D e l i v e r i n g ***P O W E R*** **E x c e l l e n c e**

RELIABILITY REPORT 1/03

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 pages M 2-6 to M 2-8 of the IXYS Data Book Vol. 2.

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

$$AF = \exp \{ Ea * [(T_2 - T_1) / (T_2 * T_1)] / k \} \quad (1)$$

Ea: activation energy; @ HTRB Ea = 1.0 eV
@ HTGB Ea = 0.4 eV

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

T_1: abs. application junction temperature (273+Tj) K

T_2: abs. test junction temperature (273+Tj) 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 / 10^9 hrs

TABLES 3:

ΔT: max Tj - min Tj during Test

DEFINITION OF FAILURE

Parametric failure means a parameter specified in data sheet is exceeded as specified in IEC 60747-1 and the functionality of the device is not impaired.

Summary of Tables 1A - 1J: HTRB

		Table 1A MOSFET/IGBT discrete device *)	Table 1B MOSFET/IGBT Module	Table 1C Thyr./Diode Module	Table1D Controller/ Rec. Bridge*)	Table 1E FRED *)	Table 1F Schottky Diode*)	Table 1G Thyr./Diode discrete device*)	Table 1H ISOPLUS	Table 1J Breakover Diode
Failure Rate [FIT]	125°C, 60% UCL	711	84423	3659	6087	2613	3603	1294	-	7228
Failure Rate [FIT]	90°C, 60% UCL	43	5055	219	365	156	216	77	-	433
Total Lots Tested		49	7	27	23	29	9	18	19	5
Total Devices Tested		1387	70	270	219	490	160	310	370	100
Total Failures	Actual	0	2	0	0	0	0	0	0	0
	60% UCL {eq. (2)}	0.92	3.1	0.92	0.92	0.92	0.92	0.92	-	0.92
Total Equivalent Device Hours @ 125°C {AF eq. (1)}		1294100	36720	251440	151132	352123	255323	710968	622003	127280
MTTF (Years)	125°C 60% UCL	161	1	31	19	44	32	88	-	16
	90°C 60% UCL	2682	23	521	313	730	529	1473	-	264

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	901	20952	-
Failure Rate [FIT]	90°C, 60% UCL	292	6781	-
Total Lots Tested		28	7	2
Total Devices Tested		769	70	40
Total Failures	Actual	0	0	0
	60% UCL {eq. (2)}	0.92	0.92	-
Total Equivalent Device Hours @ 125°C {AF eq. (1)}		1021360	43910	40000
MTTF (Years)	125°C 60% UCL	127	5	-
	90°C 60% UCL	392	17	-

*) 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	Table 3D Controller/ Rec. Bridge*)	Table 3E FRED *)	Table 3F Schottky Diode*)	Table 3G Thyr./Diode discrete device*)	Table 3H Isoplus
Total Lots Tested	20	3	11	14	17	7	13	8
Total Devices Tested	509	22	110	140	260	130	220	160
Total Failures	1	0	1	0	0	0	0	0
Total Device Cycles	7010000	2600000	1150000	1200000	1300000	550000	1260000	1200000

Summary of Tables 4A - 4J: Temperature Cycle

	Table 4A MOSFET/IGBT discrete device *)	Table 4B MOSFET/IGBT Module	Table 4C Thyr./Diode Module	Table 4D 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	27	10	17	21	28	17	20	14	10
Total Devices Tested	600	100	204	215	494	300	350	280	180
Total Failures	0	0	0	1	0	2	0	0	0
Total Device Cycles	103500	5300	37600	8600	21950	15500	26600	11400	15200

Summary of Tables 5A - 5H: Humidity Test

	Table 5A MOSFET/IGBT discrete device *)	Table 5B MOSFET/IGBT Module	Table 5C Thyr./Diode Module	Table 5D Controller/ Rec. Bridge*)	Table 5E FRED *)	Table 5F Schottky Diode*)	Table 5G Thyr./Diode discrete device*)	Table 5H Isoplus	Table 5J Breakover Diode
Total Lots Tested	22	1	6	8	12	1	7	13	4
Total Devices Tested	569	10	60	92	210	20	169	289	80
Total Failures	5	0	0	0	0	0	0	2	0
Total Device Hours	83832	1680	17680	11704	23520	960	32232	40392	4800

*) including ISOPLUS

HTRB (Tables 1A .. 1J)

TABLE 1A: MOSFET/IGBT discrete device									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	FDM21-05QC	314	400	125	1000	20	0	20000	
2	FII50-12E	309	960	125	1000	20	0	20000	
3	IXDA20N120AS	446	960	125	168	20	0	3360	
4	IXDN75N120	269	960	125	168	10	0	1680	
5	IXEH40N120	539	960	125	1000	20	0	20000	
6	IXER60N120	488	960	125	1000	20	0	20000	
7	IXFF24N100	389	800	125	1000	10	0	10000	
8	IXFH15N80	0113	640	125	1000	30	0	30000	
9	IXFH15N80	0224	640	125	1000	30	0	30000	
10	IXFH16N90Q	0242	720	125	1000	30	0	30000	
11	IXFH26N50	0110	400	125	1000	30	0	30000	
12	IXFH26N50	0116	400	125	1000	30	0	30000	
13	IXFH26N50	0119	400	125	1000	30	0	30000	
14	IXFH26N50	0134	400	125	1000	30	0	30000	
15	IXFH26N50	0139	400	125	1000	30	0	30000	
16	IXFH26N50	0228	400	125	1000	30	0	30000	
17	IXFH28N50F	0151	400	125	1000	30	0	30000	
18	IXFH32N50	0104	400	125	1000	30	0	30000	
19	IXFH32N50	0117	400	125	1000	30	0	30000	
20	IXFH32N50	0119	400	125	1000	30	0	30000	
21	IXFH32N50	0119	400	125	1000	30	0	30000	
22	IXFH32N50	0224	400	125	1000	30	0	30000	
23	IXFH32N50Q	0120	400	125	1000	30	0	30000	
24	IXFH32N50Q	0120	400	125	1000	30	0	30000	
25	IXFH32N50Q	0147	400	125	1000	30	0	30000	
26	IXFH58N20	0116	160	125	1000	30	0	30000	
27	IXFH58N20	0119	160	125	1000	30	0	30000	
28	IXFH58N20	0119	160	125	1000	30	0	30000	
29	IXFH60N20F	0151	160	125	1000	30	0	30000	
30	IXFH6N100F	9936	800	105	1000	30	0	30000	
31	IXFH6N100Q	0143	800	105	1000	29	0	29000	
32	IXFH9N80	0229	640	125	1000	30	0	30000	
33	IXFK27N80	0234	640	125	1000	30	0	30000	
34	IXFK55N50F	0216	400	125	1000	30	0	30000	
35	IXFK90N30	0244	240	125	1000	30	0	30000	
36	IXFN36N100	0116	800	105	1000	27	0	27000	
37	IXFN36N100	0229	800	125	1000	30	0	30000	
38	IXFN44N80	0110	640	125	1000	29	0	29000	
39	IXFN48N50Q	0110	400	125	1000	30	0	30000	
40	IXFN55N50F	0137	400	125	1000	30	0	30000	
41	IXFX27N80Q	0236	640	125	1000	30	0	30000	
42	IXFX34N80	0212	640	125	1000	30	0	30000	
43	IXFX55N50	0223	400	125	1000	30	0	30000	
44	IXTH9225	0119	800	125	1000	49	0	49000	
45	IXTK120N25	0151	200	125	1000	25	0	25000	
46	IXTK180N15	0151	120	125	1000	25	0	25000	
47	IXTK62N25	0150	200	125	1000	39	0	39000	
48	IXTK90N15	0150	120	125	1000	33	0	33000	
49	IXTM9226	0111	800	125	1000	21	0	21000	

TABLE 1B: MOSFET/IGBT Module									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	MII75-12	262	960	125	1000	10	0	10000	
2	MII75-12A3	262	960	125	168	10	0	1680	
3	MUBW15-12A7	392	1120	125	168	10	0	1680	
4	MWI30-06A7	553	480	125	168	10	0	1680	
5	VMM90-09F	508	720	125	1000	10	1	10000	
6	VMO440-02	349	160	125	1000	10	1	10000	Idss @ 1000 hrs
7	VMO440-02FL	419	160	125	168	10	0	1680	

TABLE 1C: Thyristor/Diode Module									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	MCC19-14	283	980	125	168	10	0	1680	
2	MCC21-14	396	980	125	168	10	0	1680	
3	MCC250-14	249	980	125	168	10	0	1680	
4	MCC250-14	249	980	140	1000	10	0	10000	
5	MCC26-16	350	1120	125	168	10	0	1680	
6	MCC26-16	350	1120	140	1000	10	0	10000	
7	MCC312-16	449	1120	125	168	10	0	1680	
8	MCC44-16io1	592	1120	125	168	10	0	1680	
9	MCC56-16io1	448	1120	125	168	10	0	1680	
10	MCC95-16io1	598	1120	125	168	10	0	1680	
11	MCC95-16io1	599	1280	125	168	10	0	1680	
12	MCD162-16	564	1120	125	168	10	0	1680	
13	MCD162-16io1	564	1120	125	1100	10	0	11000	
14	MCO500-14	299	980	125	168	10	0	1680	
15	MDD172-16	400	1120	150	1000	10	0	10000	
16	MDD172-16	400	1120	125	168	10	0	1680	
17	MDD26-16	519	1120	125	168	10	0	1680	
18	MDD310-16	324	1120	125	168	10	0	1680	
19	MDD56	334	1260	125	168	10	0	1680	
20	MDD56	334	1260	125	168	10	0	1680	
21	MDD56-16	222	1120	125	168	10	0	1680	
22	MDD56-18	423	1280	125	1000	10	0	10000	
23	MDD56-18	423	1260	125	1000	10	0	10000	
24	MDD56-18	423	1260	125	1000	10	0	10000	
25	MDD56-18	423	1260	125	1000	10	0	10000	
26	MDD72-16	214	1120	150	1000	10	0	10000	
27	MDD95-16	466	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	Param. Failures	Device Hours [hrs]	Remark
1	MMO74-16	239	1120	125	1000	10	0	10000	
2	VBO13-16AO2	246	1120	125	168	10	0	1680	
3	VBO13-16AO2	274	1120	125	1000	10	0	10000	
4	VBO25-16A	523	1120	125	168	10	0	1680	
5	VBO30-16NO7	352	1120	125	168	10	0	1680	
6	VHF28-16	358	1120	125	168	10	0	1680	
7	VHF28-16	358	1120	140	1000	10	0	10000	
8	VHF28-16io5	404	1120	125	1000	10	0	10000	
9	VHF36-16	463	1120	125	168	10	0	1680	
10	VUB120	321	960	125	168	8	0	1344	
11	VUB120	321	1120	125	168	8	0	1344	
12	VUB120	366	960	125	100	10	0	1000	
13	VUB120-12MO1	436	1120	125	168	3	0	504	

TABLE 1D(cont'd): Controller/Rectifier Bridge									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
14	VUB160-16	351	1120	125	168	10	0	1680	
15	VUB60-12NO1"C"	341	960	125	1000	10	0	10000	
16	VUE22-12NO7	225	960	125	168	10	0	1680	
17	VUO34-18	422	1260	125	168	10	0	1680	
18	VUO34-18	422	1260	150	1000	10	0	10000	
19	VUO50-16	625	1120	125	168	10	0	1680	
20	VUO52-18	256	1260	125	168	10	0	1680	
21	VUO86-16NO7	428	1120	125	168	10	0	1680	
22	VVZ40-16	231	1120	125	168	10	0	1680	
23	VVZ40-16	232	1120	125	168	10	0	1680	

TABLE 1E: FRED									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	DSEC59-06BC	304	480	125	1000	20	0	20000	
2	DSEC60-03A	322	240	125	168	20	0	3360	
3	DSEC60-03AR	600	240	125	168	20	0	3360	
4	DSEC60-06A	560	480	125	168	20	0	3360	
5	DSEE15-12CC	303	480	125	1000	20	0	20000	
6	DSEE15-12CC	303	480	125	1000	20	0	20000	
7	DSEI120-06A	554	480	125	1000	20	0	20000	
8	DSEI20-12A	486	960	125	168	20	0	3360	
9	DSEI2x101-06	320	480	125	168	10	0	1680	
10	DSEI2x121-02A	483	160	125	168	10	0	1680	
11	DSEI30-06A	206	480	125	168	20	0	3360	
12	DSEI60-06A	296	480	125	1000	20	0	20000	
13	DSEK60-02	465	160	125	168	20	0	3360	
14	DSEP12-12A	254	960	150	1000	10	0	10000	
15	DSEP12-12A	254	960	162	500	10	0	5000	
16	DSEP12-12A	363	960	125	168	20	0	3360	
17	DSEP15-12CR	381	960	125	168	20	0	3360	
18	DSEP2x31-12A	575	960	125	168	10	0	1680	
19	DSEP30-06BR	209	480	125	168	20	0	3360	
20	DSEP30-06CR	525	480	125	168	20	0	3360	
21	DSEP30-06CR	525	480	150	168	20	0	3360	
22	DSEP30-12CR	329	960	125	1000	20	0	20000	
23	DSEP60-12	236	960	125	168	20	0	3360	
24	DSEP8-06B	552	480	125	1000	20	0	20000	
25	DSEP8-06B	552	480	125	1000	20	0	20000	
26	MEK350-02B	487	160	125	168	10	0	1680	
27	MEK350-02B	487	160	125	1000	10	0	10000	
28	MEK90-06F	499	480	125	168	10	0	1680	
29	MEK95-06DA"E"	403	480	125	168	10	0	1680	

TABLE 1F: Schottky Diode									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	DGS3-03AS	582	240	125	1000	20	0	20000	
2	DGSK20-018A	518	144	125	168	20	0	3360	
3	DGSK20-025AS	331	200	125	1000	20	0	20000	
4	DSS20-01AR	305	100	150	1000	20	0	20000	
5	DSS2x160-01A	430	100	125	168	10	0	1680	
6	DSSK28-01A	513	100	150	168	20	0	3360	
7	DSSK70-008A	501	80	125	1000	20	0	20000	
8	DSSK80-0008D	500	8	100	1000	20	0	20000	
9	DSSK80-0025B	201	17	150	1000	10	0	10000	

TABLE 1G: Thyristor/Diode discrete device									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	CS19-08ho1S	338	560	125	1000	20	0	20000	
2	CS29-12io1C	306	840	125	1000	20	0	20000	
3	CS30-16io1	417	1120	125	168	20	0	3360	
4	CS30-16io1	556	1120	125	1000	10	0	10000	
5	CS30-16io1	556	1120	125	1000	10	0	10000	
6	CS35-14io4	365	980	125	168	10	0	1680	
7	CS45-16io1R	270	1120	125	168	20	0	3360	
8	CS60-14io1	594	980	125	1000	30	0	30000	
9	CS8-12io2	210	840	150	168	10	0	1680	
10	DSA17-18A	259	1260	150	168	10	0	1680	
11	DSA35-18	407	1260	150	168	10	0	1680	
12	DSDI30-06A	286	480	125	168	20	0	3360	
13	DSI30-08AC	307	560	150	1000	20	0	20000	
14	DSI30-16AS	218	1120	150	1000	20	0	20000	
15	DSIK45-16AR	608	1120	150	1000	20	0	20000	
16	DSP25-16A	295	1120	150	1000	20	0	20000	
17	DSP25-16AR	318	1120	150	168	20	0	3360	
18	DSP8-12AC	529	840	150	1000	20	0	20000	

TABLE 1H: ISOPLUS									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	CS29-12io1C	306	840	125	1000	20	0	20000	
2	CS45-16io1R	270	1120	125	168	20	0	3360	
3	DSEC59-06BC	304	480	125	1000	20	0	20000	
4	DSEC60-03AR	600	240	125	168	20	0	3360	
5	DSEE15-12CC	303	480	125	1000	20	0	20000	
6	DSEE15-12CC	303	480	125	1000	20	0	20000	
7	DSEK60-02	465	160	125	168	20	0	3360	
8	DSEP15-12CR	381	960	125	168	20	0	3360	
9	DSEP30-06BR	209	480	125	168	20	0	3360	
10	DSEP30-06CR	525	480	150	168	20	0	3360	
11	DSEP30-06CR	525	480	125	168	20	0	3360	
12	DSEP30-12CR	329	960	125	1000	20	0	20000	
13	DSI30-08AC	307	560	150	1000	20	0	20000	
14	DSIK45-16AR	608	1120	150	1000	20	0	20000	
15	DSP25-16AR	318	1120	150	168	20	0	3360	
16	DSP8-12AC	529	840	150	1000	20	0	20000	
17	DSS20-01AR	305	100	150	1000	20	0	20000	
18	IXER60N120	488	960	125	1000	20	0	20000	
19	IXFF24N100	389	800	125	1000	10	0	10000	

TABLE 1J: Breakover Diode									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	IXBOD1-06	521	480	125	168	20	0	3360	
2	IXBOD1-07	453	560	125	240	20	0	4800	
3	IXBOD1-09	370	720	150	1000	20	0	20000	
4	IXBOD1-09	370	720	125	168	20	0	3360	
5	IXBOD1-15R	228	1200	125	168	20	0	3360	

HTGB (Tables 2A .. 2C)

TABLE 2A: MOSFET/IGBT discrete device									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	FII50-12E	309	16	125	1000	20	0	20000	
2	IXBH9N160G	440	16	125	1000	20	0	20000	
3	IXDN55N120D1	596	16	125	168	10	0	1680	
4	IXFH15N80	0113	16	150	1000	30	0	30000	
5	IXFH15N80	SP 0224	16	125	1000	30	0	30000	
6	IXFH16N90Q	SP 0242	16	125	1000	30	0	30000	
7	IXFH26N50	0110	16	150	1000	30	0	30000	
8	IXFH26N50	SP 0228	16	125	1000	30	0	30000	
9	IXFH28N50F	SP 0151	16	150	1000	30	0	30000	
10	IXFH32N50	0104	16	150	1000	30	0	30000	
11	IXFH32N50	SK 0224	16	125	1000	30	0	30000	
12	IXFH32N50Q	SP 0147	16	125	1000	30	0	30000	
13	IXFH60N20F	SP 0151	16	150	1000	30	0	30000	
14	IXFH6N100F	SP 9936	16	150	1000	30	0	30000	
15	IXFH9N80	TK 0229	16	125	1000	30	0	30000	
16	IXFK27N80	SP 0234	16	125	1000	30	0	30000	
17	IXFK55N50F	SP 0216	16	125	1000	30	0	30000	
18	IXFK90N30	SP 0244	16	125	1000	30	0	30000	
19	IXFN36N100	SP 0229	16	125	1000	30	0	30000	
20	IXFN44N80	0110	16	150	1000	30	0	30000	
21	IXFN48N50Q	0110	16	150	1000	30	0	30000	
22	IXFN55N50F	SP 0137	16	150	1000	29	0	29000	
23	IXFX27N80Q	SP 0236	16	125	1000	30	0	30000	
24	IXFX34N80	SP 0212	16	125	1000	30	0	30000	
25	IXFX4N100Q	TP0149	16	125	1000	30	0	30000	
26	IXFX55N50	SP 0223	16	125	1000	30	0	30000	
27	IXLF19N250	577	30	125	1000	20	0	20000	
28	IXTN36N50	199	16	125	168	10	0	1680	

TABLE 2B: MOSFET/IGBT Module									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	MUBW25-12A7	496	16	150	168	10	0	1680	
2	MUBW25-12A7	496	16	125	1685	10	0	16850	
3	MUBW30-06A7	391	16	150	168	10	0	1680	
4	MUBW30-06A7	391	16	125	168	10	0	1680	
5	VMM300-03FP	402	16	125	168	10	0	1680	
6	VMO650-01	233	16	140	1000	10	0	10000	
7	VMO650-01	233	16	125	168	10	0	1680	

TABLE 2C: ISOPLUS									
#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	FII50-12E	309	16	125	1000	20	0	20000	
2	IXLF19N250	577	30	125	1000	20	0	20000	

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	Param. Failures	Device Cycles	Remark
1	FII50-12E	309	125	80	10000	20	0	200000	
2	IXBH9N160G	440	125	80	5000	20	0	100000	
3	IXDN75N120	269	125	80	2000	10	0	20000	
4	IXFH26N50	0119	125	100	10000	30	0	300000	
5	IXFH26N50	0119	125	100	10000	30	0	300000	
6	IXFH26N50	SP 0228	125	100	10000	24	0	240000	
7	IXFH32N50	0119	125	100	10000	30	0	300000	
8	IXFH58N20	0116	125	100	10000	30	0	300000	
9	IXFH58N20	0119	125	100	10000	30	0	300000	
10	IXFH58N20	0119	125	100	10000	30	0	300000	
11	IXFK90N30	SP 0244	125	100	10000	24	0	240000	
12	IXFN44N80	0110	125	100	25000	24	1	600000	Rdson @ 25000 cycles
13	IXFN48N50Q	277	125	80	20000	30	0	600000	
14	IXFN55N50	558	125	80	24000	15	0	360000	
15	IXFN55N50F	377	125	80	60000	30	0	1800000	
16	IXFX27N80Q	SP 0236	125	100	10000	24	0	240000	
17	IXFX4N100Q	TP0149	125	100	10000	24	0	240000	
18	IXFX55N50	SP 0223	125	100	10000	24	0	240000	
19	IXGH26N50	0116	125	100	10000	30	0	300000	
20	IXFN80N50	276	125	80	1000	30	0	30000	

TABLE 3B: MOSFET/IGBT Module

#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	MWI35-12A7	258	125	80	10000	10	0	100000	
2	VMM300-03FP/F	217	125	60	1200000	2	0	2400000	
3	VWI6-12P1	433	125	80	10000	10	0	100000	

TABLE 3C: Thyristor/Diode Module

#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	MCC162-12	221	125	80	10000	10	0	100000	
2	MCC162-12	221	125	80	10000	10	0	100000	
3	MCC26-14	263	125	80	10000	10	0	100000	
4	MCC310-12	507	125	80	10000	10	0	100000	
5	MCC56-14io1	375	125	80	10000	10	0	100000	
6	MCC95	219	125	80	20000	10	1	200000	Rth @ 20000 cycles
7	MDD26-16	215	125	80	10000	10	0	100000	
8	MDD56-12	532	125	80	10000	10	0	100000	
9	MDD95-12	452	125	80	10000	10	0	100000	
10	MDO500-16	282	125	80	10000	10	0	100000	
11	VCO180-16io7	526	125	80	5000	10	0	50000	

TABLE 3D: Controller, Rectifier Bridge									
#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	VHF28-14	457	125	80	5000	10	0	50000	
2	VHF28-16io5	404	125	80	10000	10	0	100000	
3	VHF55-08IO7	224	125	80	2000	10	0	20000	
4	VUB120	366	125	80	50000	10	0	500000	
5	VUB60-12NO1"C"	341	125	80	1000	10	0	10000	
6	VUO110-16NO7	565	125	80	8000	10	0	80000	
7	VUO110-16NO7	565	125	80	2000	10	0	20000	
8	VUO25-16NO8	434	125	80	2000	10	0	20000	
9	VUO28-12NO7	241	125	80	18000	10	0	180000	
10	VUO28-12NO7	241	125	80	2000	10	0	20000	
11	VUO34-16	516	125	80	5000	10	0	50000	
12	VUO52-18N01	242	125	40	5000	10	0	50000	
13	VUO80-16	374	125	80	5000	10	0	50000	
14	VVZ40-12	207	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	Param. Failures	Device Cycles	Remark
1	DSEC59-06BC	304	125	80	10000	20	0	200000	
2	DSEE15-12CC	394	125	80	10000	20	0	200000	
3	DSEI120-06A	554	130	85	4000	20	0	80000	
4	DSEI2x101-06	320	125	80	2000	10	0	20000	
5	DSEI2x121-02A	483	125	80	2000	10	0	20000	
6	DSEI2x31-12B	280	125	80	5000	10	0	50000	
7	DSEI2x61-02A	205	125	80	5000	10	0	50000	
8	DSEP12-12A	363	150	105	2000	20	0	40000	
9	DSEP29-06A	468	150	105	4000	20	0	80000	
10	DSEP29-06B	474	150	105	2000	20	0	40000	
11	DSEP30-06BR	209	150	40	5000	20	0	100000	
12	DSEP60-12	236	135	90	2000	20	0	40000	
13	DSEP8-06B	552	150	105	4000	20	0	80000	
14	MEE75-12	223	150	105	5000	10	0	50000	
15	MEK350-02	485	125	80	10000	10	0	100000	
16	MEK350-02	485	125	80	10000	10	0	100000	
17	MEO550-02DA"C"	371	125	80	5000	10	0	50000	

TABLE 3F: Schottky Diode									
#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	DGS4-025A	471	145	100	4000	20	0	80000	
2	DSS20-01AR	305	125	80	10000	20	0	200000	
3	DSS2x41-01A	409	125	80	5000	10	0	50000	
4	DSS2x41-01A	409	125	80	5000	10	0	50000	
5	DSS2x61-0045A	514	125	80	5000	10	0	50000	
6	DSSK28-01A	513	125	80	2000	40	0	80000	
7	DSSK70-0015B	585	113	80	2000	20	0	40000	

TABLE 3G: Thyristor/Diode discrete device									
#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	CS29-12io1C	306	125	80	10000	20	0	200000	
2	CS45-16io1R	270	125	80	5000	20	0	100000	
3	CS45-16io1R	464	125	80	5000	20	0	100000	
4	CS8-12io2	210	125	80	2000	10	0	20000	
5	DS1-12D	470	150	125	20000	20	0	400000	
6	DSA1-16	245	125	100	8000	20	0	160000	
7	DSA1-16	245	125	100	2000	20	0	40000	
8	DSA17-16A	534	125	80	2000	10	0	20000	
9	DSA17-18A	259	136	85	2000	10	0	20000	
10	DSA2-18	342	150	125	2000	20	0	40000	
11	DSA35-18	407	150	105	2000	10	0	20000	
12	DSP25-16A	285	150	105	2000	20	0	40000	
13	DSP25-16AR	318	125	80	5000	20	0	100000	

TABLE 3H: ISOPLUS									
#	Part Number	Date Code or Test #	Tj(max) [°C]	ΔT [K]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	CS29-12io1C	306	125	80	10000	20	0	200000	
2	CS45-16io1R	270	125	80	5000	20	0	100000	
3	CS45-16io1R	464	125	80	5000	20	0	100000	
4	DSEC59-06BC	304	125	80	10000	20	0	200000	
5	DSEE15-12CC	394	125	80	10000	20	0	200000	
6	DSEP30-06BR	209	150	40	5000	20	0	100000	
7	DSP25-16AR	318	125	80	5000	20	0	100000	
8	DSS20-01AR	305	125	80	10000	20	0	200000	

TEMPERATURE CYCLE (Tables 4A ..4J)

TABLE 4A: MOSFET/IGBT discrete device									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	FII50-12E	309	-55	150	100	20	0	2000	
2	IXBH9N140G	542	-55	150	50	20	0	1000	
3	IXDH20N120D1	237	-40	150	50	20	0	1000	
4	IXDH20N120D1	420	-55	150	20	20	0	400	
5	IXDN75N120	269	-40	150	10	10	0	100	
6	IXFF24N100	315	-55	150	100	20	0	2000	
7	IXFF24N100	389	-55	150	50	20	0	1000	
8	IXFF24N100	389	-55	150	50	20	0	1000	
9	IXFH26N50	0116	-55	150	250	30	0	7500	
10	IXFH26N50	0119	-55	150	250	30	0	7500	
11	IXFH26N50	0119	-55	150	250	30	0	7500	
12	IXFH32N50	0117	-55	150	250	30	0	7500	
13	IXFH32N50	0119	-55	150	250	30	0	7500	
14	IXFH32N50	0119	-55	150	250	30	0	7500	
15	IXFH32N50Q	0120	-55	150	250	30	0	7500	
16	IXFH58N20	0116	-55	150	250	30	0	7500	
17	IXFH58N20	0119	-55	150	250	30	0	7500	
18	IXFH58N20	0119	-55	150	250	30	0	7500	
19	IXFN26N50	368	-55	150	250	30	0	7500	
20	IXFN26N50	369	-55	150	250	30	0	7500	
21	IXFN55N50	194	-40	150	100	15	0	1500	
22	IXFN55N50	194	-55	150	50	15	0	750	
23	IXFN55N50	194	-40	150	100	15	0	1500	
24	IXFN55N50	194	-55	150	50	15	0	750	
25	IXKN40N60C	267	-40	150	10	10	0	100	
26	IXTN36N50	200	-40	150	20	10	0	200	
27	IXTN36N50	200	-40	150	20	10	0	200	

TABLE 4B: MOSFET/IGBT Module									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	MUBW25-12A7	496	-40	150	50	10	0	500	
2	MUBW30-06A7	391	-40	150	50	10	0	500	
3	MUBW35-12A8	328	-40	150	100	10	0	1000	
4	MWI30-06	264	-40	125	50	10	0	500	
5	MWI30-06A7	553	-40	150	50	10	0	500	
6	VMM45-02	311	-40	150	50	10	0	500	
7	VMM85-02	247	-40	150	10	10	0	100	
8	VMM85-02	330	-40	125	100	10	0	1000	
9	VMM90-09F	425	-40	150	50	10	0	500	
10	VWI6-12P1	433	-40	150	20	10	0	200	

TABLE 4C: Thyristor/Diode Module									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	MCC162	0227	-40	150	50	12	0	600	
2	MCC220-12	244	-40	150	50	10	0	500	
3	MCC26	495	-40	150	500	12	0	6000	
4	MCC310-14io1	347	-40	150	50	10	0	500	
5	MCC44	495	-40	150	500	20	0	10000	
6	MCC44-12	469	-40	150	50	10	0	500	
7	MCC56	0227	-40	150	250	20	0	5000	
8	MCC56-14	405	-40	150	50	10	0	500	
9	MCC72-16	386	-40	150	50	10	0	500	
10	MCC95-12io1	265	-40	150	50	10	0	500	
11	MCC95-12io1	319	-40	150	50	10	0	500	
12	MCC95-12io1	319	-40	150	50	10	0	500	
13	MCD250-18	284	-40	150	50	10	0	500	
14	MCD95-12io1	211	-40	150	50	10	0	500	
15	MDD56	495	-40	150	500	20	0	10000	
16	MDD56-16	517	-40	150	50	10	0	500	
17	MDD95-08	637	-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	Param. Failures	Device Cycles	Remark
1	MLO75-12	348	-40	150	50	10	0	500	
2	MMO75	0202	-40	150	100	10	0	1000	
3	MMO75	0211	-40	150	50	20	0	1000	
4	VBH40-05	361	-40	150	10	10	0	100	
5	VBO40-16NO6	364	-40	150	10	10	0	100	
6	VBO50-16NO7	353	-40	150	10	10	0	100	
7	VHF20-16io5	404	-40	125	100	10	0	1000	
8	VHF28-08	197	-40	150	50	10	1	500	Vt @ 50 cycles
9	VHF36-16	462	-40	150	50	10	0	500	
10	VHFD29-16	531	-40	150	50	10	0	500	
11	VUB120	366	-40	150	20	10	0	200	
12	VUB120	587	-40	150	50	10	0	500	
13	VUB120	0232	-40	150	20	10	0	200	
14	VUB71	586	-40	150	50	10	0	500	
15	VUB72/16NO1	480	-40	150	50	10	0	500	
16	VUE22-12NO7	225	-40	150	10	10	0	100	
17	VUE35-06NO7	427	-40	150	10	10	0	100	
18	VUO110	617	-40	150	20	5	0	100	
19	VUO110-16NO7	565	-40	150	10	10	0	100	
20	VVY40-16	415	-40	150	50	10	0	500	
21	VVZ40-16	593	-40	150	50	10	0	500	

TABLE 4E: FRED									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	DSEC30-06A	484	-55	150	50	29	0	1450	
2	DSEC59-06BC	304	-55	150	50	20	0	1000	
3	DSEC60-03A	322	-55	150	20	20	0	400	
4	DSEC60-03AR	600	-55	150	20	20	0	400	
5	DSEE15-12CC	303	-55	150	50	20	0	1000	
6	DSEI120-06A	554	-40	150	350	20	0	7000	
7	DSEI2x101-06	320	-40	150	10	10	0	100	
8	DSEI2x121-02A	483	-40	150	10	10	0	100	
9	DSEI2x61-02A	205	-40	150	10	10	0	100	
10	DSEI60-06A	296	-40	150	50	20	0	1000	
11	DSEI8-06A	208	-40	150	20	45	0	900	
12	DSEK60-02	465	-40	150	20	20	0	400	
13	DSEP12-12A	363	-55	150	20	20	0	400	
14	DSEP130-06A	616	-55	150	50	20	0	1000	
15	DSEP130-06A	616	-55	150	50	20	0	1000	
16	DSEP15-12CR	381	-55	150	20	20	0	400	
17	DSEP29-06A	468	-55	150	50	20	0	1000	
18	DSEP29-06B	474	-55	150	20	20	0	400	
19	DSEP2x31-12A	575	-40	150	10	10	0	100	
20	DSEP2x61-12A	373	-40	150	10	10	0	100	
21	DSEP30-06CR	525	-55	150	20	20	0	400	
22	DSEP30-12A	308	-55	150	20	20	0	400	
23	DSEP30-12A	216	25	125	20	20	0	400	
24	MEK250-12	384	-40	150	50	10	0	500	
25	MEK250-12	384	-40	150	50	10	0	500	
26	MEK300-06DA "E"	227	-40	150	50	10	0	500	
27	MEO450-12I	438	-40	150	50	10	0	500	
28	MEO550-02C	257	-40	150	50	10	0	500	

TABLE 4F: Schottky Diode									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	DGS10-018AS	332	-55	150	20	20	0	400	
2	DGS19-025AS	583	-55	150	200	20	0	4000	
3	DGSK20-018A	518	-55	150	20	20	0	400	
4	DSS20-01AR	305	-55	150	50	20	0	1000	
5	DSS2x111-008A	326	-40	150	50	10	0	500	
6	DSS2x160-01A	430	-40	150	10	10	0	100	
7	DSS2x200-0008D	458	-40	150	100	10	0	1000	
8	DSS2x61-0045A	514	-40	150	10	10	0	100	
9	DSSK28-01A	513	-55	150	20	20	0	400	
10	DSSK28-01AS	442	-40	150	20	20	0	400	
11	DSSK28-01AS	442	-55	150	120	20	0	2400	
12	DSSK28-01AS	442	-55	150	20	20	0	400	
13	DSSK60-0045A	202	-55	150	50	20	0	1000	
14	DSSK60-015A	255	-55	150	50	20	0	1000	
15	DSSK60-015A	255	-55	150	50	20	1	1000	Ir @ 50 cycles
16	DSSK70-0015B	585	-55	150	20	20	0	400	
17	DSSK80-0008D	489	-55	150	50	20	1	1000	Vf @ 50 cycles

TABLE 4G: Thyristor/Diode discrete device									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	CS19-08ho1S	338	-40	150	50	20	0	1000	
2	CS23-12io2	504	-40	150	20	10	0	200	
3	CS29-12io1C	306	-40	150	50	20	0	1000	
4	CS30-16io1	556	-40	150	350	20	0	7000	
5	CS30-16io1	556	-40	150	350	20	0	7000	
6	CS30-16io1	382	-55	150	50	20	0	1000	
7	CS30-16io1	213	-40	150	50	40	0	2000	
8	CS35-14io4	365	-40	150	20	10	0	200	
9	CS45-16io1R	270	-40	150	20	20	0	400	
10	CS8-12io2	210	-40	150	20	10	0	200	
11	DSA1-18D	290	-40	150	20	20	0	400	
12	DSA17-16A	534	-40	150	20	10	0	200	
13	DSA17-18A	259	-40	150	20	10	0	200	
14	DSAI35-18	344	-40	150	20	10	0	200	
15	DSAI75-18B	439	-40	150	20	10	0	200	
16	DSI30-08AC	307	-55	150	50	20	0	1000	
17	DSIK45-16AR	608	-40	150	100	20	0	2000	
18	DSP25-16A	212	-40	150	50	20	0	1000	
19	DSP25-16A	295	-40	150	50	20	0	1000	
20	DSP25-16AR	318	-40	150	20	20	0	400	

TABLE 4H: ISOPLUS									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	CS29-12io1C	306	-40	150	50	20	0	1000	
2	CS45-16io1R	270	-40	150	20	20	0	400	
3	DSEC59-06BC	304	-55	150	50	20	0	1000	
4	DSEC60-03AR	600	-55	150	20	20	0	400	
5	DSEE15-12CC	303	-55	150	50	20	0	1000	
6	DSEK60-02	465	-40	150	20	20	0	400	
7	DSEP15-12CR	381	-55	150	20	20	0	400	
8	DSEP30-06CR	525	-55	150	20	20	0	400	
9	DSI30-08AC	307	-55	150	50	20	0	1000	
10	DSIK45-16AR	608	-40	150	100	20	0	2000	
11	DSP25-16AR	318	-40	150	20	20	0	400	
12	DSS20-01AR	305	-55	150	50	20	0	1000	
13	IXFF24N100	389	-55	150	50	20	0	1000	
14	IXFF24N100	389	-55	150	50	20	0	1000	

TABLE 4J: Breakover Diode									
#	Part Number	Date Code or Test #	Low Temp. [°C]	High Temp. [°C]	Number of Cycles	Sample Size	Param. Failures	Device Cycles	Remark
1	IXBOD1-06	521	-40	150	20	20	0	400	
2	IXBOD1-07	453	-40	150	30	20	0	600	
3	IXBOD1-07	453	-40	150	20	20	0	400	
4	IXBOD1-07	597	-40	150	50	10	0	500	
5	IXBOD1-08	261	-40	150	20	20	0	400	
6	IXBOD1-08	550	-40	150	200	20	0	4000	
7	IXBOD1-08	550	-40	150	200	20	0	4000	
8	IXBOD1-08	612	-40	150	200	20	0	4000	
9	IXBOD1-09	343	-40	150	20	20	0	400	
10	IXBOD1-09	597	-40	150	50	10	0	500	

HUMIDITY TEST (Tables 5A ..5H)

TABLE 5A: MOSFET/IGBT discrete device

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	IXBH9N160G	440	121	100	96	20	0	1920	
2	IXDN75N120	482	121	100	48	20	0	960	
3	IXEH40N120	539	121	100	96	20	0	1920	
4	IXFC26N50Q	SP 0235	125	100	168	30	0	5040	
5	IXFF24N100	389	121	100	96	20	1	1920	Idss @ 96 hrs
6	IXFF24N100	389	121	100	96	20	1	1920	Idss @ 96 hrs
7	IXFF55N50	SP 0207	125	100	168	30	0	5040	
8	IXFH26N50	0116	125	100	168	30	1	5040	Igss @ 168 hrs
9	IXFH26N50	0119	125	100	168	30	0	5040	
10	IXFH26N50	0119	125	100	168	30	0	5040	
11	IXFH32N50	0117	125	100	168	30	1	5040	Igss @ 168 hrs
12	IXFH32N50	0119	125	100	168	30	0	5040	
13	IXFH32N50	0119	125	100	168	30	0	5040	
14	IXFH32N50Q	0120	125	100	96	30	0	2880	
15	IXFH58N20	0116	125	100	168	30	0	5040	
16	IXFH58N20	0119	125	100	168	30	0	5040	
17	IXFH58N20	0119	125	100	168	30	0	5040	
18	IXFN26N50	368	121	100	168	30	1	5040	Igss @ 168 hrs
19	IXFN55N50	194	125	100	168	14	0	2352	
20	IXFN55N50	194	125	100	168	15	0	2520	
21	IXFN80N50	276	125	100	168	30	0	5040	
22	IXTN 36N50	199	125	100	96	20	0	1920	

TABLE 5B: MOSFET/IGBT Module

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	MUBW35-12A8	328	85	85	168	10	0	1680	

TABLE 5C: Thyristor/Diode Module

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	MCC132-14	589	85	85	168	10	0	1680	
2	MCC250-14	387	85	85	168	10	0	1680	
3	MCC44-12	336	85	85	168	10	0	1680	
4	MCC95-16	240	85	85	1000	10	0	10000	
5	MCC95-16	240	110	85	96	10	0	960	
6	MCD56-12io1	414	85	85	168	10	0	1680	

TABLE 5D: Controller, Rectifier Bridge

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	VHF28-08	229	85	85	168	10	0	1680	
2	VTO175-16io7	444	45	65	72	16	0	1152	
3	VUB120	412	85	85	168	10	0	1680	
4	VUB60-12NO1"C"	341	85	85	100	10	0	1000	
5	VUE22-12NO7	225	85	85	168	10	0	1680	
6	VUO160-18No7	444	45	65	72	16	0	1152	
7	VUO36-16NO8	435	85	85	168	10	0	1680	
8	VWO140-14	431	85	85	168	10	0	1680	

ABLE 5E: FRED									
#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	DSEC59-06BC	304	121	100	168	20	0	3360	
2	DSEC60-03A	322	121	100	48	20	0	960	
3	DSEE15-12CC	303	121	100	168	20	0	3360	
4	DSEI2x101-06	413	121	100	48	10	0	480	
5	DSEI2x61-06C	260	125	100	96	20	0	1920	
6	DSEI60-06A	296	125	100	168	20	0	3360	
7	DSEP130-06A	616	121	100	96	20	0	1920	
8	DSEP130-06A	616	121	100	96	20	0	1920	
9	DSEP30-06BR	209	125	100	96	20	0	1920	
10	DSEP30-06CR	525	121	100	48	20	0	960	
11	MEK250/12DA	429	85	85	168	10	0	1680	
12	MEK300-06D	399	85	85	168	10	0	1680	

TABLE 5F: Schottky Diode									
#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	DGS10-018AS	332	121	100	48	20	0	960	

TABLE 5G: Thyristor/Diode discrete device									
#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	CS29-12io1C	306	121	100	168	20	0	3360	
2	CS30-16io1	382	121	100	96	20	0	1920	
3	CS30-16io1	417	121	100	48	20	0	960	
4	CS45-16io1R	270	125	100	96	20	0	1920	
5	DSI30-08AC	307	121	100	168	29	0	4872	
6	DSP25-16A	327	121	100	432	40	0	17280	
7	DSP25-16A	388	121	100	96	20	0	1920	

TABLE 5H: ISOPLUS									
#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	CS29-12io1C	306	121	100	168	20	0	3360	
2	CS45-16io1R	270	125	100	96	20	0	1920	
3	DSEC59-06BC	304	121	100	168	20	0	3360	
4	DSEC59-06BC	304	121	100	168	20	0	3360	
5	DSEE15-12CC	303	121	100	168	20	0	3360	
6	DSEE15-12CC	303	121	100	168	20	0	3360	
7	DSEP30-06BR	209	125	100	96	20	0	1920	
8	DSEP30-06CR	525	121	100	48	20	0	960	
9	DSI30-08AC	307	121	100	168	29	0	4872	
10	IXFC26N50Q	SP 0235	125	100	168	30	0	5040	
11	IXFF24N100	389	121	100	96	20	1	1920	Idss @ 96 hrs
12	IXFF24N100	389	121	100	96	20	1	1920	Idss @ 96 hrs
13	IXFF55N50	SP 0207	125	100	168	30	0	5040	

TABLE 5J: Breakover diode									
#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Param. Failures	Device Hours [hrs]	Remark
1	IXBOD1-06	567	121	100	48	20	0	960	
2	IXBOD1-07	481	121	100	48	20	0	960	
3	IXBOD1-09	343	121	100	48	20	0	960	
4	IXBOD1-15R	228	125	100	96	20	0	1920	