

The 78253 series of converter transformers are specifically designed for use with the MAX253 chip set to provide isolated power supplies. The 5V version can supply 1W and the 3.3V version can supply 500mW. A centre tapped secondary winding allows for full bridge, half bridge or voltage doubling.

The surface mount devices are fully compatible with CECC00802 to 280°C which allows them to be placed and reflowed with IC's thus reducing time and cost in production.

TEST CIRCUIT

All characterisation curves are derived from tests using the test circuit shown in figure 1 featuring a MAX253 driver IC, a pair of ZDX6 fast rectifier diodes and a 10µF tantalum output capacitor.

Figure 1: Test Circuit

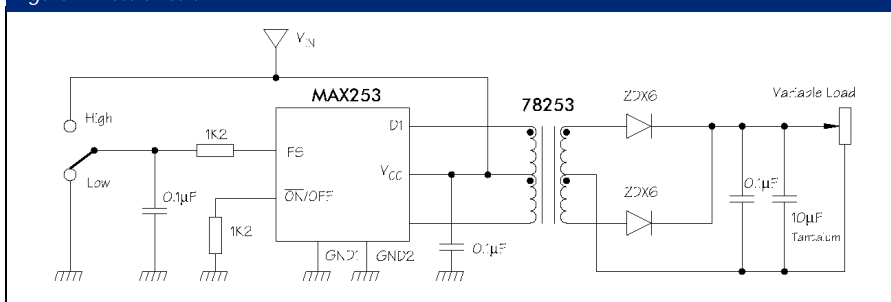


Figure 2: Input Filtering

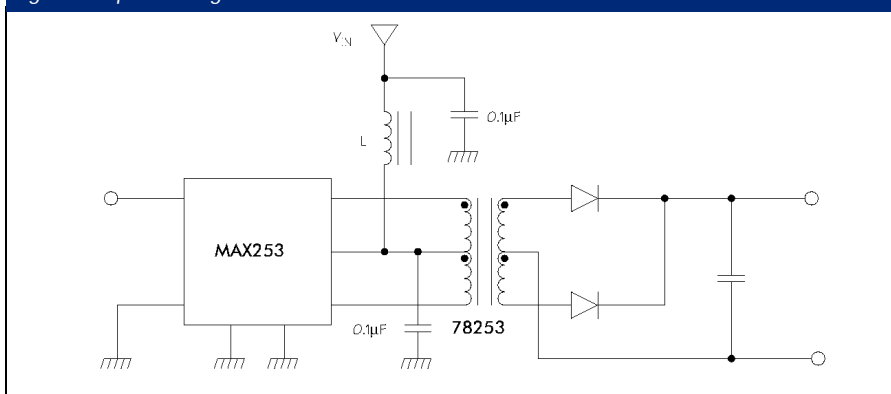
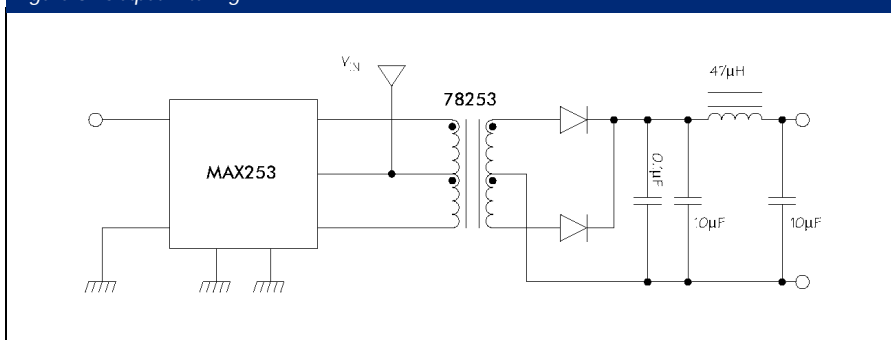


Figure 3: Output Filtering



APPLICATIONS

RECTIFICATION CIRCUITS

The 78253 series are designed to provide a 5V output from either 3.3V or 5V supply to the MAX253 IC. Other output configurations can be derived to produce positive and negative 5V outputs or voltage doubled output (for application circuits see www.maxim-ic.com). Under rectification schemes other than the standard single rail 5V output, the total power drawn from the circuit must not exceed 1W for a 5V input supply and 500mW for a 3.3V input supply.

DIODE SELECTION

The switching circuit can operate at a relatively high frequency (maximum 500kHz), hence, high speed rectifiers are recommended. If operating at low load levels (less than 50% maximum output current) low cost parts can be used even though they exhibit a high voltage drop. This is because at low output load the transformer output voltage is quite high and these lower cost parts will bring the voltage into regulation. When operating at high load demands, high efficiency, low drop Schottky diodes are recommended, the final choice is left to the designer. It must be noted that different component combinations will produce different characteristic curves to those shown in this data sheet.

INPUT FILTERING

The MAX253 IC driver and 78253 series transformer form a switching converter typically operating at either 200kHz (FS = LOW) or 350kHz (FS = HIGH). The circuit can therefore introduce some switching noise into the supply line feeding the MAX253. At C&D Technologies (NCL) we recommend filtering this supply locally via a capacitor and inductor filter at the MAX253 to reduce the noise introduced to other circuits operating from the same supply rail (see figure 2).

OUTPUT FILTERING

The output ripple from the rectifier circuit can be reduced further by a series inductor and second filter capacitor forming a pi-filter with the original smoothing capacitor (see figure 3). The values shown reduce ripple to less than

78253 SERIES

Application Notes

10mV at full load, further reductions can be achieved by using larger capacitor values. The largest recommended capacitor for the first stage smoothing is 22 μ F, up to 47 μ F can be used if required after the series inductor.

The output filter capacitors should exhibit low effective equivalent series resistance (ESR) at the switching frequency. Tantalum or ceramic capacitors are the recommended choice of dielectric.

TRANSFORMER ISOLATED ADC

The circuit in figure 4 offers a very low quiescent current for an isolated interface by using logic compatible transformer isolator/translator devices (1635). The isolators require some additional logic to interface with the ADC and a 3.3V logic controller, a few 74HC IC's and two delay lines are all that is required to implement full control over the ADC and its output.

Figure 4: Transformer Isolated ADC

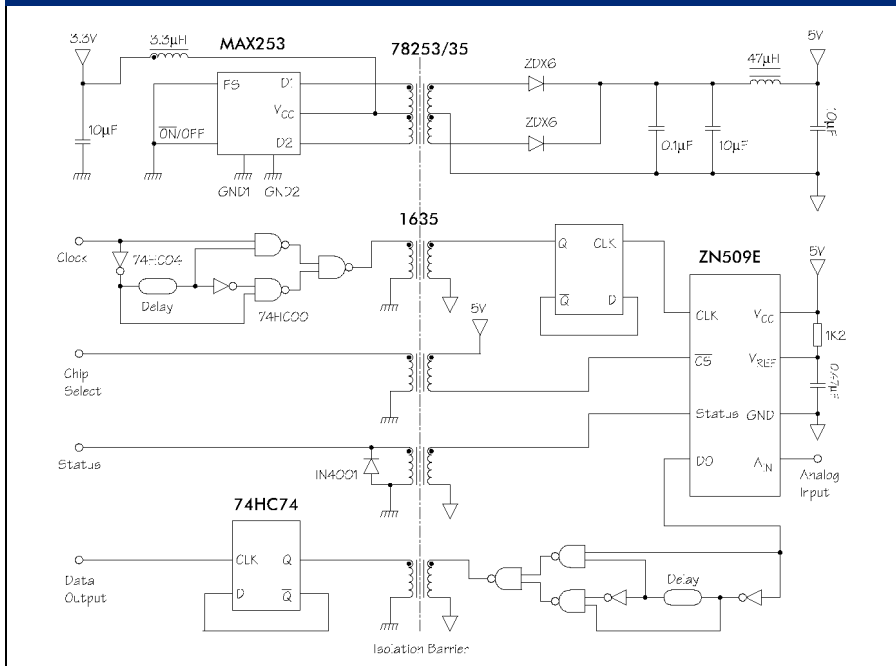
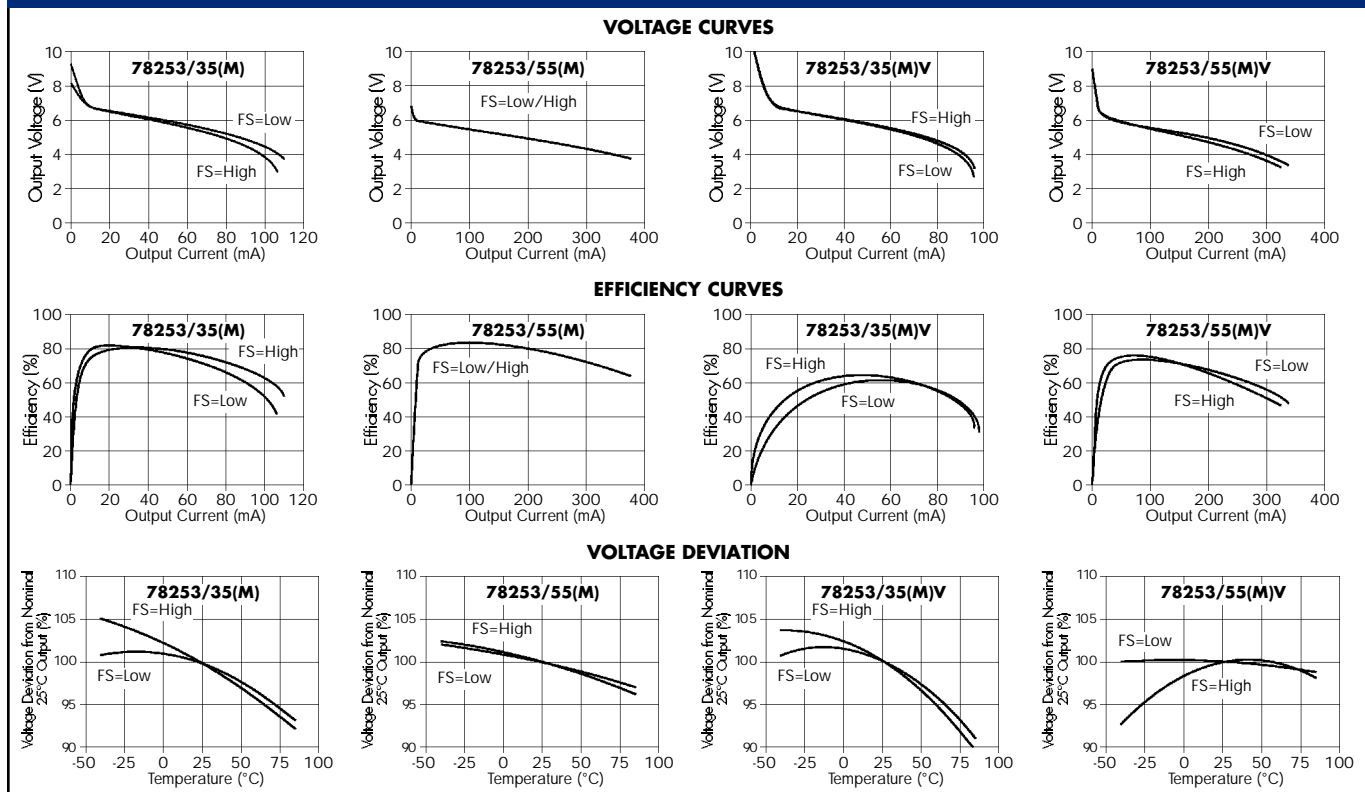


Figure 5: Typical Characteristics (Voltage Curves)



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