—	40	—	%
Load Mismatch Tolerance (V_{CC} = 26 Vdc, P_{OUT} = 70 W(PEP), I_{CQ} = 150 mA, f = 2.2 GHz —at all phase angles)	Ψ	—	—	5:1	—

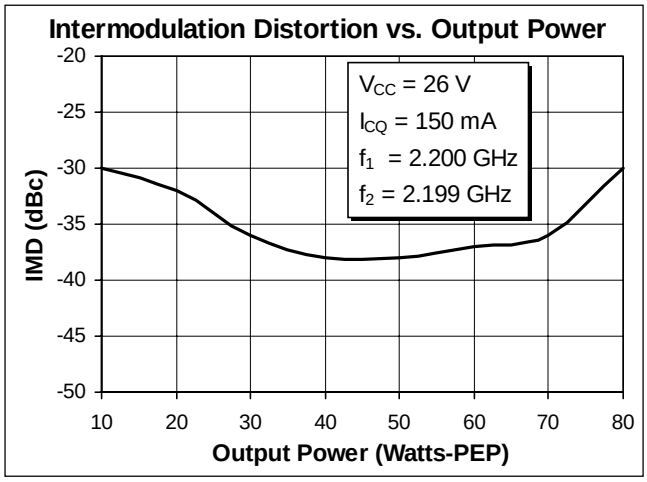
Typical Performance





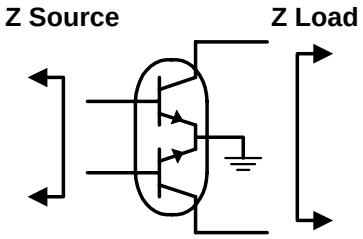






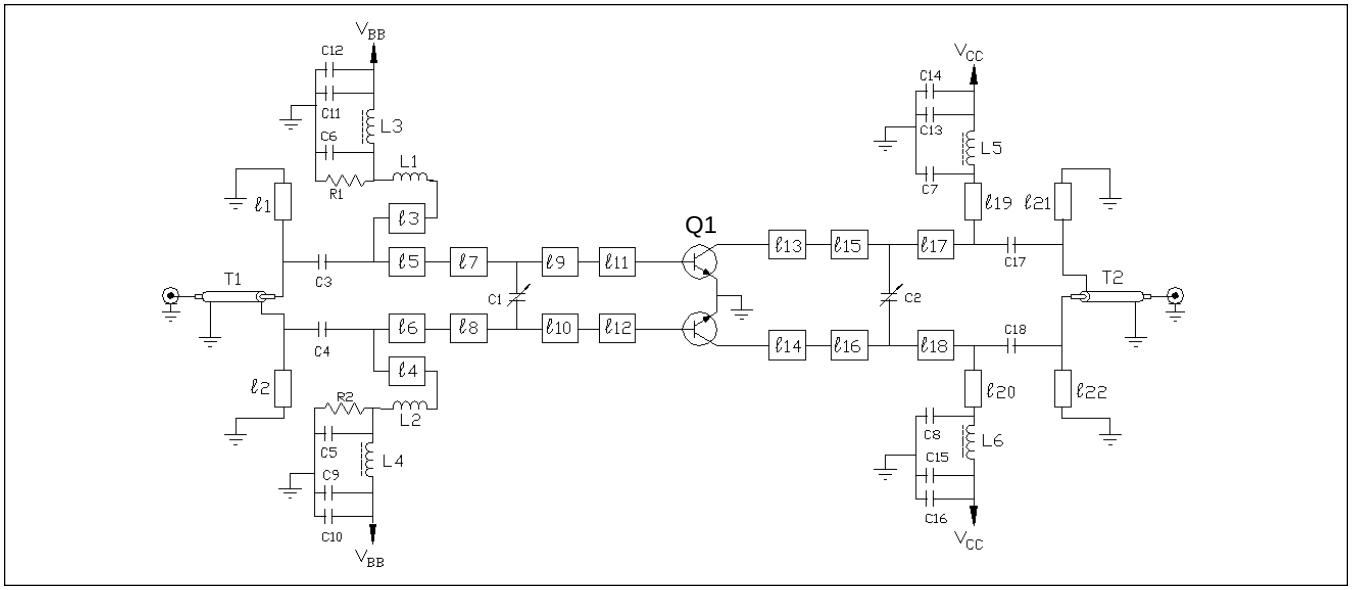
Impedance Data

V_{CC} = 26 Vdc, P_{OUT} = 70 W, I_{CQ} = 150 mA



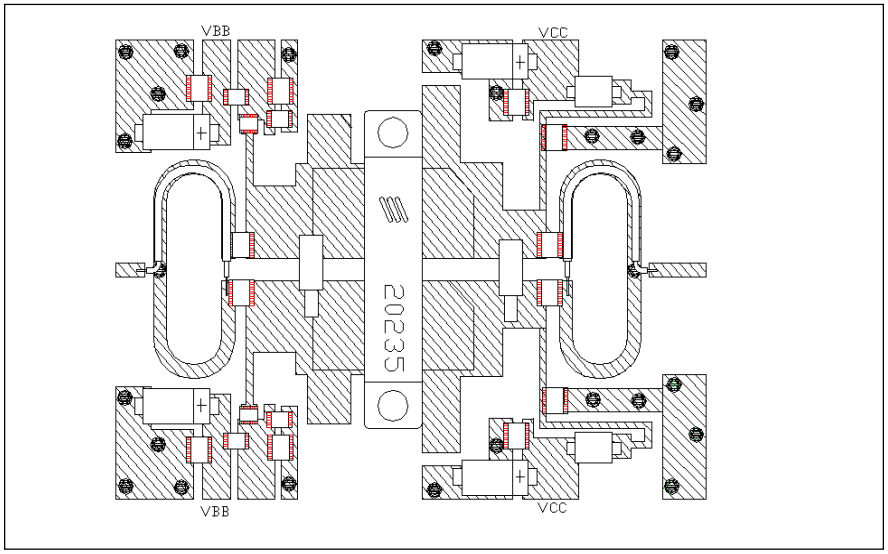
Frequency	Z Source		Z Load	
GHz	R	jX	R	jX
2.05	6.18	-6.7	6.4	-5.8
2.10	7.58	-6.9	5.9	-5.0
2.15	8.76	-6.2	5.5	-4.1
2.20	9.16	-4.8	5.0	-3.0
2.25	7.96	-3.6	4.8	-2.6

Test Circuit

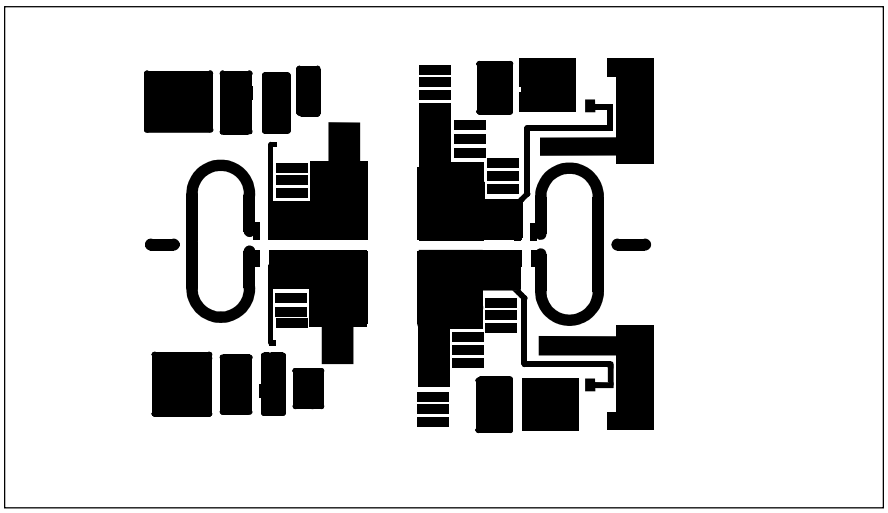


Block Diagram for f = 2 GHz

Q1	PTB 20235 NPN RF Transistor	L1, L2	6.8 nh SMT Inductor
ℓ1, ℓ2, ℓ21, ℓ22	0.25λ 2GHz Microstrip 50 Ω	L3, L4	56 nh SMT Inductor
ℓ3, ℓ4	0.085λ 2GHz Microstrip 80 Ω	L5, L6	4 mm. SMT Ferrite
ℓ5, ℓ6	0.067λ 2GHz Microstrip 20 Ω	C1, C2	0–4 pF Johanson Piston Trimmer
ℓ7, ℓ8, ℓ11, ℓ12	0.0217λ 2GHz Microstrip 11.7 Ω	C3-8, C17, C18	20 pF (B ATC 100)
ℓ9, ℓ10	0.053λ 2GHz Microstrip 8.15 Ω	C9, C11, C13, C15	0.1 µF 1206
ℓ13, ℓ14	0.055λ 2GHz Microstrip 6.7 Ω	C10, C12, C14, C16	10 µF SMT Tantalum
ℓ15, ℓ16	0.052λ 2GHz Microstrip 11.45 Ω	R1, R2	10 Ω SMT
ℓ17, ℓ18	0.060λ 2GHz Microstrip 16.9 Ω	T1, T2	UT 70-50
ℓ19, ℓ20	0.160λ 2GHz Microstrip 75 Ω	Board	0.031” G200, Solid Copper Bottom, AlliedSignal



Placement Diagram (not to scale)



Artwork (1 inch)

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