



# TEST REPORT: MFM-30-5

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## 30W High Reliable Green Medical On Board Type

### ■ DESIGN VERIFY TEST

Output Function Test  
Input Function Test  
Protection Function Test  
Control Function Test  
Component Stress Test

### ■ SAFETY & E.M.C. TEST

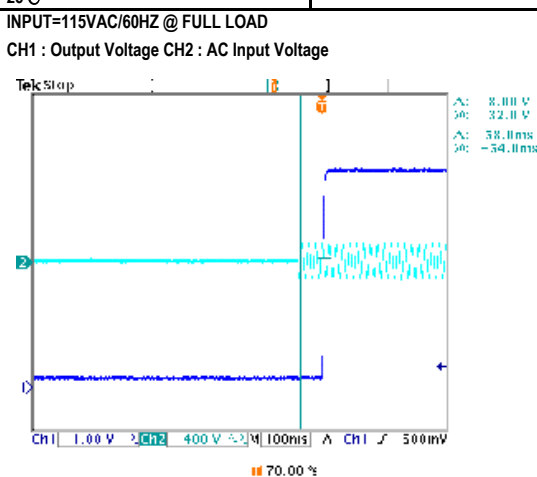
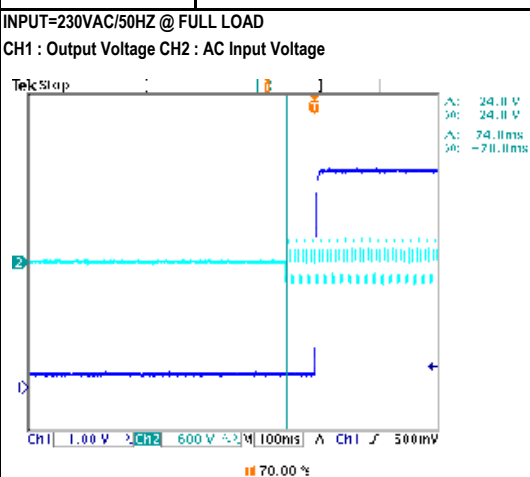
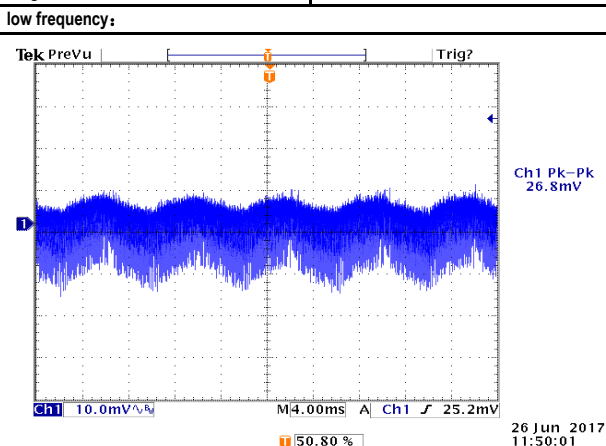
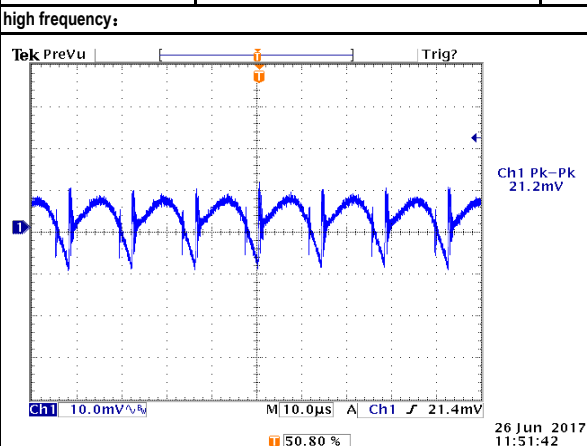
Safety Test  
E.M.C. Test

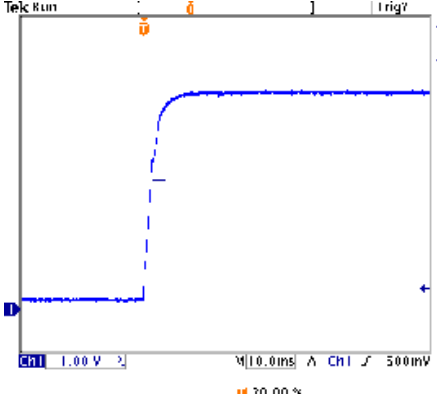
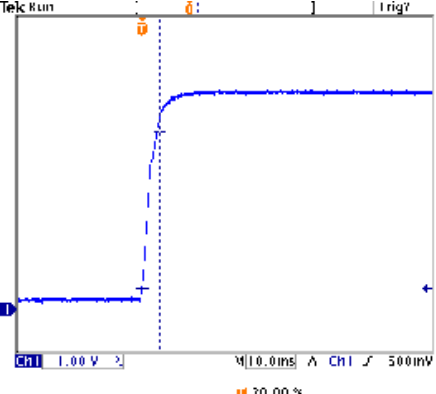
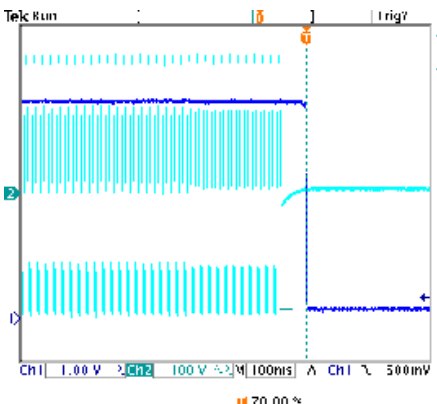
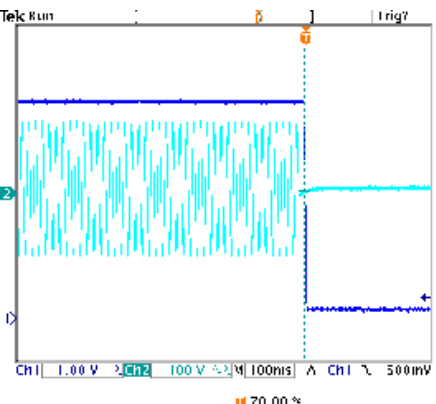
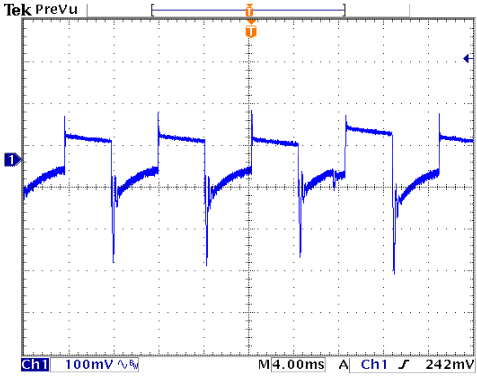
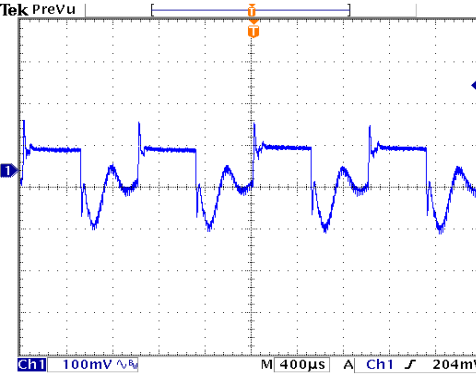
### ■ RELIABILITY TEST

ENVIRONMENT TEST

# DESIGN VERIFY TEST OUTPUT FUNCTION

| NO | TEST ITEM                      | SPECIFICATION                    | TEST CONDITION                                             | RESULT                         |
|----|--------------------------------|----------------------------------|------------------------------------------------------------|--------------------------------|
| 1  | OUTPUT VOLTAGE TOLERANCE (Max) | V1 : 2.0% ~ -2.0%                | I/P : 80VAC / 264VAC<br>O/P: FULL / MINLOAD<br>TA: 25°C    | V1: 0.10% ~ -0.10%             |
| 2  | LINE REGULATION (MAX.)         | V1 : 0.5% ~ -0.5%                | I/P : 80VAC / 264VAC<br>O/P: FULL LOAD<br>TA: 25°C         | V1: 0.00% ~ 0.00%              |
| 3  | LOAD REGULATION(MAX.)          | V1 : 1.0% ~ -1.0%                | I/P : 230VAC<br>O/P: MIN LOAD ~ FULL LOAD<br>TA: 25°C      | V1: 0.10% ~ -0.10%             |
| 4  | OVER/UNDERSHOOT TEST           | < ±10%                           | I/P : 230VAC<br>O/P: FULL LOAD<br>TA: 25°C                 | TEST< 4.0 %                    |
| 5  | RIPPLE & NOISE(Max)            | V1 : 80 mVp-p                    | I/P : 230VAC<br>O/P: FULL LOAD<br>TA: 25°C                 | V1 : 26.8 mVp-p                |
|    |                                |                                  | high frequency: low frequency:                             |                                |
| 6  | SET UP TIME (MAX.)             | 230VAC : 500ms<br>115VAC : 500ms | I/P : 230VAC<br>I/P : 115VAC<br>O/P: FULL LOAD<br>TA: 25°C | 230VAC : 74ms<br>115VAC : 58ms |
|    |                                |                                  |                                                            |                                |

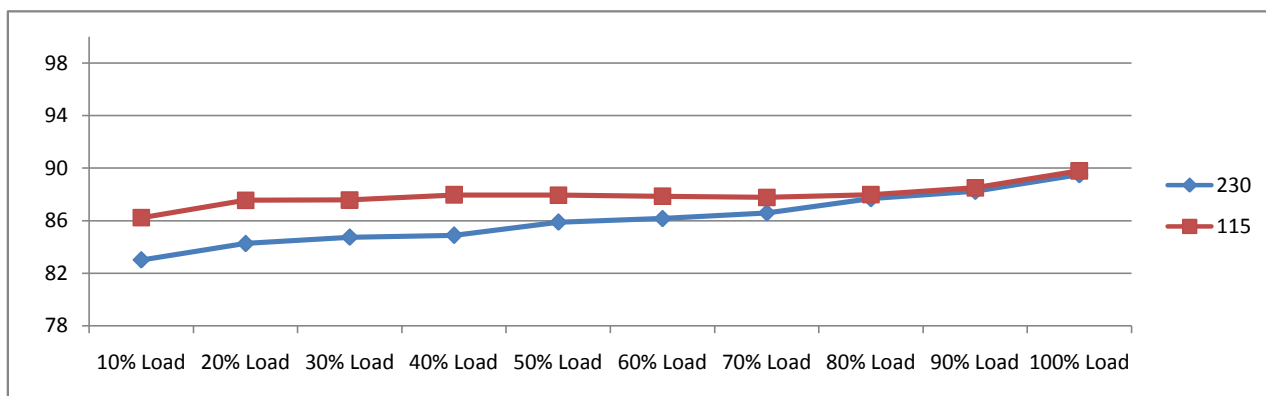


|   |                                                                                                                                                                                                                                                                                                                                                                           |                                |                                                                                                      |                                      |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------|
| 7 | RISE TIME (MAX.)                                                                                                                                                                                                                                                                                                                                                          | 230VAC : 30ms<br>115VAC : 30ms | I/P : 230VAC<br>I/P : 115VAC<br>TA : 25°C                                                            | 230VAC : 3.6ms<br>115VAC : 4.2ms     |
|   | <div> <div> INPUT=230VAC/50HZ @ FULL LOAD<br/>CH1 : Output Voltage  </div> <div> INPUT=115VAC/60HZ @ FULL LOAD<br/>CH1 : Output Voltage  </div> </div>                                                 |                                |                                                                                                      |                                      |
| 8 | HOLD UP TIME (TYP.)                                                                                                                                                                                                                                                                                                                                                       | 230VAC : 40ms<br>115VAC : 12ms | I/P : 230VAC<br>I/P : 115VAC<br>O/P: FULL LOAD<br>TA : 25°C                                          | 230VAC : 50.0ms<br>115VAC : 22.0ms   |
|   | <div> <div> INPUT=230VAC/50HZ @ FULL LOAD<br/>CH1 : Output Voltage CH2 : AC Input Voltage  </div> <div> INPUT=115VAC/60HZ @ FULL LOAD<br/>CH1 : Output Voltage CH2 : AC Input Voltage  </div> </div> |                                |                                                                                                      |                                      |
| 9 | DYNAMIC LOAD                                                                                                                                                                                                                                                                                                                                                              | V1 : 1000 mVp-p                | I/P : 230VAC<br>O/P:<br>(1)Full/Min load 50%duty/120HZ<br>(2)Full/Min load 50%duty/1KHZ<br>TA : 25°C | V1: (1). 392mv (2). 272mv unit:mVp-p |
|   | <div> <div> FULL /MIN LOAD 50%DUTY / 120HZ  </div> <div> FULL /MIN% LOAD 50%DUTY / 1KHZ  </div> </div>                                                                                             |                                |                                                                                                      |                                      |

# INPUT FUNCTION TEST

| NO | TEST ITEM                 | SPECIFICATION                    | TEST CONDITION                                                                                                                                                                            | RESULT                                 |
|----|---------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 1  | INPUT VOLTAGE RANGE       | 80VAC ~ 264VAC                   | I/P : TESTING<br>O/P : FULL LOAD<br>Ta : 25°C<br><br>I/P :<br>LOW-LINE = 97VAC<br>HIGH-LINE = 300VAC<br>O/P : FULL/MIN LOAD<br>ON:30 Sec ; OFF:30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | 72.0VAC ~ 264VAC<br><br>TEST : OK      |
| 2  | INPUT FREQUENCY RANGE     | 47HZ ~ 63HZ<br>NO DAMAGE         | I/P : 80VAC ~ 264VAC<br>O/P : FULL~MIN LOAD<br>Ta : 25°C                                                                                                                                  | TEST : OK                              |
| 3  | INPUT CURRENT (TYP.)      | 0.50A / 230VAC<br>0.75A / 115VAC | I/P : 230VAC<br>I/P : 115VAC<br>O/P : FULL LOAD<br>TA : 25°C                                                                                                                              | I= 0.25A / 230VAC<br>I= 0.47A / 115VAC |
| 4  | LEAKAGE CURRENT           | < 80.00uA                        | I/P : 264VAC<br>O/P : MIN LOAD<br>TA : 25°C                                                                                                                                               | Touch current<br>51.3 μA               |
| 5  | NO LOAD POWER CONSUMPTION | < 0.075W                         | I/P : 230VAC<br>O/P : MIN LOAD<br>TA : 25°C                                                                                                                                               | < 0.0721 W                             |
|    | EFFICIENCY (TYP.)         | 86.5%                            | I/P : 230VAC<br>O/P : FULL LOAD<br>TA : 25°C                                                                                                                                              | 89.5 %                                 |

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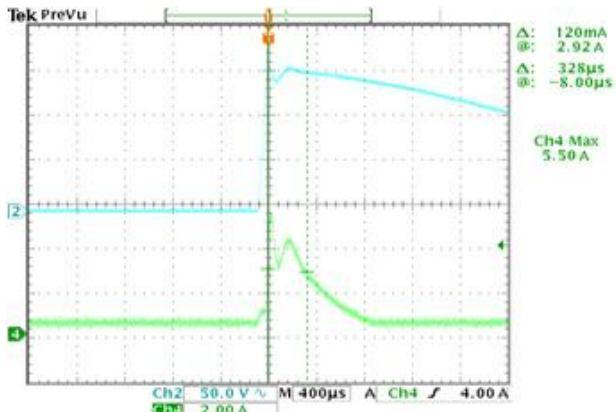
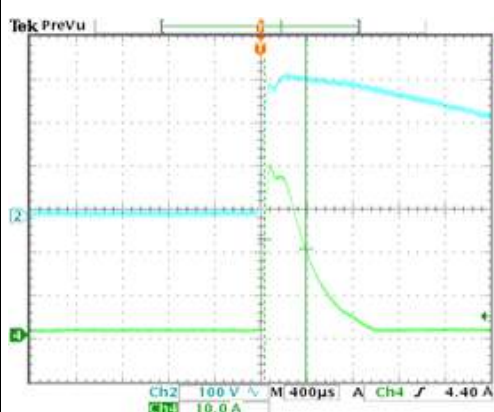
|                       |                                                                                    |                                                              |                                                                |
|-----------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|
| INRUSH CURRENT (TYP.) | 45A / 230VAC<br>25A / 115VAC<br>twidth= 555 us measured at 50% Ipeak<br>COLD START | I/P : 230VAC<br>I/P : 115VAC<br>O/P : FULL LOAD<br>TA : 25°C | I= 39.6A / 230VAC<br>I= 5.5A / 115VAC<br>T50= 360.0us / 230VAC |
|-----------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------|

INPUT=230VAC/50HZ @ FULL LOAD

INPUT=115VAC/50HZ @ FULL LOAD

CH2 : AC Input Voltage CH4 : Input current

CH2 : AC Input Voltage CH4 : Input current





## PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECIFICATION                          | TEST CONDITION                                                        | RESULT                                                                |
|----|-------------------------|----------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION    | 115% ~ 165%                            | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 100VAC<br>O/P: TESTING<br>Ta: 25°C | 146.66% 264VAC<br>148.30% 230VAC<br>148.30% 100VAC<br>Hiccup Mode     |
| 2  | OVER VOLTAGE PROTECTION | 5.30V ~ 6.80V                          | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 80VAC<br>O/P: MIN LOAD<br>Ta: 25°C | 6.45V 264VAC<br>6.42V 230VAC<br>6.39V 80VAC<br>Shut down Re- power ON |
| 3  | SHORT PROTECTION        | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 264VAC<br>I/P: 80VAC<br>O/P: FULL LOAD<br>Ta: 25°C               | NO DAMAGE<br>Hiccup Mode<br>OK                                        |

## COMPONENT STRESS TEST

| NO | TEST ITEM            | SPECIFICATION                                                                  | TEST CONDITION                                                                                                                                     | RESULT                                                                                                                |
|----|----------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1  | PWM Power Transistor | Q1 Rated : 600V 7.5A                                                           | I/P : 267VAC<br><br>VDS :<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>(3)Full load continue<br>Ta : 25°C                                  | VIN: 267VAC<br>VDS:<br>(1). 468.00V<br>(2). 456.00V<br>(3). 458.00V                                                   |
| 2  | O/P MOSFET           | Q100 Rated : 60V 60.0A                                                         | I/P : 267VAC<br><br>VDS :<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>(3)Full load continue<br>Ta : 25°C                                  | Q100<br>VDS :<br>(1). 38.40V<br>(2). 33.40V<br>(3). 35.80V                                                            |
| 3  | Input Capacitor      | C5 Rated : 56uf 400V                                                           | I/P : 267VAC<br>O/P : (1)Full Load Turn on /Off<br>(2)Min load Turn on /Off<br>(3)Full Load /Min load Change<br>(4)Full Load Continue<br>Ta : 25°C | (1). 354.00V<br>(2). 356.00V<br>(3). 354.00V<br>(4). 354.00V                                                          |
| 4  | Control IC           | U1 Rated : 28V (max)<br>-0.3 (min)<br><br>U100 Rated : 38V (max)<br>-0.3 (min) | I/P : 267VAC<br>O/P : (1) Full Load<br>(2)Output Short<br>(3)O.L.P<br>(4)O.V.P<br>(5)Low Line No Load Vo(min)<br>Ta : 25°C                         | U1 U100<br>(1). 20.40V 26.80V<br>(2). 13.80V 20.40V<br>(3). 20.80V 26.20V<br>(4). 24.40V 28.40V<br>(5). 18.20V 10.60V |
| 5  | Clamp Diode          | D5 Rated : 1000V 1.0A                                                          | I/P : 267VAC<br>O/P : (1)Dynamic Load Full/Min Load<br>(2)Full load continue<br>Ta : 25°C                                                          | (1). 444.00V<br>(2). 434.00V                                                                                          |

## SAFETY &amp; E.M.C. TEST

## SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION            | TEST CONDITION                       | RESULT                         |
|----|----------------------|--------------------------|--------------------------------------|--------------------------------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P : 4.000KVAC /min | I/P-O/P: 4.250KVAC /min<br>Ta : 25°C | I/P-O/P: 0.95mA<br>NO DAMAGE   |
| 2  | ISOLATION RESISTANCE | I/P-O/P : 500VDC>100MΩ   | I/P-O/P: 500VDC<br>Ta : 25°C/70%RH   | I/P-O/P: 9999.0MΩ<br>NO DAMAGE |

## E.M.C. TEST

| NO | TEST ITEM | SPECIFICATION          | TEST CONDITION                                     | RESULT |
|----|-----------|------------------------|----------------------------------------------------|--------|
| 1  | HARMONIC  | EN61000-3-2<br>CLASS A | I/P : 230VAC /50HZ<br>O/P : FULL LOAD<br>Ta : 25°C | PASS   |



# 30W High Reliable Green Medical On Board Type MFM-30 series

|   |            |                                         |                                                               |                               |
|---|------------|-----------------------------------------|---------------------------------------------------------------|-------------------------------|
| 2 | CONDUCTION | EN55011<br>CLASS B                      | I/P : 230VAC /50HZ<br>O/P : FULL LOAD / 50% LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab |
| 3 | RADIATION  | EN55015<br>CLASS B                      | I/P : 230VAC /50HZ<br>O/P : FULL LOAD<br>Ta : 25°C            | PASS<br>Test by certified Lab |
| 4 | E.S.D      | EN61000-4-2<br>AIR: 15KV / Contact: 8KV | I/P : 230VAC /50HZ<br>O/P : FULL LOAD<br>Ta : 25°C            | CRITERIA A                    |
| 5 | E.F.T      | EN61000-4-4<br>INDUSTRY INPUT: 2KV      | I/P : 230VAC /50HZ<br>O/P : FULL LOAD<br>Ta : 25°C            | CRITERIA A                    |
| 6 | SURGE      | EN61000-4-5<br>MEDICAL LINE-LINE:1KV    | I/P : 230VAC /50HZ<br>O/P : FULL LOAD<br>Ta : 25°C            | CRITERIA A                    |

## RELIABILITY TEST

| NO |                                                        | TEST ITEM                                                                                                                                                                                                                                                                                                                                  | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TEST CONDITION     | RESULT             |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|----|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|------------------------|----------|--------------------|------------------------|---|-----|-------|-------|---|-----|-------|-------|---|----|-------|-------|---|-----|-------|-------|---|-----|-------|-------|---|----|-------|-------|---|---------|-------|-------|---|------|-------|-------|---|------|-------|-------|----|------|-------|-------|----|----|-------|-------|----|----|-------|-------|----|----|-------|-------|----|-----|-------|-------|----|----|-------|-------|--|--|
| 1  | TEMPERATURE RISE TEST                                  |                                                                                                                                                                                                                                                                                                                                            | MODEL : MFM-30-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 1. ROOM AMBIENT BURN-IN : 1.0hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | IP: 230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | O/P: 100% LOAD     | TA= 25.2℃          |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 2. HIGH AMBIENT BURN-IN : 1.0hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | IP: 230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | O/P: 100% LOAD     | TA= 61.2℃          |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | <table><tr><td>NO.</td><td>Position</td><td>ROOM AMBIENT 25.2℃</td><td>HIGH AMBIENT Ta: 61.2℃</td></tr><tr><td>1</td><td>LF1</td><td>40.6℃</td><td>72.6℃</td></tr><tr><td>2</td><td>LF2</td><td>46.3℃</td><td>75.2℃</td></tr><tr><td>3</td><td>C5</td><td>49.7℃</td><td>78.6℃</td></tr><tr><td>4</td><td>C40</td><td>61.6℃</td><td>84.0℃</td></tr><tr><td>5</td><td>BD1</td><td>63.9℃</td><td>89.7℃</td></tr><tr><td>6</td><td>R7</td><td>67.9℃</td><td>84.9℃</td></tr><tr><td>7</td><td>T1 COIL</td><td>83.4℃</td><td>97.1℃</td></tr><tr><td>8</td><td>Q100</td><td>86.0℃</td><td>92.7℃</td></tr><tr><td>9</td><td>C105</td><td>80.2℃</td><td>92.1℃</td></tr><tr><td>10</td><td>L100</td><td>57.3℃</td><td>78.8℃</td></tr><tr><td>11</td><td>Q1</td><td>68.0℃</td><td>91.8℃</td></tr><tr><td>12</td><td>U1</td><td>62.3℃</td><td>83.5℃</td></tr><tr><td>13</td><td>D5</td><td>77.4℃</td><td>89.1℃</td></tr><tr><td>14</td><td>R40</td><td>60.7℃</td><td>90.6℃</td></tr><tr><td>60</td><td>TA</td><td>25.2℃</td><td>61.2℃</td></tr></table> |                    |                    | NO.                    | Position | ROOM AMBIENT 25.2℃ | HIGH AMBIENT Ta: 61.2℃ | 1 | LF1 | 40.6℃ | 72.6℃ | 2 | LF2 | 46.3℃ | 75.2℃ | 3 | C5 | 49.7℃ | 78.6℃ | 4 | C40 | 61.6℃ | 84.0℃ | 5 | BD1 | 63.9℃ | 89.7℃ | 6 | R7 | 67.9℃ | 84.9℃ | 7 | T1 COIL | 83.4℃ | 97.1℃ | 8 | Q100 | 86.0℃ | 92.7℃ | 9 | C105 | 80.2℃ | 92.1℃ | 10 | L100 | 57.3℃ | 78.8℃ | 11 | Q1 | 68.0℃ | 91.8℃ | 12 | U1 | 62.3℃ | 83.5℃ | 13 | D5 | 77.4℃ | 89.1℃ | 14 | R40 | 60.7℃ | 90.6℃ | 60 | TA | 25.2℃ | 61.2℃ |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Position           | ROOM AMBIENT 25.2℃ | HIGH AMBIENT Ta: 61.2℃ |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LF1                | 40.6℃              | 72.6℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | LF2                | 46.3℃              | 75.2℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C5                 | 49.7℃              | 78.6℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C40                | 61.6℃              | 84.0℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BD1                | 63.9℃              | 89.7℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | R7                 | 67.9℃              | 84.9℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | T1 COIL            | 83.4℃              | 97.1℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Q100               | 86.0℃              | 92.7℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C105               | 80.2℃              | 92.1℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | L100               | 57.3℃              | 78.8℃                  |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 11 | Q1                                                     | 68.0℃                                                                                                                                                                                                                                                                                                                                      | 91.8℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 12 | U1                                                     | 62.3℃                                                                                                                                                                                                                                                                                                                                      | 83.5℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 13 | D5                                                     | 77.4℃                                                                                                                                                                                                                                                                                                                                      | 89.1℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 14 | R40                                                    | 60.7℃                                                                                                                                                                                                                                                                                                                                      | 90.6℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 60 | TA                                                     | 25.2℃                                                                                                                                                                                                                                                                                                                                      | 61.2℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 2  | OVER LOAD BURN-IN TEST                                 | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                | I/P : 230VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TEST : OK          |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
|    |                                                        |                                                                                                                                                                                                                                                                                                                                            | O/P : 144.0% LOAD<br>Ta : 25℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 3  | LOW TEMPERATURE TURN ON TEST                           | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                | I/P : 264VAC / 100VAC<br>O/P : FULL LOAD<br>Ta : -40.0℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TEST : OK          |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 60℃<br>NO DAMAGE                                                                                                                                                                                                                                                                                | I/P : 272VAC<br>O/P : FULL LOAD<br>Ta : 60℃<br>HUMIDITY= 95.0% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | TEST : OK          |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 5  | TEMPERATURE COEFFICIENT                                | ±0.03% /℃(0~60℃)                                                                                                                                                                                                                                                                                                                           | I/P : 230VAC<br>O/P : FULL LOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ±0.0055% /℃(0~60℃) |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 6  | STORAGE TEMPERATURE TEST                               | 1. Thermal shock Temperature : -45℃ ~ +90℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition : STATIC                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TEST : OK          |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |
| 7  | THERMAL SHOCK TEST                                     | 1. Thermal shock Temperature : -45℃ ~ 65℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 16 CYCLE<br>5. Input/Output condition :<br>230VAC Full Load AC ON/OFF test turn on 3sec ; turn off 1sec @ 15CYCLE<br>230VAC Full Load AC ON turn on continue @ 1CYCLE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TEST : OK          |                    |                        |          |                    |                        |   |     |       |       |   |     |       |       |   |    |       |       |   |     |       |       |   |     |       |       |   |    |       |       |   |         |       |       |   |      |       |       |   |      |       |       |    |      |       |       |    |    |       |       |    |    |       |       |    |    |       |       |    |     |       |       |    |    |       |       |  |  |



# 30W High Reliable Green Medical On Board Type MFM-30 series

|    |                              |                                                                                                                                                                                                                                                                        |                                                                              |
|----|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 8  | VIBRATION TEST               | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(4) Acceleration : 3G<br>(5) Test Time : 60min in each axis (X.Y.Z)<br>(6) Ta : 25°C                                                                                                       | TEST : OK                                                                    |
| 9  | CAPACITOR LIFE CYCLE         | :SUPPOSE C105 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25°C LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta= 60°C LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta= 60°C LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 60°C LIFE TIME | (1). 56962.2 HRS<br>(2). 32909.3 HRS<br>(3). 42198.7 HRS<br>(4). 69229.4 HRS |
| 10 | MTBF                         | Conducted by Parts Stress Analysis Prediction<br>779Khrs min. MIL-HDBK-217F (25°C)                                                                                                                                                                                     |                                                                              |
| 11 | DMTBF /Accelerated Life test | Demonstration Mean Time Between Failure (Expected Life): 30000HRS @ TA 60°C                                                                                                                                                                                            |                                                                              |

|             |        |        |          |
|-------------|--------|--------|----------|
| TEST RESULT | TESTER | REVIEW | APPROVAL |
| PASS        | LIUTT  |        | WANGDZ   |