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*Dedicated to*  
***Prabhu Jagannatha***

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# List of Acronyms

EV	Electric Vehicle
ICE	internal combustion engines
CNG	compressed natural gas
HEVs	Hybrid electric vehicles
PHEVs	Plug-in hybrid electric vehicles
BEVs	Battery powered electric vehicles
CC	constant current
CV	constant voltage
PFC	Power factor correction
CC-CV	Constant current–constant voltage
DAB	dual active bridge
FBC	full bridge converter
PI	proportional-integral
WPT	wireless power transfer
HFAC	high frequency AC
HF inverter	high frequency inverter
ZVS	zero-voltage switching
ZDS	zero-derivative switching
VCO	voltage-controlled oscillator
SCPT	Single Controlled PWM Technique
UPF	near unity power factor
FHA	first harmonic approximation
SoC	state of charge
THD	total harmonic distortion
PF	power factor
VSI	voltage source inverter
BLDC	brushless DC
R-OPC	reconfigurable on-board power converter
CM	common contact
NC	normally closed

NO	normally open
PM	permanent magnet
CUF	component utilization factor
MRC	magnetic resonance coupling
ZVDS	zero voltage derivative switching
PPU	power-processing unit
RPP	reconfigurable power processor

## Symbols Used

$M_0$	Mode 0 (Propulsion Mode)
$M_1$	Mode 1 (Wired Charging)
$M_2$	Mode 2 (Wireless Charging)
$V_{AC}$	AC input voltage at the grid side
$I_{AC}$	AC input current drawn from the grid
$V_{dc}$	Voltage across the DC link of the two-stage charger
$V_{bat}$	Battery terminal voltage
$I_{bat}$	Battery terminal current
$V_{SNL1 \rightarrow 3}$	Switch node voltages of respective nodes
$I_{MPH1 \rightarrow 3}$	Motor Phase currents of respective phases
$S_{1 \rightarrow 6}$	Power electronic switches (MOSFETs)
$S_{inv}$	Inverter switch (MOSFET used in $EF_2$ inverter)
$D_{1 \rightarrow 4}$	Power Diodes
$D_{S1 \rightarrow S6}$	Antiparallel body diodes of the MOSFETs
$S_{1 \rightarrow 6}$	Power electronic switches (MOSFETs)
$V_{dc}$	Voltage across the DC link of the two-stage charger
$C_{dc}$	DC link Capacitor of the two-stage charger
$C_0$	Output capacitor
$L_{boost}$	Boost inductor at the input AC side
$L_{in}$	Boost inductor at the input grid side of the wireless charger
$L_{1 \rightarrow 3}$	Inductors used in the $EF_2$ inverter
$C_{1 \rightarrow 3}$	Capacitors used in the $EF_2$ inverter
$C_{pmat}, C_{smat}$	Primary and secondary side matching capacitor for WPT coils
$L_r$	Resonant inductance used in LLC series circuit to form the second stage of the two-stage charger
$L_m$	Mutual inductance of the isolation transformer in parallel with the load
$C_r$	Resonant capacitor used in LLC series circuit to form the second stage of the two-stage charger
$R_{ac}$	Reflected load resistance across the primary
$Z_i$	Equivalent input impedance at the input of LLC resonant circuit
$f_{oc}$	Open circuit frequency
$f_{sc}$	Short circuit frequency

$f_s$	Switching frequency
$G_{LLC}$	Gain of the LLC resonant circuit
$G_{LLC\_min}$	Minimum value of $G_{LLC}$
$G_{LLC\_max}$	Maximum values of $G_{LLC}$
$Q$	Quality factor of the circuit
$G_s$	Gain of the second stage of the two-stage charger
$n$	Turns ratio of the isolation transformer
$L_A, L_B, L_C$	Legg A, B and C of inverter
$K_{1 \rightarrow 5}$	Electromechanical Contactors
$PH_{1 \rightarrow 3}$	Respective phase windings of the BLDC Motor