



MODEL : SE-1500-24

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 150 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 42 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 21.6V- 26.4V	I/P : 230 VAC I/P : 200VAC O/P : MIN LOAD Ta : 25°C	19.5 V~ 27.47 V/ 230 VAC 19.5 V~ 27.47 V/ 200 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 1%~ -1 % (Max)	I/P : 200 VAC / 264 VAC O/P : FULL/ MIN LOAD Ta : 25°C	V1 : 0.04 %~ -0.04 %	P
4	LINE REGULATION	V1 : 0.5 %~ -0.5 % (Max)	I/P : 200VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.03 %~ -0.03 %	P
5	LOAD REGULATION	V1 : 0.5 %~ -0.5 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.03 %~ -0.03 %	P
6	SET UP TIME	230VAC : 150 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 62 ms	P
7	RISE TIME	230VAC : 12 ms (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 4.8 ms	P
8	HOLD UP TIME	230VAC : 26 ms (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 29 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 5 %	P
10	DYNAMIC LOAD	V1 : 2400 mVp-p	I/P : 230 VAC O/P : FULL /Min LOAD 90%DUTY/1KHZ Ta : 25°C	348 mVp-p	P

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180VAC-264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	173 V-264V	P
			I/P : LOW-LINE-3V= 177 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 : 200VAC ~ 264 VAC O/P : FULL-MIN LOAD Ta : 25°C	TEST : OK	P
3	EFFICIENCY	87 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	89.3 %	P
4	INPUT CURRENT	230V/ 17.5 A	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 11.59 A/ 230 VAC	P
5	INRUSH CURRENT	230V/ 60 A  COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 50 A/ 230 VAC	P
6	LEAKAGE CURRENT	< 3.5 mA / 240 VAC	I/P : 264 VAC O/P : Min LOAD Ta : 25°C	L-FG : 1 mA N-FG : 1 mA	P

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 %- 125 %	I/P : 230 VAC I/P : 200 VAC O/P : TESTING Ta : 25°C	115%/ 230 VAC 114%/ 200 VAC Shut down Re-power ON	P
2	OVER VOLTAGE PROTECTION	CH1 : 27.6V~ 32.4 V	I/P : 230 VAC I/P : 200 VAC O/P : MIN LOAD Ta : 25°C	29.72V/ 230 VAC 29.72V/ 200 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 80°C±5°C O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down o/p voltage , recovers automatically after temperature goes down	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Shut down Re-power ON	P

### CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	FAN LOCK TEST	POWER SUPPLY SHUT DOWN	I/P : 230 VAC O/P : FULL LOAD	OK	P
3	REMOTE CONTROL	Rc+ / Rc- 0V~ 0.8V POWER ON 4V~10V POWER OFF	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	0V ~ 1.8 V POWER ON 1.9V~ 10 V POWER OFF	P
4	DC OK SIGNAL	POWER ON : 3.3V~5.6V POWER OFF : 0V~1V	I/P : 230 VAC O/P : FULL LOAD/NO LOAD Ta : 25°C	POWER ON : 5.231 V POWER OFF : 0 V	P
5	REMOTE SENSE	>0.25V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	➤ 0.25 V	P



## ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																																																																																						
1	TEMPERATURE RISE TEST	MODEL : SE-1500-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 31.1 °C 2. HIGH AMBIENT BURN-IN : 1 HRS I/P : 230VAC O/P : FULL LOAD Ta= 43 °C			P																																																																																																																																																						
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>P/N</th> <th>ROOM AMBIENT Ta= 31.1 °C</th> <th>HIGH AMBIENT Ta= 43 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF2</td><td>TR862</td><td>53.6°C</td><td>64.5°C</td></tr> <tr><td>2</td><td>BD1</td><td>30A/800V US30KB80R</td><td>72.4°C</td><td>82.8°C</td></tr> <tr><td>3</td><td>C11</td><td>225/450V 10% P=22 MMX</td><td>51.1°C</td><td>62.0°C</td></tr> <tr><td>4</td><td>RY1</td><td>RELAY PCFN-112D2M</td><td>49.6°C</td><td>60.2°C</td></tr> <tr><td>5</td><td>C5</td><td>560u/400V 85°C SMQ</td><td>47.5°C</td><td>58.4°C</td></tr> <tr><td>6</td><td>Q900</td><td>IRGP20B60PDPbF 20A/600V</td><td>64.7°C</td><td>75.5°C</td></tr> <tr><td>7</td><td>Q903</td><td>IRGP20B60PDPbF 20A/600V</td><td>63.6°C</td><td>74.8°C</td></tr> <tr><td>8</td><td>T4</td><td>TF-1488</td><td>41.4°C</td><td>50.3°C</td></tr> <tr><td>9</td><td>T3</td><td>TF-1694</td><td>52.1°C</td><td>62.5°C</td></tr> <tr><td>10</td><td>C154</td><td>220u/25V UL7Kh KY</td><td>45.9°C</td><td>56.0°C</td></tr> <tr><td>11</td><td>U150</td><td>SG3525AN</td><td>44.6°C</td><td>54.8°C</td></tr> <tr><td>12</td><td>C157</td><td>47u/25V KY</td><td>42.8°C</td><td>52.9°C</td></tr> <tr><td>13</td><td>C167</td><td>220u/25V UL7Kh 8*11.5 KY</td><td>45.7°C</td><td>55.7°C</td></tr> <tr><td>14</td><td>TSW1</td><td>TSW ST-22-R2 NC85°C</td><td>59.4°C</td><td>69.1°C</td></tr> <tr><td>15</td><td>C158</td><td>47u/25V</td><td>44.1°C</td><td>54.4°C</td></tr> <tr><td>16</td><td>T2</td><td>TF-1835A</td><td>55.5°C</td><td>64.8°C</td></tr> <tr><td>17</td><td>T1</td><td>TF-1835A</td><td>44.9°C</td><td>52.6°C</td></tr> <tr><td>18</td><td>L101</td><td>TR812</td><td>42.9°C</td><td>53.1°C</td></tr> <tr><td>19</td><td>L103</td><td>TR812</td><td>54.5°C</td><td>64.8°C</td></tr> <tr><td>20</td><td>D110</td><td>ESAD92-02R 20A/200V</td><td>62.0°C</td><td>71.7°C</td></tr> <tr><td>21</td><td>D108</td><td>ESAD92-02R 20A/200V</td><td>60.9°C</td><td>70.8°C</td></tr> <tr><td>22</td><td>D100</td><td>ESAD92-02R 20A/200V</td><td>44.8°C</td><td>55.1°C</td></tr> <tr><td>23</td><td>D104</td><td>ESAD92-02R 20A/200V</td><td>46.6°C</td><td>57.0°C</td></tr> <tr><td>24</td><td>C119</td><td>1000u/35V KY</td><td>45.8°C</td><td>55.9°C</td></tr> <tr><td>25</td><td>T5</td><td>TF-1838</td><td>50.3°C</td><td>60.8°C</td></tr> <tr><td>26</td><td>U6</td><td>TNY280PN DIP-8C</td><td>56.3°C</td><td>67.1°C</td></tr> <tr><td>27</td><td>C75</td><td>100u/25V L5Kh 6.3*11 KY</td><td>45.0°C</td><td>55.7°C</td></tr> <tr><td>28</td><td>C301</td><td>220u/25V UL7Kh 8*11.5 KY</td><td>50.4°C</td><td>60.7°C</td></tr> <tr><td>29</td><td>C159</td><td>330u/25V KY</td><td>34.8°C</td><td>44.4°C</td></tr> </tbody> </table>		NO	Position	P/N	ROOM AMBIENT Ta= 31.1 °C	HIGH AMBIENT Ta= 43 °C	1	LF2	TR862	53.6°C	64.5°C	2	BD1	30A/800V US30KB80R	72.4°C	82.8°C	3	C11	225/450V 10% P=22 MMX	51.1°C	62.0°C	4	RY1	RELAY PCFN-112D2M	49.6°C	60.2°C	5	C5	560u/400V 85°C SMQ	47.5°C	58.4°C	6	Q900	IRGP20B60PDPbF 20A/600V	64.7°C	75.5°C	7	Q903	IRGP20B60PDPbF 20A/600V	63.6°C	74.8°C	8	T4	TF-1488	41.4°C	50.3°C	9	T3	TF-1694	52.1°C	62.5°C	10	C154	220u/25V UL7Kh KY	45.9°C	56.0°C	11	U150	SG3525AN	44.6°C	54.8°C	12	C157	47u/25V KY	42.8°C	52.9°C	13	C167	220u/25V UL7Kh 8*11.5 KY	45.7°C	55.7°C	14	TSW1	TSW ST-22-R2 NC85°C	59.4°C	69.1°C	15	C158	47u/25V	44.1°C	54.4°C	16	T2	TF-1835A	55.5°C	64.8°C	17	T1	TF-1835A	44.9°C	52.6°C	18	L101	TR812	42.9°C	53.1°C	19	L103	TR812	54.5°C	64.8°C	20	D110	ESAD92-02R 20A/200V	62.0°C	71.7°C	21	D108	ESAD92-02R 20A/200V	60.9°C	70.8°C	22	D100	ESAD92-02R 20A/200V	44.8°C	55.1°C	23	D104	ESAD92-02R 20A/200V	46.6°C	57.0°C	24	C119	1000u/35V KY	45.8°C	55.9°C	25	T5	TF-1838	50.3°C	60.8°C	26	U6	TNY280PN DIP-8C	56.3°C	67.1°C	27	C75	100u/25V L5Kh 6.3*11 KY	45.0°C	55.7°C	28	C301	220u/25V UL7Kh 8*11.5 KY	50.4°C	60.7°C	29	C159	330u/25V KY	34.8°C	44.4°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 112 % LOAD Ta : 25 °C	TEST : OK	P																																																																																																																																																						
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230 VAC O/P : 100 % LOAD Ta : -25 °C	TEST : OK	P																																																																																																																																																						
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta : 50 °C HUMIDITY= 95 %R.H	TEST : OK	P																																																																																																																																																						
5	TEMPERATURE COEFFICIENT	±0.05 % (0-50°C)	I/P : 230 VAC O/P : FULL LOAD	±0.0035 % (0-50°C)	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°C	TEST : OK	P
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### M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	SE-1500-24 : SUPPOSE C119 IS THE MOST CRITICAL COMPONENT I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME= 8511819 HRS I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME= 1346732 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 134.5 K HRS			P
3	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure : Above 20,000 hours @ TA 50°C			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 : 7.74 mA I/P-FG : 6.07 mA O/P-FG : 8.15 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 : 8.49 GΩ I/P-FG : 8.94 GΩ O/P-FG : 13.7 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C	16 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	CONDUCTION	EN55022 EN55011 CLASS B	I/P:230 VAC (50HZ)/115V(60HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
2	RADIATION	EN55022 EN55011 CLASS B	I/P:230 VAC (50HZ)/115V(60HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P



**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q900 Rated IRGP20B60PDPbF 20A/600V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Full Load (3)Output Short Ta : 25°C	(1) 412 V (2) 378 V (3) 418 V	P
2	Diode Peak Voltage	D100 Rated ESAD92-02R 20A/200V	I/P : High-Line +3V = 267 V O/P : (1)Full Load Turn on (2) Full Load (3)Output Short Ta : 25°C	(1) 120 V (2) 118 V (3) 129 V	P
3	Input Capacitor Voltage	C5 Rated 560u/400V 85°C SMO	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°C	(1) 352.7 V (2) 380.4 V (3) 381.2 V	P
4	Control IC Voltage Test	U150 Rated SG3525AN : 8V- 40 V	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°C	(1) 12.712 V (2) 12.718 V (3) 12.718 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2008/12/22	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2009/3/11	PRODUCT SAMPLE W0901A26	PASS	SANFORD SU	VINCENT TSENG
2009/5/5	PRODUCT SAMPLE W0903C24	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023