



Efficiency Through Technology

**RELIABILITY REPORT
2009**

Power Semiconductor Devices

January 2006 - December 2008

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Published March 2009

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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

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

Ea: activation energy; @ HTRB Ea = 1.0 eV

@ HTGB Ea = 0.4 eV

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

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
Failure Rate [FIT] 125 °C, 60% UCL	970	15355	25940	18312	1615	2440	10944
Failure Rate [FIT] 90 °C, 60% UCL	58	919	1553	1097	97	146	655
Total Lots Tested	252	20	20	20	45	29	18
Total Devices Tested	7392	205	210	200	815	720	320
Total Actual Failures	6	1	1	0	0	1	2
Failures 60% UCL {eq. (2)}	7,3	2,0	2,0	0,92	0,92	2,0	2,1
Total Equivalent Device Hours @ 125 °C {AF eq. (1)}	7523680	130254	77100	50240	569668	819542	191888
MTTF 125 °C 60% UCL	118	7	4	6	71	47	10
(Years) 90 °C 60% UCL	1965	124	73	104	1180	781	174

Summary of Table 2A - 2C: HTGB

	Table 2A MOSFET/IGBT discrete device	Table 2B MOSFET/IGBT Module
Failure Rate [FIT] 125 °C, 60% UCL	152	4250
Failure Rate [FIT] 90 °C, 60% UCL	49	1371
Total Lots Tested	207	20
Total Devices Tested	6107	260
Total Actual Failures	0	0
Failures 60% UCL {eq. (2)}	0,92	0,92
Total Equivalent Device Hours @ 125 °C {AF eq. (1)}	6034120	216460
MTTF 125 °C 60% UCL	749	27
(Years) 90 °C 60% UCL	2321	83

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
Total Lots Tested	20	4	8	8	18	9	13
Total Devices Tested	464	109	80	80	310	284	200
Total Failures	0	0	4	2	1	1	0
Total Device Cycles	4160000	630000	1050000	490000	710000	1640088	500000

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
Total Lots Tested	17	14	33	20	38	24	26
Total Devices Tested	350	149	340	210	662	724	440
Total Failures	1	0	5	0	1	0	2
Total Device Cycles	45200	10900	25000	10900	45000	307000	20400

** Max. storage temperature specified = 125°C. For acceleration temperature cycling conditions Tmax = 150°C applied

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

	Table 5A MOSFET/IGBT discrete device	Table 5B IGBT/Mos Module	Table 5C Thyr./Diode Module	Table5D Controller/ Rec. Bridge	Table 5E FRED	Table 5F Schottky Diode	Table 5G Thyr./Diode discrete device
Total Lots Tested	10	4	6	5	17	6	4
Total Devices Tested	200	50	63	50	320	234	80
Total Failures	0	0	1	2	0	0	0
Total Device Hours	45840	25040	13080	15520	27840	21504	4800

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	IXBH40N160	1513	1280	125	168	20	0	3360	
3	IXBH6N170	TP0806	960	125	1000	30	0	30000	
4	IXBH9N160G	2446	1280	125	168	20	0	3360	
5	IXCP01N90E	K0816	720	125	1000	30	0	30000	
6	IXDH20N120D1	2065	960	125	168	20	0	3360	
7	IXEH25N120D1	2208	960	125	168	20	0	3360	
8	IXEH40N120D1	1925	960	125	168	20	1	3360	V_GE(th)
9	IXER60N120	2306	960	125	168	20	0	3360	
10	IXFA7N80P	K533	640	125	1000	30	0	30000	
11	IXFB100N50P	SP0737	460	125	1000	30	0	30000	
12	IXFB170N30P	SP0824	240	125	1000	30	0	30000	
13	IXFB44N100P	SP0721	800	125	1000	30	0	30000	
14	IXFH12N100P	SK0733	800	125	1000	30	0	30000	
15	IXFH12N120P	SP0715	960	125	1000	30	0	30000	
16	IXFH14N100Q2	SK0834	800	125	1000	30	0	30000	
17	IXFH150N17T	SK0841	136	125	1000	30	0	30000	
18	IXFH15N100P	SK0636	800	125	1000	30	0	30000	
19	IXFH20N100P	SP0716	800	125	1000	30	0	30000	
20	IXFH20N60	SK0544	480	125	1000	30	0	30000	
21	IXFH22N50P	N/A	400	125	1000	30	0	30000	
22	IXFH24N80P	SP0824	640	125	1000	30	0	30000	
23	IXFH26N50	TP0749	400	125	1000	30	0	30000	
24	IXFH26N50	SS0846	400	125	1000	30	0	30000	
25	IXFH26N60Q	SK0604	480	125	1000	30	0	30000	
26	IXFH69N30P	SK0527	240	125	1000	30	0	30000	
27	IXFK120N20	SK0834	160	125	1000	30	0	30000	
28	IXFK21N100Q	SP0737	800	125	1000	30	0	30000	
29	IXFK220N15P	SP0826	120	125	1000	30	0	30000	
30	IXFK44N55Q	SP0737	440	125	1000	30	0	30000	
31	IXFL60N80P	SP0605	640	125	1000	30	0	30000	
32	IXFN82N60P	TJ0645E	480	125	1000	30	0	30000	
33	IXFP12N50PM	K550	400	125	1000	30	0	30000	
34	IXFQ14N80P	SK0709	640	125	1000	30	0	30000	
35	IXFR12N100Q	TP0703	800	125	1000	30	0	30000	
36	IXFR14N100Q2	SP0732	800	125	1000	30	0	30000	
37	IXFR16N120P	SP0747	960	125	1000	30	0	30000	
38	IXFR26N100P	SP0742	800	125	1000	30	0	30000	
39	IXFX48N50Q	SS0846	400	125	1000	30	0	30000	
40	IXFX48N50Q	ZP0545	400	125	1000	30	0	30000	
41	IXFX73N30Q	SK0613	240	125	1000	30	0	30000	
42	IXFX80N50P	sp0712	400	125	1000	30	0	30000	
43	IXFX90N30	SK0613	240	125	1000	30	0	30000	
44	IXGA42N30C3	K732	240	125	1000	30	0	30000	
45	IXGA60N30C3	K732	240	125	1000	30	0	30000	
46	IXGH100N30C3	SK0644	240	125	1000	30	0	30000	
47	IXGH10N170	TP0817	960	125	1000	30	0	30000	
48	IXGH120N30C3	SK0638	240	125	1000	30	0	30000	
49	IXGH12N100	TP0836	800	125	1000	30	0	30000	
50	IXGH17N100	TP0848	800	125	1000	30	0	30000	
51	IXGH17N100	TP0848	800	125	1000	30	0	30000	
52	IXGH17N100	TP0848	800	125	1000	30	0	30000	
53	IXGH20N100	TP0835	800	125	1000	30	0	30000	
54	IXGH20N170P	K0716E1	960	125	1000	30	0	30000	
55	IXGH20N170P	TP0632	960	125	1000	30	0	30000	
56	IXGH24N120C3H1	TK0650	960	125	1000	30	0	30000	
57	IXGH25N250	TJ0600E	960	125	1000	30	0	30000	
58	IXGH28N60B3D1	SP0732	480	125	1000	30	0	30000	
59	IXGH2N100	TP0835	800	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
60	IXGH30N120B3	TP0606	960	125	1000	30	0	30000	
61	IXGH32N100A3	TK0720	800	125	1000	30	0	30000	
62	IXGH32N170	TP0831	960	125	1000	30	0	30000	
63	IXGH36N60B3D1	SP0732	480	125	1000	30	0	30000	
64	IXGH48N60B3	SK0607	480	125	1000	30	0	30000	
65	IXGH48N60C3	SK0732	480	125	1000	30	0	30000	
66	IXGH48N60C3D1	SP0733	480	125	1000	30	0	30000	
67	IXGH50N60B	SK0634	480	125	1000	30	0	30000	
68	IXGH60N60C3	SK0732	480	125	1000	30	0	30000	
69	IXGH64N60B3	SK0608	480	125	1000	30	0	30000	
70	IXGH72N60B3	SK0608	480	125	1000	30	0	30000	
71	IXGH72N60C3	SK0751	480	125	1000	30	0	30000	
72	IXGH85N30C3	SK0644	240	125	1000	30	0	30000	
73	IXGH8N100	TP0824	800	125	1000	30	0	30000	
74	IXGH8N100	TP0826	800	125	1000	30	0	30000	
75	IXGH8N100	TP0835	800	125	1000	30	0	30000	
76	IXGH8N100	N/N	800	125	1000	30	0	30000	
77	IXGK28N140B3H1	TP0651	960	125	1000	30	0	30000	
78	IXGN200N60A2	SP0723	480	125	1000	30	0	30000	
79	IXGN60N60C2D1	SP0745	480	125	1000	30	0	30000	
80	IXGP120N33TBM-A	K723	264	125	1000	30	0	30000	
81	IXGP50N33TBM-A	K0651	264	125	1000	30	0	30000	
82	IXGP50N33TC	K0652	264	125	1000	30	0	30000	
83	IXGP70N33TBM-A	K726	264	125	1000	30	0	30000	
84	IXGP70N33TBM-A	K728	264	125	1000	30	0	30000	
85	IXGP90N33TB	K06251	264	125	1000	30	0	30000	
86	IXGP90N33TBM-A	K06251	264	125	1000	30	0	30000	
87	IXGQ120N30TCD1	SK0631	240	125	1000	30	0	30000	
88	IXGQ120N33TB	SK0651	264	125	1000	30	0	30000	
89	IXGQ120N33TCD1	SK0639	264	125	1000	30	0	30000	
90	IXGQ150N30TCD1	SK0631	240	125	1000	30	0	30000	
91	IXGQ150N33TCD1	SK0639	264	125	1000	30	0	30000	
92	IXGQ160N30PB	SK0601	240	125	1000	60	0	60000	
93	IXGQ160N30PB	SK0601	240	125	1000	30	0	30000	
94	IXGQ160N30PB	SK0601	240	125	1000	30	0	30000	
95	IXGQ160N30PB	SK0601	240	125	1000	30	0	30000	
96	IXGQ180N33TB	SK0711	264	125	1000	30	0	30000	
97	IXGQ180N33TC	SK0649	264	125	1000	30	0	30000	
98	IXGQ180N33TCD1	SK0639	264	125	1000	30	0	30000	
99	IXGQ200N30PB	SK0631	240	125	1000	30	0	30000	
100	IXGQ240N30PB	SK0631	240	125	1000	30	0	30000	
101	IXGQ240N30PB	SK0631	240	125	1000	30	0	30000	
102	IXGQ240N30PB	SK0631	240	125	1000	30	0	30000	
103	IXGQ240N30PB	SK0631	240	125	1000	30	0	30000	
104	IXGQ70N33TB	SK0650	264	125	1000	30	0	30000	
105	IXGQ85N33PCD1	SK0613	264	125	1000	27	0	27000	
106	IXGQ85N33PCD1	SK0638	264	125	1000	30	0	30000	
107	IXGQ86N30PB	K0543	240	125	1000	30	0	30000	
108	IXGQ90N27PB	SK0621	216	125	1000	30	0	30000	
109	IXGQ90N27PB	SK0640	216	125	1000	30	0	30000	
110	IXGQ90N30TCD1	SK0631	240	125	1000	30	0	30000	
111	IXGQ90N33TC	SK0649	264	125	1000	30	0	30000	
112	IXGQ90N33TCD1	SK0639	264	125	1000	30	0	30000	
113	IXGQ90N33TCD1	SK0728	264	125	1000	30	0	30000	
114	IXGR120N60C2	SP0722	480	125	1000	30	0	30000	
115	IXGR48N60C3D1	SP0722	480	125	1000	30	0	30000	
116	IXGR60N60C2C1	SP0850	480	125	1000	30	0	30000	
117	IXGX120N60B	SP0719	480	125	1000	30	0	30000	
118	IXGX120N60B3	SP0806	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
119	IXGX72N60B3H1	SP0739	480	125	1000	30	0	30000	
120	IXGX72N60B3H1	SP0809	480	125	1000	30	0	30000	
121	IXKC13N80C	1769	640	125	1000	20	0	20000	
122	IXKC25N80C	1590	640	125	1000	20	0	20000	
123	IXKH20N60C5	1631	480	125	1000	20	0	20000	
124	IXKH35N60C5	2098	480	125	1000	20	0	20000	
125	IXKH35N60C5	2245	480	125	1000	20	0	20000	
126	IXKH35N60CS	1984	480	125	168	20	0	3360	
127	IXKH35N60CS	1986	480	125	168	20	0	3360	
128	IXKN75N60C	2121	480	125	168	10	0	1680	
129	IXKP10N60C5M	1693	480	150	1000	20	0	20000	
130	IXKP13N60C5M	1716	480	150	1000	20	0	20000	
131	IXKP20N60C5	1653	480	125	1000	20	0	20000	
132	IXKP24N60C5	1671	480	150	800	20	0	16000	
133	IXKR25N80C	1521	640	125	168	20	0	3360	
134	IXKT70N60C5	2068	480	125	1000	20	0	20000	
135	IXSH30N60B2D1	SP0506	480	125	1000	30	0	30000	
136	IXSK40N60CD1	SK0722	480	125	1000	30	0	30000	
137	IXTA06N120P	K832	960	125	1000	30	0	30000	
138	IXTA180N10T	K746	80	125	1000	30	0	30000	
139	IXTA1N80	K707	640	125	1000	30	0	30000	
140	IXTA36N30P	SK0603	240	125	1000	30	0	30000	
141	IXTA36N30P	K0621	240	125	1000	30	0	30000	
142	IXTA36N30P	K640	240	125	1000	30	0	30000	
143	IXTA50N25T	K545	200	125	1000	30	0	30000	
144	IXTA50N28T	K0606	224	125	1000	30	2	30000	no deviations after 168h
145	IXTA50N28T	K634	224	125	1000	30	0	30000	
146	IXTA50N28T	K640	224	125	1000	30	0	30000	
147	IXTA60N20T	K545	160	125	1000	30	0	30000	
148	IXTA60N20T	SK0601	160	125	1000	30	0	30000	
149	IXTA75N10P	K0531	80	125	1000	30	0	30000	
150	IXTA76N25T	K0704	200	125	1000	25	0	25000	
151	IXTC110N25T	SP0721	200	125	1000	30	0	30000	
152	IXTC200N075T	SP0627	60	125	1000	30	0	30000	
153	IXTD200N055T2V5	2347	44	150	1000	20	0	20000	
154	IXTH03N100P	TP0844	800	125	1000	70	0	70000	
155	IXTH05N100	TP0829	800	125	1000	30	0	30000	
156	IXTH05N100	TP0843	800	125	1000	30	3	30000	no deviations after 168h
157	IXTH08N100P	TP0848	800	125	1000	30	0	30000	
158	IXTH10P50P	SP0723	400	125	1000	30	0	30000	
159	IXTH110N25T	SP0832	200	125	1000	30	0	30000	
160	IXTH130N20T	SP0721	160	125	1000	30	0	30000	
161	IXTH150N17T	SK0718	140	125	1000	30	0	30000	
162	IXTH160N075T	K751	60	125	1000	30	0	30000	
163	IXTH160N15T	SK0721	120	125	1000	30	0	30000	
164	IXTH170N075T2	SP0829	60	125	1000	30	0	30000	
165	IXTH1N80P	TP0604	640	125	1000	30	0	30000	
166	IXTH220N04T2	SP0743	32	125	1000	30	0	30000	
167	IXTH30N50L	TK0738	400	125	1000	30	0	30000	
168	IXTH3N100P	TP0639	800	125	1000	30	0	30000	
169	IXTH76N25T	SP0613	200	125	1000	30	0	30000	
170	IXTH86N25T	SP0638	200	125	1000	30	0	30000	
171	IXTH8P50	SK0712	400	125	1000	30	0	30000	
172	IXTK102N30P	SP0839	240	125	1000	30	0	30000	
173	IXTK180N15P	SP0552	120	125	1000	30	0	30000	
174	IXTK250N10	SP0721	80	125	1000	30	0	30000	
175	IXTK34N80	SP0546	640	125	1000	30	0	30000	
176	IXTK34N80	SP0603	640	125	1000	30	0	30000	
177	IXTK34N80	SP0603	640	125	1000	30	0	30000	
178	IXTN17N120L	TP0813	960	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
179	IOTP05N100M	K0829	800	125	1000	30	0	30000	
180	IOTP06N120P	K833	960	125	1000	30	0	30000	
181	IOTP08N100P	K625	800	125	1000	30	0	30000	
182	IOTP08N120P	K0709	960	125	1000	30	0	30000	
183	IOTP110N055T2	K0745	44	125	1000	30	0	30000	
184	IOTP130N10T	K834	80	125	1000	30	0	30000	
185	IOTP14N60PM	K631	480	125	1000	30	0	30000	
186	IOTP14N60PM	K643	480	125	1000	30	0	30000	
187	IOTP160N075T	K0707	60	125	1000	30	0	30000	
188	IOTP170N075T2	K0811	60	125	1000	30	0	30000	
189	IOTP17N30T	K648	240	125	1000	30	0	30000	
190	IOTP18N60PM	K631	480	125	1000	30	0	30000	
191	IOTP18P10T	K751	80	125	1000	30	0	30000	
192	IOTP1N100	K820	800	125	1000	30	0	30000	
193	IOTP1N100P	K636	800	125	1000	30	0	30000	
194	IOTP1R4N100P	K636	800	125	1000	30	0	30000	
195	IOTP1R4N120P	K638	960	125	1000	30	0	30000	
196	IOTP200N055T2	K0750	44	125	1000	30	0	30000	
197	IOTP24P085T	K0750	68	125	1000	30	0	30000	
198	IOTP2R4N120P	K636	960	125	1000	30	0	30000	
199	IOTP32N20T	K647	160	125	1000	30	0	30000	
200	IOTP36N15T	K648	120	125	1000	30	0	30000	
201	IOTP36N25T	K636	200	125	1000	30	0	30000	
202	IOTP36N30P	K841	240	125	1000	30	0	30000	
203	IOTP36N30P	SS0842	240	125	1000	30	0	30000	
204	IOTP36N30T	K641	240	125	1000	30	0	30000	
205	IOTP44N25T	K636	200	125	1000	30	0	30000	
206	IOTP50N25T	K738	200	125	1000	30	0	30000	
207	IOTP52P10P	K746	80	125	1000	30	0	30000	
208	IOTP56N15T	K636	120	125	1000	30	0	30000	
209	IOTP62N25T	K648	200	125	1000	30	0	30000	
210	IOTP74N15T	K636	120	125	1000	30	0	30000	
211	IOTP76N075T	K640	60	125	1000	30	0	30000	
212	IOTP76N075T	K726	60	125	1000	30	0	30000	
213	IOTP76N075T	SS0728	60	125	1000	30	0	30000	
214	IOTP8N50P	AK732	400	125	1000	30	0	30000	
215	IOTP8N50P	K646	400	125	1000	30	0	30000	
216	IOTP90N15T	K647	120	125	1000	30	0	30000	
217	IOTP98N075T	K746	60	125	1000	30	0	30000	
218	IOTQ140N10P	SK0807	80	125	1000	30	0	30000	
219	IOTQ170N10P	SK0802	80	125	1000	30	0	30000	
220	IOTQ182N055T	SK0612	44	125	1000	30	0	30000	
221	IOTQ22N50P	SS0633	400	125	1000	30	0	30000	
222	IOTQ22N60P	SK0539	480	125	1000	30	0	30000	
223	IOTQ22N60P	SK0604	480	125	1000	30	0	30000	
224	IOTQ22N60P	SK0609	480	125	1000	30	0	30000	
225	IOTQ22N60P	SK0608	480	125	1000	30	0	30000	
226	IOTQ22N60P	SK0608	480	125	1000	30	0	30000	
227	IOTQ22N60P	SK0609	480	125	1000	30	0	30000	
228	IOTQ22N60P	SK0609	480	125	1000	30	0	30000	
229	IOTQ26N50P	SK0604	400	125	1000	30	0	30000	
230	IOTQ26P20P	SK0746	160	125	1000	30	0	30000	
231	IOTQ28N15P	SK0653	120	125	1000	30	0	30000	
232	IOTQ30N50L2	TK0813	400	125	1000	30	0	30000	
233	IOTQ36P15P	SK0652	120	125	1000	30	0	30000	
234	IOTQ44N30T	SK0629	240	125	1000	30	0	30000	
235	IOTQ44N50P	K751	400	125	1000	30	0	30000	
236	IOTQ64N25P	SK0535	200	125	1000	30	0	30000	
237	IOTQ74N20P	SK0515	160	125	1000	30	0	30000	
238	IOTQ75N10P	SK0838	80	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
239	IXTQ76N25T	SK0613	200	125	1000	30	0	30000	
240	IXTQ82N25T	SK0603	200	125	1000	30	0	30000	
241	IXTQ88N28T	SK0641	224	125	1000	30	0	30000	
242	IXTQ88N28T	SK0545	224	125	1000	30	0	30000	
243	IXTQ88N30P	SK00742	240	125	1000	30	0	30000	
244	IXTQ88N30P	SK0605	240	125	1000	30	0	30000	
245	IXTQ88N30T	SK0638	240	125	1000	30	0	30000	
246	IXTQ96N20P	SS0631	160	125	1000	30	0	30000	
247	IXTQ96N25T	SK0648	200	125	1000	30	0	30000	
248	IXTT88N30P	SP0626	240	125	1000	30	0	30000	
249	IXTV18N60PS	SP0636	480	125	1000	30	0	30000	
250	IXTV230N085TS	SP0629	68	125	1000	30	0	30000	
251	IXTX24N100	SK0824	800	125	1000	30	0	30000	
252	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	Converter tested
3	MIAA20WD600TMH	1844	480	125	1000	10	0	10000	Inverter tested
4	MID145-12A3	2031	960	125	168	10	0	1680	
5	MID145-12A3	2031	960	125	168	10	0	1680	
6	MIXA40WB1200TED	2294	960	125	1000	20	1	20000	parametric failures
7	MKI75-06A7T	1847	480	125	168	10	0	1680	
8	MKI80-06T6K	1818	480	125	168	10	0	1680	
9	MUBW15-12A6K	2295	960	125	1000	10	0	10000	
10	MUBW15-12A6K	2348	960	125	1000	10	0	10000	
11	MUBW35-12E7	1632	960	125	168	10	0	1680	
12	MUBW36-12E7	1898	960	125	1000	10	0	10000	
13	MUBW50-12E8	2107	960	125	168	9	0	1512	
14	MUBW50-12T8	1777	960	125	1000	10	0	10000	
15	MWI150-12T8T	1897	960	125	1000	10	0	10000	
16	MWI30-06A7T	2069	480	125	168	10	0	1680	
17	MWI35-12T7T	2420	960	125	1000	10	0	10000	
18	VMM85-02F	2204	160	125	168	10	0	1680	
19	VMO1600-02P	2123	160	125	1000	10	0	10000	
20	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	MCC162-16io1	1593	1120	125	168	10	0	1680	
4	MCC21-16io8	1812	1120	125	168	10	0	1680	
5	MCC26-16io1	1539	1120	125	168	10	0	1680	
6	MCC310-16	1696	1120	125	168	10	0	1680	
7	MCC312-16	2235	1120	125	1000	10	0	10000	
8	MCC44-16io1	1747	1120	125	168	10	0	1680	
9	MCC44-16io1	2006	1120	125	168	10	0	1680	
10	MCC56-16io1	2200	1120	125	168	10	0	1680	
11	MCC95-18	2427	1260	125	595	10	0	5950	
12	MCC95-18	2429	1260	125	595	10	1	5950	
13	MCC95-16io1	1701	1120	125	168	10	0	1680	
14	MCC95-16io1	1862	1120	125	168	10	0	1680	
15	MCC95-16io1	2081	1120	125	168	10	0	1680	
16	MCD56-16io1	1587	1120	125	168	10	0	1680	
17	MDD172-16n1	1554	1120	125	168	10	0	1680	
18	MDD172-16n1	2344	1120	125	168	10	0	1680	
19	MDD56-18	2323	1260	125	1000	20	0	20000	
20	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	VBO19-16DTI	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	960	125	168	10	0	1680	
10	VUB72-16No1	2004	960	125	168	10	0	1680	
11	VUB72-16No1	2004	1120	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	1863	1260	125	1000	10	0	10000	
15	VUO34-18NO1	1861	1260	125	168	10	0	1680	
16	VUO36-16NO8	2086	1120	125	168	10	0	1680	
17	VUO52-16NO1	2179	1120	125	168	10	0	1680	
18	VUO60-16NO3	2326	1120	125	168	10	0	1680	
19	VWO140-16io1	2269	1120	125	168	10	0	1680	
20	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	DPG10I300PA	2177	240	125	1000	20	0	20000	
12	DPG10I400PA	2244	320	125	1000	20	0	20000	
13	DPG15I400PM	1770	320	125	1000	20	0	20000	
14	DPG20C200PN	1692	240	125	1000	20	0	20000	
15	DPG20C400PN	1768	320	125	1000	20	0	20000	
16	DPG30C200PC	2230	160	125	1000	20	0	20000	
17	DPG30C300HB	1644	240	125	1000	20	0	20000	
18	DPG30C300PB	1923	240	125	1000	20	0	20000	
19	DPG60C200HB	2229	160	125	1000	20	0	20000	
20	DPG60C200QB	1608	160	125	1000	20	0	20000	
21	DPG60C300HB	1525	240	125	1000	20	0	20000	
22	DPG60C300QB	1481	240	125	1000	20	0	20000	
23	DPG60IM300PC	1643	240	125	1000	20	0	20000	
24	DPH30IS600HI	2150	480	125	1000	20	0	20000	
25	DSEC29-02A	2137	160	125	168	20	0	3360	
26	DSEC60-02Aq	1929	160	125	168	20	0	3360	
27	DSEI12-12A	2192	960	125	168	20	0	3360	
28	DSEI2x31-06C	1563	480	125	168	10	0	1680	
29	DSEI2x61-12B	1607	960	125	168	10	0	1680	
30	DSEI2x61-12B	2324	960	125	168	10	0	1680	
31	DSEK60-02A	2314	160	125	168	20	0	3360	
32	DSEP15-06A	2020	480	125	168	20	0	3360	
33	DSEP29-03	1954	240	125	168	20	0	3360	
34	DSEP2x61-06A	2194	480	125	168	10	0	1680	
35	DSEP2x61-12A	1984	960	125	168	10	0	1680	
36	DSEP30-06A	2440	480	125	168	20	0	3360	
37	DSEP30-06BR	1952	480	125	168	20	0	3360	
38	DSEP30-12AR	1634	960	125	168	20	0	3360	
39	DSEP60-03A	1537	240	125	168	20	0	3360	
40	DSEP60-06A	1572	480	125	168	20	0	3360	
41	DSEP75-06AR	1619	480	125	1000	20	0	20000	
42	DSEP8-03AS	1738	240	125	1000	20	0	20000	
43	MEK95-06E	2157	480	125	168	10	0	1680	
44	MEO450-12	1826	960	125	186	6	0	1116	
45	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	1851	100	125	168	20	1	3360	L_R
4	DSA30C100HB	1981	100	125	1000	20	0	20000	
5	DSA30C100PN	1906	100	125	1000	20	0	20000	
6	DSA30C45HB	1714	45	125	1000	20	0	20000	
7	DSA50C100HB	2376	100	125	1000	60	0	60000	
8	DSA60C100PB	1781	100	125	1000	16	0	16000	
9	DSA70C100HB	1782	100	125	1000	20	0	20000	
10	DSA70C150HB	2261	150	125	1000	20	0	20000	
11	DSA90C200HB	1674	200	125	1000	20	0	20000	
12	DSA90C200HB	2117	200	125	168	20	0	3360	
13	DSB10I45PM	1942	36	100	168	20	0	3360	
14	DSB15M45IB	1622	36	100	1000	20	0	20000	
15	DSB30C30PB	1718	24	100	1000	20	0	20000	
16	DSB30C45PB	1783	36	100	1000	20	0	20000	
17	DSB30C60PB	1672	60	125	1000	20	0	20000	
18	DSB40C15PB	1673	12	100	1000	20	0	20000	
19	DSS10-0045B	2019	36	100	168	20	0	3360	
20	DSS20-0015B	1871	12	100	168	20	0	3360	
21	DSS20-01AC	1709	100	125	1000	20	0	20000	
22	DSS2x41-01A	2039	100	125	168	10	0	1680	
23	DSS6-015AS	1723	150	150	1000	77	0	77000	
24	DSS6-015AS	1838	150	150	1000	77	0	77000	
25	DSSK38-0025B	1982	20	100	168	20	0	3360	
26	DSSK48-0025B	2193	25	100	1000	20	0	20000	
27	DSSK60-015A	1600	150	125	168	20	0	3360	
28	DSSK60-015AR	1857	150	125	168	20	0	3360	
29	DSSK80-006B	2171	48	100	1000	20	0	20000	

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	CMA30E1600PN	1935	1120	125	1000	20	1	20000	parametric failures
2	CS20-12io1	2191	980	125	168	20	0	3360	
3	CS22-08io1M	2014	560	125	168	20	0	3360	
4	CS22-08io1M	2186	560	125	168	20	0	3360	
5	CS30-16io1	1855	1120	125	168	20	0	3360	
6	CS30-16io1DCSN	1920	1120	125	1000	20	1	20000	parametric failures
7	CS35-14	2008	980	125	168	10	0	1680	
8	CS45-16io1	1808	1120	125	168	20	0	3360	
9	CS60	2239	1120	125	1000	20	0	20000	
10	CS60-16io1	1830	1120	125	1000	20	0	20000	
11	CS8-12io2	1605	1280	125	168	10	0	1680	
12	DSA1-16D	2023	1120	150	168	20	0	3360	
13	DSA1-16D	2120	1120	150	168	20	0	3360	
14	DSA9-18F	2154	1260	150	168	10	0	1680	
15	DSAI75-16B	1858	1120	150	168	10	0	1680	
16	DSDI60-16A	1569	1280	125	168	20	0	3360	
17	DSP25-16	1564	1120	150	168	20	0	3360	
18	DSP25-16	2016	1120	150	168	20	0	3360	

TABLE 1J: Breakover Diode

#	Part Number	Date Code or Test #	Voltage [V]	Temp. [°C]	Time [hrs]	Sample Size	Failures	Device Hours [hrs]	Remark
1	IXBOD 1	2252	640	125	1000	20	0	20000	
2	IXBOD1-08	1941	640	125	168	20	0	3360	
3	IXBOD1-09	1800	800	125	168	20	0	3360	
	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	IXBH42N170	TP0828	16	125	1000	30	0	30000	
3	IXCP01N90E	K0816	16	125	1000	30	0	30000	
4	IXDN55N120D1	2122	16	150	168	20	0	3360	
5	IXDN75N120	1606	16	150	168	10	0	1680	
6	IXEH25N120D1	1757	16	150	168	20	0	3360	
7	IXEH25N120D1	2208	16	150	168	20	0	3360	
8	IXEH40N120D1	1482	16	150	168	20	0	3360	
9	IXER35N120D1	1950	16	150	168	20	0	3360	
10	IXFA7N80P	K533	16	125	1000	30	0	30000	
11	IXFB100N50P	SP0737	16	125	1000	30	0	30000	
12	IXFB170N30P	SP0824	16	125	1000	30	0	30000	
13	IXFB44N100P	SP0721	16	125	1000	30	0	30000	
14	IXFH12N100P	SK0733	16	125	1000	30	0	30000	
15	IXFH12N120P	TJ1041E	16	125	1000	30	0	30000	
16	IXFH14N100Q2	SK0834	16	125	1000	30	0	30000	
17	IXFH150N17T	SK0841	16	125	1000	30	0	30000	
18	IXFH15N100P	SK0636	16	125	1000	30	0	30000	
19	IXFH20N100P	SP0716	16	125	1000	30	0	30000	
20	IXFH26N50	TP0749	16	125	1000	30	0	30000	
21	IXFH26N50	SS0846	16	125	1000	30	0	30000	
22	IXFH26N60Q	SK0604	16	125	1000	30	0	30000	
23	IXFK120N20	SK0834	16	125	1000	30	0	30000	
24	IXFK21N100Q	SP0737	16	125	1000	30	0	30000	
25	IXFK220N15P	SP0826	16	125	1000	30	0	30000	
26	IXFK44N55Q	SP0737	16	125	1000	30	0	30000	
27	IXFL100N50P	SP0549	16	125	1000	30	0	30000	
28	IXFL60N80P	SP0605	16	125	1000	30	0	30000	
29	IXFL82N60P	SP0550	16	125	1000	30	0	30000	
30	IXFP12N50PM	K550	16	125	1000	30	0	30000	
31	IXFP4B100Q	K816	16	125	1000	30	0	30000	
32	IXFQ14N80P	SK0709	16	125	1000	30	0	30000	
33	IXFR12N100Q	TP0703	16	125	1000	30	0	30000	
34	IXFR14N100Q2	SP0732	16	125	1000	30	0	30000	
35	IXFR26N100P	TJ1159E	16	125	1000	30	0	30000	
36	IXFX48N50Q	SS0846	16	125	1000	30	0	30000	
37	IXFX73N30Q	SK0613	16	125	1000	30	0	30000	
38	IXFX90N30	SK0613	16	125	1000	30	0	30000	
39	IXGA42N30C3	K732	16	125	1000	30	0	30000	
40	IXGA42N30C3	K732	16	125	1000	30	0	30000	
41	IXGA60N30C3	K732	16	125	1000	30	0	30000	
42	IXGA60N30C3	K732	16	125	1000	30	0	30000	
43	IXGH100N30C3	SK0644	16	125	1000	30	0	30000	
44	IXGH100N30C3	SK0644	16	125	1000	30	0	30000	
45	IXGH120N30C3	SK0638	16	125	1000	30	0	30000	
46	IXGH120N30C3	SK0638	16	125	1000	30	0	30000	
47	IXGH12N100	TP0836	16	125	1000	30	0	30000	
48	IXGH1889	TP0736	16	125	1000	30	0	30000	
49	IXGH20N170P	K0716E1	20	125	1000	30	0	30000	
50	IXGH24N120C3H1	TK0650	16	125	1000	30	0	30000	
51	IXGH28N60B3	SK0608	16	125	1000	30	0	30000	
52	IXGH30N120B3	TP0606	16	125	1000	30	0	30000	
53	IXGH32N170	TP0831	16	125	1000	30	0	30000	
54	IXGH48N60B3	SK0607	16	125	1000	30	0	30000	
55	IXGH48N60C3	SK0732	16	125	1000	30	0	30000	
56	IXGH48N60C3D1	SP0733	16	125	1000	30	0	30000	
57	IXGH50N60B	SK0634	16	125	1000	30	0	30000	
58	IXGH60N60C3	SK0732	16	125	1000	30	0	30000	
59	IXGH64N60B3	SK0608	16	125	1000	30	0	30000	
60	IXGH72N60B3	SK0608	16	125	1000	30	0	30000	
61	IXGH72N60C3	SK0751	16	125	1000	30	0	30000	
62	IXGH85N30C3	SK0644	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
63	IXGH85N30C3	SK0644	16	125	1000	30	0	30000	
64	IXGH8N100	TP0824	16	125	1000	30	0	30000	
65	IXGK120N120A3	TP0716	16	125	1000	30	0	30000	
66	IXGN200N60A2	SP0723	16	125	1000	30	0	30000	
67	IXGN60N60C2D1	SP0745	16	125	1000	30	0	30000	
68	IXGP120N33TBM-A	K723	16	125	1000	30	0	30000	
69	IXGP24N120C3	K0652	16	125	1000	30	0	30000	
70	IXGP50N33TBM-A	K0651	16	125	1000	30	0	30000	
71	IXGP50N33TC	K0652	16	125	1000	30	0	30000	
72	IXGP70N33TBM-A	K726	16	125	1000	13	0	13000	
73	IXGP90N33TBM-A	K06251	16	125	1000	30	0	30000	
74	IXGQ120N30TCD1	SK0631	16	125	1000	30	0	30000	
75	IXGQ120N33TCD1	SK0639	16	125	1000	30	0	30000	
76	IXGQ150N30TCD1	SK0631	16	125	1000	30	0	30000	
77	IXGQ150N33TCD1	SK0639	16	125	1000	30	0	30000	
78	IXGQ160N30PB	SK0601	16	125	1000	30	0	30000	
79	IXGQ160N30PB	SK0601	16	125	1000	30	0	30000	
80	IXGQ160N30PB	SK0601	16	125	1000	30	0	30000	
81	IXGQ180N30TCD1	SK0632	16	125	1000	30	0	30000	
82	IXGQ180N33TB	SK0711	16	125	1000	30	0	30000	
83	IXGQ180N33TC	SK0649	16	125	1000	30	0	30000	
84	IXGQ180N33TCD1	SK0639	16	125	1000	30	0	30000	
85	IXGQ200N30PB	SK0631	16	125	1000	30	0	30000	
86	IXGQ240N30PB	SK0631	16	125	1000	30	0	30000	
87	IXGQ70N33TB	SK0650	16	125	1000	30	0	30000	
88	IXGQ85N33PCD1	SK0613	16	125	1000	27	0	27000	
89	IXGQ85N33PCD1	SK0638	16	125	1000	30	0	30000	
90	IXGQ90N27PB	SK0611	16	125	1000	30	0	30000	
91	IXGQ90N27PB	SK0640	16	125	1000	30	0	30000	
92	IXGQ90N30TCD1	SK0631	16	125	1000	30	0	30000	
93	IXGQ90N33TB	SK0651	16	125	1000	30	0	30000	
94	IXGQ90N33TC	SK0649	16	125	1000	30	0	30000	
95	IXGQ90N33TCD1	SK0639	16	125	1000	30	0	30000	
96	IXGQ90N33TCD1	SK0728	16	125	1000	20	0	20000	
97	IXGQ90N33TCD4	SK0721	16	125	1000	30	0	30000	
98	IXGR120N60C2	SP0722	16	125	1000	30	0	30000	
99	IXGR40N60C2D1	SP0807	16	125	1000	30	0	30000	
100	IXGR40N60C2D1	SP0819	16	125	1000	30	0	30000	
101	IXGR40N60C2D1	SP0838	16	125	1000	30	0	30000	
102	IXGR40N60C2D1	SP0635	16	125	1000	30	0	30000	
103	IXGR48N60C3D1	SP0722	16	125	1000	30	0	30000	
104	IXGX72N60B3H1	SP0739	16	125	1000	30	0	30000	
105	IXGX72N60B3H1	SP0809	16	125	1000	77	0	77000	
106	IXKH70N60C5	1926	16	150	168	20	0	3360	
107	IXKP13N60C5M	1716	16	150	1000	20	0	20000	
108	IXLF19N250A	2161	16	150	168	20	0	3360	
109	IXSH30N60B2D1	SP0506	16	125	1000	30	0	30000	
110	IXSK40N60CD1	SK0722	16	125	1000	30	0	30000	
111	IXTA06N120P	K832	16	125	1000	30	0	30000	
112	IXTA180N10T	K746	16	125	1000	30	0	30000	
113	IXTA1N80	K707	16	125	1000	30	0	30000	
114	IXTA36N30P	SK0603	16	125	1000	30	0	30000	
115	IXTA36N30P	K0621	16	125	1000	30	0	30000	
116	IXTA36N30P	K640	16	125	1000	30	0	30000	
117	IXTA50N25T	SK0604	16	125	1000	30	0	30000	
118	IXTA50N28T	K545	16	125	1000	30	0	30000	
119	IXTA50N28T	K0606	16	125	1000	30	0	30000	
120	IXTA50N28T	K634	16	125	1000	30	0	30000	
121	IXTA50N28T	K640	16	125	1000	30	0	30000	
122	IXTA60N20T	SK0601	16	125	1000	30	0	30000	
123	IXTA76N25T	K0704	16	125	1000	30	0	30000	
124	IXTC110N25T	SP0721	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
125	IXTC200N075T	SP0627	16	125	1000	30	0	30000	
126	IXTD200No55T2V5	2347	16	150	1000	20	0	20000	
127	IXTH110N25T	SP0832	16	125	1000	30	0	30000	
128	IXTH130N20T	SP0721	16	125	1000	30	0	30000	
129	IXTH150N17T	SK0718	16	125	1000	30	0	30000	
130	IXTH160N075T	K751	16	125	1000	30	0	30000	
131	IXTH160N15T	SK0721	16	125	1000	30	0	30000	
132	IXTH170N075T2	SP0829	16	125	1000	30	0	30000	
133	IXTH1N250	TP0638	16	125	1000	30	0	30000	
134	IXTH220N04T2	SP0743	16	125	1000	30	0	30000	
135	IXTH30N50L	TK0738	16	125	1000	30	0	30000	
136	IXTH76N25T	SP0613	16	125	1000	30	0	30000	
137	IXTH86N25T	SP0638	16	125	1000	30	0	30000	
138	IXTH8P50	SK0712	16	125	1000	30	0	30000	
139	IXTK102N30P	SP0839	16	125	1000	30	0	30000	
140	IXTK180N15P	SP0552	16	125	1000	30	0	30000	
141	IXTK250N10	SP0721	16	125	1000	30	0	30000	
142	IXTN17N120L	TP0813	16	125	1000	30	0	30000	
143	IXTN79N20	2052	16	150	168	20	0	3360	
144	IXTP05N100	K816	16	125	1000	30	0	30000	
145	IXTP06N120P	K833	16	125	1000	30	0	30000	
146	IXTP08N100P	K625	16	125	1000	30	0	30000	
147	IXTP08N120P	K0709	16	125	1000	30	0	30000	
148	IXTP110N055T2	K0745	16	125	1000	30	0	30000	
149	IXTP130N10T	K834	16	125	1000	30	0	30000	
150	IXTP14N60PM	K631	16	125	1000	30	0	30000	
151	IXTP14N60PM	K643	16	125	1000	30	0	30000	
152	IXTP160N075T	K0707	16	125	1000	30	0	30000	
153	IXTP170N075T2	K0811	16	125	1000	30	0	30000	
154	IXTP17N30T	K648	16	125	1000	30	0	30000	
155	IXTP18N60PM	K631	16	125	1000	30	0	30000	
156	IXTP18P10T	K751	16	125	1000	30	0	30000	
157	IXTP1R4N120P	K638	16	125	1000	30	0	30000	
158	IXTP200N055T2	K0750	16	125	1000	30	0	30000	
159	IXTP24P085T	K0750	16	125	1000	30	0	30000	
160	IXTP2R4N120P	K636	16	125	1000	30	0	30000	
161	IXTP2R4N120P	K816	16	125	1000	30	0	30000	
162	IXTP32N20T	K647	16	125	1000	30	0	30000	
163	IXTP36N15T	K648	16	125	1000	30	0	30000	
164	IXTP36N25T	K636	16	125	1000	30	0	30000	
165	IXTP36N30P	K841	16	125	1000	30	0	30000	
166	IXTP36N30P	SS0842	16	125	1000	30	0	30000	
167	IXTP36N30T	K641	16	125	1000	30	0	30000	
168	IXTP3N120	K816	16	125	1000	30	0	30000	
169	IXTP44N25T	K636	16	125	1000	30	0	30000	
170	IXTP50N25T	K738	16	125	1000	30	0	30000	
171	IXTP52P10P	K746	16	125	1000	30	0	30000	
172	IXTP56N15T	K636	16	125	1000	30	0	30000	
173	IXTP62N25T	K648	16	125	1000	30	0	30000	
174	IXTP74N15T	K636	16	125	1000	30	0	30000	
175	IXTP76N075T	K640	16	125	1000	30	0	30000	
176	IXTP76N075T	K726	16	125	1000	30	0	30000	
177	IXTP76N075T	SS0728	16	125	1000	30	0	30000	
178	IXTP8N50P	AK732	16	125	1000	30	0	30000	
179	IXTP8N50P	K646	16	125	1000	30	0	30000	
180	IXTP90N15T	K647	16	125	1000	30	0	30000	
181	IXTP98N075T	K746	16	125	1000	30	0	30000	
182	IXTQ140N10P	SK0807	16	125	1000	30	0	30000	
183	IXTQ170N10P	SK0802	16	125	1000	30	0	30000	
184	IXTQ182N055T	SK0612	16	125	1000	30	0	30000	
185	IXTQ182N055T	SK0612	16	150	500	30	0	15000	
186	IXTQ22N50P	SS0633	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
187	IQTQ22N50P DS	NK0817	16	125	1000	30	0	30000	
188	IQTQ22N60P	SK0604	16	125	1000	30	0	30000	
189	IQTQ26N50P	SK0604	16	125	1000	30	0	30000	
190	IQTQ26P20P	SK0746	16	125	1000	30	0	30000	
191	IQTQ28N15P	SK0653	16	125	1000	30	0	30000	
192	IQTQ30N50L2	TK0813	16	125	1000	30	0	30000	
193	IQTQ36P15P	SK0652	16	125	1000	30	0	30000	
194	IQTQ44N50P	K751	16	125	1000	30	0	30000	
195	IQTQ75N10P	SK0838	16	125	1000	30	0	30000	
196	IQTQ76N25T	SK0613	16	125	1000	30	0	30000	
197	IQTQ82N25T	SK0514	16	125	1000	30	0	30000	
198	IQTQ82N25T	SK0603	16	125	1000	30	0	30000	
199	IQTQ88N28T	SK0641	16	125	1000	30	0	30000	
200	IQTQ88N30P	SK00742	16	125	1000	30	0	30000	
201	IQTQ88N30P	SK0605	16	125	1000	30	0	30000	
202	IQTQ88N30T	SK0638	16	125	1000	30	0	30000	
203	IQTQ96N20P	SS0631	16	125	1000	30	0	30000	
204	IQTQ96N25T	SK0648	16	125	1000	30	0	30000	
205	IXTT88N30P	SP0626	16	125	1000	30	0	30000	
206	IXTV18N60PS	SP0636	16	125	1000	30	0	30000	
207	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	MII300-12E4	2432	16	125	168	10	0	1680	
8	MII400-12E4	1741	16	125	168	10	0	1680	
9	MII75-12A3	1541	16	125	168	10	0	1680	
10	MIXA15WB1200TED	1992	16	125	1000	5	0	5000	
11	MIXA35WB1200TED	1991	16	125	1000	5	0	5000	
12	MUBW15-12A6K	1553	16	125	168	10	0	1680	
13	MUBW15-12A7	2136	16	125	168	10	0	1680	
14	MWI30-06A7T	1635	16	125	168	10	0	1680	
15	MWI30-06A7T	2069	16	125	168	10	0	1680	
16	VII130-06P1	2025	16	125	168	10	0	1680	
17	VKI50-12P1	2084	16	125	168	10	0	1680	
18	VKI50-12P1	2084	16	125	168	10	0	1680	
19	VMO1600-02P	2123	16	125	1000	10	0	10000	
20	VWI20-06P1	2462	16	125	168	10	0	1680	

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	IXFH26N50	SS0846	-	100	10000	24	0	240000	
4	IXFN82N60P	SP0551	-	100	10000	24	0	240000	
5	IXFX48N50Q	SS0846	-	100	10000	24	0	240000	
6	IXFX73N30Q	SK0613	-	100	10000	24	0	240000	
7	IXFX90N30	SK0613	-	100	10000	24	0	240000	
8	IXGQ85N33PCD1	SK0614	-	100	10000	24	0	240000	
9	IXGQ90N27PB	SK0611	-	100	10000	24	0	240000	
10	IXGR48N60C3D1	SP0804	-	100	10000	24	0	240000	
11	IXGX72N60B3H1	SP0809	-	100	10000	24	0	240000	
12	IXKH20N60C5	1987	125	80	2000	20	0	40000	
13	IXKP13N60C5M	1716	-	80	10000	20	0	200000	
14	IXSH30N60B2D1	SP0506	-	100	10000	24	0	240000	
15	IOTP14N60PM	K643	-	50	10000	24	0	240000	
16	IOTP18N60PM	K631	-	50	10000	24	0	240000	
17	IXTQ26N50P	SK0604	-	100	10000	24	0	240000	
18	IXTQ76N25T	SK0613	-	100	10000	24	0	240000	
19	IXTQ88N30P	SK0742	-	100	10000	24	0	240000	
20	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	1960	150	100	3000	80	0	240000	
2	MIAA20WD600TMH	1844	125	80	10000	9	0	90000	
3	MKI75-06A7T	1776	125	80	10000	10	0	100000	
4	MWI35-12T7T	2147	125	80	20000	10	0	200000	

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	MCC26-16io1	2227	125	80	20000	10	0	200000	
3	MCC310-16io1	1588	125	80	10000	10	4	100000	
4	MCC44-16io1	2221	125	80	10000	10	0	100000	
5	MCC56-14io1	2093	125	80	10000	10	0	100000	
6	MCC95-12io1	2148	125	80	20000	10	0	200000	
7	MCD40-16io6	1474	125	80	5000	10	0	50000	
8	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	VUO52-16NO1	2100	125	80	5000	10	0	50000	
6	VUO70-16NO7	2166	125	80	2000	10	0	20000	
	VVY50-16io1	2246	125	80	5000	10	0	50000	
7	VVZ40-14io1	1630	125	80	5000	10	2	50000	V_T and short

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	DPG10I400PA	2244	145	100	4000	20	0	80000	
3	DSEC30-02A	1755	125	80	2000	20	0	40000	
4	DSEI120-12A	1928	145	100	2000	20	0	40000	
5	DSEI2x121-02A	2325	125	80	2000	10	0	20000	
6	DSEI2X61-10B	2040	125	80	5000	20	0	100000	
7	DSEI30-10A	2317	145	100	2000	10	0	20000	
8	DSEI60-12A	1599	150	105	2000	20	0	40000	
9	DSEP12-12A	1955	145	100	2000	20	0	40000	
10	DSEP15-12CR	1930	125	80	2000	20	0	40000	
11	DSEP15-12CR	2354	125	80	2000	20	0	40000	
12	DSEP29-06B	2140	125	80	2000	20	0	40000	
13	DSEP2x61-06A	1633	125	80	5000	10	0	50000	
14	DSEP30-12CR	1951	145	100	2000	20	1	40000	V_F over limit
15	DSEP60-03A	2185	145	100	2000	20	0	40000	
16	DSEP60-12A	2021	145	100	2000	20	0	40000	
17	MEO450-12DA"H"	2142	125	80	5000	10	0	50000	
18	MEO500-06DA	2058	125	80	5000	10	1	50000	

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	DSA90C200HB	2184	145	100	2000	20	1	80000	
2	DSS16-0045A	2018	145	100	2000	20	0	40000	
3	DSS2x160-01A	2173	145	100	4000	10	0	40000	
4	DSS6-015AS	1723	140	100	8572	77	0	660044	
5	DSS6-015AS	1838	140	100	8572	77	0	660044	
6	DSSk60-0045A	1873	150	105	2000	20	0	40000	
7	DSSK60-015AR	1753	150	105	2000	20	0	40000	
8	DSSK70-0015B	2311	125	80	2000	20	0	40000	
9	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	DSA1-16D	2120	150	105	2000	20	0	40000	
7	DSA1-18D	1435	150	105	2000	20	0	40000	
8	DSA15IM45IB	1621	125	80	4000	20	0	80000	
9	DSA75-16B	1859	150	105	2000	10	0	20000	
10	DSA9-18F	2154	125	80	2000	10	0	20000	
11	DSI45-08A	1760	150	105	2000	20	0	40000	
12	DSI45-08A	2182	150	105	2000	20	0	40000	
13	DSI75-16	2327	145	100	2000	10	0	20000	

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	FMD47-06KC5	2287	-55	150	100	20	0	2000	
3	IXA55I200HJ	2395	-40	150	100	20	0	2000	
4	IXBH9N160G	2446	-55	150	50	20	0	1000	
5	IXBH9N160G	1574	-55	150	50	20	0	1000	
6	IXDN55N120D1	2122	-40	150	50	20	0	1000	
7	IXDN75N120	1606	-40	150	20	10	0	200	
8	IXDR30N120D1	2442	-55	150	50	20	0	1000	
9	IXEH25N120D1	2208	-55	150	50	20	0	1000	
10	IXGR48N60C3D1	2129	-55	150	100	40	1	4000	I_CES 50 Cycles
11	IXKC13N80C	1769	-55	150	100	20	0	2000	
12	IXKC25N80C	1590	-55	150	100	20	0	2000	
13	IXKH20N60C5	2013	-40	150	50	20	0	1000	
14	IXKH70N60C5	1926	-40	150	50	20	0	1000	
15	IXKP10N60C5M	1693	-40	150	100	20	0	2000	
16	IXKP13N60C5M	1716	-55	150	100	20	0	2000	
17	IXKT70N60C5	2068	-55	150	1000	20	0	20000	

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	MII300-12E4	2432	-40	150	50	10	0	500	
4	MII400-12E4	1741	-40	150	50	10	0	500	
5	MII75-12A3	1541	-40	150	50	10	0	500	
6	MIXA15WB1200TED	1992	-40	150	100	10	0	1000	
7	MKI75-06A7T	1562	-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	MUBW15-12A6K	1553	-40	150	50	10	0	500	
11	MUBW25-12T7	1896	-40	150	100	10	0	1000	
12	MUBW30-12	2303	-40	150	100	20	0	2000	
13	MUBW50-12E8	2115	-40	150	50	10	0	500	
14	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	MCC162-16	2451	-40	150	50	10	0	500	
5	MCC200-14	1717	-40	150	50	10	0	500	
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	MCC310-16io1	2215	-40	150	50	10	0	500	
11	MCC312-14	2310	-40	150	100	10	1	1000	
12	MCC250-14io1	2146	-40	150	100	10	3	1000	
13	MCC44-12io1	1540	-40	150	50	10	0	500	
14	MCC44-16io1	2048	-40	150	100	10	0	1000	
15	MCC44-16io8	1864	-40	150	100	10	0	1000	
16	MCC56-16io1	2320	-40	150	300	10	0	3000	
17	MCC72-14io1	2007	-40	150	50	10	0	500	
18	MCC95-14io1	1788	-40	150	150	10	0	1500	
19	MCC95-16io1	2302	-40	150	100	10	0	1000	
20	MCC95-16io1	2450	-40	150	50	10	0	500	
21	MCD162-16io1	1884	-40	150	50	10	0	500	
22	MCD200-14	2010	-40	150	50	10	0	500	
23	MCD250/16	2059	-40	150	50	10	0	500	
24	MCD56-16io1	1646	-40	150	50	10	0	500	
25	MCD95-12io1	2199	-40	150	50	10	0	500	
26	MCO600-16io1	1680	-40	150	50	10	0	500	
27	MDD172-16n1	2344	-40	150	100	10	0	1000	
28	MDD26-18N1	1749	-40	150	100	20	1	2000	V_F
29	MDD56-16io1	1865	-40	150	50	10	0	500	
30	MDD56-18N1	2080	-40	150	50	10	0	500	
31	MDD95-16	1585	-40	150	50	10	0	500	
32	MDD95-18N1	1971	-40	150	100	10	0	1000	
33	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	MMO230-16io7	1868	-40	150	50	20	0	1000	
2	MMO75-16	2180	-40	150	50	10	0	500	
3	VBO19-16DT1	1648	-40	150	50	10	0	500	
4	VBO25-12nO2	1726	-40	150	50	10	0	500	
5	VBO25-12NO2	2005	-40	150	50	10	0	500	
6	VBO40-16NO6	1860	-40	150	20	10	0	200	
7	VBO40-16NO6	1860	-40	150	50	10	0	500	
8	VUB120-16	2034	-40	150	50	10	0	500	
9	VUB120-16NO2	1636	-40	150	50	10	0	500	
10	VUB145-16NO1	2264	-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	VUO36-16nO8	1580	-40	150	10	10	0	100	
14	VUO52-18	2251	-40	150	50	10	0	500	
15	VUO80-16	1778	-40	150	100	10	0	1000	
16	VUO82-16NO7	2085	-40	150	10	10	0	100	
17	VUO84-16	2388	-40	150	100	10	0	1000	
18	VVY40-16io1	1679	-40	150	50	10	0	500	
19	VVZ40-14	1691	-40	150	100	10	0	1000	
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	DH2x61-18A	2394	-40	150	50	20	0	1000	
2	DH60-18A	2307	-40	150	50	20	1	1000	
3	DH60-18A	1568	-40	150	50	20	0	1000	
4	DHG10I600PM	1685	-55	150	100	20	0	2000	
5	DHH55-36N1F	1604	-55	150	100	40	0	4000	
6	DPG10I300PA	2177	-55	150	100	20	0	2000	
7	DPG15I400PM	1770	-55	150	100	20	0	2000	
8	DPG60C200HB	2229	-55	150	100	20	0	2000	
9	DPG60C300QB	1909	-55	150	100	20	0	2000	
10	DPG60I400HA	2164	-55	150	100	20	0	2000	
11	DPH30IS600HI	2150	-55	150	100	20	0	2000	
12	DSEC30-03A	2188	-55	150	50	20	0	1000	
13	DSEC60-04A	2441	-55	150	50	20	0	1000	
14	DSEE29-06CC	1771	-55	150	100	20	0	2000	
15	DSEI120-12A	1756	-40	150	50	20	0	1000	
16	DSEI120-12A	1538	-40	150	50	20	0	1000	
17	DSEI2x121-02A	2042	-40	150	20	10	0	200	
18	DSEI2x121-02A	2325	-40	150	20	10	0	200	
19	DSEI2x31-06C	1563	-40	150	20	10	0	200	
20	DSEI2x61-06C	2279	-40	150	50	20	0	1000	
21	DSEI60-06A	1804	-40	150	50	20	0	1000	
22	DSEP15-06A	2020	-55	150	50	20	0	1000	
23	DSEP15-06B	2138	-55	150	50	20	0	1000	
24	DSEP15-12CR	1514	-55	150	50	20	0	1000	
25	DSEP2x61-06A	2194	-40	150	20	10	0	200	
26	DSEP30-06BR	2304	-55	150	50	20	0	1000	
27	DSEP30-06BR	1700	-55	150	50	20	0	1000	
28	DSEP30-06CR	2015	-55	150	50	20	0	1000	
29	DSEP8-03AS	1738	-40	150	100	20	0	2000	
30	DSEP8-12A	1956	-55	150	50	20	0	1000	
31	MEE250-12DA	2238	-40	150	100	10	0	1000	
32	MEE250-12I	1887	-40	150	50	10	0	500	
33	MEE300-06DA	2064	-40	150	100	10	0	1000	
34	MEK300-06	1737	-40	150	50	10	0	500	
35	MEK300-06	2431	-40	150	50	10	0	500	
36	MEK350-02	2382	-40	150	100	12	0	1200	
37	MEK95-06E	2157	-40	150	50	10	0	500	
38	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	DSA50C100HB	2376	-55	150	100	60	0	6000	
4	DSA50C100HB	2448	-55	150	100	20	0	2000	
5	DSA60C45PB	2118	-55	150	50	20	0	1000	
6	DSA60C60PB	2258	-55	150	100	20	0	2000	
7	DSA90C200HB	1674	-55	150	100	20	0	2000	
8	DSA90C200HB	2312	-55	150	50	20	0	1000	
9	DSB15IM45IB	1622	-55	150	100	20	0	2000	
10	DSS16-0045A	2018	-55	150	50	20	0	1000	
11	DSS20-01AC	1709	-55	150	100	20	0	2000	
12	DSS2x160-01A	2173	-40	150	100	10	0	1000	
13	DSS2x61-01A	2172	-40	150	100	10	0	1000	
14	DSS2x61-01A	1985	-40	150	50	10	0	500	
15	DSS31-0045A	1596	-55	150	1000	80	0	80000	
16	DSS31-0045A	1596	-55	150	1000	80	0	80000	
17	DSS31-0045A SN	1492	-55	150	500	77	0	38500	
18	DSS6-015AS	1723	-55	150	1000	77	0	77000	
19	DSSK30-01A	1807	-55	150	50	20	0	1000	
20	DSSK38-0025B	1982	-55	150	50	20	0	1000	
21	DSSK40-0015B	1557	-55	150	50	20	0	1000	
22	DSSK60-015AR	1573	-55	150	50	20	0	1000	
23	DSSK60-02A	2189	-55	150	50	20	0	1000	
24	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	CS20-12io1	1758	-40	150	50	20	1	1000	
2	CS22-08io1M	1953	-40	150	50	20	0	1000	
3	CS22-08io1M	2187	-40	150	50	20	0	1000	
4	CS23-12io2	1959	-40	150	20	20	0	400	
5	CS30-12io1	1977	-40	150	50	20	0	1000	
6	CS30-16io1DCSN	1820	-40	150	100	20	0	2000	
7	CS35-14io4	1473	-40	150	20	10	0	200	
8	CS35-14io4	2203	-40	150	20	10	0	200	
9	CS45-16io1	1598	-40	150	50	20	0	1000	
10	CS45-16io1	2017	-40	150	50	20	1	1000	
11	CS60-16io1	1830	-40	150	100	20	0	2000	
12	CS60-16io1	2257	-40	150	50	20	0	1000	
13	CS8-12io2	1605	-40	150	20	10	0	200	
14	DSA1-16D	2023	-40	150	50	20	0	1000	
15	DSA1-16D	2120	-40	150	50	20	0	1000	
16	DSA17-16A	1703	-40	150	20	20	0	400	
17	DSA35-16A	1566	-40	150	20	10	0	200	
18	DSA9-18F	2154	-40	150	20	10	0	200	
19	DSAI35-16A	2067	-40	150	20	10	0	200	
20	DSAI75-16B	1858	-40	150	20	10	0	200	
21	DSI30-08A	2190	-40	150	50	20	0	1000	
22	DSI45-12A	1805	-40	150	50	20	0	1000	
23	DSI75-16	2327	-40	150	20	10	0	200	
24	DSP25-12A	2315	-40	150	50	20	0	1000	
25	DSP25-16	1564	-40	150	50	20	0	1000	
26	DSP8-12A	2141	-40	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	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	
5	IXBOD1-10	2436	-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	FMD47-06KC5	2287	121	100	96	20	0	1920	
2	IXA55I200HJ	2395	121	100	96	20	0	1920	
3	IXGR48N60C3D1	2129	121	100	96	40	0	3840	
4	IXKH24N60C5	2066	121	100	48	20	0	960	
5	IXKP13N60C5M	1716	85	85	1000	20	0	20000	
6	IXKP13N60C5M	1687	121	100	96	10	0	960	
7	IXKR47N60C5	2286	121	100	96	20	0	1920	
8	IXLV1907	2241	85	85	168	20	0	3360	
9	IXTD200No55T2V5	2347	85	85	1000	10	0	10000	
10	IXTN79N20	2202	121	100	48	20	0	960	

TABLE 5B: MOSFET/IGBT Module

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Failures	Device Hours [hrs]	Remark
1	MIAA20WD600TMH	1844	85	85	1000	10	0	10000	
2	MII300-12A4	2012	85	85	168	20	0	3360	
3	MWI35-12T7T	2147	85	85	1000	10	0	10000	
4	VMM85-02F	2204	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	Failures	Device Hours [hrs]	Remark
1	MCC44-12io1	1748	85	85	168	10	0	1680	
2	MCC501-16io1	2415	85	85	1000	3	0	3000	
3	MDD172-16n1	2344	85	85	168	10	0	1680	
4	MDD172-16n1	2344	85	85	168	10	0	1680	
5	MDD56-16io1	2158	85	85	168	20	0	3360	
6	MDD95-16	2032	85	85	168	10	1	1680	

TABLE 5D: Controller, Rectifier Bridge

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Failures	Device Hours [hrs]	Remark
1	MMO90-16io6	2041	121	100	48	10	0	480	
2	VHF36-16	1654	85	85	168	10	0	1680	
3	VUO36-16NO8	2086	85	85	168	10	0	1680	
4	VUO52-18	2253	85	85	168	10	2	1680	I_R over
5	VUO84-16	2388	85	85	1000	10	0	10000	

TABLE 5E: FRED

#	Part Number	Date Code or Test #	Temp. [°C]	Rel. H. [%]	Time [hrs]	Sample Size	Failures	Device Hours [hrs]	Remark
1	DPG10IM300UC	2243	121	100	96	20	0	1920	
2	DPG20C300PN	1908	121	100	96	20	0	1920	
3	DPG30C200PC	2230	121	100	96	20	0	1920	
4	DPG30I300PA	2149	121	100	96	20	0	1920	
5	DPG80C400HB	2396	121	100	96	20	0	1920	
6	DPH30IS600HI	2150	121	100	96	20	0	1920	
7	DSEI2x121-02A	2325	121	100	48	20	0	960	
8	DSEI2x121-02A	2325	121	100	48	20	0	960	
9	DSEI2x61-12B	1607	121	100	96	20	0	1920	
10	DSEI60-10A	2439	121	100	168	20	0	3360	
11	DSEI8-06AS	1535	121	100	48	20	0	960	
12	DSEP30-06BR	1536	121	100	48	20	0	960	
13	DSEP30-12A	2139	121	100	48	20	0	960	
14	DSEP30-12CR	1927	121	100	48	20	0	960	
15	DSEP8-03AS	1837	121	100	96	20	0	1920	
16	MEK300-06DA	2212	85	85	168	10	0	1680	
17	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	DSA20C60PN	1974	121	100	96	20	0	1920	
3	DSA90C200HB	2183	121	100	48	20	0	960	
4	DSB15IM45IB	1622	121	100	96	20	0	1920	
5	DSS31-0045A SN	1492	121	100	96	77	0	7392	
6	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	DSA1-16D	2120	121	100	48	20	0	960	
3	DSDI60-14A	1806	121	100	48	20	0	960	
4	DSI45-16A	1976	121	100	96	20	0	1920	

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	
5	IXBOD1-10	2436	121	100	48	20	0	960	