

# Reliability Data Summary for DP8392



**REF: TEST LAB FILES**

RDT25406                      RDT26627  
 RDT25500                      RDT26638  
 RDT26562

**ABSTRACT**

DP8392 Coaxial Transceiver Interface parts from 8 lots were subjected to Operating Life Test, Temperature and Humidity Bias Test, Temperature Cycle Test, and Electrostatic Discharge Test.

**PURPOSE OF TEST**

Evaluation of new device and qualification of U.K. fab.

**TESTS PERFORMED**

- Operating Life Test (OPL) (100°C; biased)
- Operating Life Test (OPL) (125°C; biased)
- Temperature and Humidity Bias Test (THBT) (85°C; 85% R.H.; biased)
- Temperature Cycle Test (TMCL) (-40°C, +125°C; unbiased)
- Electrostatic Discharge Test (ESD) (Human body model: R = 1500Ω; C = 120 pF)

**CONCLUSIONS**

1. The DP8392AN exceeds the IEEE 802.3 specification of 1 million hours Mean Time Between Failure (MTBF).
2. U.K. fab results are comparable to those of Santa Clara. On ESD testing all pins passed at 1000V except for pin 7 (TX<sup>+</sup>).

**RESULTS**

**TEST SAMPLE DESCRIPTION/HISTORY**

Lot	Device	Package	Date Code	Fab Location	Assembly Location
1	DP8392	N, 16 Leads	8509	NSSC	NSEB
2	DP8392	N, 16 Leads	8513	NSSC	NSEB
3	DP8392	N, 16 Leads	8526	NSSC	NSEB
4	DP8392	N, 16 Leads	8552	NSSC	NSEB
5	DP8392A(-4)	N, 16 Leads	8620	NSUK	NSEB
6	DP8392A(-5)	N, 16 Leads	8637	NSUK	NSEB
7	DP8392A(-5)	N, 16 Leads	8637	NSUK	NSEB
8	DP8392A(-5)	N, 16 Leads	8637	NSUK	NSEB
9	DP8392C	N, 16 Leads	9106	NSUK	NSEB
10	DP8392C	N, 16 Leads	9106	NSUK	NSEB
11	DP8392C	N, 16 Leads	9106	NSUK	NSEB
12	DP8392C	N, 16 Leads	9106	NSUK	NSEB
13	DP8392C	N, 16 Leads	9106	NSUK	NSEB
14	DP8392C	N, 16 Leads	9106	NSUK	NSEB

Test	Temperature	Lot	Fab	Time Point—Number of Failures				
				Hours				
				168	336	500	1000	2000
OPL	100°C	1	NSSC	0/50		0/50	0/50	
	100°C	2	NSSC	0/50		0/50	0/50	
	125°C	3	NSSC	0/74				
	125°C	4	NSSC	0/100		0/100	0/100	0/100
	100°C	5	NSUK	0/60				
	100°C	6	NSUK		0/33	0/33	0/33	0/33
	100°C	7	NSUK		0/31	0/31	0/31	0/31
	100°C	8	NSUK		0/33	0/31	0/31	0/31
	85°C	9	NSUK			0/77	0/77	
	85°C	10	NSUK			0/77	0/77	
	85°C	11	NSUK			0/77	0/77	
	100°C	12	NSUK	0/64		0/64	0/64	0/64
	100°C	13	NSUK	0/25		0/25	0/25	0/25
	100°C	14	NSUK	0/10		0/10	0/10	0/10
THBT	85°C; 85% R.H.	1	NSSC	0/50		0/50	0/50	
		2	NSSC	0/50		0/50	0/50	
		3	NSSC	0/75		0/75	0/75	
		9	NSUK	0/30		0/30	0/30	
		10	NSUK	0/30		0/30	0/30	
		11	NSUK	0/30		0/30	0/30	

**RESULTS (Continued)**

Test	Temperature	Lot	Fab	Time Point—Number of Failures				
				Hours				
				168	336	500	1000	2000
ACLV	121°C; 100% R.H.	9	NSUK	0/77		0/77		
		10	NSUK	0/66		0/66		
		11	NSUK	0/77		0/77		
				Cycles				
				500	1000	2000	3000	
TMCL	-40°C, +125°C	4	NSSC	0/70	0/70	0/70	0/70	
	-65°C, +150°C	9	NSUK	0/77	0/77	0/77		
	-65°C, +150°C	10	NSUK	0/66	0/66	0/66		
	-65°C, +150°C	11	NSUK	0/77	0/77	0/77		

**ELECTROSTATIC DISCHARGE TEST (ESD) RESULTS**

26 parts from 4 wafer lots were tested by the Human Body Model test condition; R = 1500Ω; C = 120 pF. First ground was held common, then V<sub>EE</sub>. 5 positive and 5 negative pulses were applied for each pin/voltage combination.

Pin	Function	Voltage—Number of Failures	
		500V	1000V
1	CD+	0/26	0/20
2	CD-	0/26	0/20
3	RX+	0/26	0/20
4	V <sub>EE</sub>	0/26	0/20
5	V <sub>EE</sub>	0/26	0/20
6	RX-	0/26	0/20
7	TX+	6/26	13/20
8	TX-	0/26	0/20
9	HBE	0/26	0/20
10	GND	0/26	0/20
11	RR+	0/26	0/20
12	V <sub>EE</sub>	0/26	0/20
13	V <sub>EE</sub>	0/26	0/20
14	RXI	0/26	0/20
15	TXO	0/26	0/20
16	CDS	0/26	0/20

Further characterization has been done to determine individual pin ESD damage thresholds. In particular, for pin 7 (TX+), 80 parts from 4 wafer lots were tested. Pin 7 ESD damage thresholds varied from 200V-300V to 2000V-3000V, with a mean of 1800V.

**MTBF (MEAN TIME BEFORE FAILURE)**

**CONSIDERATIONS**

Results total: 212,000 device hours at 125°C, 0 failures  
301,000 device hours at 100°C, 0 failures

Assume: E<sub>a</sub> = 0.7 eV  
P<sub>d</sub> = 800 mW  
θ<sub>ja</sub> = 45°C/W

Chi-square statistics, 60% confidence  
Then: MTBF<sub>min</sub> at 25°C ambient = 93,000,000 device hours.  
MTBF<sub>min</sub> at 70°C ambient = 5,100,000 device hours.