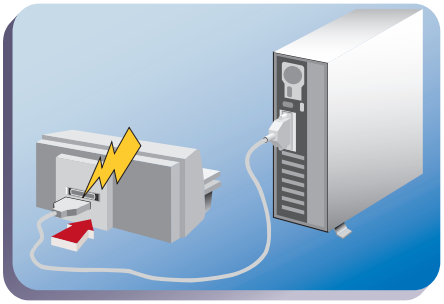
IEC 61000-4-2 Compliant Parallel Printer Interface for IEEE 1284 Standard

Existing Solution

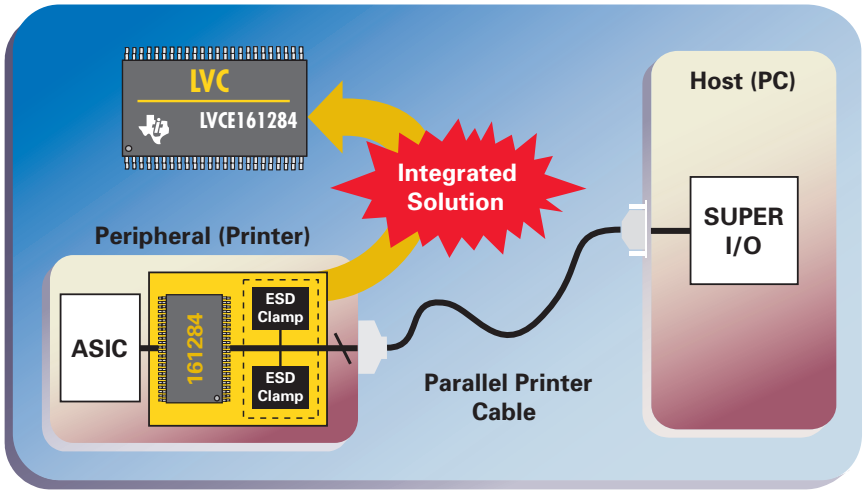
Previous IEEE 1284 interface solutions required external ESD-protection diodes for interface reliability because plugging and unplugging printer cables can subject printer ports to high electrostatic discharge (ESD) conditions that ultimately may render the printer useless. These external protection diodes add cost and consume valuable printed circuit board (PCB) space, which increase the printers' build cost.



ESD conditions.

New, Integrated Solution

The new SN74LVCE161284 from Texas Instruments (TI) integrates the external protection diodes and provides ±15-kV human body model (HBM), ±8-kV contact, and ±15-kV air-gap discharge protection in accordance with IEC 61000-4-2 (Level 4) on the connector interface pins. This high-level integration reduces component count, lowers build cost and reduces PCB space. It is a solution that provides both the manufacturer and consumer with a highly reliable and robust computer peripheral.



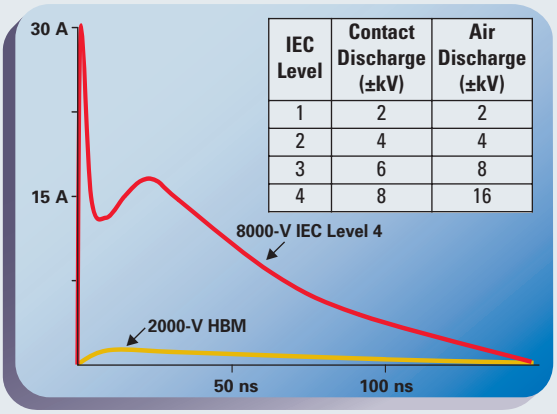
TI's integration of external protection diodes.

16-Bit IEEE 1284 Solutions

	Existing			NEW
Parameter	SN74LV161284	SN74LVC161284	SN74LVCZ161284A	SN74LVCE161284
V_{CC} (V)	4.5 to 5.5	3 to 3.6	3 to 3.6	3 to 3.6
V_{CC} Cable (V)	4.5 to 5.5	3 to 5.5	3 to 5.5	3 to 5.5
Temperature Range (°C)	–40 to 85	0 to 70	0 to 70	0 to 70
ESD Protection (HBM)	4 kV	2 kV	4 kV	4 kV (all pins) 15 kV (connector pins)
IEC 61000-4-2 Air-Gap Discharge	No	No	No	15 kV (connector pins)
IEC 61000-4-2 Contact Discharge	No	No	No	8 kV (connector pins)
Power-Up 3 State	No	No	Yes	Yes
Power-On Reset	No	No	Yes	Yes

How Does IEC ESD Stress Testing Differ From HBM?

- HBM stressing is done with the IC unpowered. IEC stressing is done both unpowered and with power applied and the device functioning. There must be no physical damage and the device must keep working normally after the stress has ended. This means no latchup on either power or signal pins.
- Unlike HBM testing, IEC stressing is done in two ways: 1) contact discharge and 2) air gap (spark) discharge. Due to energy dissipation (loss) in air, the discharge voltage requirement is higher for the air gap test.
- For the highest level of IEC 61000-4-2 (Level 4), manufacturers' equipment must pass IEC stressing at ±8000-V contact and ±15000-V air-gap discharge.



IEC Level	Contact Discharge (±kV)	Air Discharge (±kV)
1	2	2
2	4	4
3	6	8
4	8	16

Comparison of IEC 61000-4-2 (Level 4) ESD method to HBM test method.

Better ESD Protection

In addition to specifying the stress applied to the device, the IEC 61000-4-2 specification also categorizes the results of the ESD strike (ESD Result Classification). The LVCE161284 has been designed to withstand an IEC 61000-4-2 (Level 4) ESD strike and maintain an ESD Result Classification 1 or 2. This robust design means no operator intervention is needed and there is no damage to the LVCE161284 as a result of the ESD strike.

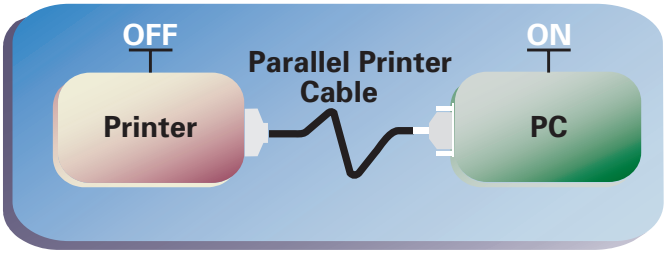
ESD Result Classification

BETTER

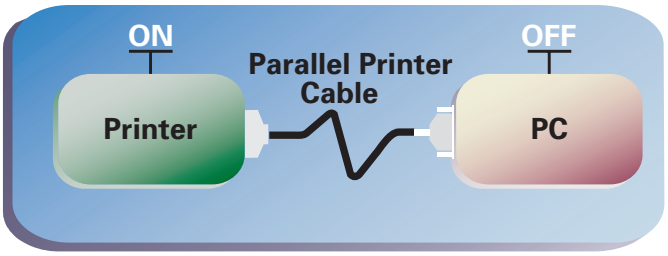
1. Normal performance within specification limits.
2. Temporary degradation or loss of function or performance that is self-recoverable.
3. Temporary degradation or loss of function or performance, which requires operator intervention or system reset.
4. Degradation or loss of function that is not recoverable due to damage of equipment (components) or software, or loss of data.

Additional Features of TI's SN74LVCE161284

- IOFF supports partial-power-down mode operation
- Power-up 3-state maintains outputs in high impedance condition during V_{CC} power-up ramp
- Provides Power-On-Reset
- Flow-through architecture for ease of PCB routing
- Available in shrink small outline plastic (SSOP) and thin shrink small outline plastic (TSSOP) for space savings



I_{OFF} protects the printer when the printer cable is connected to the PC; PC is powered ON and printer is powered OFF.



Power-On-Reset prevents printer errors when printer is ON and no valid signals are present on the connector pins.

For More Information About SN74LVCE161284

logic.ti.com

Product Folder:

www.ti.com/sc/device/SN74LVCE161284

For up-to-date information to support your design and development needs, visit:

support.ti.com

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