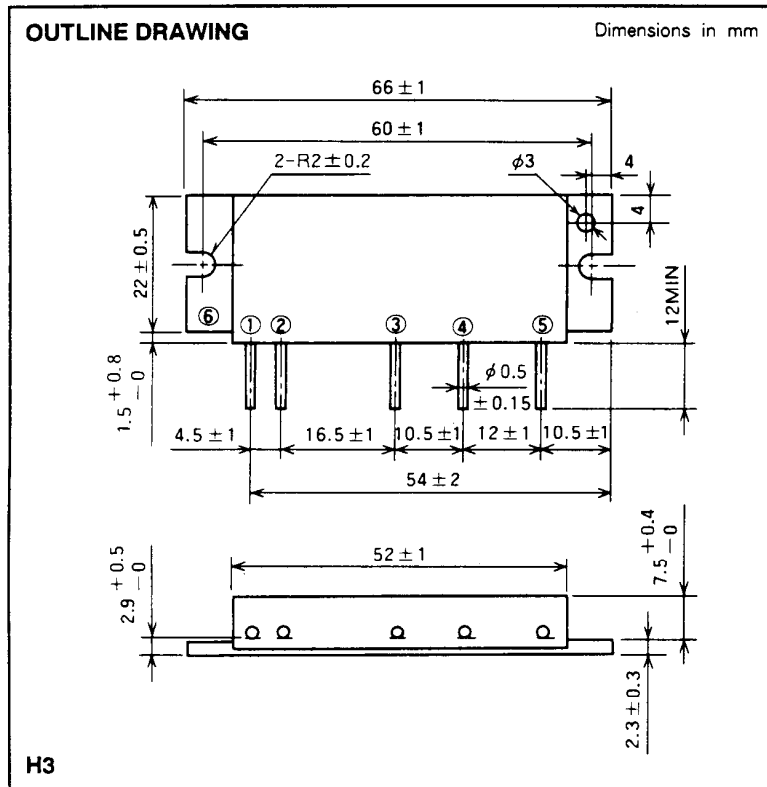
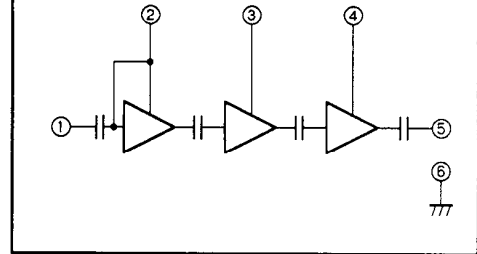


M57704M

430-450MHz, 12.5V, 13W, FM MOBILE RADIO



BLOCK DIAGRAM



- PIN :
- ① Pin : RF INPUT
 - ② Vcc1 : 1st. DC SUPPLY
 - ③ Vcc2 : 2nd. DC SUPPLY
 - ④ Vcc3 : 3rd. DC SUPPLY
 - ⑤ Po : RF OUTPUT
 - ⑥ GND : FIN

ABSOLUTE MAXIMUM RATINGS (Tc = 25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Ratings | Unit |
|----------|----------------------------|----------------|-------------|------|
| Vcc | Supply voltage | | 17 | V |
| Icc | Total current | | 5 | A |
| Pin(max) | Input power | ZG = ZL = 50 Ω | 0.4 | W |
| Po(max) | Output power | ZG = ZL = 50 Ω | 20 | W |
| Tc(OP) | Operation case temperature | | - 30 to 110 | °C |
| Tstg | Storage temperature | | - 40 to 110 | °C |

Note. Above parameters are guaranteed independently.

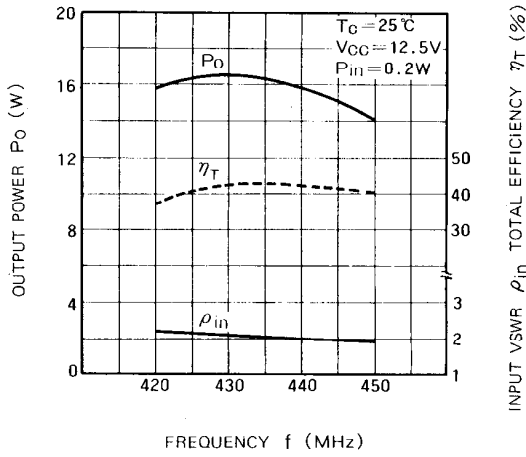
ELECTRICAL CHARACTERISTICS (Tc = 25°C unless otherwise noted)

| Symbol | Parameter | Test conditions | Limits | | Unit |
|--------|---------------------|--|---------------------------|------|------|
| | | | Min | Max | |
| f | Frequency range | Pin = 0.2W Vcc = 12.5V ZG = ZL = 50 Ω | 430 | 450 | MHz |
| Po | Output power | | 13 | | W |
| ητ | Total efficiency | | 35 | | % |
| 2fo | 2nd. harmonic | | | - 30 | dBc |
| ρin | Input VSWR | | | 2.8 | - |
| - | Load VSWR tolerance | Vcc = 15.2V, Po = 14W (Pin : controlled) Load VSWR=20:1(All phase), 2sec. ZG = 50 Ω | No degradation or destroy | | - |

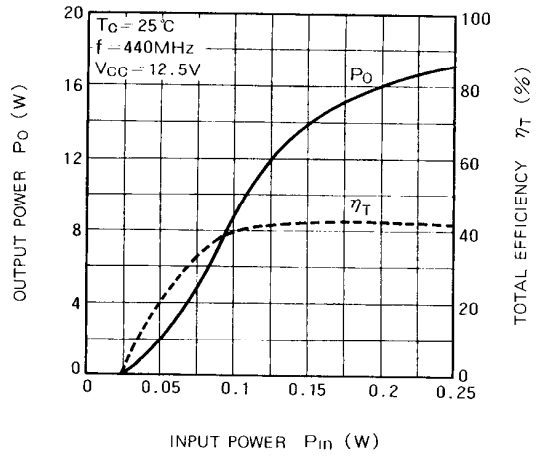
Note. Above parameters, ratings, limits and conditions are subject to change.

TYPICAL PERFORMANCE DATA

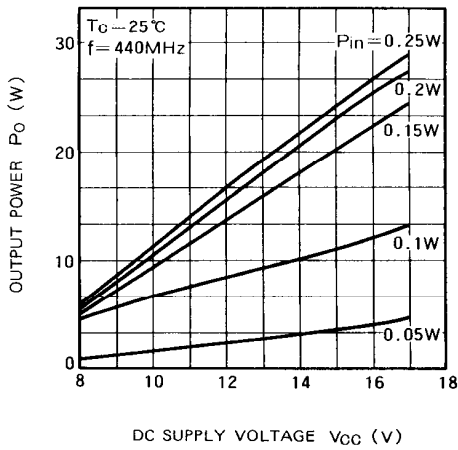
OUTPUT POWER TOTAL EFFICIENCY INPUT VSWR VS. FREQUENCY



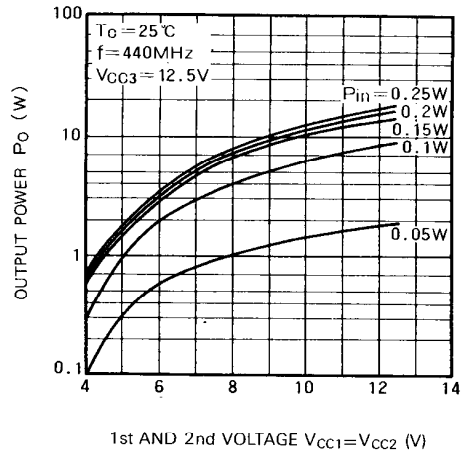
OUTPUT POWER TOTAL EFFICIENCY VS. INPUT POWER



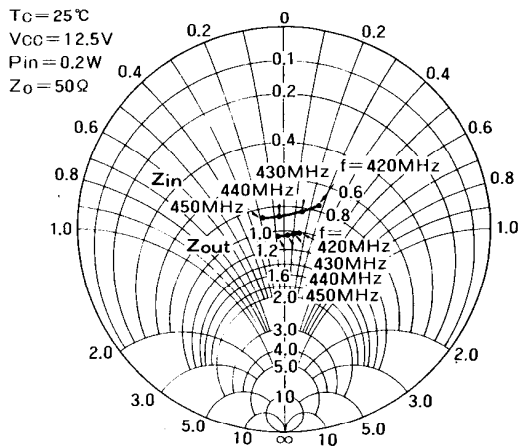
OUTPUT POWER VS. DC SUPPLY VOLTAGE



OUTPUT POWER VS. 1st AND 2nd VOLTAGE



INPUT IMPEDANCE OUTPUT IMPEDANCE



1. Junction temperature of incorporated transistors at standard operation.

(1) Thermal resistance between junction and package of incorporated transistors.

a) First stage transistor

$$R_{th(j-c)1} = 15^{\circ}\text{C/W (Typ.)}$$

b) Second stage transistor

$$R_{th(j-c)2} = 6^{\circ}\text{C/W (Typ.)}$$

c) Final stage transistor

$$R_{th(j-c)3} = 2.5^{\circ}\text{C/W (Typ.)}$$

(2) Junction temperature of incorporated transistors at standard operation.

- Conditions for standard operation.

$P_O = 13\text{W}$, $V_{CC} = 12.5\text{V}$, $P_{In} = 0.2\text{W}$, $\eta_T = 35\%$ (minimum rating), P_{O1} (Note 1) = 1.5W , P_{O2} (2) = 6W , $I_T = 3.0\text{A}$ (I_{T1} (3) = 0.25A , I_{T2} (4) = 0.75A , I_{T3} (5) = 2.0A)

Note 1: Output power of the first stage transistor

Note 2: Output power of the second stage transistor

Note 3: Circuit current of the first stage transistor

Note 4: Circuit current of the second stage transistor

Note 5: Circuit current of the final stage transistor

- Junction temperature of the first stage transistor

$$\begin{aligned} T_{j1} &= (V_{CC} \times I_{T1} - P_{O1} + P_{In}) \times R_{th(j-c)1} + T_C^{(6)} \\ &= (12.5 \times 0.25 - 1.5 + 0.2) \times 15 + T_C \\ &= 27 + T_C (^{\circ}\text{C}) \end{aligned}$$

Note 6: Package temperature of device

- Junction temperature of the second stage transistor

$$\begin{aligned} T_{j2} &= (V_{CC} \times I_{T2} - P_{O2} + P_{O1}) \times R_{th(j-c)2} + T_C \\ &= (12.5 \times 0.75 - 6 + 1.5) \times 6 + T_C \\ &= 29 + T_C (^{\circ}\text{C}) \end{aligned}$$

- Junction temperature of the final stage transistor

$$\begin{aligned} T_{j3} &= (V_{CC} \times I_{T3} - P_O + P_{O2}) \times R_{th(j-c)3} + T_C \\ &= (12.5 \times 2.0 - 13 + 6) \times 2.5 + T_C \\ &= 45 + T_C (^{\circ}\text{C}) \end{aligned}$$

or 13W below 90°C .

The thermal resistance $R_{th(c-a)}$ (7) of the heat sink to realize this:

$$\begin{aligned} R_{th(c-a)} &= \frac{T_c - T_a}{(P_O/\eta_T) - P_O + P_{In}} = \frac{90 - 60}{(13/0.35) - 13 + 0.2} \\ &= 1.2 (^{\circ}\text{C/W}) \end{aligned}$$

Note 7: Inclusive of the contact thermal resistance between device and heat sink

Mounting the heat sink of the above thermal resistance on the device,

$$T_{j1} = 117^{\circ}\text{C}, T_{j2} = 119^{\circ}\text{C}, T_{j3} = 135^{\circ}\text{C} \text{ at } T_{j3} = 135^{\circ}\text{C} \text{ at } T_a = 60^{\circ}\text{C}, T_c = 90^{\circ}\text{C}.$$

In the annual average of ambient temperature is 30°C ,

$$T_{j1} = 87^{\circ}\text{C}, T_{j2} = 89^{\circ}\text{C}, T_{j3} = 105^{\circ}\text{C}.$$

As the maximum junction temperature of these incorporated transistors T_{jmax} are 175°C , application under fully derated condition is ensured.