DPIULC6

ESD protection for internal DisplayPort™

Features

- Compliant with DisplayPort 1.1a
- IEC 61000-4-2 level 4 compliant
- Ultralarge bandwidth (> 5 GHz)
- Low capacitance variation: 0.05 pF
- 100 Ω ± 10% differential impedance (100% compatible with 100 Ω differential layout)
- 500 µm pitch for easy layout

Complies with the following standards

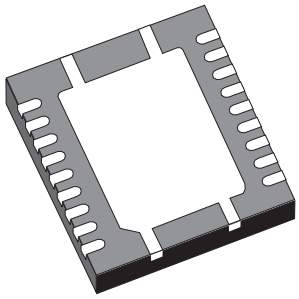
- IEC 61000-4-2 level 4
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G-Method 3015-7: class 3B
  - 8 kV HBM (Human Body Model)
- VESA DisplayPort Standard Version 1.1a

Description

The DPIULC6-6DJL device provides fully integrated ESD protection ensuring full system robustness as required by the DisplayPort specification. Differentiated protection dedicated to each link ensures full compliance with the DisplayPort specification.

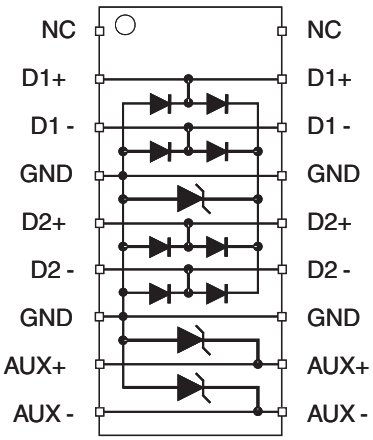
The bandwidth of each circuit ensures full transparency to the DisplayPort signals.

The DPIULC6-6DJL is packaged in DFN 5x6.



DFN 5x6 18 leads

Figure 1. Schematic diagram (top view)



NC pins and central pad must be connected to ground

TM: DisplayPort is a trademark of the Video Electronics Standards Association (VESA)

1 Characteristics

Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
T_{stg}	Storage temperature range	-55 to +150	° C
T_j	Operating junction temperature range	-40 to +125	° C
T_L	Maximum lead temperature for soldering during 10 s	260	° C

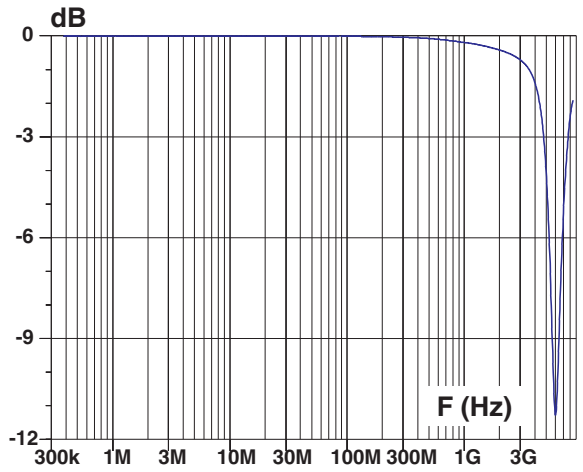
Table 2. Electrical characteristics: high speed differential pairs (T_{amb} = 25 °C)

Symbol	Parameter	Test conditions		Value			Unit
				Min.	Typ.	Max.	
I_{RM}	Leakage current	V = 3.0 V		-	-	100	nA
V_{BR}	Breakdown voltage	T_A = 25 °C, I_R = 1 mA		6	-	-	V
V_{CL}	Clamping voltage (Any I/O pin to ground)	t_p = 8/20 µs	I_{PP} = 1 A	-	-	12	V
			I_{PP} = 5 A	-	-	17	
$C_{I/O\ -GND}$	Capacitance between I/O and ground	V_R = 0 V, F=1 MHz		-	-	1.5	pF
		V_R = 0 V, F = 1.4 GHz		-	-	1.5	
$\Delta C_{I/O\ -GND}$	Capacitance variation between 2 lines of the same pair	V_R = 0 V, F = 1.4 GHz		-	0.05	0.12	pF
Z_{Diff}	Differential impedance between input and output	t_r(20%-80%)=130 ps		90	100	110	Ω

Table 3. Electrical characteristics: auxiliary link (T_{amb} = 25 °C)

Symbol	Parameters	Test conditions		Value			Unit
				Min.	Typ.	Max.	
I_{RM}	Leakage current	V = 3.0 V		-	-	100	nA
V_{BR}	Breakdown voltage between V_{BUS} and ground	T_A = 25 °C, I_R = 1 mA		6	-	-	V
V_{CL}	Clamping voltage	t_p = 8/20 µs	I_{PP} = 1 A	-	-	12	V
			I_{PP} = 5 A	-	-	17	
$C_{i/o-GND}$	Capacitance between I/O and ground	V_R=0 V, F=1 MHz		-	42	50	pF
F_c	Cut-off frequency			-	7.0	-	MHz

Figure 2. Frequency response (typical value)



	Average performance (50 Ω system)
Passband attenuation	0.05 dB
-3 dB point	4.7 GHz
Attenuation (0.8 - 4 GHz)	< 0.4 dB 0.1 dB @ 900 MHz 0.4 dB @ 1.8 GHz

Figure 3. Leakage current versus junction temperature (typical values)

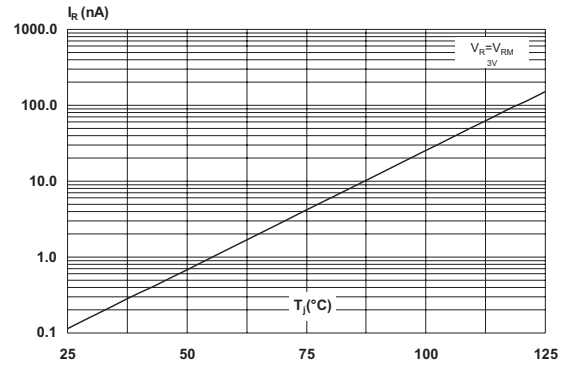


Figure 4. Differential T_{dr} measurement at 130 ps (20 - 80%)

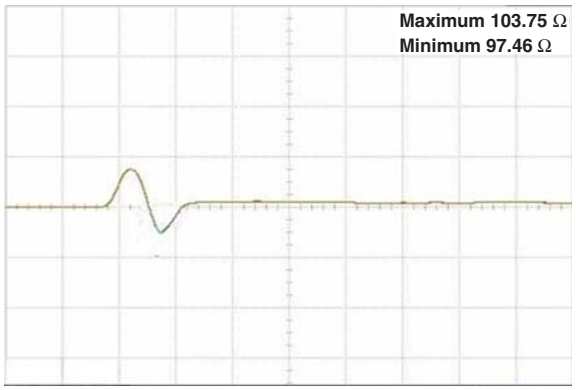


Figure 5. Eye diagram at 2.7 Gbps (PCB alone)

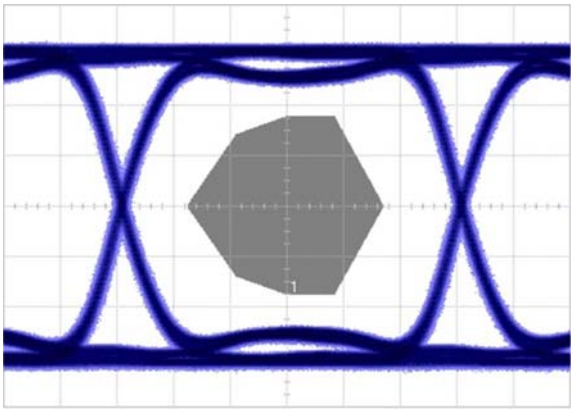


Figure 6. Eye diagram at 2.7 Gbps (PCB + DPIULC6-6DJL)

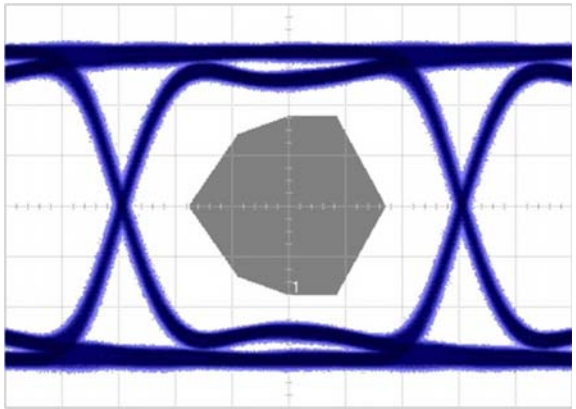


Figure 7. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

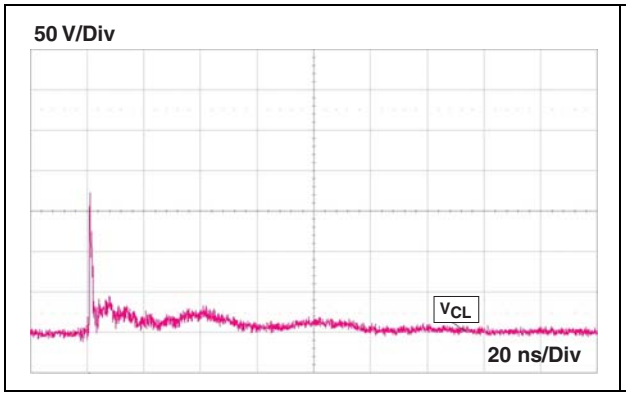
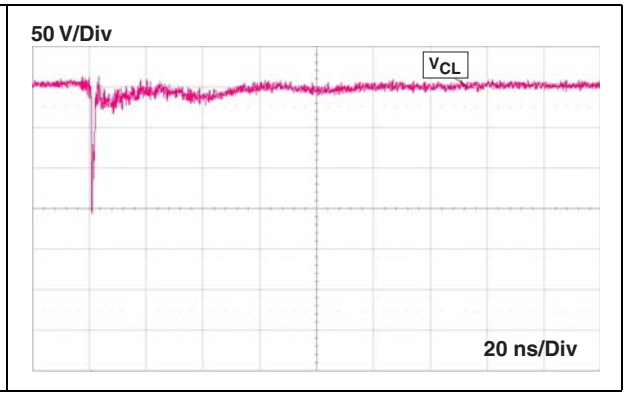


Figure 8. ESD response to IEC 61000-4-2 (+8 kV contact discharge)



2 Application information

Figure 9. DisplayPort internal schematic on source side

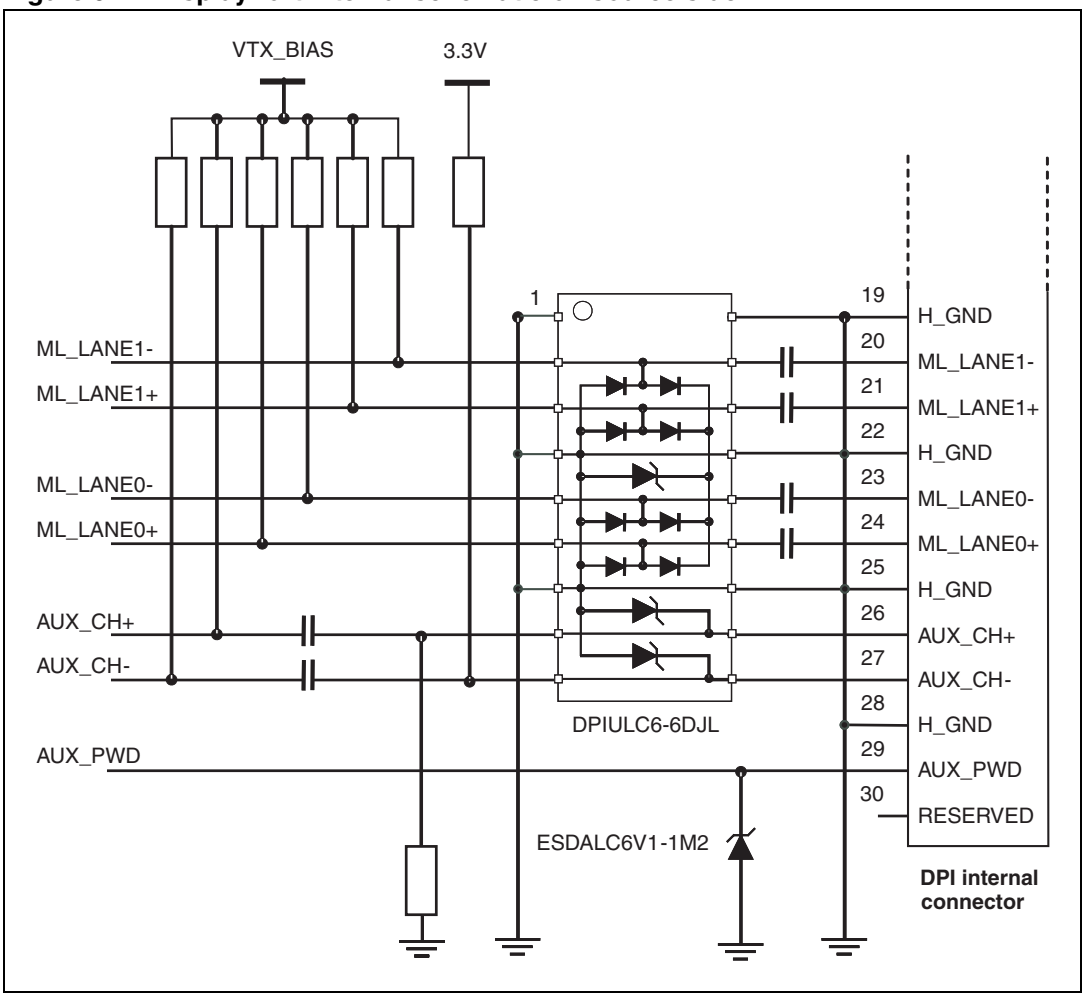
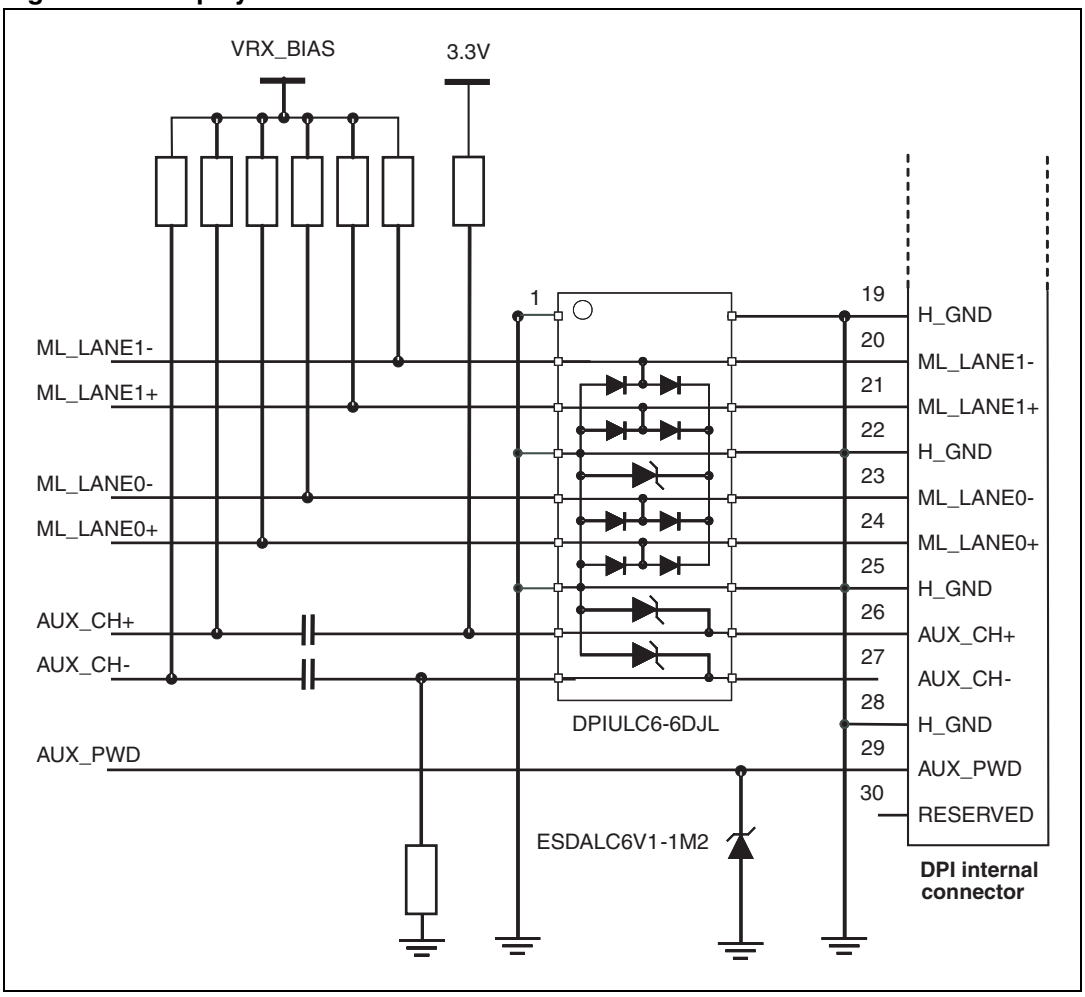
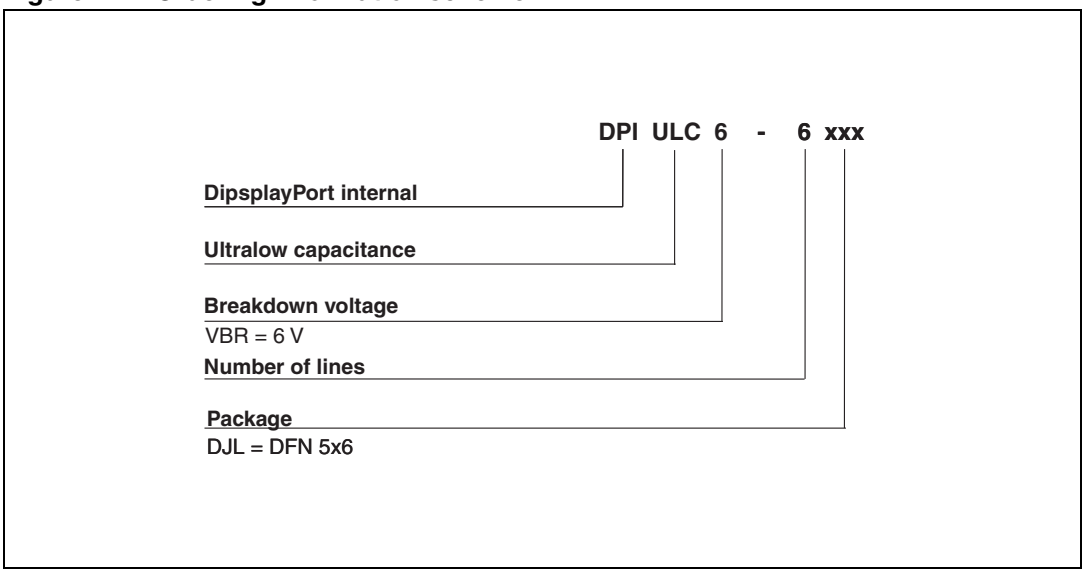


Figure 10. DisplayPort internal schematic on sink side



3 Ordering information scheme

Figure 11. Ordering information scheme



4 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

Figure 12. DFN 5x6 package dimension definitions

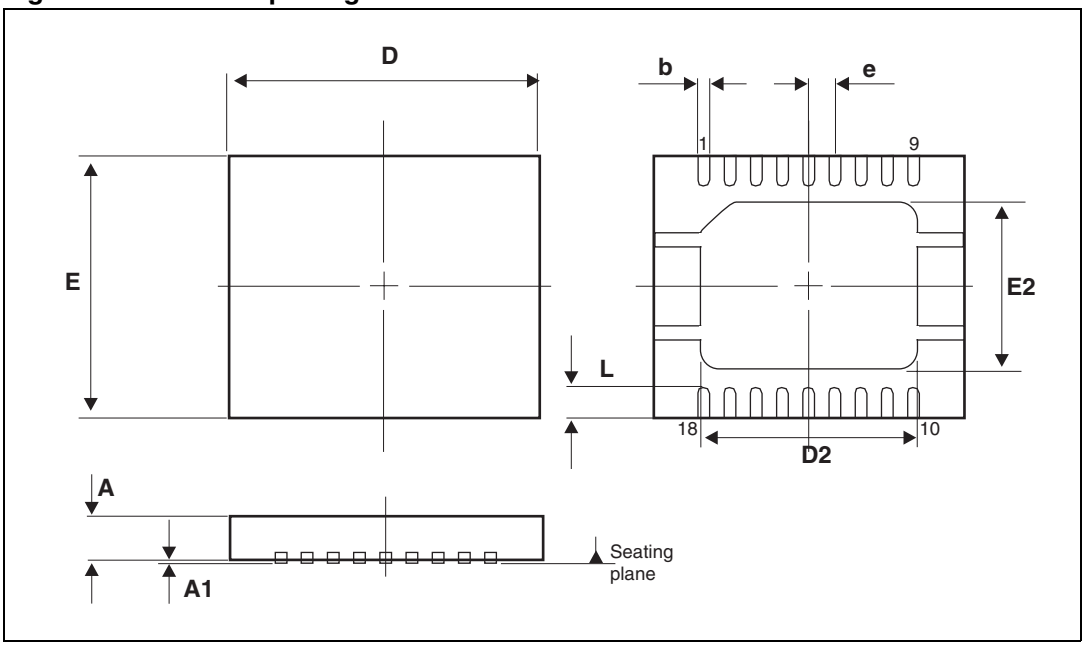


Table 4. DFN 5x6 package dimension values

Ref.	Millimetres			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80	0.90	1.0	0.031	0.035	0.039
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.18	0.25	0.30	0.007	0.010	0.012
D	5.90	6.00	6.10	0.232	0.236	0.240
D2	4.00	4.15	4.25	0.157	0.163	0.167
e	-	0.5	-	-	0.020	-
E	4.90	5.00	5.10	0.193	0.197	0.201
E2	3.00	3.15	3.25	0.118	0.124	0.128
L	0.45	0.55	0.65	0.020	0.022	0.025

Figure 13. Footprint recommendations in millimetres (inches)

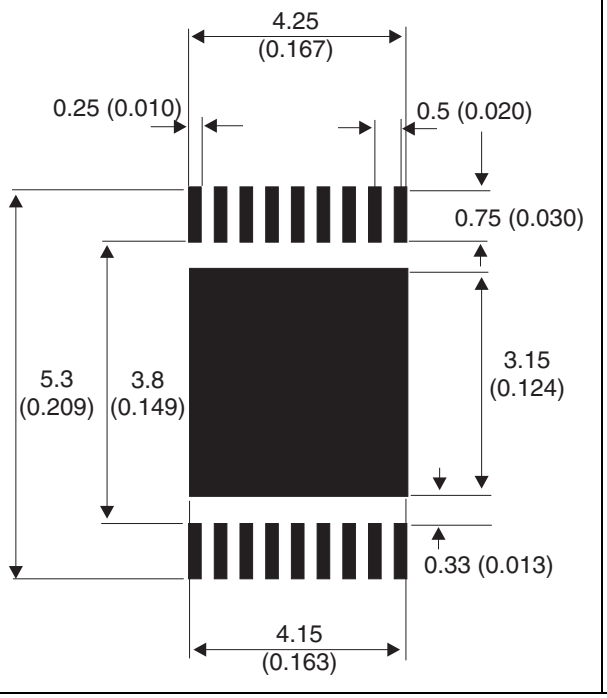
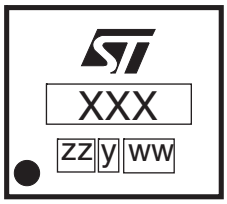


Figure 14. Marking



XXX: Marking
ZZ: Manufacturing location
Y: Year
WW: Week

5 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
DPIULC6-6DJL	DPIL66	DFN 5x6 18 leads	78.8 mg	3000	Tape and reel

6 Revision history

Table 6. Document revision history

Date	Revision	Changes
27-Nov-2009	1	Initial release.
09-Apr-2010	2	Added central pad to comment in *Figure 1*.

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