



Efficiency Through Technology

**RELIABILITY REPORT
2008**

Power Semiconductor Devices

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QUALITY AND RELIABILITY

IXYS is committed to setting a new standard for excellence in Power Semiconductors. Reflecting our dedication to industry leadership in the manufacture of medium to high power devices, reliability has assumed a primary position in raw material selection, design, and process technology.

Reliability utilizes information derived from applied research, engineering design, analysis of field applications and accelerated stress testing and integrates this knowledge to optimize device design and manufacturing processes.

All areas that impact reliability have received considerable attention in order to achieve our goal to be the # 1 Reliability Supplier of Power Semiconductor products. We believe IXYS products should be the most reliable components in your system.

We have committed significant resources to continuously improve and optimize our device design, wafer fab processes, assembly processes and test capabilities. As a result of this investment, IXYS has realized a dramatic improvement in reliability performance on all standardized tests throughout the product line.

Excellence in product reliability is "built-in", not tested-in. Moreover, it requires a total systems approach, involving all parties: from design to raw materials to manufacturing.

In addition to qualifying new products released to the market, life and environmental tests are periodically performed on standard products to maintain feedback on assembly and fabrication performance to assure product reliability. Further information on reliability of power devices is provided on www.ixys.com.

RELIABILITY TESTS

High Temperature Reverse Bias (HTRB)

Failure Modes: Gradual degradation of break-down characteristics due to presence of foreign materials and polar/ionic contaminants disturbing the electric field termination structure.

Sensitive Parameters: BV_{DSS} , BV_{CES} , V_{DRRM} , V_{RRM} , I_{DSS} , I_{CES} , I_{DRM} , I_{RRM} , V_{TH} .

High Temperature Gate Bias (HTGB)

Failure Modes: Rupture of the gate oxide due to localized thickness variations, structural anomalies, particulates in the oxide, channel inversion due to presence of mobile ions in the gate oxide.

Sensitive Parameters: I_{GSS} , I_{GES} , V_{TH} , I_{DSS} , I_{CES} .

Temperature Cycle

Failure modes: Thermal fatigue of silicon-metal and metal-metal interfaces due to heating and cooling, causing thermal and electrical performance degradation.

Sensitive Parameters: R_{thJC} , $R_{DS(on)}$, $V_{CE(sat)}$, V_T , V_F .

Humidity Test

Failure Modes: Degradation of electrical leakage characteristics due to moisture penetration into plastic packages.

Sensitive Parameters: BV_{DSS} , BV_{CES} , V_{DRRM} , V_{RRM} , I_{DSS} , I_{CES} , I_{DRM} , I_{RRM} , I_{GSS} , I_{GES} , V_{TH} .

Power Cycle

Failure Modes: Thermal fatigue of silicon-metal and metal-metal interfaces due to heating and cooling can cause thermal and electrical performance degradation.

Sensitive Parameters: R_{thJC} , $R_{DS(on)}$, $V_{CE(sat)}$, V_T , V_F , I_{DSS} , I_{CES} , I_{DRM} , I_{RRM} , BV_{DSS} , BV_{CES} , V_{DRRM} , V_{RRM} .

TERMS IN TABLES

SUMMARY TABLES 1 AND 2:

AF: acceleration factor

$$AF = \exp \left\{ Ea \cdot \left[\frac{T_2 - T_1}{T_2 \cdot T_1} \right] / k \right\} \quad (1)$$

Ea: activation energy; @ HTRB Ea = 1.0 eV

@ HTGB Ea = 0.4 eV

k: Boltzmann's constant $8.6 \cdot 10^{-5}$ eV/K

T₁: abs. application junction temperature (273+T_j) K

T₂: abs. test junction temperature (273+T_j) K

UCL: upper confidence limit (60%)

Total Failures @ 60% UCL:

$$N = r + dr \quad (2)$$

r: number of failed devices

dr: additional term, depending on both r and UCL

MTTF: Mean Time To Failures = 1/Failure Rate

FIT: 1 FIT = 1 failure / 10⁹ hrs

TABLES 3:

ΔT: max T_j - min T_j during Test

DEFINITION OF FAILURE

Failure criteria are defined according to IEC 60747 standard series

Summary of Tables 1A - 1H: HTRB

| | Table 1A MOSFET/IGBT discrete device *) | Table 1B MOSFET/IGBT Module | Table 1C Thyr./Diode Module | Table 1D Controller/ Rec. Bridge*) | Table 1E FRED *) | Table 1F Schottky Diode*) | Table 1G Thyr./Diode discrete device*) | Table 1H ISOPLUS |
|----------------------------------------------------|------------------------------------------------------|------------------------------------------|------------------------------------------|-------------------------------------------------|-------------------------------|----------------------------------------|-----------------------------------------------------|----------------------------|
| Failure Rate [FIT] 125°C, 60% UCL | 592 | 12483 | 45956 | 17190 | 1939 | 845 | 16855 | - |
| Failure Rate [FIT] 90°C, 60% UCL | 35 | 747 | 2752 | 1029 | 116 | 51 | 1009 | - |
| Total Lots Tested | 169 | 13 | 15 | 17 | 35 | 24 | 12 | 20 |
| Total Devices Tested | 4932 | 116 | 160 | 170 | 645 | 570 | 210 | 456 |
| Total Actual Failures | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| 60% UCL {eq. (2)} | 3 | 0.92 | 2 | 0.92 | 0.92 | 0.92 | 2 | - |
| Total Equivalent Device Hours @ 125°C {AF eq. (1)} | 5066720 | 73702 | 43520 | 53520 | 474548 | 1089301 | 118658 | 465622 |
| MTTF 125°C 60% UCL | 193 | 9 | 2 | 7 | 59 | 135 | 7 | - |
| (Years) 90°C 60% UCL | 3220 | 153 | 41 | 111 | 983 | 2257 | 113 | - |

Summary of Table 2A - 2C: HTGB

| | Table 2A MOSFET/IGBT discrete device *) | Table 2B MOSFET/IGBT Module | Table 2C ISOPLUS |
|----------------------------------------------------|------------------------------------------------------|------------------------------------------|----------------------------|
| Failure Rate [FIT] 125°C, 60% UCL | 231 | 4606 | - |
| Failure Rate [FIT] 90°C, 60% UCL | 75 | 1486 | - |
| Total Lots Tested | 138 | 15 | 15 |
| Total Devices Tested | 4030 | 210 | 460 |
| Total Actual Failures | 0 | 0 | 0 |
| 60% UCL {eq. (2)} | 0.92 | 0.92 | - |
| Total Equivalent Device Hours @ 125°C {AF eq. (1)} | 3976960 | 199740 | 506800 |
| MTTF 125°C 60% UCL | 493 | 25 | - |
| (Years) 90°C 60% UCL | 1530 | 77 | - |

*) including ISOPLUS

Summary of Tables 3A - 3H: Power Cycle

| | Table 3A MOSFET/IGBT discrete device *) | Table 3B MOSFET/IGBT Module | Table 3C Thyr./Diode Module | Table3D Controller/ Rec. Bridge*) | Table 3E FRED *) | Table 3F Schottky Diode*) | Table 3G Thyr./Diode discrete device*) | Table 3H Isoplus |
|----------------------|------------------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------------|-------------------------------|----------------------------------------|-----------------------------------------------------|----------------------------|
| Total Lots Tested | 15 | 7 | 5 | 5 | 10 | 6 | 9 | 2 |
| Total Devices Tested | 344 | 139 | 50 | 50 | 190 | 224 | 140 | 100 |
| Total Failures | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Device Cycles | 2960000 | 751300 | 850000 | 370000 | 410000 | 1520088 | 380000 | 280000 |

Summary of Tables 4A - 4J: Temperature Cycle

| | Table 4A MOSFET/IGBT discrete device *) | Table 4B MOSFET/IGBT Module | Table 4C Thyr./Diode Module | Table4D Controller/ Rec. Bridge*) | Table 4E FRED *) | Table 4F Schottky Diode*) | Table 4G Thyr./Diode discrete device*) | Table 4H Isoplus | Table 4J Breakover Diode |
|----------------------|------------------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------------|-------------------------------|----------------------------------------|-----------------------------------------------------|----------------------------|---------------------------------------|
| Total Lots Tested | 13 | 12 | 27 | 20 | 25 | 19 | 17 | 18 | 4 |
| Total Devices Tested | 353 | 119 | 290 | 210 | 450 | 614 | 300 | 532 | 80 |
| Total Failures | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Device Cycles | 135700 | 8400 | 19500 | 14900 | 29900 | 302000 | 14300 | 198200 | 4000 |

Summary of Tables 5A, 5E - 5J: Humidity Test

| | Table 5A MOSFET/IGBT discrete device *) | Table 5E FRED *) | Table 5F Schottky Diode*) | Table 5G Thyr./Diode discrete device*) | Table 5H Isoplus | Table 5J Breakover Diode |
|----------------------|------------------------------------------------------|-------------------------------|----------------------------------------|-----------------------------------------------------|----------------------------|---------------------------------------|
| Total Lots Tested | 4 | 8 | 9 | 3 | 2 | 4 |
| Total Devices Tested | 80 | 138 | 294 | 60 | 40 | 80 |
| Total Failures | 0 | 0 | 1 | 0 | 0 | 0 |
| Total Device Cycles | 24800 | 11088 | 64384 | 3840 | 1920 | 3840 |

*) including ISOPLUS

HTRB (Tables 1A .. 1J)

| TABLE 1A: MOSFET/IGBT single device | | | | | | | | | |
|-------------------------------------|-----------------|---------------------------|----------------|---------------|---------------|----------------|----------|--------------|--------|
| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours | Remark |
| | | | | | | | | [hrs] | |
| 1 | IXBH16N170 | TP0619 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 2 | IXBH16N170 | TP0619 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 3 | IXBH40N160 | 1513 | 1280 | 125 | 168 | 20 | 0 | 3360 | |
| 4 | IXDH20N120 | 1436 | 960 | 125 | 168 | 20 | 0 | 3360 | |
| 5 | IXDH20N120D1 | 2065 | 960 | 125 | 168 | 20 | 0 | 3360 | |
| 6 | IXEH28N60C2D2 | 1578 | 600 | 125 | 1000 | 20 | 0 | 20000 | |
| 7 | IXFA7N80P | K533 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 8 | IXFB100N50P | SP0737 | 460 | 125 | 1000 | 30 | 0 | 30000 | |
| 9 | IXFB44N100P | SP0721 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 10 | IXFH12N120P | SP0715 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 11 | IXFH15N100P | SK0636 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 12 | IXFH20N100P | SP0716 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 13 | IXFH20N60 | SK0544 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 14 | IXFH22N50P | N/A | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 15 | IXFH26N60Q | SK0604 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 16 | IXFH69N30P | SK0527 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 17 | IXFK21N100Q | SP0737 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 18 | IXFK44N55Q | SP0737 | 440 | 125 | 1000 | 30 | 0 | 30000 | |
| 19 | IXFL60N80P | SP0605 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 20 | IXFN82N60P | TJ0645E | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 21 | IXFP12N50PM | K550 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 22 | IXFQ14N80P | SK0709 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 23 | IXFR12N100Q | TP0703 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 24 | IXFR14N100Q2 | SP0732 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 25 | IXFR26N100P | SP0742 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 26 | IXFX48N50Q | ZP0545 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 27 | IXFX73N30Q | SK0613 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 28 | IXFX90N30 | SK0613 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 29 | IXGH20N170P | K0716E1 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 30 | IXGH20N170P | TP0632 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 31 | IXGH25N250 | TJ0600E | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 32 | IXGH28N60B3D1 | SP0732 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 33 | IXGH30N120B3 | TP0606 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 34 | IXGH36N60B3D1 | SP0732 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 35 | IXGH48N60B3 | SK0607 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 36 | IXGH64N60B3 | SK0608 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 37 | IXGH72N60B3 | SK0608 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 38 | IXGH8N100 | N/N | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 39 | IXGK28N140B3H1 | TP0651 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 40 | IXGN200N60A2 | SP0723 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 41 | IXGP120N33TBM-A | K723 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 42 | IXGP50N33TC | K0652 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 43 | IXGP70N33TBM-A | K726 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 44 | IXGP70N33TBM-A | K728 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 45 | IXGP90N33TB | K06251 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 46 | IXGP90N33TBM-A | K06251 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 47 | IXGQ120N30TCD1 | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 48 | IXGQ120N33TB | SK0651 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 49 | IXGQ120N33TCD1 | SK0639 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 50 | IXGQ150N30TCD1 | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 51 | IXGQ150N33TCD1 | SK0639 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 52 | IXGQ160N30PB | SK0601 | 240 | 125 | 1000 | 60 | 0 | 60000 | |
| 53 | IXGQ160N30PB | SK0601 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 54 | IXGQ160N30PB | SK0601 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 55 | IXGQ160N30PB | SK0601 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 56 | IXGQ180N33TB | SK0711 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 57 | IXGQ180N33TC | SK0649 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 58 | IXGQ180N33TCD1 | SK0639 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 59 | IXGQ200N30PB | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 60 | IXGQ240N30PB | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |

TABLE 1A (cont'd): MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|-----|---------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------------------------|
| 61 | IXGQ240N30PB | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 62 | IXGQ240N30PB | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 63 | IXGQ240N30PB | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 64 | IXGQ70N33TB | SK0650 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 65 | IXGQ85N33PCD1 | SK0613 | 264 | 125 | 1000 | 27 | 0 | 27000 | |
| 66 | IXGQ85N33PCD1 | SK0638 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 67 | IXGQ86N30PB | K0543 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 68 | IXGQ90N27PB | SK0621 | 216 | 125 | 1000 | 30 | 0 | 30000 | |
| 69 | IXGQ90N27PB | SK0640 | 216 | 125 | 1000 | 30 | 0 | 30000 | |
| 70 | IXGQ90N30TCD1 | SK0631 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 71 | IXGQ90N33TC | SK0649 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 72 | IXGQ90N33TCD1 | SK0639 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 73 | IXGQ90N33TCD1 | SK0728 | 264 | 125 | 1000 | 30 | 0 | 30000 | |
| 74 | IXGR120N60C2 | SP0722 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 75 | IXGR48N60C3D1 | SP0722 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 76 | IXGX120N60B | SP0719 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 77 | IXGX72N60B3H1 | SP0739 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 78 | IXKC13N80C | 1769 | 640 | 125 | 1000 | 20 | 0 | 20000 | |
| 79 | IXKC25N80C | 1590 | 640 | 125 | 1000 | 20 | 0 | 20000 | |
| 80 | IXKH20N60C5 | 1631 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 81 | IXKH35N60CS | 1984 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 82 | IXKH35N60CS | 1986 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 83 | IXKP10N60C5M | 1693 | 480 | 150 | 1000 | 20 | 0 | 20000 | |
| 84 | IXKP13N60C5M | 1716 | 480 | 150 | 1000 | 20 | 0 | 20000 | |
| 85 | IXKP20N60C5 | 1653 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 86 | IXKP24N60C5 | 1671 | 480 | 150 | 800 | 20 | 0 | 16000 | |
| 87 | IXKR25N80C | 1521 | 640 | 125 | 168 | 20 | 0 | 3360 | |
| 88 | IXKT70N60C5 | 2068 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 89 | IXSH30N60B2D1 | SP0506 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 90 | IXSK40N60CD1 | SK0722 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 91 | IXTA36N30P | SK0603 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 92 | IXTA36N30P | K0621 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 93 | IXTA36N30P | K640 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 94 | IXTA50N25T | K545 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 95 | IXTA50N28T | K0606 | 224 | 125 | 1000 | 30 | 2 | 30000 | no deviations after 168h |
| 96 | IXTA50N28T | K634 | 224 | 125 | 1000 | 30 | 0 | 30000 | |
| 97 | IXTA50N28T | K640 | 224 | 125 | 1000 | 30 | 0 | 30000 | |
| 98 | IXTA60N20T | K545 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 99 | IXTA60N20T | SK0601 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 100 | IXTA75N10P | K0531 | 80 | 125 | 1000 | 30 | 0 | 30000 | |
| 101 | IXTA76N25T | K0704 | 200 | 125 | 1000 | 25 | 0 | 25000 | |
| 102 | IXTC110N25T | SP0721 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 103 | IXTC200N075T | SP0627 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 104 | IXTH130N20T | SP0721 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 105 | IXTH150N17T | SK0718 | 140 | 125 | 1000 | 30 | 0 | 30000 | |
| 106 | IXTH160N15T | SK0721 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 107 | IXTH1N80P | TP0604 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 108 | IXTH30N50L | TK0738 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 109 | IXTH3N100P | TP0639 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 110 | IXTH76N25T | SP0613 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 111 | IXTH86N25T | SP0638 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 112 | IXTH8P50 | SK0712 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 113 | IXTK180N15P | SP0552 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 114 | IXTK34N80 | SP0546 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 115 | IXTK34N80 | SP0603 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 116 | IXTK34N80 | SP0603 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 117 | IXTP08N100P | K625 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 118 | IXTP08N120P | K0709 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 119 | IXTP14N60PM | K631 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 120 | IXTP14N60PM | K643 | 480 | 125 | 1000 | 30 | 0 | 30000 | |

TABLE 1A (cont'd): MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|-----|---------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 121 | IXTP160N075T | K0707 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 122 | IXTP17N30T | K648 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 123 | IXTP18N60PM | K631 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 124 | IXTP1N100P | K636 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 125 | IXTP1R4N100P | K636 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 126 | IXTP1R4N120P | K638 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 127 | IXTP2R4N120P | K636 | 960 | 125 | 1000 | 30 | 0 | 30000 | |
| 128 | IXTP32N20T | K647 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 129 | IXTP36N15T | K648 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 130 | IXTP36N25T | K636 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 131 | IXTP36N30T | K641 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 132 | IXTP44N25T | K636 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 133 | IXTP50N25T | K738 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 134 | IXTP56N15T | K636 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 135 | IXTP62N25T | K648 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 136 | IXTP74N15T | K636 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 137 | IXTP76N075T | K640 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 138 | IXTP76N075T | K726 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 139 | IXTP76N075T | SS0728 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 140 | IXTP8N50P | K646 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 141 | IXTP8N50P | AK732 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 142 | IXTP90N15T | K647 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 143 | IXTQ182N055T | SK0612 | 44 | 125 | 1000 | 30 | 0 | 30000 | |
| 144 | IXTQ22N50P | SS0633 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 145 | IXTQ22N60P | SK0539 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 146 | IXTQ22N60P | SK0604 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 147 | IXTQ22N60P | SK0609 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 148 | IXTQ22N60P | SK0608 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 149 | IXTQ22N60P | SK0608 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 150 | IXTQ22N60P | SK0609 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 151 | IXTQ22N60P | SK0609 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 152 | IXTQ26N50P | SK0604 | 400 | 125 | 1000 | 30 | 0 | 30000 | |
| 153 | IXTQ28N15P | SK0653 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 154 | IXTQ36P15P | SK0652 | 120 | 125 | 1000 | 30 | 0 | 30000 | |
| 155 | IXTQ44N30T | SK0629 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 156 | IXTQ64N25P | SK0535 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 157 | IXTQ74N20P | SK0515 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 158 | IXTQ76N25T | SK0613 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 159 | IXTQ82N25T | SK0603 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 160 | IXTQ88N28T | SK0545 | 224 | 125 | 1000 | 30 | 0 | 30000 | |
| 161 | IXTQ88N28T | SK0641 | 224 | 125 | 1000 | 30 | 0 | 30000 | |
| 162 | IXTQ88N30P | SK0605 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 163 | IXTQ88N30T | SK0638 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 164 | IXTQ96N20P | SS0631 | 160 | 125 | 1000 | 30 | 0 | 30000 | |
| 165 | IXTQ96N25T | SK0648 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 166 | IXTT88N30P | SP0626 | 240 | 125 | 1000 | 30 | 0 | 30000 | |
| 167 | IXTV18N60PS | SP0636 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 168 | IXTV230N085TS | SP0629 | 68 | 125 | 1000 | 30 | 0 | 30000 | |
| 169 | IXUC200N055 | 1594 | 44 | 125 | 1000 | 20 | 0 | 20000 | |

TABLE 1B: MOSFET/IGBT Module

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|----------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|------------------|
| 1 | GWM160-0055P3 | 1524 | 240 | 150 | 168 | 6 | 0 | 1008 | |
| 2 | MIAA20WD600TMH | 1844 | 1120 | 125 | 1000 | 10 | 0 | 10000 | Konverter tested |
| 3 | MIAA20WD600TMH | 1844 | 480 | 125 | 1000 | 10 | 0 | 10000 | Inverter tested |
| 4 | MID145-12A3 | 2031 | 960 | 125 | 168 | 10 | 0 | 1680 | |
| 5 | MKI75-06A7T | 1847 | 480 | 125 | 168 | 10 | 0 | 1680 | |
| 6 | MKI80-06T6K | 1818 | 480 | 125 | 168 | 10 | 0 | 1680 | |
| 7 | MUBW36-12E7 | 1898 | 960 | 125 | 1000 | 10 | 0 | 10000 | |
| 8 | MUBW50-12T8 | 1777 | 960 | 125 | 1000 | 10 | 0 | 10000 | |
| 9 | MUBW75-17T8 | 2001 | 1540 | 125 | 1000 | 5 | 0 | 5000 | |
| 10 | MUBW75-17T8 | 2001 | 1360 | 125 | 1000 | 5 | 0 | 5000 | |
| 11 | MWI150-12T8T | 1897 | 960 | 125 | 1000 | 10 | 0 | 10000 | |
| 12 | MWI30-06A7T | 2069 | 480 | 125 | 168 | 10 | 0 | 1680 | |
| 13 | VMO60-05F | 1552 | 400 | 125 | 168 | 10 | 0 | 1680 | |

TABLE 1C: Thyristor/Diode Module

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|--------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|-----------------|
| 1 | MCC132-16io1 | 1509 | 1120 | 125 | 1000 | 10 | 0 | 10000 | |
| 2 | MCC132-16io1 | 1980 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 3 | MCC162-08io1 | 1624 | 800 | 126 | 168 | 20 | 0 | 3360 | |
| 4 | MCC162-16io1 | 1593 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 5 | MCC21-16io8 | 1812 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 6 | MCC26-16io1 | 1539 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 7 | MCC310-16 | 1696 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 8 | MCC312-16 | 2028 | 1120 | 125 | 1000 | 10 | 1 | 10000 | I_R @ increased |
| 9 | MCC44-16io1 | 1747 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 10 | MCC44-16io1 | 2006 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 11 | MCC95-16io1 | 1701 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 12 | MCC95-16io1 | 1862 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 13 | MCD56-16io1 | 1587 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 14 | MDD172-16n1 | 1554 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 15 | MDD95-16 | 2032 | 1120 | 125 | 168 | 10 | 0 | 1680 | |

TABLE 1D: Controller/Rectifier Bridge

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|--------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | MMO75-16io1 | 1727 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 2 | MMO90-16 | 1710 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 3 | VBO19-16DT1 | 2011 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 4 | VBO19-16DT1 | 1584 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 5 | VBO40-16NO6 | 1860 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 6 | VHF36-16io5 | 1542 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 7 | VHF36-16io5 | 1732 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 8 | VUB72-16 | 1657 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 9 | VUB72-16No1 | 2004 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 10 | VUB72-16No1 | 2004 | 960 | 125 | 168 | 10 | 0 | 1680 | |
| 11 | VUB72-16No1 | 2004 | 960 | 125 | 168 | 10 | 0 | 1680 | |
| 12 | VUO190-18NO7 | 2026 | 1260 | 125 | 1000 | 10 | 0 | 10000 | |
| 13 | VUO25-16NO8 | 1581 | 1120 | 125 | 168 | 10 | 0 | 1680 | |
| 14 | VUO31-18 | 1863 | 1260 | 125 | 1000 | 10 | 0 | 10000 | |
| 15 | VUO34-18NO1 | 1861 | 1260 | 125 | 168 | 10 | 0 | 1680 | |
| 16 | VVO140-16 | 1684 | 1120 | 125 | 1000 | 10 | 0 | 10000 | |
| 17 | VY40-16io1 | 1745 | 1120 | 125 | 168 | 10 | 0 | 1680 | |

TABLE 1E: FRED

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|--------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | DHF30IM600PN | 1508 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 2 | DHF30IM600QB | 1625 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 3 | DHG10I1200PM | 1682 | 960 | 125 | 1000 | 20 | 0 | 20000 | |
| 4 | DHG10I600PM | 1685 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 5 | DHG20C600QB | 1711 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 6 | DHG30I1200HA | 1652 | 960 | 125 | 1000 | 20 | 0 | 20000 | |
| 7 | DHG30I1200HA | 1734 | 960 | 125 | 1000 | 20 | 0 | 20000 | |
| 8 | DHG40C1200HB | 1903 | 960 | 125 | 1000 | 20 | 0 | 20000 | |
| 9 | DHG40C600PB | 2037 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 10 | DHG60C600HB | 1668 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 11 | DPG15I400PM | 1770 | 320 | 125 | 1000 | 20 | 0 | 20000 | |
| 12 | DPG20C200PN | 1692 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 13 | DPG20C400PN | 1768 | 320 | 125 | 1000 | 20 | 0 | 20000 | |
| 14 | DPG30C300HB | 1644 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 15 | DPG30C300PB | 1923 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 16 | DPG60C200QB | 1608 | 160 | 125 | 1000 | 20 | 0 | 20000 | |
| 17 | DPG60C300HB | 1525 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 18 | DPG60C300QB | 1481 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 19 | DPG60C400QB | 1446 | 320 | 125 | 1000 | 20 | 0 | 20000 | |
| 20 | DPG60IM300PC | 1643 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 21 | DSEC60-02Aq | 1929 | 160 | 125 | 168 | 20 | 0 | 3360 | |
| 22 | DSEI2x31-06C | 1563 | 480 | 125 | 168 | 10 | 0 | 1680 | |
| 23 | DSEI2x61-12B | 1607 | 960 | 125 | 168 | 10 | 0 | 1680 | |
| 24 | DSEP15-06A | 2020 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 25 | DSEP29-03 | 1954 | 240 | 125 | 168 | 20 | 0 | 3360 | |
| 26 | DSEP29-06A | 1736 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 27 | DSEP2x61-12A | 1984 | 960 | 125 | 168 | 10 | 0 | 1680 | |
| 28 | DSEP30-06BR | 1952 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 29 | DSEP30-12AR | 1634 | 960 | 125 | 168 | 20 | 0 | 3360 | |
| 30 | DSEP60-03A | 1537 | 240 | 125 | 168 | 20 | 0 | 3360 | |
| 31 | DSEP60-06A | 1572 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 32 | DSEP75-06AR | 1619 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 33 | DSEP8-03AS | 1738 | 240 | 125 | 1000 | 20 | 0 | 20000 | |
| 34 | MEO450-12 | 1826 | 960 | 125 | 186 | 6 | 0 | 1116 | |
| 35 | MEO500-06DA | 1934 | 480 | 125 | 168 | 9 | 0 | 1512 | |

TABLE 1F: Schottky Diode

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|--------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | DSA120C150QB | 1507 | 150 | 125 | 1000 | 20 | 0 | 20000 | |
| 2 | DSA120C150QB | 1907 | 150 | 125 | 1000 | 20 | 0 | 20000 | |
| 3 | DSA30C100HB | 1981 | 100 | 125 | 1000 | 20 | 0 | 20000 | |
| 4 | DSA30C100PN | 1906 | 100 | 125 | 1000 | 20 | 0 | 20000 | |
| 5 | DSA30C45HB | 1714 | 45 | 125 | 1000 | 20 | 0 | 20000 | |
| 6 | DSA60C100PB | 1781 | 100 | 125 | 1000 | 16 | 0 | 16000 | |
| 7 | DSA70C100HB | 1782 | 100 | 125 | 1000 | 20 | 0 | 20000 | |
| 8 | DSA90C200HB | 1674 | 200 | 125 | 1000 | 20 | 0 | 20000 | |
| 9 | DSB10I45PM | 1942 | 45 | 100 | 1000 | 20 | 0 | 20000 | |
| 10 | DSB15IM45IB | 1622 | 36 | 100 | 1000 | 20 | 0 | 20000 | |
| 11 | DSB30C30PB | 1718 | 24 | 100 | 1000 | 20 | 0 | 20000 | |
| 12 | DSB30C45PB | 1783 | 36 | 100 | 1000 | 20 | 0 | 20000 | |
| 13 | DSB30C60PB | 1672 | 60 | 125 | 1000 | 20 | 0 | 20000 | |
| 14 | DSB40C15PB | 1673 | 12 | 100 | 1000 | 20 | 0 | 20000 | |
| 15 | DSS10-0045B | 2019 | 36 | 100 | 168 | 20 | 0 | 3360 | |
| 16 | DSS20-0015B | 1871 | 12 | 100 | 1000 | 20 | 0 | 20000 | |
| 17 | DSS20-01AC | 1709 | 100 | 125 | 1000 | 20 | 0 | 20000 | |
| 18 | DSS2x41-01A | 1467 | 100 | 125 | 168 | 10 | 0 | 1680 | |
| 19 | DSS2x41-01A | 2039 | 100 | 125 | 168 | 10 | 0 | 1680 | |
| 20 | DSS6-015AS | 1723 | 150 | 150 | 1000 | 77 | 0 | 77000 | |
| 21 | DSS6-015AS | 1838 | 150 | 150 | 1000 | 77 | 0 | 77000 | |
| 22 | DSSK38-0025B | 1982 | 20 | 100 | 168 | 20 | 0 | 3360 | |
| 23 | DSSK60-015A | 1600 | 150 | 125 | 168 | 20 | 0 | 3360 | |
| 24 | DSSK60-015AR | 1857 | 150 | 125 | 168 | 20 | 0 | 3360 | |

TABLE 1G: Thyristor/Diode single device

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|----------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|-----------------|
| 1 | CS22-08io1M | 2014 | 560 | 125 | 168 | 20 | 0 | 3360 | |
| 2 | CS30-16io1 | 1855 | 1120 | 125 | 168 | 20 | 0 | 3360 | |
| 3 | CS30-16io1DCSN | 1920 | 1120 | 125 | 1000 | 20 | 1 | 20000 | I_DRM increased |
| 4 | CS35-14 | 2008 | 980 | 125 | 168 | 10 | 0 | 1680 | |
| 5 | CS45-16io1 | 1808 | 1120 | 125 | 168 | 20 | 0 | 3360 | |
| 6 | CS60-16io1 | 1830 | 1120 | 125 | 1000 | 20 | 0 | 20000 | |
| 7 | CS8-12io2 | 1605 | 1280 | 125 | 168 | 10 | 0 | 1680 | |
| 8 | DSA1-16D | 2023 | 1120 | 150 | 168 | 20 | 0 | 3360 | |
| 9 | DSA175-16B | 1858 | 1120 | 150 | 168 | 10 | 0 | 1680 | |
| 10 | DSD160-16A | 1569 | 1280 | 125 | 168 | 20 | 0 | 3360 | |
| 11 | DSP25-16 | 1564 | 1120 | 150 | 168 | 20 | 0 | 3360 | |
| 12 | DSP25-16 | 2016 | 1120 | 150 | 168 | 20 | 0 | 3360 | |

TABLE 1H: ISOPLUS

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|---------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|-----------------|
| 1 | CS45-16io1 | 1808 | 1120 | 125 | 168 | 20 | 0 | 3360 | |
| 2 | DSEP30-06BR | 1952 | 480 | 125 | 168 | 20 | 0 | 3360 | |
| 3 | DSEP30-12AR | 1634 | 960 | 125 | 168 | 20 | 0 | 3360 | |
| 4 | DSEP75-06AR | 1619 | 480 | 125 | 1000 | 20 | 0 | 20000 | |
| 5 | DSS20-01AC | 1709 | 100 | 125 | 1000 | 20 | 0 | 20000 | |
| 6 | GWM160-0055P3 | 1524 | 240 | 150 | 168 | 6 | 0 | 1008 | |
| 7 | IXEL40N400 | 1611 | 3000 | 125 | 168 | 10 | 0 | 1680 | |
| 8 | IXFL60N80P | SP0605 | 640 | 125 | 1000 | 30 | 0 | 30000 | |
| 9 | IXFR12N100Q | TP0703 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 10 | IXFR14N100Q2 | SP0732 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 11 | IXFR26N100P | SP0742 | 800 | 125 | 1000 | 30 | 0 | 30000 | |
| 12 | IXGR120N60C2 | SP0722 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 13 | IXGR48N60C3D1 | SP0722 | 480 | 125 | 1000 | 30 | 0 | 30000 | |
| 14 | IXKC13N80C | 1769 | 640 | 125 | 1000 | 20 | 0 | 20000 | |
| 15 | IXKC25N80C | 1590 | 640 | 125 | 1000 | 20 | 0 | 20000 | |
| 16 | IXKR25N80C | 1521 | 640 | 125 | 168 | 20 | 0 | 3360 | |
| 17 | IXTC110N25T | SP0721 | 200 | 125 | 1000 | 30 | 0 | 30000 | |
| 18 | IXTC200N075T | SP0627 | 60 | 125 | 1000 | 30 | 0 | 30000 | |
| 19 | IXUC200N055 | 1594 | 44 | 125 | 1000 | 20 | 0 | 20000 | |
| 20 | LKK47-06C5 | 1675 | 480 | 150 | 1000 | 20 | 1 | 20000 | I_DSS increased |

TABLE 1J: Breakover Diode

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|-------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | IXBOD1-08 | 1941 | 640 | 125 | 168 | 20 | 0 | 3360 | |
| 2 | IXBOD1-09 | 1800 | 800 | 125 | 168 | 20 | 0 | 3360 | |
| 3 | IXBOD1-10 | 1576 | 800 | 125 | 168 | 20 | 0 | 3360 | |
| 4 | IXBOD1-10 | 2096 | 800 | 125 | 168 | 20 | 0 | 3360 | |

HTGB (Tables 2A .. 2C)

| TABLE 2A: MOSFET/IGBT single device | | | | | | | | | |
|-------------------------------------|-----------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
| 1 | IXBH42N170 | TK0734 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 2 | IXDN75N120 | 1606 | 16 | 150 | 168 | 10 | 0 | 1680 | |
| 3 | IXEH25N120D1 | 1757 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 4 | IXEH40N120D1 | 1482 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 5 | IXER35N120D1 | 1950 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 6 | IXFA7N80P | K533 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 7 | IXFB100N50P | SP0737 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 8 | IXFB44N100P | SP0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 9 | IXFH12N120P | TJ1041E | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 10 | IXFH15N100P | SK0636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 11 | IXFH20N100P | SP0716 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 12 | IXFH26N60Q | SK0604 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 13 | IXFK21N100Q | SP0737 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 14 | IXFK44N55Q | SP0737 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 15 | IXFL100N50P | SP0549 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 16 | IXFL60N80P | SP0605 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 17 | IXFL82N60P | SP0550 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 18 | IXFP12N50PM | K550 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 19 | IXFQ14N80P | SK0709 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 20 | IXFR12N100Q | TP0703 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 21 | IXFR14N100Q2 | SP0732 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 22 | IXFR26N100P | TJ1159E | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 23 | IXFX73N30Q | SK0613 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 24 | IXFX90N30 | SK0613 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 25 | IXGA42N30C3 | K732 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 26 | IXGA60N30C3 | K732 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 27 | IXGH100N30C3 | SK0644 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 28 | IXGH120N30C3 | SK0638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 29 | IXGH1889 | TP0736 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 30 | IXGH20N170P | K0716E1 | 20 | 125 | 1000 | 30 | 0 | 30000 | |
| 31 | IXGH28N60B3 | SK0608 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 32 | IXGH30N120B3 | TP0606 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 33 | IXGH48N60B3 | SK0607 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 34 | IXGH64N60B3 | SK0608 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 35 | IXGH72N60B3 | SK0608 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 36 | IXGH85N30C3 | SK0644 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 37 | IXGN200N60A2 | SP0723 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 38 | IXGP120N33TBM-A | K723 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 39 | IXGP24N120C3 | K0652 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 40 | IXGP50N33TC | K0652 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 41 | IXGP70N33TBM-A | K726 | 16 | 125 | 1000 | 13 | 0 | 13000 | |
| 42 | IXGP90N33TBM-A | K06251 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 43 | IXGQ120N30TCD1 | SK0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 44 | IXGQ120N33TCD1 | SK0639 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 45 | IXGQ150N30TCD1 | SK0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 46 | IXGQ150N33TCD1 | SK0639 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 47 | IXGQ160N30PB | SK0601 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 48 | IXGQ160N30PB | SK0601 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 49 | IXGQ160N30PB | SK0601 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 50 | IXGQ180N30TCD1 | SK0632 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 51 | IXGQ180N33TB | SK0711 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 52 | IXGQ180N33TC | SK0649 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 53 | IXGQ180N33TCD1 | SK0639 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 54 | IXGQ200N30PB | SK0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 55 | IXGQ240N30PB | SK0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 56 | IXGQ70N33TB | SK0650 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 57 | IXGQ85N33PCD1 | SK0613 | 16 | 125 | 1000 | 27 | 0 | 27000 | |
| 58 | IXGQ85N33PCD1 | SK0638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 59 | IXGQ90N27PB | SK0611 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 60 | IXGQ90N27PB | SK0640 | 16 | 125 | 1000 | 30 | 0 | 30000 | |

TABLE 2A (cont'd): MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|-----|---------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 61 | IXGQ90N30TCD1 | SK0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 62 | IXGQ90N33TB | SK0651 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 63 | IXGQ90N33TC | SK0649 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 64 | IXGQ90N33TCD1 | SK0639 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 65 | IXGQ90N33TCD1 | SK0728 | 16 | 125 | 1000 | 20 | 0 | 20000 | |
| 66 | IXGQ90N33TCD4 | SK0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 67 | IXGR120N60C2 | SP0722 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 68 | IXGR40N60C2D1 | SP0635 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 69 | IXGR48N60C3D1 | SP0722 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 70 | IXGX72N60B3H1 | SP0739 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 71 | IXKH70N60C5 | 1926 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 72 | IXKP13N60C5M | 1716 | 16 | 150 | 1000 | 20 | 0 | 20000 | |
| 73 | IXSH30N60B2D1 | SP0506 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 74 | IXSK40N60CD1 | SK0722 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 75 | IXTA36N30P | SK0603 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 76 | IXTA36N30P | K0621 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 77 | IXTA36N30P | K640 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 78 | IXTA50N25T | SK0604 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 79 | IXTA50N28T | K545 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 80 | IXTA50N28T | K0606 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 81 | IXTA50N28T | K634 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 82 | IXTA50N28T | K640 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 83 | IXTA60N20T | SK0601 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 84 | IXTA76N25T | K0704 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 85 | IXTC110N25T | SP0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 86 | IXTC200N075T | SP0627 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 87 | IXTH130N20T | SP0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 88 | IXTH150N17T | SK0718 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 89 | IXTH160N15T | SK0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 90 | IXTH1N250 | TP0638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 91 | IXTH30N50L | TK0738 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 92 | IXTH76N25T | SP0613 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 93 | IXTH86N25T | SP0638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 94 | IXTH8P50 | SK0712 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 95 | IXTK180N15P | SP0552 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 96 | IXTN79N20 | 2052 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 97 | IXTP08N100P | K625 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 98 | IXTP08N120P | K0709 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 99 | IXTP14N60PM | K631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 100 | IXTP14N60PM | K643 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 101 | IXTP160N075T | K0707 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 102 | IXTP17N30T | K648 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 103 | IXTP18N60PM | K631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 104 | IXTP1R4N120P | K638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 105 | IXTP2R4N120P | K636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 106 | IXTP32N20T | K647 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 107 | IXTP36N15T | K648 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 108 | IXTP36N25T | K636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 109 | IXTP36N30T | K641 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 110 | IXTP44N25T | K636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 111 | IXTP50N25T | K738 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 112 | IXTP56N15T | K636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 113 | IXTP62N25T | K648 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 114 | IXTP74N15T | K636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 115 | IXTP76N075T | K640 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 116 | IXTP76N075T | K726 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 117 | IXTP76N075T | SS0728 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 118 | IXTP8N50P | K646 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 119 | IXTP8N50P | AK732 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 120 | IXTP90N15T | K647 | 16 | 125 | 1000 | 30 | 0 | 30000 | |

TABLE 2A (cont'd): MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|-----|---------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 121 | IXTQ182N055T | SK0612 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 122 | IXTQ182N055T | SK0612 | 16 | 150 | 500 | 30 | 0 | 15000 | |
| 123 | IXTQ22N50P | SS0633 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 124 | IXTQ22N60P | SK0604 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 125 | IXTQ26N50P | SK0604 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 126 | IXTQ28N15P | SK0653 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 127 | IXTQ36P15P | SK0652 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 128 | IXTQ76N25T | SK0613 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 129 | IXTQ82N25T | SK0514 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 130 | IXTQ82N25T | SK0603 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 131 | IXTQ88N28T | SK0641 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 132 | IXTQ88N30P | SK0605 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 133 | IXTQ88N30T | SK0638 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 134 | IXTQ96N20P | SS0631 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 135 | IXTQ96N25T | SK0648 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 136 | IXTT88N30P | SP0626 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 137 | IXTV18N60PS | SP0636 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 138 | IXTV230N085TS | SP0629 | 16 | 125 | 1000 | 30 | 0 | 30000 | |

TABLE 2B: MOSFET/IGBT Module

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|-----------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | GWM100-01X1SL | 1965 | 16 | 150 | 168 | 10 | 0 | 1680 | |
| 2 | GWM120-0075P3SL | 1720 | 16 | 150 | 1000 | 80 | 0 | 80000 | |
| 3 | MDI300-12A4 | 1555 | 16 | 125 | 126 | 10 | 0 | 1260 | |
| 4 | MDI75-12 | 1931 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 5 | MIAA20WD600TMH | 1844 | 16 | 125 | 1000 | 10 | 0 | 10000 | |
| 6 | MII300-12A4 | 2012 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 7 | MII400-12E4 | 1741 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 8 | MII75-12A3 | 1541 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 9 | MIXA15WB1200TED | 1992 | 16 | 125 | 1000 | 5 | 0 | 5000 | |
| 10 | MIXA35WB1200TED | 1991 | 16 | 125 | 1000 | 5 | 0 | 5000 | |
| 11 | MUBW15-12A6K | 1553 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 12 | MUBW50-12E8 | 1469 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 13 | MWI30-06A7T | 1635 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 14 | MWI30-06A7T | 2069 | 16 | 125 | 168 | 10 | 0 | 1680 | |
| 15 | VII130-06P1 | 2025 | 16 | 125 | 168 | 10 | 0 | 1680 | |

TABLE 2C: ISOPLUS

| # | Part Number | Date Code or Test # | Voltage [V] | Temp. [°C] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|----|-----------------|---------------------------|----------------|---------------|---------------|----------------|----------|-----------------------|--------|
| 1 | GWM100-01X1SL | 1965 | 16 | 150 | 168 | 10 | 0 | 1680 | |
| 2 | GWM120-0075P3SL | 1720 | 16 | 150 | 1000 | 80 | 0 | 80000 | |
| 3 | IXER35N120D1 | 1950 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 4 | IXER35N120D1 | 1950 | 16 | 150 | 168 | 20 | 0 | 3360 | |
| 5 | IXFL100N50P | SP0549 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 6 | IXFL60N80P | SP0605 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 7 | IXFL82N60P | SP0550 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 8 | IXFR12N100Q | TP0703 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 9 | IXFR14N100Q2 | SP0732 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 10 | IXFR26N100P | TJ1159E | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 11 | IXGR120N60C2 | SP0722 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 12 | IXGR40N60C2D1 | SP0635 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 13 | IXGR48N60C3D1 | SP0722 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 14 | IXTC110N25T | SP0721 | 16 | 125 | 1000 | 30 | 0 | 30000 | |
| 15 | IXTC200N075T | SP0627 | 16 | 125 | 1000 | 30 | 0 | 30000 | |

POWER CYCLE (Tables 3A ..3H)

TABLE 3A: MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|---------------|---------------------------|-----------------|-----------|------------------------|----------------|----------|---------------|--------|
| 1 | IXBH9N160G | 1759 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 2 | IXDH30N120D1 | 1940 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 3 | IXFN82N60P | SP0551 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 4 | IXFX73N30Q | SK0613 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 5 | IXFX90N30 | SK0613 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 6 | IXGQ85N33PCD1 | SK0614 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 7 | IXGQ90N27PB | SK0611 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 8 | IXKH20N60C5 | 1987 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 9 | IXKP13N60C5M | 1716 | 125 | 80 | 10000 | 20 | 0 | 200000 | |
| 10 | IXSH30N60B2D1 | SP0506 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 11 | IXTP14N60PM | K643 | - | 50 | 10000 | 24 | 0 | 240000 | |
| 12 | IXTP18N60PM | K631 | - | 50 | 10000 | 24 | 0 | 240000 | |
| 13 | IXTQ26N50P | SK0604 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 14 | IXTQ76N25T | SK0613 | - | 100 | 10000 | 24 | 0 | 240000 | |
| 15 | IXTQ96N20P | SS0631 | - | 100 | 10000 | 24 | 0 | 240000 | |

TABLE 3B: MOSFET/IGBT Module

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|------------------|---------------------------|-----------------|-----------|------------------------|----------------|----------|---------------|--------|
| 1 | GWM160-0055X1-SL | 1960 | 150 | 100 | 3000 | 80 | 0 | 240000 | |
| 2 | MIAA20WD600TMH | 1844 | 125 | 80 | 10000 | 9 | 0 | 90000 | |
| 3 | MKI75-06A7 | 1464 | 125 | 80 | 10000 | 10 | 0 | 100000 | |
| 4 | MKI75-06A7T | 1676 | 125 | 80 | 10000 | 10 | 0 | 100000 | |
| 5 | MKI75-06A7T | 1772 | 125 | 80 | 5000 | 10 | 0 | 50000 | |
| 6 | MKI75-06A7T | 1776 | 125 | 80 | 10000 | 10 | 0 | 100000 | |
| 7 | MUBW20-06A7 | 1735 | 125 | 80 | 7130 | 10 | 0 | 71300 | |

TABLE 3C: Thyristor/Diode Module

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|--------------|---------------------------|-----------------|-----------|------------------------|----------------|----------|---------------|--------|
| 1 | MCC162-12io1 | 2056 | 125 | 80 | 10000 | 10 | 0 | 100000 | |
| 2 | MCC56-14io1 | 1472 | 125 | 80 | 20000 | 10 | 0 | 200000 | |
| 3 | MCD40-16io6 | 1474 | 125 | 80 | 5000 | 10 | 0 | 50000 | |
| 4 | MDD95 | 1875 | 125 | 80 | 30000 | 10 | 0 | 300000 | |
| 5 | MDD95-18N1 | 1971 | 125 | 80 | 20000 | 10 | 0 | 200000 | |

TABLE 3D: Controller, Rectifier Bridge

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|--------------|---------------------------|-----------------|-----------|------------------------|----------------|----------|---------------|--------|
| 1 | VBO19-16DT1 | 2011 | 125 | 80 | 5000 | 10 | 0 | 50000 | |
| 2 | VBO40-16NO6 | 1860 | 125 | 80 | 5000 | 10 | 0 | 50000 | |
| 3 | VUO121-16NO1 | 2071 | 125 | 80 | 20000 | 10 | 0 | 200000 | |
| 4 | VUO190-18NO7 | 2026 | 125 | 80 | 2000 | 10 | 0 | 20000 | |
| 5 | VUO80-16 | 1456 | 125 | 80 | 5000 | 10 | 0 | 50000 | |

TABLE 3E: FRED

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|--------------|---------------------------|-----------------|-------------------|------------------------|----------------|----------|---------------|--------|
| 1 | DH60-18A | 1699 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 2 | DSEC30-02A | 1755 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 3 | DSEI120-12A | 1928 | 145 | 100 | 2000 | 20 | 0 | 40000 | |
| 4 | DSEI60-02A | 1440 | 145 | 105 | 2000 | 20 | 0 | 40000 | |
| 5 | DSEI60-12A | 1599 | 150 | 105 | 2000 | 20 | 0 | 40000 | |
| 6 | DSEP12-12A | 1955 | 145 | 100 | 2000 | 20 | 0 | 40000 | |
| 7 | DSEP15-12CR | 1930 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 8 | DSEP29-06A | 1736 | 150 | 105 | 2000 | 20 | 0 | 40000 | |
| 9 | DSEP2x61-06A | 1633 | 125 | 80 | 5000 | 10 | 0 | 50000 | |
| 10 | DSEP60-12A | 2021 | 145 | 100 | 2000 | 20 | 0 | 40000 | |

TABLE 3F: Schottky Diode

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|--------------|---------------------------|-----------------|-------------------|------------------------|----------------|----------|---------------|--------|
| 1 | DSS16-0045A | 2018 | 145 | 100 | 2000 | 20 | 0 | 80000 | |
| 2 | DSS2x160-01A | 1856 | 125 | 80 | 4000 | 10 | 0 | 40000 | |
| 3 | DSS6-015AS | 1723 | 140 | 100 | 8572 | 77 | 0 | 660044 | |
| 4 | DSS6-015AS | 1838 | 140 | 100 | 8572 | 77 | 0 | 660044 | |
| 5 | DSSk60-0045A | 1873 | 150 | 105 | 2000 | 20 | 0 | 40000 | |
| 6 | DSSK80-006B | 1575 | 125 | 80 | 2000 | 20 | 0 | 40000 | |

TABLE 3G: Thyristor/Diode single device

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|-------------|---------------------------|-----------------|-------------------|------------------------|----------------|----------|---------------|--------|
| 1 | CS30-16io1 | 2009 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 2 | CS35-14 | 2008 | 125 | 80 | 2000 | 10 | 0 | 20000 | |
| 3 | CS35-14io4 | 1473 | 125 | 80 | 2000 | 10 | 0 | 20000 | |
| 4 | CS45-12io1 | 1601 | 125 | 80 | 5000 | 20 | 0 | 100000 | |
| 5 | CS8-12io2 | 1605 | 125 | 80 | 2000 | 10 | 0 | 20000 | |
| 6 | DSA1-18D | 1435 | 150 | 105 | 2000 | 20 | 0 | 40000 | |
| 7 | DSA15IM45IB | 1621 | 125 | 80 | 4000 | 20 | 0 | 80000 | |
| 8 | DSA75-16B | 1859 | 150 | 105 | 2000 | 10 | 0 | 20000 | |
| 9 | DSI45-08A | 1760 | 150 | 105 | 2000 | 20 | 0 | 40000 | |

TABLE 3H: ISOPLUS

| # | Part Number | Date Code or Test # | Tj(max) [°C] | ΔT [K] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|---------------|---------------------------|-----------------|-------------------|------------------------|----------------|----------|---------------|--------|
| 1 | DSEP15-12CR | 1930 | 125 | 80 | 2000 | 20 | 0 | 40000 | |
| 2 | GWM160-0055X1 | 1960 | 150 | 100 | 3000 | 80 | 0 | 240000 | |

TEMPERATURE CYCLE (Tables 4A ..4J)

TABLE 4A: MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|--------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|--------|
| 1 | FII50-12EL | 1534 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 2 | IXBH9N160G | 1574 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 3 | IXDD404SI | 1913 | -55 | 150 | 1000 | 83 | 0 | 83000 | |
| 4 | IXDD404SIA | 1695 | -55 | 150 | 500 | 30 | 0 | 15000 | |
| 5 | IXDN75N120 | 1606 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 6 | IXKC13N80C | 1769 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 7 | IXKC25N80C | 1590 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 8 | IXKH20N60C5 | 2013 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 9 | IXKH70N60C5 | 1926 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 10 | IXKP10N60C5M | 1693 | -40 | 150 | 100 | 20 | 0 | 2000 | |
| 11 | IXKP13N60C5M | 1716 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 12 | IXKT70N60C5 | 2068 | -55 | 150 | 1000 | 20 | 0 | 20000 | |
| 13 | IXUC200N055 | 1802 | -55 | 150 | 90 | 50 | 0 | 4500 | |

TABLE 4B: MOSFET/IGBT Module

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|-----------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|--------|
| 1 | MDI300-12A4 | 1555 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 2 | MIAA20WD600TMH | 1844 | -40 | 150 | 100 | 9 | 0 | 900 | |
| 3 | MII400-12E4 | 1741 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 4 | MII75-12A3 | 1541 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 5 | MIXA15WB1200TED | 1992 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 6 | MKI75-06A7T | 1562 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 7 | MKI75-06A7T | 1724 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 8 | MKI75-06A7T | 1724 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 9 | MKI80-06T6K | 1818 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 10 | MUBW15-12A7 | 1466 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 11 | MUBW25-12T7 | 1896 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 12 | MUBW75-12T8 | 1731 | -40 | 150 | 100 | 10 | 0 | 1000 | |

TABLE 4C: Thyristor/Diode Module

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|--------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|---------------|
| 1 | MCC162-14 | 1816 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 2 | MCC162-14io1 | 1544 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 3 | MCC162-14io1 | 1629 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 4 | MCC200-14 | 1717 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 5 | MCC21-16 | 1821 | -40 | 150 | 100 | 20 | 0 | 2000 | |
| 6 | MCC26-14 | 2035 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 7 | MCC26-14io1 | 1641 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 8 | MCC310-12io1 | 1545 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 9 | MCC310-14io1 | 1627 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 10 | MCC44-12io1 | 1540 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 11 | MCC44-16io1 | 2048 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 12 | MCC44-16io8 | 1864 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 13 | MCC56-12io1 | 1449 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 14 | MCC72-14io1 | 2007 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 15 | MCC95-14io1 | 1788 | -40 | 150 | 150 | 10 | 0 | 1500 | |
| 16 | MCD162-16io1 | 1884 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 17 | MCD200-14 | 2010 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 18 | MCD250/16 | 2059 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 19 | MCD56-16io1 | 1646 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 20 | MCO600-16io1 | 1680 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 21 | MDD26-18N1 | 1749 | -40 | 150 | 100 | 20 | 1 | 2000 | V_F increased |
| 22 | MDD56-16io1 | 1865 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 23 | MDD56-18N1 | 2080 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 24 | MDD95-22 | 1875 | -40 | 150 | 100 | 10 | 1 | 1000 | V_F increased |
| 25 | MDD95-16 | 1585 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 26 | MDD95-18N1 | 1971 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 27 | MDI300-12A4 | 1555 | -40 | 150 | 50 | 10 | 0 | 500 | |

TABLE 4D: Controller, Rectifier Bridge

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|--------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|--------|
| 1 | MMO230-16 | 1543 | -40 | 150 | 150 | 10 | 0 | 1500 | |
| 2 | MMO230-16io7 | 1868 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 3 | MMO74-12io6 | 1615 | -55 | 150 | 300 | 10 | 0 | 3000 | |
| 4 | VBO19-16DT1 | 1648 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 5 | VBO25-12nO2 | 1726 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 6 | VBO25-12NO2 | 2005 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 7 | VBO40-16NO6 | 1860 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 8 | VBO40-16NO6 | 1860 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 9 | VUB120-16 | 2034 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 10 | VUB120-16NO2 | 1636 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 11 | VUB72-16No1 | 1894 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 12 | VUO36-12NO8 | 2024 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 13 | VUO36-16 | 2036 | -40 | 150 | 150 | 10 | 0 | 1500 | |
| 14 | VUO36-16nO8 | 1580 | -40 | 150 | 10 | 10 | 0 | 100 | |
| 15 | VUO80-16 | 1778 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 16 | VUO82-16NO7 | 2085 | -40 | 150 | 10 | 10 | 0 | 100 | |
| 17 | VVY40-16io1 | 1679 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 18 | VVZ40-14 | 1691 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 19 | VW2x60-14 | 1443 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 20 | VWO85-12 | 1570 | -40 | 125 | 50 | 10 | 0 | 500 | |

TABLE 4E: FRED

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|---------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|--------|
| 1 | DH60-18A | 1568 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 2 | DHG10I600PM | 1685 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 3 | DHH55-36N1F | 1604 | -55 | 150 | 100 | 40 | 0 | 4000 | |
| 4 | DPG15I400PM | 1770 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 5 | DPG60C300QB | 1909 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 6 | DSEE29-06CC | 1771 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 7 | DSEI120-12A | 1538 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 8 | DSEI120-12A | 1756 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 9 | DSEI2x121-02A | 2042 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 10 | DSEI2x31-06C | 1563 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 11 | DSEI60-06A | 1804 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 12 | DSEP15-06A | 2020 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 13 | DSEP15-12CR | 1514 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 14 | DSEP25-16AR | 1712 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 15 | DSEP2x25-12C | 1468 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 16 | DSEP30-06BR | 1700 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 17 | DSEP30-06CR | 2015 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 18 | DSEP8-03AS | 1738 | -40 | 150 | 100 | 20 | 0 | 2000 | |
| 19 | DSEP8-12A | 1438 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 20 | DSEP8-12A | 1956 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 21 | DSEP9-06CR | 1437 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 22 | MEE250-12I | 1887 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 23 | MEE300-06DA | 2064 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 24 | MEK300-06 | 1737 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 25 | MEO450-12DA | 2000 | -40 | 150 | 100 | 10 | 0 | 1000 | |

TABLE 4F: Schottky Diode

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|----------------|---------------------------|----------------------|-----------------------|------------------------|----------------|----------|---------------|--------|
| 1 | DSA120C150QB | 1907 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 2 | DSA30C100PN | 1906 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 3 | DSA90C200HB | 1674 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 4 | DSB15IM45IB | 1622 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 5 | DSS16-0045A | 2018 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 6 | DSS20-01AC | 1709 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 7 | DSS2x160-01A | 1856 | -40 | 150 | 100 | 10 | 0 | 1000 | |
| 8 | DSS2x61-01A | 1985 | -40 | 150 | 50 | 10 | 0 | 500 | |
| 9 | DSS31-0045A | 1596 | -55 | 150 | 1000 | 80 | 0 | 80000 | |
| 10 | DSS31-0045A | 1596 | -55 | 150 | 1000 | 80 | 0 | 80000 | |
| 11 | DSS31-0045A SN | 1492 | -55 | 150 | 500 | 77 | 0 | 38500 | |
| 12 | DSS6-015AS | 1723 | -55 | 150 | 1000 | 77 | 0 | 77000 | |
| 13 | DSSK30-01A | 1807 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 14 | DSSK38-0025B | 1982 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 15 | DSSK40-0015B | 1557 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 16 | DSSK60-0045B | 1457 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 17 | DSSK60-015AR | 1591 | -55 | 150 | 200 | 40 | 0 | 8000 | |
| 18 | DSSK60-015AR | 1573 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 19 | DSSK80-006B | 1575 | -55 | 150 | 50 | 20 | 0 | 1000 | |

TABLE 4G: Thyristor/Diode single device

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|----------------|---------------------|----------------|-----------------|------------------|-------------|----------|---------------|--------|
| 1 | CS20-22-moF1 | 1888 | -55 | 150 | 50 | 30 | 0 | 1500 | |
| 2 | CS22-08io1M | 1953 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 3 | CS23-12io2 | 1959 | -40 | 150 | 20 | 20 | 0 | 400 | |
| 4 | CS30-12io1 | 1977 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 5 | CS30-16io1DCSN | 1820 | -40 | 150 | 100 | 20 | 0 | 2000 | |
| 6 | CS35-14io4 | 1473 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 7 | CS45-16io1 | 1598 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 8 | CS60-16io1 | 1830 | -40 | 150 | 100 | 20 | 0 | 2000 | |
| 9 | CS8-12io2 | 1605 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 10 | DSA1-16D | 2023 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 11 | DSA17-16A | 1703 | -40 | 150 | 20 | 20 | 0 | 400 | |
| 12 | DSA35-16A | 1566 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 13 | DSAI35-16A | 2067 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 14 | DSAI75-16B | 1858 | -40 | 150 | 20 | 10 | 0 | 200 | |
| 15 | DSI45-12A | 1805 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 16 | DSP25-16 | 1564 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 17 | DSP25-16A | 1639 | -40 | 150 | 50 | 20 | 0 | 1000 | |

TABLE 4H: ISOPLUS

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|----|------------------|---------------------|----------------|-----------------|------------------|-------------|----------|---------------|--------|
| 1 | CS20-22-moF1 | 1888 | -55 | 150 | 50 | 30 | 0 | 1500 | |
| 2 | DHH55-36N1F | 1604 | -55 | 150 | 100 | 40 | 0 | 4000 | |
| 3 | DSEE29-06CC | 1771 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 4 | DSEP15-12CR | 1514 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 5 | DSEP25-16AR | 1712 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 6 | DSEP30-06BR | 1700 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 7 | DSEP30-06CR | 2015 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 8 | DSEP9-06CR | 1437 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 9 | DSS20-01AC | 1709 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 10 | DSSK60-015AR | 1573 | -55 | 150 | 50 | 20 | 0 | 1000 | |
| 11 | DWP25-16/18AL | 1842 | -55 | 150 | 100 | 22 | 0 | 2200 | |
| 12 | FII50-12EL | 1534 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 13 | GWM120-0075P3SL | 1720 | -55 | 150 | 1000 | 80 | 0 | 80000 | |
| 14 | GWM160-0055X1-SL | 1960 | -55 | 150 | 1000 | 80 | 0 | 80000 | |
| 15 | GWM70-01P2 | 1448 | -55 | 150 | 1000 | 10 | 0 | 10000 | |
| 16 | IXKC13N80C | 1769 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 17 | IXKC25N80C | 1590 | -55 | 150 | 100 | 20 | 0 | 2000 | |
| 18 | IXUC200N055 | 1802 | -55 | 150 | 90 | 50 | 0 | 4500 | |

TABLE 4J: Breakover Diode

| # | Part Number | Date Code or Test # | Low Temp. [°C] | High Temp. [°C] | Number of Cycles | Sample Size | Failures | Device Cycles | Remark |
|---|-------------|---------------------|----------------|-----------------|------------------|-------------|----------|---------------|--------|
| 1 | IXBOD1-08 | 1941 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 2 | IXBOD1-09 | 1800 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 3 | IXBOD1-10 | 1576 | -40 | 150 | 50 | 20 | 0 | 1000 | |
| 4 | IXBOD1-10 | 2096 | -40 | 150 | 50 | 20 | 0 | 1000 | |

HUMIDITY TEST (Tables 5A, 5H..5J)

TABLE 5A: MOSFET/IGBT single device

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|--------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|--------|
| 1 | IXDD404SIA | 1695 | 121 | 100 | 96 | 30 | 0 | 2880 | |
| 2 | IXKH24N60C5 | 2066 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 3 | IXKP13N60C5M | 1716 | 85 | 85 | 1000 | 20 | 0 | 20000 | |
| 4 | IXKP13N60C5M | 1687 | 121 | 100 | 96 | 10 | 0 | 960 | |

TABLE 5E: FRED

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|--------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|--------|
| 1 | DPG20C300PN | 1908 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 2 | DPG60C400QB | 1446 | 121 | 100 | 96 | 8 | 0 | 768 | |
| 3 | DSEI2x61-12B | 1607 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 4 | DSEI8-06AS | 1535 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 5 | DSEP30-06BR | 1536 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 6 | DSEP30-12CR | 1927 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 7 | DSEP8-03AS | 1837 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 8 | MEO450-12DA | 1742 | 85 | 85 | 168 | 10 | 0 | 1680 | |

TABLE 5F: Schottky Diode

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|----------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|---------------|
| 1 | DSA120C150QB | 1907 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 2 | DSA20C100PB | 1835 | 85 | 85 | 1000 | 20 | 0 | 20000 | |
| 3 | DSA20C100PB | 1835 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 4 | DSA20C60PN | 1974 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 5 | DSA90C200HB | 1836 | 85 | 85 | 1000 | 20 | 0 | 20000 | |
| 6 | DSA90C200HB | 1836 | 121 | 100 | 96 | 20 | 1 | 1920 | I_R increased |
| 7 | DSB15IM45IB | 1622 | 121 | 100 | 96 | 20 | 0 | 1920 | |
| 8 | DSS31-0045A SN | 1492 | 121 | 100 | 96 | 77 | 0 | 7392 | |
| 9 | DSS6-015AS | 1723 | 121 | 100 | 96 | 77 | 0 | 7392 | |

TABLE 5G: Thyristor/Diode single device

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|-------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|--------|
| 1 | CS45-12io1 | 1754 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 2 | DSDI60-14A | 1806 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 3 | DSI45-16A | 1976 | 121 | 100 | 96 | 20 | 0 | 1920 | |

TABLE 5H: ISOPLUS

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|-------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|--------|
| 1 | DSEP30-06BR | 1536 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 2 | DSEP30-12CR | 1927 | 121 | 100 | 48 | 20 | 0 | 960 | |

TABLE 5J: Breakover diode

| # | Part Number | Date Code or Test # | Temp. [°C] | Rel. H. [%] | Time [hrs] | Sample Size | Failures | Device Hours [hrs] | Remark |
|---|-------------|---------------------------|---------------|----------------|---------------|----------------|----------|-----------------------|--------|
| 1 | IXBOD1-08 | 1941 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 2 | IXBOD1-09 | 1800 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 3 | IXBOD1-10 | 1576 | 121 | 100 | 48 | 20 | 0 | 960 | |
| 4 | IXBOD1-10 | 2096 | 121 | 100 | 48 | 20 | 0 | 960 | |