

Reliability Report: IXYS IC Division SSR-Form-B Relay Family
(Output Voltage Rating 250V -350V)
Qualification Report No.: 2012-018



Reliability Report
Reliability Data for IXYS IC Division SSR-
Form-B Relay Family
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Date: 7/9/12

Introduction:

This summarizes the Qualification/Reliability Data Life-Test and Environmental data on LCB/LBB/PLB/PBB1XX series-Form-B Relay products that were collected during Qualification or as ongoing Monthly Reliability Monitor Program. Some data is represented by P7.1 discrete Form B MOSFET's from IXYS Integrated Circuits Division product CPC5602C and can be used for qualification by comparison.

Reliability Tests:

Table 1 below outlined Reliability stresses performed on various products that are transferable to IXYS IC Division SSR-Form-B Relay Family Products.

Table 1: IXYS IC Division SSR-Form-B Relay Family Products Reliability Tests

Product/ Package	Stress	Applicable Specs	Stress Conditions	# of Kits	Sample Size (SS)	Total SS
CPC5602/ SOT-223	HTRB	JESD22-A108	125C, 80% WVDC, 1000 hrs	1	108	108
CPC5602/ SOT-223	HTRB	JESD22-A108	125C, 80% WVDC, 1000 hrs	1	36	36
LBB110/ 8DIP	HTRB	JESD22-A108	125C, 80% WVDC, 1000 hrs	1	129	129
CPC5602/ SOT-223	THB	JESD22-A101	RH=85C/85%, Ids Bias = 1A; if Bias=5mA	2	77	154
CPC5602/ SOT-223	THB	JESD22-A101	RH=85C/85%, Ids Bias = 1A; if Bias=5mA	1	77	77
LCB110/ 6-DIP	Thermal Shock (T/S)	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells 15 cycles	1	55	55
LCB110/ 6-DIP	Temp Cycle (T/C)	Mil-Std-883 M1010, "B"	-55 to 125°C, 10/10 dwells, 300 cycles	1	55	55
LCB110/ 6-DIP	Thermal Shock (T/S)	Mil-Std-883, M1011	0 to 100°C, 10/10 dwells 15 cycles	1	54	54
LCB110/ 6-DIP	Temp Cycle (T/C)	Mil-Std-883 M1010, "B"	-55 to 125°C, 10/10 dwells, 300 cycles	1	54	54

Reliability Tests Results:

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The stress tests data and associated results for the ICYS IC Division SSR Form-B Relay Family products are summarized in Table 2.

Table 2: IXYS IC Division SSR Form-B Relay Family Reliability Tests Results

Product/ Package	Stress Test/ Conditions	Kits (lots) Number	Readpoints / (Reject/ SS)	Comments
CPC5602/ SOT-223	HTRB 125C, 80% WVDC	D047	1000 hrs.	Rel Monitor Data
			0/108	
CPC5602/ SOT-223	HTRB 125C, 80% WVDC	K636	1000 hrs.	Rel Monitor Data
			0/36	
LBB110/ 8-DIP	HTRB 125C, 80% WVDC	T20571	1000 hrs	Rel Monitor Data
			0/129	
CPC5602/ SOT-223	THB RH=85C/85%, Ids Bias=1A: if Bias=5mA	D047	1000 hrs	Qualification Data
			0/154	
CPC5602/ SOT-223	THB RH=85C/85%, Ids Bias=1A: if Bias=5mA	K636	1000 hrs	Qualification Data
			0/77	
LCB110/ 6-DIP	Thermal Shock 0 to 100C, 10/10 Dwell	T2148	15 cycles	Qualification Data
			0/55	
LCB110/ 6-DIP	Thermal Shock 0 to 100C, 10/10 Dwell	T2147	15 cycles	Qualification Data
			0/54	
LCB110/ 6-DIP	Temp Cycles -55 to 125C, 10/10 Dwell	T2148	300 cycles	Qualification Data
			0/55	
LCB110/ 6-DIP	Temp Cycles -55 to 125C, 10/10 Dwell	T2147	300 cycles	Qualification Data
			0/54	

FIT (Failure in Time) Rate on IXYS IC Division SSR-Form-B Relay Family Products:

Table 3 below summarizes the FITs rate from the HTRB data. FITs rate was calculated using the life-test HTRB data based on the equivalent device hours at use condition of 40°C and stressed condition of 125°C. To calculate equivalent device hours, Acceleration Factor (AF) was calculated at 0.7eV of activation energy @60% CL. For THB stress, FITs were calculated based on the 85°C/85% RH test condition, with 40°C/60% RH ambient use conditions at the activation energy of 0.7eV. The FITs rate came out to be 13.19 FITs (HTRB) and 35.05 FITs (THB).

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Table 3: IXYS IC Division SSR-Form-B Relay Family Products FIT Rate Summary

Product/ Stress	# of Devices	# of Fails.	Hours Tested	Test Temp (°C)	Eq. Dev. Hours	FITs @ 60% CL
CPC5602C/ HTRB	144	0	1000	125	69,725,829	13.19
LBB110/ HTRB	129	0	1000	125		
CPC5602C/ THB	77	0	1000	85	26,248,530	35.05
CPC5602C/ THB	77	0	1000	85		
CPC5602C/ THB	77	0	1000	85		