



HFE-LAN

RELIABILITY

DATA

APPD	CHK	DWG
26/12/17 	Anie G. 25/12/17	 25/12/17

TDK-LAMBDA

INDEX

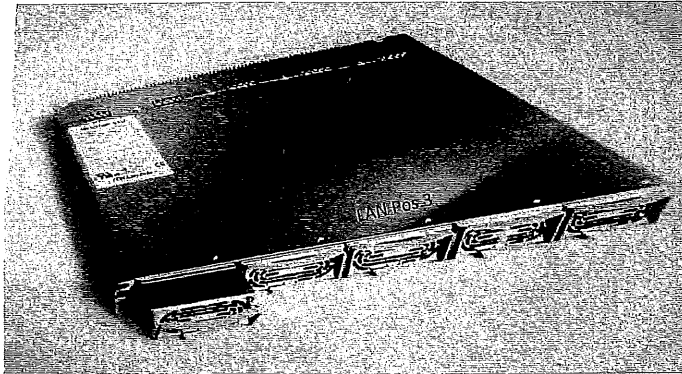
1. Main Components Temperature Rise
2. Component Derating
3. Elec. Capacitor Computed Life
4. TST and PCT Test
5. Humidity Test
6. Noise Simulation Test

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

THERMAL TEST

MODEL:HFE1600-LAN
PROTOTYPE PRN.
JUDGEMENT: OK NG

Supply Modules HFE1600-12 x 4



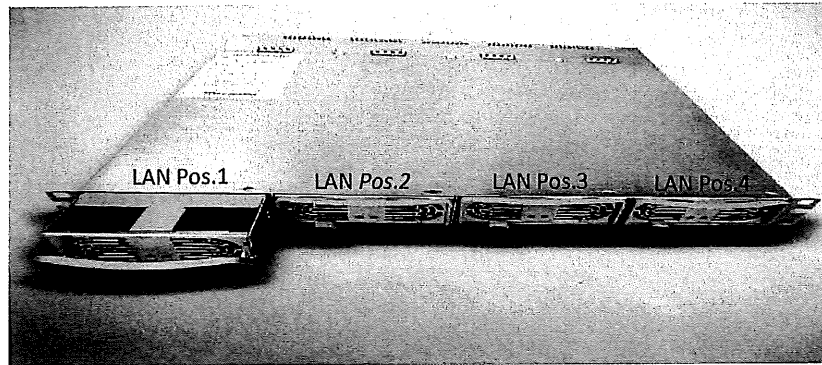
A = Ambient

		Vin.230VAC	Vin.230VAC	Vin.100VAC	Vin.100VAC
LAN Position		LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.3
Vin.(V)	NOTE				
Vout.(V)		12.0	12.0	12.0	12.0
Io(A)		505.000	303.000	380.000	228.000
Tamb.(°C)		50.0	70.0	50.0	70.0
REF		50.4	70.0	50.1	70.0
SW102 (A)	SWITCH	72.2	84.7	71.2	83.4
PD101 (A)	LED	70.1	83.6	69.2	82.5
CN101	RJ-45 CONNECTOR	72.8	85.4	72.1	84.5
A102	PHY	81.4	93.4	80.8	92.2
A102 (A)	PHY	75.6	84.8	74.8	84.9
XT101	CRYSTAL	74.4	84.9	73.6	85.0
A101	MICROCONTROLLER	81.4	94.2	80.7	93.0
A101 (A)	MICROCONTROLLER	75.7	84.8	74.7	84.9
A104	REGULATOR	78.3	90.8	77.5	89.5
A104 (A)	REGULATOR	75.4	87.1	74.4	86.0
C146	E-CAPACITOR	74.5	86.3	73.6	85.0
A103 (A)	ESD PROTECTOR	79.4	88.9	77.2	87.1
A105	EEPROM	75	84.9	74.2	84.5
R137 (A)	RESISTOR (AREA)	75.7	88.2	74.9	86.9
CN103 (A)	POSITRO. CONNECTOR	79.2	88.7	77.1	86.9
R151 (A)	RESISTOR (AREA)	79	88.8	77.4	87.2

APPROVED:	CHECKED:	ENGR:	DRWG:
Anie G.	Anie G.		
04/10/17	04/10/17	30/10/17	30/11/17

THERMAL TEST

MODEL: HFE2500-LAN	
ØPROTOTYPE	PRN.
JUDGEMENT: (OK) NG	




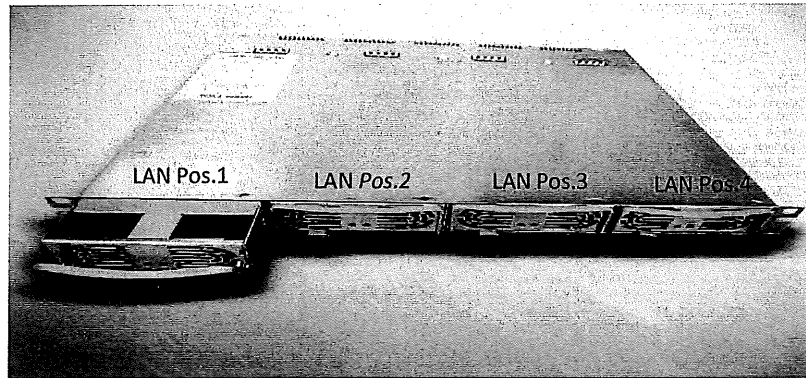
48V

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.2	LAN Pos.2	LAN Pos.2	LAN Pos.2	
Vout.(V)		48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Io(A)		148.000	148.000	89.000	148.000	148.000	148.000	148.000	89.000	148.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	-10.0	
REF		25.0	50.2	69.7	-9.1	25.4	51.0	70.5	-10.5	
A101	MICROCONTROLLER	43.7	68.9	84.8	8.6	50.2	74.3	87.4	15.5	
A102	PHY	47.5	73.3	89.9	12.8	56.4	79.9	93.3	22.2	
A103	ESD PROTECTOR	42.0	66.5	79.2	7.5	47.7	71.1	81.5	11.9	
A104	REGULATOR	49.3	77.8	93.1	14.3	55.5	82.2	94.8	19.9	
A105	EEPROM	38.4	63.6	79.4	3.5	45.0	69.1	81.9	10.1	
XT101	CRYSTAL	37.0	62.4	78.4	1.6	44.3	68.5	81.3	9.2	
CN103	CONNECTOR	46.3	69.7	81.0	11.4	49.4	73.2	82.5	12.9	
CN101	RJ-45 CONNECTOR	31.2	57.4	74.9	-3.5	41.1	65.4	79.2	6.2	
A103 amb.	ESD PROTECTOR	43.5	67.8	79.9	8.6	48.3	71.9	81.8	11.1	
A105 amb.	EEPROM	37.5	62.8	77.9	1.6	45.0	69.2	80.8	9.1	
Q101 amb.	MOSFET	36.0	62.2	78.4	0.1	45.3	69.2	81.7	10.3	
PD101 amb.	LED	31.2	57.3	75.1	-3.5	42.6	66.9	80.3	7.5	

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.4	LAN Pos.4	LAN Pos.4	LAN Pos.4	
Vout.(V)		48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Io(A)		148.000	148.000	89.000	148.000	148.000	148.000	148.000	89.000	148.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	-10.0	
REF		25.2	50.1	70.0	-10.1	25.0	49.8	69.8	-10.0	
A101	MICROCONTROLLER	49.7	74.6	86.9	13.9	46.1	70.8	84.3	10.8	
A102	PHY	56.3	80.6	93.3	21.1	52.8	77.1	90.9	18.0	
A103	ESD PROTECTOR	46.3	70.6	80.7	9.9	44.8	69.5	79.4	9.1	
A104	REGULATOR	55.7	82.2	94.2	18.1	52.1	78.5	91.8	14.9	
A105	EEPROM	44.6	69.5	81.5	8.8	41.1	65.9	79.1	5.8	
XT101	CRYSTAL	43.9	68.9	81.0	8.0	40.5	65.3	78.5	5.1	
CN103	CONNECTOR	45.3	71.6	81.1	8.5	46.2	71.9	80.5	10.1	
CN101	RJ-45 CONNECTOR	41.0	66.0	79.1	5.3	37.2	62.2	76.5	1.9	
A103 amb.	ESD PROTECTOR	45.5	70.8	80.8	9.1	44.6	69.7	79.4	8.7	
A105 amb.	EEPROM	44.1	69.3	80.3	8.0	40.7	65.7	77.7	4.9	
Q101 amb.	MOSFET	44.8	69.7	81.5	9.0	41.1	66.0	78.9	5.8	
PD101 amb.	LED	42.5	67.4	80.2	7.1	38.6	63.5	77.7	3.5	

DWG.No			
APPROV.	CHECK	ENGR.	DRAWN
Ariz G.	Ariz G.		
26/11/16	26/11/16	26/11/16	26/11/16


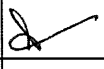
MODEL: HFE2500-LAN	
PROTOTYPE	PRN.
JUDGEMENT:  / NG	



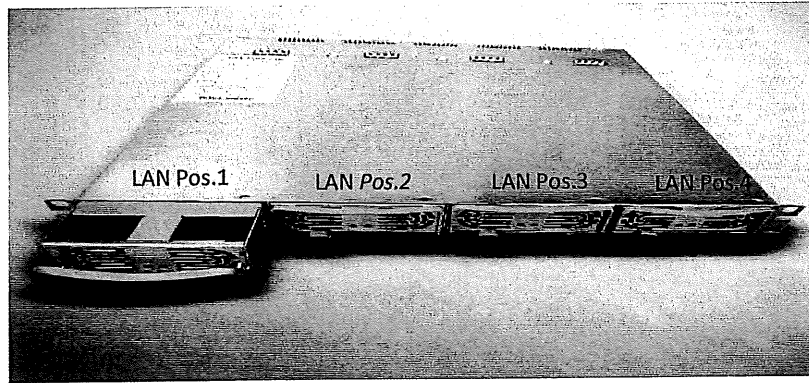
12V

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.2	LAN Pos.2	LAN Pos.2	LAN Pos.2	
Vout.(V)		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Io(A)		570.000	570.000	342.000	570.000	570.000	570.000	570.000	342.000	570.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	-10.0	-10.0
REF		25.0	49.8	69.9	-10.2	24.9	49.5	69.9	-10.3	-10.3
A101	MICROCONTROLLER	45.5	70.2	85.2	10.1	52.7	75.3	88.3	16.6	
A102	PHY	49.3	75.0	90.8	13.8	58.7	81.0	94.3	23.2	
A103	ESD PROTECTOR	47.1	71.0	80.8	11.0	52.1	74.6	83.6	15.3	
A104	REGULATOR	52.9	79.2	93.6	16.1	60.1	83.3	95.9	21.5	
A105	EEPROM	40.6	65.3	80.0	5.2	47.6	70.3	82.8	11.6	
XT101	CRYSTAL	39.0	64.1	79.3	3.4	46.9	69.7	82.5	10.7	
CN103	CONNECTOR	55.8	77.8	83.7	19.4	55.6	77.5	85.1	17.9	
CN101	RJ-45 CONNECTOR	36.2	61.6	77.2	0.3	41.9	65.1	78.7	6.2	
A103 amb.	ESD PROTECTOR	48.4	72.7	82.1	11.6	52.9	75.7	84.2	15.4	
A105 amb.	EEPROM	40.6	66.3	79.3	4.5	48.5	71.5	82.3	11.9	
Q101 amb.	MOSFET	38.9	65.1	79.6	2.7	48.4	71.0	83.1	12.3	
PD101 amb.	LED	33.1	59.6	76.3	-2.8	44.8	68.1	81.2	9.0	

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.4	LAN Pos.4	LAN Pos.4	LAN Pos.4	
Vout.(V)		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Io(A)		570.000	570.000	342.000	570.000	570.000	570.000	570.000	342.000	570.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	-10.0	-10.0
REF		25.7	50.7	70.1	-9.6	25.2	50.2	70.1	-10.5	-10.5
A101	MICROCONTROLLER	53.3	76.5	88.6	18.1	50.8	72.9	86.2	12.2	
A102	PHY	59.3	82.2	94.6	24.7	57.0	78.8	92.4	18.9	
A103	ESD PROTECTOR	52.4	75.3	83.9	16.9	52.5	74.7	82.9	13.4	
A104	REGULATOR	60.7	84.5	96.1	22.8	57.4	80.8	93.7	16.7	
A105	EEPROM	48.6	71.7	83.4	13.2	46.1	68.3	81.1	7.5	
XT101	CRYSTAL	47.8	71.0	83.1	12.4	45.5	67.7	80.8	6.7	
CN103	CONNECTOR	54.1	77.9	85.0	17.7	55.8	78.9	84.9	16.0	
CN101	RJ-45 CONNECTOR	43.3	66.1	79.4	8.1	40.2	63.1	76.9	2.0	
A103 amb.	ESD PROTECTOR	52.2	76.2	84.3	16.2	51.6	74.5	82.7	12.6	
A105 amb.	EEPROM	49.6	72.8	82.9	13.5	46.8	69.7	80.7	7.8	
Q101 amb.	MOSFET	49.4	72.5	83.8	13.8	46.3	68.9	81.3	7.8	
PD101 amb.	LED	46.1	69.5	81.9	11.2	43.3	65.8	79.5	4.8	

DWG.No			
APPROV.	CHECK	ENGR.	DRAWN
Arie G.	Arie G.		
26/10/16	26/10/16	26/10/16	26/10/16

MODEL: HFE2500-LAN	
PROTOTYPE	PRN.
JUDGEMENT: OK/NG	



24V

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.1	LAN Pos.2	LAN Pos.2	LAN Pos.2	LAN Pos.2	
Vout.(V)		24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Io(A)		296.000	296.000	178.000	296.000	296.000	296.000	296.000	178.000	296.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	70.1	-10.0
REF		25.0	49.9	69.7	-10.6	24.3	50.3	70.1	-9.4	
A101	MICROCONTROLLER	44.9	70.8	82.5	7.8	52.7	77.3	87.4	17.9	
A102	PHY	47.5	74.1	87.6	10.6	58.3	82.7	93.3	24.0	
A103	ESD PROTECTOR	46.2	70.9	77.7	9.4	53.2	77.2	83.2	17.9	
A104	REGULATOR	51.8	80.0	90.9	14.3	60.2	85.5	95.2	22.7	
A105	EEPROM	40.0	65.8	77.3	2.9	47.8	72.5	82.1	12.9	
XT101	CRYSTAL	38.3	64.5	76.3	0.9	47.1	71.9	81.6	12.0	
CN103	CONNECTOR	53.1	76.5	79.6	15.9	56.3	80.1	84.7	20.8	
CN101	RJ-45 CONNECTOR	33.0	60.9	75.0	-3.9	43.5	68.8	79.5	8.4	
A103 amb.	ESD PROTECTOR	47.6	72.8	78.6	10.6	54.0	78.3	83.9	18.1	
A105 amb.	EEPROM	39.7	66.3	76.2	2.4	49.0	74.1	82.1	13.5	
Q101 amb.	MOSFET	36.5	65.2	76.6	-0.8	48.5	73.0	82.4	13.4	
PD101 amb.	LED	31.1	58.3	73.3	-5.3	44.2	69.9	80.4	9.4	

Vin.(V)	NOTE	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	Vin.230VAC	
LAN Position		LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.3	LAN Pos.4	LAN Pos.4	LAN Pos.4	LAN Pos.4	
Vout.(V)		24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Io(A)		296.000	296.000	178.000	296.000	296.000	296.000	296.000	178.000	296.000
Tamb.(°C)		25.0	50.0	70.0	-10.0	25.0	50.0	70.0	70.0	-10.0
REF		24.8	49.7	71.0	-9.2	25.4	50.3	69.7	-10.6	
A101	MICROCONTROLLER	53.8	77.9	88.5	17.0	48.9	74.1	85.5	12.6	
A102	PHY	59.7	83.5	94.7	23.8	55.3	80.0	91.9	19.5	
A103	ESD PROTECTOR	51.2	76.7	83.7	14.9	50.9	77.5	82.6	13.5	
A104	REGULATOR	61.5	85.6	95.8	21.5	54.9	82.1	93.1	16.8	
A105	EEPROM	49.0	73.2	83.3	12.2	44.0	69.4	80.4	7.8	
XT101	CRYSTAL	48.6	72.9	82.9	11.9	43.5	68.8	79.9	7.0	
CN103	CONNECTOR	51.6	77.8	84.3	14.5	53.8	80.9	83.9	14.8	
CN101	RJ-45 CONNECTOR	44.8	69.5	80.9	8.4	39.7	65.1	77.6	3.4	
A103 amb.	ESD PROTECTOR	49.6	76.1	83.4	13.7	50.6	77.4	82.5	12.4	
A105 amb.	EEPROM	48.9	73.7	82.8	12.2	44.7	70.4	79.7	7.5	
Q101 amb.	MOSFET	49.1	73.6	83.6	12.5	44.3	69.7	80.5	7.8	
PD101 amb.	LED	46.4	71.0	82.1	10.2	41.2	66.4	78.9	4.9	

DWG.No			
APPROV.	CHECK	ENGR.	DRAWN
Arie G.	Arie G.		
28/11/16	28/11/16	28/11/16	28/11/16

2.COMPONENT DERATING

HFE1600-LAN

used along with 4 units of HFE1600-12/S power supplies

Calculation method

(1) Condition of the power supplies -

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:

$$\Theta_{j-a} = \frac{T_j(\max) - T_a}{P_c(\max)} \quad \Theta_{j-c} = \frac{T_j(\max) - T_c}{P_c(\max)} \quad \Theta_{j-l} = \frac{T_j(\max) - T_l}{P_c(\max)}$$

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

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

$P_c(\max)$: Maximum Power Dissipation

$T_j(\max)$: 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



MODEL: HFE-LAN	
PROTOTYPE	(PRN.)
JUDGEMENT: OK NG	

PART DERATING :CRYSTAL

MODEL : HFE-LAN
with HFE1600-12/S x 4

GRADE : G3

				Vin:TYP.,Ic:TYP.		
No.	PART NAME	ITEM	RATING	Ta	DATA	RATE
XT101	12.88711	Tmax(°C)	85	50	74.4	88%

APPROV.	CHECK	ENGR.	DRAWN
Arie G.	Arie G.		
04/12/17	04/12/17	29/11/17	29/11/17

MODEL: HFE-LAN
 PROTOTYPE (PRN)
 JUDGEMENT: OK/NG

PART DERATING : LED

MODEL : HFE-LAN
 with HFE1600-12/S x 4

GRADE : G3

No.	PART NAME	ITEM	RATING	VIn: TYP, Io: TYP					WORST CASE A					WORST CASE B				
				Ta	DATA	RATE	CRITE.	VIn	Io	Ta	DATA	RATE	CRITE.	VIn	Io	Ta	DATA	RATE
PD101	595-2101-013F RED	VR(V)	4	50	0	0%	90%	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP
		IF(A)			0.005	18%	80%											
		Ta(C)	85		70.1	82%	100%											
		Pd(W)			0.0091													
		θj-c(C/W)			20.1													
		ΔT(C)																
PD102	595-2301-013NF GREEN	VR(V)	4	50	0	0%	90%	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP	SAME AS TYP
		IF(A)			0.004	13%	80%											
		Ta(C)	85		70.1	82%	100%											
		Pd(W)			0.0084													
		θj-c(C/W)			20.1													
		ΔT(C)																

APPROV/CHECK	ENGR.	DRAWN
<i>Anne G.</i>	<i>Anne G.</i>	<i>Anne G.</i>
02/12/17	02/14/17	29/11/17

MODEL: HFE-LAN
 PROTOTYPE
 JUDGEMENT: (OK) NG (PRN)

PART DERATING: SWITCH

MODEL: HFE-LAN
 with HFE1600-12/S x 4

GRADE: G3

No.	PART NAME	ITEM	RATING	VIn:TYP. I _o :TYP.					WORST CASE A					WORST CASE B					
				Ta	DATA	RATE	CRITE.	VIn	I _o	Ta	DATA	RATE	CRITE.	VIn	I _o	Ta	DATA	RATE	CRITE.
SW101	SKRKAHE010	Vmax (V) Imax (A) Tmax (C)	12 0.05 85	50	3.3 0.00033 74.4	28% 1% 88%	90% 85% 100%	SAME AS TYP SAME AS TYP SAME AS TYP											90% 85% 100%
SW102	SKRTLAE010	Vmax (V) Imax (A) Tmax (C)	12 0.05 85	50	3.3 0.003 72.2	28% 6% 85%	90% 85% 100%	SAME AS TYP SAME AS TYP SAME AS TYP											85% 85% 100%

APPROV/CHECK	ENGR.	DRAWN
Arie G. Arie G.	<i>[Signature]</i>	<i>[Signature]</i>
01/24/17	08/14/17	29/11/17

MODEL: HFE-LAN
 PROTOTYPE
 JUDGEMENT: OK / JING PRN

PART DERATING :INDUCTOR

MODEL : HFE-LAN
 with HFE1600-12/S x 4

GRADE : G3

No.	PART NAME	ITEM	RATING	Vinc.TYP. Ilo.TYP.				WORST CASE A				WORST CASE B				
				Ta	DATA	RATE	CRITE.	Vin	Ilo	Ta	DATA	RATE	CRITE.	Vin	Ilo	Ta
L101	LQH32PN100M/NCL	Tmax(d) ATT(θ)	125	50	75.4 25.4	60%	85%	SAME AS TYP				SAME AS TYP				95%

APPROV	CHECK	ENGR.	DRAWN
Done Gt		<i>[Signature]</i>	<i>[Signature]</i>
29/11/17		29/11/17	29/11/17

PART DERATING : TRANSISTOR, FET

MODEL : HFE-LAN
With HFE1600-12/S x 4

GRADE : G3

MODEL: HFE-LAN
PROTOTYPE
JUDGEMENT: OK/JNG

No.	PART NAME	ITEM	RATING	VIn: TYP, Vole: TYP				WORST CASE A				WORST CASE B						
				Ta	DATA	RATE	CRITE	VIn	Io	Ta	DATA	RATE	CRITE	VIn	Io	Ta	DATA	RATE
Q101	SSM3K09FU(TE85L,F) Rdson(max)=1.2Ω	VDS(V)	30	3.3	11%	90%	SAME AS TYP											100%
		IDP(A)	0.8	0.0053	1%	85%	SAME AS TYP											100%
		VG(S/V)	20	3.3	17%	90%	SAME AS TYP											100%
		Tj(°C)	150	79.42133	53%	90%	SAME AS TYP											
Q102	SSM3K09FU(TE85L,F) Rdson(max)=1.2Ω	Pch(W)	0.15	29.4														
		θj-a(°C/W)	833	0.00003														
		ΔT(°C)																
		PLOSS(W)																
Q103	SSM3K09FU(TE85L,F) Rdson(max)=1.2Ω	VDS(V)	30	3.3	11%	90%	SAME AS TYP											100%
		IDP(A)	0.8	0.0022	0%	85%	SAME AS TYP											100%
		VG(S/V)	20	12	60%	90%	SAME AS TYP											100%
		Tj(°C)	150	79.40202	53%	90%	SAME AS TYP											
Q104	SSM3K09FU(TE85L,F) Rdson(max)=1.2Ω	Pch(W)	0.15	29.4														
		θj-a(°C/W)	833	0.00002														
		ΔT(°C)																
		PLOSS(W)																
Q105	SSM3K09FU(TE85L,F) Rdson(max)=1.2Ω	VDS(V)	30	3.3	11%	90%	SAME AS TYP											100%
		IDP(A)	0.8	0.0022	0%	85%	SAME AS TYP											100%
		VG(S/V)	20	12	60%	90%	SAME AS TYP											100%
		Tj(°C)	150	79.40202	53%	90%	SAME AS TYP											

*Calculations made using an ambient temperature of 79.4°C which is the temperature of the hottest part of the PCB

APPROV/CHECK	ENGR	DRAWN
Anie G.	Anie G.	
01/11/17	29/11/17	29/11/17

PART DERATING - CAPACITOR
 MODEL: HFE1LAN
 PROTOTYPE (PBRN)
 JUDGEMENT: OK/NG

MODEL: HFE1LAN
 with HFE1600-12S X 4
 GRADE: C3

No.	PART NAME	ITEM	RATING	WORST CASE A		WORST CASE B	
				Vin, ITP, A, ITP, Ta	DATA	Vin, ITP, A, ITP, Ta	DATA
C101	C1608C0G1H2214JT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C102	C1608C0G1H2214JT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C103	C1608C0G1H2214JT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C104	GRM1885C1H220JA01D	Vmax(V) Tmax(C) ΔT(C)	25 106	3.3 79.4	13% 7%	60% 95%	SAME AS TYP SAME AS TYP
C105	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C106	C1608X7R1E105KT	Vmax(V) Tmax(C) ΔT(C)	25 125	3.3 79.4	13% 6%	60% 95%	SAME AS TYP SAME AS TYP
C107,108	Not Assigned						
C109,C110							
C111	GRM1885C1H220JA01D	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C112	GRM1885C1H220JA01D	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C113	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C114	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C115	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C116	C1608X7R1E105KT	Vmax(V) Tmax(C) ΔT(C)	25 125	1.4 79.4	6% 6%	60% 95%	SAME AS TYP SAME AS TYP
C117	C1608X7R1E105KT	Vmax(V) Tmax(C) ΔT(C)	25 125	1.4 79.4	6% 6%	60% 95%	SAME AS TYP SAME AS TYP
C118	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	3.3 79.4	7% 6%	60% 95%	SAME AS TYP SAME AS TYP
C119	C1608X7R1E105KT	Vmax(V) Tmax(C) ΔT(C)	25 125	1.4 79.4	6% 6%	60% 95%	SAME AS TYP SAME AS TYP

*Calculations made using an ambient temperature of 79.4C which is the temperature of the hottest part of the PCB

APPROV. CHECK ENGR
 DATE 01/20/2010
 01/20/2010

PART DERATING - CAPACITOR
 MODEL: HFE-LAN
 With HFE1600-12S X 4
 GRADE: G3
 MODEL: HFE-LAN
 PROTOTYPE
 JUDGEMENT: OK NG
 (FRN)

No.	PART NAME	ITEM	RATING	Worst Case A		Worst Case B		Ta	DATA	RATE	CRITE	Vmax(V)	Tmax(C)
				Vin-TYP	Ic-TYP	Vin	Ic						
C120	C1608X7R1H104KT	Vmax(V) ATT(C)	25	1.4	6%	60%	50	50	1.4	6%	60%	50	50
C121	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C122	C1608X7R1H104KT	Vmax(V) ATT(C)	125	29.4	64%	95%	50	50	29.4	64%	95%	50	50
C123	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C124	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C125	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C126	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C127	GRM21BC91C106K47L	Vmax(V) ATT(C)	16	3.3	21%	60%	50	50	3.3	21%	60%	50	50
C128	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C129	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C130	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C131	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C132	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C133	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50
C134	C1608X7R1H104KT	Vmax(V) ATT(C)	50	29.4	7%	60%	50	50	29.4	7%	60%	50	50

APPROV/CHECK ENGR. DRAWN
 Aris G. Mac G.
 07/01/2019 14:29:17

PART DERATING-CAPACITOR

MODEL: HEFLAN
WITH HEF1600-12IS X 4

GRADE: G3

MODEL: HEFLAN
PROTOTYPE
JUDGEMENT: OK/NG
PRN:

No.	PART NAME	ITEM	RATING	WORST CASE A		WORST CASE B		Ta	DATA	RATE	CRITE.	Vin	Ic	Ta	DATA	RATE	CRITE.	Vin	Ic	Ta	DATA	RATE	CRITE.			
				Vm	Ta	Vm	Ta																			
C135	GRM21BC81C108KA73L	Vmax(V) Tmax(C) ΔTTC	16 125	50	3.3 79.4 29.4	21% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C136	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C137	C1608X7R1H103KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C138	C1608C0G1H101JT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C139	GRM21BC81E575KA12L	Vmax(V) Tmax(C) ΔTTC	25 105	50	12 79.4 29.4	48% 78% 21%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C140	GRM21BC81C108KA73L	Vmax(V) Tmax(C) ΔTTC	16 125	50	3.3 79.4 29.4	21% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C141	GRM21BC81C108KA73L	Vmax(V) Tmax(C) ΔTTC	16 125	50	3.3 79.4 29.4	21% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C142	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	12 79.4 29.4	24% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C143	GRM21BC81C108KA73L	Vmax(V) Tmax(C) ΔTTC	16 125	50	3.3 79.4 29.4	21% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C144	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C145	GRM31CR71E108KA12L	Vmax(V) Tmax(C) ΔTTC	25 125	50	12 79.4 29.4	48% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C146	ELX300DEL101MH12D	Vmax(V) Tmax(C) ΔTTC	35 105	50	12 79.4 29.4	34% 75% 7%	95% 95% 60%	SAME AS TYP				95%	95%	60%	SAME AS TYP			95%	95%	60%	SAME AS TYP			95%	95%	
C147	Not Assigned																									
C148	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C149	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	
C150	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔTTC	50 125	50	3.3 79.4 29.4	7% 64% 7%	60% 95% 60%	SAME AS TYP				60%	95%	60%	SAME AS TYP			60%	95%	60%	SAME AS TYP			60%	100%	

APPROV/CHECK ENGR. DRAWN

 2011/11/29 11:17

PART DERATING :CAPACITOR

MODEL : HFE1LN PROTYPE (PRN)
 JUDGEMENT: OK NG

MODEL : HFE1LN GRADE : G3

No.	PART NAME	ITEM	RATING	VOLTAGE		DATA	RATE	CRITE	WORST CASE A		WORST CASE B		DATA	RATE	CRITE
				Vm(TYP)	Io(TYP)				Vm	Io	Vm	Io			
C151	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C152	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C153	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C154	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C155	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	55% 95%	SAME AS TYP SAME AS TYP			55% 95%	SAME AS TYP SAME AS TYP			60% 100%
C156	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C157	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C158	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C159	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C160	Not Assigned														
C161	C1608X7R1H104KT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C162	C1608C0G1H221JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C163	C1608C0G1H221JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C164	C1608C0G1H221JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C165	C1608C0G1H101JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C166	C1608C0G1H101JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%
C167	C1608C0G1H101JT	Vmax(V) Tmax(C) ΔT(C)	50 125	50 50	3.3 79.4 29.4	7% 64% 95%	60% 95%	SAME AS TYP SAME AS TYP			60% 95%	SAME AS TYP SAME AS TYP			60% 100%

APPROV CHECK ENGR DRAWN
 [Signature] [Signature] [Signature]

PART DERATING RESISTOR

MODEL : HFE-LAN
with HFE1600-1/2/S x 4

GRADE : G3

MODEL : HFE-LAN
PROTOTYPE
JUDGEMENT : OKING



No.	PART NAME	ITEM	RATING	DATA	V _{in} -TYP. I _o -TYP.			WORST CASE A			WORST CASE B						
					RATE	CRITE	V _{in}	I _o	Ta	DATA	RATE	CRITE	V _{in}	I _o	Ta	DATA	RATE
R101	RK73H1JTTD1501F	Vmax (V) Pmax (W)	150 0.1	3.3 0.007	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R102	RK73H1JTTD1501F	Vmax (V) Pmax (W)	150 0.1	3.3 0.007	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R103	RK73H1JTTD1501F	Vmax (V) Pmax (W)	150 0.1	3.3 0.007	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R104	RK73H1JTTD1000F	Vmax (V) Pmax (W)	150 0.1	3.3 0.000	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R105	RK73H1JTTD1000F	Vmax (V) Pmax (W)	150 0.1	3.3 0.000	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R106	RK73H1JTTD1501F	Vmax (V) Pmax (W)	150 0.1	3.3 0.007	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R107	RK73H1JTTD1000F	Vmax (V) Pmax (W)	150 0.1	3.3 0.000	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R108	RK73H2AJTTD1800F	Vmax (V) Pmax (W)	150 0.25	3.3 0.009	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R109	RK73H2AJTTD1800F	Vmax (V) Pmax (W)	150 0.25	3.3 0.009	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R110	Not Assigned																
R111	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0	0.0%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R112	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0	0.0%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R113	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0	0.0%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R114	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0	0.0%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R115	RK73H1ETTP4871F	Vmax (V) Pmax (W)	50 0.1	3.3 0.002	6.6%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R116	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	3.3 0.001	4.4%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R117	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	3.3 0.001	4.4%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R118	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	3.3 0.001	4.4%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R119	RK73H2AJTTD3000F	Vmax (V) Pmax (W)	150 0.25	3.3 0.009	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R120	RK73H2AJTTD3000F	Vmax (V) Pmax (W)	150 0.25	3.3 0.009	2.2%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R121	RK73H1JTTD2702F	Vmax (V) Pmax (W)	75 0.1	3.2 0.000	4.3%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R122	RK73H1JTTD2702F	Vmax (V) Pmax (W)	75 0.1	3.2 0.000	4.3%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
R123	Not Assigned																
R124	RK73H1JTTD1001F	Vmax (V) Pmax (W)	75 0.125	3.3 0.009	4.4%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%

APPROV CHECK ENGR DRAWN
 HFE-GT-Are-GT
 2011/11/29/1117

PART DERATING: RESISTOR
 MODEL: HFE-LAN
 With HFE160-12S x 4

GRADE: G3

MODEL: HFE-LAN
 PROTOTYPE
 JUDGEMENT: OK NG

No.	PART NAME	ITEM	RATING	DATA	Vfr-TYP, Ic-TYP		WORST CASE A		WORST CASE B	
					RATE	CRITE	RATE	CRITE	RATE	CRITE
R125	RK73H1JTTD2702F	Vmax (V) Pmax (W)	75 0.1	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	85%
R126	RK73H1JTTD2702F	Vmax (V) Pmax (W)	75 0.1	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	85%
R127	RK73Z1JTTD	Vmax (V) Pmax (W)	- -	- -	-	85%	SAME AS TYP	85%	SAME AS TYP	80%
R128	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	12 0.000	16.0%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R129	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	12 0.000	16.0%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R130	RK73H1JTTD1002F	Vmax (V) Pmax (W)	75 0.1	12 0.000	16.0%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R131	RK73H1JTTD1501F	Vmax (V) Pmax (W)	75 0.1	0.8 0.000	1.1%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R132	RK73H1JTTD4701F	Vmax (V) Pmax (W)	75 0.1	2.8 0.001	3.3%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R133	RK73B2JTTD101J	Vmax (V) Pmax (W)	200 0.25	3.3 0.109	1.7%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R134	RK73H1JTTD1003F	Vmax (V) Pmax (W)	75 0.1	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R135	RK73H1JTTD1003F	Vmax (V) Pmax (W)	75 0.1	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R136	RK73H1JTTD1000F	Vmax (V) Pmax (W)	75 0.125	0.3 0.001	0.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R137	RK73Z1JTTD	Vmax (V) Pmax (W)	- -	- -	-	85%	SAME AS TYP	85%	SAME AS TYP	80%
R138	Not Assigned	Vmax (V) Pmax (W)								
R139	Not Assigned	Vmax (V) Pmax (W)								
R140	Not Assigned	Vmax (V) Pmax (W)								
R141	Not Assigned	Vmax (V) Pmax (W)								
R142	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R143	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R144	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R145	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R146	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R147	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0%	85%	SAME AS TYP	85%	SAME AS TYP	80%
R148	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4%	85%	SAME AS TYP	85%	SAME AS TYP	80%

APPROV CHECK ENGR DRAWN
 Ane G. Ane G. D
 2017/10/17 2017/10/17

PART DERATING RESISTOR
 MODEL : HFE-LAN
 With HFE1600-12S x 4

GRADE : G3

MODEL : HFE LAN
 PROTOTYPE
 JUDGEMENT : OK JING (PRN)

No.	PART NAME	ITEM	RATING	DATA	V _{in} -TYP, I _o -TYP	RATE	CRITE	V _{in}	I _o	WORST CASE A				WORST CASE B						
										Ta	DATA	RATE	CRITE	V _{in}	I _o	Ta	DATA	RATE	CRITE	
R149	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4% 0.1%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R150	RK73H1JTTD22R0F	Vmax (V) Pmax (W)	75 0.125	3.3 0.000	4.4% 0.1%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R151	RK73B2B1TD300J	Vmax (V) Pmax (W)	200 0.25	1.5 0.075	30.0% 30.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R152	RK73B2B1TD300J	Vmax (V) Pmax (W)	200 0.25	1.5 0.075	30.0% 30.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R153	RK73B2B1TD300J	Vmax (V) Pmax (W)	200 0.25	1.5 0.075	30.0% 30.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R154	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R155	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R156	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R157	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R158	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R159	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R160	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R161	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R162	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R163	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R164	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R165	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R166	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R167	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R168	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R169	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R170	RK73H1JTTD51R0F	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
R171	Not Assigned	Vmax (V) Pmax (W)	75 0.125	0 0.000	0.0% 0.0%	85% 55%	55%	SAME AS TYP	SAME AS TYP	85%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%

APPROV/CHECK ENGR. DRAWN
 HFE G- A
 HFE G- A
 01/2017 01/2017 29/11/17 29/11/17

PART DERATING :IC

MODEL : HFE1600-12/S x 4
with HFE1600-12/S x 4

GRADE : G3

MODEL: HFE1600-12/S x 4
PROTOTYPE
JUDGEMENT: OKING
PRN

No.	PART NAME	ITEM	RATING	Vint: TYP. Ic: TYP.			WORST CASE A			WORST CASE B										
				Ta	DATA	RATE	CRITE.	Vin	Ic	Ta	DATA	RATE	CRITE.	Vin	Ic	Ta	DATA	RATE	CRITE.	
A103	TPD4E1B0DCKR	V _{WM} (V)	5.5	-	3.3	60%	95%	SAME AS TYP											95%	
		Ta(°C)	125	50	79.4	64%	100%	SAME AS TYP											100%	
		θ _{JA} (°C/W)	227.3	-	-	-	-	SAME AS TYP												
A102	DP838481VVXINOPB	Pd(W)	-	-	-	-	-	-												
		ΔT (°C)	-	-	29.4	-	-	-	SAME AS TYP											
		V _{ocd} (V)	4.2	50	3.3	79%	95%	SAME AS TYP											95%	
A105	M95080-RDWB6TP	Ta(°C)	85	50	75.6	89%	100%	SAME AS TYP											100%	
		θ _{JA} (°C/W)	40.1	-	-	-	-	SAME AS TYP												
		Tc(°C)	81.4	-	-	-	-	SAME AS TYP												
A104	TPS560200DBVR	Pd(W)	0.267	50	-	-	-	-												
		Tc(°C)	121.5	50	88.21	73%	85%	SAME AS TYP											85%	
		ΔT (°C)	-	-	25.6	-	-	-	SAME AS TYP											
A101	STM32F427ZGT6TR	V _{ocd} (V)	5.5	-	3.3	60%	95%	SAME AS TYP											95%	
		Ta(°C)	85	50	75	88%	100%	SAME AS TYP											100%	
		θ _{JA} (°C/W)	100	-	0.006	-	-	-	SAME AS TYP											
A101	STM32F427ZGT6TR	Pd(W)	-	-	0.2	-	-	-												
		Tc(°C)	78.3	50	98.3	79%	85%	SAME AS TYP											85%	
		ΔT (°C)	125	-	28.3	-	-	-	SAME AS TYP											
A102	DP838481VVXINOPB	V _{ocd} (V)	3.6	-	3.3	92%	95%	SAME AS TYP											95%	
		Ta(°C)	85	50	75.7	89%	100%	SAME AS TYP											100%	
		θ _{JA} (°C/W)	40	-	-	-	-	-	SAME AS TYP											
A101	STM32F427ZGT6TR	Pd(W)	0.33	-	-	-	-	-												
		Tc(°C)	105	50	88.9	85%	85%	SAME AS TYP											85%	
		ΔT (°C)	-	-	25.7	-	-	-	SAME AS TYP											

PART NAME	R _{θJC} /R _{θJA}		T _J	T _{Jmax}	DF
	T _a	T _{case}			
DP838481VVXINOPB	50	31.4	88.208	121.5	72.59%
STM32F427ZGT6TR	75.7	31.4	88.9	105	84.66%

$$T_J = T_a + (P_d * R_{\theta JA})$$

$$= 81.4 + (0.267 * 25.5) = 88.208$$

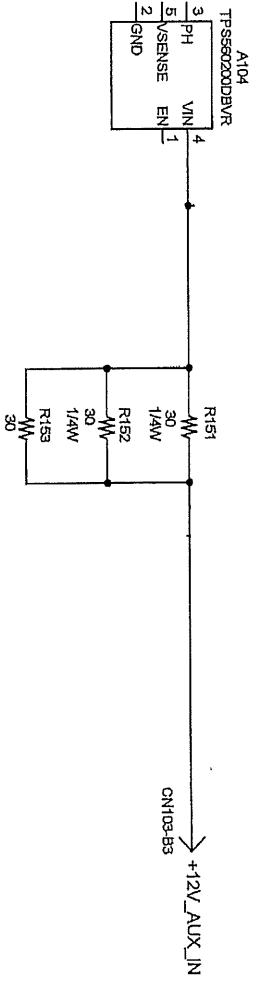
$$T_J = T_a + (P_d * R_{\theta JA})$$

$$= 75.7 + (0.33 * 40) = 88.9$$

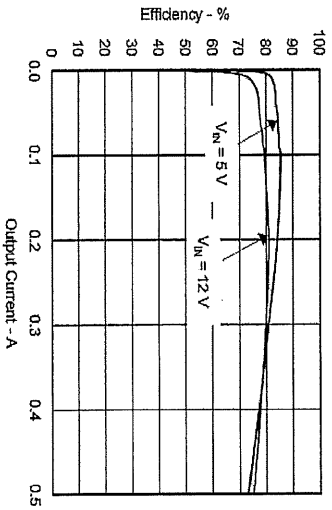
APPROV/CHECK	ENGR.	DRAWN
Anie G.	Anie G.	
30/11/17	30/11/17	30/11/17

MODEL: HFE-IAN
 PROTOTYPE
 JUDGEMENT: OKING

A104 Junction Temperature Calculation

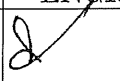


Input Voltage from HFE	12V
Measured drop across the resistors - 0.9V	0.9V
Current Input to the regulator = (0.9/30)*3	0.09A
Power Input = (11.1*0.09)	0.9991W
Considering efficiency of 80%	
0.8=Power/Pin. Power Output = 0.8 * 0.999	0.7991W
Output Current = 0.7999/3.3	0.242A
Power Dissipation = (0.999-0.799)	0.200W
Tj = 78.3 + (0.2*100)	98.3C



APPROV/CHECK	ENGR.	DRAWN
Arc G.	Arc G.	
01/02/17	01/02/17	01/02/17

Component Derating Criteria Deviating Application

APPD	CHK	ENGR
Ari G.	Ari G.	
1/22/17	1/22/17	1/22/17

1. Model – HFE-LAN

2. Grade – G3

3. Content of application

COM or UNI	Component category	Parts No.	Catalog No.	Ratings	Case A		Case B	
					Criteria	DF(Data)	Criteria	DF(Data)
	IC	A104	TPS560200DBVR		85%- Junction Tempera ture	4%	Same as case A	Same as case A
	IC	A101	STM32F427Z6T6TR		85% - Junction Tempera ture	8%	Same as case A	Same as case A

4. Application reason

The Junction Temperature of A104 is 4% more than the derating criteria. The calculated Junction Temperature is 110.8°C. The manufacturer recommendation is 125°C maximum.

The Junction Temperature of A101 is 8% more than the derating criteria. The calculated Junction Temperature is 98°C. The manufacturer recommendation is 105°C maximum.

5. Impact of Deviation



HFE-LAN was checked with 4 x HFE1600-12/S power supplies in a rack. Software reliability test (software loop) was performed @70C and no abnormal effects were found.

MODEL: HFE1600-LAN
PROTOTYPE (PRN.)
JUDGEMENT: (OK) NG

Electrolytic Capacitor Life

C146 E. CAP ELXZ350ELL101MH12D 100uF 35V NICHEMI

No.	Amb. Temp. Ta (°C)	Max. Operating Temp.	Guaranteed Life data (NI-CHEMI)	ΔT case (°C)	Absolute Temp. rise Tx (°C)	Calculated E-cap life Lx (h)	Calculated E-cap life Lx (year)
1	30	105	4000	24.5	54.5	132,514	15.1
2	40	105	4000	24.5	64.5	66,257	7.6
3	50	105	4000	24.5	74.5	33,128	3.8
4	70	105	4000	16.3	86.3	14,621	1.7

DWG.No			
APPROV.	CHECK	ENGR.	DRAWN
Arie G.	Arie G.		
04/12/17	04/12/17	29/11/17	29/11/17

HFE LAN Approval

- HFE 1600 LAN unit – IA816
- HFE 2500 LAN unit – IA817

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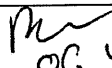
Visual inspection 6

Test description

All tests were executed on HFE 2500 LAN units (10 samples), using a HFE2500-48 power module.

Test flowchart for each one of the 10 samples:

1. Flash the CPU with actual firmware (Ver. 01.02)
2. Check IP detection using a LXI discovery tool.
3. Open Web page via Internet Explorer
4. Check if LAN data displayed correctly (See page 4-Home page image).
5. Check communication with power module and readings: voltage, current (See page 4-DC power images).
6. Place 5 samples in TST, and 5 samples it PCT, and wait to tests completion.
7. Check IP detection using a LXI discovery tool.
8. Open Web page via Internet Explorer
9. Check if LAN data displayed correctly (See page 5-Home page image).
10. Check communication with power module and readings: voltage, current (See page 5-DC power images).

Judgment:		
DWG	Check	Appr.
Yevgeni K. 05/04/2017	 06/04/17	 06.4.17

TST EVALUATION REPORT

MODEL: HFE LAN
Number of Pb-Free samples tested: 5 units.

TEST CONDITIONS
Test equipment: TSA-101S-W ['ESPEC'] Min Temperature: -40°C Max Temperature: 85°C Number of hours : 100 (30/30) Test start date: 19/02/2017 Test end date: 23/02/2017

EVALUATION RESULTS			
Appearance check before and after TST(Pb-Free samples): OK	Judgement	Engineer	Approval
Refer to attached TEST RESULTS	PASS	Yevgeni K.	<i>[Signature]</i>

Sample №	Before	After	Judgment
1	OK	OK	PASS
2	OK	OK	PASS
3	OK	OK	PASS
4	OK	OK	PASS
5	OK	OK	PASS

PCT EVALUATION REPORT

MODEL: HFE LAN
Number of Pb-Free samples tested: 5 units.

TEST CONDITIONS
Test equipment: EHS-411M ['ESPEC'] Temperature: 105°C Humidity: 100% Number of hours : 96 Test start date: 19/02/2017 Test end date: 23/02/2017

EVALUATION RESULTS			
Electrical evaluation before and after PCT(Pb-Free samples): OK Refer to attached TEST RESULTS	Judgement	Engineer	Approval
	PASS	Yevgeni K.	<i>[Signature]</i>

Sample №	Before	After	Judgment
6	OK	OK	PASS
7	OK	OK	PASS
8	OK	OK	PASS
9	OK	OK	PASS
10	OK	OK	PASS



05/04/2017

Web interface images

Before

Home page:



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	<p>Welcome</p> <table border="1"> <tr><td>TDK-LAMBDA Model:</td><td>HFE-LAN</td></tr> <tr><td>Manufacturer:</td><td>TDK-LAMBDA</td></tr> <tr><td>Serial Number:</td><td>11111111111111111222</td></tr> <tr><td>Firmware Revision:</td><td>01.02</td></tr> </table>		TDK-LAMBDA Model:	HFE-LAN	Manufacturer:	TDK-LAMBDA	Serial Number:	11111111111111111222	Firmware Revision:	01.02	<p>LAN</p> <table border="1"> <tr><td>IP Address</td><td>10.97.4.102</td></tr> <tr><td>MAC Address</td><td>00:19:F9:48:77:07</td></tr> <tr><td>Hostname</td><td>HFE-LAN-222</td></tr> <tr><td>Auto-MDIX</td><td>Yes</td></tr> <tr><td>Auto-Negotiate</td><td>Auto select</td></tr> <tr><td>Multicast DNS</td><td>Enabled</td></tr> <tr><td>SNMP Service</td><td>Enabled</td></tr> </table>	IP Address	10.97.4.102	MAC Address	00:19:F9:48:77:07	Hostname	HFE-LAN-222	Auto-MDIX	Yes	Auto-Negotiate	Auto select	Multicast DNS	Enabled	SNMP Service	Enabled
TDK-LAMBDA Model:	HFE-LAN																								
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DC Power	<p>VISA</p> <table border="1"> <tr><td>Description:</td><td>TDK-LAMBDA HFE-LAN 222</td></tr> <tr><td>VISA Name using IP Address:</td><td>TCPIP0.:10.97.4.102.:INSTR</td></tr> <tr><td>VISA Name using Hostname:</td><td>TCPIP0.:HFE-LAN-222.local.:INSTR</td></tr> </table>			Description:	TDK-LAMBDA HFE-LAN 222	VISA Name using IP Address:	TCPIP0.:10.97.4.102.:INSTR	VISA Name using Hostname:	TCPIP0.:HFE-LAN-222.local.:INSTR																
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LAN																									

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DC power page - no load



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	<p>Output Group Utility</p> <p>Blink Identify MultiDrop Supply Address HFE2500: 2 Refresh list</p>			
DC Power	<p>Measurement</p> <p>Voltage CV 44.164 V Current CC 0.645 A</p>			
LAN	<p>Settings</p> <p>Check To Modify Output</p> <p>Apply <input type="radio"/> On <input type="radio"/> Voltage Voltage/Current Setting Max Voltage Setting</p> <p>Cancel <input type="radio"/> Off <input type="radio"/> Current Volt/Amps 49.002 Volts</p> <p>Setting through web page only</p>			
LOGIN	<p>Faults</p> <p>Fault <input type="checkbox"/> DC <input type="checkbox"/> OTP <input type="checkbox"/> OTA <input type="checkbox"/> FAN <input type="checkbox"/> AC <input type="checkbox"/> OVP <input type="checkbox"/> PVA <input type="checkbox"/> CE</p>			

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DC power page – load



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	<p>Output Group Utility</p> <p>Blink Identify MultiDrop Supply Address HFE2500: 2 Refresh list</p>			
DC Power	<p>Measurement</p> <p>Voltage CV 44.516 V Current CC 8.504 A</p>			
LAN	<p>Settings</p> <p>Check To Modify Output</p> <p>Apply <input type="radio"/> On <input type="radio"/> Voltage Voltage/Current Setting Max Voltage Setting</p> <p>Cancel <input type="radio"/> Off <input type="radio"/> Current Volt/Amps 49.002 Volts</p> <p>Setting through web page only</p>			
LOGIN	<p>Faults</p> <p>Fault <input type="checkbox"/> DC <input type="checkbox"/> OTP <input type="checkbox"/> OTA <input type="checkbox"/> FAN <input type="checkbox"/> AC <input type="checkbox"/> OVP <input type="checkbox"/> PVA <input type="checkbox"/> CE</p>			

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After

Home page:



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	Welcome		LAN	
DC Power	TDK-LAMBDA Model:	HFE-LAN	IP Address	10.97.4.102
LAN	Manufacturer:	TDK-LAMBDA	MAC Address	00:19:F9:48:77:07
	Serial Number:	111111111111111111222	Hostname	HFE-LAN-222
	Firmware Revision:	01.02	Auto-MDIX	Yes
			Auto-Negotiate	Auto select
			Multicast DNS	Enabled
			SNMP Service	Enabled
	VISA			
	Description:	TDK-LAMBDA HFE-LAN 222		
	VISA Name using IP Address:	TCPIP0:10.97.4.102:INSTR		
	VISA Name using Hostname:	TCPIP0:HFE-LAN-222.local:INSTR		

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DC power page - no load



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	Output Group Utility				
DC Power	Blink Identify MultiDrop Supply Address HFE2EG0: 2 Refresh list				
LAN	Measurement				
LOGIN	Voltage CV	44.223 V	Current CC	0.704 A	
	Settings				
	Check To Modify	Output			
	Apply	On	Voltage	Voltage/Current Setting	Max Voltage Setting
	Cancel	Off	Current	Volt/Amps	49.002 Volts
	Setting through web page only				
	Faults				
	Fault	DC	OTP	OTA	FAN AC OVP PVA CE

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DC power page – load



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

TDK-Lambda

Home	Output Group Utility				
DC Power	Blink Identify MultiDrop Supply Address HFE2EG0: 2 Refresh list				
LAN	Measurement				
LOGIN	Voltage CV	44.575 V	Current CC	8.622 A	
	Settings				
	Check To Modify	Output			
	Apply	On	Voltage	Voltage/Current Setting	Max Voltage Setting
	Cancel	Off	Current	Volt/Amps	49.002 Volts
	Setting through web page only				
	Faults				
	Fault	DC	OTP	OTA	FAN AC OVP PVA CE

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PCB data:

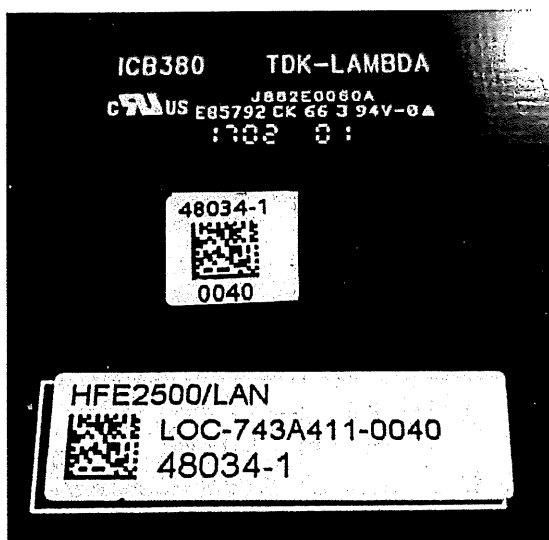
PCB Manufacturer – APCB ELECTRONCS

PCB revision – ICB380

Visual inspection:

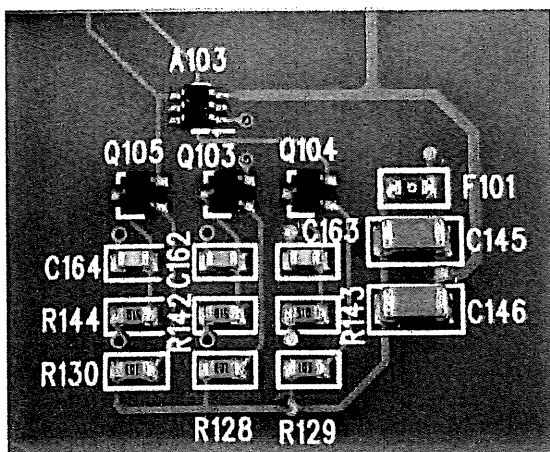
Visual inspection after TST & PCT tests:

PCB labels and marking



Judgment: OK

SMT components



Judgment: OK

HUMIDITY EVALUATION REPORT



MODEL: HFE-LAN
Number of Pb-Free samples tested: 1 unit.

TEST CONDITIONS
Test equipment: SM-16-3800 ['THERMOTRON'] Temperature: 50°C Humidity: 95% Number of hours : 500 Test start date: 14/11/2017 Test end date: 05/12/2017

EVALUATION RESULTS			
Electrical evaluation after Humidity (Pb-Free samples): OK	Judgement	Engineer	Approval
Refer to attached TEST RESULTS	PASS	Yevgeni K.	Rabia S

Table of Contents

Web interface images	2
PCB data:	4
Visual inspection:	4

DWG	Check	Appr.
Yevgeni K. 11/12/2017	 13/12/2017	 13/12/2017

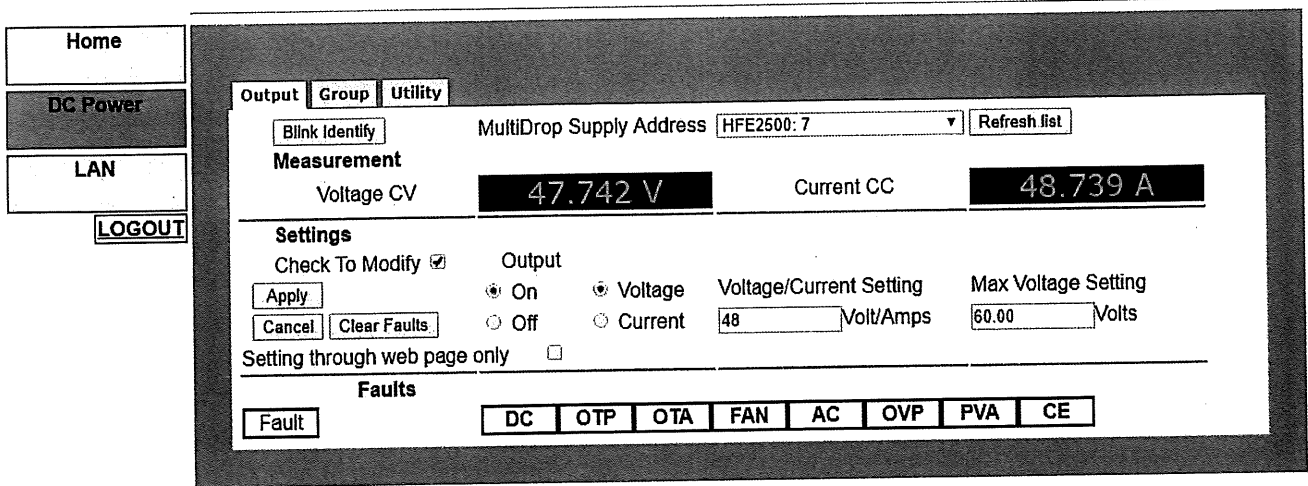
Web interface images

1. DC power page after humidity



HFE 1600W/2500W Series
Front End DC Power Supplies
LAN Option

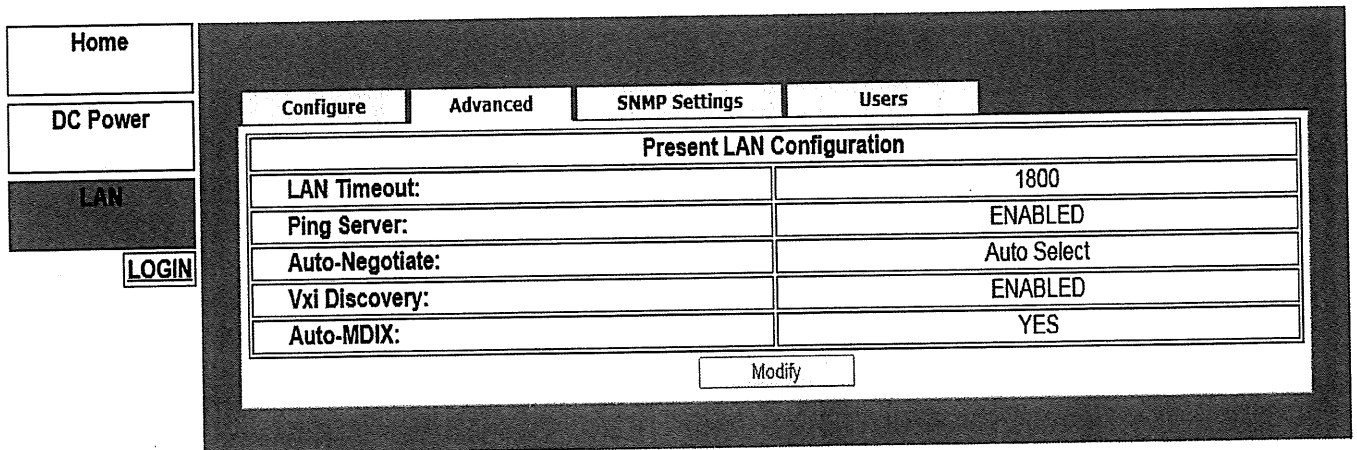
TDK-Lambda



The screenshot shows the DC Power web interface. On the left is a navigation menu with 'Home', 'DC Power', 'LAN', and 'LOGOUT'. The main content area has tabs for 'Output', 'Group', and 'Utility'. Under 'Output', there is a 'Blink Identify' button and a 'MultiDrop Supply Address' dropdown set to 'HFE2500: 7' with a 'Refresh list' button. The 'Measurement' section displays 'Voltage CV' as 47.742 V and 'Current CC' as 48.739 A. The 'Settings' section includes a 'Check To Modify' checkbox, an 'Apply' button, and a 'Clear Faults' button. There are radio buttons for 'Output' (On/Off) and 'Voltage/Current Setting' (Voltage/Current). The 'Voltage/Current Setting' is currently set to 'Voltage' with a value of 48 Volt/Amps. The 'Max Voltage Setting' is 60.00 Volts. A checkbox for 'Setting through web page only' is present. At the bottom, there is a 'Faults' section with a 'Fault' button and a row of status indicators: DC, OTP, OTA, FAN, AC, OVP, PVA, and CE.

Judgment: OK

2. LAN --> Advanced settings



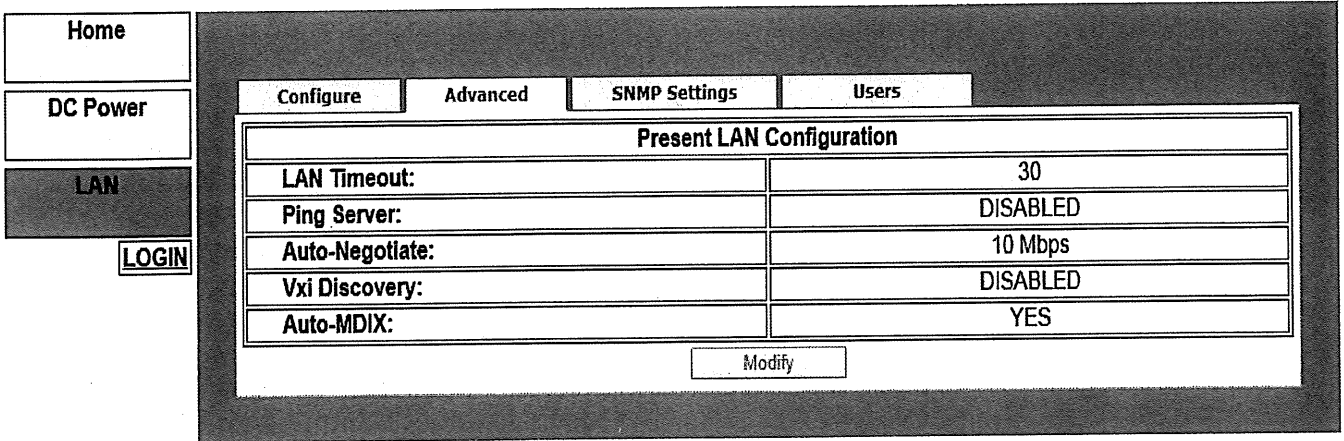
The screenshot shows the LAN Advanced settings web interface. On the left is a navigation menu with 'Home', 'DC Power', 'LAN', and 'LOGIN'. The main content area has tabs for 'Configure', 'Advanced', 'SNMP Settings', and 'Users'. The 'Advanced' tab is selected, showing a table titled 'Present LAN Configuration' with the following settings:

Present LAN Configuration	
LAN Timeout:	1800
Ping Server:	ENABLED
Auto-Negotiate:	Auto Select
Vxi Discovery:	ENABLED
Auto-MDIX:	YES

Below the table is a 'Modify' button.

Judgment: OK

3. LAN -->Advanced Settings were changed. AC reset was applied to save the settings and confirm



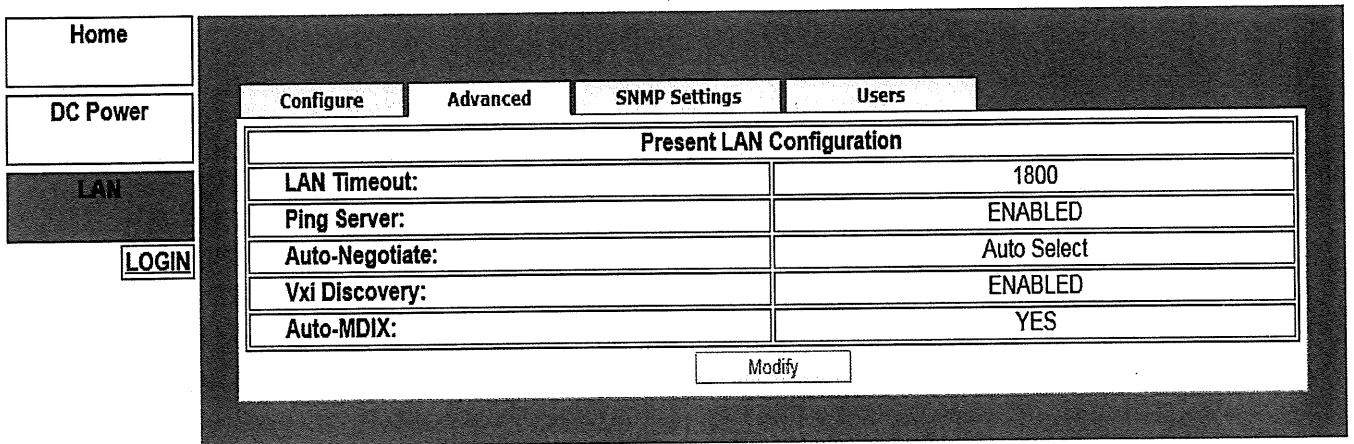
The screenshot shows a web interface with a left sidebar containing 'Home', 'DC Power', 'LAN', and a 'LOGIN' button. The main content area has tabs for 'Configure', 'Advanced', 'SNMP Settings', and 'Users'. Under the 'Advanced' tab, there is a section titled 'Present LAN Configuration' containing a table of settings:

LAN Timeout:	30
Ping Server:	DISABLED
Auto-Negotiate:	10 Mbps
Vxi Discovery:	DISABLED
Auto-MDIX:	YES

Below the table is a 'Modify' button.

Judgment: OK

4. LAN reset was applied via the LAN switch to confirm the default settings.



The screenshot shows the same web interface as above, but with the 'Present LAN Configuration' table updated to show default settings:

LAN Timeout:	1800
Ping Server:	ENABLED
Auto-Negotiate:	Auto Select
Vxi Discovery:	ENABLED
Auto-MDIX:	YES

The 'Modify' button is still present below the table.

Judgment: OK

PCB data:

PCB Manufacturer – APCB ELECTRONCS

PCB revision – ICB380A

Visual inspection:

1. No cracks in PCB or components detected.
2. No corrosion or oxidation.
3. No broken components.

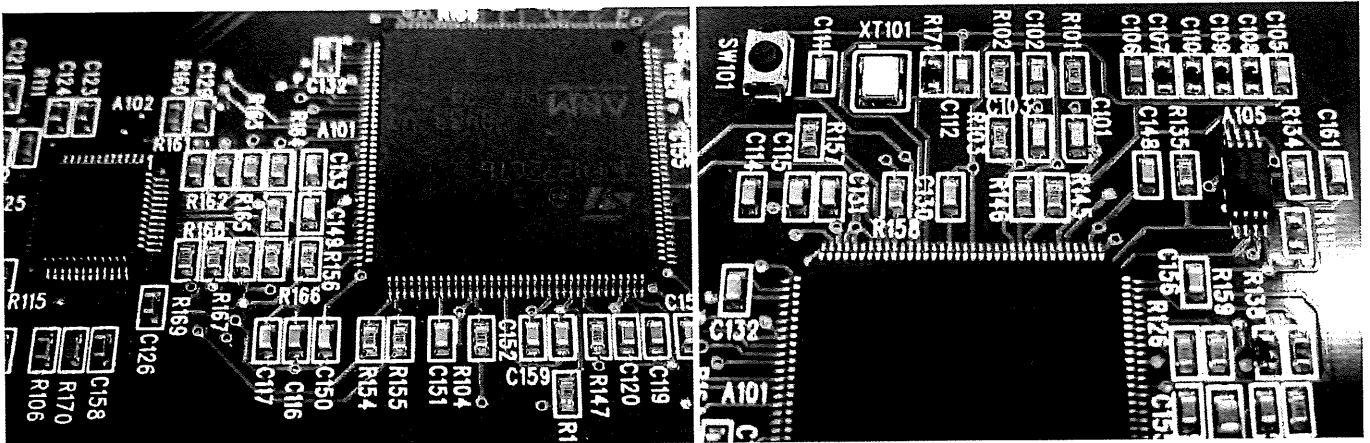
Visual inspection after Humidity test:

PCB labels and marking



Judgment: OK

SMT components



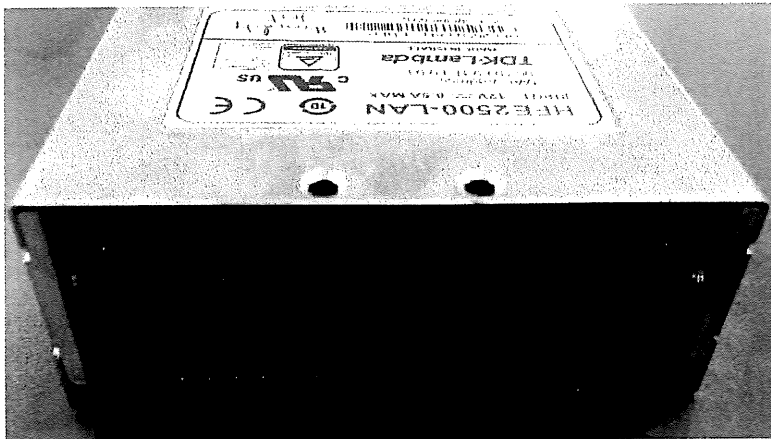
Judgment: OK



No color change detected after humidity test. Deflector material - FR60.

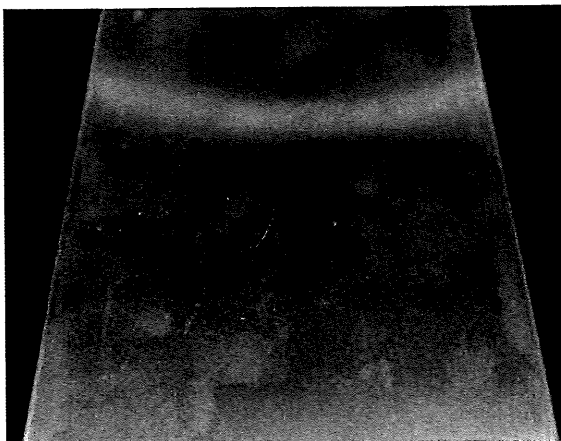
Judgment: OK

External chassis – rear panel

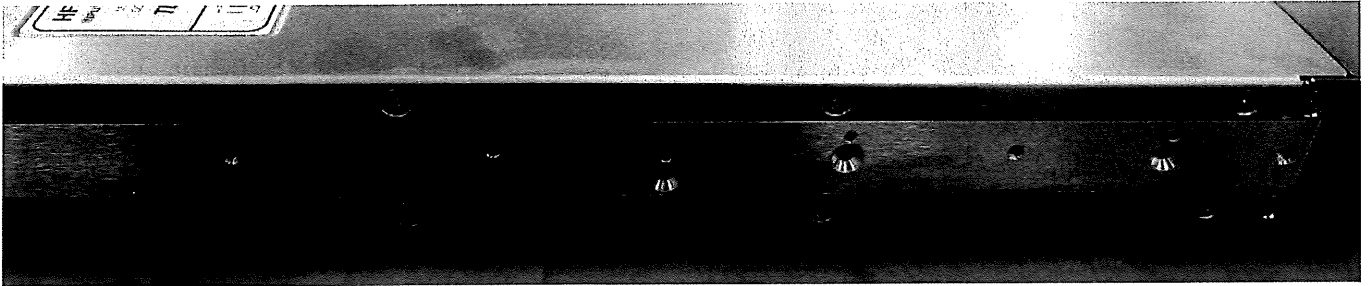


Judgment: OK

External chassis – top cover

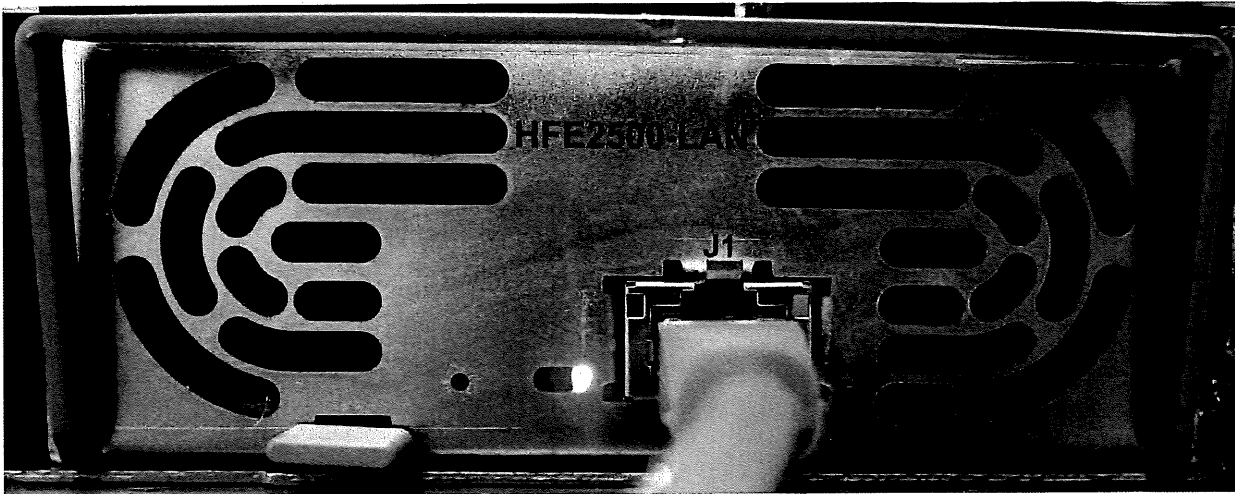
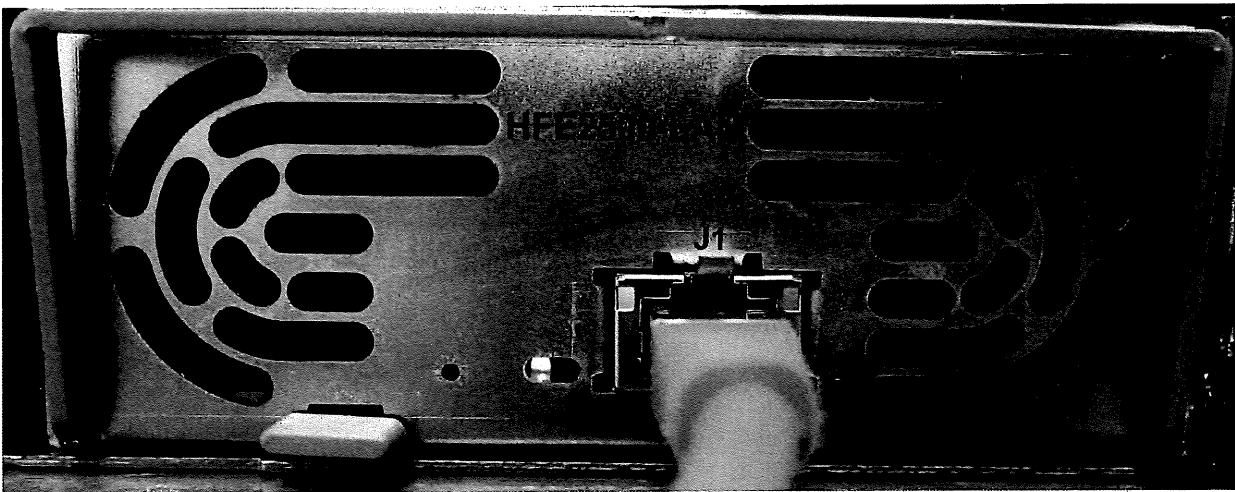


Judgment: OK



Judgment: OK

External chassis – Front panel



Judgment: OK

MODEL: HFE2500-LAN	
PROTOTYPE	PRN.
JUDGEMENT: OK/ NG	

NOISE SIMULATION TEST

1. TESTED MODELS HFE2500-48_LAN

2. TEST EQUIPMENT:

NoiseKen INS-4040- impulse noise simulator
NoiseKen IJ-4050- coupling decoupling network

3. ACCEPTANCE CRITERIA:

No damage to PS
No output shutdown
No other abnormalities

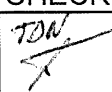
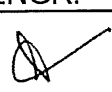
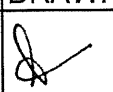
4. TEST CONDITION:

Ta=25°C
Noise level- ± (0.6kV, 1.2kV, 1.8kV, 2.4kV) (50Ω term.)
Pulse width- 50ns ~ 1us
Injection phase (AC input only) - 0°~360° (with step 45°)
Input voltage - 230Vac
Load - Full Load
Output voltage - Nominal

5. TEST RESULT:

No damage to PS
No output shutdown
No other abnormalities

Pulse	Polarity	Line-Neutral	Line-FG	Neutral-FG
2.4kV	+	OK		
2.4kV	-	OK		
2.4kV	+		OK	OK
2.4kV	-		OK	OK

DWG.No	APPROV.	CHECK	ENGR.	DRAWN
	Arie G.			
26/11/16	26/11/16	26/11/16	26/11/16	26/11/16