

Protection for automotive onboard chargers (OBC)



Charge safely and maximize OBC performance



ST TVS & ESD protections reduce switching losses and EMI for higher performance in more compact OBCs

The onboard charger (OBC) in an electric vehicle (EV) or plug-in hybrid vehicle (PHEV) is responsible for recharging the high-voltage battery from AC mains or charging stations. OBCs must meet stringent design requirements in terms of size and weight, and ensure high efficiency and robustness in rapid charging solutions.

Adding TVS and ESD protections in OBCs not only safeguard sensitive components from transient overvoltages, but also optimize switching performance by enabling faster and more stable transitions thanks to well-controlled clamping voltages.

These protections extend the longevity of OBCs and help minimize field returns.

KEY FEATURES AND BENEFITS

The following ST TVS and ESD device features ensure compliance with highly stringent requirements, including those in ISO 7637, ISO 10605, and ISO 16750:

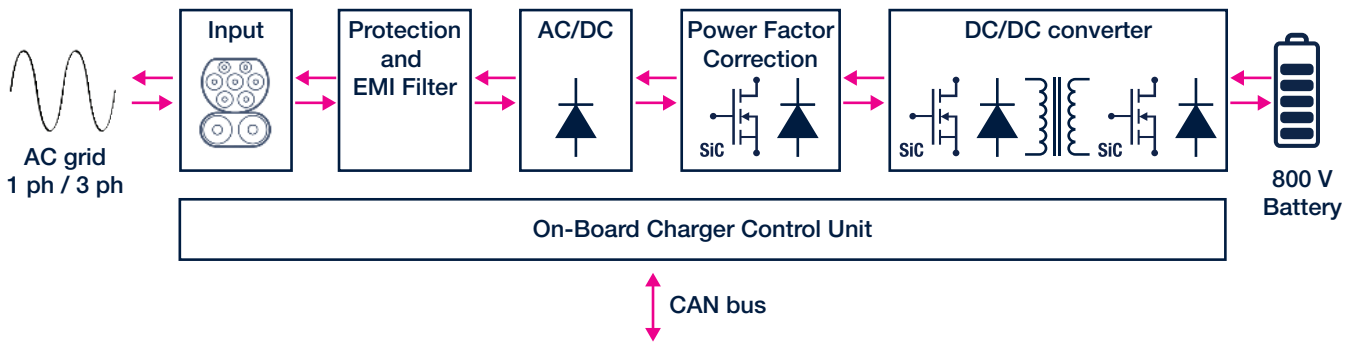
- Protection efficiency with low clamping voltage (V_{CL})
- Protection transparency with low leakage current (I_{RM})
- Wide power rating range.
- High temperature capability up to 175°C

Designed for automotive applications:

- Certified for AEC-Q101 standards.
- 10-year longevity commitment.
- Packages compatible with automatic optical inspection.

Referenced in ST hardware boards

Recommended protections in onboard charger (OBC)



STMicroelectronics AEC-Q101 qualified solutions ensure safe operation by protecting against surges and other transients that may occur during daily, frequent, and prolonged use. These solutions help designers enhance system immunity and achieve compliance with stringent automotive ISO10605 and ISO7637-3 standards.

Socket	Technology	Application	Series name	Comments
PFC DC/DC	ESD Protection	MOSFET/IGBT gate input protection	Silicon MOSFET / IGBT: HSP181-2W3Y (Bidirectional) SM4T21CAY	Protection against coupling perturbations and transient spikes (ISO 7637-3 ; ISO10605) SiC MOSFETs need lower breakdown voltage protection for negative level voltage
	Transient Voltage Suppressor (TVS)		SiC MOSFET: HSP181-2W3Y with ESDA041-1JY in anti-series SM4T21AY with SM4T6V7AY in anti-series	
	Transient Voltage Suppressor (TVS)	MOSFET protection Active clamping	SM6TxY series SM15TxY series SM30TxY series SM50TxY series	Protects the MOSFETs from overvoltages that are created when the MOSFET switches. Effective low clamping voltage. Breakdown voltage selection according to the bus voltage.
Control Unit	EOS/ESD protection	Low voltage power supplies	3.3 V: ESDA041-1JY 5.0 V: ESDA051-1JY 12 V: ESDA14V2LY	Protection against coupling perturbations and transient spikes (ISO 7637-3 ; ISO 10605)
	ESD protection	CAN bus protection against ESD, EFT and voltage transient	ESDCAN04-2BWY (SOT323), ESDCAN01-2BLY (SOT23) ESDCAN06-2BWY (SOT323), ESDCAN06-2BLY (SOT23)	Protection against coupling perturbations and transient spikes (ISO 7637-3 ; ISO 10605) ESDCAN series is compliant with reverse battery, jump start (ISO 16750-2)
	ESD protection	CAN-FD, FlexRay bus protection against ESD, EFT and voltage transient	ESDCAN03-2BM3Y (QFN1110), ESDCAN03-2BWY (SOT323), ESDCAN04-2BLY (SOT23) ESDCAN05-2BWY (SOT323), ESDCAN06-2BLY (SOT23)	Protection against coupling perturbations and transient spikes (ISO7637-3 ; ISO 10605) ESDCAN series is compliant with reverse battery, jump start (ISO 16750-2) Low line capacitance
	EMI filter and ESD protection	MCU ADC inputs EMI filter and ESD protection	Application Specific Integrated Product (ASIP)*	Integrated solution embedding both EMIF filter and ESD protection Space saving, performances and reliability improvement

Note *: Please contact your local sales for more information



Find more details on our website:

<https://www.st.com/en/automotive-analog-and-power/automotive-protection-and-filtering.html>



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