

## Enabling energy-efficient power solutions

# 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 total system solutions for the latest USB Type-C power delivery and QC 4.0 platforms that enable faster charging and 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 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.

### PRODUCTS

**AC-DC Controllers**

Our selection of AC-DC products includes efficient IC solutions for switched-mode power supply (SMPS) controllers intended for flyback topologies, automatic discharge for low-power X capacitors, and synchronous rectifier (SR) controllers for switched-mode power supplies with adaptive gate drive.

- TEA1708T: GreenChip X capacitor discharge IC
- TEA173x: Low-voltage start-up flyback controllers suitable for Fixed Frequency/CCM
- TEA1833TS: GreenChip SMPS control IC
- TEA19361T: GreenChip SMPS primary side control IC with QR/DCM operation
- TEA1993TS: GreenChip synchronous rectifier controller

### 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, and TEA1916x: 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 high efficiency.

- TEA172x: HV start-up flyback controller with integrated MOSFET for 5 W to 11 W applications, f~burst = 430–1750 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 total 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 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

- TEA19361T: GreenChip SMPS primary side control IC with QR/DCM operation
- TEA19362T: GreenChip SMPS control IC
- TEA19363T: GreenChip SMPS primary side control IC with QR/DCM operation and X-capacitor discharge
- TEA1938T: GreenChip SMPS primary side control IC

### Secondary Side (SR) Controller

- TEA199x: GreenChip synchronous rectifier controller

### Protocol Controller

- TEA19031 (USB PD 2.0 Compliance)
- TEA19032 (USB PD 3.0 Compliance)
- TEA1905 (QC 4.0+)

### Smart Type-C Interface Protection

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

## MOBILE POWER SOLUTIONS

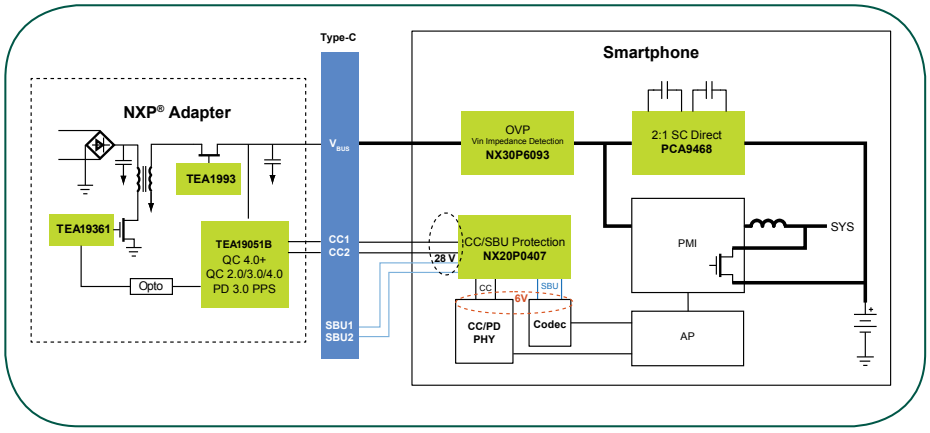
NXP provides a wide range of products focusing on mobile power management systems. From comprehensive input protection ICs to compact fast charging charger ICs.

NXP's mobile power solutions address the needs for mobile devices, tablets, laptops and other integrated solutions that demand outstanding performance in smaller packages.

## PRODUCTS:

- PCA9468: High-current fast charger with 98% efficiency
- NX30P6093: OVP with moisture detection
- NX20P0407: Type-C CC/SBU protection
- NX5P3290A: USB PD and Type-C current-limited power switch
- NX20P5090: High-voltage USB PD power switch

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




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