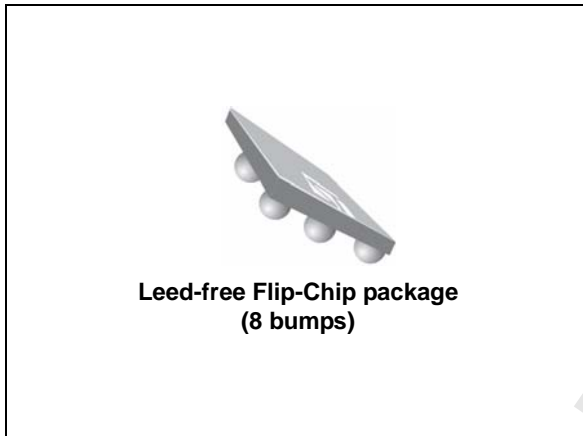


## 5-line IPAD™, HDMI™ control line ESD protection

Datasheet - production data



### 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

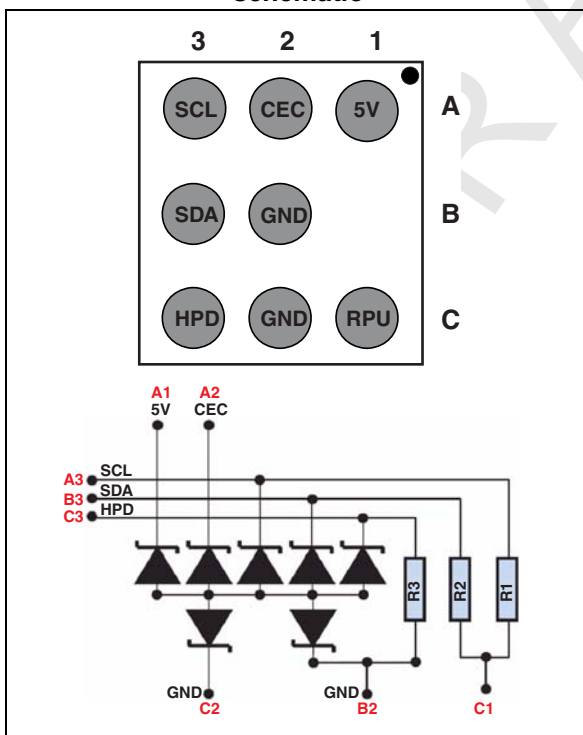
The HDMI05-CL01F3 chip is a low capacitance ESD protection for HDMI control pins. It also integrates a pull-up resistor for I<sup>2</sup>C bus and a pull-down resistor for hot plug detect.

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

1. B2 and C2 bumps must be connected together in the PCB

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**Figure 1. Pin configuration (bump side) and schematic**

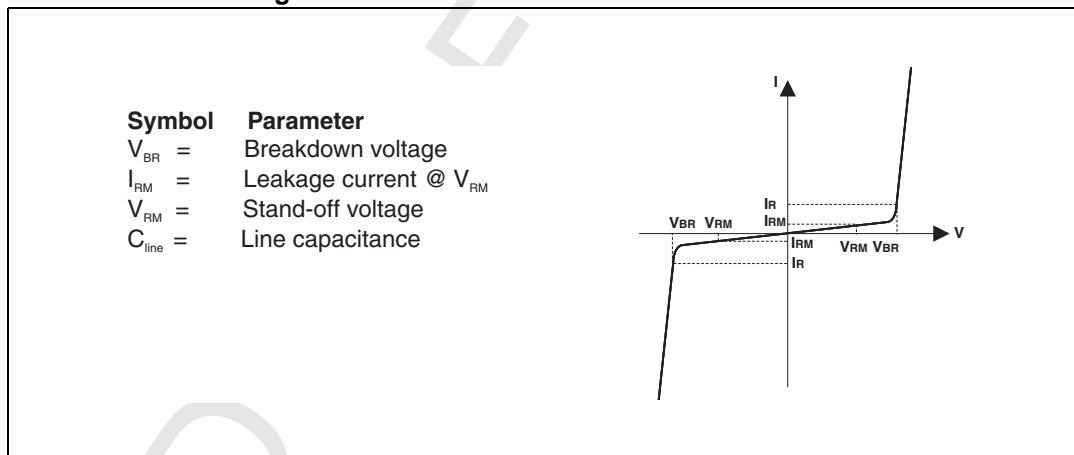


# 1 Characteristics

**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	$\Omega$
$R_3$		80	100	120	k $\Omega$
$C_{line}$	$V_{line} = 0\text{ V}, V_{osc} = 30\text{ mV}, F = 1\text{ MHz}$ (measured under zero light conditions, B2 and C2 bumps connect together)	8	10	12	pF

Figure 3. S21(dB) versus frequency on A1

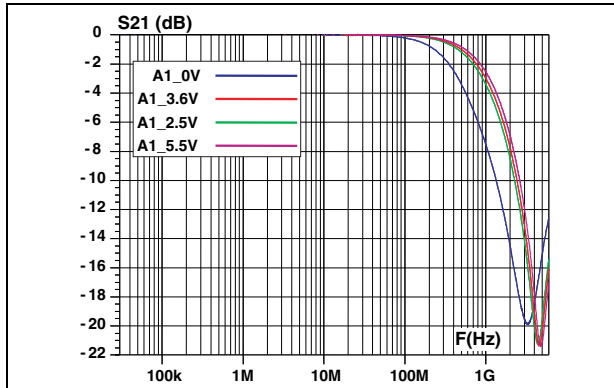


Figure 4. Analog crosstalk measurements B3-A3

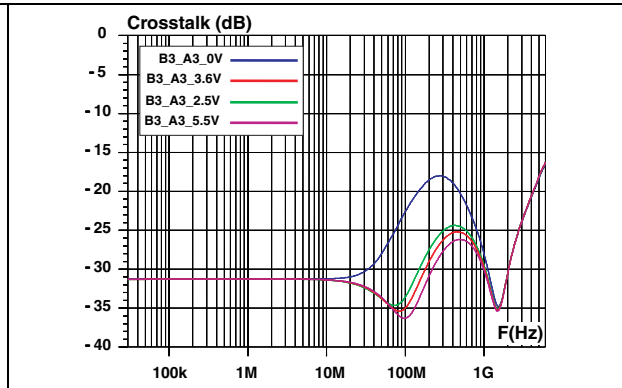


Figure 5. Digital crosstalk measurement A3-B3 with 5 V applied on C1

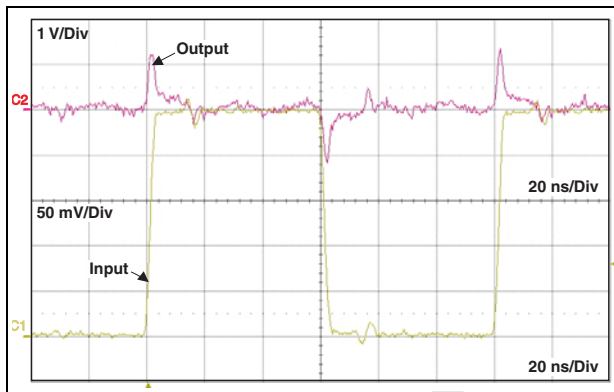


Figure 6. ESD response to IEC 61000-4-2 (+8 kV contact discharge) on CEC line (A2)

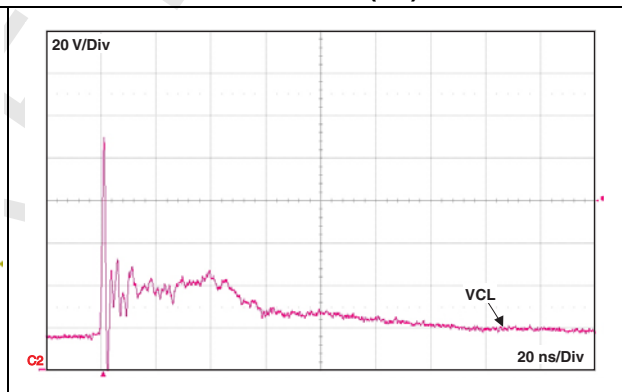


Figure 7. ESD response to IEC 61000-4-2 (-8 kV contact discharge) on CEC line (A2)

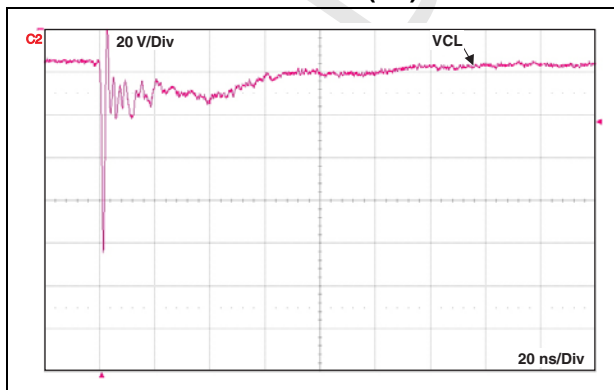
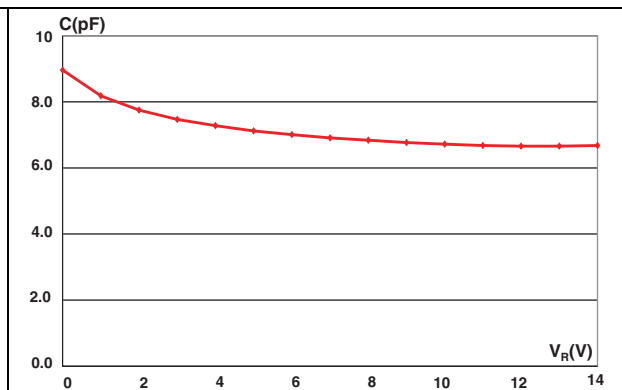
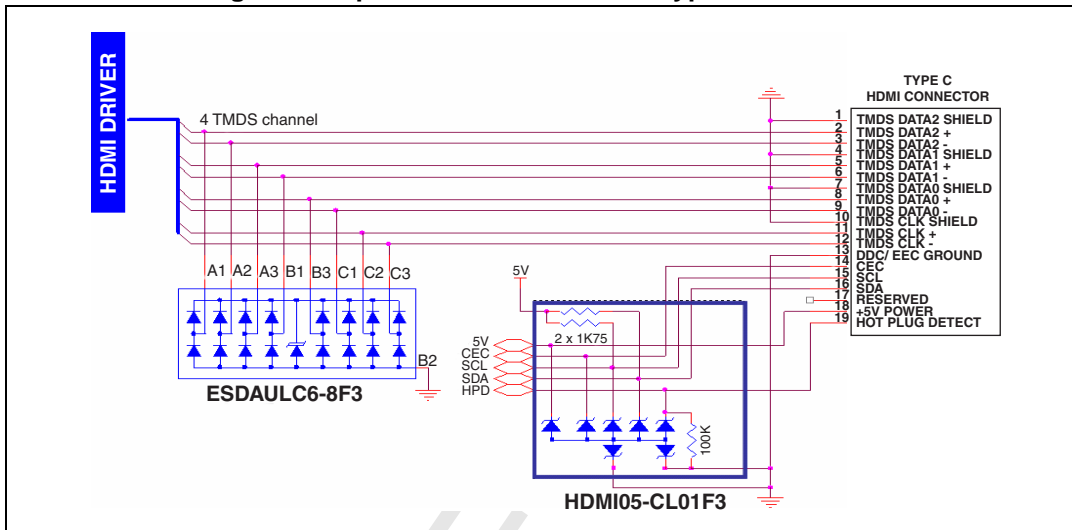


Figure 8. Line capacitance versus reverse applied voltage on A2-B2



## 2 Typical application schematic

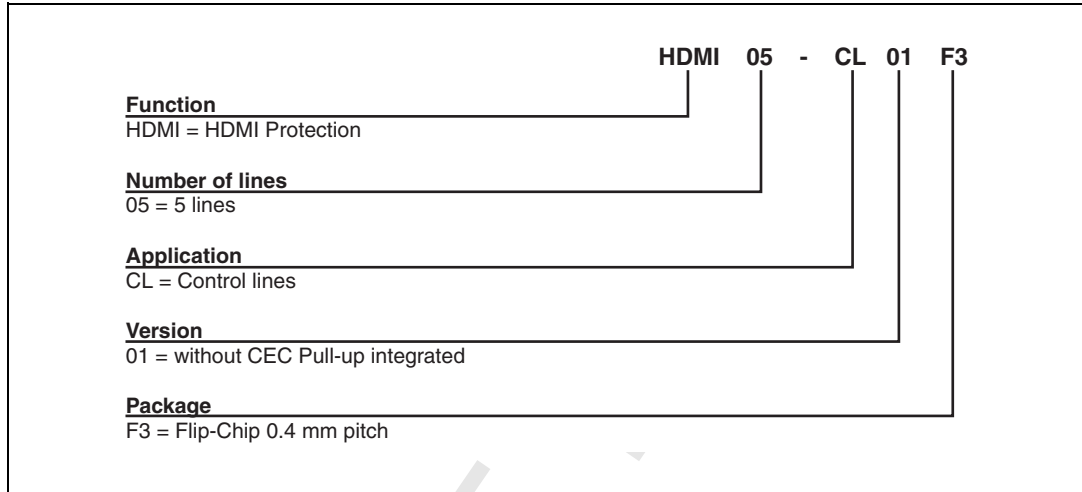
Figure 9. Implementation with HDMI type C connector



DRAFT

### 3 Ordering information scheme

Figure 10. 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](http://www.st.com). ECOPACK® is an ST trademark.

Figure 11. Flip-Chip dimensions

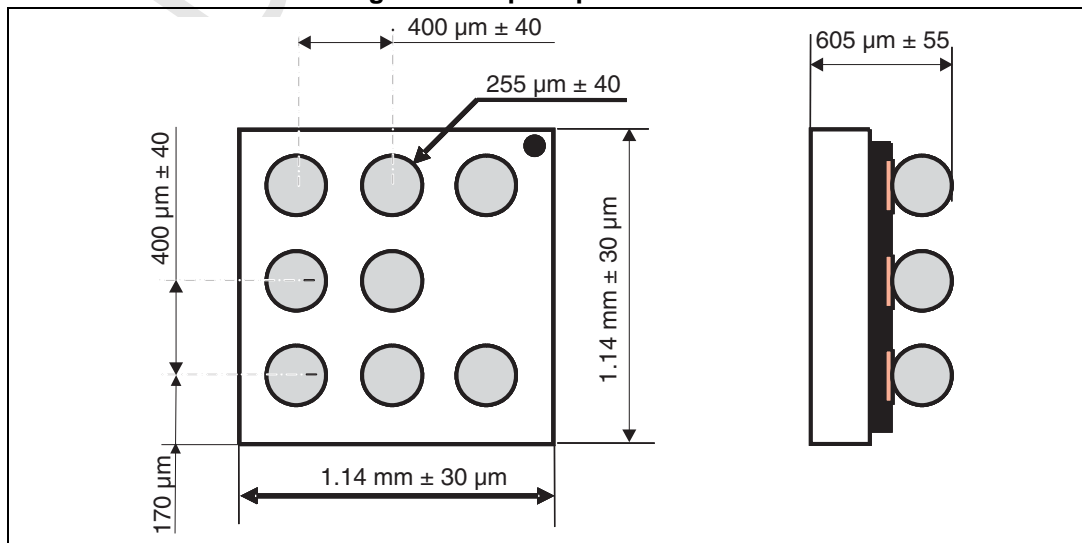


Figure 12. Footprint

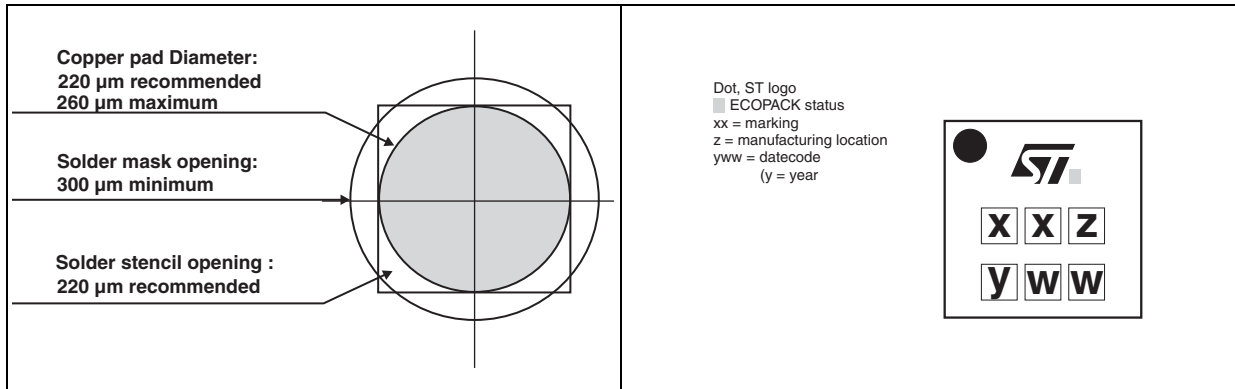


Figure 13. Marking

Dot, ST logo  
 ■ ECOPACK status  
 xx = marking  
 z = manufacturing location  
 yww = datecode  
 (y = year)

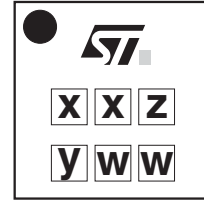
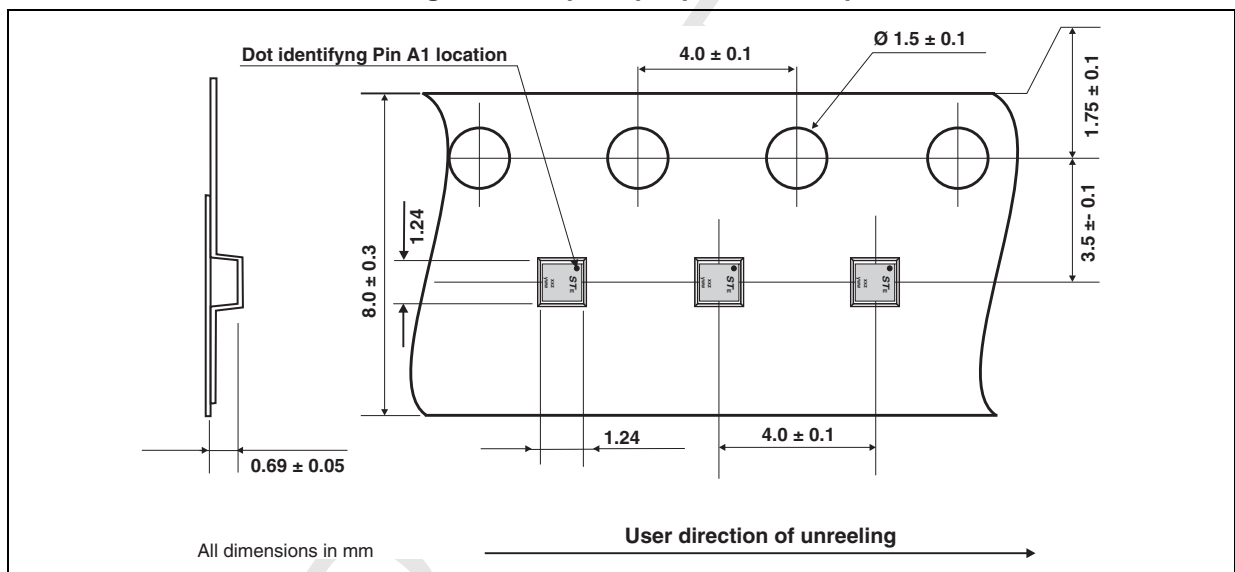


Figure 14. Flip-Chip tape and reel specification



## 5 Ordering information

**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")

## 6 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
30-Apr-2010	1	Initial release.
14-Mar-2014	2	Updated <a href="#">Figure 9</a> .

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