Forward Converter

D ≤ ½ restriction avoided by R-C-diode circuit to eliminate "rect coil"
Fig. 1. Forward converter with RCD clamp.

FET has high R.I.

Diode & coil for reset.
R-C diode replaces.
Fig. 2. Active Clamp Schematic.

Vout is low

For U7, U9, U16
Set-Drive Synchro

N DRIVE

Replace R-13 with 1kΩ

Input signal

Replace R-41125
Fig. 3. MOSFET Drain to source waveforms for $Q_1$ and $Q_2$ on the primary and $Q_3$ and $Q_4$ on the secondary side.
Fig. 4. (d) Fully balanced push-pull forward converter with terminal ripple current cancellation.

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Fig. 4.10 - 1 - Magnetic energy is stored in L1 - Current is transferred
Fig. 6. Power stage schematic

Active Clamp Design

Fig. 6 - Power Stage Schematic

Active Clamp Design
ACTIVE CLAMP FORWARD

\[
\frac{V_{OUT}}{V_{IN}} = \left( \frac{N_S}{N_P} \right) \times \left( \frac{R_{DS}}{T_P} \right) = \left( \frac{N_S}{N_P} \right) \times D
\]

\[
I_{Q1\ (\text{max})} = \left( \frac{N_S}{N_P} \right) \times I_{OUT}
\]

\[
V_{DS} = V_{IN} \times \left( \frac{1}{1-D} \right)
\]

\[
I_{D1} = I_{OUT \times D}
\]

\[
V_{D1} = V_{OUT} + V_{IN} \times \left( \frac{N_S}{N_P} \right) \times \left( \frac{1}{1-D} \right)
\]

Active Clamp and Reset Technique Enhances Forward Converter Performance (SEM1000)
Design Considerations for Active Clamp and Reset Technique (SEM1100)

Controls:

UCC3891, 2, 3, 4, 7
UCC3890, K
UC3824