

G+GENESYS™ 1.7kW

RELIABILITY

DATA

DWG: IA845-79-01		
APPD	CHK	DWG
Sergey.K 4/9/2018	Uri M. 4/9/2018	MICHAEL G. 4.9.2018

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.

M.T.B.F.

Calculation based on parts stress reliability projection of Telcordia (Bellcore)
 "Reliability Prediction Procedure for Electronic Equipment" Document number TR-322, Issue 5)
 Individual failure λ_{SSi} 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 in 10^9 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
- N_i : Quantity of i th device type
- π_E : Equipment environmental factor

Conditions:

$T_a = 25^\circ\text{C}$

Gf - Ground, Fixed, Uncontrolled

M.T.B.F. = 357416 (HOURS)

2.COMPONENT DERATING

G 1.7kW 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:

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

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

Load = 100%

Ta=50°C

INPUT1P

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D1 D25XB60-7000 SHINDENGEN	Tjmax= 150 °C Pd = 7.9 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.0 °C/W ΔTc = 22.0 °C Tj = 79.9 °C	Pmax = --- W Tc = 72.0 °C D.F. = 53.3 %
D2 D25XB60-7000 SHINDENGEN	Tjmax= 150 °C Pd = 7.9 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.0 °C/W ΔTc = 21.0 °C Tj = 78.9 °C	Pmax = --- W Tc = 71.0 °C D.F. = 52.6 %
A4 TPS54202DDCR TI	Tjmax= 150 °C Pd = 0.31 W Tj = Tc + (θj-c x Pd) =>	θj-c = 39.5 °C/W ΔTc = 8.6 °C Tj = 70.8 °C	Pmax = --- W Tc = 58.6 °C D.F. = 47.2 %
A5 TPS54202DDCR TI	Tjmax= 150 °C Pd = 0.03 W Tj = Tc + (θj-c x Pd) =>	θj-c = 39.5 °C/W ΔTc = 12.9 °C Tj = 64.1 °C	Pmax = --- W Tc = 62.9 °C D.F. = 42.7 %
A6 MIP2E5DMY PANASONIC	Tjmax= 150 °C Pd = 1.84 W Tj = Tc + (θj-c x Pd) =>	θj-c = 3.0 °C/W ΔTc = 11.2 °C Tj = 66.7 °C	Pmax = --- W Tc = 61.2 °C D.F. = 44.5 %
A7 TPS560200DBVR TI	Tjmax= 125 °C Pd = 0.1 W Tj = Tc + (θj-c x Pd) =>	θj-c = 100 °C/W ΔTc = 24.0 °C Tj = 84.0 °C	Pmax = --- W Tc = 74.0 °C D.F. = 67.2 %

Load = 100%

Ta=50°C

PFC

Q3 TK39N60W,S1VF Toshiba	Tjmax= 150 °C Pd = 6.6 W Tj = Tc + (θj-c x Pd) =>	θj-c = 0.5 °C/W ΔTc = 21.6 °C Tj = 74.7 °C	Pmax = 270.0 W Tc = 71.6 °C D.F. = 49.8 %
Q4 TK39N60W,S1VF Toshiba	Tjmax= 150 °C Pd = 6.6 W Tj = Tc + (θj-c x Pd) =>	θj-c = 0.5 °C/W ΔTc = 24.4 °C Tj = 77.5 °C	Pmax = 270.0 W Tc = 74.4 °C D.F. = 51.6 %
Q7 TK39N60W,S1VF Toshiba	Tjmax= 150 °C Pd = 6.6 W Tj = Tc + (θj-c x Pd) =>	θj-c = 0.5 °C/W ΔTc = 23.7 °C Tj = 76.8 °C	Pmax = 270.0 W Tc = 73.7 °C D.F. = 51.2 %
Q8 TK39N60W,S1VF Toshiba	Tjmax= 150 °C Pd = 6.6 W Tj = Tc + (θj-c x Pd) =>	θj-c = 0.5 °C/W ΔTc = 20.6 °C Tj = 73.7 °C	Pmax = 270.0 W Tc = 70.6 °C D.F. = 49.1 %
D2 IDH10G65C5 INFINEON	Tjmax= 175 °C Pd = 3.5 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 15.4 °C Tj = 71.3 °C	Pmax = 89.0 W Tc = 65.4 °C D.F. = 40.8 %
D3 IDH10G65C5 INFINEON	Tjmax= 175 °C Pd = 3.5 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 15.5 °C Tj = 71.4 °C	Pmax = 89.0 W Tc = 65.5 °C D.F. = 40.8 %
D5 IDH10G65C5 INFINEON	Tjmax= 175 °C Pd = 3.5 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 16.5 °C Tj = 72.4 °C	Pmax = 89.0 W Tc = 66.5 °C D.F. = 41.4 %
D6 IDH10G65C5 INFINEON	Tjmax= 175 °C Pd = 3.5 W Tj = Tc + (θj-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 15.6 °C Tj = 71.5 °C	Pmax = 89.0 W Tc = 65.6 °C D.F. = 40.9 %

Load = 100%

Ta=50°C

DC/DC 10V

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Q1 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 13.15 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 52.0 °C Tj = 109.5 °C	Pmax = 220.0 W Tc = 102.0 °C D.F. = 73.0 %
Q2 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 13.15 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 60.0 °C Tj = 117.5 °C	Pmax = 220.0 W Tc = 110.0 °C D.F. = 78.3 %
Q5 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.41 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 51.5 °C Tj = 106.7 °C	Pmax = 130.0 W Tc = 101.5 °C D.F. = 71.1 %
Q6 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.39 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 49.0 °C Tj = 104.2 °C	Pmax = 130.0 W Tc = 99.0 °C D.F. = 69.4 %
Q9 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.58 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 49.0 °C Tj = 104.4 °C	Pmax = 130.0 W Tc = 99.0 °C D.F. = 69.6 %
Q10 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 6.64 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 46.5 °C Tj = 102.9 °C	Pmax = 130.0 W Tc = 96.5 °C D.F. = 68.6 %
Q17,Q19,Q21 IPP023N04N G Infineon	Tjmax= 175 °C Pd = 0.65 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.9 °C/W ΔTc = 51.0 °C Tj = 101.6 °C	Pmax = 167.0 W Tc = 101.0 °C D.F. = 58.0 %
Q23~Q27 IPP023N04N G Infineon	Tjmax= 175 °C Pd = 0.65 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.9 °C/W ΔTc = 51.0 °C Tj = 101.6 °C	Pmax = 167.0 W Tc = 101.0 °C D.F. = 58.0 %
D4 IDH10G65C5 Infineon	Tjmax= 175 °C Pd = 2.6 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 40.1 °C Tj = 94.5 °C	Pmax = --- W Tc = 90.1 °C D.F. = 54.0 %

Load = 100%

Ta=50°C

DC/DC 60V

Q1 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 12.47 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 57.2 °C Tj = 114.3 °C	Pmax = 220.0 W Tc = 107.2 °C D.F. = 76.2 %
Q2 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 11.31 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 60.2 °C Tj = 116.6 °C	Pmax = 220.0 W Tc = 110.2 °C D.F. = 77.8 %
Q5 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.41 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 36.8 °C Tj = 92.0 °C	Pmax = 130.0 W Tc = 86.8 °C D.F. = 61.3 %
Q6 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.39 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 41.4 °C Tj = 96.6 °C	Pmax = 130.0 W Tc = 91.4 °C D.F. = 64.4 %
Q9 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.58 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 37.1 °C Tj = 92.5 °C	Pmax = 130.0 W Tc = 87.1 °C D.F. = 61.6 %
Q10 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 6.64 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 40.8 °C Tj = 97.2 °C	Pmax = 130.0 W Tc = 90.8 °C D.F. = 64.8 %
D24~D31 STTH2003CT ST	Tjmax= 175 °C Pd = 3.542 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 1.3 °C/W ΔTc = 41.4 °C Tj = 96.0 °C	Pmax = --- W Tc = 91.4 °C D.F. = 54.9 %
D4 IDH10G65C5 Infineon	Tjmax= 175 °C Pd = 2.6 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 40.6 °C Tj = 95.0 °C	Pmax = --- W Tc = 90.6 °C D.F. = 54.3 %

Load = 100%

Ta=50°C

DC/DC 150V

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Q1 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 13.15 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 32.7 °C Tj = 90.2 °C	Pmax = 220.0 W Tc = 82.7 °C D.F. = 60.1 %
Q2 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 13.15 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 35.2 °C Tj = 92.7 °C	Pmax = 220.0 W Tc = 85.2 °C D.F. = 61.8 %
Q5 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.64 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 30.1 °C Tj = 84.6 °C	Pmax = 130.0 W Tc = 80.1 °C D.F. = 56.4 %
Q6 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.72 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 36.5 °C Tj = 91.0 °C	Pmax = 130.0 W Tc = 86.5 °C D.F. = 60.7 %
Q9 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.64 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 35.3 °C Tj = 89.8 °C	Pmax = 130.0 W Tc = 85.3 °C D.F. = 59.8 %
Q10 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.72 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 34.0 °C Tj = 88.5 °C	Pmax = 130.0 W Tc = 84.0 °C D.F. = 59.0 %
D30~D37 YG911S3R Fuji	Tjmax= 150 °C Pd = 3.5 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 3.5 °C/W ΔTc = 52.6 °C Tj = 114.9 °C	Pmax = --- W Tc = 102.6 °C D.F. = 76.6 %
D4 IDH10G65C5 Infineon	Tjmax= 175 °C Pd = 2 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 37.0 °C Tj = 90.4 °C	Pmax = --- W Tc = 87.0 °C D.F. = 51.7 %

Load = 100%

Ta=50°C

DC/DC 600V


Q1 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 13.37 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 52.0 °C Tj = 109.6 °C	Pmax = 220.0 W Tc = 102.0 °C D.F. = 73.1 %
Q2 FMW30N60S1HF Fuji	Tjmax= 150 °C Pd = 11.18 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.57 °C/W ΔTc = 60.0 °C Tj = 116.4 °C	Pmax = 220.0 W Tc = 110.0 °C D.F. = 77.6 %
Q5 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.78 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 37.0 °C Tj = 91.6 °C	Pmax = 130.0 W Tc = 87.0 °C D.F. = 61.1 %
Q6 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 4.73 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 38.0 °C Tj = 92.5 °C	Pmax = 130.0 W Tc = 88.0 °C D.F. = 61.7 %
Q9 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5.24 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 36.0 °C Tj = 91.0 °C	Pmax = 130.0 W Tc = 86.0 °C D.F. = 60.7 %
Q10 FMV40N60S1 Fuji	Tjmax= 150 °C Pd = 5 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 0.96 °C/W ΔTc = 38.0 °C Tj = 92.8 °C	Pmax = 130.0 W Tc = 88.0 °C D.F. = 61.9 %
D31~D35 IDH02SG120 Infineon	Tjmax= 175 °C Pd = 3.414 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 2.0 °C/W ΔTc = 40.5 °C Tj = 97.3 °C	Pmax = --- W Tc = 90.5 °C D.F. = 55.6 %
D4 IDH10G65C5 Infineon	Tjmax= 175 °C Pd = 2.2 W Tj = Tc + (θ j-c x Pd) =>	θj-c = 1.7 °C/W ΔTc = 40.0 °C Tj = 93.7 °C	Pmax = --- W Tc = 90.0 °C D.F. = 53.6 %

3.Main Components Temperature Rise

G10-170

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	T3 IN	Transformer	72.0
	T3 Core	Transformer	46.4
	Q17	Mosfet	46.5
	Q6	Mosfet	36.4
	Q2	Mosfet	46.3
	D4	Diode	37.1
	Q32	Mosfet	32.3
	L3 IN	Choke	49.1
	L3 Core	Choke	34.2
	C4	E-Cap	30.9
	C17	E-Cap	22.0
	R101	Shunt	47.3
PFC	L1	Choke	29.7
	D5	Diode	23.5
	Q4	Mosfet	68.3
	C21	E-Cap	12.7
OUTPUT FILTER	C5	E-Cap	30.9
	C1	E-Cap	28.6
	L1 Core	Choke	28.3
INPUT	D2	Bridge	52.2
	RL1	Relay	27.3
	A6	Top-Switch	18.3
	T1 Core	Transformer	21.4
	T1 IN1	Transformer	27.8
	T1 IN2	Transformer	25.3
	C30	E-Cap	11.6
	C44	E-Cap	18.7
	C66	E-Cap	15.2
C75	E-Cap	18.5	

Conditions:


Standard Mounting	
Input Voltage	85V~265V
Output Voltage	10V
Output Current	170A

3.Main Components Temperature Rise

G60-28

Location No.		Parts Name	ΔT Temperature Rise (°C)
			Standard Mounting
DC-DC	Q2	Mosfet	60.2
	D26	Diode	41.4
	Q6	Mosfet	41.4
	T3 IN	Transformer	73.5
	T3 Core	Transformer	33.7
	Q16	Mosfet	28.4
	L3	Choke	31.4
	R91	Shunt	30.6
	C5	E-Cap	23
OUTPUT FILTER	C1	Choke	19.7
	C5	E-Cap	30.1
	C44	E-Cap	20.9

Conditions:


Standard Mounting	
Ta	50°C
Input Voltage	85V~265V
Output Voltage	60V
Output Current	28A

3.Main Components Temperature Rise

G150-11.2


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	11.2A

3.Main Components Temperature Rise

G600-2.8

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		2.8A	

4.ELECTROLYTIC CAPACITORS LIFE TIME ESTIMATION


MODEL	COMPUTED LIFE (year) at Tambient		
	30 °C	40 °C	50 °C
G10V-170A	15	8.6	4.3
G60V-28A	15	9.6	4.8
G150V-11.2A	15	9.6	4.8
G600V-2.8A	15	9.6	4.8

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

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

L_o: Guarantee life for Elec.capacitor

T_c: Case temperature of Elec.capacitor

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

5. ABNORMAL TEST

INPUT 1P

GENESYS™ 1.7kW

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

No.	Test Position		Failure	Study result (prediction of the phenomena)														Note			
	Location No.	Test Point		Short	Open	Fire	Slight Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	V < O	P C O	P H O	AC FAIL		No Output	No Change	PS functional after AC recycle
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		●																●	Temperature 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		●															●		

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

No.	Test Position		Failure	Study result (prediction of the phenomena)														Note				
	Location No.	Test Point		Short	Open	Fire	Slight Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	P < O	P C O	P T O	AC FAIL		No Output	No Change	PS functional after AC recycle	Others
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

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

No.	Test Position		Failure	Study result (prediction of the phenomena)														Note			
	Location No.	Test Point		Short	Open	Fire	Slight Smoke	Smoke	Burst	Smell	Red Hot	Damaged	Fuse Open	V < O	V C O	V - O	AC FAIL		No Output	No Change	PS functional after AC recycle
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

