

## 440-520M,30W, 12.5V, 2 stage for Mobile radio

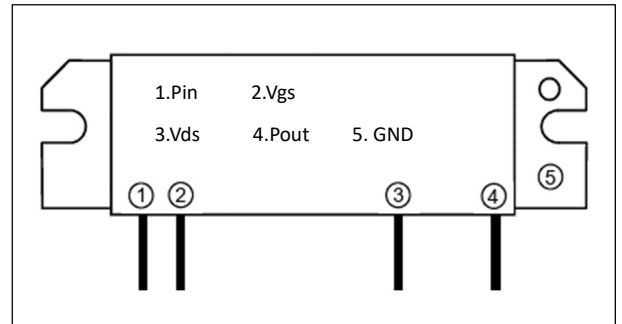
### Description

IA30N4452 is a rugged 30W RF LDMOS Amplifier Module for 12.5V mobile radios that operate in the 440 to 520MHz range. The battery can be connected directly to the drain of the modules. This module is designed for non-linear modulation, but may also be used for linear modulation by setting the drain quiescent current with the gate voltage and controlling the output power with the input power.



### Features

- Rugged LDMOS technology
- $P_{out} > 30W$ ,  $Eff > 50\%$  @  $V_{ds} = 12.5V$ ,  $V_{gs} = 5.2V$ ,  $P_{in} = 50mW$
- Broadband Frequency Range: 440-520MHz
- Metal shielding structure
- Module Size: 67 x 19.4 x 9.9 mm
- DC block capacitor integrated
- Linear and non linear operation supported



**Table 1. Maximum Ratings**

| Rating                         | Symbol    | Value       | Unit |
|--------------------------------|-----------|-------------|------|
| Drain--Source Voltage          | $V_{DS}$  | +65         | Vdc  |
| Gate--Source Voltage           | $V_{GS}$  | -10 to +10  | Vdc  |
| Operating Voltage              | $V_{DD}$  | +24         | Vdc  |
| Storage Temperature Range      | $T_{stg}$ | -65 to +150 | °C   |
| Case Operating Temperature     | $T_c$     | +150        | °C   |
| Operating Junction Temperature | $T_J$     | +225        | °C   |

**Table 2. ELECTRICAL CHARACTERISTICS ( $T_{case} = +25^{\circ}C$ ,  $Z_G = Z_L = 50\Omega$ , unless otherwise specified)**

| SYMBOL    | PARAMETER                | CONDITIONS  | MIN                                       | TYP | MAX | UNIT |
|-----------|--------------------------|---|---|-----|-----|------|
| f         | Frequency Range          | -   | 440                                       | -   | 520 | MHz  |
| $P_{out}$ | Output Power             | $V_{DD} = 12.5V$ , $V_{GG} = 5V$ , $P_{in} = 50mW$  | 30  | -   | -   | W    |
| $\eta$    | Total Efficiency         |   | 50  | -   | -   | %    |
| $2f_0$    | 2 <sup>nd</sup> Harmonic |   | -   | -   | -40 | dBc  |
| $3f_0$    | 3 <sup>rd</sup> Harmonic |   | -   | -   | -60 | dBc  |
| $in$      | Input VSWR               |   | -   | -   | 4:1 | -    |
| $I_{DD}$  | Leakage Current          | $V_{DD} = 17V$ , $V_{GG} = 0V$ , $P_{in} = 0W$  | -   | -   | 3   | mA   |
| -         | Load VSWR Tolerance      | $V_{DD} = 15.2V$ , $P_{in} = 50mW$ , $P_{out} = 30W$ ( $V_{GG}$ adj.),<br>Load VSWR = 20:1 (All phase)                          | No degradation or destroy                 |     |     | -    |
| -         | Stability                | $V_{DD} = 10/12.5/15.2V$ ,<br>$P_{in} = 25/50/70mW$ ,<br>$P_{out} \leq 40W$ ( $V_{GG}$ control),<br>Load VSWR = 3:1 (All phase) | No parasitic oscillation more than -60dBc |     |     | -    |

Figure 1: Network analyzer Output S11/S21

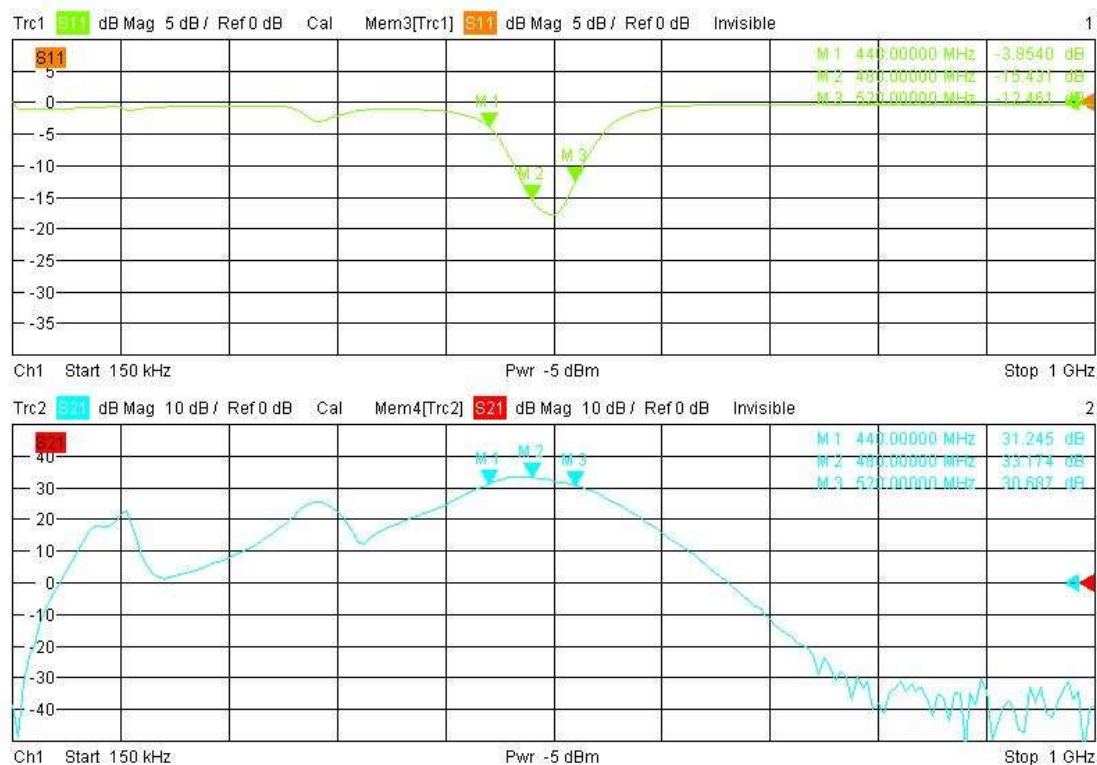
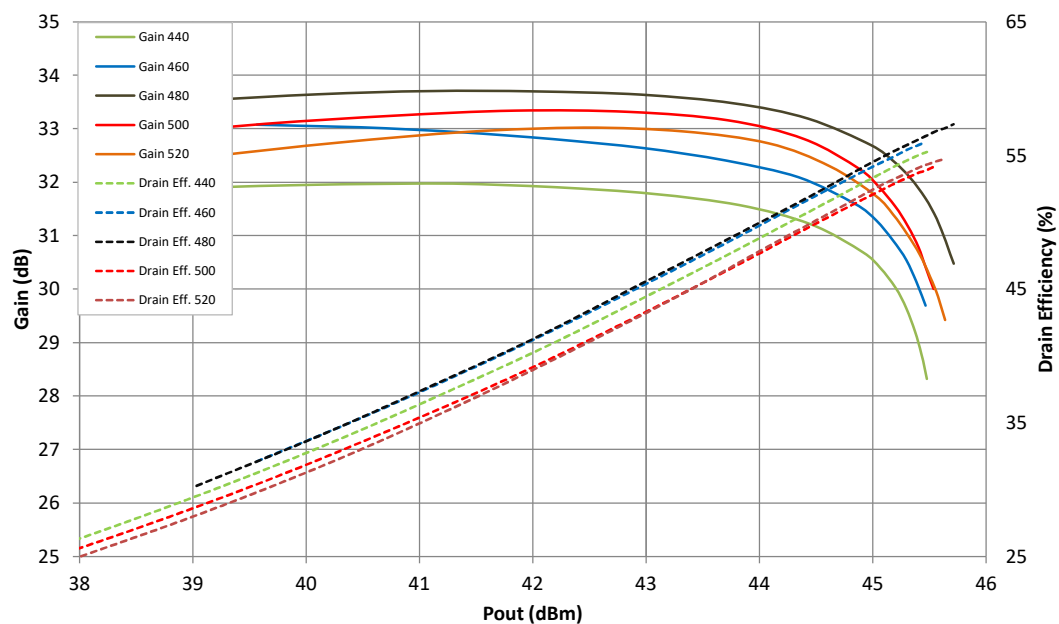


Figure 2: CW Power gain, Efficiency as function of output Power

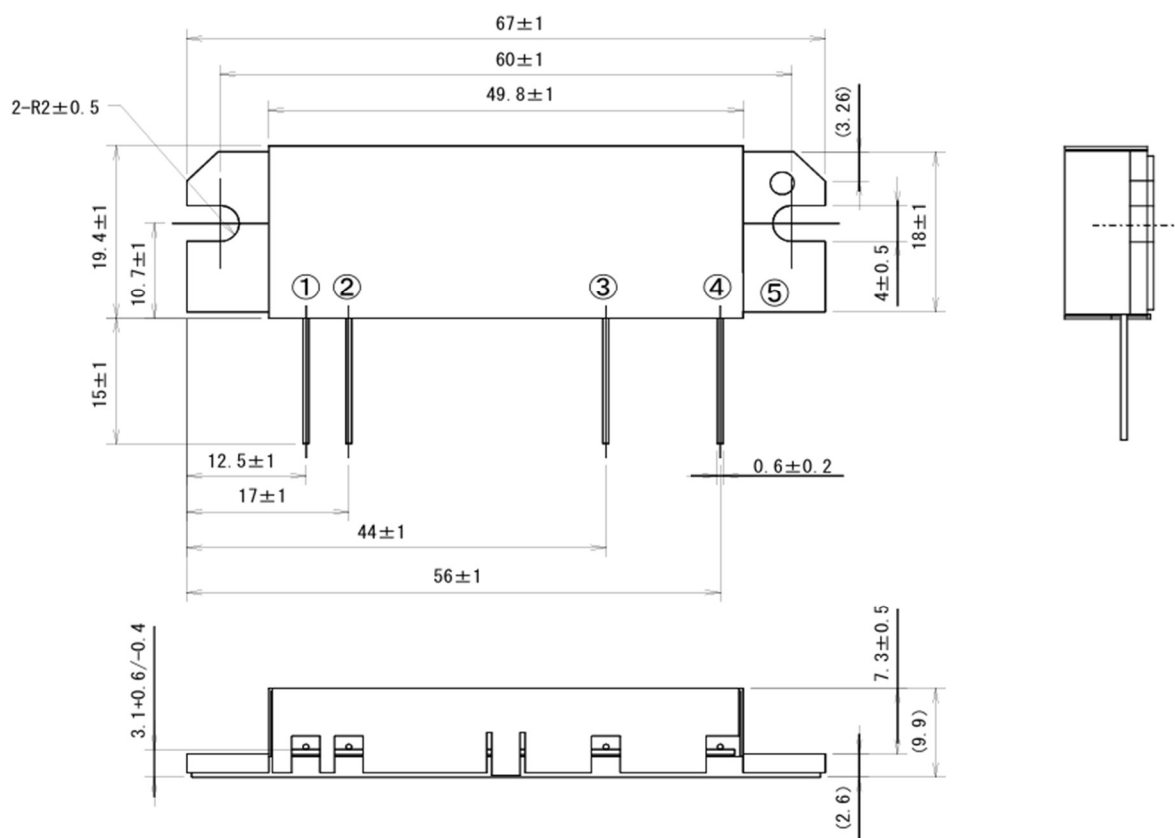



| $V_{DS}=12.5V$ , $V_{gs}=5.2V$ , $I_{dq}=560mA$ |         |                |           |         |         |
|---|---------|----------------|-----------|---------|---------|
| Freq (MHz)                                      | P1(dBm) | P1 Gain ( dB ) | P3dB(dBm) | P3dB(W) | EFF (%) |
| 440   | 44.65   | 31.0           | 45.40     | 34.7    | 55.0    |
| 450   | 44.23   | 31.5           | 45.24     | 33.4    | 54.7    |
| 460   | 44.34   | 32.1           | 45.39     | 34.6    | 55.7    |
| 470   | 44.65   | 32.5           | 45.57     | 36.1    | 56.8    |
| 480   | 44.95   | 32.7           | 45.67     | 36.9    | 57.2    |
| 490   | 44.99   | 32.7           | 45.63     | 36.6    | 56.4    |
| 500   | 44.79   | 32.4           | 45.48     | 35.3    | 53.9    |
| 510   | 44.73   | 32.3           | 45.43     | 34.9    | 53.6    |
| 520   | 44.81   | 32.0           | 45.54     | 35.8    | 54.5    |

Figure 3: Test circuit



**Flanged package; 2 mounting holes; 4 Pins, Unit:mm**



| OUTLINE<br>VERSION | REFERENCE |       |       | EUROPEAN<br>PROJECTION   | ISSUE DATE |
|--------------------|-----------|-------|-------|--|------------|
|                    | IEC       | JEDEC | JEITA |  |            |
| PKG-               |           |       |       |  | 06/17/2024 |

## Revision history

Table 5. Document revision history

| Date      | Revision | Datasheet Status           |
|-----------|----------|----------------------------|
| 2024/6/17 | Rev 1.0  | Product Datasheet Creation |
|           |          |                            |
|           |          |                            |

Application data based on HL-24-10

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