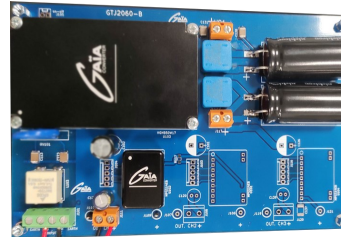


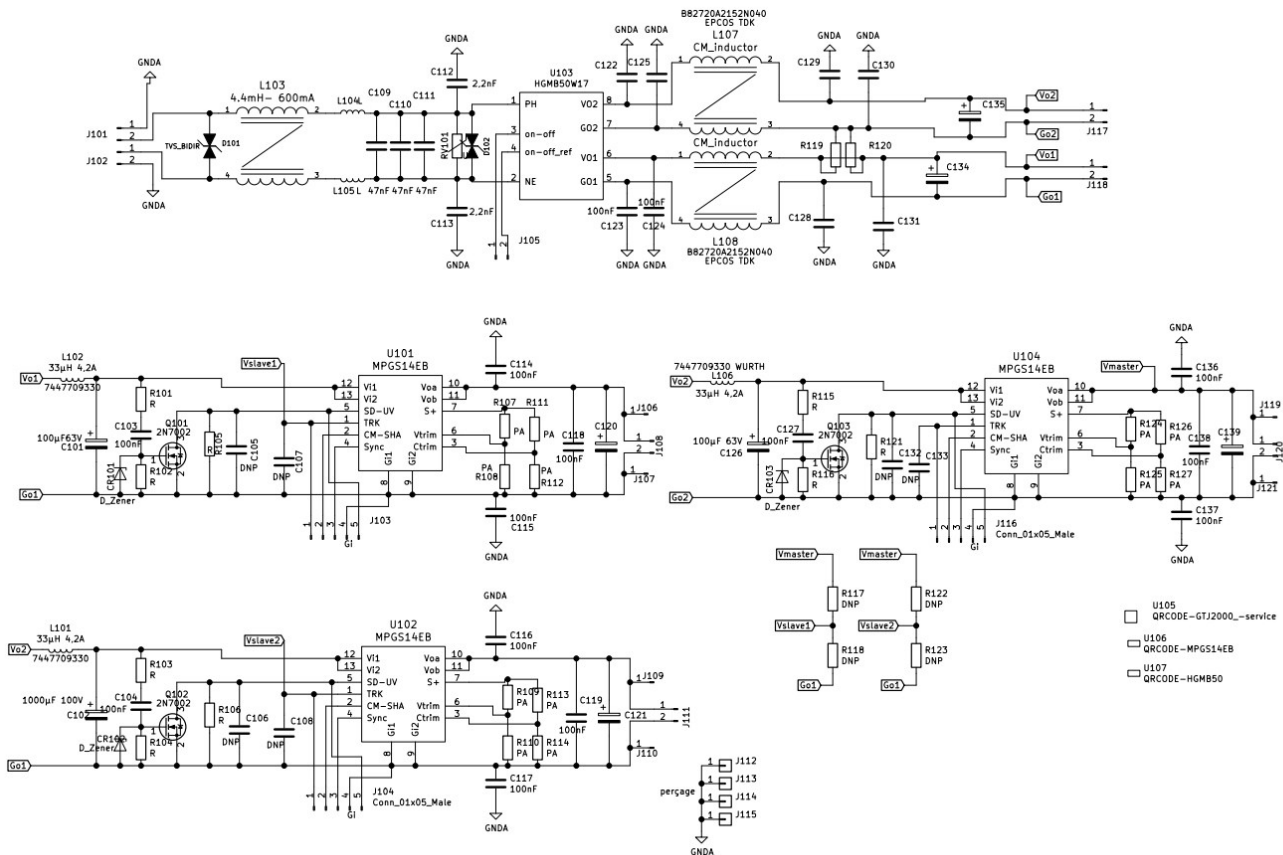
5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.1-Board Description

GTJ2060 is a test jig that can be used to evaluate ac/dc converters from the HGMM35 or HGMM50 series, along with the MPGS14Eb Point of load. Testing can be performed against Military standards Mil-STD 704, DO 160, ABD 100 and Mil-Std 461. The board has also been designed in order to test separately up to 3 MPGS14EB with multiple sequencing modes. This board is for evaluation purpose only

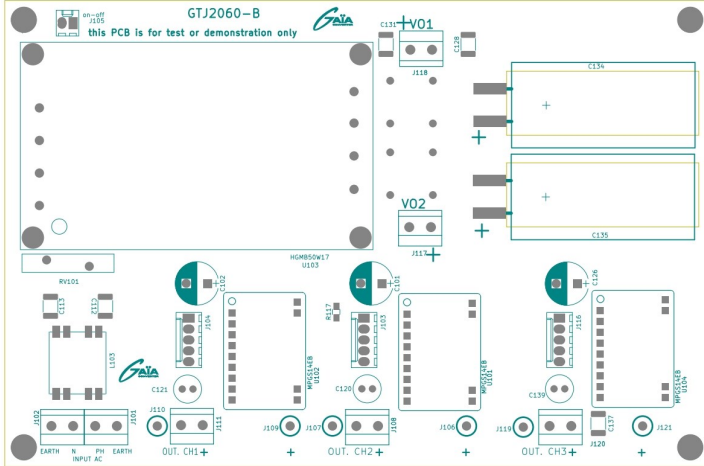


5.2-SCHEMATIC DIAGRAM

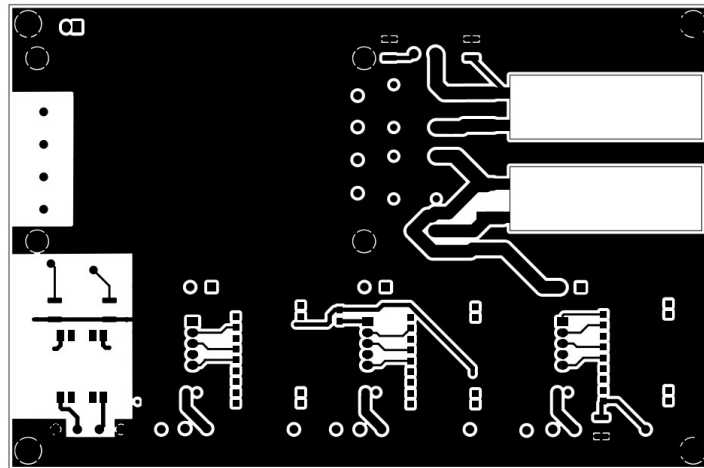
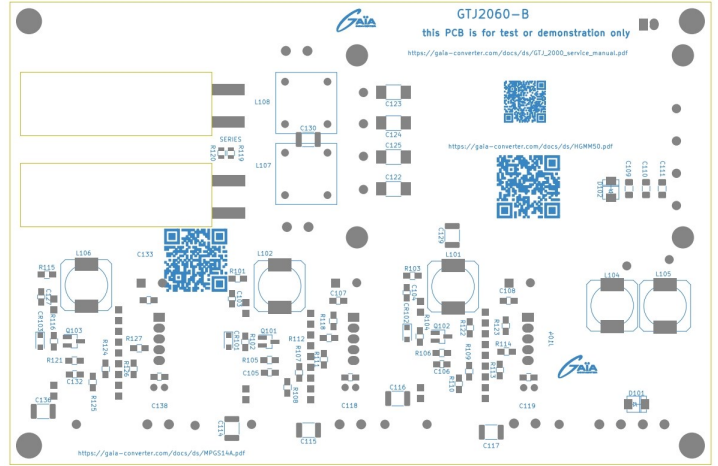


5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

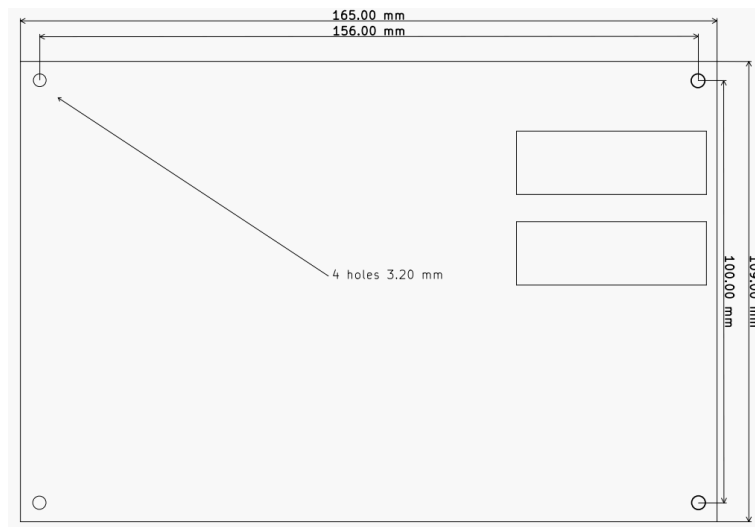
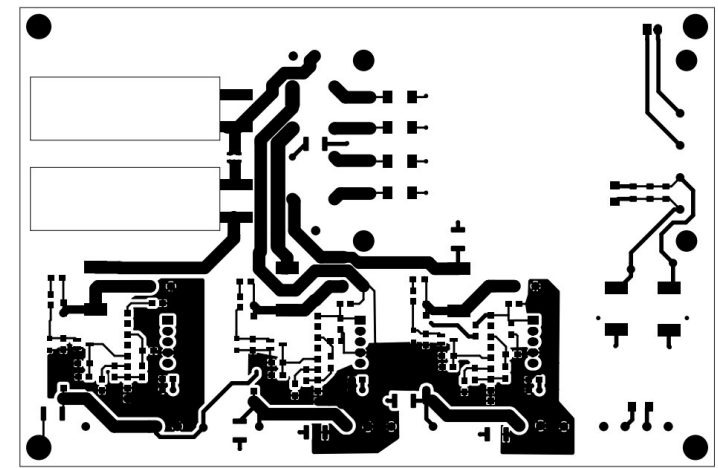
5.3-BOARD DRAWINGS



Top view



Top view



General tolerances +/- 0.2

PCB thickness : 1.6 mm

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.4-BILL OF MATERIAL

DDesignator	Description	Qty	Possible part-number	Supplier	Comment
C101,C102,C126	100µF/100V	3	ECA2AHG101	Panasonic	
C105,C106,C107,C108,C132,C133	DNP	6	08055C103KAT2A	AVX	for MPGS14EB sequencing
C109,C110,C111	47nF /200V	3	VJ1206Y473KXCAT	Vishay	
C112,C113	2,2nF /500V	2	VJ1206Y222KXEAC	Vishay	
C118,C103,C104,C119,C127,C138	100nF 50V	6	08055C104KAT2A	AVX	
C121,C120,C139	100µF 35V	3	ECA1VHG101B		
C135,C134	2200µF 50V	2	SK050M2200B7F-1636	Yageo	value fit for H-up
C136,C115,C128,C129,C130,C131,C114,C116,C117,C137,C122,C123,C124,C125	100nF / 500V	10	1812Y5000104MX	Syfer	value can be adjusted
CR101,CR102,CR103	12V 0.5W zener	3	MMSZ12T1	One semi	not mandatory
D101,D102	TVS_BIDIR	2	TVS_BIDIR		
J103,J104,J116	Connector 5 points	3	22-27-2051	Molex	
J105	Connector 2 points	1	22-27-2021	Molex	
J101,J102,J108,J111,J117,J118,J120	Connector 2 points	7	PM 5.08/0290 3.35NCR BX	WEIDMULLER	407-7871 RS
J110,J106,J107,J109,J119,J121	test point	6	Radispares	RS 101-2391	
L102,L101,L106	33µH 4,2A	3	7447709330	WURTH ELECTRONIK	
L103	4.4mH- 600mA	1	B82720S2601N040	EPCOS	
L104,L105	1mH	2	74477030	WURTH ELECTRONIK	
L107,L108	1.6mH 1.5A	2	B82720A2152N040	EPCOS	
Q101,Q102,Q103	2N7002	3	2N7002NXBKR	NEXPERIA	
R102,R104,R116	68k 0805	3	R		not mandatory
R105,R106,R121	1k5 0805	3			not mandatory
R107,R108,R109,R110,R111,R112,R113,R114,R124,R125,R126,R127	DNP	12	TBD		configuration resistor
R115,R103,R101	3k3 0805				not mandatory
R117,R118,R122,R123	DNP	4			for MPGS14EB sequencing
R119,R120	0R	2	5015	Keystone Electronics	configuration strap
RV101	Varistor 230Vac 130J	1	B72220S0231K101	EPCOS	
U101,U102,U104	MPGS14EB	3	MPGS14EB	GAIA-CONVERTER	Single converter possible testing
U103	HGMB50W17	1	HGMB35W17 / HGMB50W17	GAIA-CONVERTER	

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.5-COMPATIBLE PRODUCTS

Compatible Modules	comment
HGMS35W17	Can be tested stand-alone or along with MPGS14EB
HGMS55W17	Can be tested stand-alone or along with MPGS14EB
MPGS14EB	Can be tested stand-alone (up to 3 converters) or to down convert the AC/DC converter output

5.6-ASSEMBLY & OPERATION

Board Assembly : Start by populating smallest components (SMD resistors and SMD capacitors) on the bottom side of JIG, and then on top side. Populate configuration resistors according to the desired output configuration (see table).

Board Operation :

.AC/DC stand-alone: The PFC converter can be operated stand-alone with 2 independent 17 Vdc outputs (R119 and R120 not populated). In this case only the LOAD1 and LOAD2 are connected according to connecting diagram#1. If AC/DC outputs are connected in series (R119 and R120 populated) to provide 34 Vdc, only LOAD3 is connected according to diagram#1.

For this mode of operation the MPGS14EB (U101-U102-U104) and associated components can remain unpopulated.

.AC/DC along with down converter:

To provide an output voltage between 12Vdc and 24Vdc it is recommended to populate U2 and its associated components, U2 being the only MPGS14EB supplied with 34Vdc. To provide an output voltage between 1.2 and 12V dc it is recommended to populate U101 or U104 with their associated components. For these operation modes, follow the diagram#2.

For this mode of operation, the set of components R103, R104, C104, Q102, CR102, R106 associated to U102, or the homologue components associated to U101 and U104 need to be populated. This delay circuit is designed to delay MPGS14EB start-up in order not to disturb Tank capacitor (C135 and C135) charge during AC/DC warm up. This circuit is intended to delay start-up during voltage rising stage and allow turn-off tuning (through R106) during voltage falling stage.

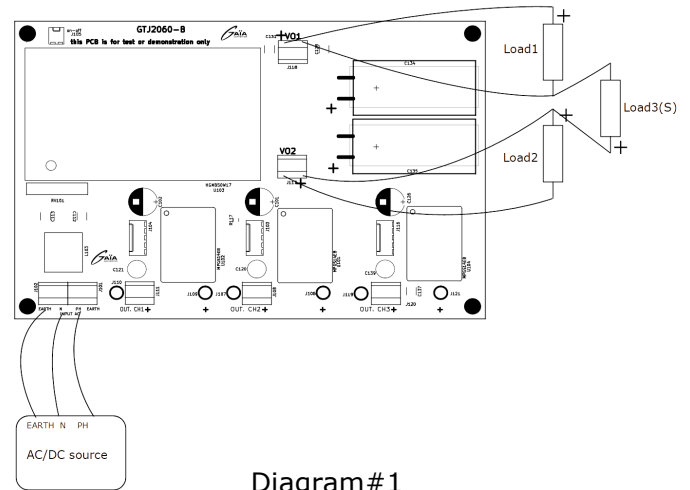


Diagram #1

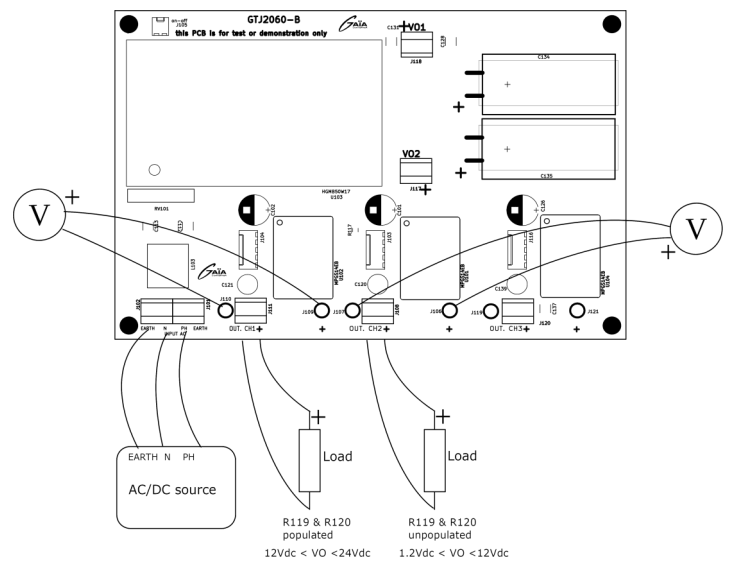


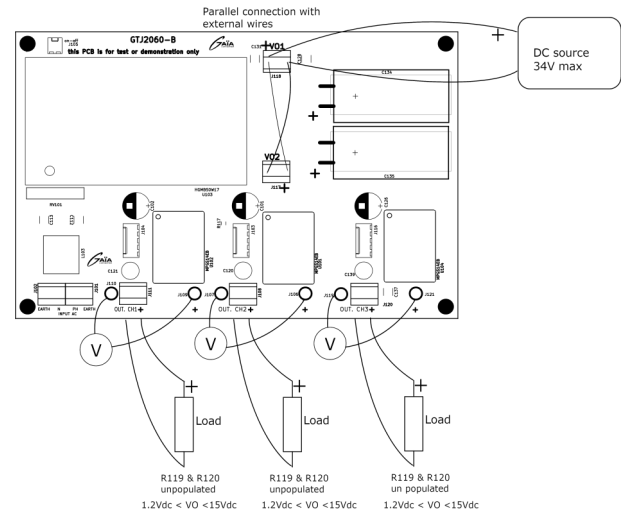
Diagram #2

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.6-ASSEMBLY & OPERATION (continued)

DC/DC operation : dc/dc operation involving up to 3 MPGS14EB can be possible when Dc input is performed through J117 and J118. In this configuration the components related to PFC function, including U103 and associated input and output filters circuit are not necessarily populated.

To supply each MPGS14EB with the same input voltage, J117 and J118 need to get connected together in parallel to serve as common input connector for MPGS14EB input voltage, this connection should be performed via external cables. The connection diagram is represented in diagram#3.



5.7-CONNECTORS PINOUT

Designator	Pin#	Section	Function	Model	Designator	Pin#	Section	Function	Model
J101	1	PFC	INPUT Chassis (Earth)	PCB terminal 26 to 14 AWG	J111	1	CH1	Vch1 Load	PCB terminal 26 to 14 AWG
J101	2	PFC	INPUT AC : PH	PCB terminal 26 to 14 AWG	J111	2	CH1	Gch1 Load	PCB terminal 26 to 14 AWG
J102	1	PFC	INPUT AC : N	PCB terminal 26 to 14 AWG	J116	1	CH2	Tracking function	MOLEX KK 5
J102	2	PFC	INPUT Chassis (Earth)	PCB terminal 26 to 14 AWG	J116	2	CH2	Current monitoring /share function	MOLEX KK 5
J103	1	CH2	Tracking function	MOLEX KK 5	J116	3	CH2	Sync input	MOLEX KK 5
J103	2	CH2	Current monitoring /share function	MOLEX KK 5	J116	4	CH2	Gch1	MOLEX KK 5
J103	3	CH2	Sync input	MOLEX KK 5	J116	5	CH2	Sd UVLO	MOLEX KK 5
J103	4	CH2	Go1	MOLEX KK 5	J116	1	CH2	Tracking function	MOLEX KK 5
J103	5	CH2	Sd UVLO	MOLEX KK 5	J116	2	CH2	Current monitoring /share function	MOLEX KK 5
J104	1	CH1	Tracking function	MOLEX KK 5	J116	3	CH2	Sync input	MOLEX KK 5
J104	2	CH1	Current monitoring /share function	MOLEX KK 5	J116	4	CH2	Go1	MOLEX KK 5
J104	3	CH1	Sync input	MOLEX KK 5	J116	5	CH2	Sd UVLO	MOLEX KK 5
J104	4	CH1	Go1	MOLEX KK 5	J117	1	PFC	VO2	PCB terminal 26 to 14 AWG
J104	5	CH1	Sd UVLO	MOLEX KK 5	J117	2	PFC	GO2	PCB terminal 26 to 14 AWG
J105	1	PFC	PFC On-off	MOLEX KK 2	J118	1	PFC	VO1	PCB terminal 26 to 14 AWG
J105	2	PFC	PFC On-off _ref	MOLEX KK 2	J118	2	PFC	GO1	PCB terminal 26 to 14 AWG
J106	1	CH2	Vch2 Measure	Terminal assembly testpoint	J119	1	CH3	Vch3 Measure	Terminal assembly testpoint
J107	1	CH2	Gch2 Measure	Terminal assembly testpoint	J120	1	CH3	Vch3 Load	PCB terminal 26 to 14 AWG
J108	1	CH2	Vch2 Load	PCB terminal 26 to 14 AWG	J120	2	CH3	Gch3 Load	PCB terminal 26 to 14 AWG
J108	2	CH2	Gch2 Load	PCB terminal 26 to 14 AWG	J121	1	CH3	Gch3 Measure	Terminal assembly testpoint
J109	1	CH1	Vch1 Measure	Terminal assembly testpoint					
J110	1	CH1	Gch1 Measure	Terminal assembly testpoint					

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.8-CONFIGURATION TABLE

SECTION	CONFIGURATION	COMPONENTS VALUE AND CONNEXIONS
AC/DC TESTING	34V dc output (U102 input voltage =34Vdc) (U101 input voltage =17Vdc) (U104 input voltage =17Vdc)	R119, R120=0Ω
AC/DC TESTING	2X 17 Vdc output (U102 input voltage =NC) (U101 input voltage =17Vdc) (U104 input voltage =17Vdc)	R119, R120=DNP
AC/DC TESTING	MPGS14EB supplier by U103 with large tank capacitors (C135-C134)	R103, R104,C104, CR102, Q102, Populated R101, R102,C103, CR101, Q101, Populated R110, R115,C127, CR103, Q103, Populated
DC/DC TESTING	MPGS14EB supplier by external PSU on J117 & J118	R103, R104,C104, CR102, Q102, = DNP R101, R102,C103, CR101, Q101, = DNP R110, R115,C127, CR103, Q103, = DNP
DC/DC TESTING	(U102 input voltage =34Vdc) (U101 input voltage =17Vdc) (U104 input voltage =17Vdc)	R119, R120=0Ω Input + on J117(1) Input - on J118(2)
DC/DC TESTING	(U102 input voltage =17Vdc) (U101 input voltage =17Vdc) (U104 input voltage =17Vdc)	R119, R120=DNP Input + on J117(1) & J118(1) Input - on J118(2) & J117(2)
DC/DC TESTING	U102 U101 U104 independent operation	R117,R118,R122,R123 = DNP
DC/DC TESTING	U104 U101 coincident (AN5005056)	R117,R118 =calculated values
DC/DC TESTING	U104 U102 coincident (AN5005056)	R122,R123 =calculated values
DC/DC TESTING	U102 U101 U104 output trimmed up	R110,R108,R125 =calculated values R109,R107,R124 =DNP
DC/DC TESTING	U102 U101 U104 output trimmed down	R110,R108,R125 = DNP R109,R107,R124 = calculated values
DC/DC TESTING	U102 U101 U104 nominal UVLO	R106,R105,R121 = DNP
DC/DC TESTING	U102 U101 U104 trimmed UVLO	R106,R105,R121 = calculated values P
DC/DC TESTING	U102 U101 U104 Current limit trim	R114,R112,R127 populated R113,R111,R126 = DNP
DC/DC TESTING	U102 U101 U104 nominal Current limit	R114,R112,R127 = DNP R113,R111,R126 = DNP
DC/DC TESTING	U102 U101 U104 nominal start-up delay	C106,C105,C132 = DNP
DC/DC TESTING	U102 U101 U104 delayed start-up delay	C106,C105,C132 = populated
DC/DC TESTING	U102 U101 U104 nominal start-up slope	C108,C107,C133 = DNP
DC/DC TESTING	U102 U101 U104 modified start-up slope	C108,C107,C133 = populated

DNP = do not populate,

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

5.9-PERFORMANCES

5.9.1 Power factor and THD :

Frequency : (Hz)	360	400	500	600	700	800
Input Voltage	Power Factor@ 50W output power					
100 VAC	1.00	1.00	1.00	1.00	1.00	1.00
115 Vac	1.00	1.00	1.00	1.00	1.00	1.00
122 Vac	1.00	1.00	1.00	1.00	0.99	0.99

Frequency : (Hz)	360	400	500	600	700	800
Input Voltage	Power Factor@25W output power					
100 VAC	0.99	0.99	0.99	0.98	0.97	0.97
115 Vac	0.98	0.98	0.98	0.96	0.94	0.94
122 Vac	0.98	0.97	0.97	0.95	0.94	0.92

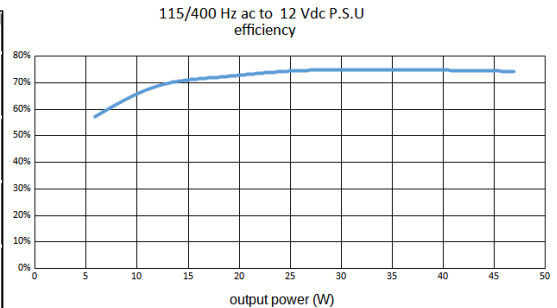
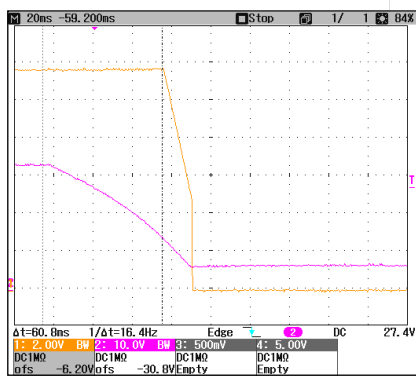
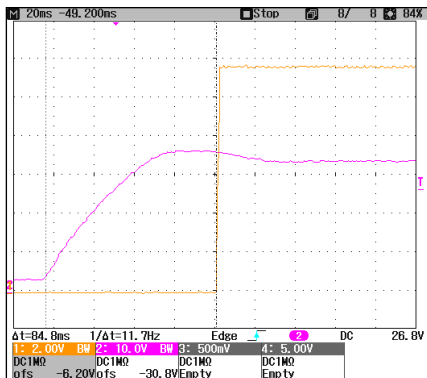
Frequency : (Hz)	360	400	800
Output Power	THD@ 115 Vac (%)		
50W	2.3	3	2.8
25W	4.2	5.8	5.1

Single output performances measured with U102 Populated and tuned to 12V out, C134 & C135 = 3300µF R119 & R120 = 0R

MPGS14EB starting delay :

12V 45W 50ms Hold up :

Power efficiency :



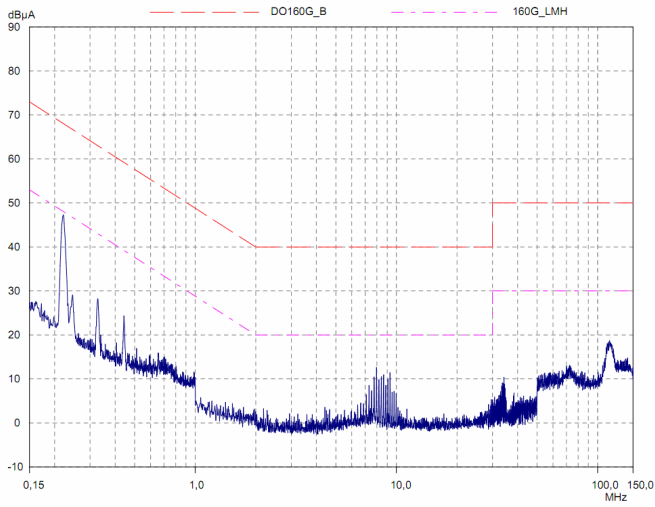
Ch1 + 12v dc output Ch2= 34V dc PFC output (6600µF)

5-GTJ-2060 : JIG For HGMB50 & MPGS14EB

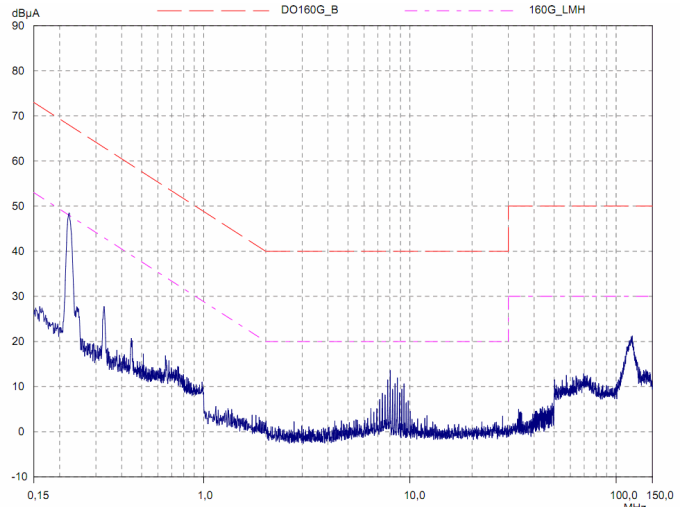
5.9-PERFORMANCES

5.9.2 EMC compliance :

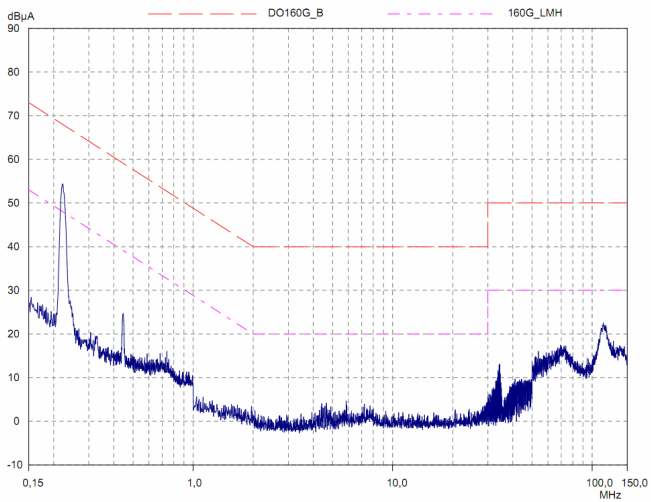
DO160 EMI for HGMB50W17 connected to 1 MPGS14EB(CH1) at 45W



Measure on PHASE AC line



Measure on NEUTRAL AC line



Measure on EARTH AC line