U.H.F. POWER AMPLIFIER MODULES

A range of broadband u.h.f. modules, primarily designed for mobile communication equipment, operating directly from 12 V electrical systems.

The BGY40,41 series produce minimum output powers of 7.5 W and 13 W respectively in the u.h.f. communications bands, the ‘A’ types covering 400 to 440 MHz and the ‘B’ types covering 440 to 470 MHz.

The modules consist of a three-stage r.f. amplifier using n-p-n transistor chips with lumped element matching components in a plastic stripline encapsulation. The negative supply is internally connected to the flange.

QUICK REFERENCE DATA

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>c.w.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltages</td>
<td>$V_{S1}, V_{S2}$</td>
</tr>
<tr>
<td>Input impedance</td>
<td>$Z_i$</td>
</tr>
<tr>
<td>Output load impedance</td>
<td>$Z_L$</td>
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</tbody>
</table>

R.f. performance

<table>
<thead>
<tr>
<th></th>
<th>BGY40A</th>
<th>BGY41A</th>
<th>BGY40B</th>
<th>BGY41B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of operation</td>
<td>f</td>
<td>400 to 440</td>
<td>440 to 470</td>
<td>MHz</td>
</tr>
<tr>
<td>Typical drive power</td>
<td>$P_D$</td>
<td>75</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Typical load power</td>
<td>$P_L$</td>
<td>11.5</td>
<td>15.6</td>
<td>10</td>
</tr>
<tr>
<td>Typical efficiency</td>
<td>$\eta$</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

MECHANICAL DATA (see Fig. 15)

![Circuit Diagram](image)

Fig. 1 Circuit of the u.h.f. modules.

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

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RATINGS
Limiting values in accordance with the Absolute Maximum System (IEC134)

Voltages (with respect to flange)
- D.C. supply terminals $V_{S1}$ and $V_{S2}$ max. 16.5 V
- R.F. input terminal $\pm V_{in}$ max. 25 V
- R.F. output terminal $\pm V_{out}$ max. 25 V

Load power (see Fig.2)
- BGY40A, 40B $P_L$ max. 12 W
- BGY41A, 41B $P_L$ max. 16.5 W

Input drive power
- BGY40A, 40B $P_D$ max. 150 mW
- BGY41A, 41B $P_D$ max. 200 mW

Storage temperature range $T_{stg}$ -40 to +100 °C
Operating heatsink temperature $T_h$ max. 90 °C

Fig.2 Load power derating; VSWR = 1
CHARACTERISTICS

T_h = 25 °C unless otherwise specified;
V_S1 = V_S2 = 12.5 V; R_S = 50 Ω; R_L = 50 Ω

<table>
<thead>
<tr>
<th>Frequency of operation</th>
<th>BGY40A</th>
<th>BGY41A</th>
<th>BGY40B</th>
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<tr>
<td></td>
<td>400 to 440 MHz</td>
<td>440 to 470 MHz</td>
<td></td>
<td></td>
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<tr>
<td>Minimum load power</td>
<td>P_L</td>
<td>7.5</td>
<td>13</td>
<td>7.5</td>
</tr>
<tr>
<td>Nominal drive power</td>
<td>P_D</td>
<td>100</td>
<td>150</td>
<td>100</td>
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<tr>
<td>Minimum efficiency</td>
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<td>η</td>
<td>40</td>
<td>40</td>
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Harmonic output: Any single harmonic will be at least 40 dB down from the carrier.
Input VSWR (with respect to 50 Ω): typ. 1.5
Stability

The modules are stable with load VSWR up to 3 (all phases) when operated within the following limits:

<table>
<thead>
<tr>
<th>BGY40A, BGY40B</th>
<th>BGY41A, BGY41B</th>
</tr>
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<tbody>
<tr>
<td>P_D = 30 to 150 mW</td>
<td>P_D = 30 to 200 mW</td>
</tr>
<tr>
<td>V_S1 = V_S2 = 8 to 16.5 V</td>
<td>V_S1 = V_S2 = 8 to 16.5 V</td>
</tr>
<tr>
<td>P_L = 5 to 12 W</td>
<td>P_L = 5 to 16.5 W</td>
</tr>
</tbody>
</table>

Ruggedness

The modules will withstand load VSWR of 50 (all phases) for short period overload conditions with P_D, V_S1 and V_S2 at maximum values, providing the combination does not result in the matched r.f. output power rating being exceeded.

Mounting

To ensure good thermal transfer, the module should be mounted onto a heatsink with a flat surface, with heat conducting compound between module and heatsink. If an isolation washer is used, heatsink compound should be applied to both sides of the washer. Burrs and thickening of the holes in the heatsink should be removed and 3 mm bolts tightened to a torque of 0.5 Nm.

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.
Fig. 3 Typical values; $V_{S1} = V_{S2} = 12.5$ V

Fig. 4 Typical values; $V_{S2} = 12.5$ V; $P_D = 100$ mW

Fig. 5 Typical values; $V_{S1} = V_{S2} = 12.5$ V

Fig. 6 Typical values; $V_{S2} = 12.5$ V; $P_D = 100$ mW
U.H.F. power amplifier modules

Fig. 7 Typical values; $P_D = 100$ mW

Fig. 8 Typical values; $V_{S1} = V_{S2} = 12.5$ V; $P_D = 100$ mW

Fig. 9 Typical values; $V_{S1} = V_{S2} = 12.5$ V; $P_D = 100$ mW
Fig. 11 Typical values; \( V_{S1} = V_{S2} = 12.5 \text{ V} \)

Fig. 12 Typical values; \( V_{S2} = 12.5 \text{ V}; P_D = 150 \text{ mW} \)

Fig. 13 Typical values; \( V_{S1} = V_{S2} = 12.5 \text{ V} \)

Fig. 14 Typical values; \( V_{S2} = 12.5 \text{ V}; P_D = 150 \text{ mW} \)
MECHANICAL DATA
Fig. 16 SOT-132C.

Dimensions in mm

Lead reference
1 = Input
2 = Earth
3 = Vgs1
4 = Earth
5 = Vgs2
6 = Earth
7 = Output

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