DELPHI

Delphi Mechatronic Systems

Quality Department

[redacted]

Phone: [redacted]

E-Mail: [redacted]

9.- MATERIAL/ PERFORMANCE TEST RESULTS

Test Report

Lab Number	: C005-217	Customer	: GM	Date In	: 12/2/2005
Type of Test	: Special test	Part Name	: Delta Ignition Switch	Date Out	: 4/13/2006
Requested By	: A. Alcala	DELPHI P/N	: 741-79282	Assigned to	: A. Calvillo
		Customer P/N	: 10392433	Customer Specialist	: L. Delgado

Objectives: Annual revalidation test and validation of new PCBs.

Issued By: L. Delgado

Reviewed By: [redacted] 4/13/06

Distribution:
Full Copy : A. Alcala
Top Sheet : A. Calvillo

Specification: 12450250

12 samples of Delta Ignition switch were submitted to 3X life in order to validate new PCBs from Visiosystems. Devices were built using Catera Spring Plunger P/N 741-79378. This testing meet spec. requirements and has been considered the 2005 annual revalidation test. Samples were identified as follows:
Lab Job C005-177, test units were identified as DUT 1 - 12

Testing performed on samples as per the following plan.

Tests performed:

Initial Parametrics	
Voltage Drop/Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.3
Contact Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.4
Open Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.5
Isolation Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.6
Force & Displacement	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.2.3
Simple Function Check	(Units 1 to 12). As per Spec. 12450250 Sec. 5.6
Contact Bounce	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.8
Durability to 100%	
1X life Durability (50K cycles)	(Units 1 to 12). As per Spec. 12450250 Sec. 3.1.5.1
Voltage Drop/Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.3
Contact Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.4
Open Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.5
Isolation Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.6
Force & Displacement	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.2.3
Simple Function Check	(Units 1 to 12). As per Spec. 12450250 Sec. 5.6
Contact Bounce	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.8
Durability to 200%	
2X life Durability (50K Cycles plus. Total of 100K cycles)	(Units 1 to 12). As per Spec. 12450250 Sec. 3.1.5.1
Voltage Drop/Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.3
Contact Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.4
Open Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.5
Isolation Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.6
Force & Displacement	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.2.3
Simple Function Check	(Units 1 to 12). As per Spec. 12450250 Sec. 5.6
Contact Bounce	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.8
Durability to 300%	
3X life Durability (50K Cycles plus. Total of 150K cycles)	(Units 1 to 12). As per Spec. 12450250 Sec. 3.1.5.1
Voltage Drop/Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.3
Contact Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.4
Open Circuit Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.5
Isolation Resistance	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.6
Force & Displacement	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.2.3
Simple Function Check	(Units 1 to 12). As per Spec. 12450250 Sec. 5.6
Contact Bounce	(Units 1 to 12). As per Spec. 12450250 Sec. 3.2.1.8

DELPHI

Delphi Mechatronic Systems
[redacted]

Tests results:

All samples met requirements on initial parametric measurements.
Initial Contact Bounce testing performed at Room Temp and -40 degrees C . No issues observed during the test.

Initial Torque and Angle Measurements on 6 samples were performed in DG. Results on attached Test Report C005-395.
Aditional Torque and Angle Measurements on the 12 samples were performed using the EOL tester. Make / Break readings below specification's low limit were observed on DUTs# 1, 2, 6 and 10.
See attached data sheet for detailed results.

1x Life:
No issues on millivolt drop behavior were observed; all samples met the millivolt drop spec during the 1x life cycling.
No issues observed on post durability measurements.

No issues found on Contact Bounce test After 1X cycling at Room Temp and -40 degrees C.

2x Life:
During 2x Life durability , DUT #11 became not functional after 50,100 cycles. Parametric measurements were performed to this part showing an open circuit condition in Off/Run/Crank circuit on the Start detent.
Device showed resistor R2 open on Contact Resistance measurement and open circuit condition on Off/Run/Crank circuit on the Start detent on Voltage Drop post parametric measurement.
Sample was sent to DG for analysis showing damage on one of the terminals.
Remaining samples were resumed for cycling.
No millivolt drop issues were observed; all samples met the spec during the cycling.

No issues found on Contact Bounce at room temperature.
DUT# 2, 4 and 12 presented contact bounces at -40 C.

3x Life:
3x life cycle to 11 devices.
No issues on millivolt drop behavior were observed; all samples met the spec during the 3x life cycling.
No issues observed during parametric measurements after cycling.
No Contact Bounce issue was observed at Room Temp.
DUT# 3, 5, 6, 8, 9 and 12 presented contact bounce issues after 3x life at -40C. Remaining devices did not show issues at this temperature.

Note. Torque and Angle Results from EOL tester showed Make / Break readings below the specification's low limit after 1x, 2x and 3x life.
See attached data sheet for detailed results.

Summary Test Results.

1X life successfully passed and issues were observed during 2X life and 3X life.

See attached sheets for detailed results.

DELPHI
Delphi Mechatronic Systems
[redacted]

Rivera Alvarez, Jose

From: Rodriguez, Eduardo P
Sent: Friday, May 26, 2006 10:37 AM
To: Naredo, Alejandro; Rivera Alvarez, Jose
Subject: FW: Delta IMDS

IMDS

-----Original Message-----
From: Paz, Lino
Sent: Tuesday, April 25, 2006 8:46 AM
To: Rodriguez, Eduardo P
Subject: FW: Delta IMDS

Eduardo.

En el e-mail de Carlie encontraras el IMDS ID # que se requerira para el paquete de PPAP.
Por favor notificar a la persona correspondiente.

Gracias.

-----Original Message-----
From: Ghioldi, Carlie M
Sent: Tuesday, April 25, 2006 5:23 AM
To: Paz, Lino
Subject: RE: Delta IMDS

Hello Lino,

Your IMDS ID number is 45206723. This has also been released to GM. Have a nice day.

Take care,
Carlie

From: Paz, Lino
Sent: Monday, April 24, 2006 11:50 AM
To: Ghioldi, Carlie M
Cc: Pietros, Mussie; Rodriguez, Eduardo P
Subject: FW: Delta IMDS

Hello Carlie.

Can you please upload the following cxs file into IMDS.
This submission belong to the client GM

Thanks.

-----Original Message-----
From: Rodriguez, Eduardo P
Sent: Friday, April 21, 2006 8:22 AM
To: Rodriguez, Eduardo P; Paz, Lino
Cc: Rivera Alvarez, Jose
Subject: RE: Delta IMDS

Lino:

Anexo esta el CXS del IMDS para el Delta Ignition Switch
Esta actualizado con el nuevo PCB que se metera produccion en junio 30 y con el spring plunger que se metera la misma fecha

Por favor avisame si tiene sinconvenientes, este archivo se lo pediran a Jose Luis Rivera para aprobacion de PPAP en las proximas semanas

Saludos

<< File: CXS_2.1g_Delphi_Delphi Packard Electric_2006-04-19-16-24-45_Delta Ignition Sw GM# 10392423 & Delphi# 741-76307.cxs >>

Eduardo Rodríguez Pequeño
Present Product Engineer
Delphi Mechatronic Systems
US Phone: [redacted]
Fax Phone: [redacted]
Mex Phone: [redacted]
e-mail: [redacted]