

# NXP GREENCHIP SOLUTIONS PROGRAM

Our innovative GreenChip power portfolio enables smarter, more compact and extremely energy-efficient power solutions. These solutions are in products ranging from energy-saving power supplies to fast battery chargers and adapters, system protectors and secure wireless chargers.

## OVERVIEW

NXP's current GreenChip portfolio provides AC/DC solutions for the latest USB Type-C power delivery and QC 4.0 platforms that enable faster charging and best-in-class thermal power management. Designed for mobile and computing applications, these solutions offer superior power density, efficiency and protection to ensure the utmost in safety and reliability.

## FEATURES

- Seamless, energy efficient end-to-end solution
- Compliant with industry's strictest energy regulations (Energy Star, EuP Lot 6, DoE, CoC)
- Wide output voltage operating range (2.9 V - 20 V) for USB Type-C solutions
- Extended portfolio of AC-DC, power solutions, USB type C, wireless power

## BENEFITS

- Industry's best-in-class power efficiency with high-power density
- A complete certified and validated solution enabling faster time-to-market
- Broader set of applications: mobile, consumer, TV, IoT
- Ease of use and flexibility to customize your design



## SMART POWER SOLUTIONS

NXP offers a wide range of AC-DC power solutions that address a wide range of applications such as USB Type-C, laptop, gaming, TV, and others with leading technologies that offer:

- Highly efficient AC-DC power conversion
- Superior safety and reliability
- Highly integrated and cost-efficient system

Our AC-DC solution also meets or exceeds all applicable U.S. DOE and EU CoC energy conservation standards.

### AC-DC Controllers with Integrated PFC

This selection of AC-DC controllers integrates a power factor corrector (PFC) controller in a multi-chip IC. Efficient PFC operation is achieved by implementing functions for Quasi-Resonant (QR) operation at high-power levels and valley skipping at lower power levels.

- TEA1713T, TEA1716T, TEA1916x, and TEA2016: Resonant power supply control IC with PFC
- TEA175x: HV start-up DCM/QR flyback controller with integrated DCM/QR PFC controller

## AC-DC Controllers with Integrated Power Switch

This selection of AC-DC controller ICs features power switches. These highly integrated devices reduce component count for more cost-effective application design while providing advanced control modes for exceptional efficiency.

- TEA172x: HV start-up flyback controller with integrated MOSFET for 5 W to 11 W applications,  $f_{\text{burst}} = 430\text{--}1750$  Hz

## Secondary-Side Controllers

Simple, cost-effective power designs. Our extremely efficient and highly integrated GreenChip ICs control synchronous rectification in a compact form factor. These 'smart' solutions mitigate increasing power demands for designing more energy-efficient and cost-effective power supplies.

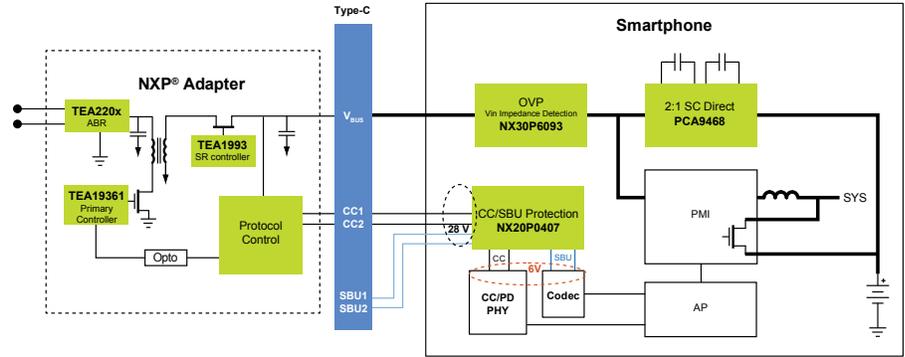
- TEA176x: Synchronous rectification controller with integrated feedback and protection
- TEA179x: Synchronous rectification controller suitable for both high-side and low-side control
- TEA1995T: GreenChip synchronous rectifier controller

## USB Type-C Power Solutions

The USB Type-C connector is changing the world of charging for the latest portable electronic platforms and devices. Its design meets the trend towards smaller and thinner form factors that demand higher power density with more safety features and security.

NXP provides USB Type-C AC-DC solutions with higher power density, security and safety with leading technologies that enable a shorter time-to-market, solve application challenges

## TYPICAL END-TO-END MOBILE CHARGING SYSTEM BLOCK DIAGRAM



and adhere to all global power regulations.

It's designed with USB PD and Qualcomm® Quick Charge™ to drive a smarter, more scalable AC-DC solution for a broader platform of consumer products.

While there are clear advantages of Type-C connectors, they also pose a challenge in system design to ensure that the integrity of downstream circuitry is maintained. NXP offers a wide portfolio of smart protection devices that provide robust protection against any fault events.

## PRODUCTS

### Primary Controllers

- TEA1708T: GreenChip X capacitor discharge IC
- TEA220xT Active Bridge Rectifier (ABR): GreenChip Active Bridge control IC's
- TEA173xT(S): Low-voltage start-up flyback controllers suitable for Fixed Frequency/CCM
- TEA1833TS: GreenChip SMPS control IC
- TEA1936xT: GreenChip SMPS primary side Flyback control IC's

### Secondary Side (SR) Controller

- TEA199x: GreenChip synchronous rectifier controller
- TEA2095T(E): GreenChip dual synchronous rectifier controller

### Smart Type-C Interface Protection

- NX5P3290: USB PD and Type-C Current-Limited Power Switch
- NX20P5090: High Voltage USB PD Power Switch