THE DATASHEET OF

HDMIULC6-4F3

HDMIULC6-4F3

4-line, ultralarge bandwhith ESD protection

Datasheet – production data

Features

- 4-line 15 kV ESD protection
- Ultralow line capacitance: 1.1 pF
- Ultralarge bandwidth
  - no influence on signal rise and fall times
  - maximized number of signal harmonics
- Flow-through layout with type C HDMI™ connector
- Low PCB space area: 1.76 mm² footprint
- Very low leakage current 70 nA
- 0.4 mm pitch Flip-Chip package (wafer level CSP) to minimize parasitic inductances
- RoHS compliant

Complies with the standards:

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

Applications

- Mobile phones
- HDMI ports at 1.65 Gb/s and up to 3.2 Gb/s
- USB 2.0 ports up to 480 Mb/s (Hi-Speed)
- Video line protection

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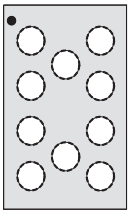
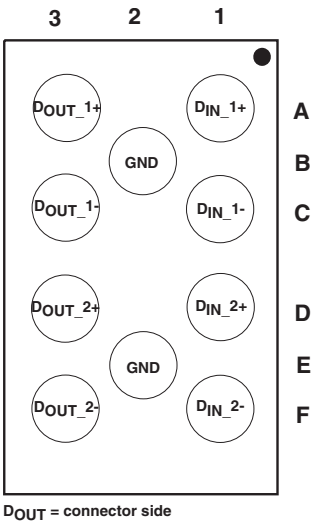


Flip Chip (top view)
10 bumps

Figure 1. Pin configuration (bump side)



D_{OUT} = connector side

Description

The HDMIULC6-4F3 is a monolithic, application specific discrete device dedicated to ESD protection of the HDMI connection. It also offers the same high level of protection for IEEE 1394a and IEEE 1394b/c, USB 2.0, Ethernet links, and video lines.

Its ultrahigh cutoff frequency (7 GHz) secures a high level of signal integrity. The device topology provides this integrity without compromising the complete protection of ICs against the most stringent ESD strikes.

1 Characteristics

Figure 2. Internal circuit schematic (top view)

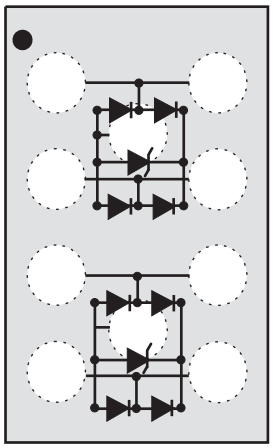


Table 1. Absolute maximum ratings (T_{amb} = 25 °C)

Symbol	Parameter	Value	Unit
V_{PP}	ESD discharge IEC 61000-4-2 Air discharge Contact discharge	 ±15 ±8	kV
P_{PP}	Peak pulse power dissipation (8/20 µs)	35	W
T_j	Maximum junction temperature	125	°C
T_{stg}	Storage temperature range	-55 to + 150	°C

Table 2. Electrical characteristics (T_{amb} = 25 °C)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage between VBUS and GND	I_R = 1 mA	6			V
I_{RM}	Leakage current	V_{RM} = 3 V			70	nA
$C_{I/O-GND}$(1)	Capacitance between I/O and GND	V_{line} = 0 V, V_{osc} = 30 mV, F = 1 MHz		1.1	1.4	pF
$\Delta C_{I/O-GND}$(1)	Capacitance variation between I/O and GND	V_{line} = 0 V, V_{osc} = 30 mV, F = 1 MHz between two lines of the same lane		0.06		pF
BW	Bandwidth	- 3 dB		5.3		GHz

1. $C_{I/O-GND}$ values are given per line and relative to one GND.

Figure 3. Attenuation measurements

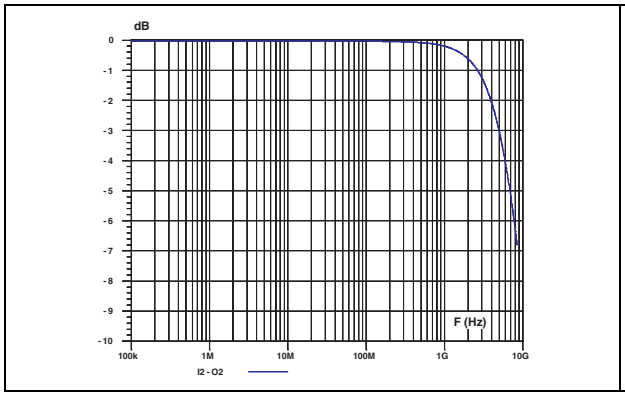


Figure 4. Analog crosstalk measurements

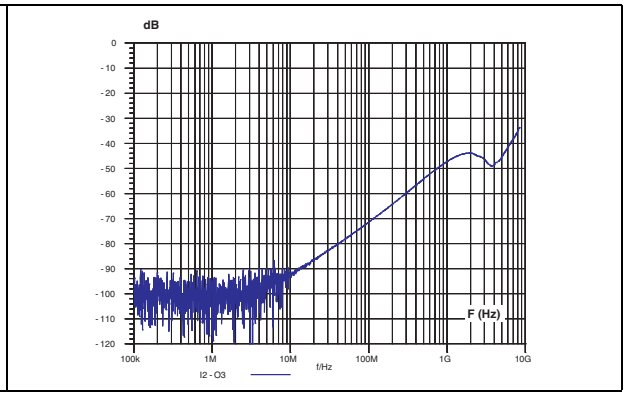


Figure 5. +8 kV ESD response (typical value)

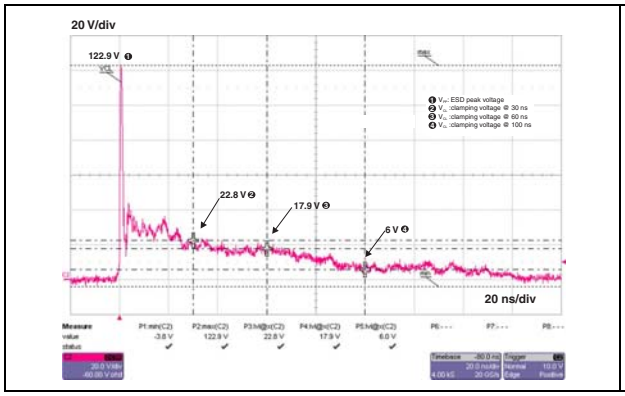


Figure 6. -8 kV ESD response (typical value)

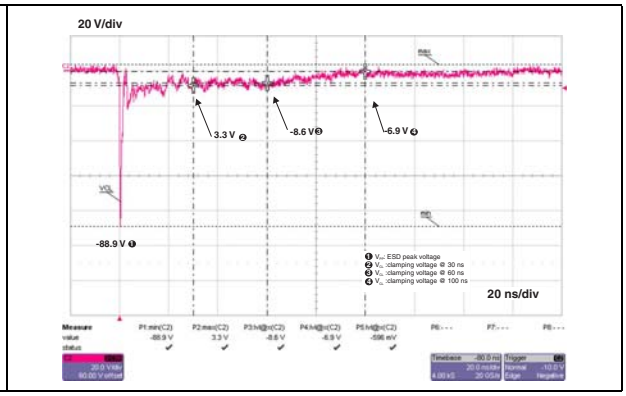
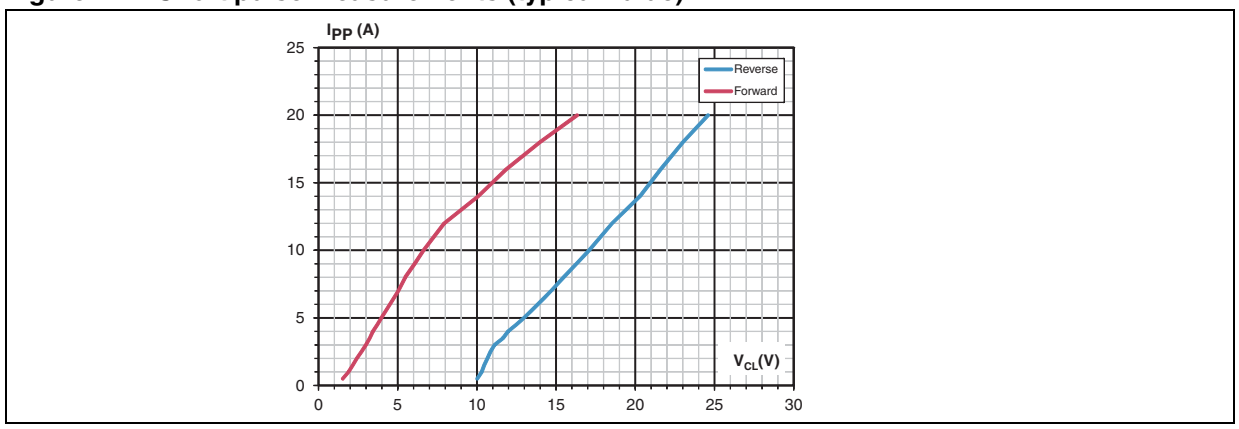
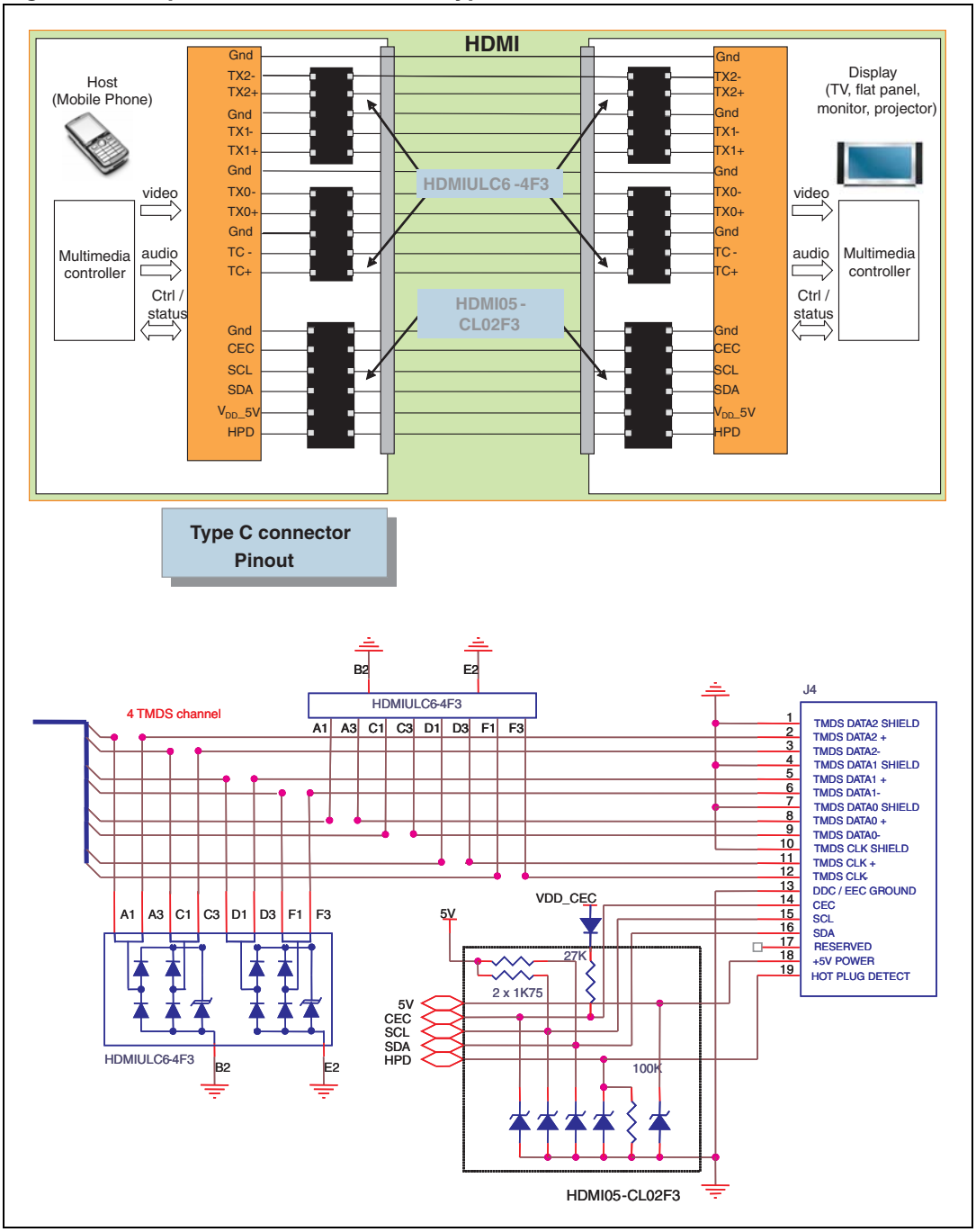


Figure 7. Short pulse measurements (typical value)



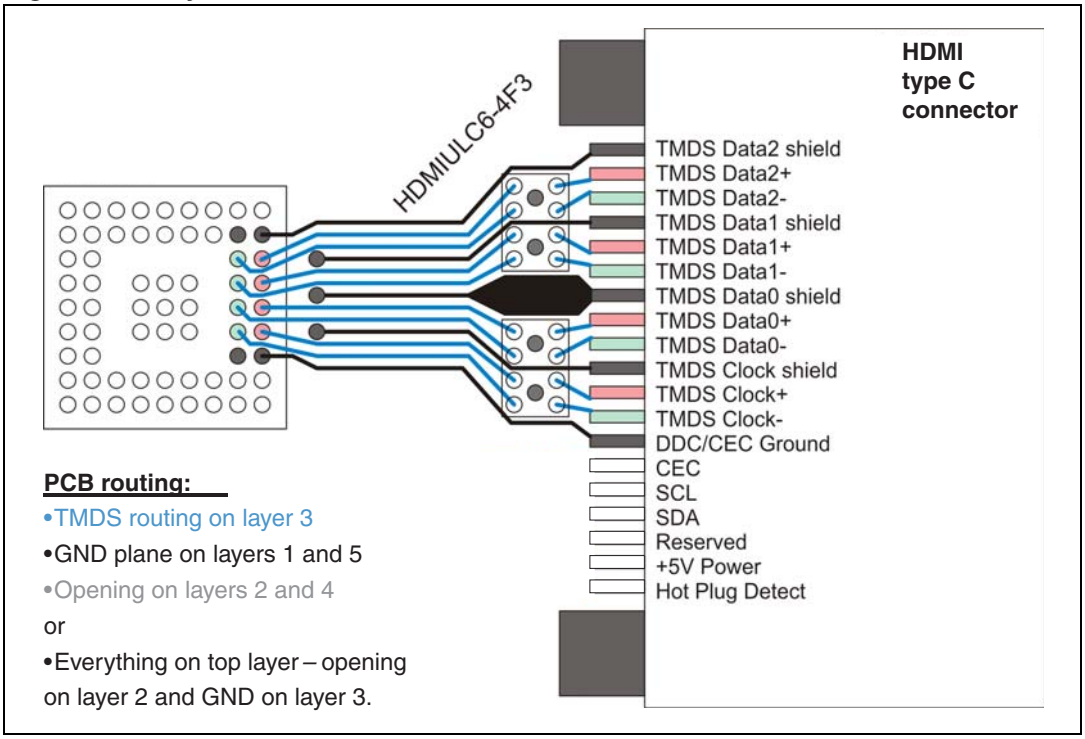
2 Typical application schematic

Figure 8. Implementation with HDMI type C connector



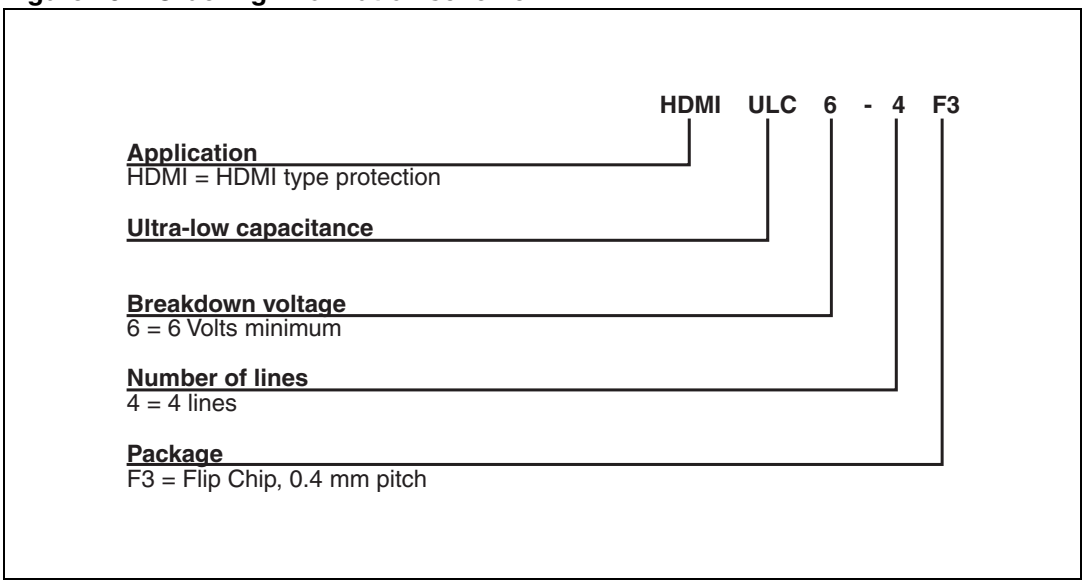
3 Layout recommendations

Figure 9. Layout recommendations



4 Ordering information scheme

Figure 10. Ordering information scheme



5 Package information

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 11. Package dimensions

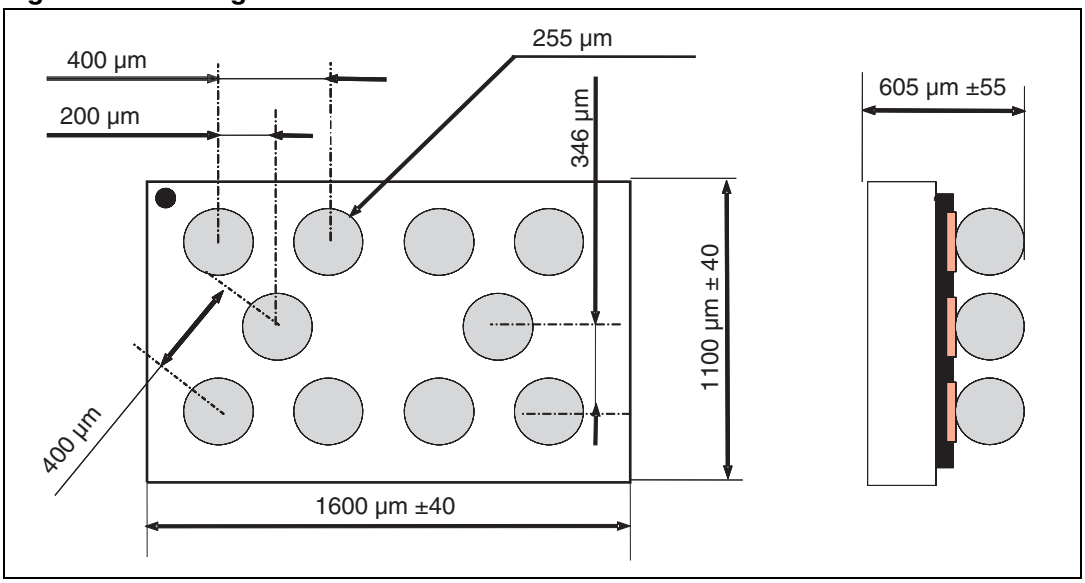


Figure 12. Footprint recommendations

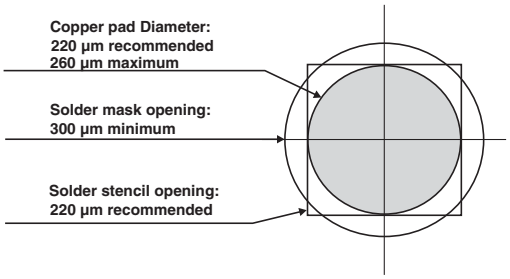


Figure 13. Marking

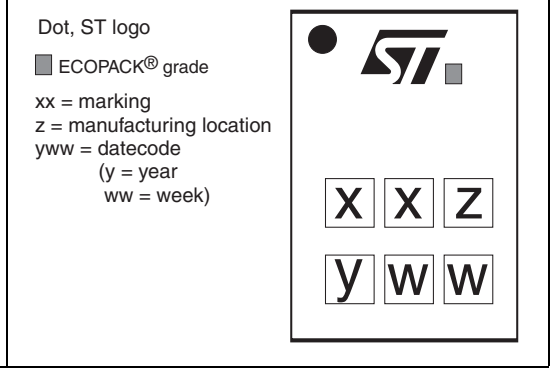
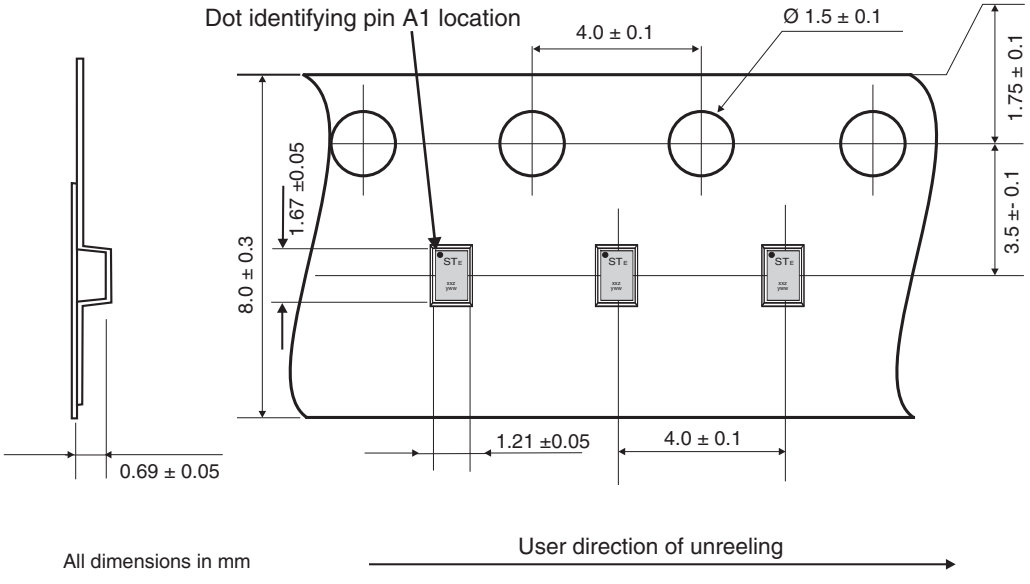


Figure 14. Flip-Chip tape and reel specifications



6 Ordering information

Table 3. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
HDMIULC6-4F3	EP	Flip Chip	2.2 mg	10000	Tape and reel (7”)

7 Revision history

Table 4. Document revision history

Date	Revision	Changes
24-Mar-2009	1	First issue.
10-Sept-2009	2	Removed “Electrical characteristics, parameters” table.Updated *Table 2.* and *Table 3.*Updated Figure 18.Added dimension in Figure 19.
15-Jan-2013	3	Updated features, *Table 1.*, *Table 2.*,and *Table 3.*Updated ESD curves and added *Figure 3.*, *Figure 4.*and *Figure 7.*

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