



35W Triple Output Switching Power Supply

NET-35 series



■ Features :

- Universal AC input / Full range
- Protections: Short circuit / Over load / Over voltage
- Cooling by free air convection
- 100% full load burn-in test
- 2 years warranty



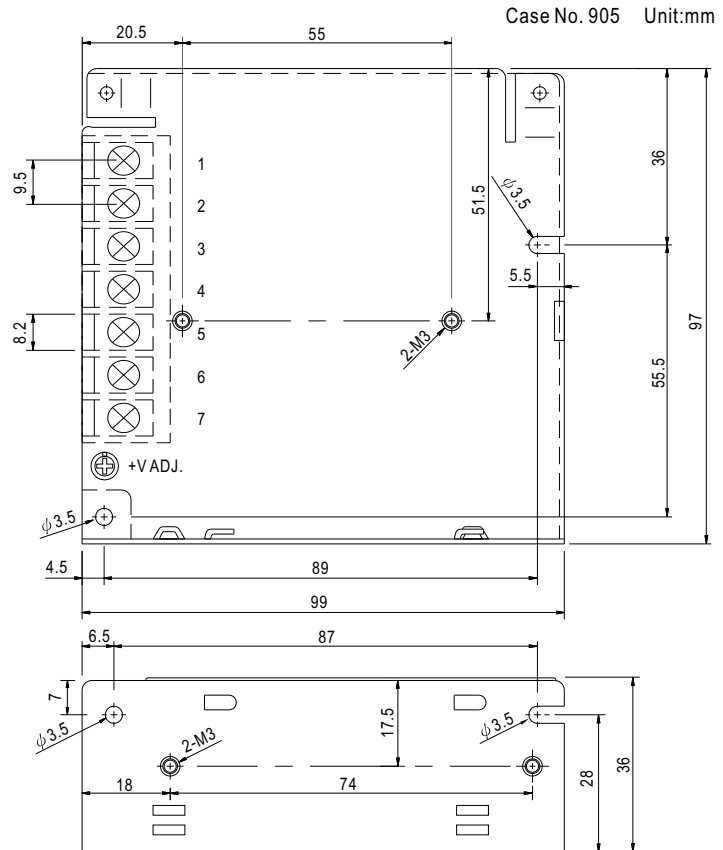
SPECIFICATION

MODEL		NET-35A			NET-35B			NET-35C			NET-35D		
OUTPUT	OUTPUT NUMBER	CH1	CH2	CH3	CH1	CH2	CH3	CH1	CH2	CH3	CH1	CH2	CH3
	DC VOLTAGE	5V	12V	-5V	5V	12V	-12V	5V	15V	-15V	5V	24V	12V
	RATED CURRENT	3A	1A	0.5A	3A	1A	0.5A	2.5A	1A	0.5A	2.5A	0.5A	1A
	CURRENT RANGE Note.6	0.5 ~ 4A	0.1 ~ 1.5A	0.1 ~ 0.5A	0.5 ~ 4A	0.1 ~ 1.5A	0.1 ~ 0.5A	0.5 ~ 3.5A	0.1 ~ 1.5A	0.1 ~ 0.5A	0.5 ~ 3.5A	0.1 ~ 1A	0.1 ~ 1A
	RATED POWER	29.5W			33W			35W			36.5W		
	RIPPLE & NOISE (max.) Note.2	80mVp-p	120mVp-p	120mVp-p	80mVp-p	120mVp-p	120mVp-p	80mVp-p	150mVp-p	150mVp-p	80mVp-p	200mVp-p	120mVp-p
	VOLTAGE ADJ. RANGE	CH1: 4.75 ~ 5.5V			CH1: 4.75 ~ 5.5V			CH1: 4.75 ~ 5.5V			CH1: 4.75 ~ 5.5V		
	VOLTAGE TOLERANCE Note.3	±2.0%	±6.0%	±6.0%	±2.0%	±6.0%	±6.0%	±2.0%	±8.0%	±8.0%	±2.0%	±8.0%	±8.0%
	LINE REGULATION Note.4	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%	±0.5%	±1.0%	±1.0%
	LOAD REGULATION Note.5	±1.5%	±3.0%	±3.0%	±1.5%	±3.0%	±3.0%	±1.5%	±3.0%	±3.0%	±1.5%	±3.0%	±3.0%
SETUP, RISE TIME		500ms, 30ms/230VAC			1200ms, 30ms/115VAC at full load								
HOLD UP TIME (Typ.)		50ms/230VAC			10ms/115VAC at full load								
INPUT	VOLTAGE RANGE	85 ~ 264VAC			120 ~ 370VDC								
	FREQUENCY RANGE	47 ~ 63Hz											
	EFFICIENCY (Typ.)	78%			79%			79%			79%		
	AC CURRENT (Typ.)	0.75A/115VAC			0.5A/230VAC								
	INRUSH CURRENT (Typ.)	COLD START 45A											
	LEAKAGE CURRENT	<2mA / 240VAC											
PROTECTION	OVERLOAD	110 ~ 150% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed											
	OVER VOLTAGE	CH1: 5.75 ~ 6.75V Protection type : Shut down o/p voltage, re-power on to recover											
ENVIRONMENT	WORKING TEMP.	-20 ~ +60℃ (Refer to output load derating curve)											
	WORKING HUMIDITY	20 ~ 90% RH non-condensing											
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH											
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 45℃)											
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes											
SAFETY & EMC (Note 6)	SAFETY STANDARDS	UL60950-1, CB(IEC60950-1) Approved											
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC											
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC											
	EMI CONDUCTION & RADIATION	Compliance to EN55022 (CISPR22) Class B											
	HARMONIC CURRENT	Compliance to EN61000-3-2,-3											
	EMS IMMUNITY	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, ENV50204, EN55024, EN61000-6-1 Light industry level, criteria A											
OTHERS	MTBF	386.2Khrs min. MIL-HDBK-217F (25℃)											
	DIMENSION	99*97*36mm (L*W*H)											
	PACKING	0.36Kg; 45pcs/17.2Kg/0.93CUFT											
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Line regulation is measured from low line to high line at rated load. 5. Load regulation is measured from 20% to 100% rated load, and other output at 60% rated load. 6. Each output can work within current range. But total output power can't exceed rated output power. 7. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.												

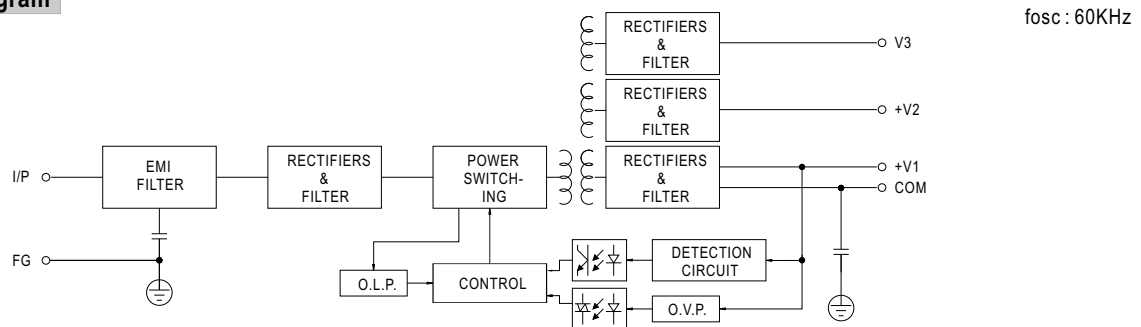
Mechanical Specification

Terminal Pin. No Assignment

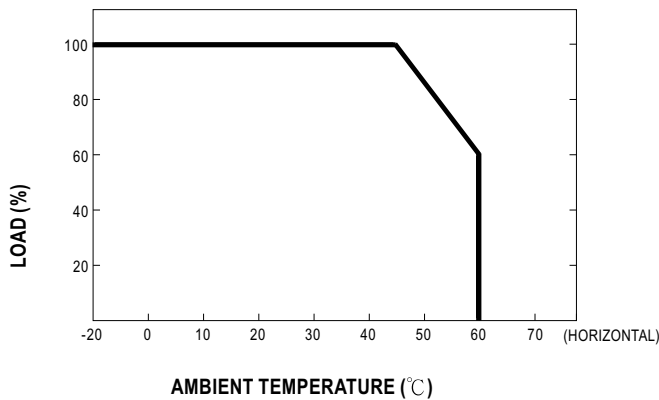
Pin No.	Assignment	Pin No.	Assignment
1	AC/L	5	DC OUTPUT +V2
2	AC/N	6	DC OUTPUT COM
3	FG $\perp$	7	DC OUTPUT +V1
4	DC OUTPUT V3		



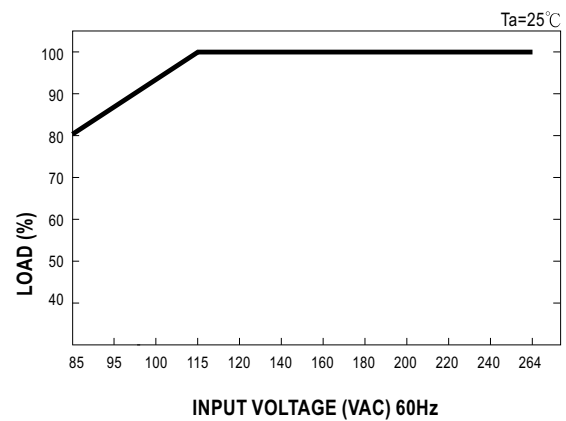
Block Diagram



Derating Curve



Output Derating VS Input Voltage



MODEL : NET-35A

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:80 mVp-p (Max) V2:120 mVp-p (Max) V3:120 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 23 mVp-p (Max) V2: 10 mVp-p (Max) V3: 10 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75V~ 5.5 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	4.53 V~ 5.9 V/ 230 VAC 4.53 V~ 5.9 V/ 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1: 2 %~- 2 % (Max) V2: 6 %~- 6 % (Max) V3: 6 %~- 6 % (Max)	I/P: 115 VAC / 264 VAC O/P:FULL/ 40% LOAD Ta:25°C	V1: 1.25 %~- -1.25 % V2: 1.3 %~- -1.3 % V3: 2.4 %~- -2.4 %	P
4	LINE REGULATION	V1: 0.5 %~- 0.5 % (Max) V2: 1 %~- 1 % (Max) V3: 1 %~- 1 % (Max)	I/P: 115 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0.25 %~- -0.25 % V2: 0.5 %~- -0.5 % V3: 0.4 %~- -0.4 %	P
5	LOAD REGULATION	V1: 1.5 %~- 1.5 % (Max) V2: 3 %~- 3 % (Max) V3: 3 %~- 3 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 1.25 %~- -1.25 % V2: 1.1 %~- -1.1 % V3: 1 %~- -1 %	P
6	CROSS REGULATION	V1: 1.5 %~- 1.5 % (Max) V2: 3 %~- 3 % (Max) V3: 3 %~- 3 % (Max)	I/P: 230 VAC O/P: Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta:25°C	V1: 0.12 %~- -0.12 % V2: 0.8 %~- -0.8 % V3: 2.1 %~- -2.1 %	P
7	SET UP TIME	230VAC: 500 ms (Max) 115 VAC: 1200 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 193 ms 115VAC/ 615 ms	P
8	RISE TIME	230VAC: 30 ms (Max) 115VAC: 30 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 6 ms 115VAC/ 7 ms	P
9	HOLD UP TIME	230VAC: 50 ms (TYP) 115VAC: 10 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 103 ms 115VAC/ 20 ms	P
10	OVER/UNDERSHOOT TEST	< +5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: <5 %	P
11	DYNAMIC LOAD	V1: 1000 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	84 mVp-p	P

INPUT FUNCTION TEST

N O	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	85VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	67 V~264V	P
			I/P: LOW-LINE-3V= 82 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 85VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	P
3	EFFICIENCY	78 % (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	78.2 %	P
4	INPUT CURRENT	230V/ 0.5 A (TYP) 115V/ 0.75 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 0.4 A/ 230 VAC I = 0.68 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 45 A (TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 38 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P: 254 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.4 mA N-FG: 0.4 mA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %~ 150 %	I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25°C	123 %/ 230 VAC 121 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75 V~ 6.75 V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	6.12 V/ 230 VAC 6.12 V/ 115 VAC Shunt down Re- power ON	P
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P:FULL LOAD Ta:25°C	NO DAMAGE Hiccup Mode	P

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																
1	TEMPERATURE RISE TEST	MODEL : NET-35A 1. ROOM AMBIENT BURN-IN : 1.5HRS I/P: 230VAC O/P: FULL LOAD Ta= 28.1℃ 2. HIGH AMBIENT BURN-IN : 2.5 HRS I/P: 230VAC O/P: FULL LOAD Ta= 53.2℃ <table><thead><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 28.1 ℃</th><th>HIGH AMBIENT Ta= 53.2 ℃</th></tr></thead><tbody><tr><td>1</td><td>BD1</td><td>KBJ208G 2A/800V LT</td><td>53.8℃</td><td>75.1℃</td></tr><tr><td>2</td><td>C5</td><td>82U/400V RUB 85℃ USR</td><td>46.2℃</td><td>67.2℃</td></tr><tr><td>3</td><td>LF1</td><td>LF-158</td><td>43.3℃</td><td>65.0℃</td></tr><tr><td>4</td><td>D1</td><td>HER306 3A/600V REC</td><td>69.0℃</td><td>91.6℃</td></tr><tr><td>5</td><td>C305</td><td>220U/25V CAPX 105℃ GL</td><td>52.0℃</td><td>73.5℃</td></tr><tr><td>6</td><td>Q1</td><td>K3562 6A/600V IR</td><td>69.4℃</td><td>93.7℃</td></tr><tr><td>7</td><td>U1</td><td>1203P</td><td>51.1℃</td><td>72.8℃</td></tr><tr><td>8</td><td>T1 COIL</td><td>TF-1245</td><td>73.0℃</td><td>94.1℃</td></tr><tr><td>9</td><td>D200</td><td>SF10SC6 10A/60V SHI</td><td>84.2℃</td><td>104.7℃</td></tr><tr><td>10</td><td>D100</td><td>SF10SC4 10A/40V SHI</td><td>85.5℃</td><td>106.1℃</td></tr><tr><td>11</td><td>C105</td><td>1200U/16V CAPX 105℃</td><td>64.7℃</td><td>85.2℃</td></tr><tr><td>12</td><td>D300</td><td>SR360 60V/3A</td><td>80.0℃</td><td>100.0℃</td></tr><tr><td>13</td><td>C205</td><td>470U/16V CAPX 105℃ GL</td><td>72.6℃</td><td>93.2℃</td></tr><tr><td>14</td><td></td><td></td><td>℃</td><td>℃</td></tr><tr><td>15</td><td></td><td></td><td>℃</td><td>℃</td></tr></tbody></table>			NO	Position	P/N	ROOM AMBIENT Ta= 28.1 ℃	HIGH AMBIENT Ta= 53.2 ℃	1	BD1	KBJ208G 2A/800V LT	53.8℃	75.1℃	2	C5	82U/400V RUB 85℃ USR	46.2℃	67.2℃	3	LF1	LF-158	43.3℃	65.0℃	4	D1	HER306 3A/600V REC	69.0℃	91.6℃	5	C305	220U/25V CAPX 105℃ GL	52.0℃	73.5℃	6	Q1	K3562 6A/600V IR	69.4℃	93.7℃	7	U1	1203P	51.1℃	72.8℃	8	T1 COIL	TF-1245	73.0℃	94.1℃	9	D200	SF10SC6 10A/60V SHI	84.2℃	104.7℃	10	D100	SF10SC4 10A/40V SHI	85.5℃	106.1℃	11	C105	1200U/16V CAPX 105℃	64.7℃	85.2℃	12	D300	SR360 60V/3A	80.0℃	100.0℃	13	C205	470U/16V CAPX 105℃ GL	72.6℃	93.2℃	14			℃	℃	15			℃	℃	P
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12	D300	SR360 60V/3A	80.0℃	100.0℃																																																																																	
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P: 137 % LOAD Ta:25℃	TEST : OK	P																																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P: 100% LOAD Ta= -20℃	TEST : OK	P																																																																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 ℃ NO DAMAGE	I/P: 272 VAC O/P:FULL LOAD Ta= 45 ℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																																																
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~45℃)	I/P: 230 VAC O/P:FULL LOAD	± 0.01 %(0~45℃)	P																																																																																
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency:10~500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25℃		TEST : OK	P																																																																																

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 4.36 mA I/P-FG: 3.61 mA O/P-FG: 2.37 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C	I/P-O/P: 1 GΩ I/P-FG: 2 GΩ O/P-FG: 3 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C	5 mΩ	P
4	APPROVAL	TUV: Certificate NO : UL: File NO : E183223			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SUPPOSE C105 IS THE MOST CRITICAL COMPONENT I/P: 230VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 181812 HRS I/P: 230VAC O/P:FULL LOAD Ta= 45 °C LIFE TIME= 48723 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 386.2K HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated K2545 : 600V 6A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 486 V (2) 492 V (3) 460 V	P
2	Diode Peak Voltage	D100 Rated SF10SC4 : 40V 10A D200 Rated SF10SC6 : 60V 10A D300 Rated SR360 : 60V 3A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Full Load (3)Output Short Ta:25℃	(1) 38.2 V (2) 38.2 V (3) 34.4 V (1) 55.6 V (2) 55 V (3) 47.2 V (1) 43.6 V (2) 39.8 V (3) 38.6 V	P
3	Clamp Diode Peak Voltage	D1 Rated HER306 : 600V 3A	I/P:High-Line +3V = 267 V O/P: (1)Full Load (2) Dynamic Load 90%Duty/1KHz Ta:25℃	(1) 470 V (2) 466 V	P
4	Input Capacitor Voltage	C5 Rated : 82u /400V/ 85℃	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change (4)Burn in 1hour Ta:25℃	(1) 386 V (2) 384 V (3) 384 V (4) 384 V	P
5	Control IC Voltage Test	U1 Rated 1203 : 18V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25℃	(1) 13.2 V (2) 13.3 V (3) 10.5 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2005/4/8	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2005/7/8	PRODUCT SAMPLE	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023