

The Extended Phase Shift (EPS) modulation method for Dual-Active-Bridge (DAB) converters is a control strategy applied within DAB converters. Building on the foundation of standard Single-Phase-Shift (SPS) modulation, EPS modulation introduces a phase shift angle within the full bridge on one side of the converter, thereby granting the converter greater control flexibility to optimize performance.

In EPS modulation, by altering the phase shift angle within the full bridge on one side of the converter, the direction and magnitude of power flow can be regulated. This modulation method allows for the control of power transmission through phase angle adjustment without changing the duty cycle of the switching devices, thereby enabling soft-switching operations, reducing switching losses, and enhancing efficiency.

A key advantage of the EPS modulation strategy is its greater control flexibility, which is crucial for optimizing converter performance. For instance, it can be used to improve the soft-switching characteristics, reduce current stress and backflow power, thus enhancing the operational efficiency of the DAB.

In practical applications, the EPS modulation strategy can be used in bidirectional charging and discharging scenarios and is capable of handling a wide range of gain, making it particularly important in power electronic transformers and high-efficiency energy conversion systems.

In summary, the EPS modulation method, by introducing a phase shift angle inside the full bridge on one side of the DAB converter, provides an effective means to optimize converter performance, especially in applications requiring high efficiency and flexible control.