

■ Features :

- 4"x2" miniature size
- Universal AC input/Full range
- Low leakage current<200uA
- Protections: Short circuit / Over load / Over voltage
- Cooling by free air convection
- UL60601-1/IEC60601-1/EN60601-1 medical safety approved
- UL60950-1/IEC60950-1/EN60950-1 ITE safety approved
- Fixed switch frequency at 100KHz
- 3 years warranty



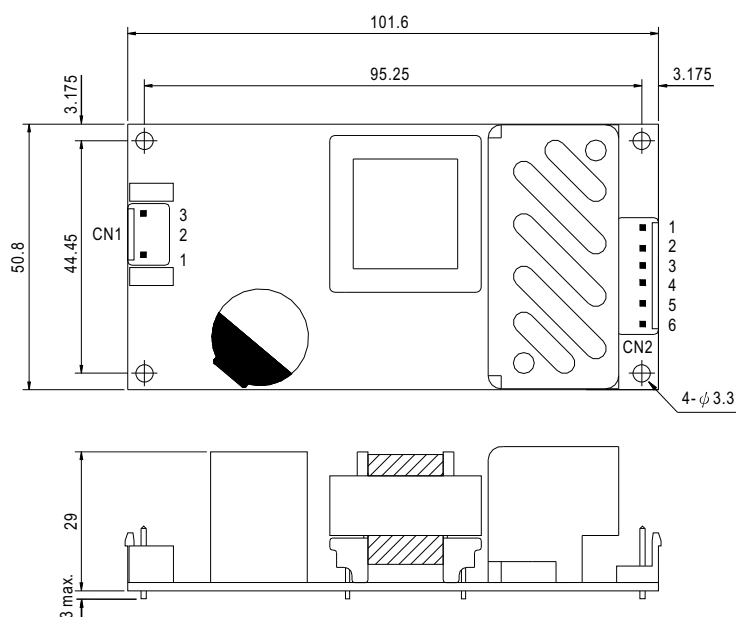
SPECIFICATION

MODEL		RPD-60A		RPD-60B	
OUTPUT	OUTPUT NUMBER	CH1	CH2	CH1	CH2
	DC VOLTAGE	5V	12V	5V	24V
	RATED CURRENT	5A	2A	3.5A	1.5A
	CURRENT RANGE	0.5 ~ 5.5A	0.1 ~ 2.2A	0.5 ~ 3.85A	0.1 ~ 1.65A
	RATED POWER	49W		53.5W	
	PEAK LOAD(10sec.) Note.4	53.9W		58.85W	
	RIPPLE & NOISE (max.) Note.2	80mVp-p	80mVp-p	80mVp-p	100mVp-p
	VOLTAGE TOLERANCE Note.3	+3,-2%	±6.0%	+3,-2%	+8,-4%
	LINE REGULATION	±0.5%	±1.0%	±0.5%	±1.0%
	LOAD REGULATION	±1.5%	±2.0%	±1.5%	±2.0%
	SETUP, RISE TIME	200ms, 15ms/230VAC 200ms, 15ms/115VAC at full load			
	HOLD UP TIME (Typ.)	70ms/230VAC 14ms/115VAC at full load			
INPUT	VOLTAGE RANGE	90 ~ 264VAC 127 ~ 370VDC			
	FREQUENCY RANGE	47 ~ 63Hz			
	EFFICIENCY (Typ.)	78%		82%	
	AC CURRENT (Typ.)	1.1A/115VAC 0.7 A/230VAC			
	INRUSH CURRENT (Typ.)	COLD START 60A/230VAC 30A/115VAC			
	LEAKAGE CURRENT	For earth <200uA/264VAC, For patient <100uA/264VAC			
PROTECTION	OVERLOAD	115 ~ 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 ~ +65℃ (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 5)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1, UL60601-1, TUV EN60601-1, IEC60601-1 approved			
	WITHSTAND VOLTAGE	I/P-O/P:4KVAC I/P-FG:1.5KVAC O/P-FG:1.5KVAC			
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC			
	EMI CONDUCTION & RADIATION	Compliance to EN55011(CISPR11),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, EN60601-1-2, EN61204-3, medical level, criteria A			
OTHERS	MTBF	677.8Khrs min. MIL-HDBK-217F (25℃)			
	DIMENSION	101.6*50.8*29mm (L*W*H)			
	PACKING	0.15Kg; 96pcs/15.4Kg/0.89CUFT			
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. 33% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power. 5. 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. 6. Length of set up time is measured at cold first start. Turning ON/OFF the power supply may lead to increase of the set up time.				

60W Dual Output Medical Type

■ Mechanical Specification

Unit:mm



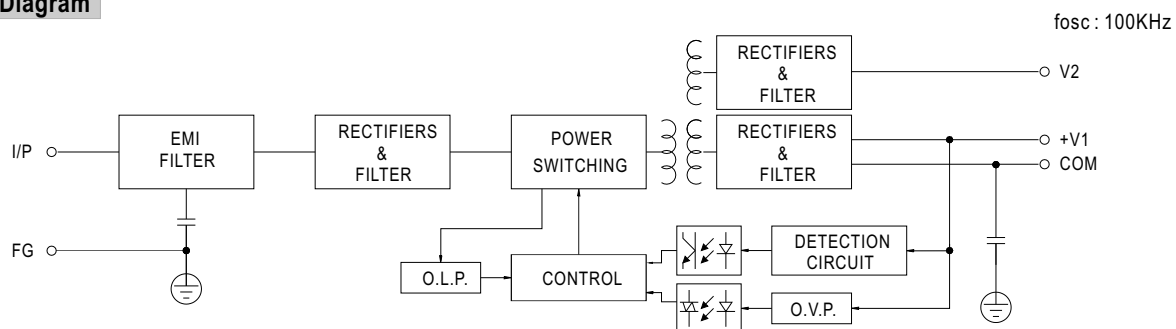
AC Input Connector (CN1) : JST B3P-VH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	AC/N	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
2	No Pin		
3	AC/L		

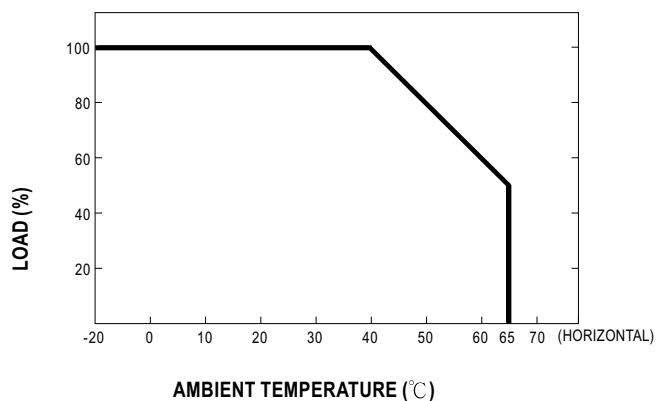
DC Output Connector (CN2) : JST B6P-VH or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1,2	V1	JST VHR or equivalent	JST SVH-21T-P1.1 or equivalent
3,4	COM		
5	V2		
6	NC		

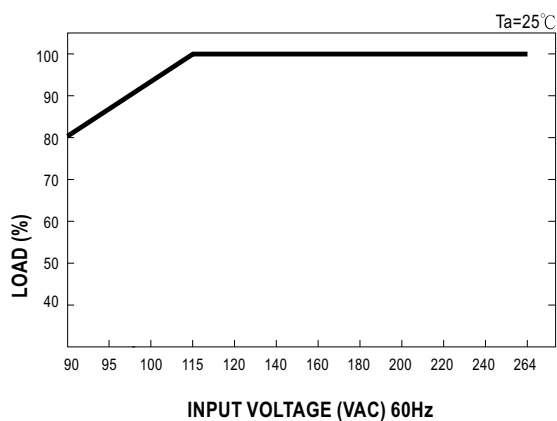
■ Block Diagram



Derating Curve



■ Output Derating VS Input Voltage



MODEL : RPD-60A

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1: 80 mVp-p (Max) V2: 80 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 15 mVp-p (Max) V2: 24 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1: 3 %~ -2 % (Max) V2: 6 %~ -6 % (Max)	I/P: 115 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: 0.18 %~-0.18 % V2: 2.8 %~-2.8 %	P
3	LINE REGULATION	V1: 0.5 %~ -0.5 % (Max) V2: 1 %~ -1 % (Max)	I/P: 115 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0 %~-0 % V2: 0.36 %~-0.36 %	P
4	LOAD REGULATION	V1: 1.5 %~ -1.5 % (Max) V2: 2 %~ -2 % (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.24 %~-0.24 % V2: 0.52 %~-0.52 %	P
5	CROSS REGULATION	V1: 1.5 %~ -1.5 % (Max) V2: 2 %~ -2 % (Max)	I/P: 230 VAC O/P: Testing O/P 60%LOAD Other O/P 40%LOAD Change Ta:25°C	V1: 0 %~-0 % V2: 1.5 %~-1.5 %	P
6	SET UP TIME	230VAC: 200 ms (Max) 115 VAC: 200 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 161 ms 115VAC/ 150 ms	P
7	RISE TIME	230VAC: 15 ms (Max) 115VAC: 15 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 6 ms 115VAC/ 6 ms	P
8	HOLD UP TIME	230VAC: 70 ms (TYP) 115VAC: 14 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 78 ms 115VAC/ 15.4 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: 1000 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	173 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	67 V~264V	P
			I/P: LOW-LINE-3V= 87V 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: 90VAC ~ 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	78.3 %	P
4	INPUT CURRENT	230V/ 0.7 A (TYP) 115V/ 1.1 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 0.62 A/ 230 VAC I = 0.97 A/ 115 VAC	P
5	INRUSH CURRENT	230V/ 60 A (TYP) 115V/ 30 A(TYP) COLD START	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 50 A/ 230 VAC I = 25 A/ 115 VAC	P
6	LEAKAGE CURRENT	< 200 uA / 264 VAC	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG: 108 uA N-FG: 108 uA	P
		< 100 uA/264 VAC for patient	I/P: 264 VAC O/P:Min LOAD Ta:25°C	L-FG: 36 uA N-FG 36 uA	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	115%~ 150%	I/P: 230 VAC I/P: 115 VAC O/P:TESTING Ta:25°C	135 %/ 230 VAC 127 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 5.75V~ 6.75V	I/P: 230 VAC I/P: 115 VAC O/P:MIN LOAD Ta:25°C	6.4 V/ 230 VAC 6.5 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 : RPD-60A 1. ROOM AMBIENT BURN-IN : 1HRS I/P: 230VAC O/P: FULL LOAD Ta= 29.5℃ 2. HIGH AMBIENT BURN-IN : 2HRS I/P: 230VAC O/P: FULL LOAD Ta= 39.6 ℃ <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta= 29.5 ℃</th><th>HIGH AMBIENT Ta= 39.6 ℃</th></tr><tr><td>1</td><td>LF1</td><td>LF158</td><td>57.3℃</td><td>67.1℃</td></tr><tr><td>2</td><td>BD1</td><td>US4K 4A/800V SHI</td><td>60.8℃</td><td>70.4℃</td></tr><tr><td>3</td><td>C5</td><td>100U/400V NCC 105℃</td><td>55.3℃</td><td>65.3℃</td></tr><tr><td>4</td><td>T1 COIL</td><td>TF-1419 LS</td><td>79.1℃</td><td>90.8℃</td></tr><tr><td>5</td><td>C36</td><td>47U/50V RUB 105℃ YXF</td><td>70.4℃</td><td>82.2℃</td></tr><tr><td>6</td><td>Q1</td><td>2SK2545 2A/600V TOS</td><td>96.9℃</td><td>105.9℃</td></tr><tr><td>7</td><td>D1</td><td>EGP20J 2A/600V ZOW</td><td>80.7℃</td><td>91.2℃</td></tr><tr><td>8</td><td>U1</td><td>1230D</td><td>71.9℃</td><td>85.8℃</td></tr><tr><td>9</td><td>D100</td><td>MBR20H100CT 20A/100V</td><td>106.2℃</td><td>115.8℃</td></tr><tr><td>10</td><td>D200</td><td>YG805C10R 20A/100V FUJI</td><td>92.1℃</td><td>100.7℃</td></tr><tr><td>11</td><td>C105</td><td>1800U/10V RUB 105℃ ZLH</td><td>92.8℃</td><td>100.5℃</td></tr><tr><td>12</td><td>C205</td><td>390U/35V RUB 105℃ ZLH</td><td>87.4℃</td><td>95.5℃</td></tr></table>			NO	Position	P/N	ROOM AMBIENT Ta= 29.5 ℃	HIGH AMBIENT Ta= 39.6 ℃	1	LF1	LF158	57.3℃	67.1℃	2	BD1	US4K 4A/800V SHI	60.8℃	70.4℃	3	C5	100U/400V NCC 105℃	55.3℃	65.3℃	4	T1 COIL	TF-1419 LS	79.1℃	90.8℃	5	C36	47U/50V RUB 105℃ YXF	70.4℃	82.2℃	6	Q1	2SK2545 2A/600V TOS	96.9℃	105.9℃	7	D1	EGP20J 2A/600V ZOW	80.7℃	91.2℃	8	U1	1230D	71.9℃	85.8℃	9	D100	MBR20H100CT 20A/100V	106.2℃	115.8℃	10	D200	YG805C10R 20A/100V FUJI	92.1℃	100.7℃	11	C105	1800U/10V RUB 105℃ ZLH	92.8℃	100.5℃	12	C205	390U/35V RUB 105℃ ZLH	87.4℃	95.5℃	P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P: V1=6.8A V2=2.5A 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 40℃ NO DAMAGE	I/P: 272 VAC O/P:FULL LOAD Ta= 40 ℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																																	
5	TEMPERATURE COEFFICIENT	± 0.03 %(0~50℃)	I/P: 230 VAC O/P:FULL LOAD	± 0.01%(0~50℃)	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: 4 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 1.5 KVAC/min	I/P-O/P: 4.2 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 1.8 KVAC/min Ta:25°C	I/P-O/P: 2.19 mA I/P-FG: 1.52 mA O/P-FG: 1.57 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: 30 GΩ I/P-FG: 30 GΩ O/P-FG: 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta:25°C	3 mΩ	P
4	APPROVAL	TUV: Certificate NO : R 50112371 UL: File NO : E227340			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 EN55011 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 EN55011 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 MEDICAL AIR:8KV / Contact:6KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 MEDICAL INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 MEDICAL 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= 33167 HRS I/P: 230VAC O/P:FULL LOAD Ta= 40 °C LIFE TIME= 13871 HRS I/P: 230VAC O/P:75% LOAD Ta= 40 °C LIFE TIME= 34836 HRS			P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 677.8K 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 6 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Output Short Ta:25℃	(1) 496 V (2) 580 V	P
2	Diode Peak Voltage	D100 Rated MBR20H100 : 100V 20A D200 Rated YG805C010R : 100V 20 A	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2)Output Short Ta:25℃	(1) 60 V (2) 52 V (1) 72 V (2) 66 V	P
3	Clamp Diode Peak Voltage	D1 Rated EGP20J : 600V 2A	I/P:High-Line +3V = 267 V O/P: (1) Dynamic Load 90%Duty/1KHz Ta:25℃	(1) 398 V	P
4	Input Capacitor Voltage	C5 Rated : 100u / 400V/ 105℃	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) 378 V (2) 380 V (3) 378 V	P
5	Control IC Voltage Test	U1 Rated 1230D : 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) 12.7 V (2) 11.7 V (3) 12.7 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2006/4/3	RD SAMPLE	PASS	VINCENT TSENG	MAX LIN
2006/6/2	PRODUCT SAMPLE W0605A33	PASS	VINCENT TSENG	MAX LIN
2006/8/16	PRODUCT SAMPLE W0607C20	PASS	VINCENT TSENG	MAX LIN

2003/12/12 A50-F023