UHF POWER AMPLIFIER MODULE

A UHF amplifier module primarily designed for mobile communications equipment, operating directly from 12.5 V electrical systems. The module will produce a minimum output of 6 W into a 50 Ω load over the frequency range of 806 to 890 MHz.

The module consists of a three-stage RF amplifier using npn transistor chips with lumped-element matching components in a plastic stripline encapsulation. The negative supply is internally connected to the flange.

QUICK REFERENCE DATA

Mode of operation			CW
Frequency range			806 to 890 MHz
DC supply voltage	V_{S1}, V_{S2}, V_{S3}	nom.	12.5 V
Drive power	P_D	max.	30 mW
Load power	P_L	>	6.0 W
Input, output impedance	z_i, Z_L	nom.	50 Ω

MECHANICAL DATA

Dimensions in mm

Pinning:

1 = RF input
2 = V_{S1}
3 = V_{S2}
4 = V_{S3}
5 = RF output

Flange connected to earth.

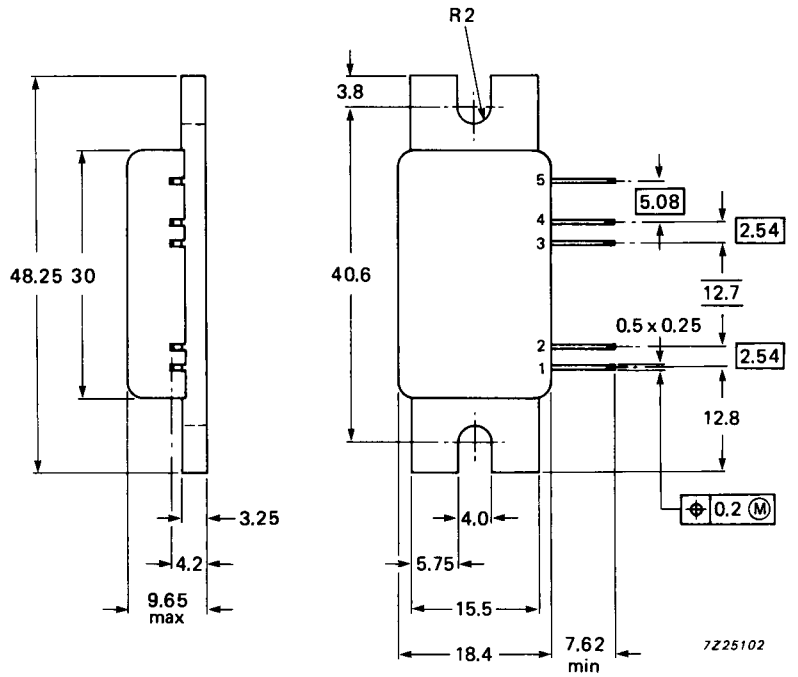

Fig. 1 SOT-233.

PRODUCT SAFETY This device incorporates beryllium oxide (BeO), the dust of which is toxic. The device is entirely safe provided that the internal BeO disc is not damaged.

RATINGS

Limiting values in according with the Absolute Maximum System (IEC 134)

DC supply terminal voltages *	V_{S1}, V_{S2}, V_{S3}	max.	16 V
RF input terminal voltage *	$\pm V_i$	max.	25 V
RF output terminal voltage *	$\pm V_o$	max.	25 V
Load power	P_L	max.	8.0 W
Drive power	P_D	max.	80 mW
Storage temperature range	T_{stg}		−40 to + 100 °C
Operating heatsink temperature range	T_h		−30 to + 90 °C

CHARACTERISTICS

T_h = 25 °C; $V_{S1} = V_{S2} = V_{S3}$ = 12.5 V; $R_S = R_L$ = 50 Ω; f = 806 to 890 MHz uhless otherwise stated.

Quiescent currents			
P_D = 0	I_{Q1}	typ.	10 mA
	I_{Q2}	typ.	80 mA
RF drive power			
P_L = 6 W	P_D	<	30 mW
		typ.	20 mW
Efficiency			
P_L = 6 W	η	>	30 %
		typ.	35 %
Harmonic output			
any harmonic (relative to carrier); P_L = 6 W		<	−35 dB
		typ.	−40 dB
Input VSWR			
with respect to 50 Ω	VSWR	max.	2.0 : 1

Stability

The module is stable with load VSWR up to 4 (all phases) when operated within the following conditions:

$V_{S2} = V_{S3}$ = 10 to 16 V; f = 806 to 890 MHz; P_D = 0 to 40 mW; V_{S1} = 0 to 12.5 V; P_L < 8 W (matched).

Ruggedness

The module will withstand a load VSWR of 50 : 1 for short period overload conditions, with P_D, V_{S1}, V_{S2} and V_{S3} at maximum values, providing the combination does not result in the matched RF output power derating curve being exceeded (T_h < 90 °C).

Mounting

To ensure good thermal transfer the module should be mounted onto a heatsink with a flat surface and heat-conducting compound applied between module and heatsink. Burrs and thickening of the heatsink should be removed and 3 mm bolts tightened to a torque of 0.5 Nm. The leads of the devices may be soldered directly into a circuit using a soldering iron with a maximum temperature of 245 °C for not more than 10 seconds at a distance of at least 1 mm from the plastic.

* With respect to flange.

Power rating

In general it is recommended that the output power from the module under nominal conditions should not exceed 7 W in order to provide an adequate safety margin under fault conditions.

Gain control

Power output can be controlled by variation of the driver stage supply voltage V_{S1} from 0.5 V to 12.5 V.