**HIGH EFF. PFC Application**

**General conditions**

- Boost PFC
  - $V_{GE\text{on}} = +15 \, \text{V}$
  - $V_{GE\text{off}} = -5 \, \text{V}$
  - $R_{\text{gon}} = 4 \, \Omega$
  - $R_{\text{goff}} = 4 \, \Omega$
  - $V_{\text{in}} = V_{\text{inpk}} \cdot \sin(\omega t)$

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**Figure 1**

Typical average static loss as a function of input current

$P_{\text{loss}} = f(I_{\text{in}})$

At

- $T_{j} = 125 \, ^{\circ}\text{C}$
- $V_{\text{inpk}} / V_{\text{out}}$ from 0.1 to 1 in steps of 0.2

**Figure 2**

Typical average static loss as a function of input current

$P_{\text{loss}} = f(I_{\text{in}})$

At

- $T_{j} = 125 \, ^{\circ}\text{C}$
- $V_{\text{inpk}} / V_{\text{out}}$ from 0.1 to 1 in steps of 0.2

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**Figure 3**

Typical average switching loss as a function of input current

$P_{\text{loss}} = f(I_{\text{in}})$

At

- $T_{j} = 125 \, ^{\circ}\text{C}$
- DC link = 350 V
- $f_{\text{sw}}$ from 8 kHz to 64 kHz in steps of factor 2

**Figure 4**

Typical average switching loss as a function of input current

$P_{\text{loss}} = f(I_{\text{in}})$

At

- $T_{j} = 125 \, ^{\circ}\text{C}$
- DC link = 350 V
- $f_{\text{sw}}$ from 8 kHz to 64 kHz in steps of factor 2

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Figure 5
Typical available input current as a function of $V_{\text{inpk}} / V_{\text{out}}$

$\text{I}_{\text{in}} = f(V_{\text{inpk}}/V_{\text{out}})$

Per boost phase

At
$T_j = \ 125 \ \degree C$
DC link = 350 V
$f_{\text{sw}} = \ 50 \ \text{kHz}$
Th from 60 °C to 100 °C in steps of 10 °C

Figure 6
Typical available input current as a function of switching frequency

$\text{I}_{\text{in}} = f(f_{\text{sw}})$

Per boost phase

At
$T_j = \ 125 \ \degree C$
DC link = 350 V
$V_{\text{inpk}}/V_{\text{out}} = 0.9$
Th from 60 °C to 100 °C in steps of 10 °C

Figure 7
Typical available input current as a function of $V_{\text{inpk}} / V_{\text{out}}$ and switching frequency

$\text{I}_{\text{in}} = f(f_{\text{sw}}, V_{\text{inpk}}/V_{\text{out}})$

Per boost phase

At
$T_j = \ 125 \ \degree C$
DC link = 350 V

Figure 8
Typical available input current as a function of switching frequency

$\text{I}_{\text{in}} = f(f_{\text{sw}})$

Per boost phase

At
$T_j = \ 125 \ \degree C$
DC link = 350 V
$V_{\text{inpk}}/V_{\text{out}} = 0.4$
Th from 60 °C to 100 °C in steps of 5 °C
Figure 9

Typical available electric input power as a function of heatsink temperature

\[ P_{in} = f(T_h) \]

Per boost phase

At

\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 V

\[ V_{inpk}/V_{out} = 0.9 \, \text{kHz} \]

fsw from 8 kHz to 64 kHz in steps of factor 2

Figure 10

Typical efficiency as a function of input power efficiency = f(\( P_{in} \))

Total without rectifier

At

\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 V

\[ V_{inpk}/V_{out} = 0.9 \, \text{kHz} \]

fsw from 8 kHz to 64 kHz in steps of factor 2

Figure 11

Typical available electric input power as a function of heatsink temperature

\[ P_{in} = f(T_h) \]

Per boost phase

At

\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 V

\[ V_{inpk}/V_{out} = 0.4 \, \text{kHz} \]

fsw from 8 kHz to 64 kHz in steps of factor 2

Figure 12

Typical efficiency as a function of input power efficiency = f(\( P_{in} \))

Total without rectifier

At

\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 V

\[ V_{inpk}/V_{out} = 0.4 \, \text{kHz} \]

fsw from 8 kHz to 64 kHz in steps of factor 2
Figure 13       Rectifier
Typical average static loss as a function of input current

\[ P_{\text{loss}} = f(I_{\text{in}}) \]

Per boost phase

At
\[ T_j = 125 \, ^\circ\text{C} \]

Figure 14       Rectifier Bridge
Typical efficiency as a function of input power

\[ \text{efficiency} = f(P_{\text{in}}) \]

At
\[ T_j = 125 \, ^\circ\text{C} \]

Figure 15       Overall
Typical efficiency as a function of input power

\[ \text{efficiency} = f(P_{\text{in}}) \]

At
\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 \, V
\[ V_{\text{inpk}}/V_{\text{out}} = 0.9 \, \text{kHz} \]
fsw from 8 kHz to 64 kHz in steps of factor 2

Figure 16       Overall
Typical efficiency as a function of input power

\[ \text{efficiency} = f(P_{\text{in}}) \]

At
\[ T_j = 125 \, ^\circ\text{C} \]

DC link = 350 \, V
\[ V_{\text{inpk}}/V_{\text{out}} = 0.4 \, \text{kHz} \]
fsw from 8 kHz to 64 kHz in steps of factor 2