

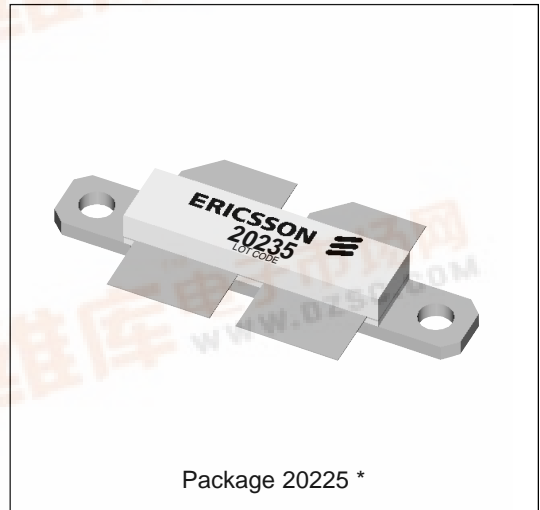
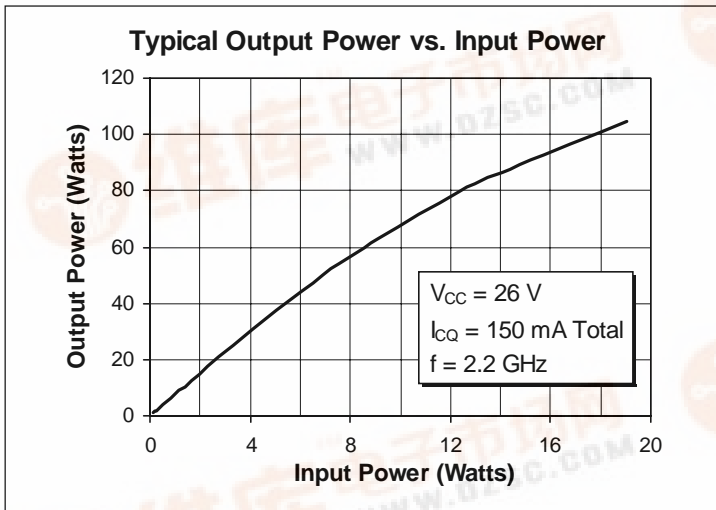


PTB 20235 70 Watts, 2.1–2.2 GHz Wideband CDMA Power Transistor

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



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 $T_{flange} = 25^\circ\text{C}$ Above 25°C derate by | P_D | 320 1.83 | Watts $W/^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -40 to +150 | $^\circ\text{C}$ |
| Thermal Resistance ($T_{flange} = 70^\circ\text{C}$) | $R_{\theta JC}$ | 0.547 | $^\circ\text{C/W}$ |

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



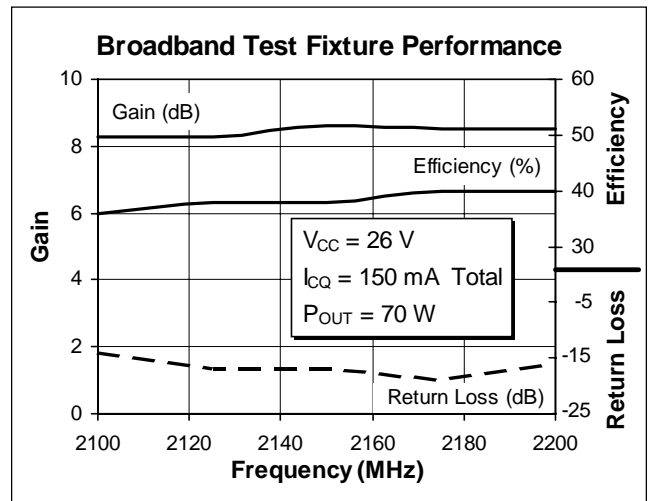
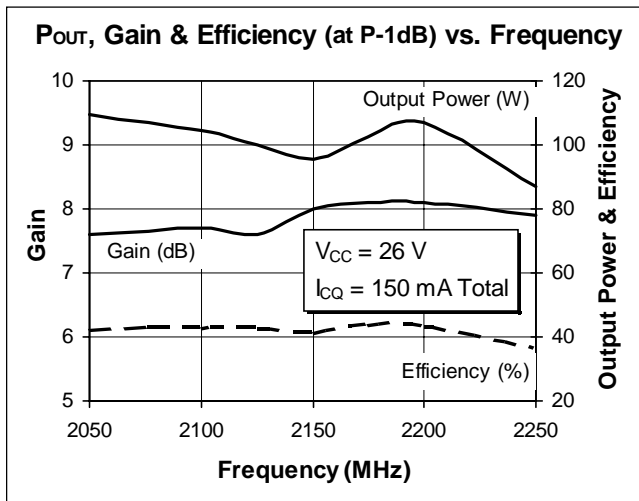
Electrical Characteristics (100% Tested)

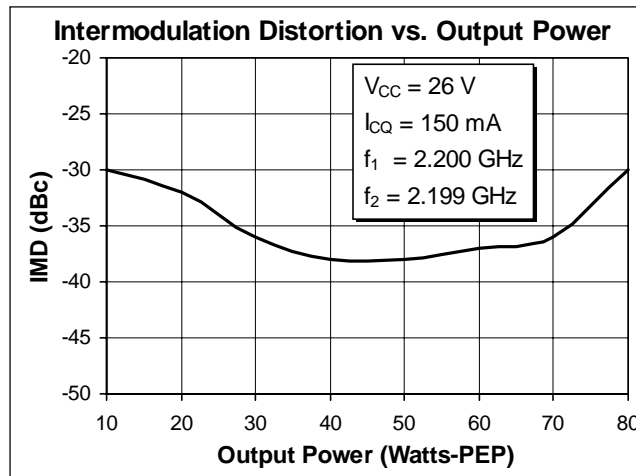
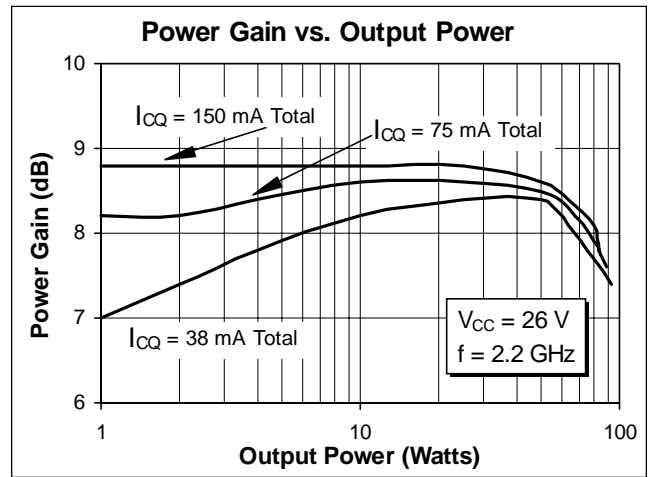
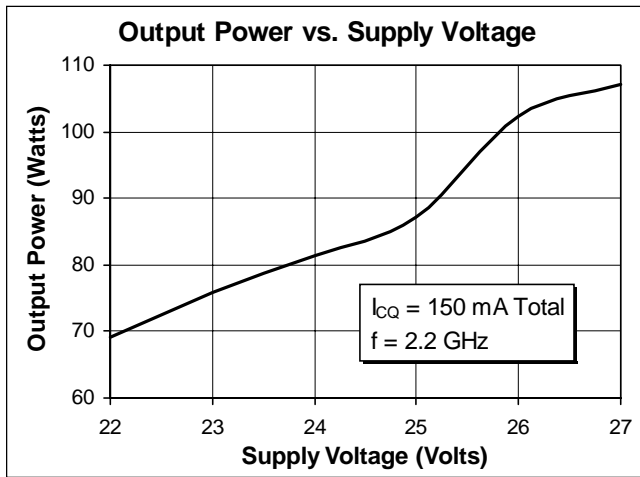
| Characteristic | Conditions | Symbol | Min | Typ | Max | Units |
|--------------------------|--|---------------|-----|-----|-----|-------|
| Breakdown Voltage C to E | $V_{BE} = 0\text{ V}, I_C = 20\text{ mA}$ | $V_{(BR)CES}$ | 55 | — | — | Volts |
| Breakdown Voltage E to B | $I_C = 0\text{ A}, I_E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

RF Specifications (100% Tested)

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

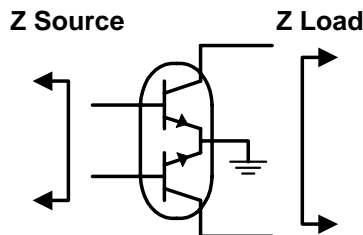
Typical Performance





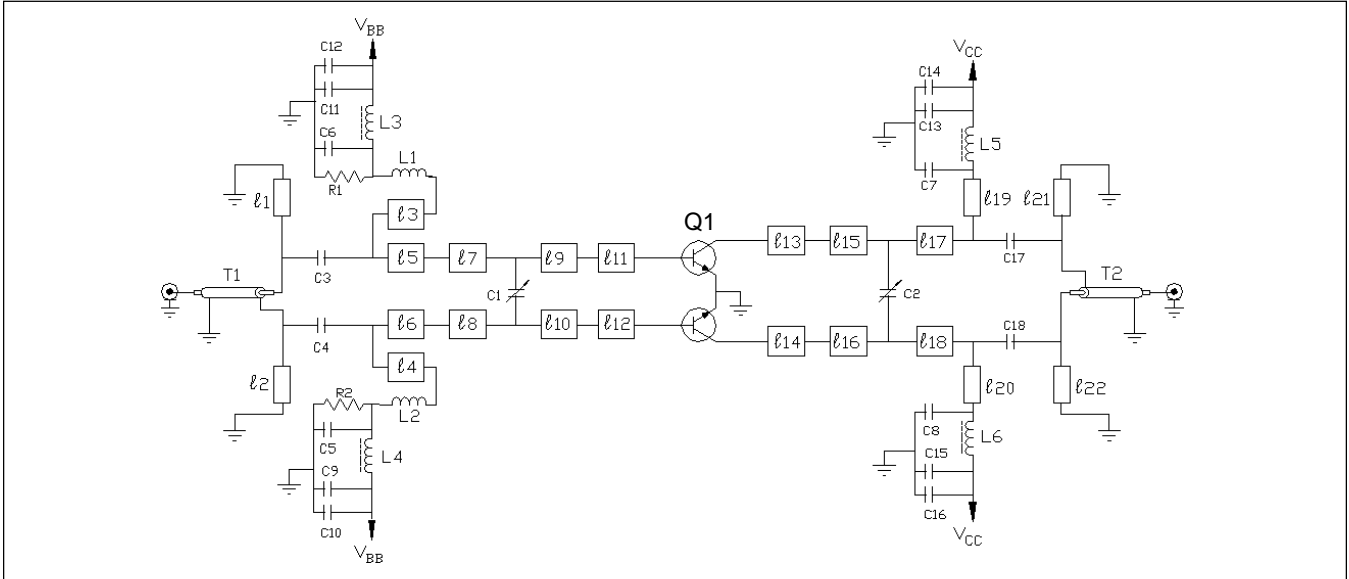
Impedance Data

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



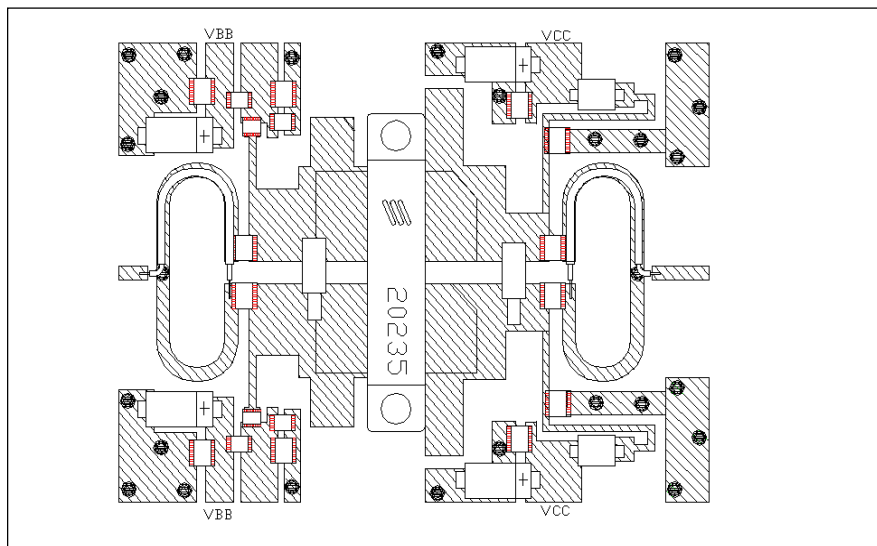
| Frequency GHz | Z Source | | Z Load | |
|------------------|----------|------|--------|------|
| | R | jX | R | jX |
| 2.05 | 6.18 | -6.7 | 6.4 | -5.8 |
| 2.10 | 7.58 | -6.9 | 5.9 | -5.0 |
| 2.15 | 8.76 | -6.2 | 5.5 | -4.1 |
| 2.20 | 9.16 | -4.8 | 5.0 | -3.0 |
| 2.25 | 7.96 | -3.6 | 4.8 | -2.6 |

Test Circuit

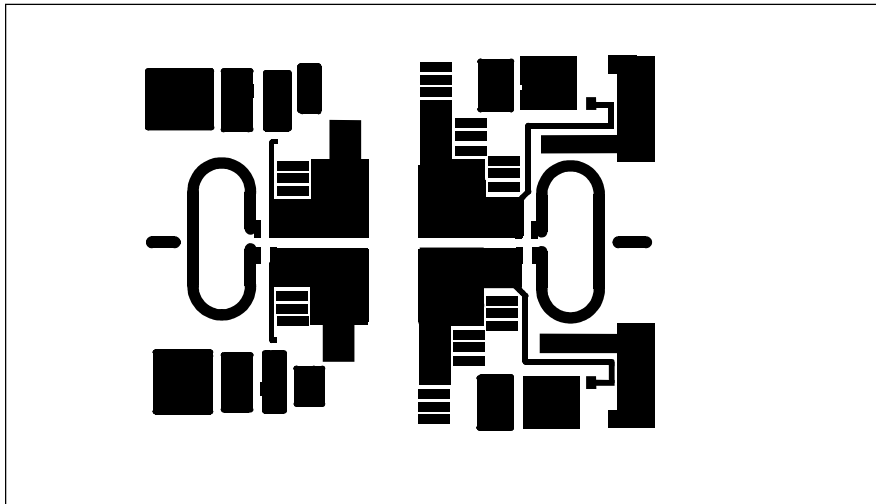


Block Diagram for $f = 2 \text{ GHz}$

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



Placement Diagram (not to scale)



Artwork (1 inch )