TVS Diodes

Transient Voltage Suppressor Diodes

ESD204-B1-02 Series

Bi-directional Low Capacitance TVS Diode

ESD204-B1-02ELS
ESD204-B1-02EL

Data Sheet

Revision 1.2, 2013-05-17
Final

Power Management & Multimarket

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Revision History: Rev. 1.1, 2013-02-06	
Page or Item	**Subjects (major changes since previous revision)**
Revision 1.2, 2013-05-17	
	New type ESD204-B1-02EL inserted

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Last Trademarks Update 2010-06-09

1 Bi-directional Low Capacitance TVS Diode

1.1 Features

- ESD / Transient protection of data lines in 3.3 / 5 / 12 V applications according to :
  - **IEC61000-4-2 (ESD) : ±20 kV (air) and ±18 kV (contact)**
  - **IEC61000-4-4 (EFT) : ±40 A (5/50ns)**
- Maximum working voltage: V_{RWM} **= -8 / +14 V**
- Very low reverse current: I_R **< 1 nA** (typical)
- Low capacitance C_L **= 4 pF** I/O to GND (typical)

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

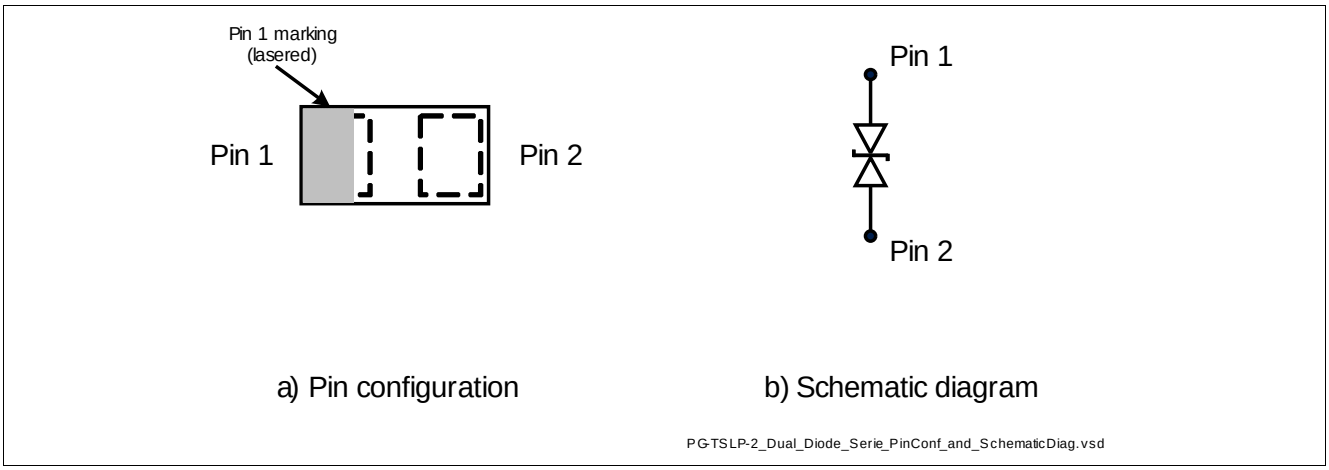

Figure 1 a) Pin Configuration and b) Schematic Diagram

Table 1 Ordering information

Type	Package	Configuration	Marking code
ESD204-B1-02ELS	TSSLP-2-3	1 line, bi-directional	D
ESD204-B1-02EL[1)]	TSLP-2-19	1 line, bi-directional	RR

1) Product not avialalble yet, target data

2 Characteristics

Table 2 Maximum Rating at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
ESD air discharge[1)]	V_{ESD}	-20	–	20	kV
ESD contact discharge[1)]	V_{ESD}	-18	–	18	kV
Peak pulse current (t_p = 8/20 µs)[2)]	I_{PP}	-1	–	1	A
Operating temperature	T_{OP}	-55	–	150	°C
Storage temperage	T_{stg}	-65	–	150	°C

1) V_{ESD} according to IEC61000-4-2

2) I_{PP} according to IEC61000-4-5

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

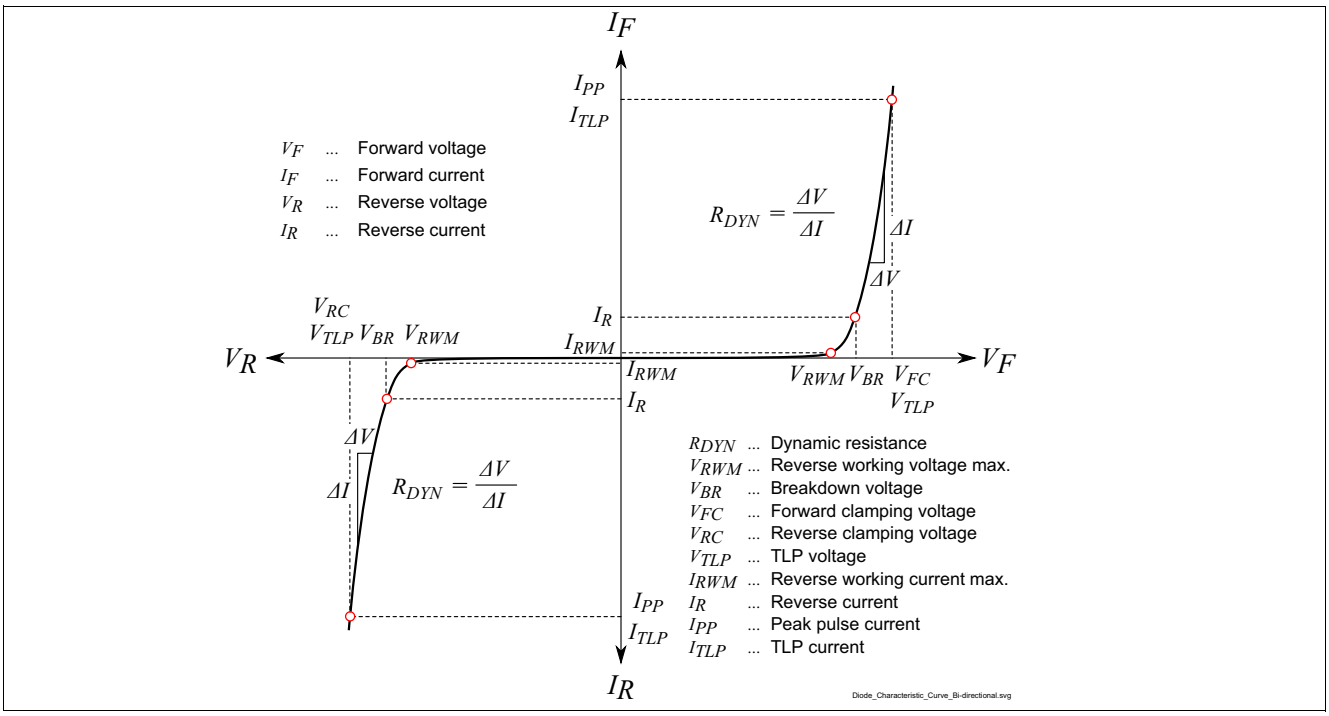

Figure 2 Definitions of electrical characteristics

Table 3 DC characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Reverse working voltage	V_{RWM}	-8	–	14	V	from Pin2 to Pin1
Breakdown voltage	V_{BR}	8.5	11	14	V	I_R = 1 mA, from Pin1 to Pin2
Breakdown voltage	V_{BR}	14.5	17	20	V	I_R = 1 mA, from Pin2 to Pin1
Reverse current	I_R	–	<1	50	nA	V_R = 3.3 V

Table 4 RF characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Line capacitance	C_L	–	4	7	pF	V_R = 0 V, f = 1 MHz, I/O to GND
Serie inductance	L_S	– –	0.2 0.4	– –	nH	ESD204-B1-02ELS ESD204-B1-02EL

Table 5 ESD characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Clamping voltage[1)]	V_{CL}	–	17	22	V	I_{PP} = 1 A from Pin1 to Pin2
	V_{CL}	–	23	28	V	I_{PP} = 1 A from Pin2 to Pin1

1) According to IEC61000-4-5 (t_p : 8 / 20 µs)

2.2 Typical Performance characteristics at T_A = 25 °C, unless otherwise specified

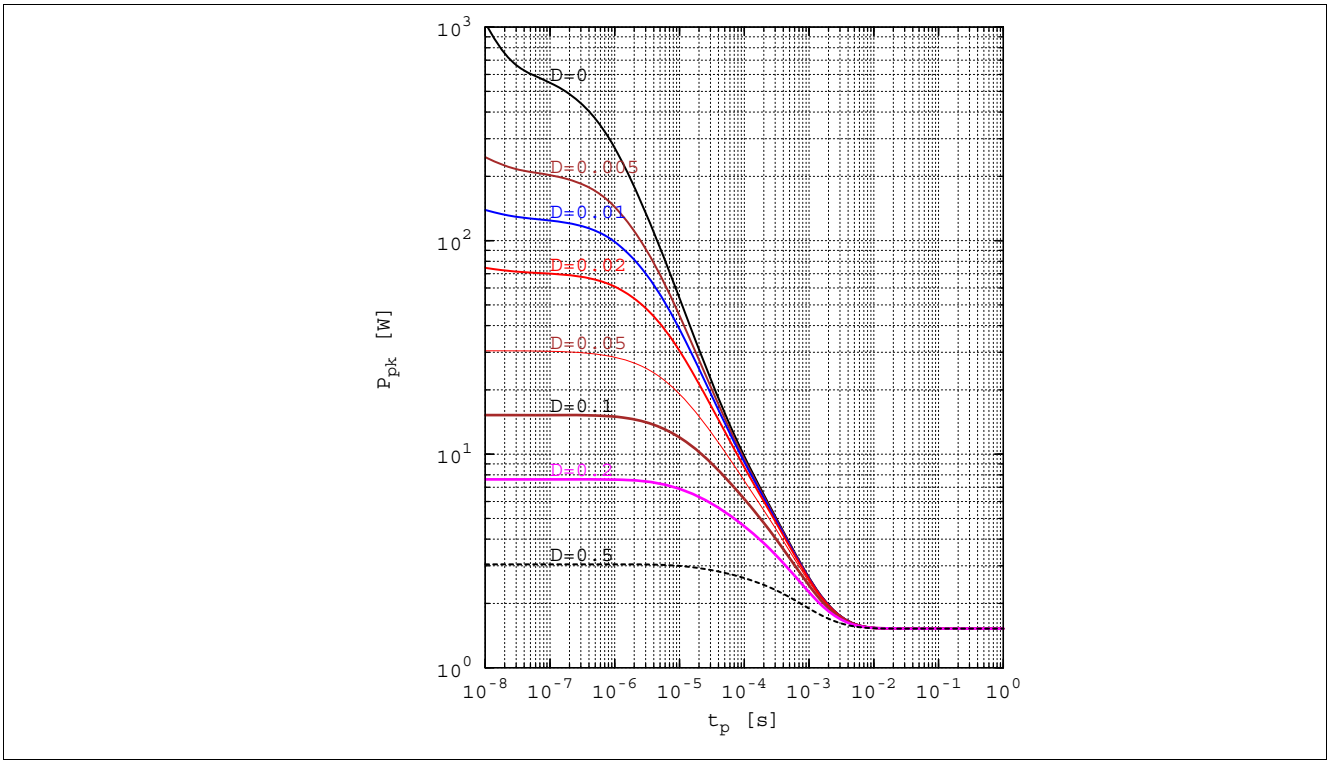

Figure 3 Non-repetitive peak pulse power: $P_{pk} = f(t_p)$

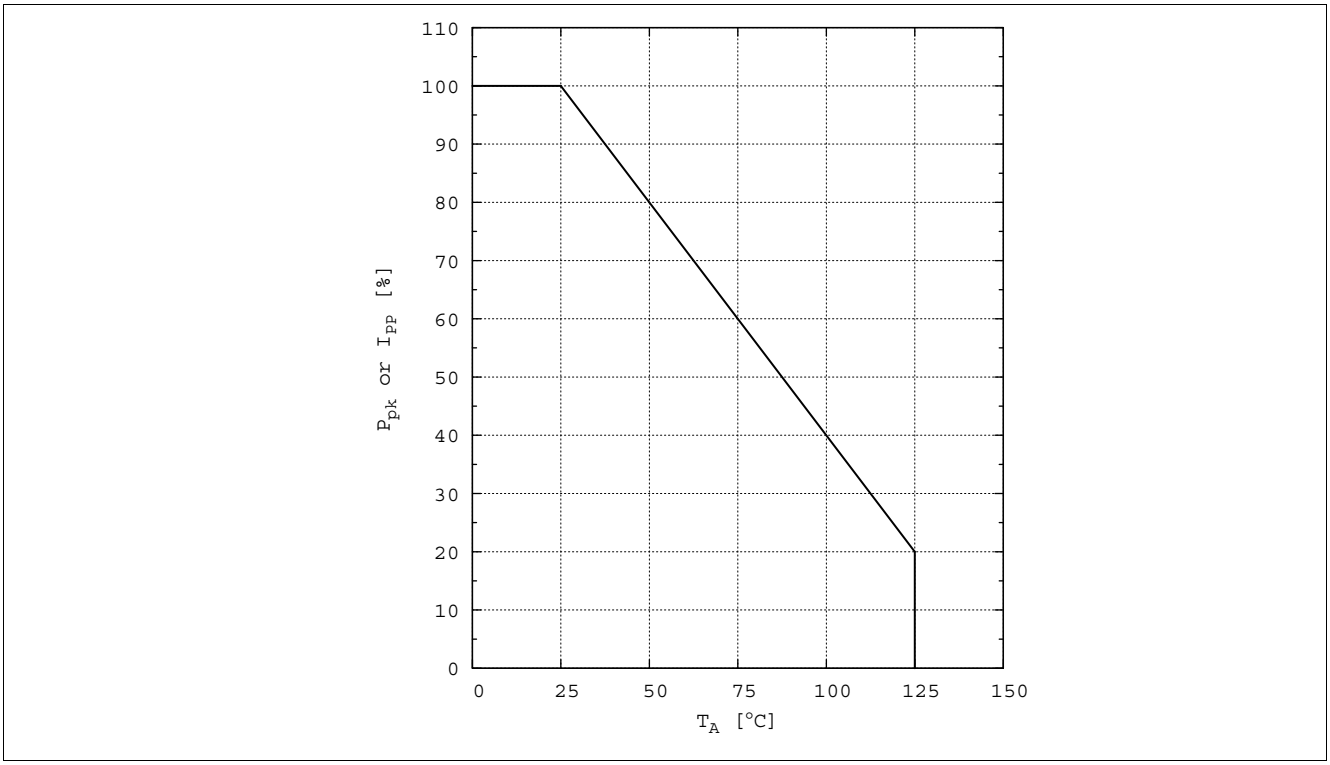

Figure 4 Power derating curve: $P_{pk} = f(T_A)$

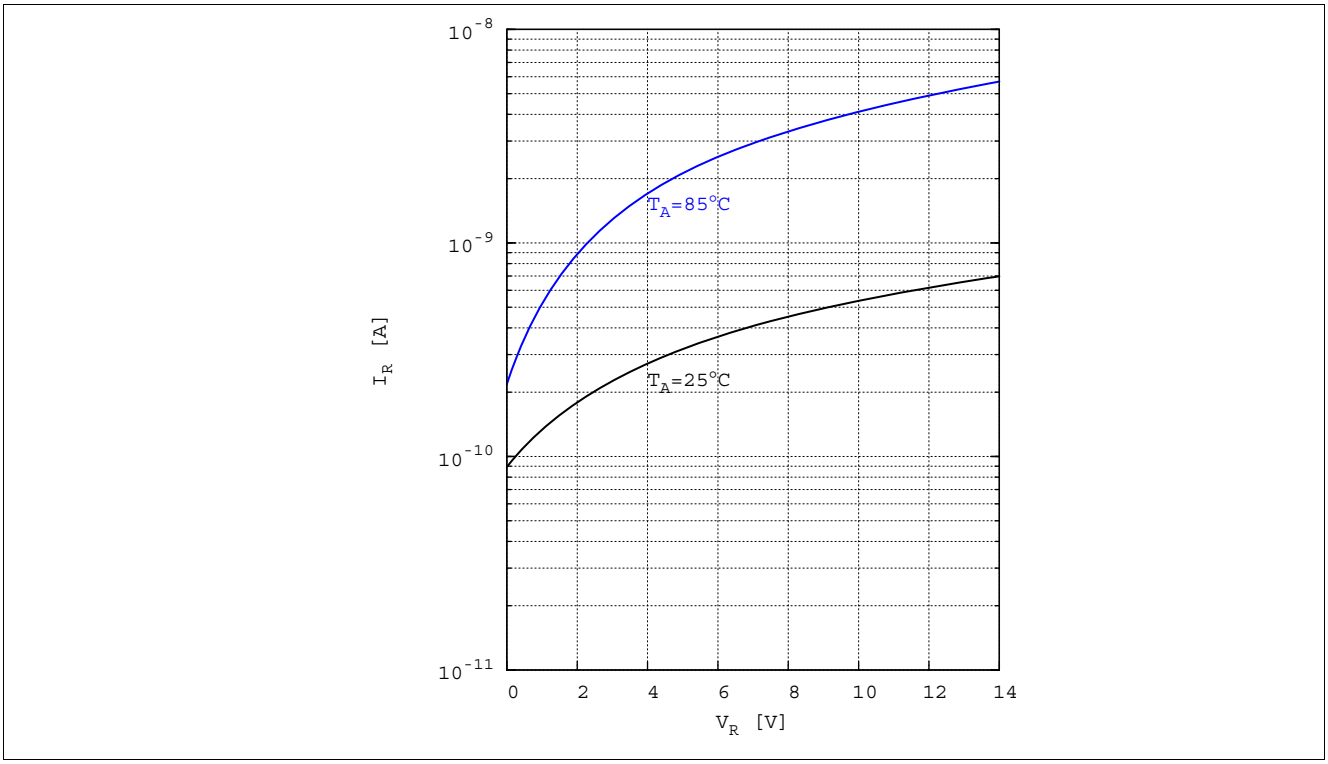

Figure 5 Reverse characteristic, $I_R = (V_R)$, T_A = parameter

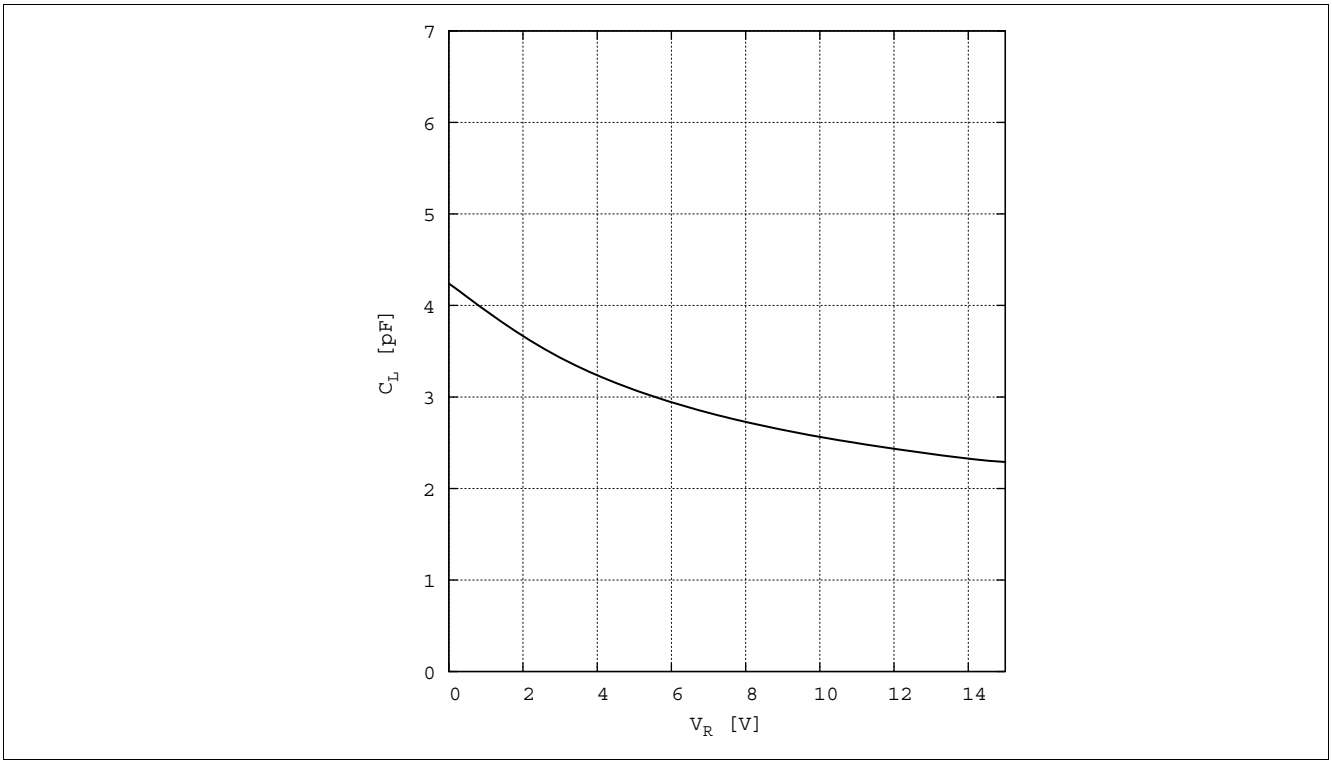

Figure 6 Line capacitance $C_L = f(V_R)$

3 Application Information

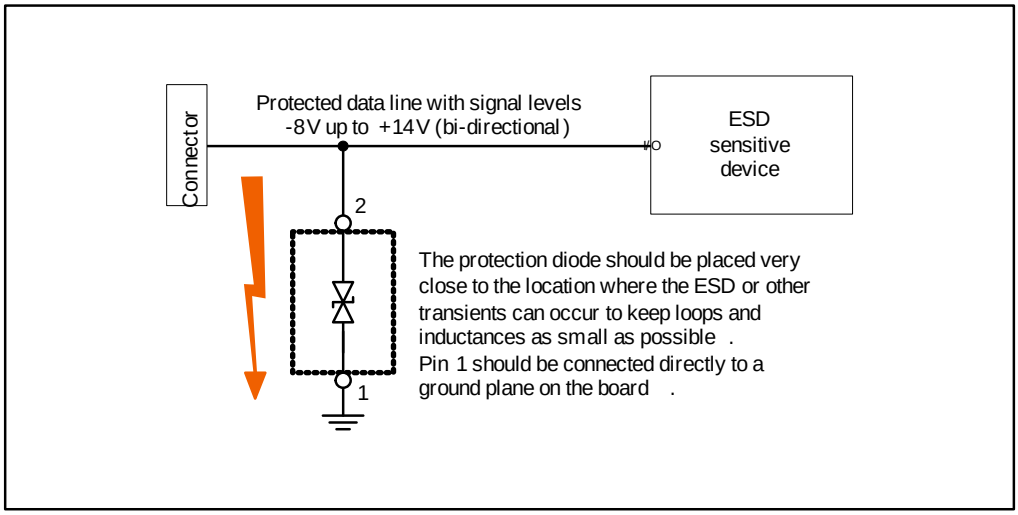

Figure 7 1 Line, bi-directional protection with ESD diode

4 Package Information

4.1 TSSLP-2-3

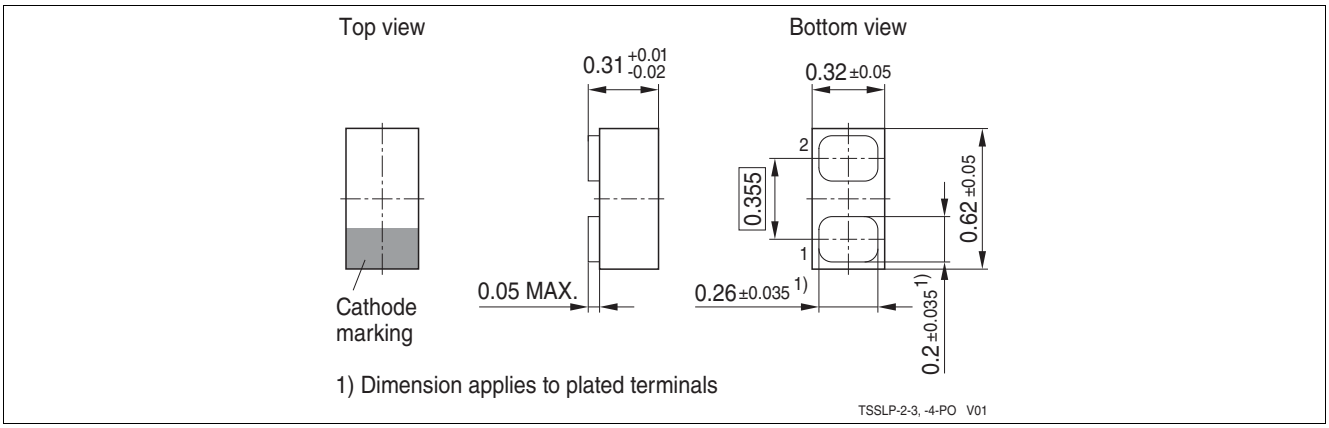

Figure 8 TSSLP-2-3: Package Overview

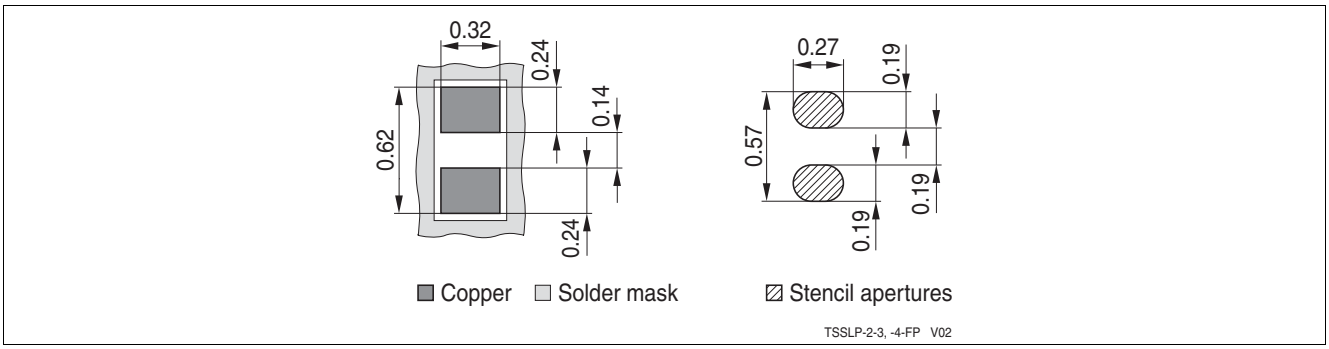

Figure 9 TSSLP-2-3 Footprint

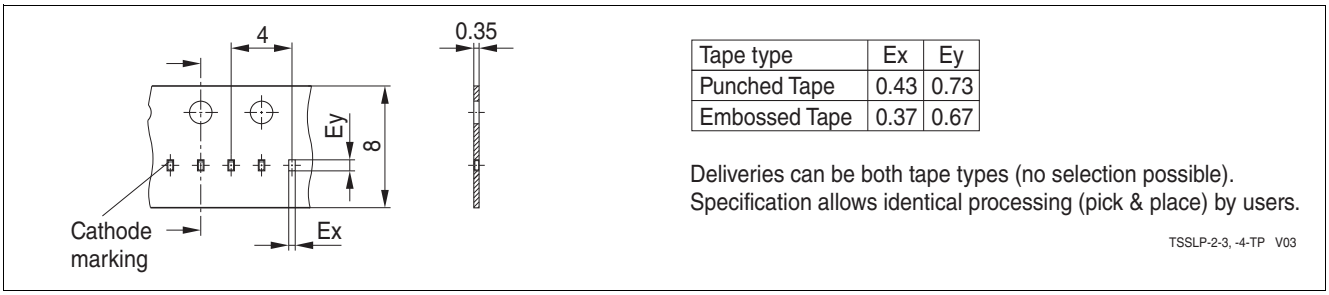

Figure 10 TSSLP-2-3: Packing

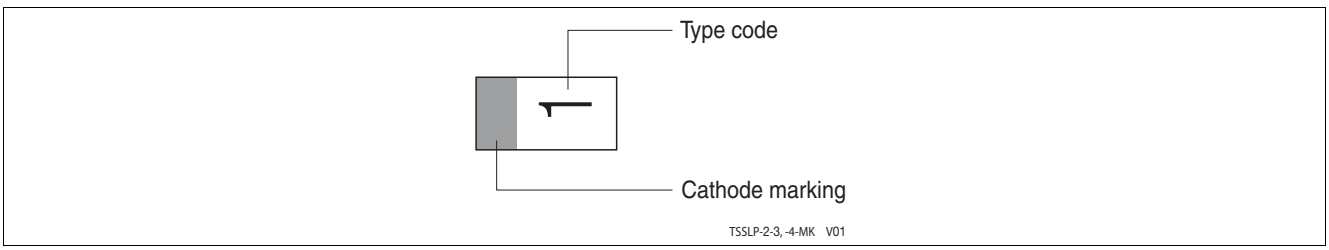

Figure 11 TSSLP-2-3: Marking (example)

4.2 TSLP-2-19

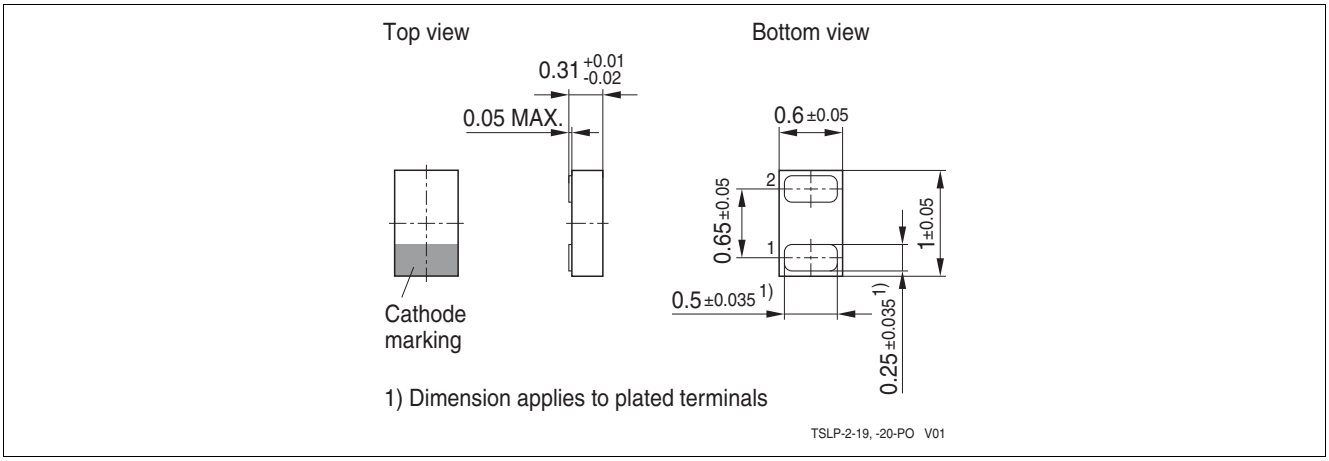

Figure 12 TSLP-2-19: Package Overview

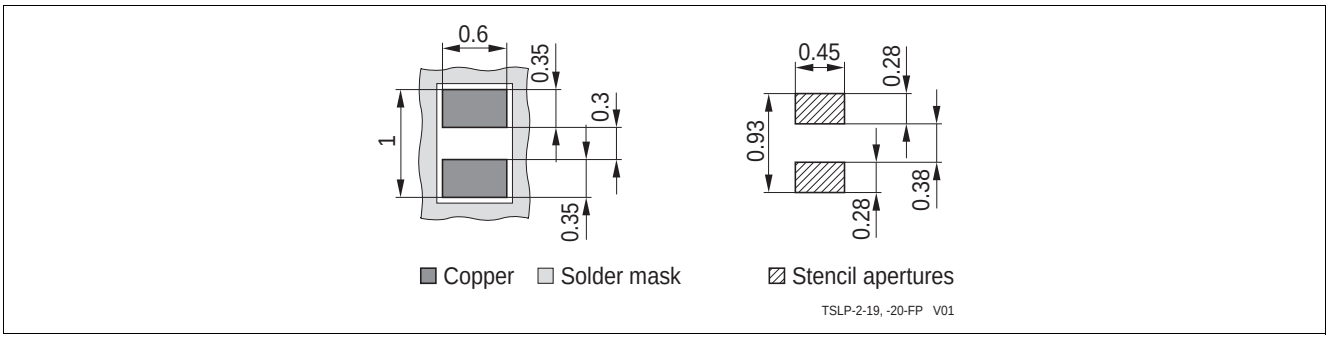

Figure 13 TSLP-2-19: Footprint

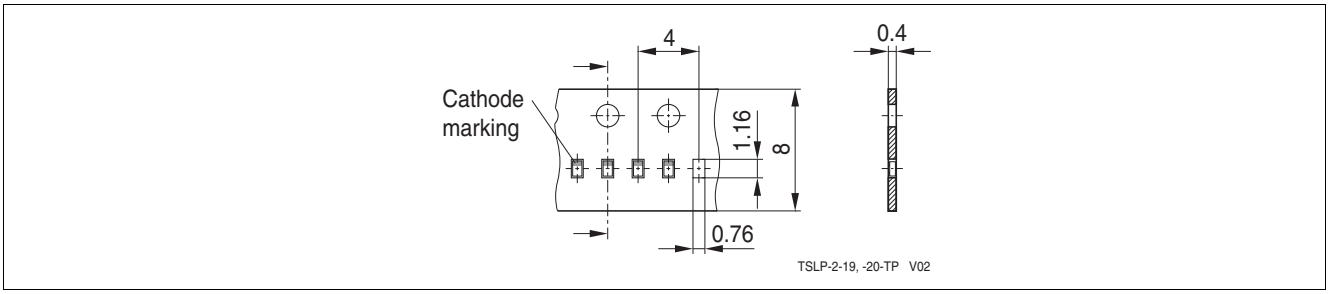

Figure 14 TSLP-2-19: Packing

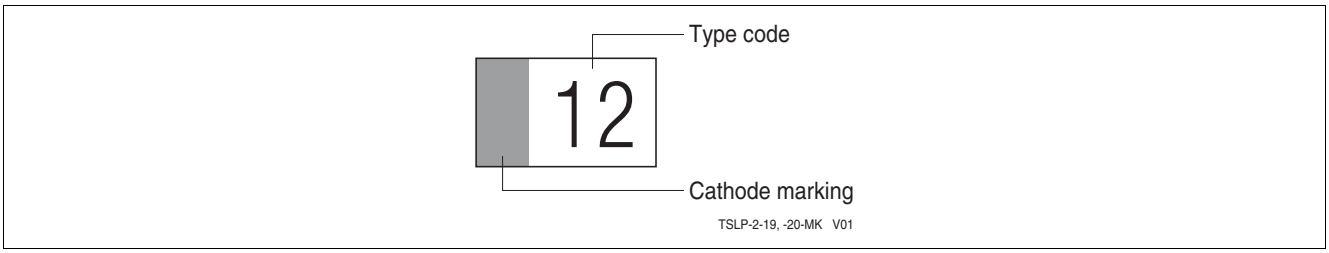

Figure 15 TSLP-2-19: Marking (example)

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