MULTIFUNCTIONAL ON-BOARD POWER PROCESSOR WITH MULTIMODE CAPABILITIES FOR ELECTRIC VEHICLE APPLICATIONS

Thesis submitted in partial fulfilment for the

Award of Degree

Doctor of Philosophy

by

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List of Acronyms

AGM	Absorbed Glass Mat
AI	Artificial intelligence
BLDC	Brushless DC motor
CC	Constant current
CC	Common connector mode
CM	Common contact
CM	Charging connector mode
CUF	Component utilization factor
CV	constant voltage
DAB	Dual active bridge
DCR	DC resistance
EMC	Electromagnetic Compatibility
EMI	Electromagnetic interference
ESR	Equivalent Series Resistance
EV	Electric Vehcile
FEC	Front-end converter
G2V	Grid-to-vehicle
GM	Gain Margin
HB-LLC	Half-bridge LLC
HPLN	High-PWM low-ON
HPLS	Hihg-PWM Low-ON switching
HVB	High-voltage battery
ICE	internal combustion engine
IM	Induction motor
IM	Induction motor
LV	Low-voltage
LVB	Low-voltage battery
LVBC	Low- voltage battery charger
MM	Motoring mode
MM	Motoring connector mode
M-SPWM	Modified sinusoidal pulse width modulation
NC	Normally closed contact
NC	Normally closed contact
NO	normally open contact
OBC	On-board charger
PCB	Perforated circuit board
PF	Power factor
PFC	Power factor correction
PI	Proportional integral
PLL	Phase lock loop
PM	permanent magnet
PM	Phase margin

PMSM	Permanent Magnet Synchronous Motor
PPP	Proposed power processor
PR	Proportional-resonant
PV	Photovoltaic
PWM	Pulse width modulation
Q-ZSI	Quasi-Z source inverter
RMS	Root mean square
SOC	state of charge
SPDT	Single-pole double-throw
SPST	Single-pole single-throw
SRM	Switch reluctance motor
THD	Total harmonic distortion
THD-F	Total Harmonic Distortion (THD) as a percentage of the Fundamental RMS value of the waveform.
THD-R	Total Harmonic Distortion (THD) as a percentage of the Root Mean Square (RMS) value of the waveform
UPF	unity power factor
V2G	Vehicle-to-Grid
V2H	Vehicle-to-Home
V2V	Vehicle-to-vehicle
VSI	Voltage source inverter
ZVS	Zero voltage switching