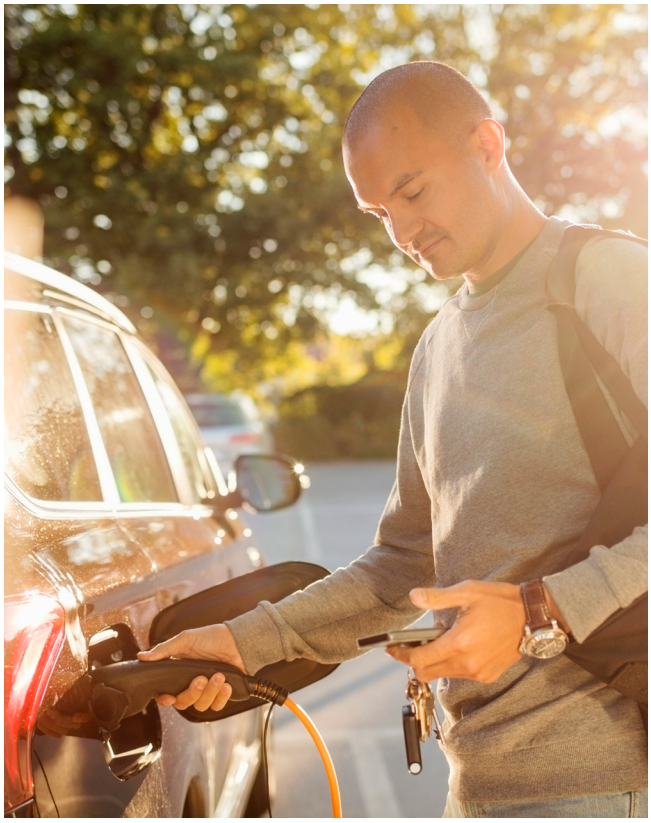
TAA3033: Active pre-charge controller IC

The TAA3033AT is an active pre-charge controller IC designed for automotive applications, such as hybrid electric vehicles (HEV) and battery electric vehicles (BEV). The TAA3033 replaces the traditional passive pre-charge circuits that include costly high-current rated contactor switches, along with large power resistors. It is developed as an active current controller to pre-charge the DC-link capacitor of the traction inverter in HEV and BEV vehicles. The device can be used as part of the battery management system (BMS). The battery junction box (BJB) or the battery disconnect unit (BDU) controls and supplies the device.



Key features

- AEC-Q100 grade 1 qualified: -40 °C to +125 °C ambient temperature range
- Wide supply voltage range from 11 V up to 36 V
- Supports low-side and high-side operation
- Suitable to drive Si and SiC power MOSFETs
- I^2C interface for configuration of control parameters
- Enable input for start of pre-charging cycle
- Ready output for end of pre-charging cycle
- Fault output for triggered protections against switching and connection failures
- Regulated pre-charge current with continuous conduction mode (CCM) control
- Peak current and ripple adjustable by internal comparator level and external sense resistor
- Duty cycle operation with very wide range from 0.1 % up to 99.9 %
- Start of pre-charging with a low duty cycle to prevent current run-away
- End of precharging by operation with maximum duty cycle

Target applications

- **Automotive:**

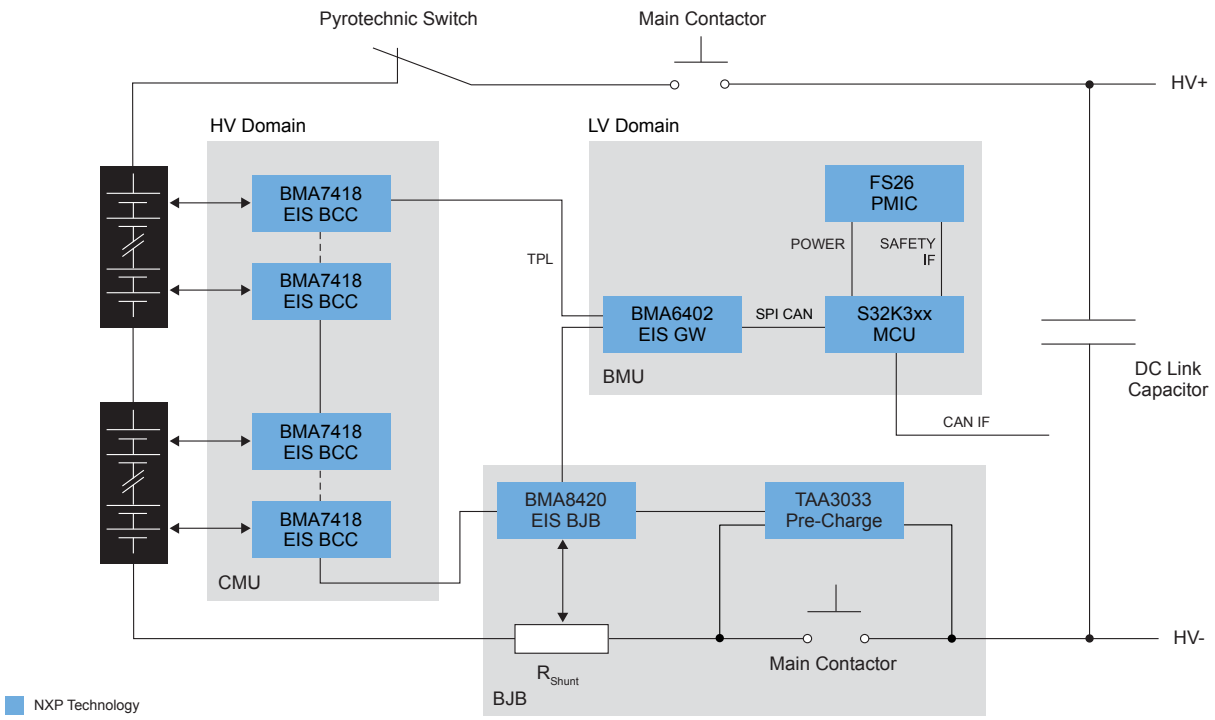
  (Plug-in) HEV Battery Management Systems

  EV Battery Management Systems

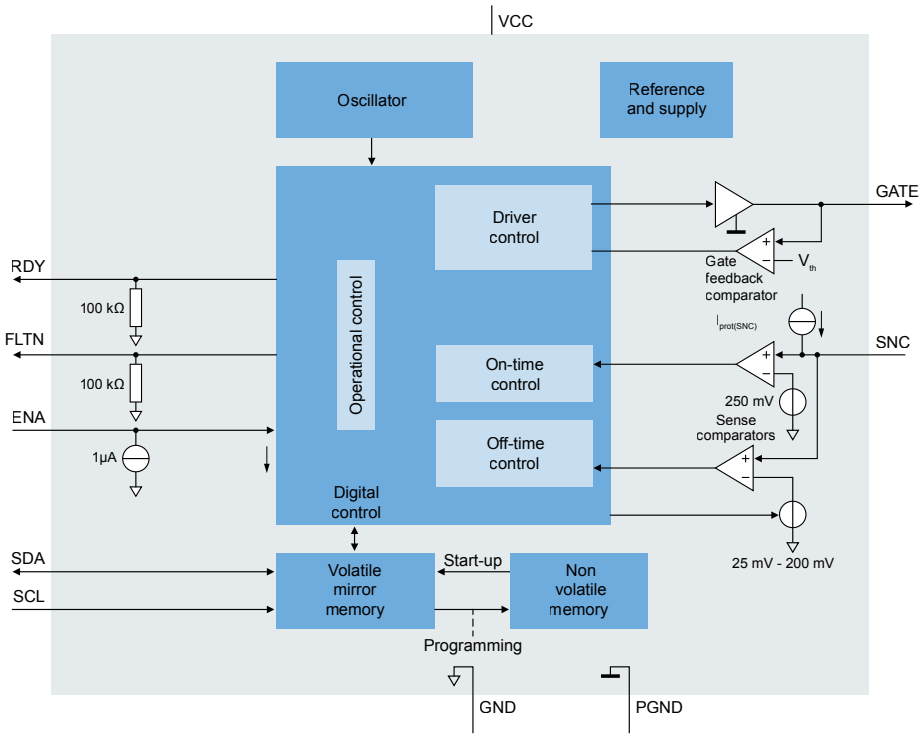
- **Industrial:**

  Stationary Battery Energy Storage System (ESS)

Main application block diagram



TAA3033 controller block diagram



Orderable samples

Part number	Temp range	Other features	Other features	Package
TAA3033AT	-40 °C~125 °C	I²C interface	Softstart	SO14

nxp.com/TAA3033

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