

## HPA Series

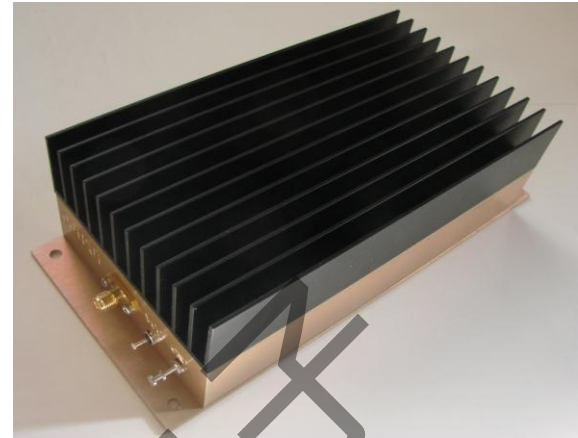
## 430-530MHz 22-28W RF Power Amplifier

### Features

- Frequency Range: 440-520MHz (min)
- Gain: 39.5dB (typ.)
- $P_{3dB}$ : > +43.5dBm
- $P_{sat}$ : > +44.5dBm
- DCpower: 12V (nominal), 9-15V OK
- SMA-Female connectorized
- Typ. for Mobile Radio, HAM Radio, etc

**28Watt RFpower out** (@ $P_{sat}$ ), under special (non-standard) warranty.

### Photo



### Description

HPA-480 is a 22Watt output (min. @ $P_{3dB}$ ) RF Power Amplifier; within frequencies of 440 to 520MHz; operating from a single 12VDC power supply. Also usable within 430-530MHz, 9-15VDC (not recommended). With proper (active) cooling is capable of

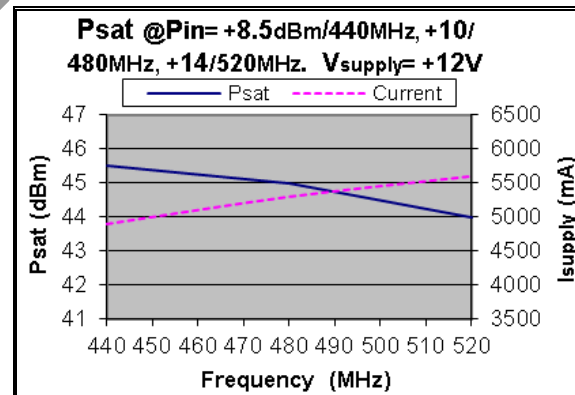
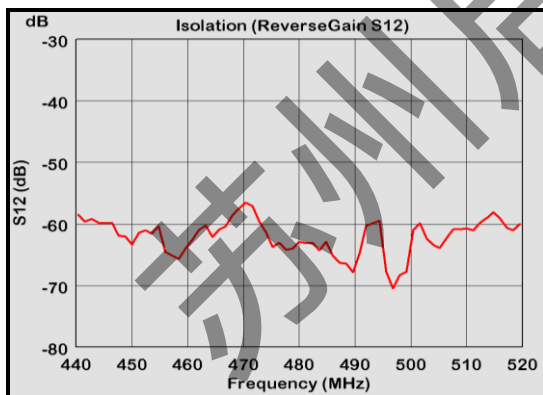
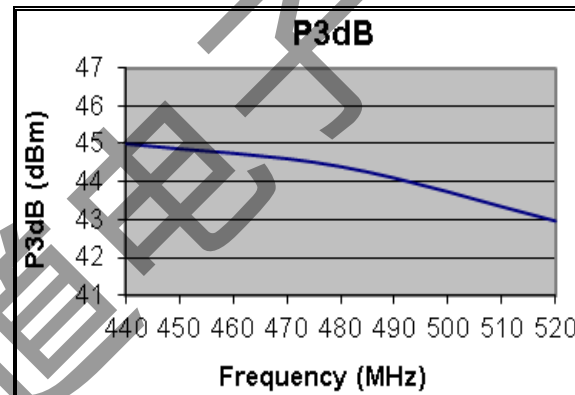
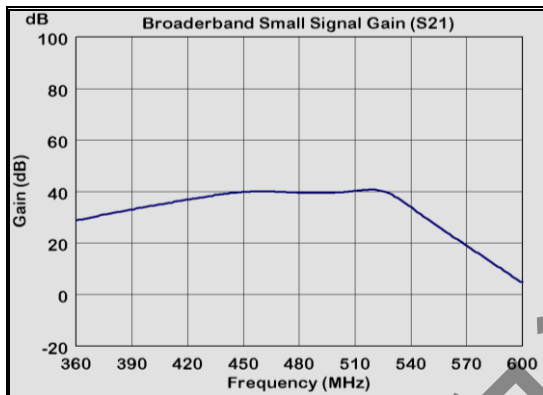
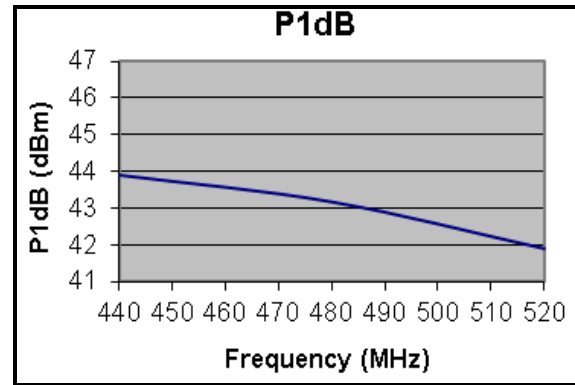
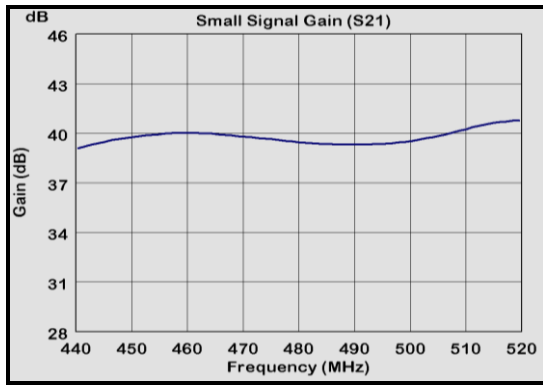
### Electrical Specifications @ +25°C, $Z_{in}=Z_{out}=50\Omega$ , $V_{supply} = +12VDC$

**IMPORTANT: MUST USE ACTIVE COOLING IF CASE TEMP. EXCEEDS 65°C or to ACHIEVE MAX. RFpower Output over 16W upto 28W (over +42dBm upto +44.5dBm).**

Parameter	Unit	Minimum	Typical	Maximum
Frequency Range	MHz	440 [430]		520 [530]
Small Signal Gain	dB	39.0	39.5	40.7
Output Power - 3dB gain compr. ( $P_{3dB}$ )	dBm	+43	+44.5	+45.0
Output Power - saturated ( $P_{sat}$ )	dBm	+44.0	+45.0	
Reverse Isolation (S12) @480MHz	dB		-62	-56
VSWR - Input (S11)	ratio:1	1.5 @440MHz	1.7	2.0 @520MHz
VSWR - Output (S22)	(unitless)	2.5 @480MHz	3.8	5.7 @440MHz
VSWR - Load Tolerance (non-destructive)	ratio:1			18:1
Efficiency @480MHz & $P_{out}$ in dBm	%	<31 @ $P_{out}<+40$	39 @ $P_{out}+42$	47 @ $P_{out}+44$
DCpower Supply - voltage (unipolar, positive)	V	9 not recommended	<b>12</b>	15 not recommended
DCpower Supply - current: quiesc. (no RF)	A	0.8	1.0	
@ $P_{out} = +40dBm$	A		2.8	3.1
Size (incl. all hardware & heatsink [standard])	Inch	7.00 (L) x 3.25 (W) x 2.00 (H)		
Weight (incl. all hardware & heatsink [standard])	Oz	24		

**HPA Series****430-530MHz 22-28W RF Power Amplifier****Typical Performance @ +25°C**

(Power &amp; S-parameters also available for download)

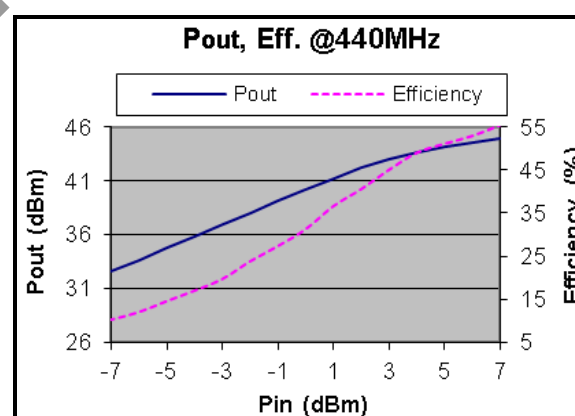
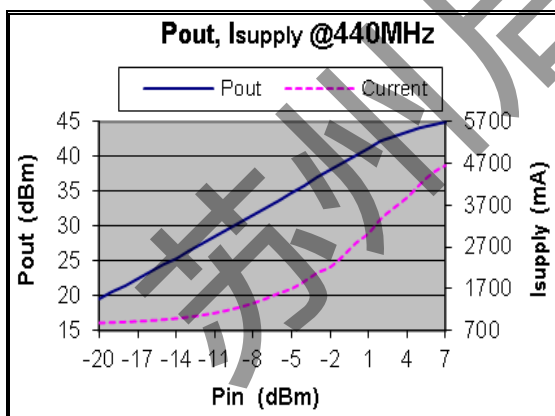
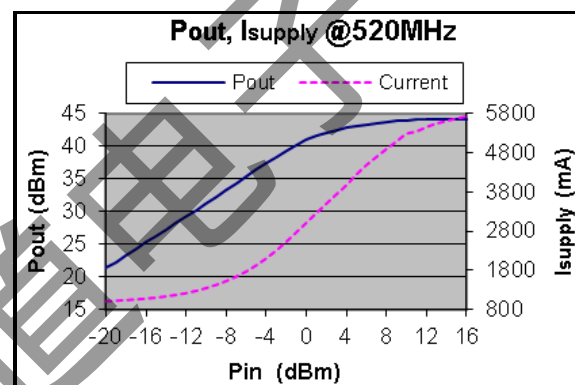
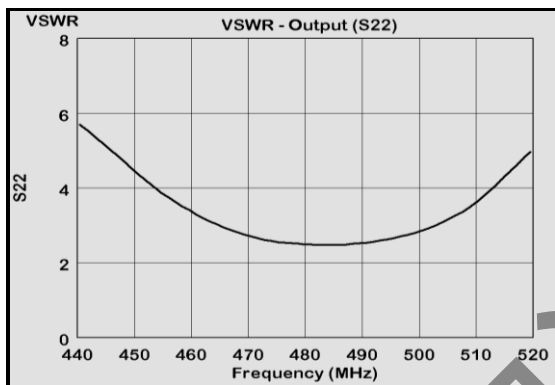
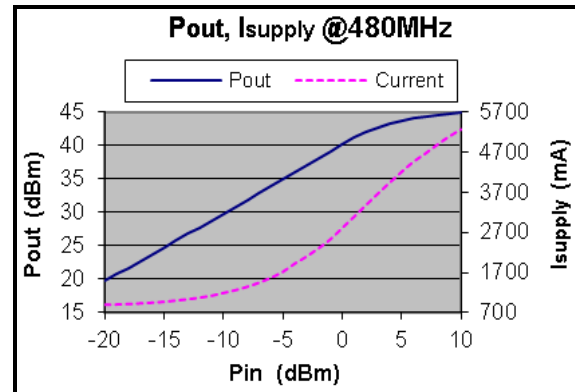
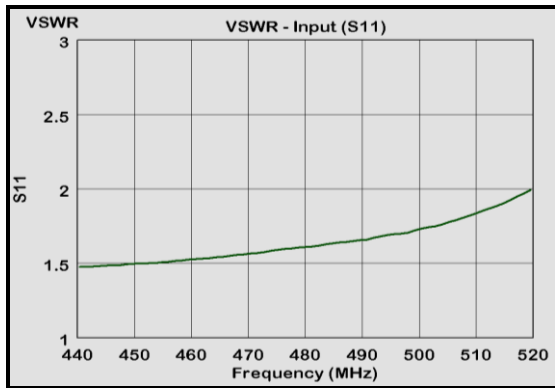


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### Typical Performance @ +25°C

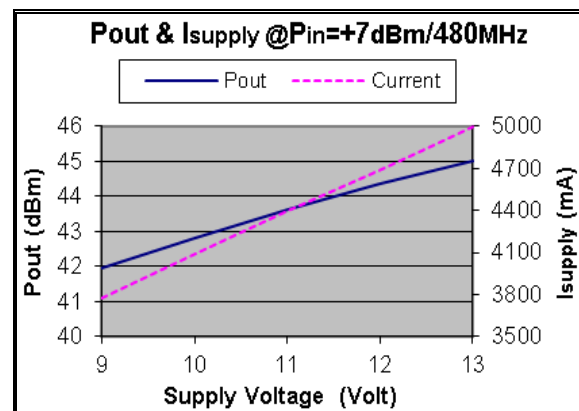
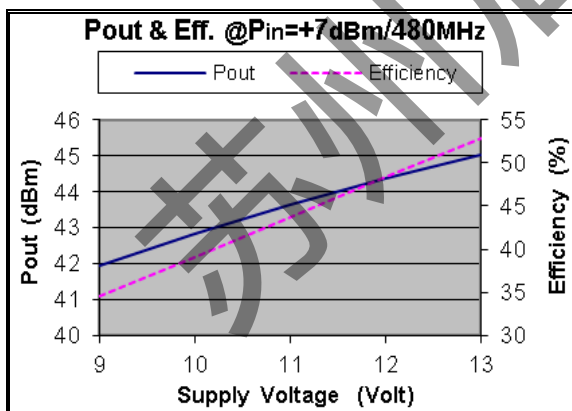
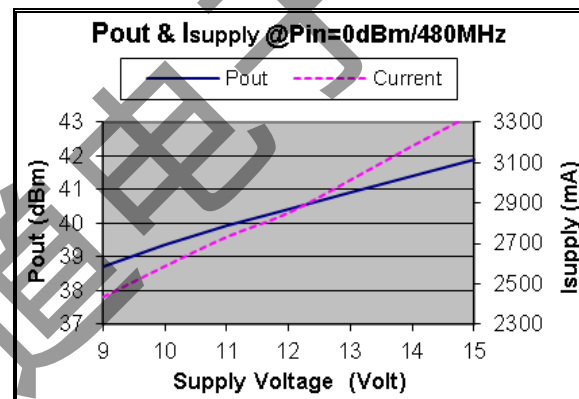
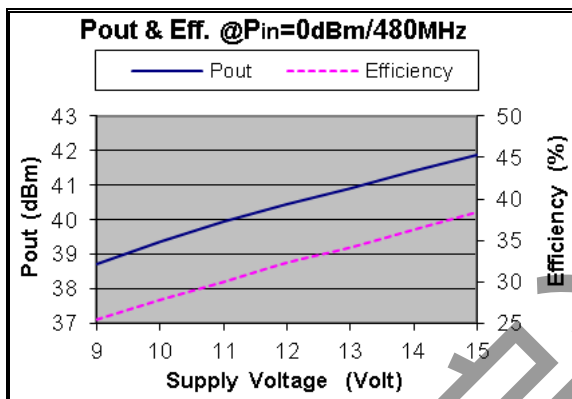
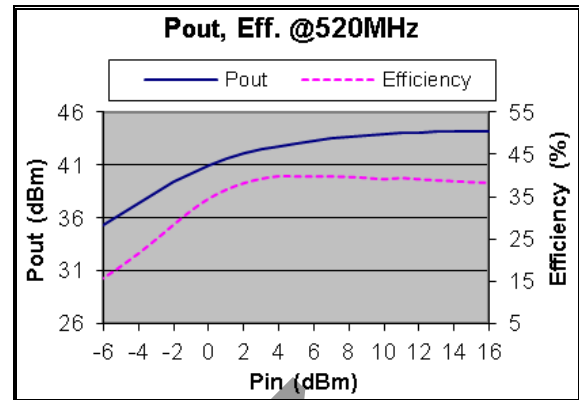
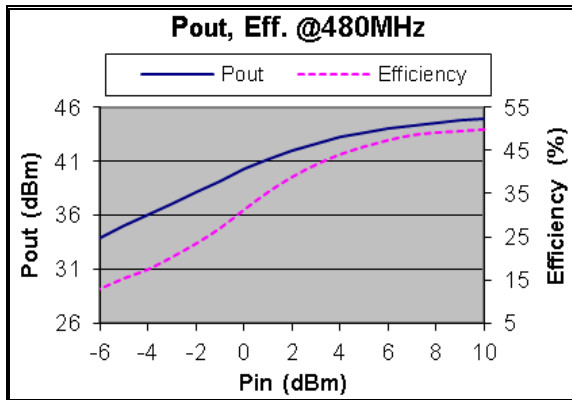
(Power & S-parameters also available for download)



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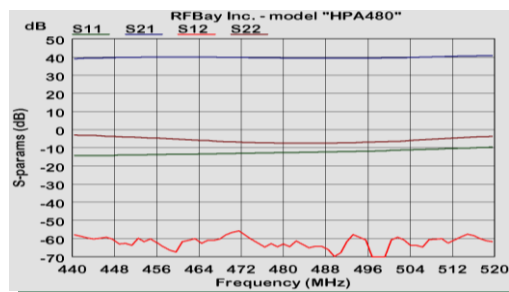


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### Absolute Maximum Ratings

Parameter	Absolute Maximum
RF Input Power	+15dBm
Supply Voltage	+16V
Operating Temperature	-30 °C to +65 °C
Storage Temperature	-55 °C to +100 °C



The above parameters are independently guaranteed and are @Tcase <23°C, unless otherwise specified

### APPLICATION NOTES (reliability):

#### • Thermal:

Specifications shown above as graphs, are at room temperature (23-25°C i.e. in a controlled environment), per international standard. If Amplifier's temperature is let rise significantly (e.g. towards max. 65-70°C) in customer's use, DCpower (supply) current may rise and stabilize at approx. 200-450mA higher values vs. shown in graphs, especially if at the same time RF PowerOut is driven beyond approx. 12Watt (contributing to selfheating, besides ambient temperature) - which is normal. Such increase in DCsupply current due to higher than standard ambient temperature, is less pronounced at low RF PowerOut; at below 1Watt it may add less than 90mA vs. current @25°C. Amplifier is designed to operate normal at **ANY** temperature or RF PowerOut within specs, this notice is only a recommendation to expect higher DCcurrent if user allows heat build-up far above standard 25°C.

Stock Heatsink is removable & upgradeable by the user, additionally Mountplate (opposite of heatsink) is strongly recommended to mount on a surface conducting heat away (e.g. mass of metal); some customers use active cooling such as fans (for extreme environment, even liquid cooling is an option), however be careful to not generate ElectroStatic Fields harmful for RF/Microwave devices. Use of inadequate Heatsink or HeatSpreader instead of stock, or inappropriate thermal-interface-material (TIM, i.e. grease, paste, semi-solids) voids warranty; *RF Bay Inc.* reserves the right to determine if a unit submitted for warranty service had been thermally abused. The key to reliability, is not only to minimize temperature rise, but also avoid repetitive thermal gradient (shock) due to cold-hot-cold cycling; these Amplifiers are meant for Commercial (rather than Mission-Critical) Mobile communications; in particular in Base & Fixed station applications with long-term continuous transmission and a higher On-Off frequency, please consider derating, redundancy system, maintenance schedule, or otherwise assure reliability.

#### • Oscillation & Load VSWR:

This amplifier's rugged design can withstand Load VSWR mismatch upto 18:1 (no degradation/destruction), guaranteed stable (no parasitic self-oscillation) for Pout<30Watt & Load VSWR under 3:1. If oscillation is observed, check if Load & Source impedances  $Z_L = Z_s = 50 \text{ Ohm}$ ; adding DCpower decoupling ceramic + electrolytic capacitors (in parallel, closest possible to amplifier & minimal parasitic inductance to Ground) may help but not necessary, because already present internally.

#### • ESD:

Sensitive to ESD voltages to approx. 1KiloVolt - as typical for RF/Microwave amplifiers, appropriate ESD precaution is required.

#### • Mounting & DCpower connection:

Avoid excessive or torque (twisting) force onto DC terminals

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### Outline (compact version)

Also available as a standalone higher-resolution 3D model (MCADsolid) & 2D drawing - see "Notes" on compact drawing (below):

