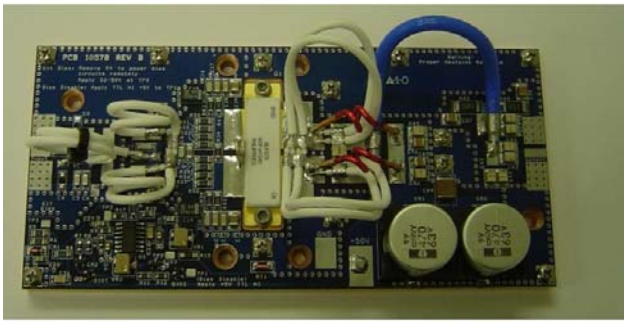
Broadcast Concepts Inc
11700 NW 102nd Road Suite 4Medley FL 33178
Tel: 305.887.8400 FAX 305.887.8444

Model P600XR-B3TV TV Pallet Amplifier Module

This amplifier module is ideal for final output stages in analog and digital TV broadcast equipment.

- **170 – 230MHz (CH 7 – 13)**
- **50 Volts**
- **Input/output 50 ohms**
- **Pout: 600W Peak Sync.**
- **300 Watts digital power.**
- **21dB Gain**
- **NXP BLF188XR Mosfet**

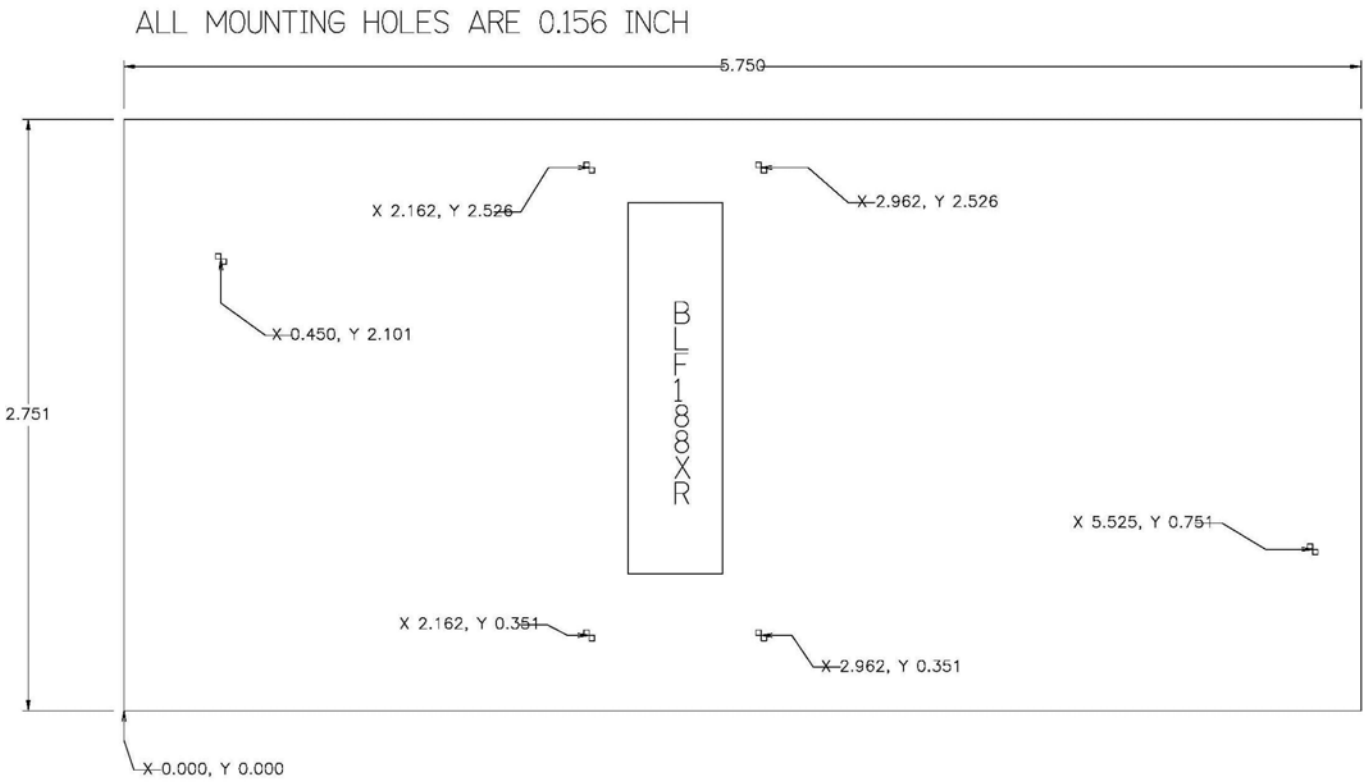


Dimension (L x W x H inch) [5.75” x 2.75” x 1.25”]

Electrical Specifications				
Characteristics	min	typ	max	unit
Operating Frequency range	170		230	MHz
Analog TV peak power	600			W
Analog TV average power	275			W
8VSB Digital TV -47dB shoulder uncorrected	275	300		W
DVB Digital TV (Estimated uncorrected)	250			W
Power Input		2	3	W
Input VSWR		1.15	1.2	VSWR
Power Gain	20	21	22	dB
Collector Eff – 600W Average 8VSB	40	42		%
Collector Current 600W Average 8VSB		14	15	A dc
Absolute maximum current rating			16	A dc
Insertion Phase variation (unit to unit)		+/-3.5		degrees
Power gain (unit to unit)		+/-1.0		dB
F2 Second Harmonic		-30dB		dB
F3 Third Harmonic		-25dB		dB
Bias Current per transistor: Factory set @50V.		2.4		A dc
Drain voltage supply	48	50	52	V
Base plate operating temperature	0	n/a	70	Celsius
Load Mismatch (All phase angles, Id=16A, 10 seconds)			65:1	VSWR
Shipping Weight		1.5		LBS

Broadcast Concepts Inc
11700 NW 102nd Road Suite 4Medley FL 33178
Tel: 305.887.8400 FAX 305.887.8444

Amplifier Mechanical Drawing: Figure 1



This drawing may be downloaded in DXF format: http://broadcastconcepts.com/177300/P600XR.DXF

Heatsink Mounting/Hardware

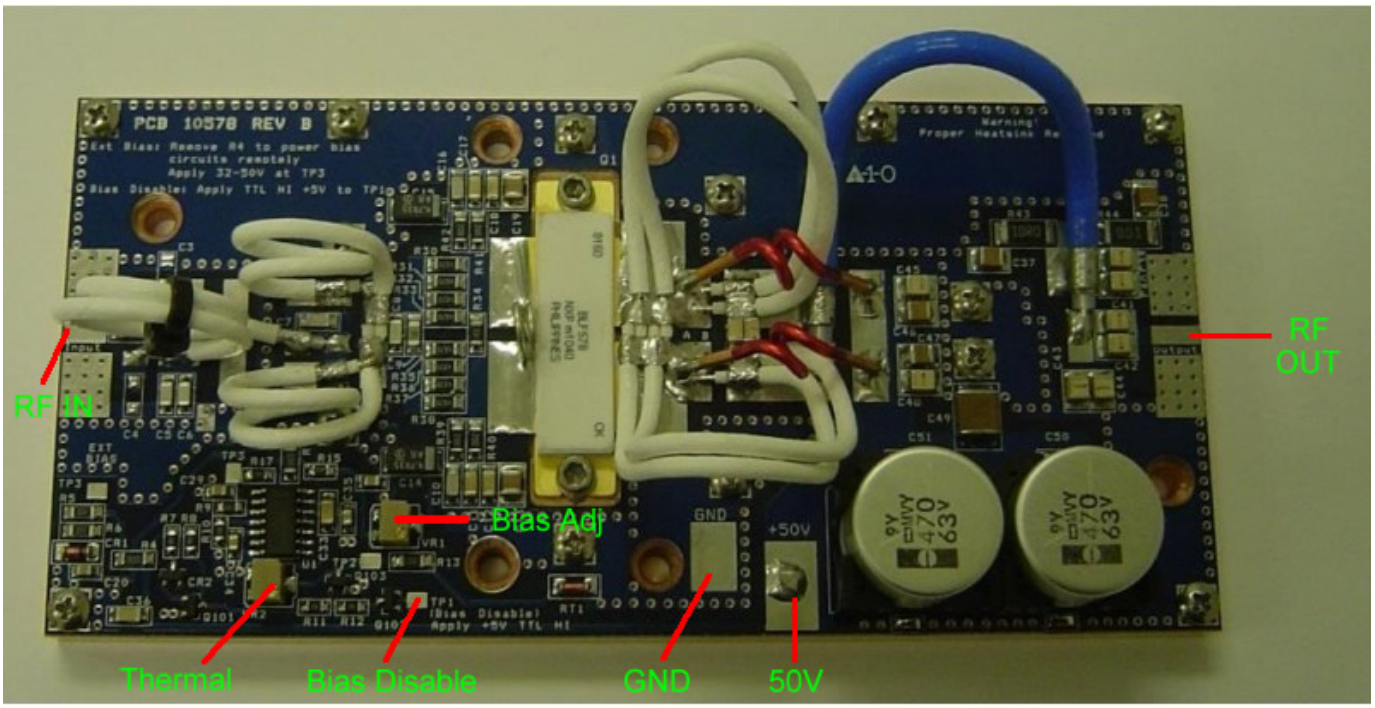
Tips for Mechanical Mounting:

1 All holes (Designated “A thru E”) are 0.156 inch thru and they are designed for a #6 Screw. Stainless Steel mounting hardware is recommended, grade 18-8 or better. A lock washer of same material should also be used.
2 Ensure mounting surface is flat to better than 0.0025”
3 Use a thin layer of thermal compound on the backside of the PA - no more than 0.001” - 0.002” thickness!
4 Torque all screws to 10-12 in-lbs

Use of cooling air on top of pallet to keep output transformers cool is recommended. Output transformers are rated for continuous operation at 150C. Keep all external circuitry away from input and output transformers to avoid interference - give at least 0.5 inch clearance above tallest cables to avoid creating feedback loops.

Warning: Failure to use a proper heat sink and/or improper installation will cause the transistors to burn out. This type of failure is not covered by warranty. This product can be ordered with a custom heat sink. Please contact factory for more information.

Broadcast Concepts Inc
11700 NW 102nd Road Suite 4Medley FL 33178
Tel: 305.887.8400 FAX 305.887.8444



There is 1 50V pad. The Meanwell RSP1000 or SE1000 are the suggested power supplies for this pallet.

Ground can be attached to the heatsink. An optional ground pad is provided on the amplifier board as shown above.

The bias pots marked “Bias Adj” controls the bias current for BLF188XR. The factory setting is 2.4Amps.

Electrical Connections:

When bias adjustment is required always use a small lab supply that is current limited. This will prevent accidental over bias and loss of a transistor.

The adjustment pot marked “Thermal” sets up the thermal compensation slope. Adjustment of this pot is not required; however, if it is accidently tampered with simply re-adjust it until “7.2 volts” is present at TP3 (located closest to the LM723 IC) as this is the factory setting.“Bias disable” removes bias voltage from the transistor. A voltage above 2.0V is required to activate the “bias disable” condition.

If transistor replacement is necessary always verify that the bias circuits are functioning before installing new parts. Transistor pocket must be cleaned with alcohol, all debris removed and new thermal compound applied prior to installing new transistor. Bias voltage should be adjusted to 0.5V before new part is installed. We assume no responsibility for self repairs. Please consider sending pallet back to factory for service.

Broadcast Concepts Inc
11700 NW 102nd Road Suite 4Medley FL 33178
Tel: 305.887.8400 FAX 305.887.8444

Warning: **Solid state amplifiers can be easily destroyed! Operating the amplifier outside of its specifications will cause the mosfets to fail. These failures are not covered by warranty.**

- Do not over drive the amplifier.
- Do not run the amplifier into an open circuit. Do not run the amplifier when the SWR is unknown. System integrator must foresee adding VSWR protection if there is a risk that the amplifier will be subjected to high VSWR conditions. Do not adjust the bias settings or attempt transistor replacement without a current limited lab supply.
- Do not allow the amplifier to overheat. Do not let the base plate temp exceed 70C. This amplifier is capable of dissipating over 400W in the maximum working condition. **This product requires prior experience working with high power RF amplifiers. This is not for beginners.**
- This amplifier has been designed for analog and digital TV modulation only. Under no circumstances should CW signals be applied. CW signals may cause the transistor to over-dissipate and burn out. We have amplifiers that are designed for CW non-linear service based on the BLF188XR. Please contact factory for more information.
- Expensive test equipment like RF wattmeters, dummy loads, Ammeters and thermal meters are required to verify proper installation. Operating this amplifier without this equipment is like driving blind. You won't be able to see what's really going on and the end result could be transistors that burn out.

Broadcast Concepts Inc
11700 NW 102nd Road Suite 4Medley FL 33178
Tel: 305.887.8400 FAX 305.887.8444

Calculating Die Temperature:

How do you know if the amplifier is running to hot? There are symptoms to watch for. If there is a significant drop in power of more than 5% over a short period of time the amplifier is likely overheating.

There is a scientific method that must be used to verify that the amplifier is installed and running within thermal limits. We do not recommend the "dropping power with time test" described above.

Use the thermal resistance (Rth) of the device to calculate the junction temperature. The Rth from the junction to the device flange for the BLF188XR is 0.11 °C /W. If the device is soldered down to the pallet baseplate, this same value can be used to determine Tj. If the device is greased down to the pallet baseplate, the Rth(j-h) value becomes 0.26K/W, as the thermal resistivity for the grease layer from the flange to the baseplate is approximately 0.15 °C /W.

Note: *We always use thermal grease under transistors because soldering them directly would render the pallets unserviceable.*

Example: Assuming that the device is running at 300W with the RF output power at 50V while consuming 14 amps on a pallet baseplate (e.g. 70 °C). Tj can be determined based on this condition for the given baseplate temperature:
• Dissipated power (Pd) = (50V x 14A) – (300W) = 400W
• Temperature rise (Tr) = Pd ´ Rth = 400 W (0.26 °C/W) = 104 °C
• Junction temperature (Tj) = Th + Tr = 70°C + 104 °C = 174 °C

The best way to make this calculation is to measure the temperature of the transistor flange directly. In this case temperature rise is calculated using 0.11°C/W.

The maximum junction temperature for most LDMOS devices is 200C. We suggest staying under 175C. In the example above a base plate temperature of 70C was used. When the pallet is mounted to an efficient heatsink like one of our bonded fin models base plate temperatures in the 50C range are easily maintained at full output power.