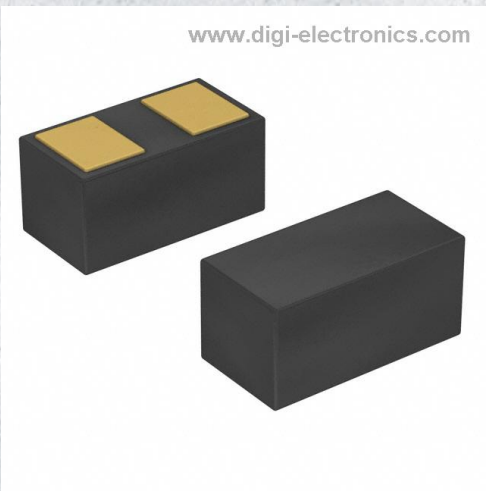
ESD208B102ELSE6327XTSA1 Datasheet



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DiGi Electronics Part Number	ESD208B102ELSE6327XTSA1-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	ESD208B102ELSE6327XTSA1
Description	TVS DIODE 3.3VWM 8.1VC TSSLP-2-3
Detailed Description	8.1V Clamp 4A (8/20µs) Ipp Tvs Diode Surface Mount PG-TSSLP-2-3

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Manufacturer Product Number:	Manufacturer:
ESD208B102ELSE6327XTSA1	Infineon Technologies
Series:	Product Status:
-	Obsolete
Type:	Bidirectional Channels:
Zener	1
Voltage - Reverse Standoff (Typ):	Voltage - Breakdown (Min):
3.3V (Max)	3.65V
Voltage - Clamping (Max) @ Ipp:	Current - Peak Pulse (10/1000µs):
8.1V	4A (8/20µs)
Power - Peak Pulse:	Power Line Protection:
30W	No
Applications:	Capacitance @ Frequency:
General Purpose	6pF @ 1MHz
Operating Temperature:	Mounting Type:
-55°C ~ 125°C (TJ)	Surface Mount
Package / Case:	Supplier Device Package:
0201 (0603 Metric)	PG-TSSLP-2-3
Base Product Number:	
ESD208	

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
1 (Unlimited)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8541.10.0080

TVS Diode

Transient Voltage Suppressor Diodes

ESD208-B1-02 Series

Ultra Low Clamping ESD / Transient Protection Diode

ESD208-B1-02EL
ESD208-B1-02ELS

Data Sheet

Revision 1.2, 2013-11-29
Final

Power Management & Multimarket

Revision History Revision 1.1, 2013-11-26	
Page or Item	**Subjects (major changes since previous revision)**
Revision 1.2, 2013-11-29	
5	Update of Table 2-2)

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Last Trademarks Update 2010-10-26

1 Ultra Low Clamping ESD / Transient Protection Diode

1.1 Features

- ESD / transient protection of signal lines in low voltage applications according to:
  - **IEC61000-4-2 (ESD): ±30 kV air discharge, ±25 kV contact discharge**
  - **IEC61000-4-4 (EFT): ±80 A / ±4 kV (5/50 ns)**
  - **IEC61000-4-5 (Surge): ±4 A (8/20 µs)**
- Bi-directional, symmetrical working voltage up to V_{RWM} **= ±3.3 V**
- Low capacitance: C_L **= 6 pF** (typical)
- Very low clamping voltage due to extremely low dynamic resistance down to: R_{DYN} **= 0.2 Ω** (typical)
- Pb-free (RoHS compliant) and halogen free package, very small form factor down to: 0.62 x 0.32 x 0.31 mm^3

1.2 Application Examples

- Keypad, touchpad, buttons, convenience keys
- LCD displays, Camera, audio lines, mobile communication, Consumer products (E-Book, MP3, DVD, DSC...)
- Notebooks tablets and desktop computers and their peripherals

1.3 Product Description

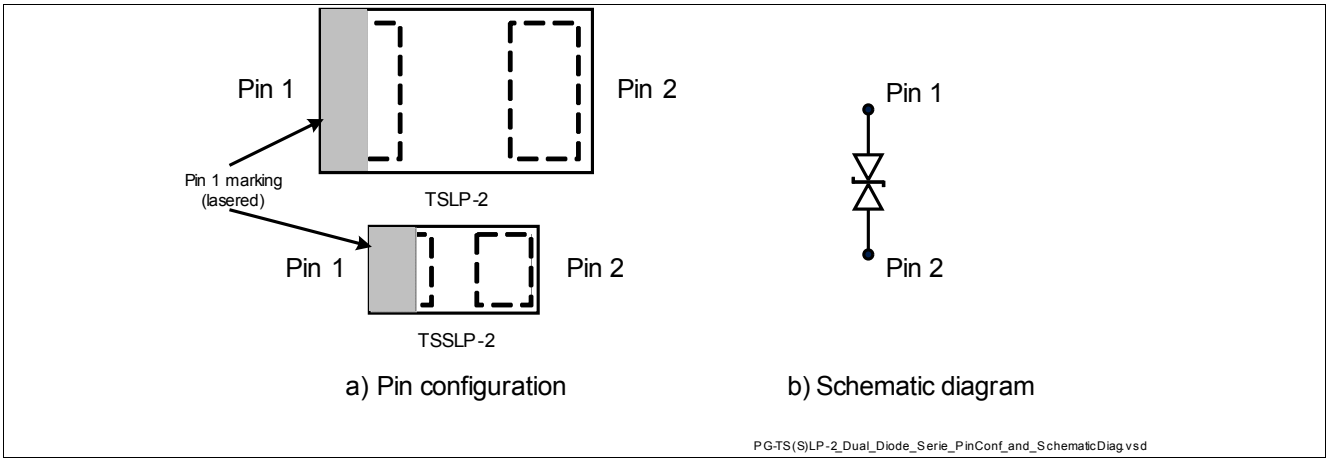

Figure 1-1 Pin Configuration and Schematic Diagram

Table 1-1 Ordering Information

Type	Package	Configuration	Marking code
ESD208-B1-02EL	TSLP-2-19	1 line, bi-directional	C
ESD208-B1-02ELS	TSSLP-2-3	1 line, bi-directional	C

2 Characteristics

Table 2-1 Maximum Ratings at T_A = 25 °C, unless otherwise specified [1)]

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
ESD discharge[2)] air contact	V_{ESD}	 – –	 – –	 30 25	kV
Peak pulse current (t_p = 8/20 µs)[3)]	I_{PP}	–	–	4	A
Peak pulse power (t_p = 8/20 µs)[3)]	P_{PK}	–	–	30	W
Operating temperature range	T_{OP}	-55	–	125	°C
Storage temperature	T_{stg}	-65	–	150	°C

1) Device is electrically symmetrical

2) V_{ESD} according to IEC61000-4-2 (R = 330 Ω, C = 150 pF)

3) I_{PP} according to IEC61000-4-5 (t_p = 8/20 µs)

Attention: Stresses above the max. values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

2.1 Electrical Characteristics at T_A = 25 °C, unless otherwise specified

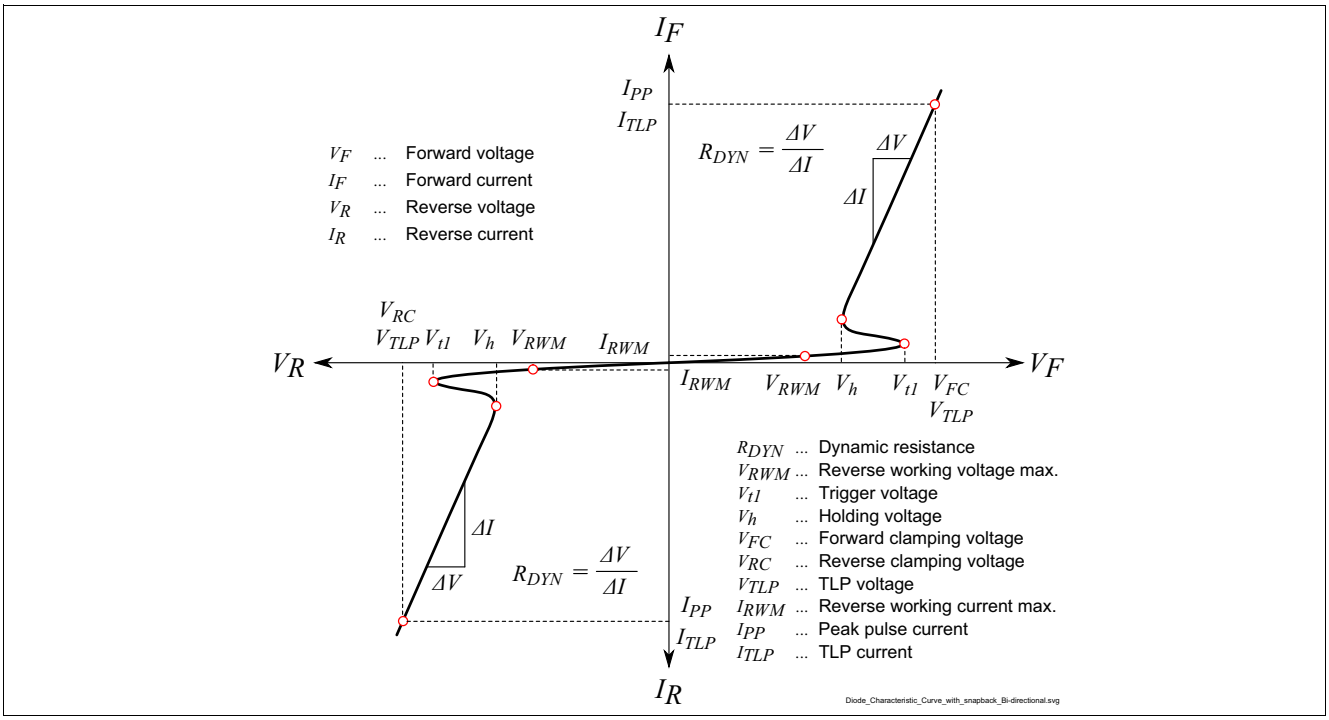

Figure 2-1 Definitions of electrical characteristics

Table 2-2 DC Characteristics at T_A = 25 °C, unless otherwise specified [1)]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Reverse working voltage	V_{RWM}	–	–	3.3	V	
Reverse current	I_R	–	<10	50	nA	V_R = 3.3 V
Trigger voltage	V_{t1}	3.65	–	–	V	
Holding voltage	V_h	3.65	4	–	V	I_R = 10 mA

1) Device is electrically symmetrical

Table 2-3 AC Characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Line capacitance	C_L	–	6	9	pF	V_R = 0 V, f = 1 MHz
			6	9		V_R = 0 V, f = 1 GHz

Table 2-4 ESD and Surge Characteristics at T_A = 25 °C, unless otherwise specified [1)]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Clamping voltage[2)]	V_{CL}	–	8	9.5	V	I_{TLP} = 16 A, t_p = 100 ns
		–	11	12.5		I_{TLP} = 30 A, t_p = 100 ns
Clamping voltage[3)]		–	4.8	6.3		I_{PP} = 1 A, t_p = 8/20 µs
		–	5.8	7.3		I_{PP} = 3 A, t_p = 8/20 µs
		–	6.6	8.1		I_{PP} = 4 A, t_p = 8/20 µs
Dynamic resistance[2)]	R_{DYN}	–	0.20	0.25	Ω	t_p = 100 ns

1) Device is electrically symmetrical

2) Please refer to Application Note AN210 [1]TLP parameters: Z_0 = 50 Ω , t_p = 100 ns, t_r = 0.6 ns, averaging window: t_1 = 30 ns to t_2 = 60 ns, extraction of dynamic resistance using least squares fit of TLP characteristics between I_{TLP1} = 10 A and I_{TLP2} = 40 A.

3) I_{PP} according to IEC61000-4-5 (t_p = 8/20 µs)

3 Typical Characteristics at T_A = 25 °C, unless otherwise specified

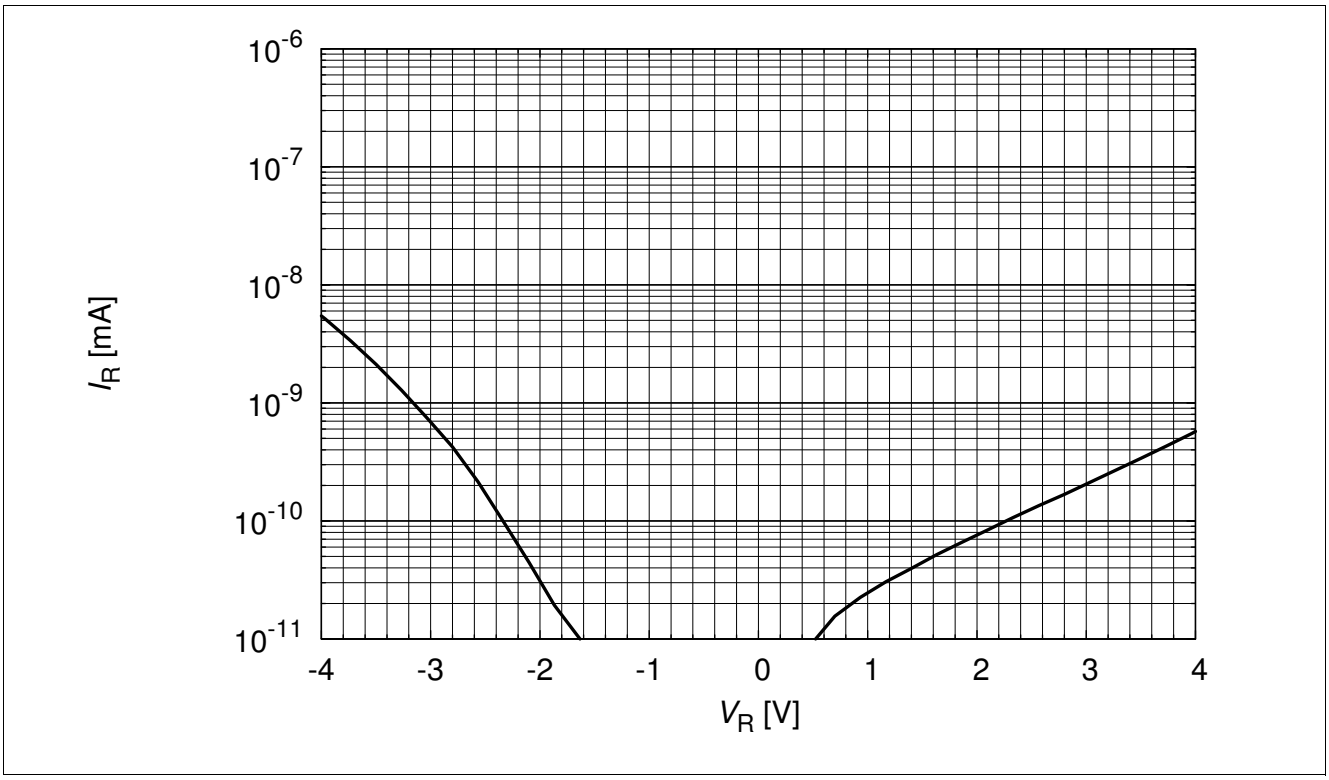

Figure 3-1 Reverse current: $I_R = f(V_R)$

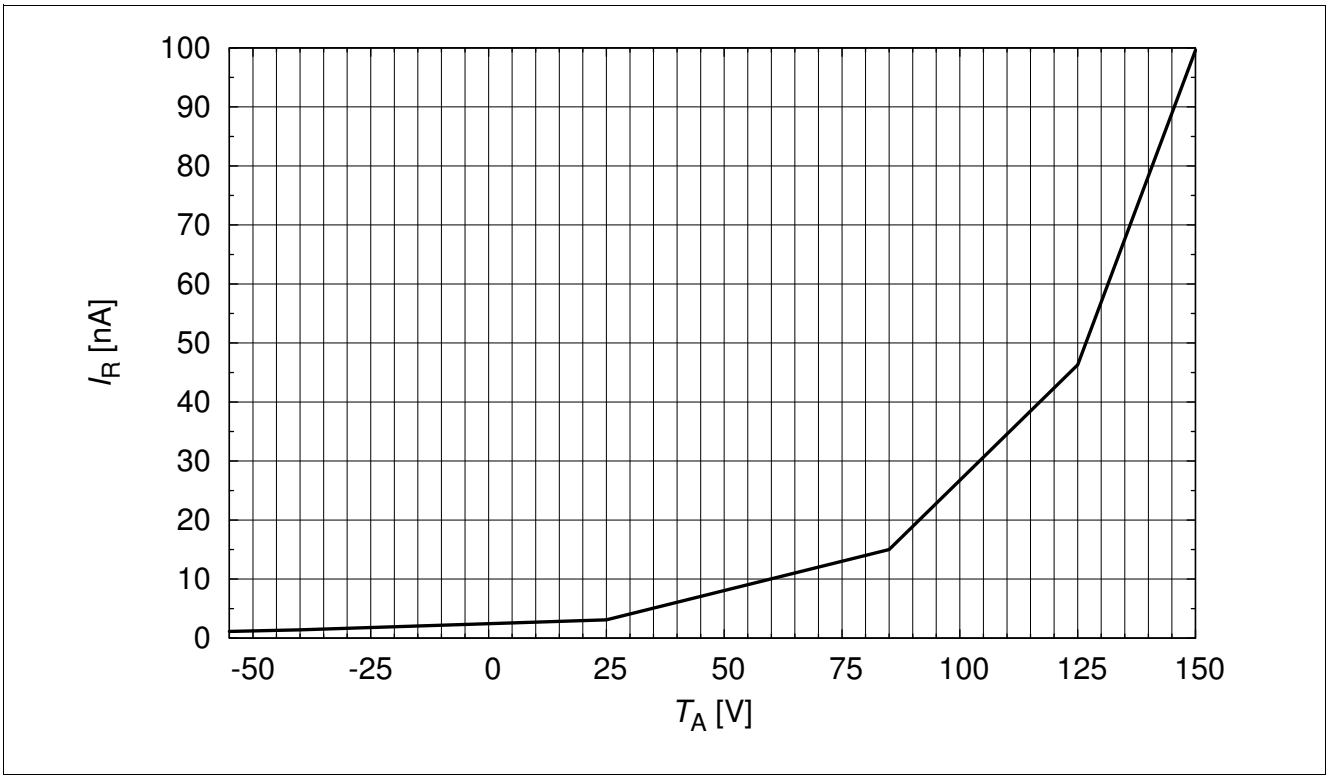

Figure 3-2 Reverse current: $I_R = f(T_A)$, V_R = 3.3 V

Typical Characteristics at T_A = 25 °C, unless otherwise specified

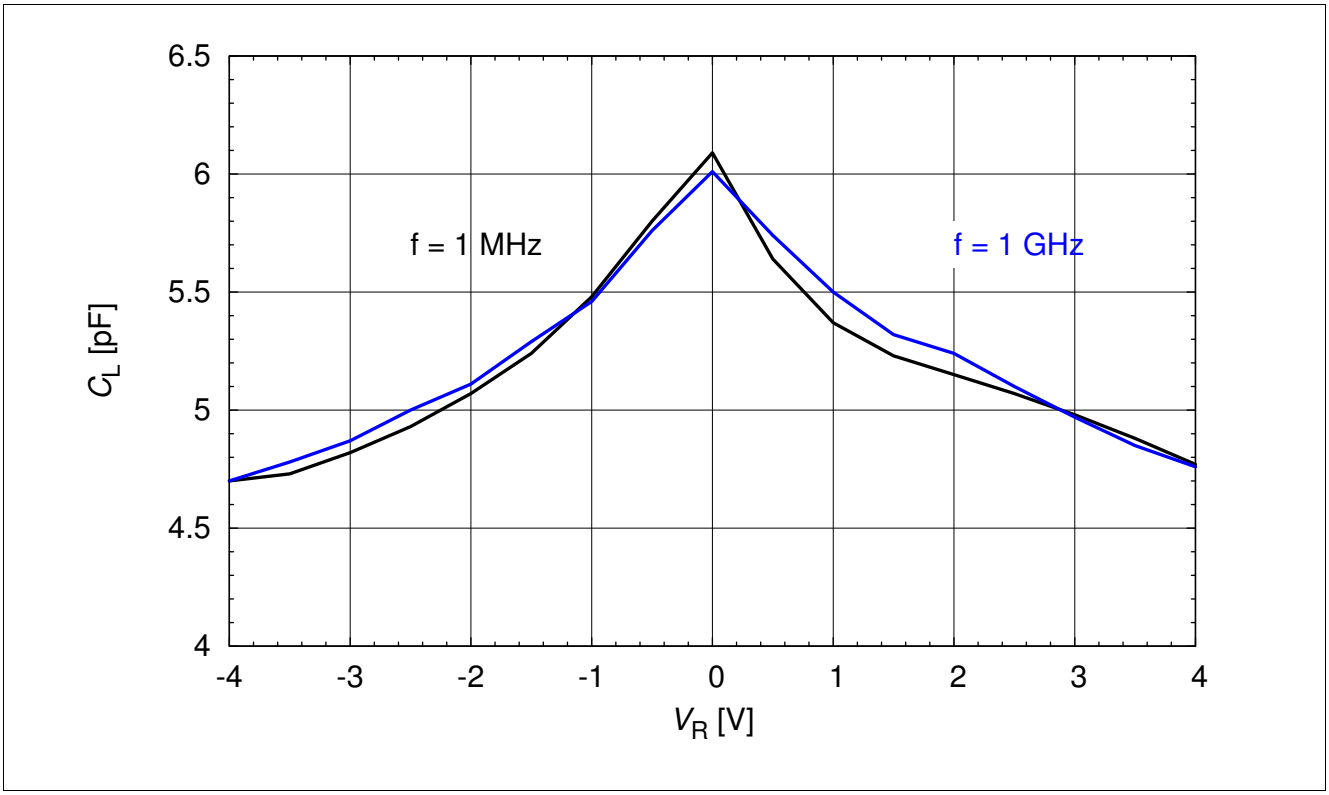

Figure 3-3 Line capacitance: $C_L = f(V_R)$

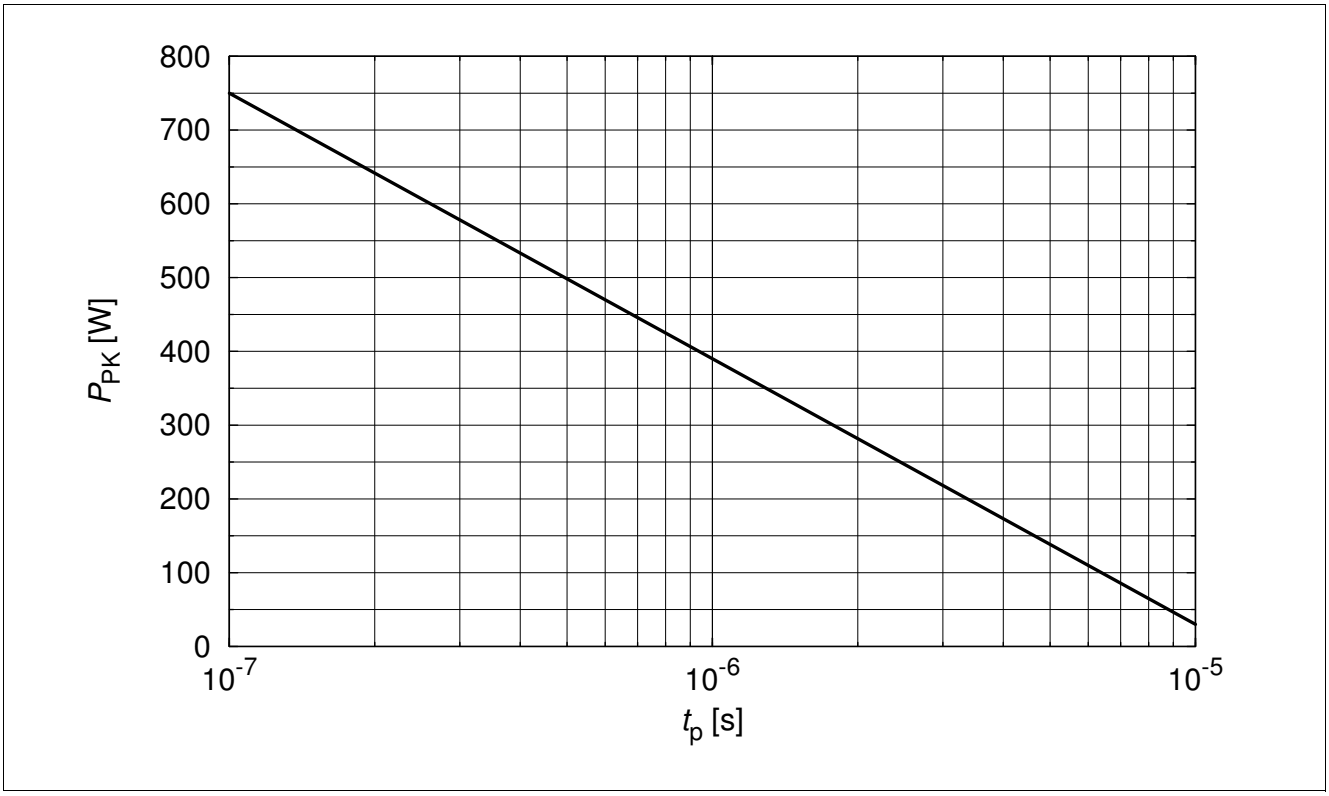

Figure 3-4 Peak pulse power: $P_{PK} = f(t_p)$

Typical Characteristics at T_A = 25 °C, unless otherwise specified

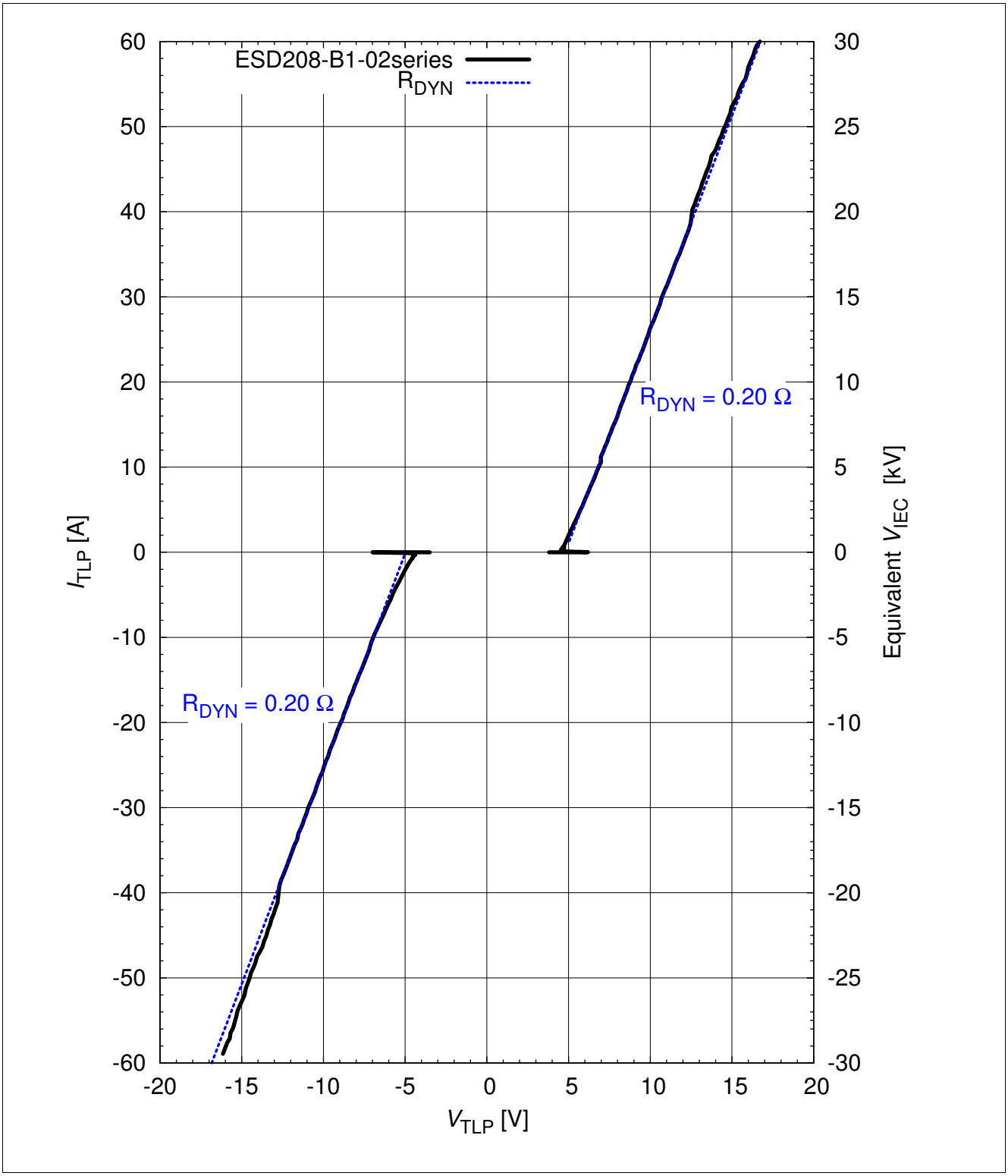

Figure 3-5 Clamping voltage (TLP): $I_{TLP} = f(V_{TLP})$ according ANSI/ESD STM5.5.1 - Electrostatic Discharge Sensitivity Testing using Transmission Line Pulse (TLP) Model. TLP conditions: Z_0 = 50 Ω, t_p = 100 ns, t_r = 0.6 ns, I_{TLP} and V_{TLP} averaging window: t_1 = 30 ns to t_2 = 60 ns, extraction of dynamic resistance using squares fit to TLP characteristics between I_{TLP1} = 10 A and I_{TLP2} = 40 A. Please refer to Application Note AN210 [1]

Typical Characteristics at T_A = 25 °C, unless otherwise specified

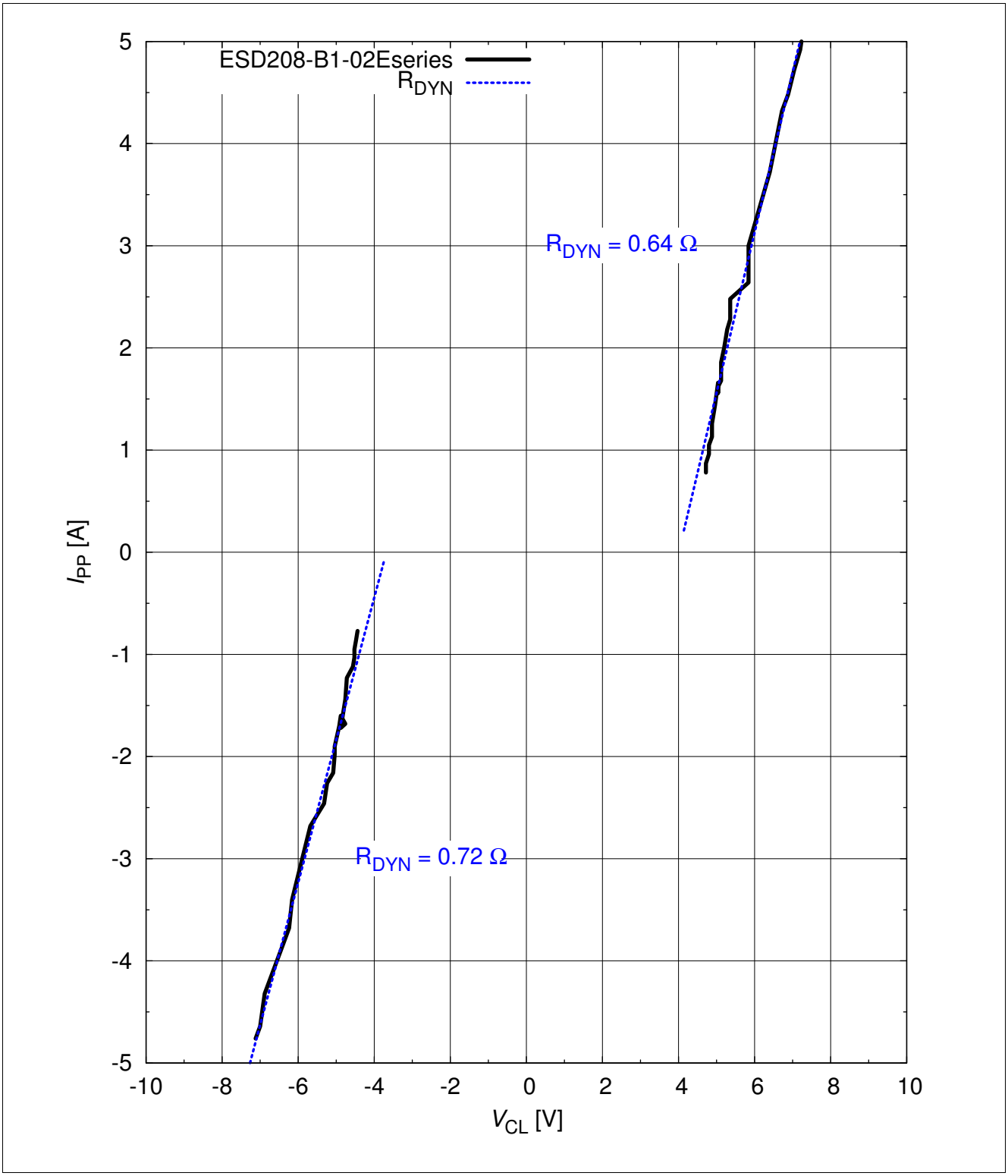

Figure 3-6 Pulse current (IEC61000-4-5) versus clamping voltage: $I_{PP} = f(V_{CL})$

Typical Characteristics at T_A = 25 °C, unless otherwise specified

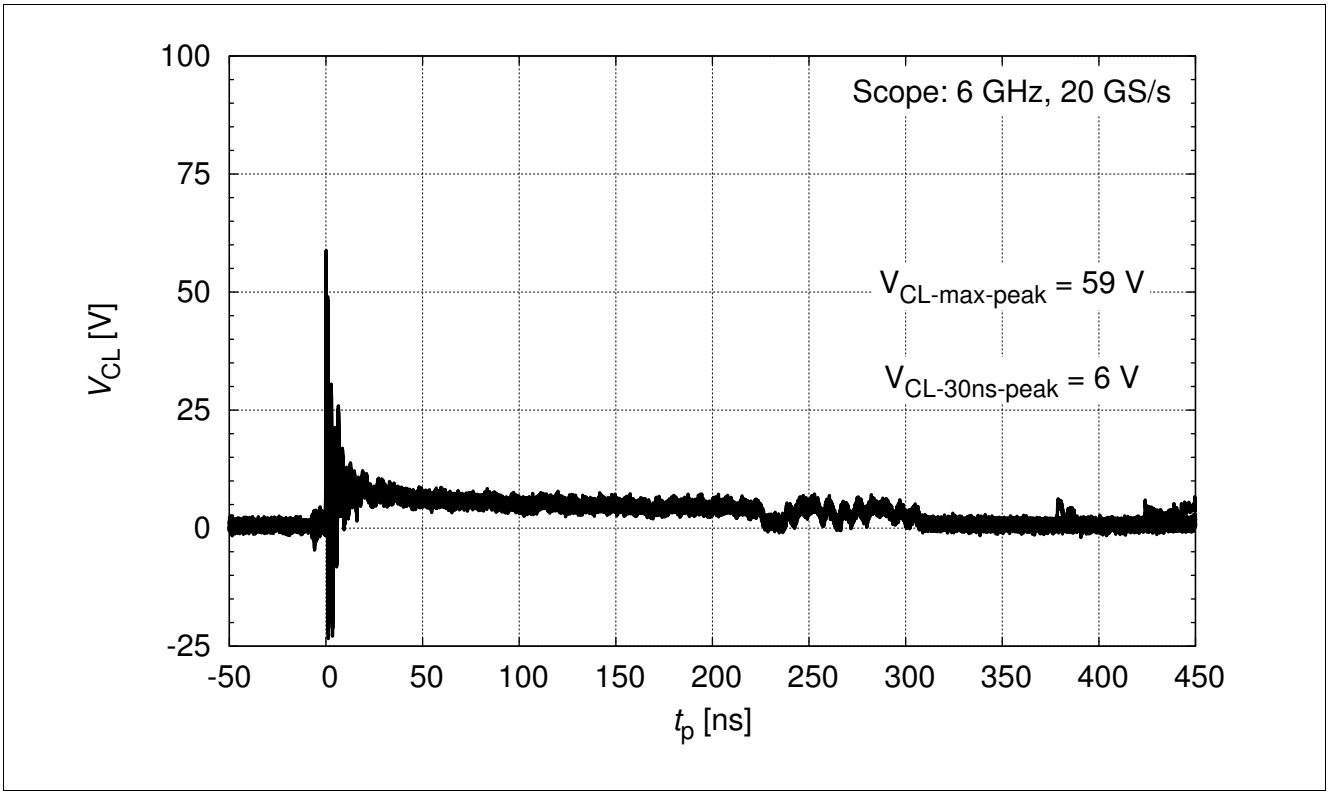

Figure 3-7 IEC61000-4-2 : V_{CL} = $f(t)$, 8 kV positive pulse from pin 1 to pin 2

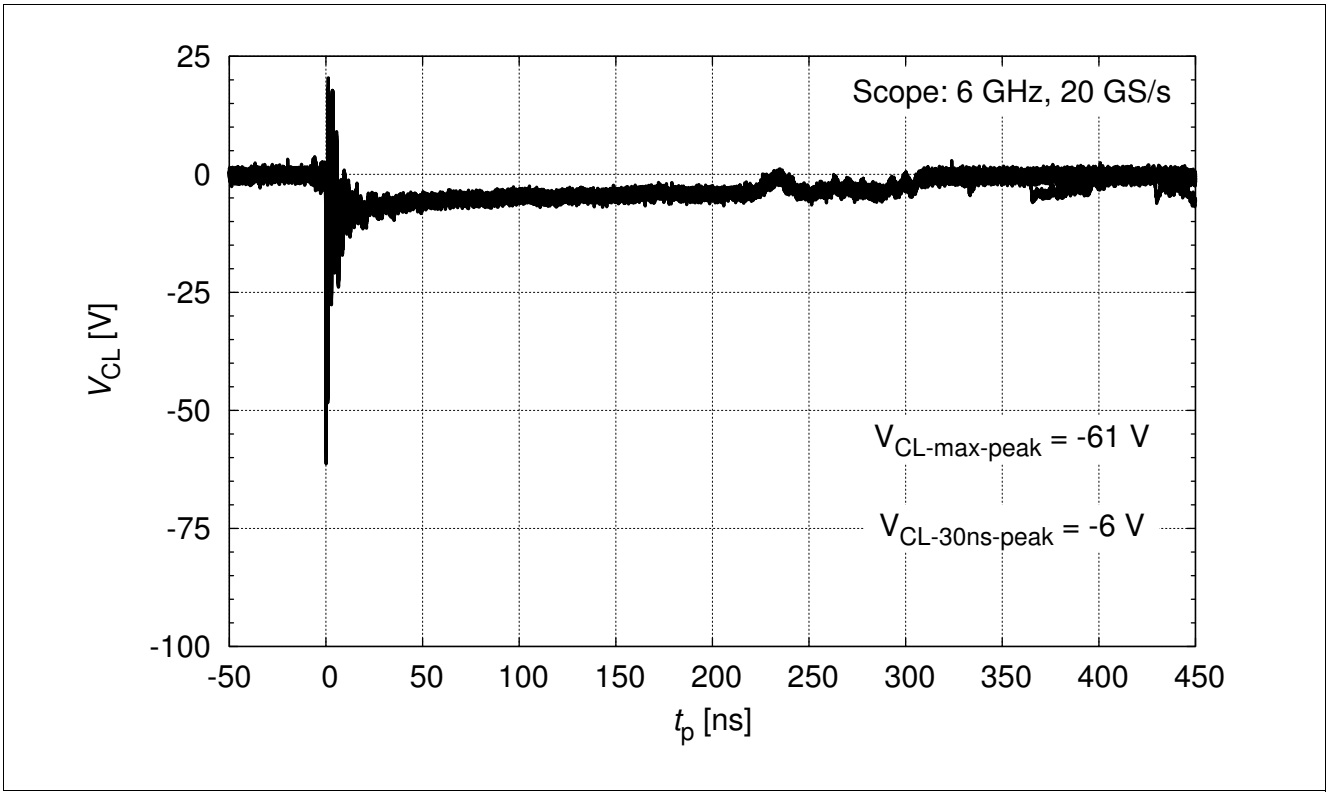

Figure 3-8 IEC61000-4-2 : V_{CL} = $f(t)$, 8 kV negative pulse from pin 1 to pin 2

Typical Characteristics at T_A = 25 °C, unless otherwise specified

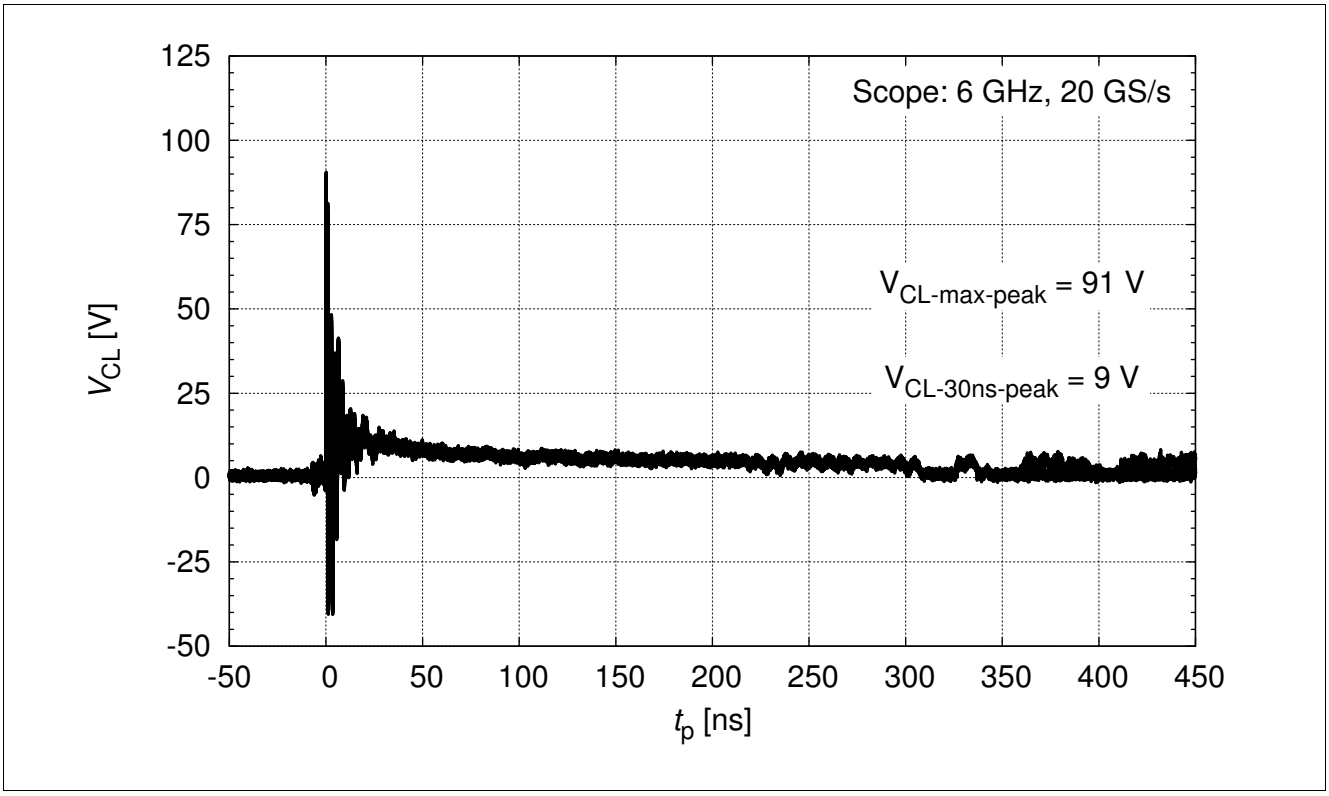

Figure 3-9 IEC61000-4-2 : V_{CL} = $f(t)$, 15 kV positive pulse from pin 1 to pin 2

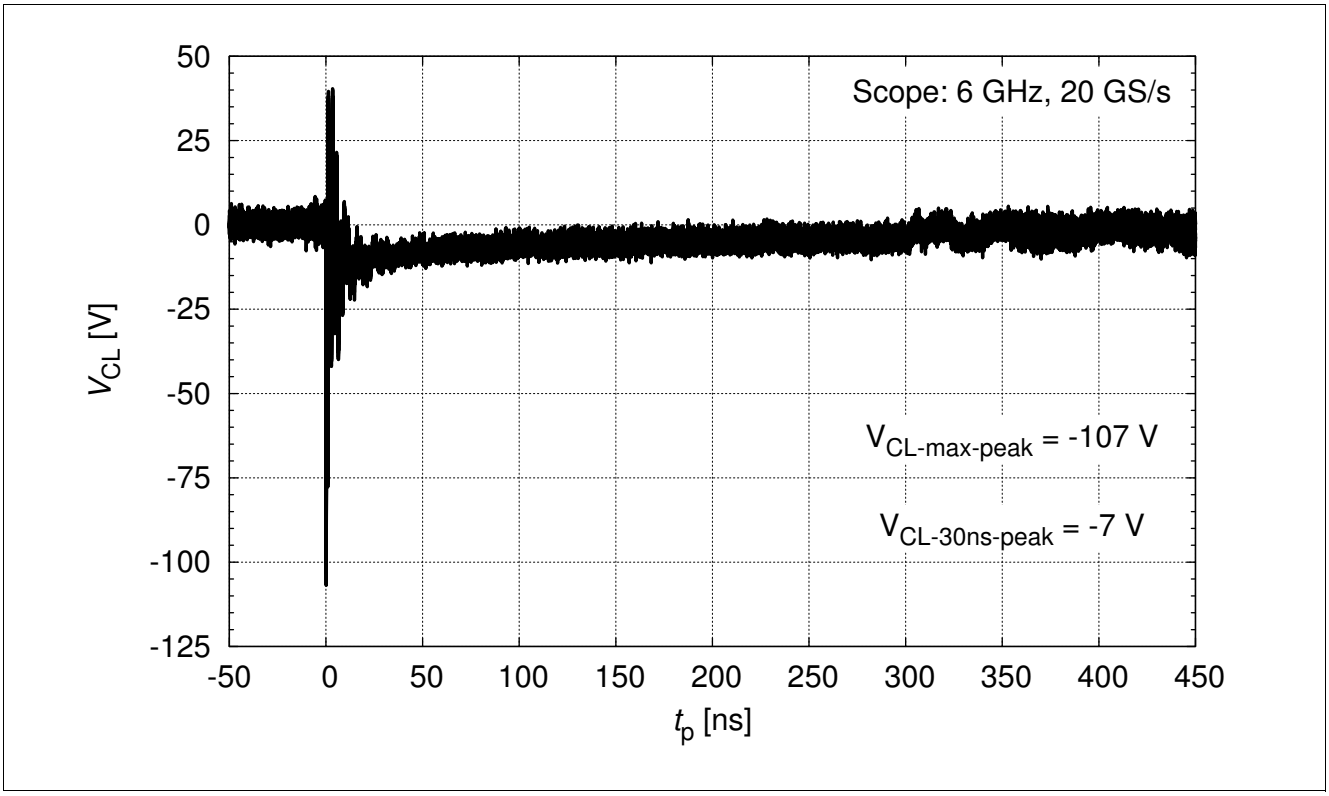

Figure 3-10 IEC61000-4-2 : V_{CL} = $f(t)$, 15 kV negative pulse from pin 1 to pin 2

4 Application Information

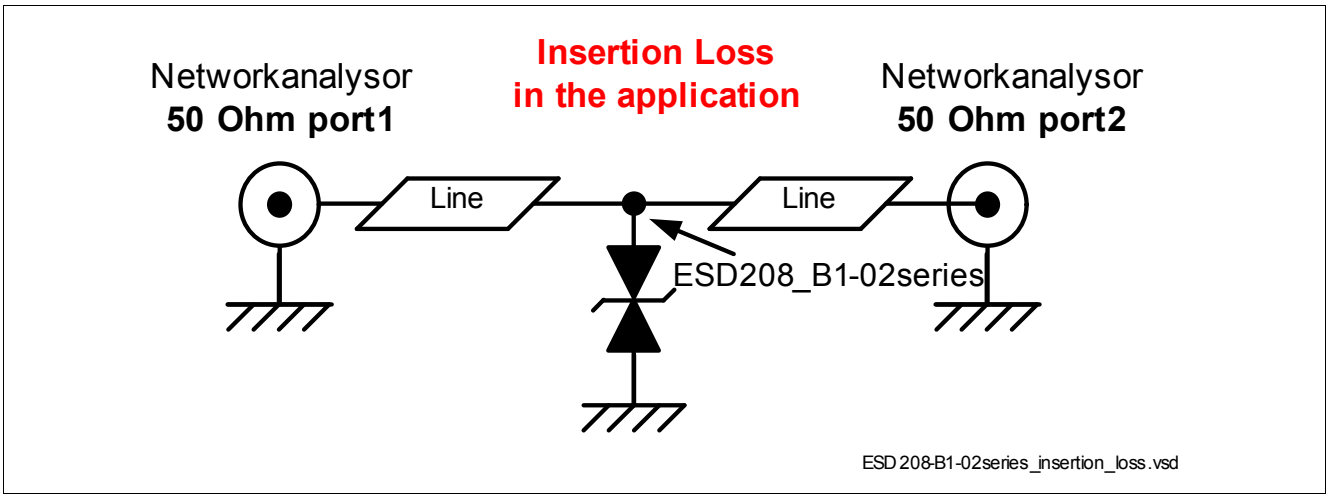

Figure 4-1 Insertion loss measured in 50 Ω environment

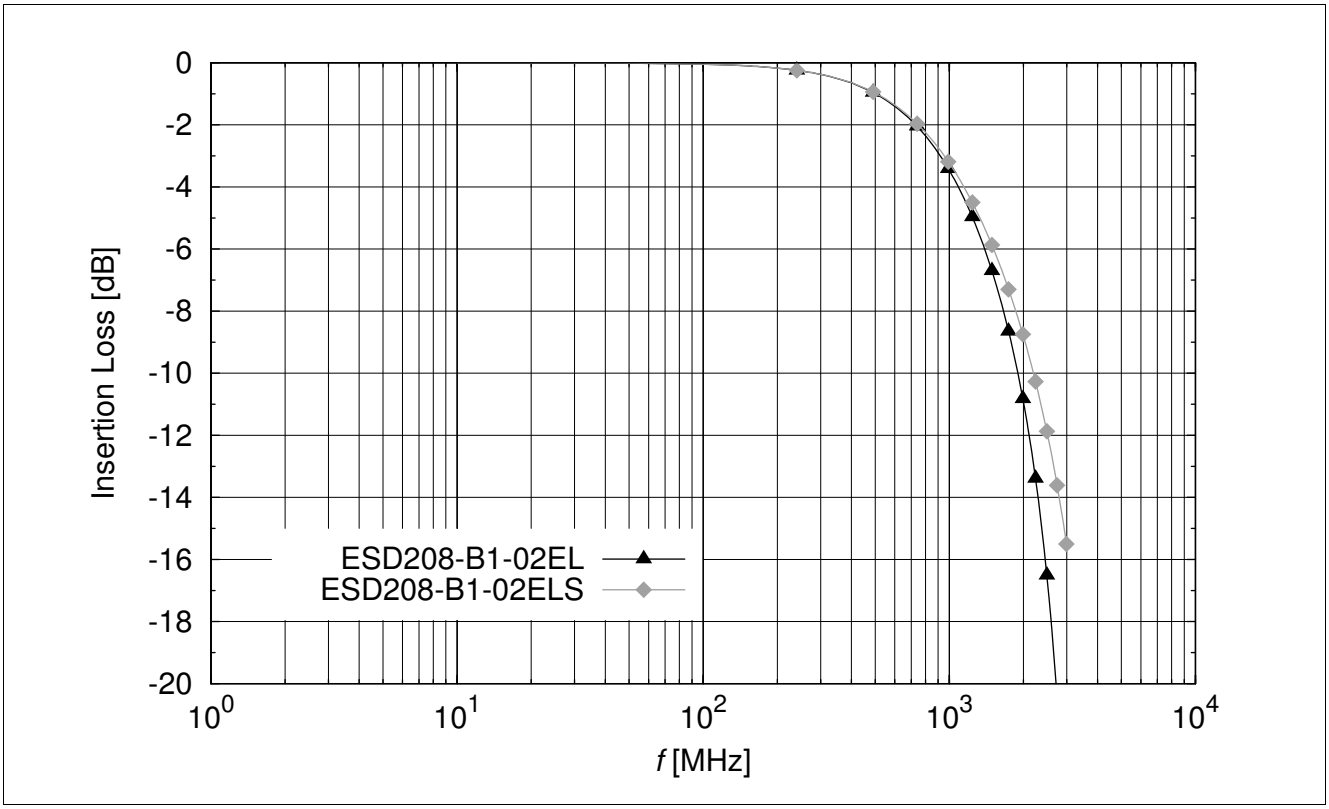

Figure 4-2 Insertion loss vs. frequency of ESD208-B1-02xx in a 50 Ω system

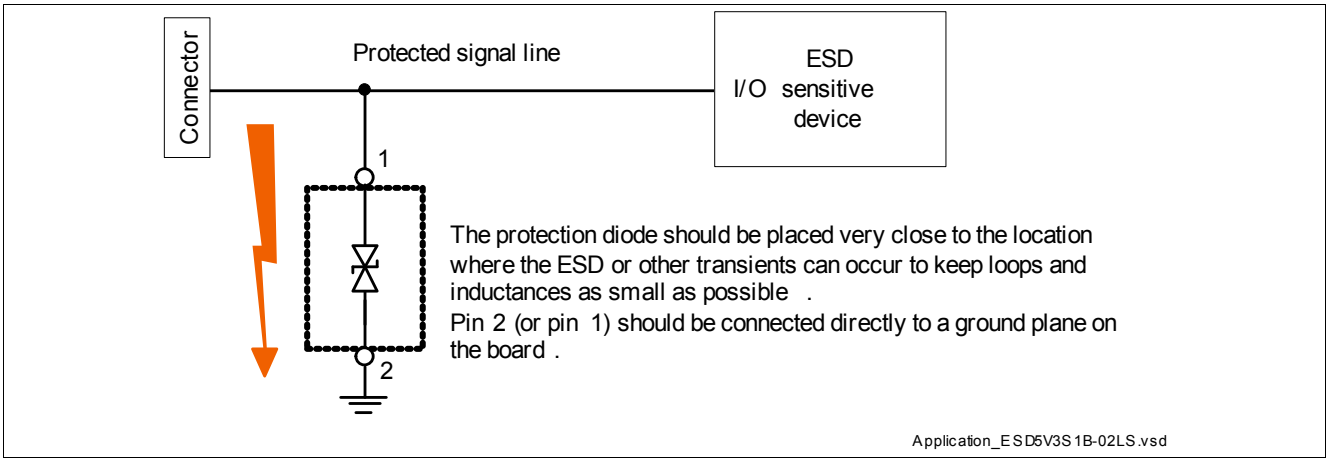

Figure 4-3 Single line, bi-directional ESD / Transient protection

5 Package Information

5.1 TSLP-2-19

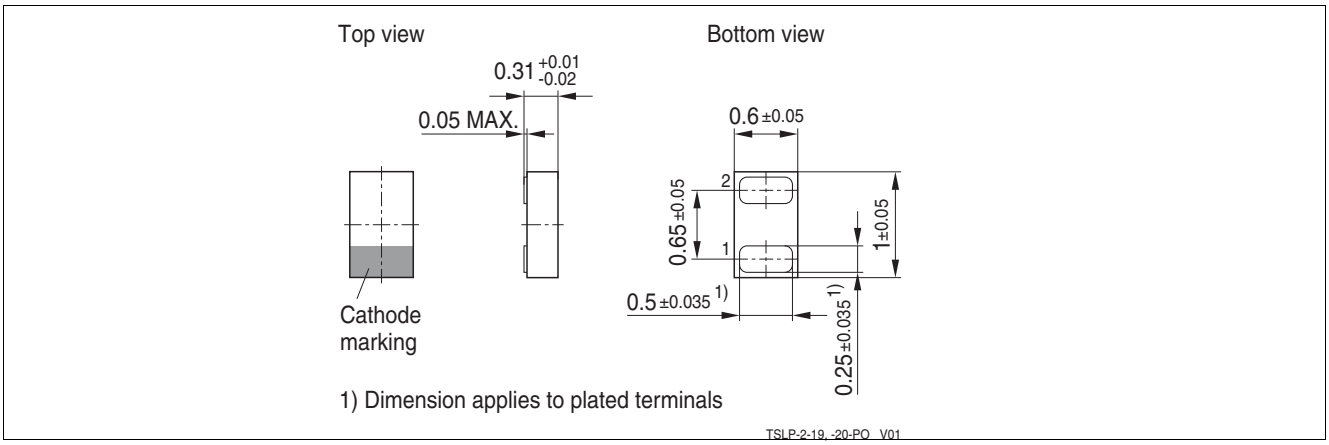

Figure 5-1 TSLP-2-19: Package overview (dimension in mm)

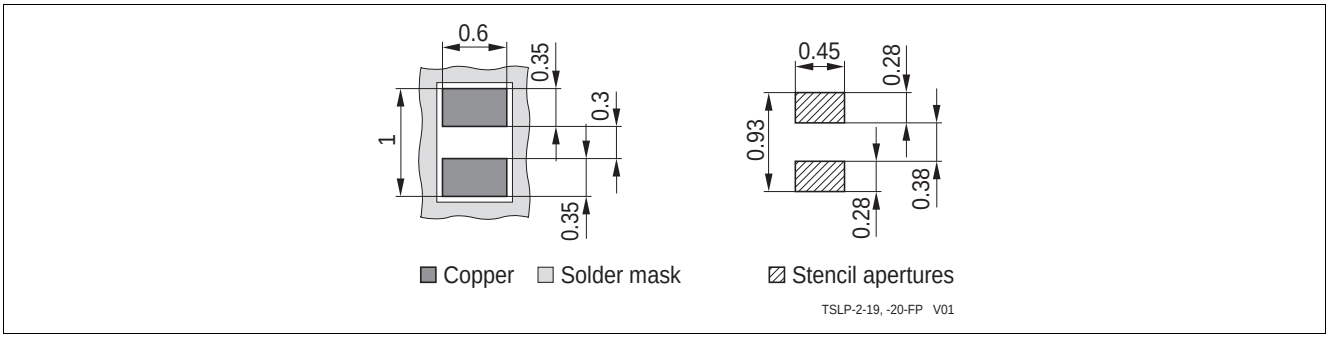

Figure 5-2 TSLP-2-19: Footprint (dimension in mm)

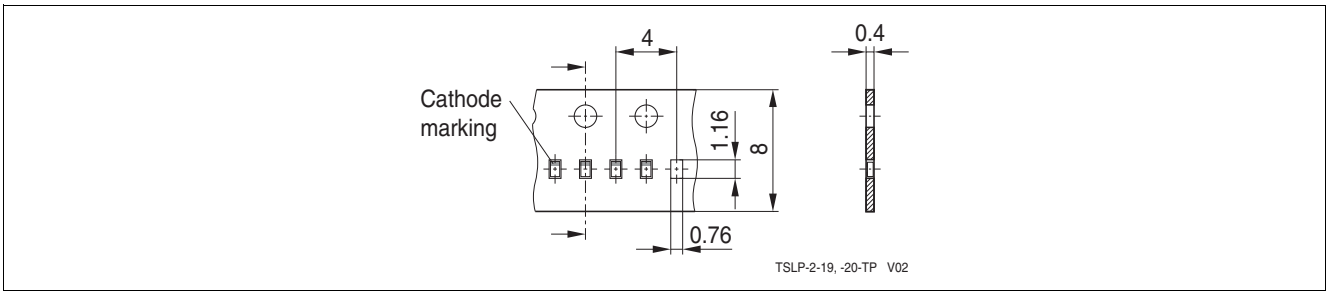

Figure 5-3 TSLP-2-19: Tape information (dimension in mm)

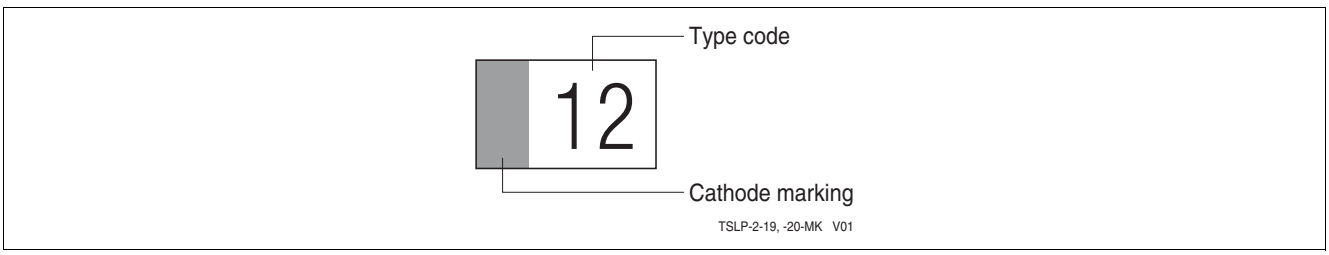

Figure 5-4 TSLP-2-19: Marking (example)

5.2 TSSLP-2-3

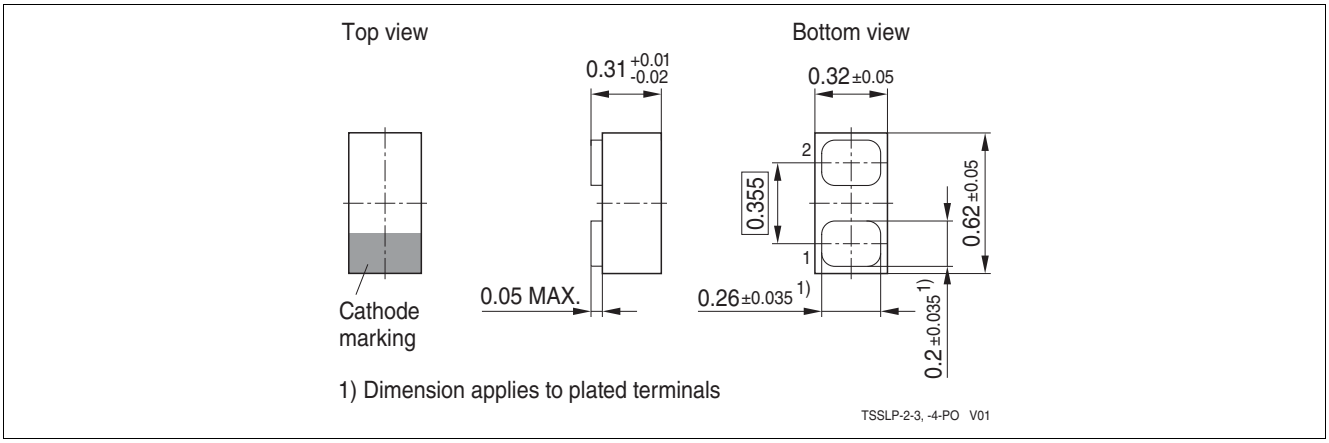

Figure 5-5 TSSLP-2-3: Package outline(dimension in mm)

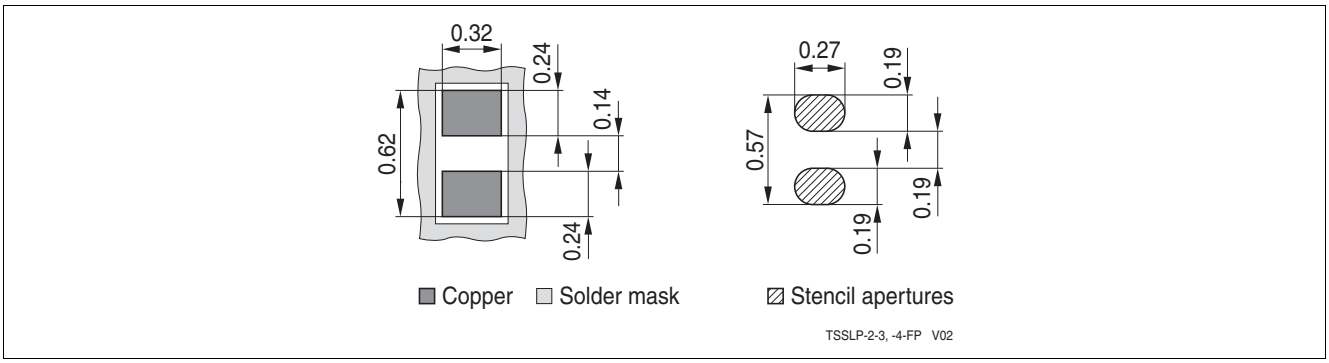

Figure 5-6 TSSLP-2-3: Footprint (dimension in mm)

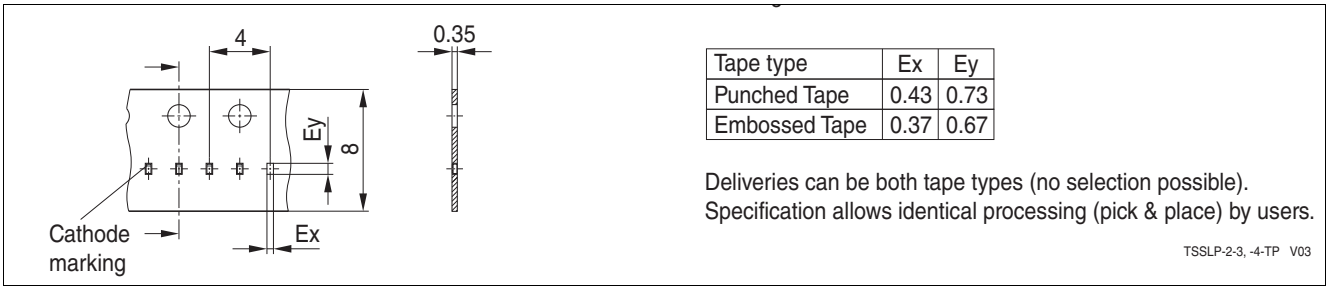

Figure 5-7 TSSLP-2-3: Tape information (dimension in mm)

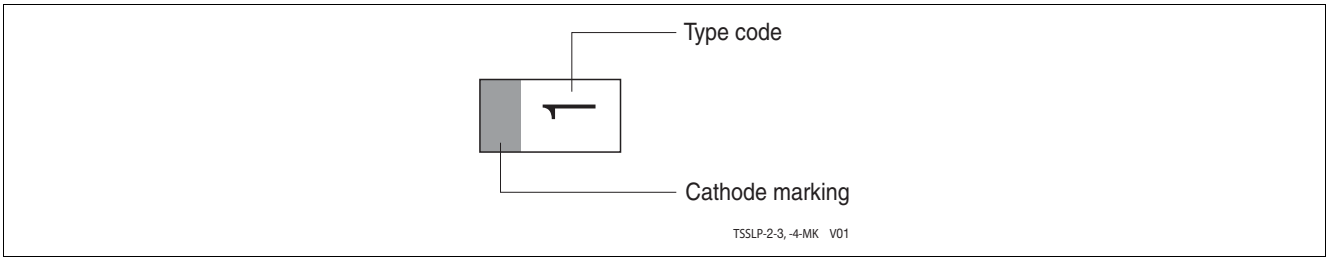

Figure 5-8 TSSLP-2-3: Marking (example)

References

[1] Infineon AG - **Application Note AN210:** Effective ESD Protection design at System Level Using VF-TLP Characterization Methodology

[2] Infineon AG - Recommendations for PCB Assembly of Infineon TSLP and TSSLP Packages

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