MPX2002

All-in-One Flyback Controller
Integrated Primary-side Control Circuitry
and Secondary-side Synchronous Rectification Driver

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

DESCRIPTION

The MPX2002 is an all-in-one flyback controller and it integrates a primary driving circuit, secondary controller, synchronous rectification driver and safety-compliance feedback all in one chip, maintaining the benefits of both primary-side regulation (PSR) and secondary-side regulation (SSR).

With the MPX2002, system complexity can be reduced since no feedback circuit is needed. Therefore, the total BOM cost is reduced. At the same time, the synchronous rectifier (SR) can be matched perfectly with the driving signal of the primary-side MOSFET. With this feature, the SR can operate safely in continuous conduction mode (CCM). Meanwhile, the SR controller integrated in MPX2002 regulates the SR FET at very low threshold, which helps increase overall efficiency and provides the design with more flexibility. There is an internal linear regulator integrated for the SR power supply, so MPX2002 is able to drive low side SR FET without auxiliary winding even when the output is too low.

The MPX2002 can run in CCM at heavy load, while the operation mode becomes Quasi-Resonant (QR) when load decreases. With the load decreases in further, the MPX2002 works in pulse frequency modulation (PFM) and the switching frequency fixed at 20kHz when it enters burst mode, which can avoid the audible noise. With this feature, the MPX2002 can achieve high efficiency in overall load condition and also has the good electromagnetic interference (EMI) performance.

The MPX2002 features advanced protections, including Vcc over-voltage protection (OVP), primary over-current protection (POCP), real secondary-sense output overload protection (OLP), internal brown-in/brown-out (B/O, B/I), short-circuit protection (SCP), current-sensing short protection (SSP), SR gate open/short protection (SGOP/SGSP), SRD abnormal protection (SRDP), FB OVP/UVP, internal thermal shutdown, under-voltage lockout (UVLO), and an externally triggered protection (Ext.P).

FEATURES

- Isolation Voltage >4500V_{AC}
- 100% Production HIPOT Compliance Testing
- UL1577 (Approved) and IEC62368 Safety Approved (Pending)
- Integrated Multi-mode DCM/Quasi-Resonant (QR)/CCM Flyback Controller, Secondary-side Synchronous Rectifier (SR) Sensing/Driving Circuitry and Safety-compliance Feedback Link
- Integrated 650V Primary-side Current Source and 150V Secondary-side Current Source
- Less than 30mW in Standby Mode
- Improved SR Control for Reliable Operation and Higher Efficiency
- V_{CC} OVP, POCP, OLP, Internal B/O and B/I, SCP, Current-Sensing Short Protection, SR Gate Open/Short Protection, SRDP, FB OVP/UVP, Internal Thermal Shutdown, UVLO, and Ext.P
- Available in Thin SOICW-16-T and Standard SOICW-16 Package

APPLICATIONS

- High Performance USB PD Adapters
- Offline Battery Chargers
- High Efficiency, High-Current Power Supplies, etc.

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TYPICAL APPLICATION