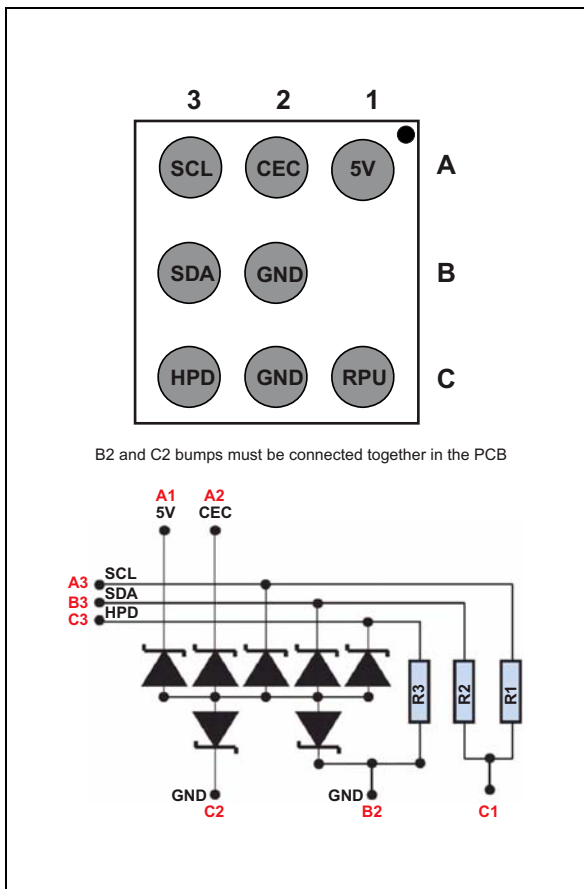


5-line IPAD™, HDMI™ control line ESD protection

Datasheet - production data



Figure 1. Pin configuration (bump side) and schematic



Features

- Low line capacitance
- High efficiency in ESD protection
- Lead-free package
- Very thin package
- High reliability offered by monolithic integration
- High reduction of parasitic elements through integration and wafer level packaging

Complies with the standards:

- IEC 61000-4-2 Level 4
 - ± 15 kV (air discharge)
 - ± 8 kV (contact discharge)
- IEC 61000-4-2 Level 1
 - ± 2 kV (air discharge)
 - ± 2 kV (contact discharge)

Application

Where ESD protection for HDMI control lines (CEC, HPD, SCL and SDA) is required:

- Mobile phones and communication systems
- Portable multimedia players
- Camcorder, digital still cameras

Description

The HDMI05-CL01F3 chip is a low capacitance ESD protection for HDMI control pins. It also integrates a pull-up resistor for I²C bus and a pull-down resistor for hot plug detect.

The ESD protection circuitry prevents damage to the protected device when subjected to ESD surges up to 15 kV.

TM: IPAD is a trademark of STMicroelectronics. HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

1 Characteristics

Table 1. Absolute maximum ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Value	Unit
V_{PP}	External pins (A1, A2, A3, B3 and C3):		
	ESD IEC 61000-4-2, level 4 - air discharge	15	kV
	ESD IEC 61000-4-2, level 4 - contact discharge	8	
	Internal pin (C1):		
ESD IEC 61000-4-2, level 1 - air discharge	2		
	ESD IEC 61000-4-2, level 1 - contact discharge	2	
P_d	Line resistance power dissipation at 70 °C	60	mW
T_{op}	Operating temperature range	-30 to + 85	°C
T_{stg}	Storage temperature range	-55 to + 150	°C

Figure 2. Electrical characteristics - definitions

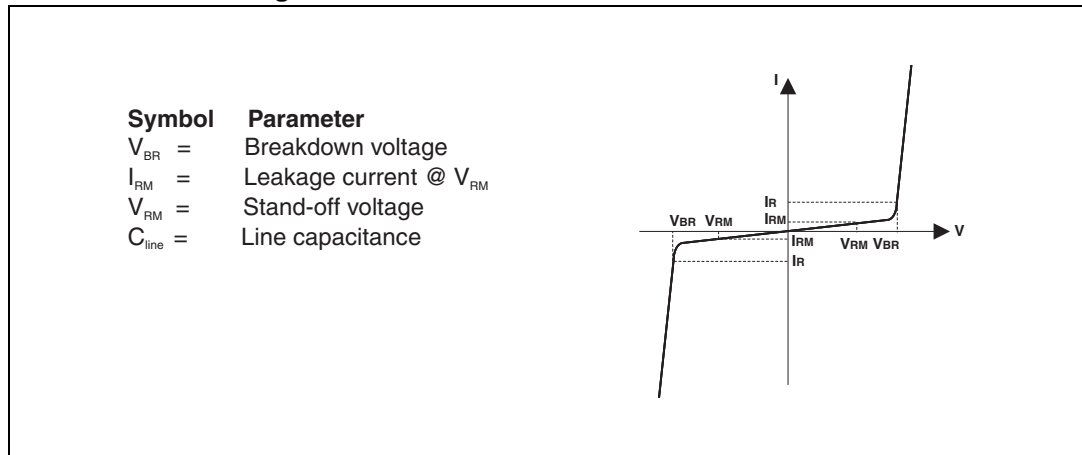


Table 2. Electrical characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Test condition	Min.	Typ.	Max.	Unit
V_{BR}	$I_R = 1\text{ mA}$	14			V
I_{RM}	$V_{RM} = 3\text{ V per line}$		50	200	nA
R_1, R_2		1575	1750	1925	Ω
R_3		80	100	120	k Ω
C_{line}	$V_{line} = 0\text{ V}, V_{osc} = 30\text{ mV}, F = 1\text{ MHz}$ (measured under zero light conditions, B2 and C2 bumps connect together)	8	10	12	pF

Figure 3. S21(dB) versus frequency on A1

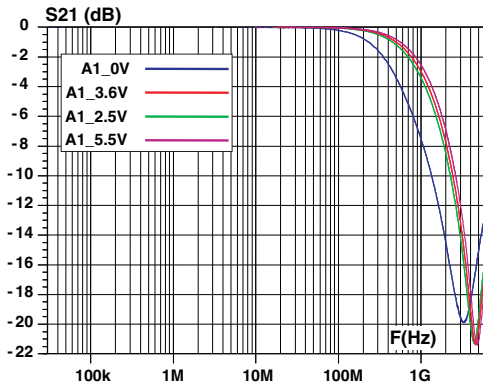


Figure 4. Analog crosstalk measurements B3-A3

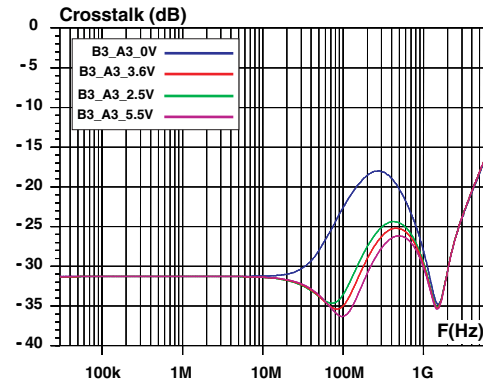


Figure 5. Digital crosstalk measurement A3-B3 with 5 V applied on C1

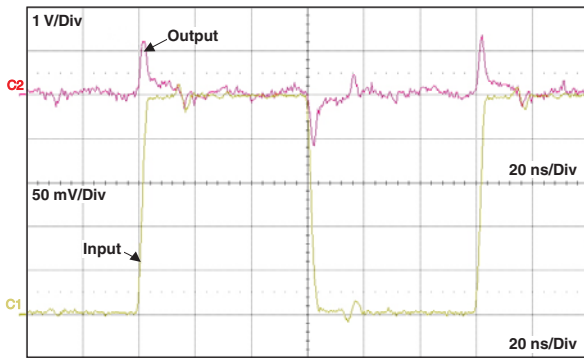


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge) on CEC line (A2)

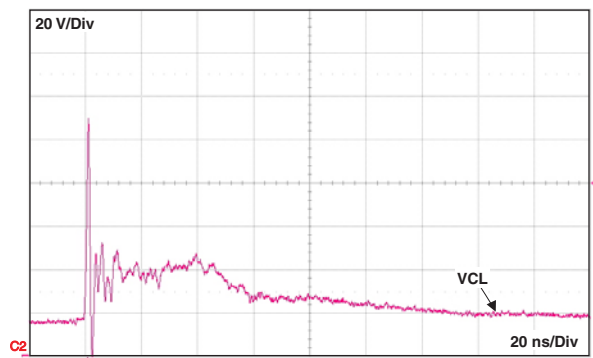


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge) on CEC line (A2)

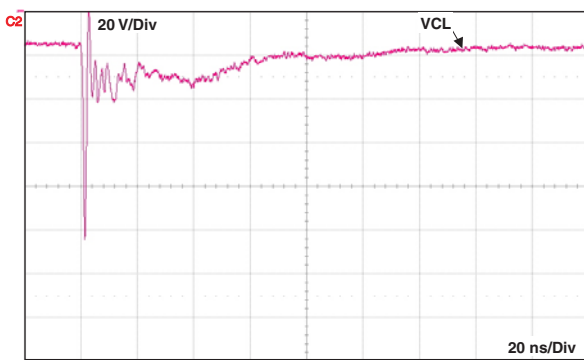
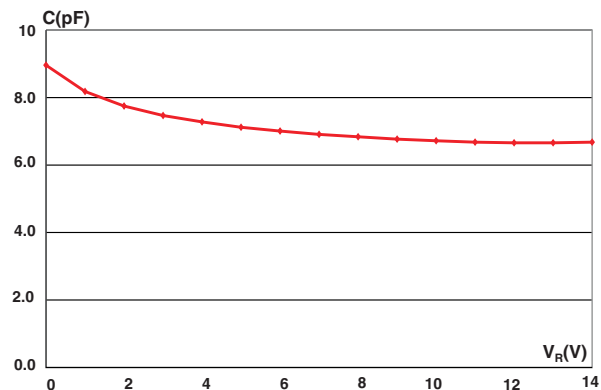
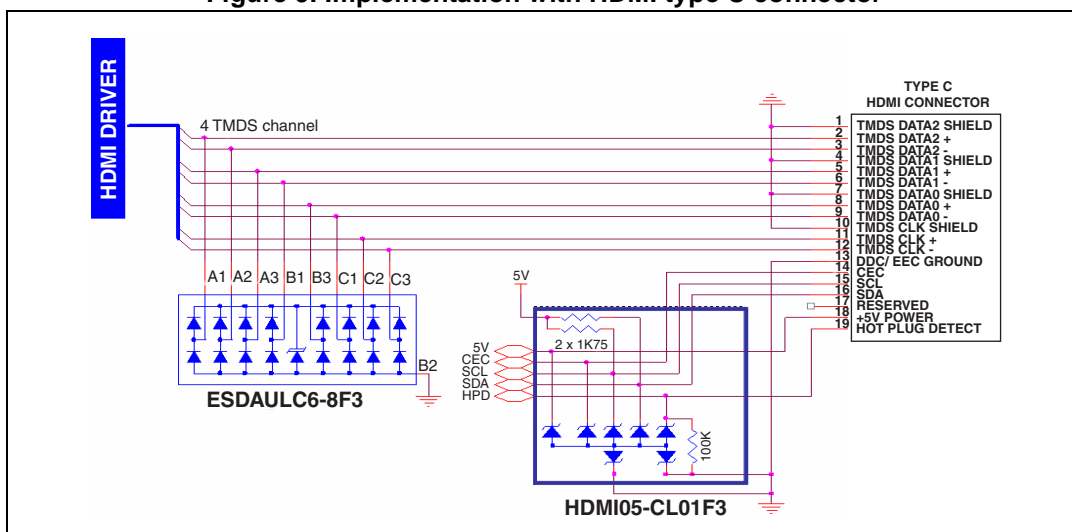


Figure 8. Line capacitance versus reverse applied voltage on A2-B2



2 Typical application schematic

Figure 9. Implementation with HDMI type C connector



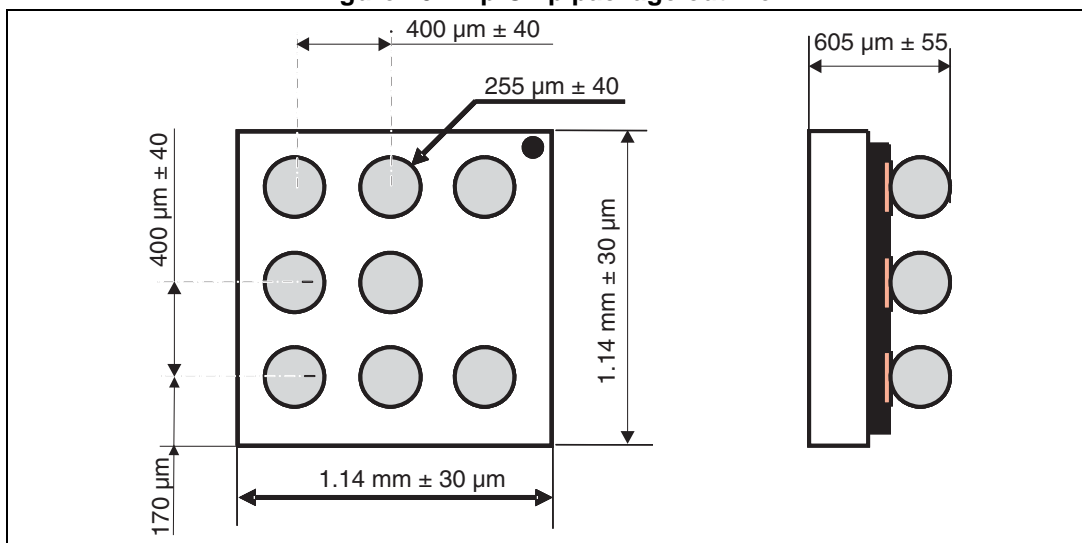
3 Package information

- 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.

3.1 Flip-Chip package information

Figure 10. Flip-Chip package outline



3.2 Packing information

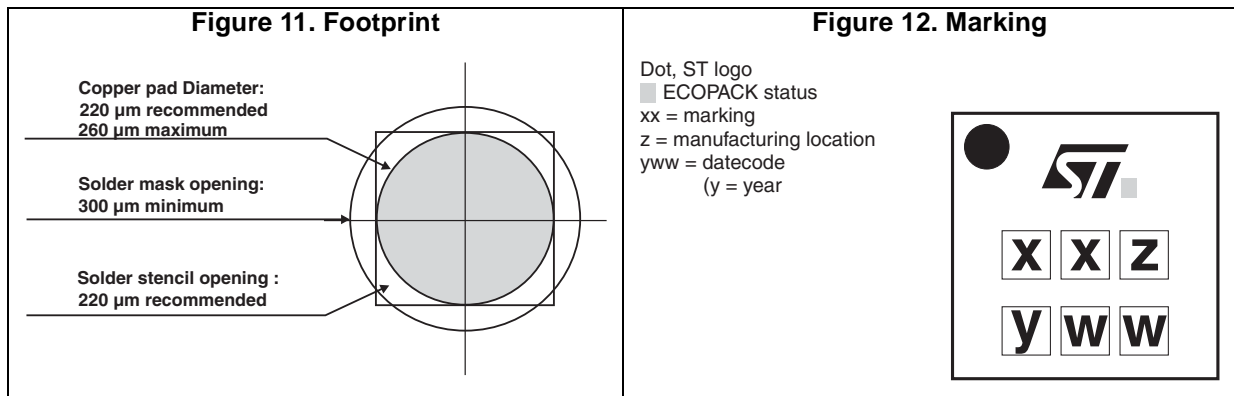
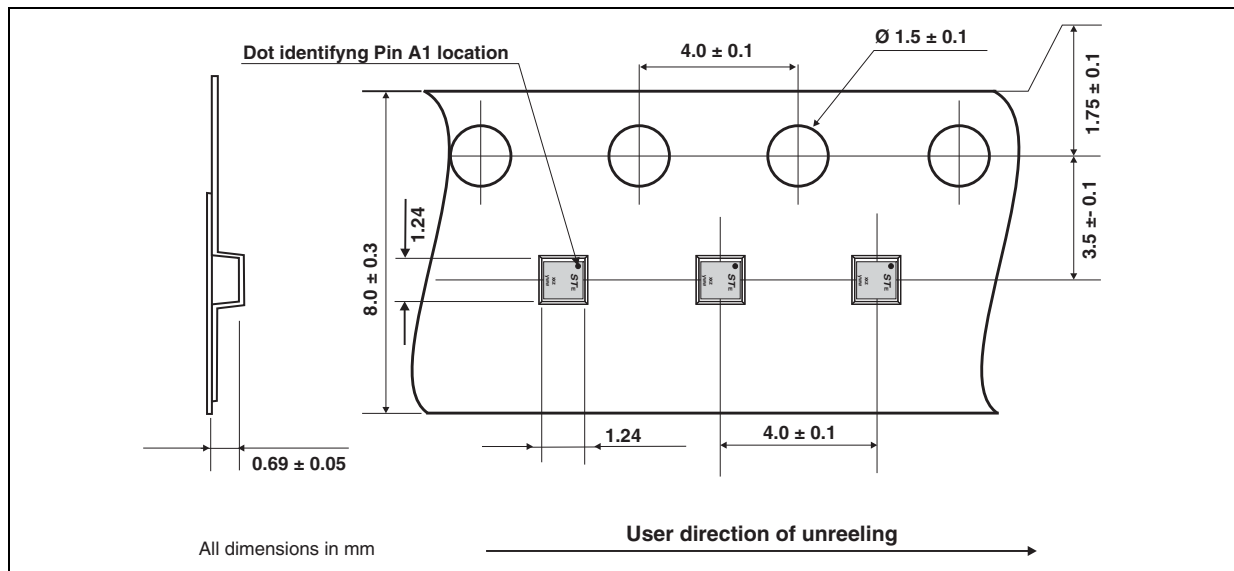


Figure 13. Tape and reel outline



4 Ordering information

Figure 14. Ordering information scheme

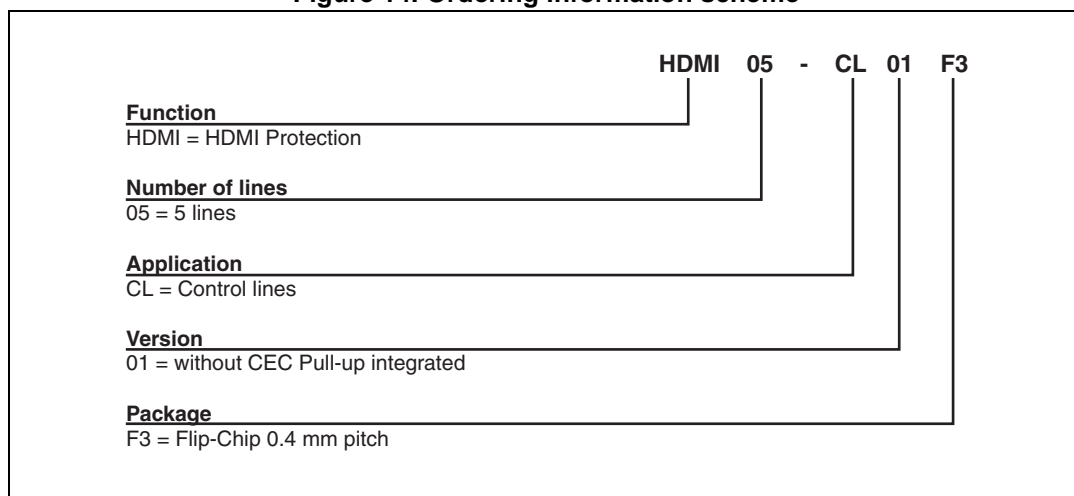


Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
HDMI05-CL01F3	JN	Flip-Chip	1.9 mg	5000	Tape and reel (7")

5 Revision history

Table 4. Document revision history

Date	Revision	Changes
30-Apr-2010	1	Initial release.
14-Mar-2014	2	Updated Figure 9 .
16-July-2015	3	Removed erroneous watermark from the document and reformatted to current standard.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2015 STMicroelectronics – All rights reserved