

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

Datasheet - production data

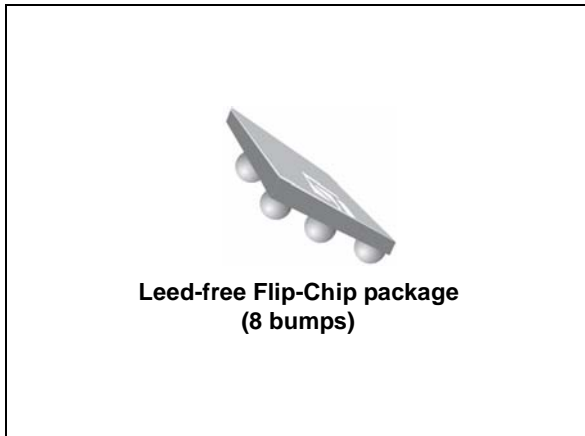
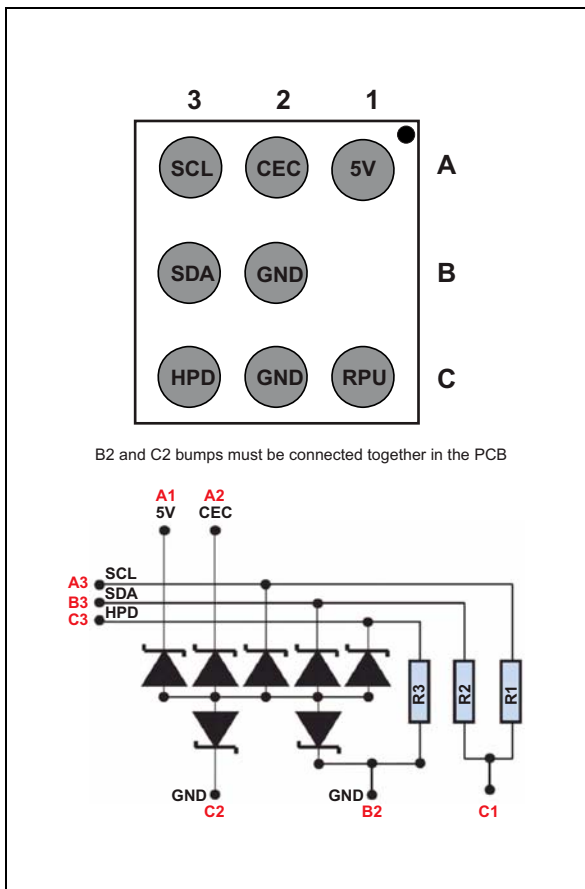


Figure 1. Pin configuration (bump side) and schematic



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.

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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

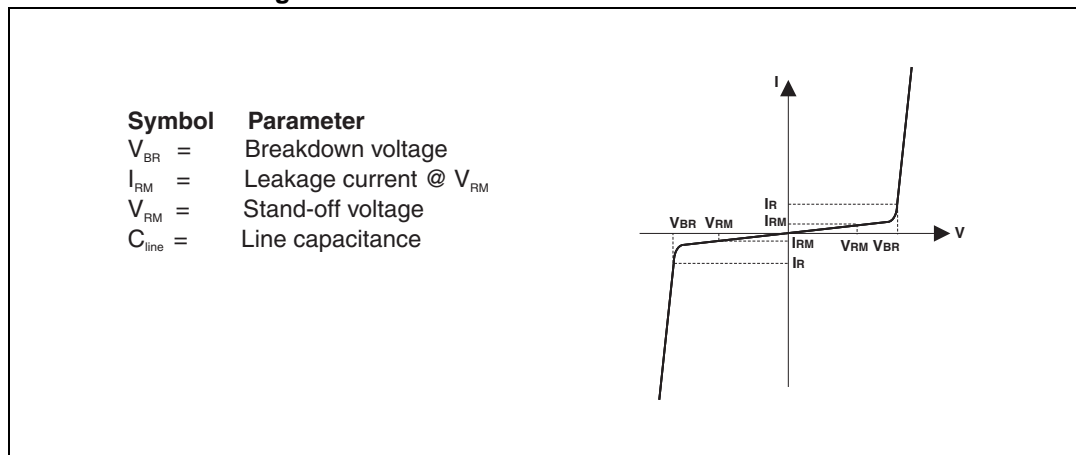


Table 2. Electrical characteristics ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

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

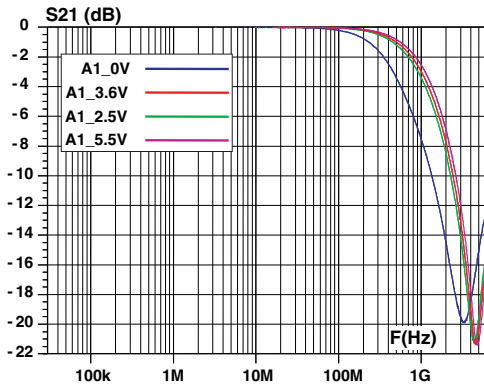


Figure 4. Analog crosstalk measurements B3-A3

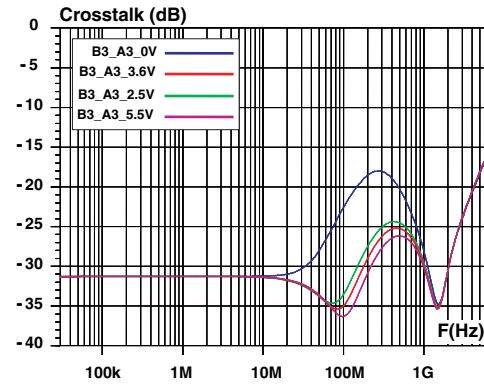


Figure 5. Digital crosstalk measurement A3-B3 with 5 V applied on C1

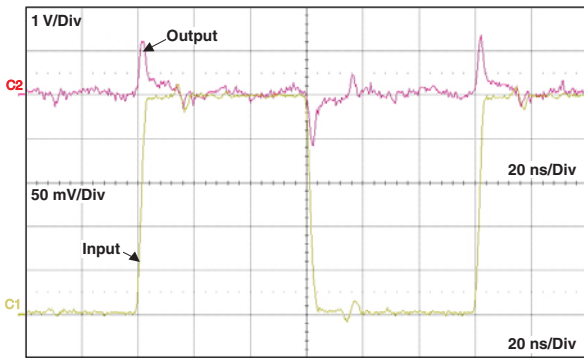


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge) on CEC line (A2)

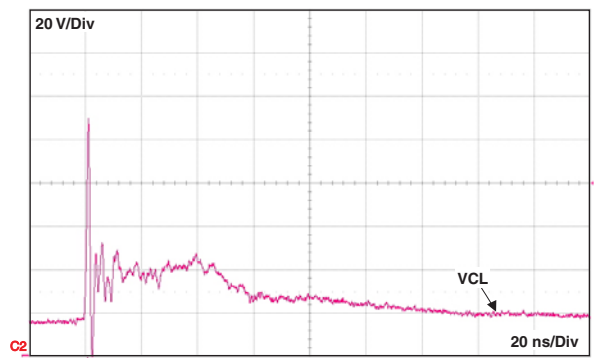


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge) on CEC line (A2)

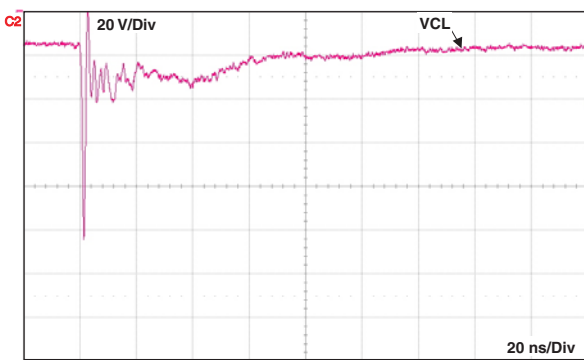
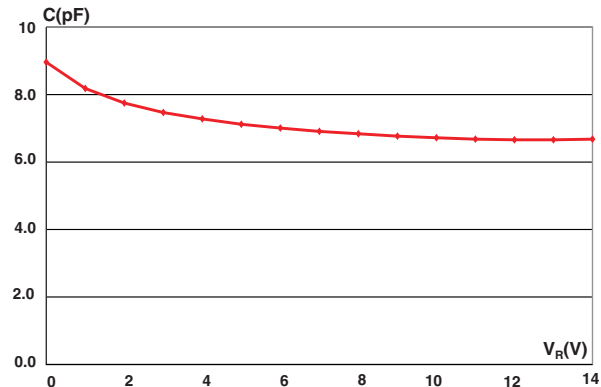
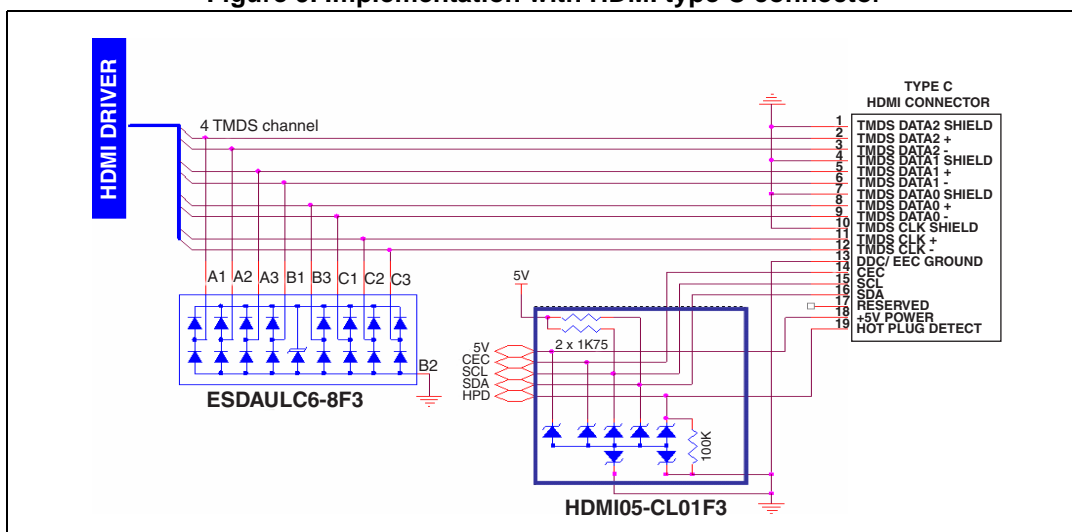


Figure 8. Line capacitance versus reverse applied voltage on A2-B2



2 Typical application schematic

Figure 9. Implementation with HDMI type C connector



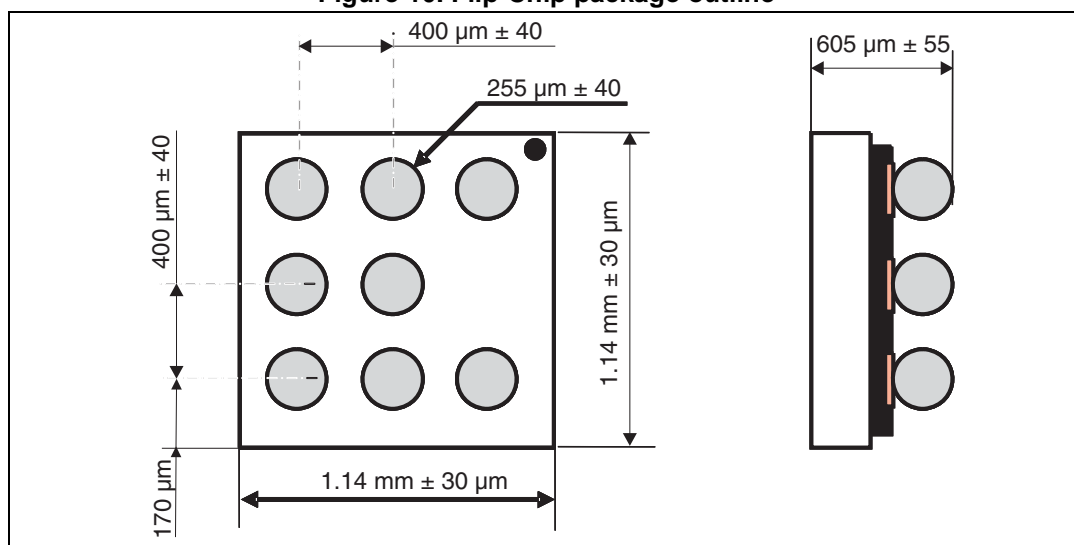
3 Package information

- Epoxy meets UL94, V0
- Lead-free package

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3.1 Flip-Chip package information

Figure 10. Flip-Chip package outline



3.2 Packing information

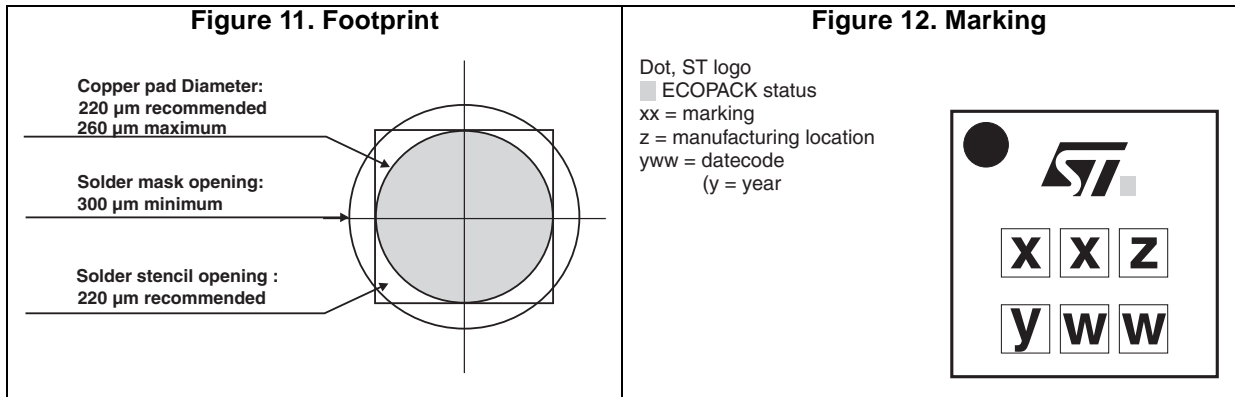
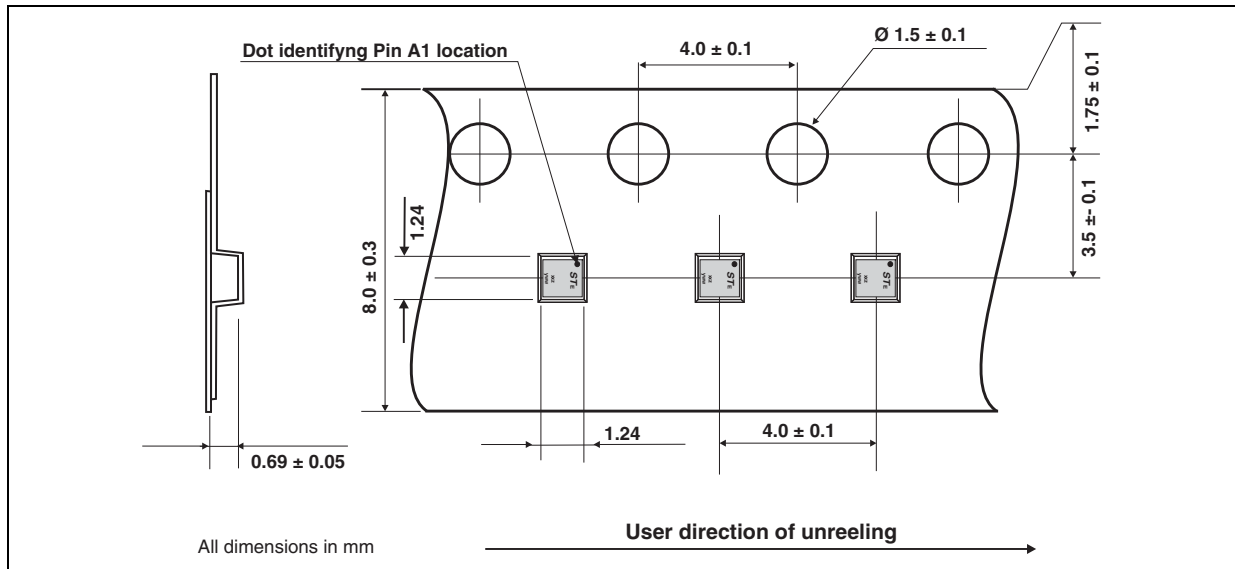


Figure 13. Tape and reel outline



4 Ordering information

Figure 14. Ordering information scheme

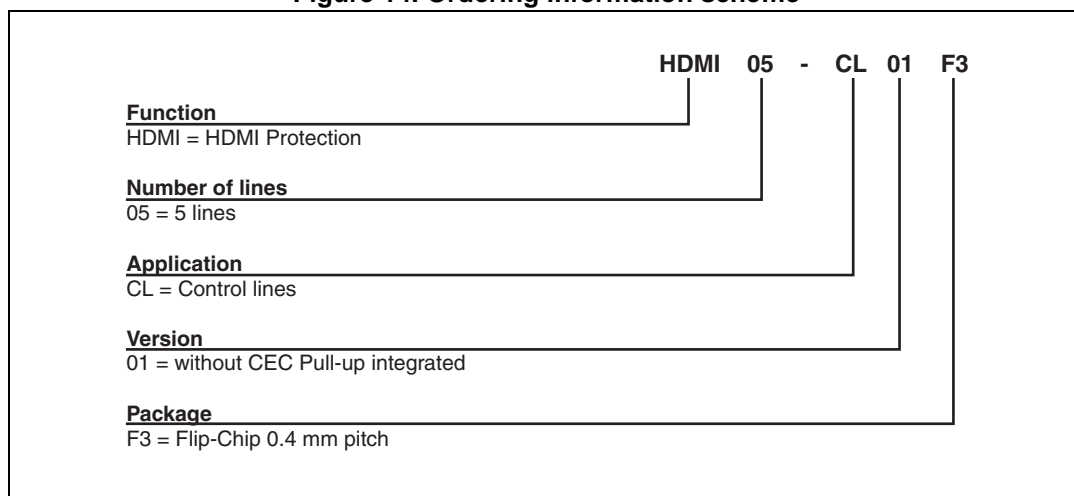


Table 3. Ordering information

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.

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