GENESYS™

GH1.5kW

RELIABILITY

DATA

DWG: IA762-79-01		
APPD	CHK	DWG
Graner 19/08/19	Uri m 19/8/19	MICHAEL G. 18.08.2019

TDK-LAMBDA

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The above data is typical value. As all units have nearly the same characteristics, the data to be considered as ability value.

1. M.T.B.F.

Calculation based on parts stress reliability projection of Telcordia (Bellcore)
"Reliability Prediction Procedure for Electronic Equipment" Document number TR-322,Issue5)
Individual failure λss is calculated from electrical stress and temperature rise of each device.

$$MTBF = \frac{1}{\lambda_{equip}} = \frac{1}{\pi_E \sum_{i=1}^{m} N_i \cdot \lambda_{SSi}} \times 10^9 \quad \text{(hours)}$$

$$\lambda_{SSi} = \lambda_{Gi} \cdot \pi_{Qi} \cdot \pi_{Si} \cdot \pi_{Ti}$$

λ equip	:	Total Equipment failure rate (FITs = Failures in10^9 hours)
λ Gi	:	Generic failure rate for the *i* th device
π Qi	:	Quality factor for the *i* th device
π Si	:	Stress factor for the *i* th device
π Ti	:	Temperature factor for the *i* th device
m	:	Number of different device types
Ni	:	Quantity of *i* th device type
π E	:	Equipment environmental factor

Conditions:

Ta=25°C
Gf - Ground,Fixed,Uncontrolled

M.T.B.F. =347377 (HOURS)

2. COMPONENT DERATING

GH1.5kW SERIES

Calculation method

(1) Conditions

Input:	Nominal
Output:	Vout - 100%, Iout - 100%
Ambient temperature:	50°C
Mounting Method:	Standard Mounting

(2) Semiconductors

Compared with maximum junction temperature and actual one which is calculated on case temperature, power dissipation and thermal impedance.

(3) IC, Resistors, Capacitors, etc.

Ambient temperature, operating conditions and power dissipation are within derating criteria.

(4) Calculation method of thermal impedance:

$$\Theta_{j-a} = \frac{Tj(\max) - Ta}{Pc(\max)} \qquad \Theta_{j-c} = \frac{Tj(\max) - Tc}{Pc(\max)} \qquad \Theta_{j-l} = \frac{Tj(\max) - Tl}{Pc(\max)}$$

Tc : Case Temperature at Start Point of Derating; 25°C in General

Ta : Ambient Temperature at Start Point of Derating; 25°C in General

$Pc(\max)$: Maximum Power Dissipation

$Tj(\max)$: Maximum Junction temperature

Θ_{j-c} : Thermal Impedance between Junction and Case

Θ_{j-a} : Thermal Impedance between Junction and Air

Θ_{j-l} : Thermal Impedance between Junction and Lead

2. COMPONENT DERATING

Load = 100% Ta=50°C **INPUT1P**

D1	Tjmax=	150	°C	□j-c =	1.0	°C/W	Pmax =	---	W
D25XB60-7000	Pd =	14	W	□Tc =	45.7	°C	Tc =	95.7	°C
SHINDENGEN	Tj = Tc + (□j-c x Pd) =>			Tj =	109.7	°C	D.F. =	73.1	%
D2	Tjmax=	150	°C	□j-c =	1.0	°C/W	Pmax =	---	W
D25XB60-7000	Pd =	14	W	□Tc =	52.9	°C	Tc =	102.9	°C
SHINDENGEN	Tj = Tc + (□j-c x Pd) =>			Tj =	116.9	°C	D.F. =	77.9	%
A6	Tjmax=	150	°C	□j-c =	3.0	°C/W	Pmax =	---	W
MIP2E5DMY	Pd =	1.84	W	□Tc =	14.1	°C	Tc =	64.1	°C
PANASONIC	Tj = Tc + (□j-c x Pd) =>			Tj =	69.6	°C	D.F. =	46.4	%

Load = 100% Ta=50°C **PFC**

Q3	Tjmax=	150	°C	□j-c =	0.5	°C/W	Pmax =	270.0	W
TK39N60W,S1VF	Pd =	6.6	W	□Tc =	47.4	°C	Tc =	97.4	°C
Toshiba	Tj = Tc + (□j-c x Pd) =>			Tj =	100.5	°C	D.F. =	67.0	%
Q4	Tjmax=	150	°C	□j-c =	0.5	°C/W	Pmax =	270.0	W
TK39N60W,S1VF	Pd =	6.6	W	□Tc =	50.2	°C	Tc =	100.2	°C
Toshiba	Tj = Tc + (□j-c x Pd) =>			Tj =	103.3	°C	D.F. =	68.8	%
Q7	Tjmax=	150	°C	□j-c =	0.5	°C/W	Pmax =	270.0	W
TK39N60W,S1VF	Pd =	6.6	W	□Tc =	49.5	°C	Tc =	99.5	°C
Toshiba	Tj = Tc + (□j-c x Pd) =>			Tj =	102.6	°C	D.F. =	68.4	%
Q8	Tjmax=	150	°C	□j-c =	0.5	°C/W	Pmax =	270.0	W
TK39N60W,S1VF	Pd =	6.6	W	□Tc =	46.4	°C	Tc =	96.4	°C
Toshiba	Tj = Tc + (□j-c x Pd) =>			Tj =	99.5	°C	D.F. =	66.3	%
D2	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	89.0	W
IDH10G65C5	Pd =	3.5	W	□Tc =	18.3	°C	Tc =	68.3	°C
INFINEON	Tj = Tc + (□j-c x Pd) =>			Tj =	74.2	°C	D.F. =	42.4	%
D3	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	89.0	W
IDH10G65C5	Pd =	3.5	W	□Tc =	18.4	°C	Tc =	68.4	°C
INFINEON	Tj = Tc + (□j-c x Pd) =>			Tj =	74.3	°C	D.F. =	42.5	%
D5	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	89.0	W
IDH10G65C5	Pd =	3.5	W	□Tc =	19.4	°C	Tc =	69.4	°C
INFINEON	Tj = Tc + (□j-c x Pd) =>			Tj =	75.3	°C	D.F. =	43.1	%
D6	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	89.0	W
IDH10G65C5	Pd =	3.5	W	□Tc =	18.5	°C	Tc =	68.5	°C
INFINEON	Tj = Tc + (□j-c x Pd) =>			Tj =	74.4	°C	D.F. =	42.5	%

2. COMPONENT DERATING

Load = 100% Ta=50°C **DC/DC 10V**

Q1	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	13.15	W	□Tc =	33.2	°C	Tc =	83.2	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	90.7	°C	D.F. =	60.5	%
Q2	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	13.15	W	□Tc =	41.2	°C	Tc =	91.2	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	98.7	°C	D.F. =	65.8	%
Q5	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.41	W	□Tc =	28.9	°C	Tc =	78.9	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	84.1	°C	D.F. =	56.1	%
Q6	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.39	W	□Tc =	26.4	°C	Tc =	76.4	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	81.6	°C	D.F. =	54.4	%
Q9	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.58	W	□Tc =	26.4	°C	Tc =	76.4	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	81.8	°C	D.F. =	54.5	%
Q10	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	6.64	W	□Tc =	23.9	°C	Tc =	73.9	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	80.3	°C	D.F. =	53.5	%
Q17,Q19,Q21	Tjmax=	175	°C	□j-c =	0.9	°C/W	Pmax =	167.0	W
IPP023N04N G	Pd =	0.65	W	□Tc =	39.2	°C	Tc =	89.2	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	89.8	°C	D.F. =	51.3	%
Q23~Q27	Tjmax=	175	°C	□j-c =	0.9	°C/W	Pmax =	167.0	W
IPP023N04N G	Pd =	0.65	W	□Tc =	39.2	°C	Tc =	89.2	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	89.8	°C	D.F. =	51.3	%
D4	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	---	W
IDH10G65C5	Pd =	2.6	W	□Tc =	33.2	°C	Tc =	83.2	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	87.6	°C	D.F. =	50.1	%

Load = 100% Ta=50°C **DC/DC 60V**

Q1	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	12.47	W	□Tc =	40.2	°C	Tc =	90.2	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	97.3	°C	D.F. =	64.9	%
Q2	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	11.31	W	□Tc =	43.2	°C	Tc =	93.2	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	99.6	°C	D.F. =	66.4	%
Q5	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.41	W	□Tc =	29.5	°C	Tc =	79.5	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	84.7	°C	D.F. =	56.5	%
Q6	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.39	W	□Tc =	34.1	°C	Tc =	84.1	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	89.3	°C	D.F. =	59.5	%
Q9	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.58	W	□Tc =	29.8	°C	Tc =	79.8	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	85.2	°C	D.F. =	56.8	%
Q10	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	6.64	W	□Tc =	33.5	°C	Tc =	83.5	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	89.9	°C	D.F. =	59.9	%
D24~D31	Tjmax=	175	°C	□j-c =	1.3	°C/W	Pmax =	---	W
STTH2003CT	Pd =	3.542	W	□Tc =	46.8	°C	Tc =	96.8	°C
ST	Tj = Tc + (□j-c x Pd) =>			Tj =	101.4	°C	D.F. =	57.9	%

2. COMPONENT DERATING

Load = 100% Ta=50°C **DC/DC 150V**

Q1	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	13.15	W	□Tc =	41.0	°C	Tc =	91.0	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	98.5	°C	D.F. =	65.7	%
Q2	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	13.15	W	□Tc =	43.5	°C	Tc =	93.5	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	101.0	°C	D.F. =	67.3	%
Q5	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.64	W	□Tc =	23.1	°C	Tc =	73.1	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	77.6	°C	D.F. =	51.7	%
Q6	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.72	W	□Tc =	29.5	°C	Tc =	79.5	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	84.0	°C	D.F. =	56.0	%
Q9	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.64	W	□Tc =	28.3	°C	Tc =	78.3	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	82.8	°C	D.F. =	55.2	%
Q10	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.72	W	□Tc =	27.0	°C	Tc =	77.0	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	81.5	°C	D.F. =	54.4	%
D30~D37	Tjmax=	150	°C	□j-c =	3.5	°C/W	Pmax =	---	W
YG911S3R	Pd =	3.5	W	□Tc =	49.6	°C	Tc =	99.6	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	111.9	°C	D.F. =	74.6	%
D4	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	---	W
IDH10G65C5	Pd =	2	W	□Tc =	36.5	°C	Tc =	86.5	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	89.9	°C	D.F. =	51.4	%

Load = 100% Ta=50°C **DC/DC 600V**

Q1	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	13.37	W	□Tc =	32.8	°C	Tc =	82.8	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	90.4	°C	D.F. =	60.3	%
Q2	Tjmax=	150	°C	□j-c =	0.57	°C/W	Pmax =	220.0	W
FMW30N60S1HF	Pd =	11.18	W	□Tc =	40.6	°C	Tc =	90.6	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	97.0	°C	D.F. =	64.6	%
Q5	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.78	W	□Tc =	27.9	°C	Tc =	77.9	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	82.5	°C	D.F. =	55.0	%
Q6	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	4.73	W	□Tc =	28.9	°C	Tc =	78.9	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	83.4	°C	D.F. =	55.6	%
Q9	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5.24	W	□Tc =	26.8	°C	Tc =	76.8	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	81.8	°C	D.F. =	54.6	%
Q10	Tjmax=	150	°C	□j-c =	0.96	°C/W	Pmax =	130.0	W
FMV40N60S1	Pd =	5	W	□Tc =	28.9	°C	Tc =	78.9	°C
Fuji	Tj = Tc + (□j-c x Pd) =>			Tj =	83.7	°C	D.F. =	55.8	%
D31~D35	Tjmax=	175	°C	□j-c =	2.0	°C/W	Pmax =	---	W
IDH02SG120	Pd =	3.414	W	□Tc =	36.8	°C	Tc =	86.8	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	93.6	°C	D.F. =	53.5	%
D4	Tjmax=	175	°C	□j-c =	1.7	°C/W	Pmax =	---	W
IDH10G65C5	Pd =	2.2	W	□Tc =	35.1	°C	Tc =	85.1	°C
Infineon	Tj = Tc + (□j-c x Pd) =>			Tj =	88.8	°C	D.F. =	50.8	%

3. Main Components Temperature Rise

GH10-150

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	T3 IN	Transformer	71.1
	T3 Core	Transformer	48.2
	Q17	Mosfet	39.2
	Q6	Mosfet	26.4
	Q2	Mosfet	36.3
	D4	Diode	33.2
	Q32	Mosfet	27.2
	L3 IN	Choke	44.7
	C4	E-Cap	27.9
	C16	E-Cap	16.6
	R101	Shunt	48.2
PFC	L2	Choke	35.6
	D3	Diode	15.3
	Q8	Mosfet	48.9
	C11	E-Cap	7.1
OUTPUT FILTER	C1	E-Cap	37.6
	C3	E-Cap	37.2
INPUT	D2	Bridge	52.9
	RL1	Relay	24.9
	A6	Top-Switch	14.1
	T1 Core	Transformer	9.9
	T1 IN1	Transformer	23.8
	C29	E-Cap	6.8
	C57	E-Cap	14.0
	C68	E-Cap	14.8

Conditions:

Standard Mounting	
Ta	50°C
Input Voltage	85V~265V
Output Voltage	10V
Output Current	150A

3. Main Components Temperature Rise

GH60-25

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	Q2	Mosfet	43.2
	D27	Diode	46.8
	Q6	Mosfet	34.1
	T3 Core	Transformer	46.7
	Q16	Mosfet	29.1
	L3	Choke	33.5
	R91	Shunt	34.5
	C5	E-Cap	31.4
OUTPUT FILTER	L1	Choke	27.1
	C1	E-Cap	26.3
	C3	E-Cap	26.6
Conditions:			
Standard Mounting			
Ta		50°C	
Input Voltage		85V~265V	
Output Voltage		60V	
Output Current		25A	

3. Main Components Temperature Rise

GH150-10

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	Q2	Mosfet	35.2
	D35	Diode	52.6
	Q6	Mosfet	36.5
	T3 IN	Transformer	59.8
	T3 Core	Transformer	33.7
	Q16	Mosfet	25.3
	L3	Choke	44.0
	R99	Shunt	37.4
	C7	E-Cap	26.6
OUTPUT FILTER	C1	Film Cap	25.8
	C2	Film Cap	24.8
	C4	E-Cap	26.6
Conditions:			
Standard Mounting			
Ta		50°C	
Input Voltage		85V~265V	
Output Voltage		150V	
Output Current		10A	

3. Main Components Temperature Rise

GH600-2.6

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	Q2	Mosfet	59.1
	D34	Diode	40.4
	Q10	Mosfet	39.8
	T3 IN	Transformer	79.9
	T3 Core	Transformer	43.9
	Q16	Mosfet	29.8
	L1	Choke	34.3
	L2	Choke	65.1
	L2 Core	Choke	38.7
	R99	Shunt	32.0
	C5	E-Cap	29.6
	C8	E-Cap	28.4
OUTPUT FILTER	L1	Choke	27.5
	C14	E-Cap	25.6
	C4	E-Cap	19.5
Conditions:			
Standard Mounting			
Ta		50°C	
Input Voltage		85V~265V	
Output Voltage		600V	
Output Current		2.6A	

4. ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION

MODEL	COMPUTED LIFE (year) at Tambient		
	30°C	40°C	50°C
GH10V-150A	12	6.5	3.3
GH60V-25A	16	8	4
GH150V-10A	16	8	4
GH600V-2.6A	16	8	4

FORMULA $L = Lo \times 2^{\frac{105-Tc}{10}}$ (years)

L : Elec.capacitor computed life (24 hours per day,365 days operation)

Lo : Guarantee life for Elec.capacitor

Tc : Case temperature of Elec.capacitor

Standard Mounting	
Input Voltage	Nom.
Output Voltage	100%
Output Current	100%

5. ABNORMAL TEST INPUT 1P

Condition: Ta:25°C Input:230VAC Vout:100% Iout:100%

No.	Test Position		Failure		Study result (prediction of the phenomena)																	
	Location No.	Test Point	Short	Open	Fire	Sligth Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	OTP	AC FAIL	No Output	No Change	PS functional after AC recycle	Others	Note
1	A4	2-3	●								●						●				Input-A4
2	A5	2-3	●								●						●				Input-A5
3	A6	1-2	●														●		●		Display stopped working
4		1		●													●		●		Display stopped working
5		2-3	●									●					●				Input-F3
6		2		●													●		●		Display stopped working
7		3-1	●								●	●					●				Input-F3;ZD4;A6
8		3		●													●		●		Display stopped working
9	A7	3-4	●								●						●			●	Input-A7,Internal Error
10	C28		●														●		●		Display stopped working
11				●														●			
12	C50	thermal:A5,L4	●														●		●	●	Internal Error. Input-A5&L4-35°C
13				●														●			
14	C70	thermal:A8,L6	●																	●	Fan`s stopped working*
15				●														●			
16	D1	4		●																●	Themperature up on D2 FROM 39°C to 43°C
17	D7	A-C	●								●						●				Input-A5
18		A		●														●			
19	D9	A-C	●														●		●	●	Internal Error
20		A		●														●			
21	D14	A-C	●														●		●		Display stopped working
22	D17	A-C	●														●		●		Display stopped working
23		A		●														●			

5. ABNORMAL TEST PFC 1P

Condition: Ta:25°C Input:230VAC Vout:100% Iout:100%

No.	Test Position		Failure		Study result (prediction of the phenomena)																	
	Location No.	Test Point	Short	Open	Fire	Sligth Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	OTP	AC FAIL	No Output	No Change	PS functional after AC recycle	Others	Note
1	C10, C11, C12		●								●	●					●				D1, Input F1, F2
2				●														●			
3	D2	A-C	●														●			●	Display shows: V - 0 and I - 0
4		A		●														●			
5	D4	A-C	●															●			
6		A		●														●			
7	L1		●								●	●					●				Q3, Q4, R10, ZD1; Input - F1, F2
8				●							●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
9	Q1	B-E	●															●			
10		B		●							●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
11		K-E	●															●			
12		E		●							●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
13		K-B	●								●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
14		K		●														●			
15	Q2	B-E	●															●			
16		B		●							●	●					●				Q3, Q4, R10, ZD1; Input - F1, F2
17		K-E	●								●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
18		E		●							●	●					●				Q3, Q4, R10, ZD1; Input - F1, F2
19		K-B	●								●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
20		K		●							●	●					●				Q3, Q4, R10, ZD1; Input - F1, F2
21	Q3	G-S	●								●	●					●				Q7, Q8, R20, R24, ZD2; Input - F1, F2
22		G		●							●	●					●				Q3, Q4, R10, ZD1; Input - F1, F2
23		D-S	●								●	●					●				Q3, Q4; Input - F1, F2; DC/DC - F1
24		S		●							●	●					●				Q3, Q4, R6, R10, ZD1; Input - F1, F2; DC/DC - F1
25		D-G	●								●	●					●				Q3, Q4, R6, R10, ZD1; Input - F1, F2
26		D		●							●	●					●				Q3, Q4, R6, R10, ZD1; Input - F1, F2

5. ABNORMAL TEST DCDC 10V

Condition: Ta:25°C Input:230VAC Vout:100% Iout:100%

No.	Test Position		Failure		Study result (prediction of the phenomena)																	
	Location No.	Test Point	Short	Open	Fire	Sligth Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	OTP	AC FAIL	No Output	No Change	PS functional after AC recycle	Others	Note
1	C8		●						●		●	●					●				A1, Q2, Q6~Q10, D11, D13, D14, ZD1, R6, R39, R40, R41, R42
2				●														●			
3	C17		●								●	●					●				PFC3P200 - D1; Input3P200 - F1, F3
4				●														●			
5	L3		●															●			
6				●													●		●		
7	Q1	G-S	●																●	●	Q2 temp enlarge from 57°C to 76°C
8		G		●									●				●		●		
9		D-S	●										●				●		●		
10		S		●															●	●	Q2 temp enlarge from 57°C to 76°C
11		D-G	●										●				●		●		
12		D		●															●	●	Q2 temp enlarge from 57°C to 76°C
13	Q5	G-S	●																●	●	Vo go down to 6V; Mode CV change to CC
14		G		●					●		●	●					●				A1, Q6, Q5, C12, C14, C20, Q1, D1, R2, ZD1, R5
15		D-S	●						●		●	●					●				A1, Q6, Q5, Q1, D1, R1, R2, ZD1, R5
16		S		●															●	●	Vo go down to 6V; Mode CV change to CC
17		D-G	●						●		●	●					●				A1, Q5, Q6, Q4, Q1, D1, D6, D8, R1, R2, ZD1, R5, R27, R28,
18		D		●															●	●	Vo go down to 6V; Mode CV change to CC
19	Q23	G-S	●															●			
20		G		●														●			
21		D-S	●						●		●	●					●				A1, Q25, Q5~Q7, Q9, Q1, D1, D6, R2, ZD1, R5, R27, R30, R39
22		S		●														●			
23		D-G	●						●		●	●					●				A1, Q22, Q23, Q25, Q5~Q7, Q9, Q1, D1, D6, R2, ZD1, R5, R27, R30, R39, R84
24		D		●														●			
25	T3	1-2	●						●		●	●					●				A1, Q5, Q9, Q10, Q7, C12, C14, C20, Q1, D1, D6, R2, ZD1, R5, R39
26		1		●													●		●		
27		A-C	●								●						●				A1, Q17, Q25, Q1, Q2, Q5~Q7, Q9, D1, D6, ZD1, R5, R6, R27, R30, R39
28		A		●															●	●	Vo go down to 6V
29		B-C	●								●						●				A1, Q17, Q25, Q1, Q2, Q5~Q7, Q9, D1, D6, ZD1, R5, R6, R27, R30, R39
30		B		●															●	●	Vo go down to 6V

5. ABNORMAL TEST DCDC 600V

Condition: Ta:25°C Input:230VAC Vout:100% Iout:100%

No.	Test Position		Failure		Study result (prediction of the phenomena)																	
	Location No.	Test Point	Short	Open	Fire	Sligth Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	OVP	OCP	OTP	AC FAIL	No Output	No Change	PS functional after AC recycle	Others	Note
1	C4		●										●				●				
2				●														●			
3	C7		●										●				●				
4				●														●			
5	C16		●								●	●					●				PFC3P200 - D1; Input3P200 - F1, F3
6				●														●			
7	D22	A-C	●															●			
8		A		●														●			
9	D32	A-C	●						●		●						●				A1, Q1, Q8, Q9, Q10, Q14, Q15, D1, D35, D13, D11, ZD1, R1, R5, R39, R40 PFC3P200 - Q1
10		A		●							●									●	R63~R66, R68, R71, R66, R69; Vo go down to 360V; Mode CV change to CC
11	L3	8.9-10,11	●															●			
12		8,9		●													●		●		
13		5,4-3,2	●															●			
14		5,4		●													●		●		
15	Q1	G-S	●																●	●	Q2 temp enlarge from 57°C to 76°C
16		G		●									●				●		●		
17		D-S	●										●				●		●		
18		S		●															●	●	Q2 temp enlarge from 57°C to 76°C
19		D-G	●										●				●		●		
20		D		●															●	●	Q2 temp enlarge from 57°C to 76°C
21	Q5	G-S	●																●	●	Vo go down to 360V; Mode CV change to CC
22		G		●					●		●						●				A1, Q6, Q5, C12, Q1, D1, R2, ZD1, R5
23		D-S	●						●		●						●				A1, Q6, Q5, Q1, D1, R1, R2, ZD1, R5
24		S		●															●	●	Vo go down to 360V; Mode CV change to CC
25		D-G	●						●		●						●				A1, R149, Q5, Q6, Q3, Q1, D1, D6, D8, R1, R2, ZD1, R5, R27, R28
26		D		●															●	●	Vo go down to 360V; Mode CV change to CC
27	T3	1-2	●						●		●	●					●				A1, C11, C12, Q1, Q9, Q10, D1, ZD1, R1, R5, R39, R40 PFC3P200 - D1; Input3P200 - F1, F3
28		1		●													●		●		
29		A-B	●						●		●	●					●				A1,C11, C12, Q1, Q9, Q10, D1, ZD1, R1, R5, R39, R40 PFC3P200 - D1; Input3P200 - F1, F3
30		A		●															●	●	Vo go down to 360V
31		C-B	●						●		●						●				A1, C11, C12, Q1, Q9, Q10, D1, ZD1, R1, R5, R39, R40 PFC3P200 - D1; Input3P200 - F1, F3
32		C		●															●	●	Vo go down to 360V