

APPLICATION NOTE
NEW MAR-8A AND MAR-8ASM AMPLIFIERS
(AN-60-024)

**BENEFITS RELATIVE TO MAR-8 AND MAR-8SM, AND GUIDANCE FOR
USERS**

Mini-Circuits is introducing a new series of high-gain Darlington amplifier offering several advantages over Models MAR-8 and MAR-8SM:

- Unconditionally stable: stability-factor $k > 1$ and stability-measure $\beta > 0$ at all frequencies.
- Less power dissipation with similar output power, for lower junction temperature and higher reliability.
- Can operate with lower DC supply voltages, due to device voltages being lower.
- For same DC supply voltages MAR-8A and MAR-8ASM use higher resistor values, so user can omit RF choke in some applications for cost saving.

Bias Resistors

The required resistor values are listed in the specification sheet for each amplifier. As examples, for 10V, 12V and 15V DC supply voltages the recommended resistors (standard 1% values) are:

	10V	12V	15V
MAR-8/MAR-8SM	61.9 ohms	118 ohms	200 ohms
MAR-8A/MAR-8ASM	174 ohms	226 ohms	309 ohms

For MAR-8A and MAR-8ASM, which operate at the same 36mA bias current as MAR-8 and MAR-8SM, the increase in resistor values is due to the typical device voltage being 3.8V instead of 7.8V. Adding a 110-ohm resistor to the existing bias resistor is a good way to make the conversion. If the user chooses to omit the RF choke in the bias circuit, there is less penalty in gain and output power than with MAR-8 and MAR-8SM because of the higher value of bias resistor shunting the external load.

Minimum DC Supply Voltage

As a guideline for good stability of bias current over temperature, choose a DC supply voltage at least 2V higher than the device voltage. Thus, for MAR-8A and MAR-8ASM the DC supply can be as low as 7V, while it should not be less than 10V for MAR-8 and MAR-8SM.