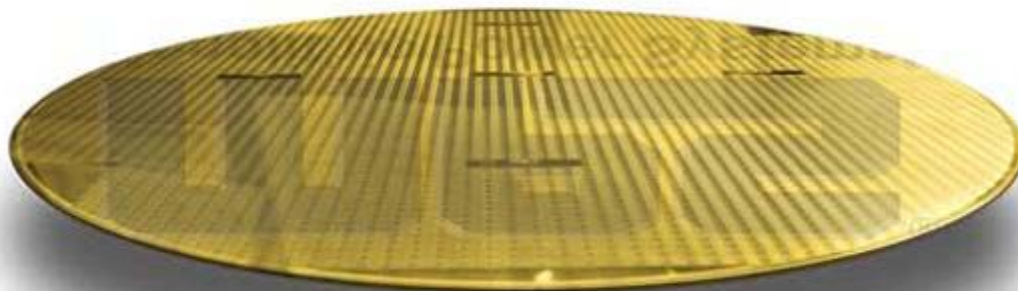


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**Monolithic Power Systems**<sup>®</sup>



***HR1200***

***High Performance PFC + LLC  
Combo Controller***

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***The Future of Analog IC Technology***<sup>®</sup>

□ Key Features and Performances

□ Comparison between HR1200 and TEA1716



## Key Features and Performance---System

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### ➤ High voltage current source for start up & Smart X-cap discharger

MPS Patent

- High cost effective due to less components count
- Target to meet:  $P_{in} < 150\text{mw}$  @  $P_o = 0\text{w}$  and  $P_{in} < 450\text{mw}$  @  $P_o = 250\text{mw}$

### ➤ Remote On/off Control

### ➤ Precise Brown-in/Brown-out protection

- Programmable threshold
- Programmable compensation with input current.

### ➤ Sync. operation of PFC and LLC at burst mode

### ➤ I2C functions & 1K EEPROM

### ➤ GUI for program parameters

### ➤ Record fault information

### ➤ OTP with auto restart



## Key Features and Performance---PFC part

### ➤ **Average current control with CCM/DCM operation**

MPS Patent

- $\eta > 96\%$  @ 10% load &  $V_{in} = 230V$
- THD < 10% at full load
- Harmonic meet IEC61000-3-2

### ➤ **Phase shift compensation to improve power factor.**

MPS Patent

- PF > 0.95 @ 20% load &  $V_{in} = 230V$  &  $C_{after-brige} < 1\mu F$

### ➤ **Programmable frequency jitter at CCM to improve EMI**

### ➤ **Adaptive digital control loop**

### ➤ **Programmable soft start**

### ➤ **Comprehensive fault protections for high system reliability**

- Cycle by cycle current limitation
- OCP with Hiccup, programmable restart and Latch
- Open/short protection for FB pin
- Output fast OVP
- Fast loop



## Key Features and Performance---LLC part

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➤ **High efficiency**

- ZVS over the entire load and line range
- Advance burst mode for higher light load efficiency

➤ **Low no load power consumption**

- Low start up current
- Low power supply consumption at burst mode

➤ **Adaptive dead time adjustment control for easy design**

➤ **Capacitive Mode protection for better reliability**

MPS Patent

➤ **50% Duty Cycle, Variable Frequency Control**

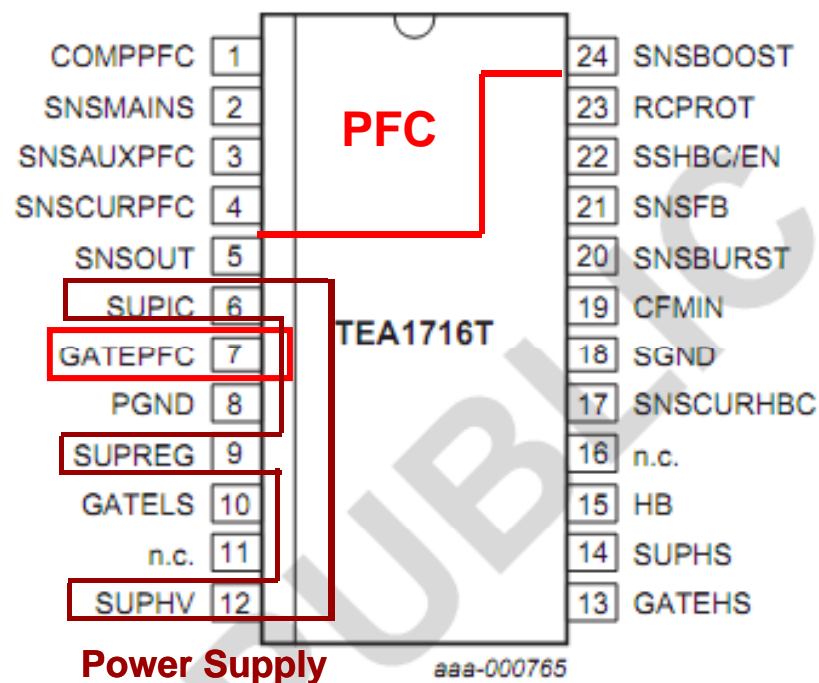
➤ **600V High-Side Gate Driver with Integrated Bootstrap Diode**

➤ **Comprehensive protection**

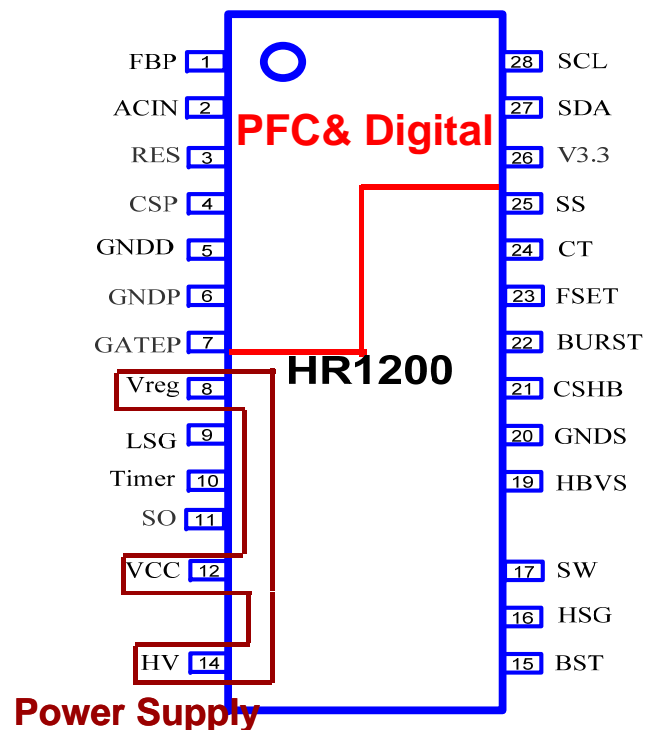
- Programmable soft start
- Two level OCP with frequency shift and latch
- Programmable timer for OCP
- Accurate output OVP and UVP
- Pin for latch functions



## HR1200 vs TEA1716---Package



**SOP-24**

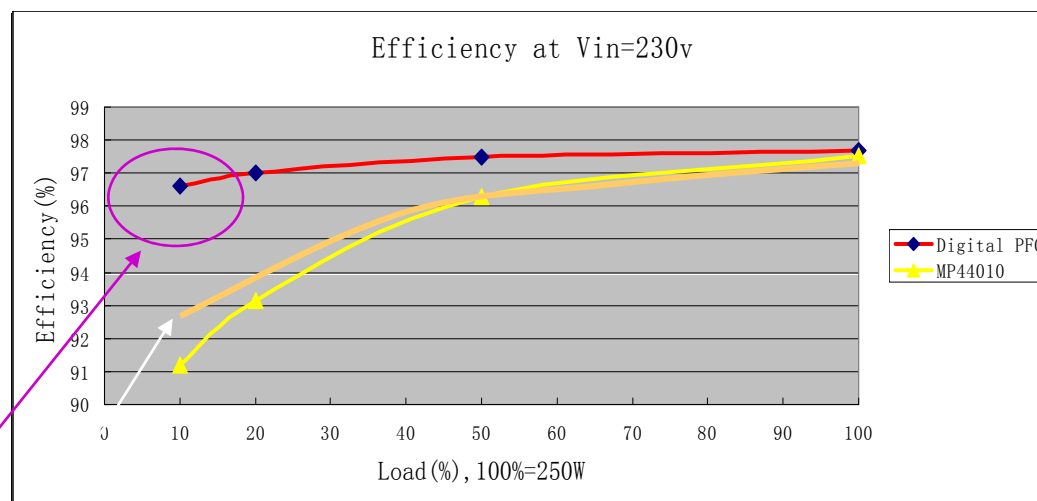


**TSSOP-28**

**Smaller outline**



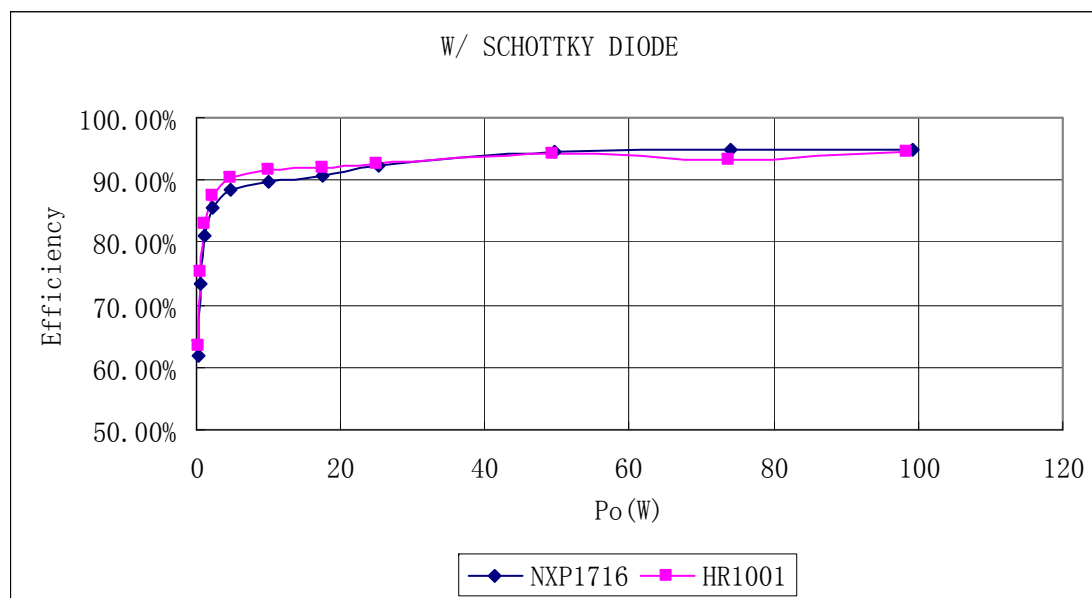
## MPS Advantage---PFC Efficiency



- ✓ TEA1716T have a little better efficiency at light than MP44010 due to Max. switching frequency is limited to 125KHz.
- ✓ Advanced digital PFC control scheme for high efficiency.



## MPS Advantage-LLC Efficiency

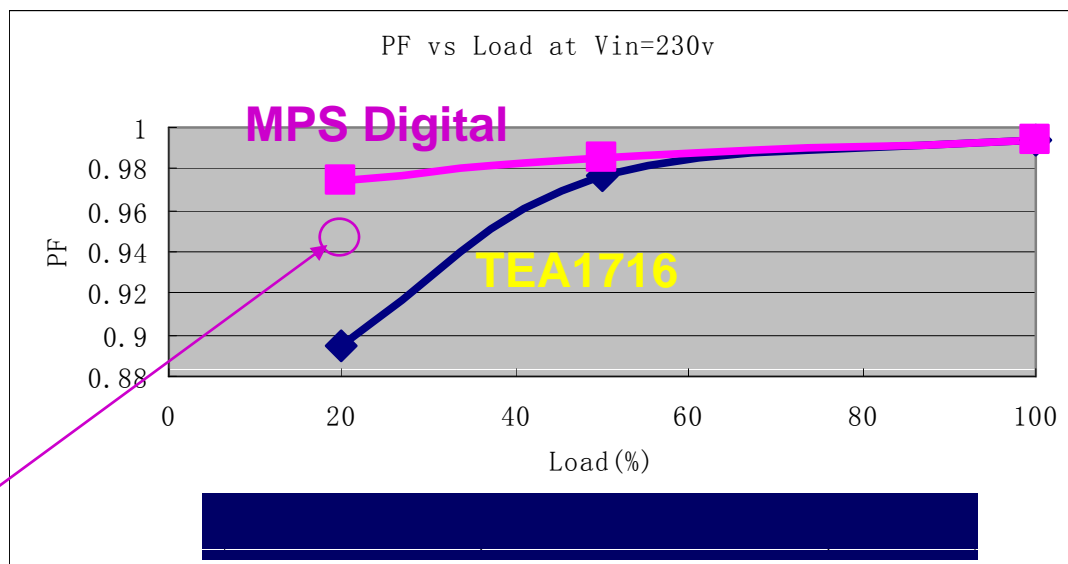


✓ At full load, HR1001 has comparable efficiency with TEA1716.

Overall for PFC+LLC, MPS has advantage on efficiency.



- High PF at Light load due to Cap current compensation

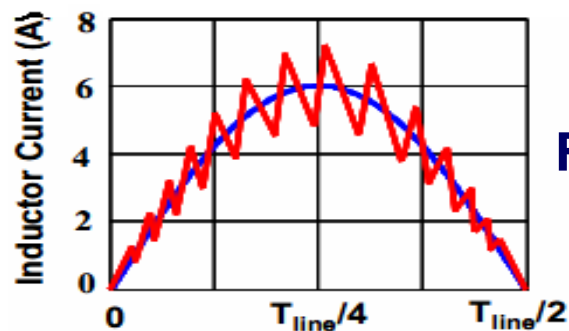


80 Plus, Titanium : PF>0.95 @  $\geq 20\%$  load and Vin=230v.

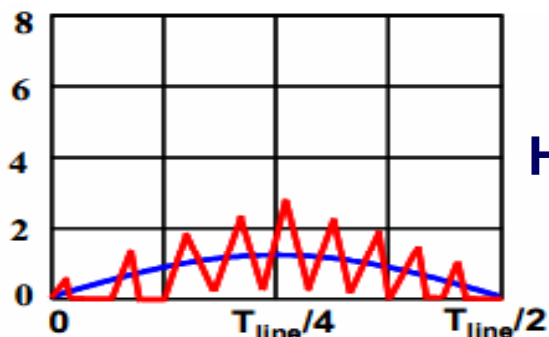
✓ Enhance PF at light load and high line by compensation.

**MPS Patent**

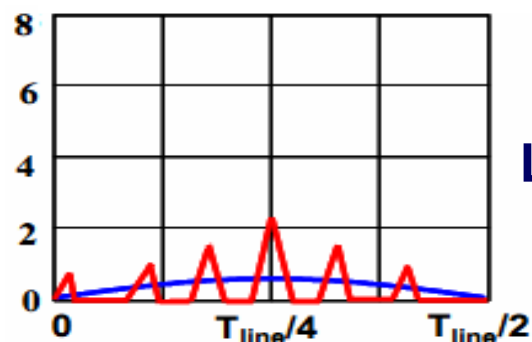
## Digital Algorithm



Full load



Half load



Light load

