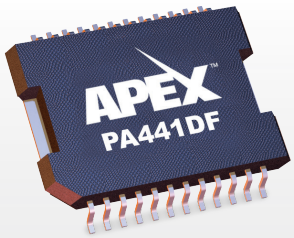
# PA441DF/PA441DW/PA443DF

## 350V Single, Dual Low-Noise Power Amplifier




24-PIN PSOP (STYLE DF)


10-PIN PowerSIP (STYLE DW)

## FEATURES

- Low 12µV RMS noise at 20kHz bandwidth
- Low voltage offset 5mV typical at 25°C
- Low cost
- High voltage operation 350V
- No second breakdown
- Single (PA441DF/PA441DW) or dual amplifier design (PA443DF)
- High output current 120mA PEAK
- Low quiescent current 2.2mA typical
- RoHS compliant
- Monolithic MOSFET technology
- Small packaging footprints

## Product Overview

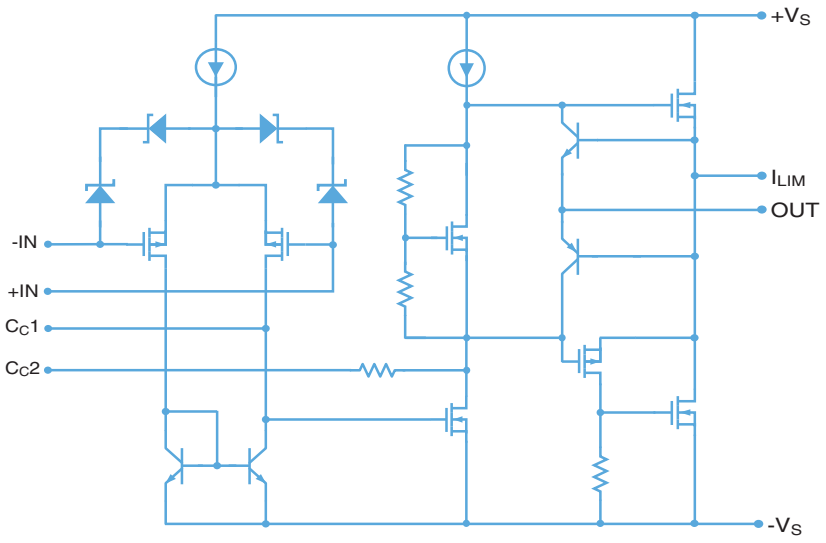
Now in its fourth product iteration, the PA441DF/PA441DW/PA443DF represent next generation performance of the popular Apex Microtechnology PA34X product family. These monolithic designs leverage improvements in a specialty high voltage process to provide a staggering 96 percent reduction in noise and an equally impressive 2X improvement in offset voltage. For piezo positioning applications, a low noise rating of 12µV RMS at 20kHz bandwidth (Cc = 68 pF) make the PA441DF/PA441DW/PA443DF the amplifiers of choice to drive these high voltage systems. In terms of offset voltage performance, 5mV at 25°C typical is the new specification, with just 20mV at full operating temperature range (-40°C to +125°C).

All three ICs operate on a wide voltage supply ranging from ±10V to ±175V. This is still considered an industry best for a power amplifier IC. The PA441DF/PA441DW are single channel models and will deliver 60mA of output current continuously, and up to 120mA PEAK, while exhibiting a very low 2.2mA of quiescent current. The dual-channel PA443DF will double the output current performance. In summary, these ICs rival the performance features of competing hybrid circuit designs, but at a much lower cost per unit and a greatly reduced packaging footprint.

## Target Applications

The PA441DF/PA441DW/PA443DF are low noise, 350V power amplifier ICs specifically designed for high voltage applications such as piezo-electric positioning, electrostatic transducers/deflection, deformable mirror focusing, biochemistry stimulators, and computer to vacuum tube interface. All three models are pin compatible to the PA341DF/PA341DW/PA343DF to provide drop-in replacement for existing sockets.

## Block Diagram



# PA441DF/PA441DW/PA443DF

## 350V Single, Dual Low-Noise Power Amplifier

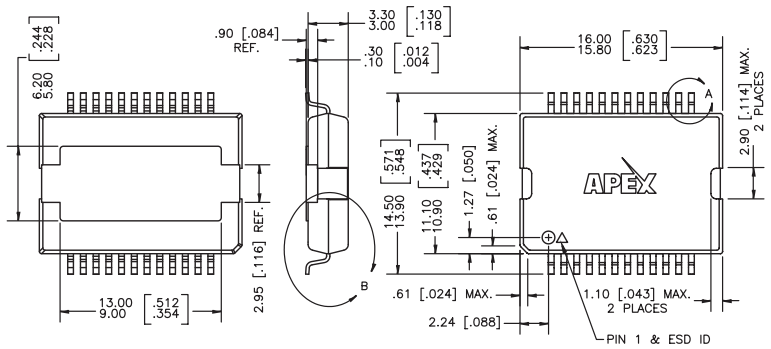
## Product Selector Table

| Parameter | PA341DF | PA441DF/ PA441DW | PA443DF |
|---|---|---|---|
| Maximum Supply Voltage | 350V | | |
| Output Current, continuous (case ≤+85°C) | 60mA | | 60mA x 2 |
| Output Current, PEAK (case ≤+85°C) | 120mA | | 120mA x 2 |
| Quiescent Current, typical | 2.2mA | | |
| Operating Temperature (case) | -40°C to +125°C | | |
| Noise, RTI,<br>* 10kHz BW / Rs=1k,<br>** 20kHz BW / Rs=2k | 337µV RMS* | 12µV RMS** | |
| Offset Voltage, initial, typical | 12mV | 5mV | |
| Open Loop Gain @ 15Hz, Rl=5kohm | 103dB | | |
| Power Bandwidth at 280Vp-p typical | 35kHz | | |
| Slew Rate (Cc=4.7pF), typical | 32V/µs | | |
| Package | 24-pin PSOP (Style DF) | 24-pin PSOP (DF)<br>10-pin SIP (DW) | 24-pin PSOP (Style DF) |
| Order Code | | PA441DF<br>PA441DW | PA443DF |

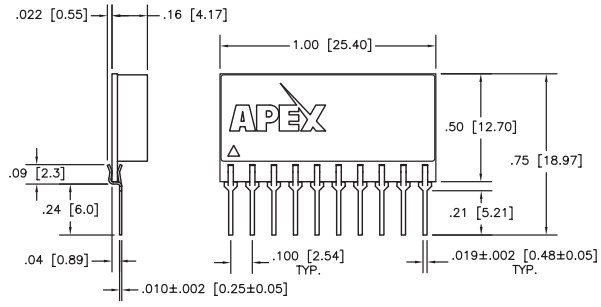
## Packaging, Evaluation Kit

The PA441DF and PA443DF both utilize a surface mount, non-hermetic, plastic 24-pin PSOP with a metal slug. The PA441DW is a thru-hole, space- saving, electrically isolated 10-pin ceramic PowerSIP package that lends itself to high-density circuit board layouts. Prototyping for these devices is made easy with the EK13 and EK42 breadboarding evaluation kits. The PA441DF and PA443DF can be used with the EK13, which includes a PCB and heatsink, and the EK42 is designed for the PA441DW.

24-Pin PSOP Package (Style DF)




10-Pin PowerSIP (Style DW)





### APEX MICROTECHNOLOGY INC.

5980 N Shannon Road
Tucson, Arizona 85741 USA
T: +1.520.690.8600
F: +1.520.888.3329

### SALES SUPPORT

Toll Free: +1.800.862.1032
eMail: custserv@apexanalog.com

### TECHNICAL SUPPORT

Toll Free: +1.800.546.2739
eMail: apex.support@apexanalog.com

**www.apexanalog.com**