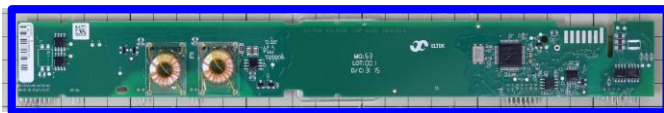


VOLVO V60 PHV ON BOARD CHARGER (OBC) DETAILED CIRCUIT ANALYSIS REPORT

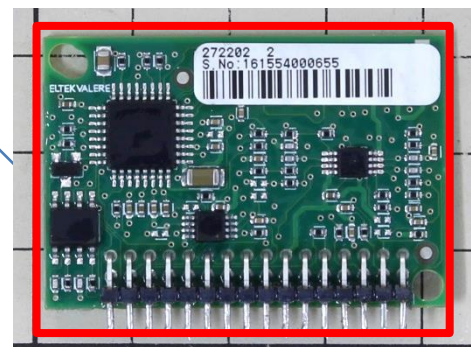
October 2017. LTEC Corporation released a circuit analysis report of the On board charger of Volvo V60 PHV (2015 model). Main features of this OBC are 3.5kW(220V/16A), Single phase AC Charger and water cooling system. This module consists of three PCBs (PFC control board, charger control board and power stage board).



Power stage board



Charger control board



PFC control board

Key attributes:

1. Power Stage consists of input filter, PFC and LLC Current Resonant Half-Bridge converter.
2. The protection function built in each control boards (PFC control board and Charger control board)
3. Communication with the outside is performed by the CAN transceiver and DSP in Charge control board.

The 59 page report provides details of the PCB layout, BOM, and circuit schematic diagram.

Note:

The listed report price may not be accurate as it decreases over time.

Please contact us for current report pricing info@ltecusa.com

17G-0012-1

Table of Contents

	Page
<u>Product information</u>	
Table 1 Product information	... 3
<u>Analysis summary</u>	
Table 2 Analysis summary	... 5
<u>Components</u>	
Table 3 Parts count	... 8
<u>Teardown</u>	
Fig. 1 Product Overview	... 9
Fig. 2 Product Marking	... 10
Fig. 3-1 Product Disassembly 1	... 11
Fig. 3-2 Product Disassembly 2	... 12
Fig. 3-3 Product Disassembly 3	... 13
Fig. 4-1 PCB Overview (Power Stage PCB)	... 14
Fig. 4-2 PCB Overview (Charger Control PCB)	... 15
Fig. 4-3 PCB Overview (PFC Control PCB)	... 16
Fig. 5-1 PCB X-Ray (Power Stage PCB)	... 17
Fig. 5-2 PCB X-Ray (Charger Control PCB)	... 18
Fig. 5-3 PCB X-Ray (PFC Control PCB)	... 19
Fig. 6-1 PCB after removal parts (Power Stage PCB)	... 20
Fig. 6-2 PCB after removal parts (Charger Control PCB)	... 21
Fig. 6-3 PCB after removal parts (PFC Control PCB)	... 22
Fig. 7-1-1 Power Stage PCB L1 Pattern (Top View)	... 23
Fig. 7-1-2 Power Stage PCB L2 Pattern (Top View)	... 23
Fig. 7-1-3 Power Stage PCB L3 Pattern (Top View)	... 23
Fig. 7-1-4 Power Stage PCB L4 Pattern (Top View)	... 23
Fig. 7-2-1 Charger Control PCB L1 Pattern (Top View)	... 24
Fig. 7-2-2 Charger Control PCB L2 Pattern (Top View)	... 24
Fig. 7-2-3 Charger Control PCB L3 Pattern (Top View)	... 24
Fig. 7-2-4 Charger Control PCB L4 Pattern (Top View)	... 24
Fig. 7-3-1 PFC Control PCB L1 Pattern (Top View)	... 25
Fig. 7-3-2 PFC Control PCB L2 Pattern (Top View)	... 25
Fig. 7-3-3 PFC Control PCB L3 Pattern (Top View)	... 25
Fig. 7-3-4 PFC Control PCB L4 Pattern (Top View)	... 25

17G-0012-1



		Page
<u>Parts mount position</u>		
Fig. 8-1	Parts mount position 1 (Top View)	... 26
Fig. 8-2	Parts mount position 2 (Top View)	... 27
Fig. 8-3	Parts mount position 3 (Top View)	... 28
Fig. 8-4	Parts mount position 4 (Top View)	... 29
Fig. 8-5	Parts mount position 5 (Top View)	... 30
Fig. 8-6	Parts mount position 6 (Top View)	... 31
Fig. 8-7	Parts mount position 7 (Top View)	... 32
<u>Component details</u>		
Fig. 9-1	Parts Photographs 1 (Top View)	... 33
Fig. 9-2	Parts Photographs 2 (Top View)	... 34
Fig. 9-3	Parts Photographs 3 (Top View)	... 35
Fig. 9-4	Parts Photographs 4 (Top View)	... 36
Fig. 9-5	Parts Photographs 5 (Top View)	... 37
<u>Interface</u>		
Fig. 10-1	Connector pin assignment 1	... 38
Fig. 10-2	Connector pin assignment 2	... 39
Fig. 10-3	Connector pin assignment 3	... 40
Fig. 10-4	Connector pin assignment 4	... 41
<u>Sensor</u>		
Fig. 11-1	Sensor Position1	... 42
Fig. 11-2	Sensor Position2	... 43
Fig. 11-3	Sensor Position3	... 44
<u>Circuit</u>		
Fig. A-1	Block Diagram	... A-1
Fig. A-2	Schematic (Power Stage PCB)	... A-2
Fig. A-3	Schematic (Charger Control PCB)	... A-3
Fig. A-4	Schematic (PFC Control PCB)	... A-4
<u>Component list</u>		
Table B-1	Component list (Power Stage PCB)	... B-1
Table B-2	Component list (Charger Control PCB)	... B-7
Table B-3	Component list (PFC Control PCB)	... B-10

17G-0012-1

