QUAD LOW-CAPACITANCE ARRAY WITH ±15-kV ESD PROTECTION

Check for Samples: TPD4E002

FEATURES

- **Four Unidirectional Voltage Suppression Diodes for use in ESD Protection**
- **I/O Breakdown Voltage, V_{BR} = 6.1 V Min**
- **Low I/O Capacitance (11 pF at 0 V)**
- **Low I/O Leakage Current <100 nA**
- **2.5-A Peak Pulse Current (8/20-ms Pulse)**
- **No Power Supply Routing is Required since there is no V_{DD} Pin**
- **Very Small Printed Circuit Board (PCB) Area <2.6 mm^2**
- **ESD Protection Exceeds**
  - **±15-kV Human Body Model (HBM)**
  - **±15-kV IEC 61000-4-2 Contact Discharge**

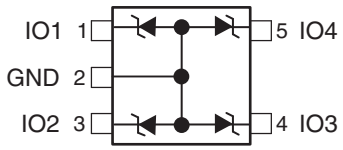
APPLICATIONS

- **Where Transient Overvoltage Protection in ESD-Sensitive Equipment is Required, Such as:**
  - **Computers**
  - **Printers**
  - **Communication Systems and Cellular Phones**
  - **Video Equipment**

BENEFITS

- **High ESD Protection Level**
- **High Integration**
- **Suitable for High-Density Boards**

DRL PACKAGE
(TOP VIEW)



DESCRIPTION/ORDERING INFORMATION

The TPD4E002 is a monolithic array designed to protect up to four lines against ESD transients. Monolithic circuit design allows superior matching between the channels and reduced crosstalk. This device is ideal for applications where both reduced line capacitance and board space-saving are required.

ORDERING INFORMATION

T_A	PACKAGE(1)		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 125°C	1.6 × 1.6 DRL	Reel of 4000	TPD4E002DRLR	28S
			TPD4E002DRL2(2)	

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

(2) The TPD4E002DRL2 is the same exact device as the TPD4E002DRL. This special orderable offers 180 degree shift in device orientation in the reel compared to TI standard DRL package orientation in the reel. Refer to the tape and reel information section at the end of this datasheet for the details on orientation information.

Absolute Maximum Ratings

			MIN	MAX	UNIT
V_{PP}	ESD discharge	Human Body Model (HBM)		±15	kV
		IEC 61000-4-2 Contact Discharge		±15	
T_J	Junction temperature			125	°C
T_{stg}	Storage temperature range		–55	150	°C
T_{op}	Operating temperature range		–40	125	°C
	Peak pulse power	t_p = 8/20 µs		35	W
	Peak pulse current	t_p = 8/20 µs		2.5	A

Thermal Resistance

PARAMETER		VALUE	UNIT
$R_{\theta JA}$	Junction to ambient on printed circuit on recommended pad layout	220	°C/W

Electrical Characteristics

T_{amb} = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{BR}	I/O Breakdown voltage	I_R = 1 mA	6.1		7.2	V
I_{RM}	I/O Leakage current	V_{RM} = 3 V			0.1	μA
αT	Voltage temperature coefficient			45		10^{-4}/°C
C	I/O Capacitance per line			11		pF
R_d	Dynamic resistance(1)			2		Ω

(1) R_d is measured under reverse breakdown condition with inrush current in the range 1Amps using pulse technique

TYPICAL CHARACTERISTICS

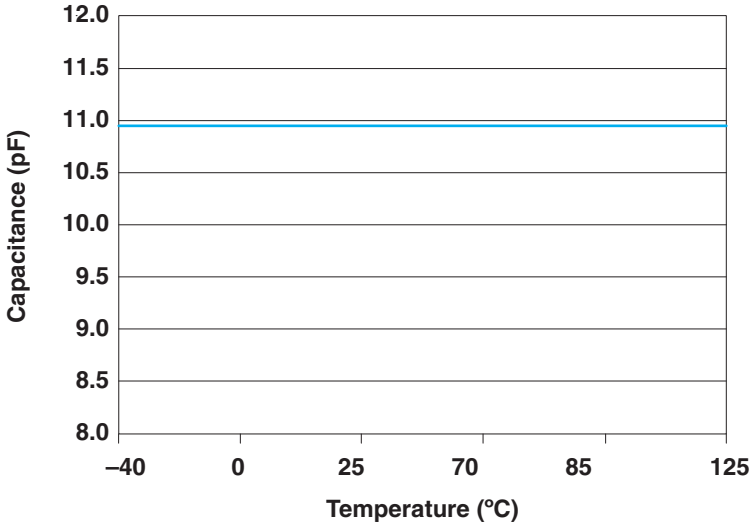


Figure 1. I/O Capacitance vs Temperature

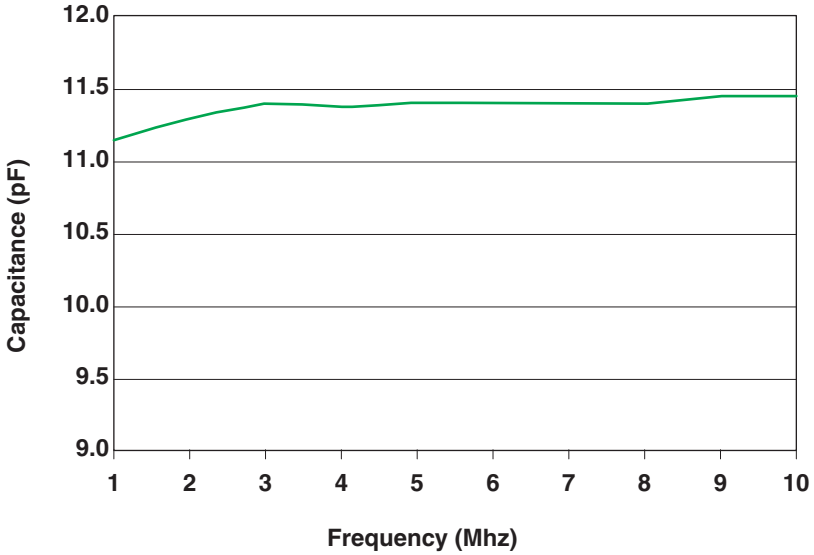


Figure 2. I/O Capacitance vs Frequency (Typical Values)

TYPICAL CHARACTERISTICS (continued)

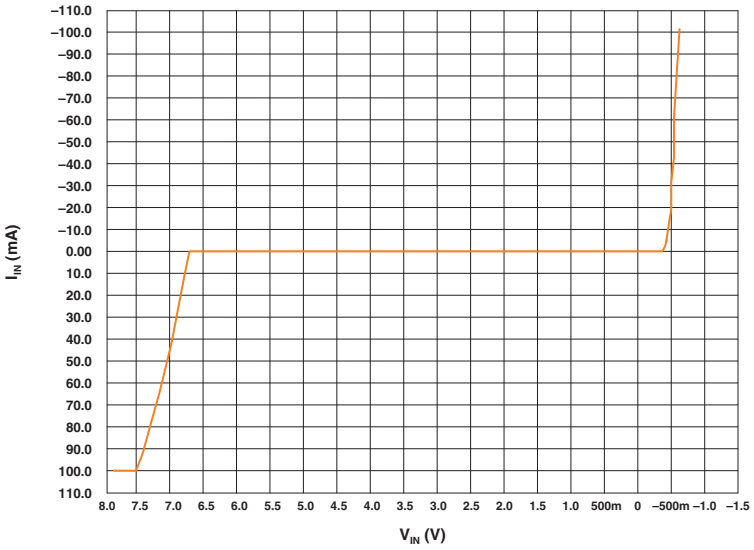


Figure 3. Diode Current Across I/O Voltage (Typical Values)

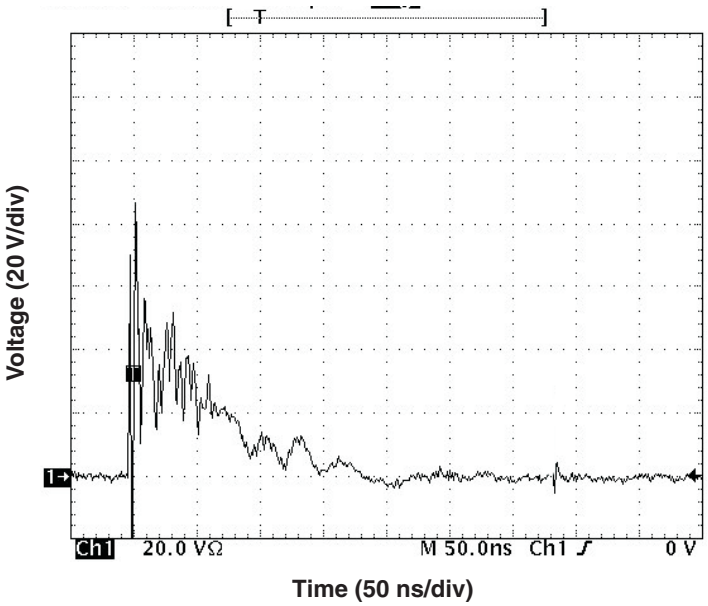


Figure 4. ESD Clamp Voltage At I/O Pins: IEC6100-4-2 15 kV Contact Discharge

TYPICAL CHARACTERISTICS (continued)

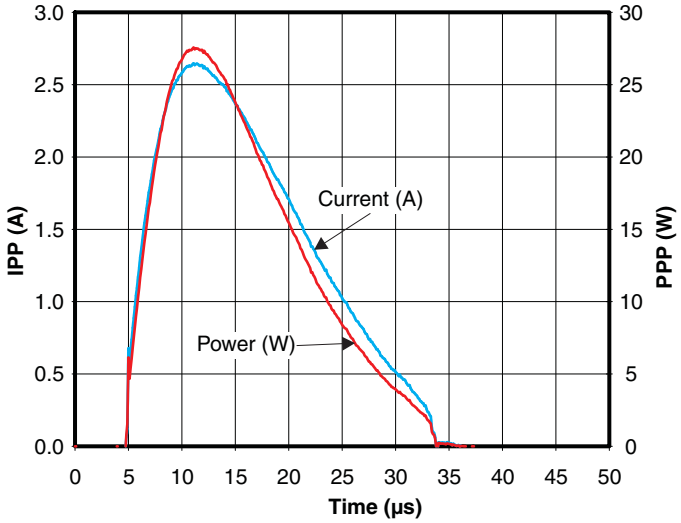
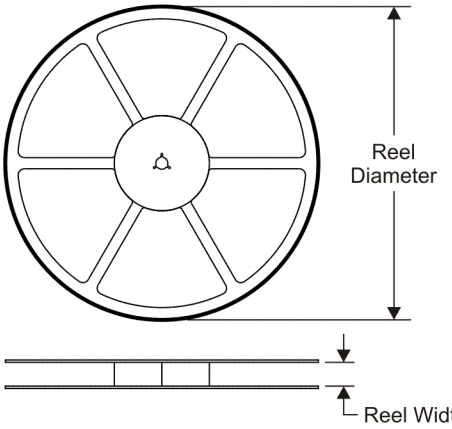


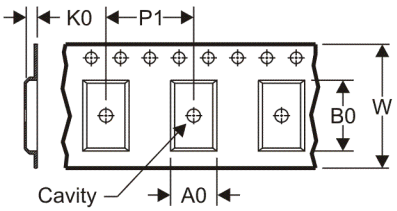
Figure 5. Pulse Waveform (8/20 µs Pulse)

TAPE AND REEL INFORMATION

REEL DIMENSIONS

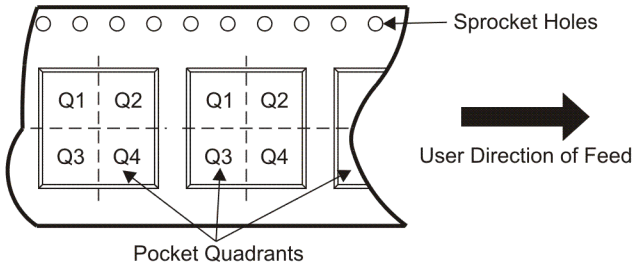


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

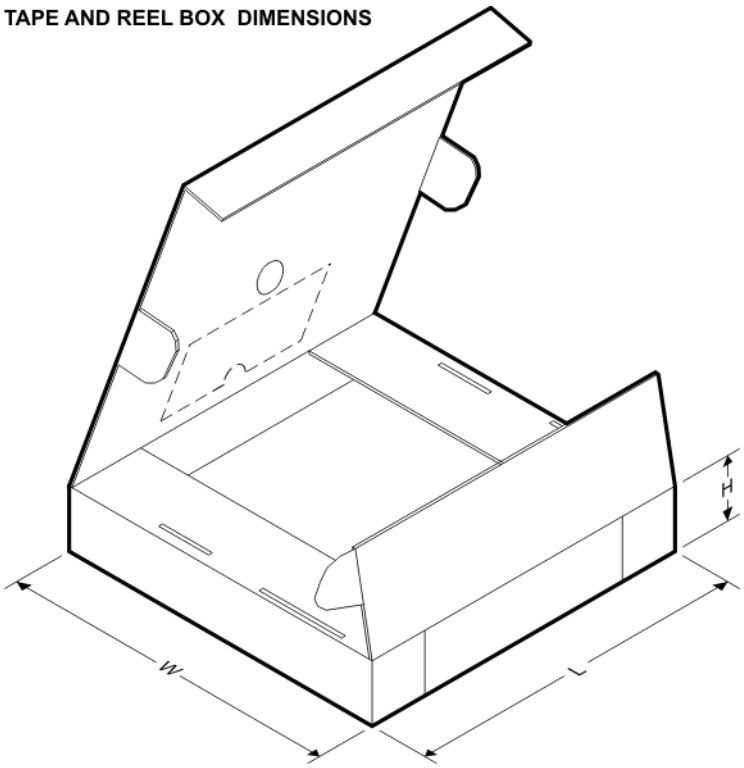
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TPD4E002DRLR	SOT	DRL	5	4000	180.0	9.2	1.78	1.78	0.69	4.0	8.0	Q3

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TPD4E002DRLR	SOT	DRL	5	4000	202.0	201.0	28.0

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