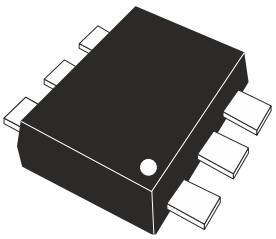
HSP061-2Y

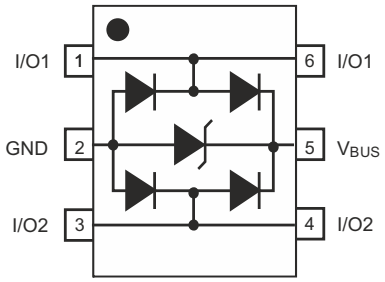
Automotive 2-line ESD protection for high speed lines

Datasheet - production data



HSP061-2P6Y
SOT666

Figure 1. Functional diagram (top view)



HSP061-2P6Y
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Features

- Flow-through routing to keep signal integrity
- Ultralarge bandwidth: 6 GHz
- Ultralow capacitance: 0.6 pF
- Low leakage current: 100 nA at 25 °C
- Extended operating junction temperature range: -40 °C to 150 °C
- RoHS compliant
- AEC-Q101 qualified

Benefits

- High ESD robustness of the equipment
- Suitable for high density boards

Complies with following standards:

- ISO 10605 - C = 150 pF, R = 330 Ω
  - 30 kV (air discharge)
  - 15 kV (contact discharge)
- ISO 10605 - C = 330 pF, R = 330 Ω
  - 30 kV (air discharge)
  - 15 kV (contact discharge)
- ISO 7637-3:
  - Pulse 3a: Vs = -150 V
  - Pulse 3b: Vs = +100 V

Applications

The HSP061-2Y is designed to protect against electrostatic discharge on automotive circuits driving:

- APIX
- LVDS
- HDMI 1.3 and 1.4
- Ethernet
- Digital Video Interface
- Display Port
- USB 3.0
- Serial ATA
- High speed communication buses
- HMI

Description

The HSP061-2Y is a 2-channel ESD array with a rail to rail architecture designed specifically for the protection of high speed differential lines.

The ultralow variation of the capacitance ensures very low influence on signal-skew. The large bandwidth makes it compatible with 5 Gbps.

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{PP}(1)	Peak pulse voltage	ISO 10605 - C = 150 pF, R = 330 Ω contact discharge air discharge ISO 10605 - C = 330 pF, R = 330 Ω contact discharge air discharge	 15 30 15 30	kV
I_{pp}	Peak pulse current (8/20 µs)		3	A
T_j	Operating junction temperature range		-40 to +150	°C
T_{stg}	Storage temperature range		-65 to +150	°C
T_L	Maximum lead solder temperature (10 s duration)		260	°C

1. For a surge greater than the maximum values, the diode will fail in short-circuit.

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

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	Breakdown voltage	I_R = 1 mA	6			V
I_R	Leakage current	V_R = 5 V			150	nA
		V_R = 3 V			100	
V_{CL}	Clamping voltage	ISO 10605 - C = 150 pF, R = 330 Ω +8 kV contact discharge, measured at 30 ns		18		V
$C_{I/O - GND}$	Capacitance (input/output to ground)	$V_{I/O}$ = 0 V, F = 200 to 3000 MHz, V_{OSC} = 30 mV		0.6	0.85	pF
$\Delta C_{I/O - GND}$	Capacitance variation (input/output to ground)	$V_{I/O}$ = 0 V F = 200 to 3000 MHz, V_{OSC} = 30 mV		0.03	0.08	pF
f_C	Cut-off frequency	-3 dB		5.5		GHz

Figure 2. Leakage current versus junction temperature (typical values)

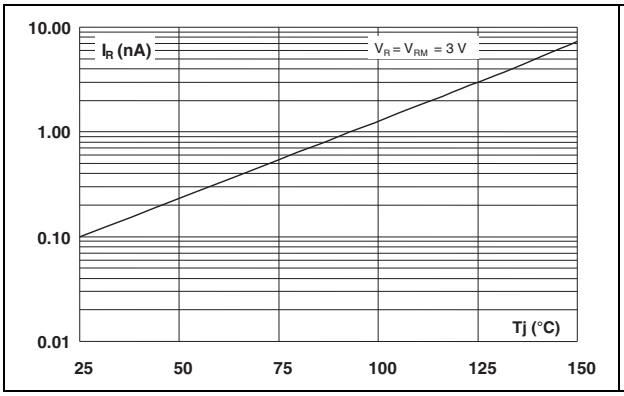


Figure 3. S21 attenuation measurement

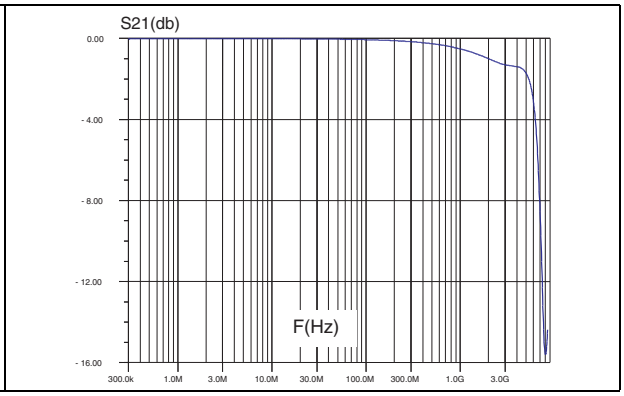


Figure 4. Eye diagram - HDMI mask at 3.4 Gbps per channel

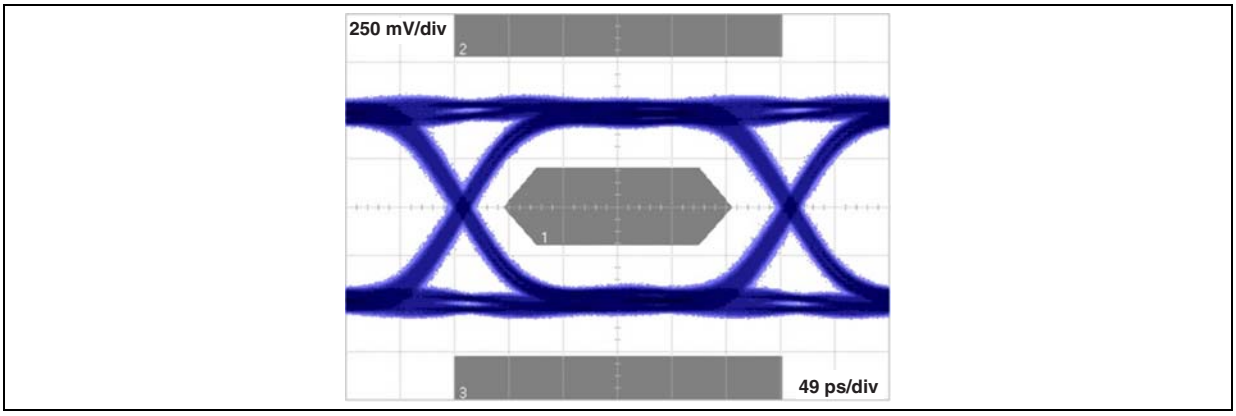


Figure 5. ESD response to IEC 61000-4-2 (+8 kV contact discharge)

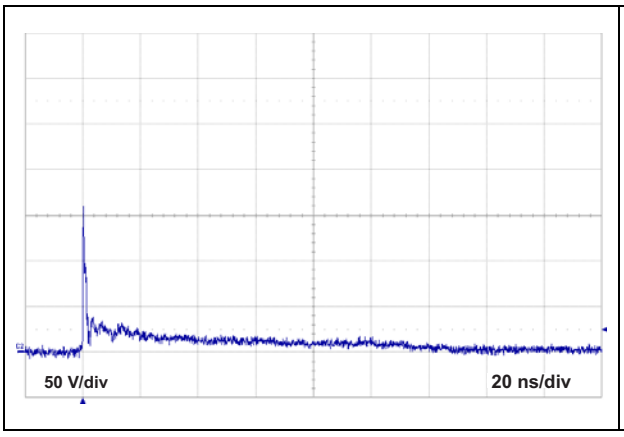


Figure 6. ESD response to IEC 61000-4-2 (-8 kV contact discharge)

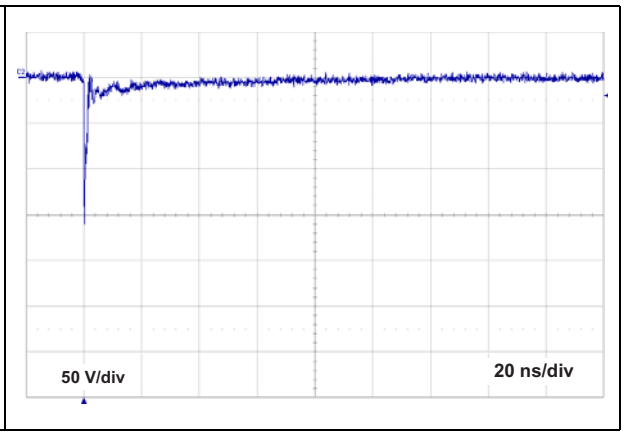


Figure 7. Response to ISO 7637-3 Pulse 3a (Us = -150 V)

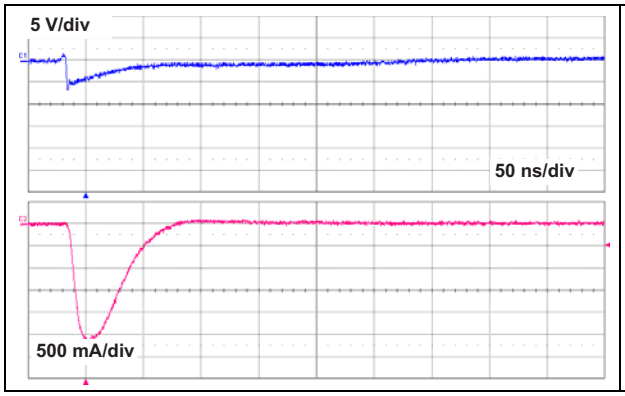
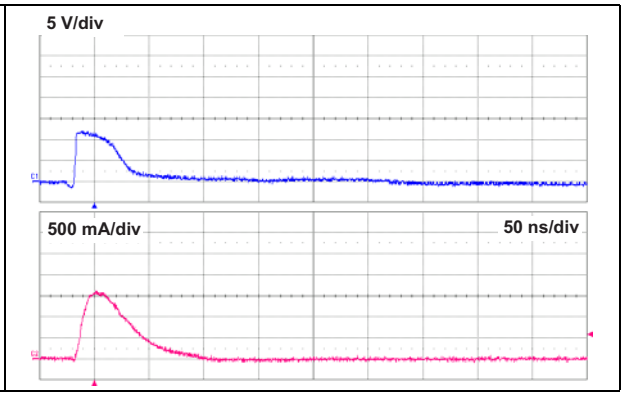


Figure 8. Response to ISO 7637-3 Pulse 3b (Us = +100 V)



2 Application information

More information is available in the STMicroelectronics application note:

AN2689, “Protection of automotive electronics from electrical hazards, guidelines for design and component selection”.

3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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 9. SOT666 dimension definitions

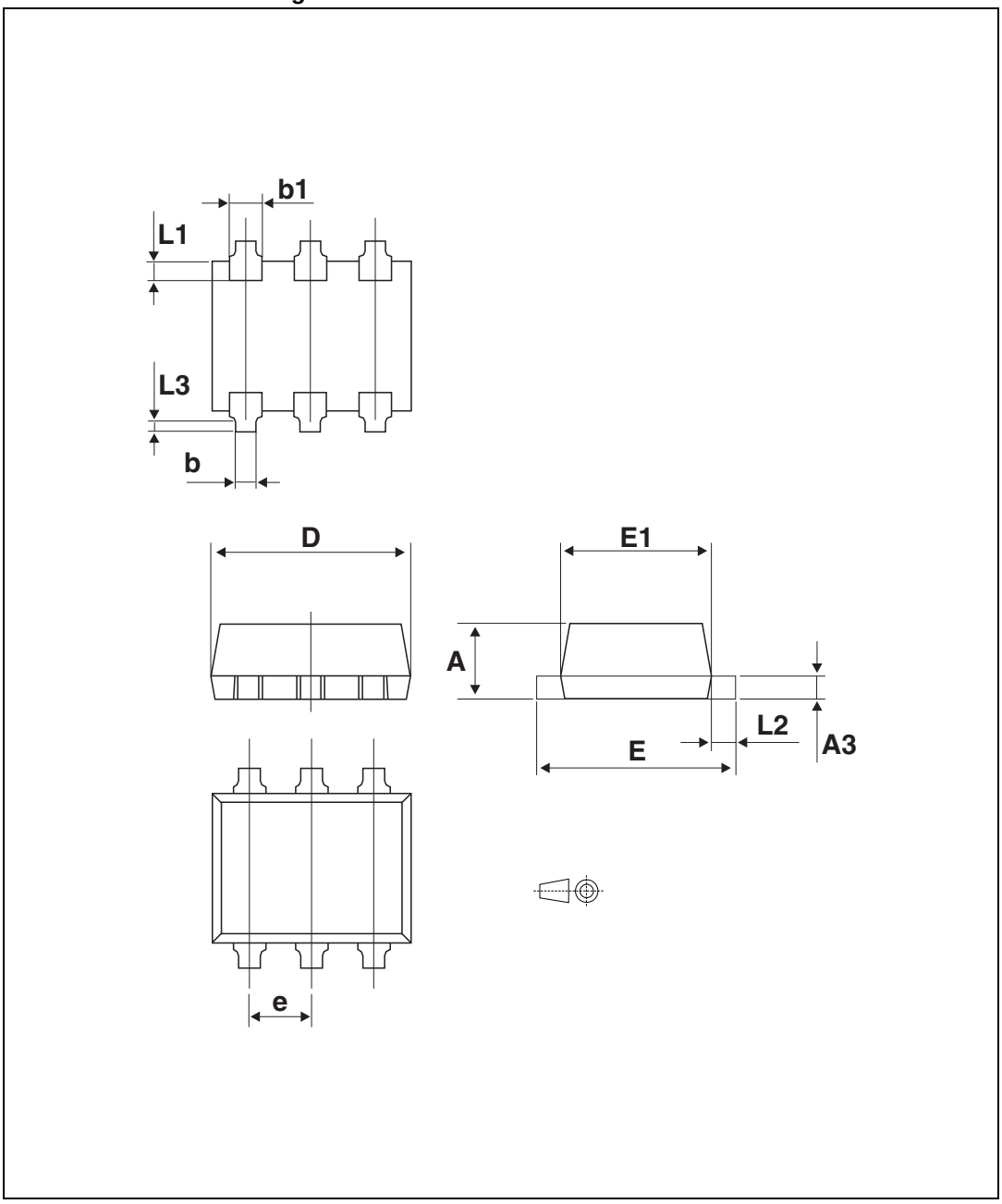


Table 3. SOT666 dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45		0.60	0.018		0.024
A3	0.08		0.18	0.003		0.007
b	0.17		0.34	0.007		0.013
b1	0.19	0.27	0.34	0.007	0.011	0.013
D	1.50		1.70	0.059		0.067
E	1.50		1.70	0.059		0.067
E1	1.10		1.30	0.043		0.051
e		0.50			0.020	
L1		0.19			0.007	
L2	0.10		0.30	0.004		0.012
L3		0.10			0.004	

Figure 10. Footprint recommendations dimensions in mm (inches)

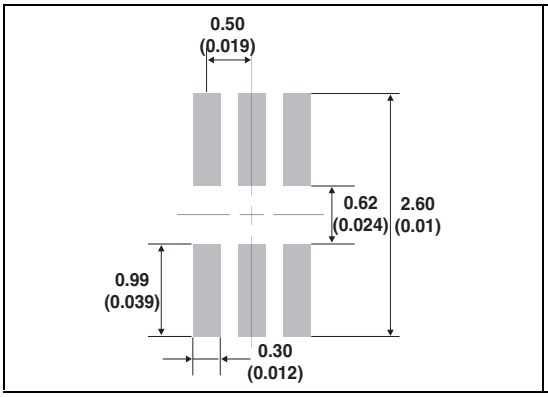
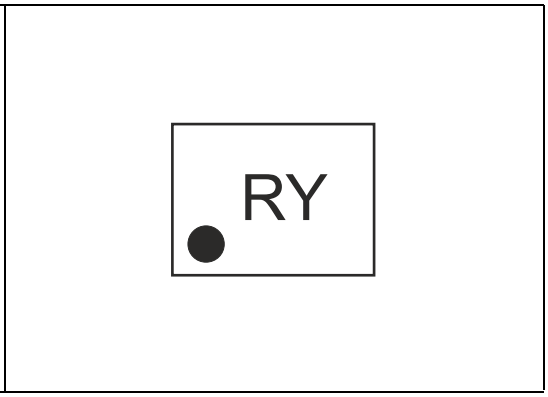


Figure 11. Marking



Note: Product marking may be rotated by 90° or 180° to differentiate assembly location. In no case should this product marking be used to orient the component for its placement on a PCB. Only pin 1 mark is to be used for this purpose.

4 Ordering information

Figure 12. Ordering information scheme

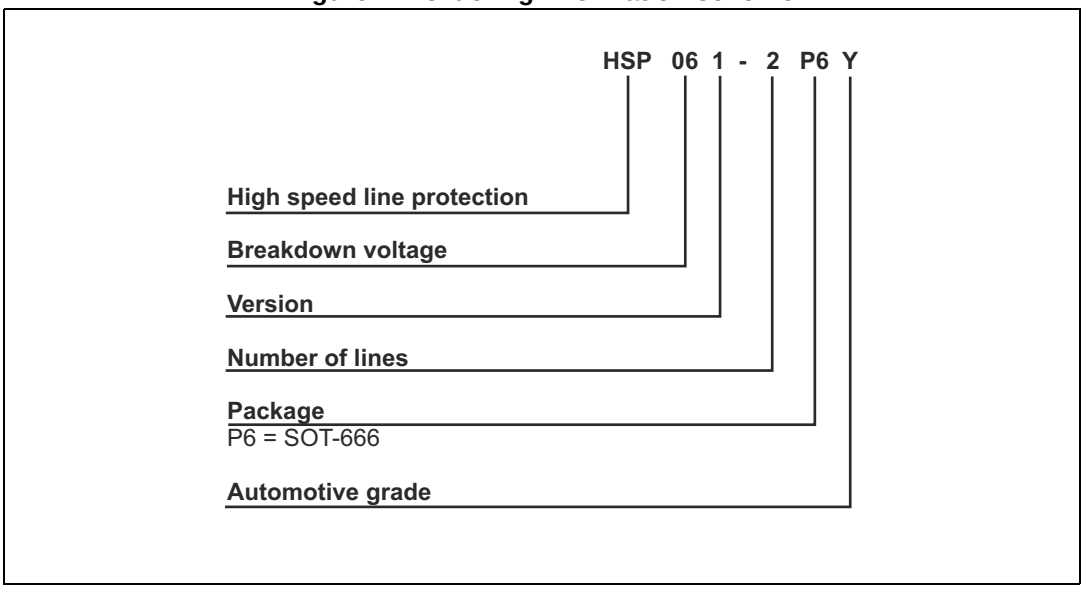


Table 4. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
HSP061-2P6Y	RY(1)	SOT-666	3 mg	3000	Tape and reel

1. The marking can be rotated by 90° or 180° to differentiate assembly location

5 Revision history

Table 5. Document revision history

Date	Revision	Changes
17-Oct-2013	1	Initial release.
19-Nov-2014	2	Updated *Figure 5*, *Figure 6* and *Table 4*. Added *Figure 7* and *Figure 8*.