

TVS Diodes

Transient Voltage Suppressor Diodes

ESD5V0L1B-02V

Bi-directional Low Capacitance TVS Diode

ESD5V0L1B-02V

Data Sheet

Revision 1.0, 2010-12-16
Final

Industrial and Multi-Market

Edition 2010-12-16

**Published by
Infineon Technologies AG
81726 Munich, Germany**

**© 2010 Infineon Technologies AG
All Rights Reserved.**

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

Revision History

Page or Item	Subjects (major changes since previous revision)
Revision 1.0, 2010-12-16	

Trademarks of Infineon Technologies AG

AURIX™, BlueMoon™, C166™, CanPAK™, CIPOS™, CIPURSE™, COMNEON™, EconoPACK™, CoolMOS™, CoolSET™, CORECONTROL™, CROSSAVE™, DAVE™, EasyPIM™, EconoBRIDGE™, EconoDUAL™, EconoPIM™, EiceDRIVER™, eupec™, FCOS™, HITFET™, HybridPACK™, I²RF™, ISOFACE™, IsoPACK™, MIPAK™, ModSTACK™, my-d™, NovalithIC™, OmniTune™, OptiMOS™, ORIGAT™, PRIMARION™, PrimePACK™, PrimeSTACK™, PRO-SIL™, PROFET™, RASIC™, ReverSave™, SatRIC™, SIEGET™, SINDRION™, SIPMOS™, SMARTi™, SmartLEWIS™, SOLID FLASH™, TEMPFET™, thinQ!™, TRENCHSTOP™, TriCore™, X-GOLD™, X-PMU™, XMM™, XPOSYS™.

Other Trademarks

Advance Design System™ (ADS) of Agilent Technologies, AMBA™, ARM™, MULTI-ICE™, KEIL™, PRIMECELL™, REALVIEW™, THUMB™, µVision™ of ARM Limited, UK. AUTOSAR™ is licensed by AUTOSAR development partnership. Bluetooth™ of Bluetooth SIG Inc. CAT-iq™ of DECT Forum. COLOSSUS™, FirstGPS™ of Trimble Navigation Ltd. EMV™ of EMVCo, LLC (Visa Holdings Inc.). EPCOS™ of Epcos AG. FLEXGO™ of Microsoft Corporation. FlexRay™ is licensed by FlexRay Consortium. HYPERTERMINAL™ of Hilgraeve Incorporated. IEC™ of Commission Electrotechnique Internationale. IrDA™ of Infrared Data Association Corporation. ISO™ of INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. MATLAB™ of MathWorks, Inc. MAXIM™ of Maxim Integrated Products, Inc. MICROTEC™, NUCLEUS™ of Mentor Graphics Corporation. Mifare™ of NXP. MIPI™ of MIPI Alliance, Inc. MIPS™ of MIPS Technologies, Inc., USA. muRata™ of MURATA MANUFACTURING CO., MICROWAVE OFFICE™ (MWO) of Applied Wave Research Inc., OmniVision™ of OmniVision Technologies, Inc. Openwave™ Openwave Systems Inc. RED HAT™ Red Hat, Inc. RFMD™ RF Micro Devices, Inc. SIRIUS™ of Sirius Satellite Radio Inc. SOLARIS™ of Sun Microsystems, Inc. SPANSION™ of Spansion LLC Ltd. Symbian™ of Symbian Software Limited. TAIYO YUDEN™ of Taiyo Yuden Co. TEAKLITE™ of CEVA, Inc. TEKTRONIX™ of Tektronix Inc. TOKO™ of TOKO KABUSHIKI KAISHA TA. UNIX™ of X/Open Company Limited. VERILOG™, PALLADIUM™ of Cadence Design Systems, Inc. VLYNQ™ of Texas Instruments Incorporated. VXWORKS™, WIND RIVER™ of WIND RIVER SYSTEMS, INC. ZETEX™ of Diodes Zetex Limited.

Last Trademarks Update 2010-10-26

Table of Contents

	Table of Contents	4
	List of Figures	5
	List of Tables	6
1	Bi-directional Low Capacitance TVS Diode	7
1.1	Features	7
1.2	Application Examples	7
2	Product Description	7
3	Characteristics	8
3.1	Electrical Characteristics at $T_A=25^{\circ}\text{C}$, unless otherwise specified	8
3.2	Typical Performance characteristics at $T_A = 25^{\circ}\text{C}$, unless otherwise specified	10
4	Application Information	13
5	Ordering information scheme	14
6	Package Information	15
6.1	PG-SC79-2-1	15
7	Date Code Marking	16
	Terminology	17

List of Figures

Figure 1	Pin configuration and schematic diagram.	7
Figure 2	Definitions of electrical characteristics	8
Figure 3	Capacitance characteristics: $C_L = f(V_R)$	10
Figure 4	Reverse characteristics: $I_R = f(V_R)$	10
Figure 5	Reverse TLP characteristics.	11
Figure 6	Forward TLP characteristics.	11
Figure 7	Power derating curve: $P_{PK} = f(T_A)$	12
Figure 8	Single Chanel, uni-directional TVS protection	13
Figure 9	Ordering Information Scheme.	14
Figure 10	PG-SC79-2-1: Package Overview	15
Figure 11	PG-SC79-2-1: Footprint	15
Figure 12	PG-SC79-2-1: Packing	15
Figure 13	PG-SC79-2-1: Marking (example)	15
Figure 14	Date Code marking for Discrete packages with one digit (SCD8, SC79, SC75 ¹⁾) CES-Code	16

List of Tables

Table 1	Ordering information	7
Table 2	Maximum Rating at $T_A = 25\text{ °C}$, unless otherwise specified	8
Table 3	DC characteristics at $T_A = 25\text{ °C}$, unless otherwise specified	8
Table 4	RF characteristics at $T_A = 25\text{ °C}$, unless otherwise specified	9
Table 5	ESD characteristics at $T_A = 25\text{ °C}$, unless otherwise specified	9

1 Bi-directional Low Capacitance TVS Diode

1.1 Features

- ESD / transient protection according to:
 - IEC61000-4-2 (ESD): ± 25 kV (contact)
 - IEC61000-4-4 (EFT): 40 A (5/50 ns)
 - IEC61000-4-5 (surge): 2.5 A (8/20 μ s)
- Max.working voltage: $V_{RWM} = \pm 5$ V
- Ultra low dynamic resistance: $R_{dyn} = 0.3\Omega$
- Low capacitance: $C_L = 8.5$ pf typ.
- Very low reverse current: $I_R = \leq 1$ nA typ.
- Pb-free (RoHS compliant) and halogen free package
- Qualified according AEC Q101



1.2 Application Examples

- Cellular handsets, portable devices, notebooks and computers
- Digital cameras, power supplies and audio / video equipment, accessories

2 Product Description

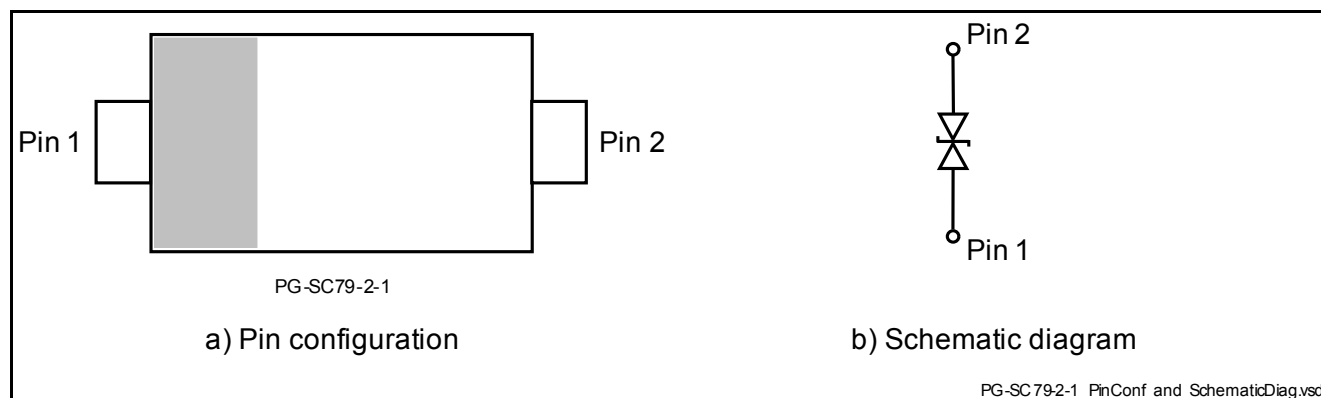


Figure 1 Pin configuration and schematic diagram

Table 1 Ordering information

Type	Package	Configuration	Marking code
ESD5V0L1B-02V	PG-SC79-2-1	1 channel, bi-directional	I

3 Characteristics

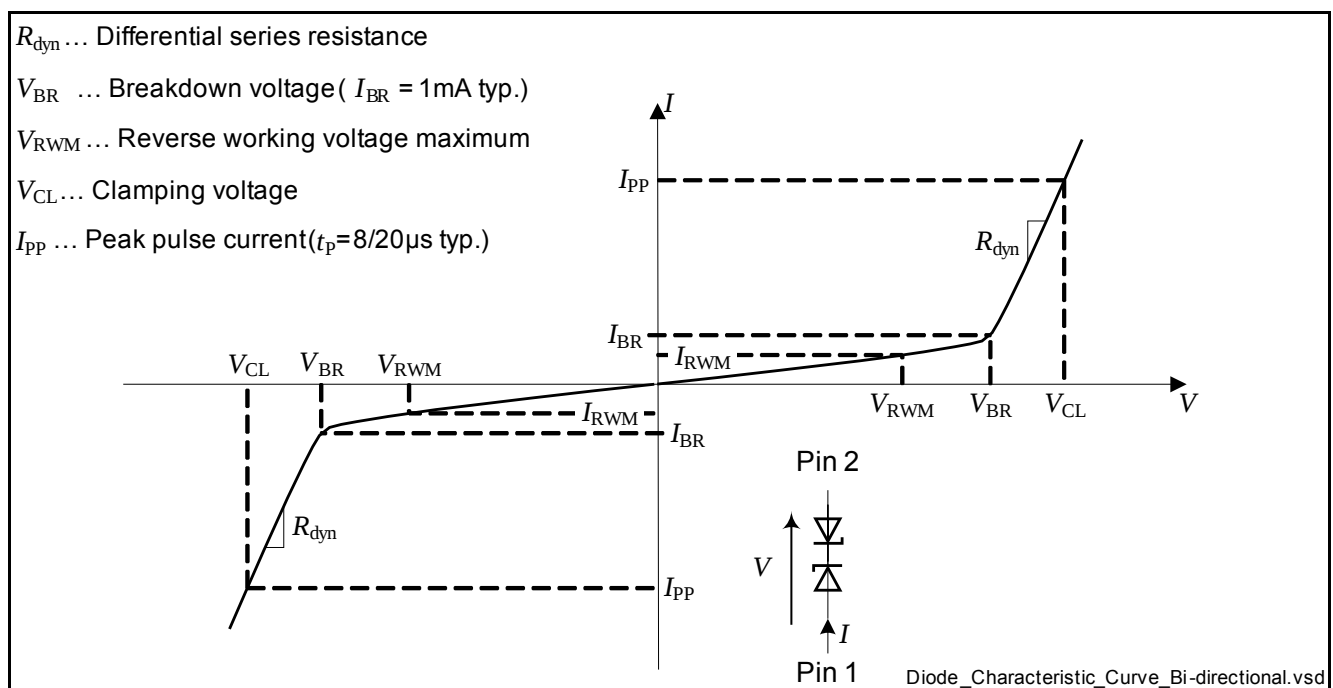
Table 2 Maximum Rating at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
ESD contact discharge ¹⁾	V_{ESD}	-25	–	25	kV
Peak pulse current ($t_p = 8/20\text{ }\mu\text{s}$) ²⁾	I_{PP}	-2.5	–	2.5	A
Operating temperature range	T_{OP}	-55	–	125	$^{\circ}\text{C}$
Storage temperature	T_{stg}	-65	–	150	$^{\circ}\text{C}$

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

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

3.1 Electrical Characteristics at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified


Figure 2 Definitions of electrical characteristics
Table 3 DC characteristics at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Reverse working voltage	V_{RWM}	–	–	5	V	
Breakdown voltage	V_{BR}	7	–	–	V	$I_{\text{R}} = 1\text{ mA}$
Reverse current	I_{R}	–	≤ 1	50	nA	$V_{\text{R}} = 3\text{ V}$

Characteristics

Table 4 RF characteristics at $T_A = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode capacitance	C_L	–	8.5	13	pF	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$

Table 5 ESD characteristics at $T_A = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Clamping voltage ¹⁾	V_{CL}	–	17	–	V	$I_{pp} = 5\text{ A}$, $t_p = 30\text{ ns}$, pin 1-2
Clamping voltage ¹⁾	V_{CL}	–	20	–	V	$I_{pp} = 5\text{ A}$, $t_p = 30\text{ ns}$, pin 2-1
Clamping voltage ¹⁾	V_{CL}	–	22	–	V	$I_{pp} = 16\text{ A}$, $t_p = 30\text{ ns}$, pin 1-2
Clamping voltage ¹⁾	V_{CL}	–	25	–	V	$I_{pp} = 16\text{ A}$, $t_p = 30\text{ ns}$, pin 2-1
Dynamic resistance ¹⁾	R_{DYN}	–	0.3	–	Ω	$t_p = 30\text{ ns}$

1) According TLP tests. Please refer to Application Note AN-210

3.2 Typical Performance characteristics at $T_A = 25\text{ °C}$, unless otherwise specified

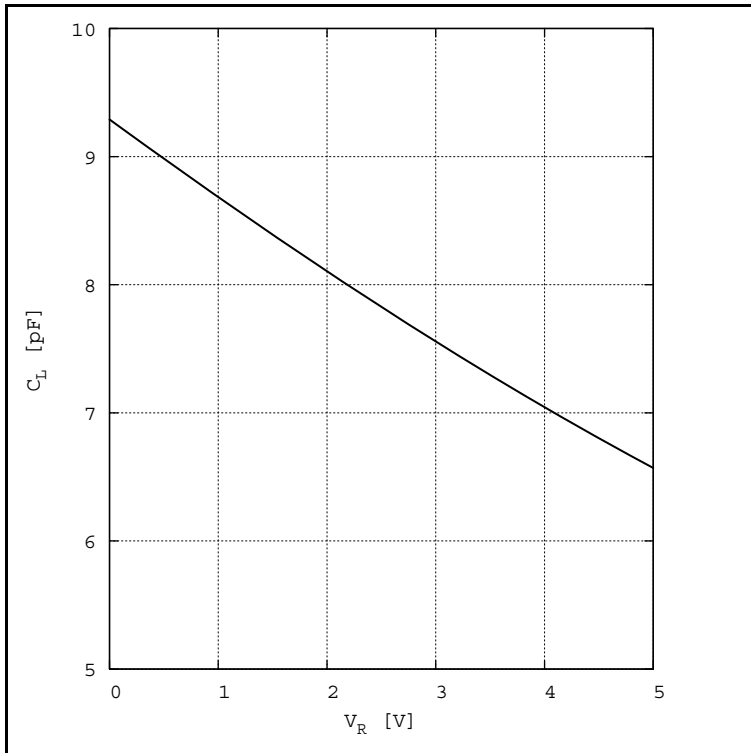


Figure 3 Capacitance characteristics: $C_L = f(V_R)$

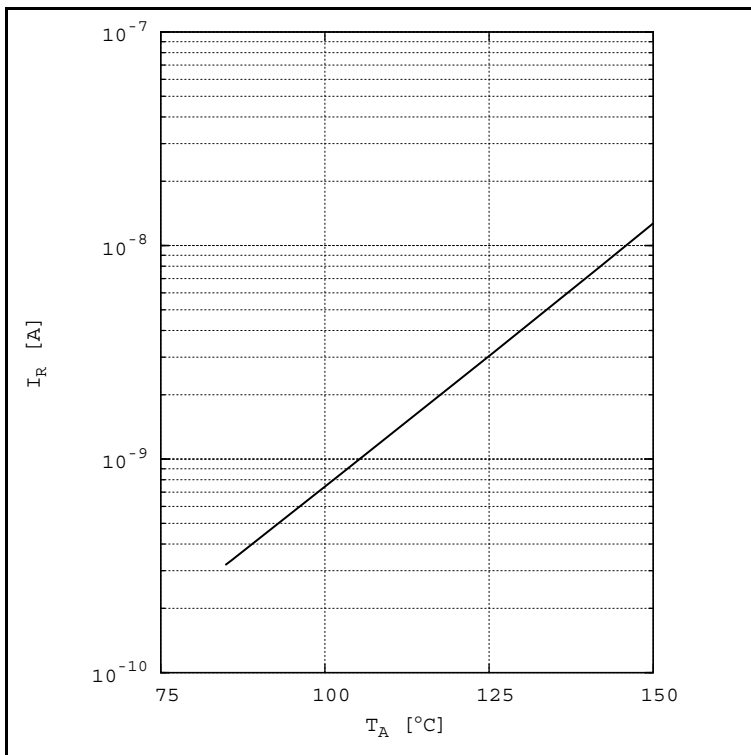


Figure 4 Reverse characteristics: $I_R = f(V_R)$

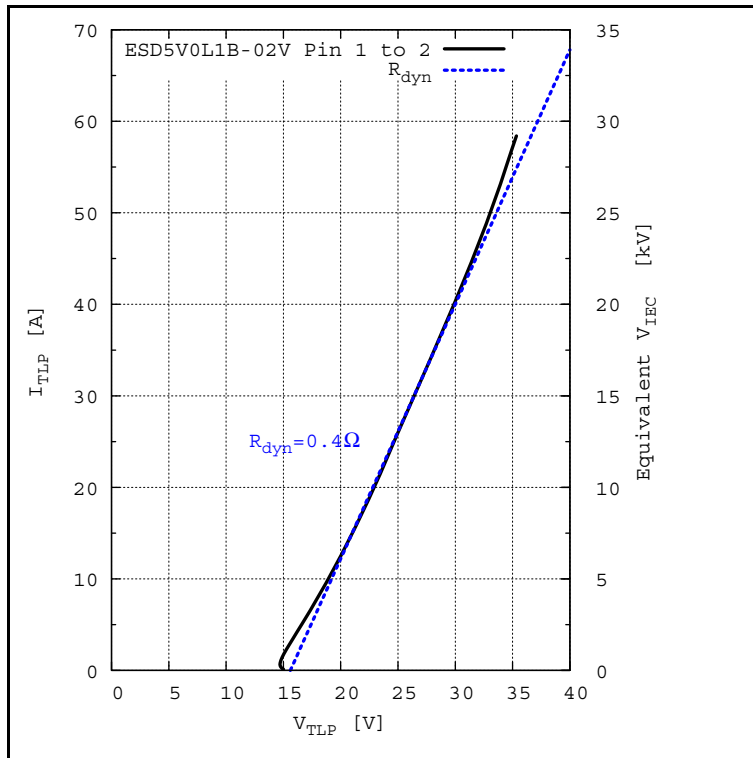


Figure 5 Reverse TLP characteristics

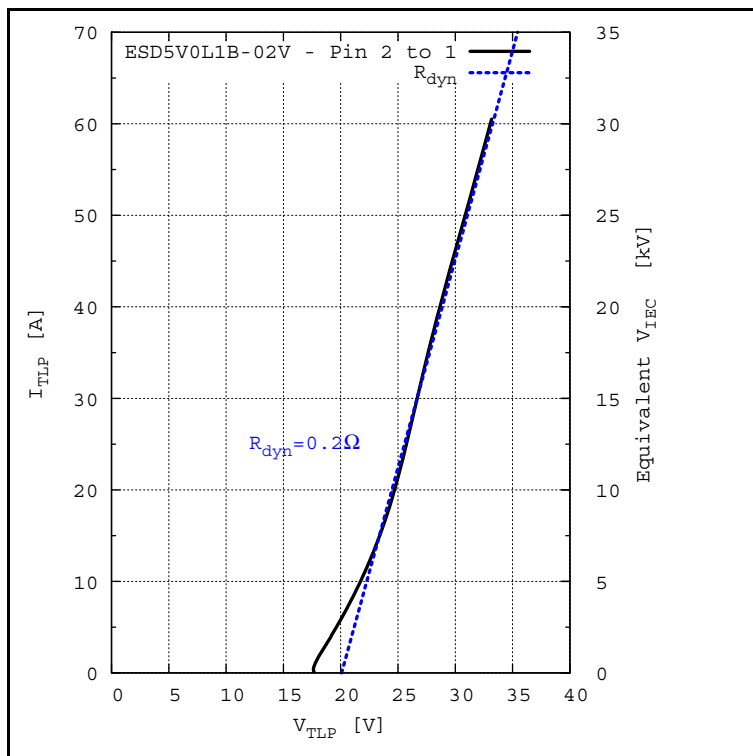


Figure 6 Forward TLP characteristics

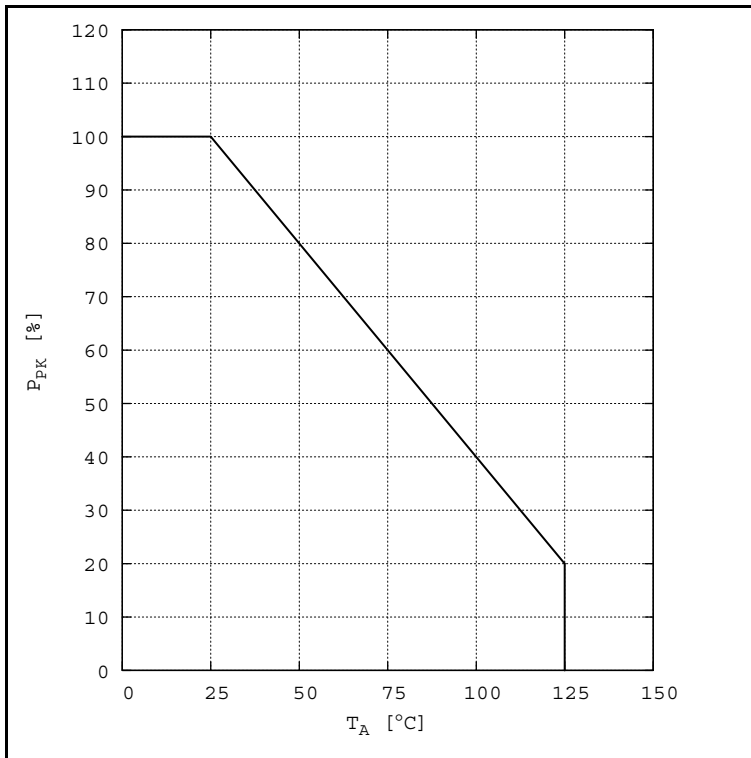


Figure 7 Power derating curve: $P_{PK} = f(T_A)$

4 Application Information

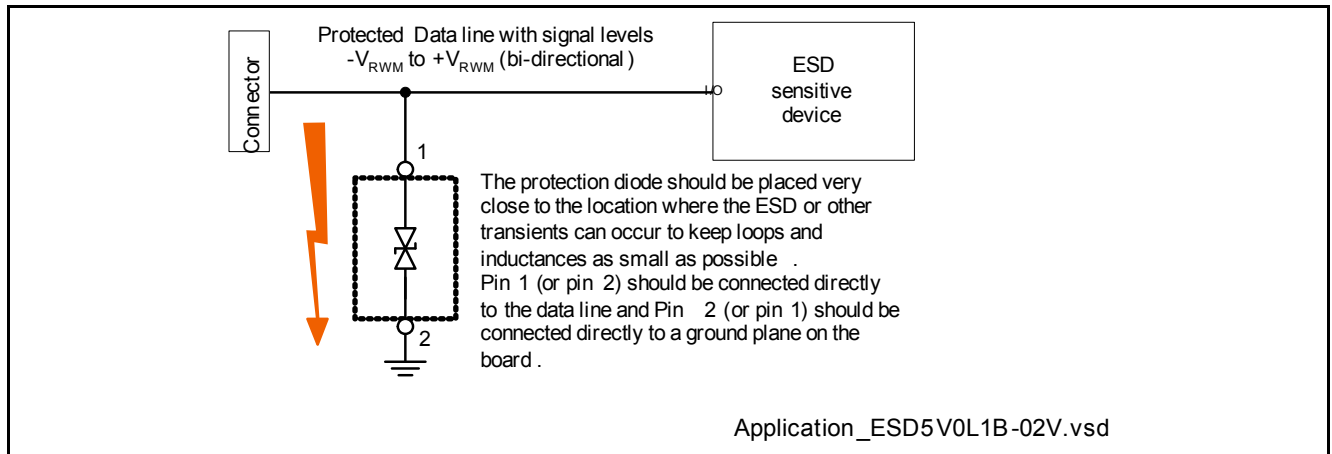


Figure 8 Single Channel, uni-directional TVS protection

5 Ordering information scheme

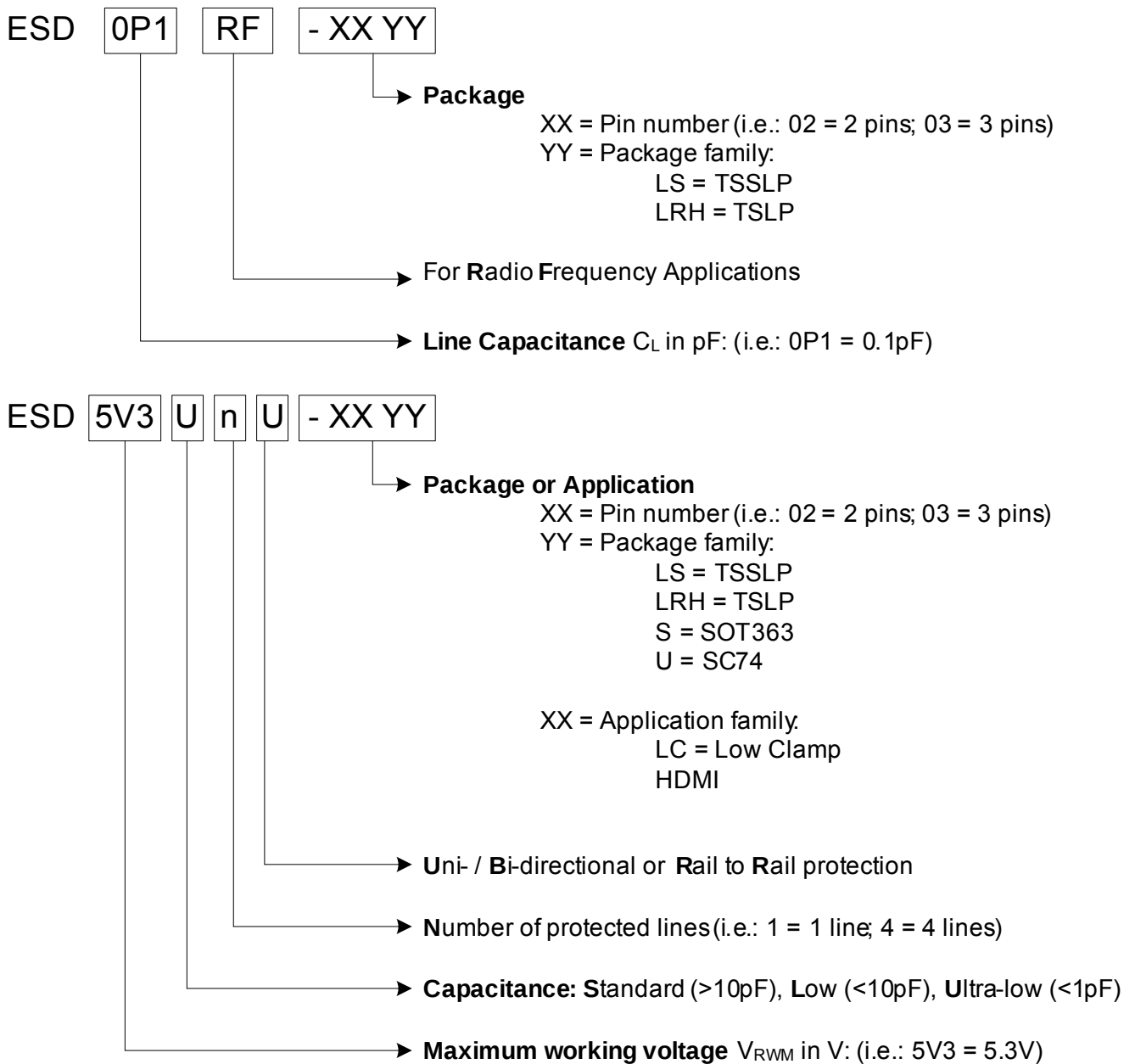


Figure 9 Ordering Information Scheme

6 Package Information

6.1 PG-SC79-2-1

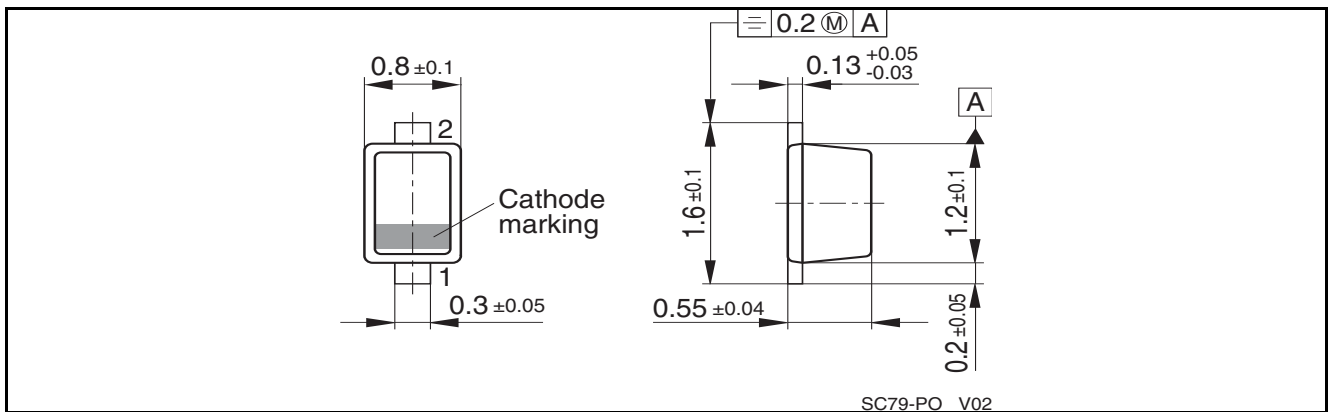


Figure 10 PG-SC79-2-1: Package Overview

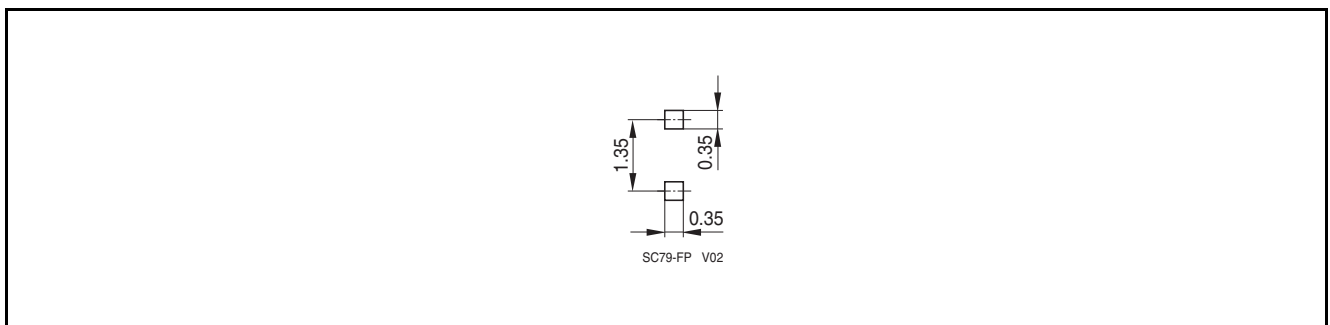


Figure 11 PG-SC79-2-1: Footprint

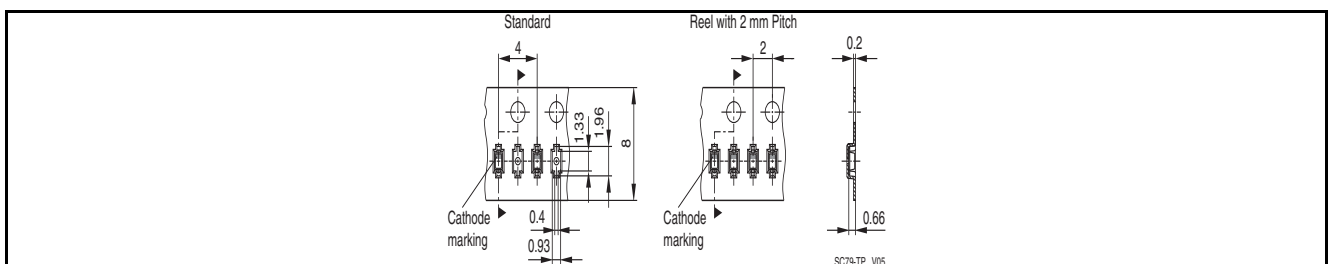


Figure 12 PG-SC79-2-1: Packing

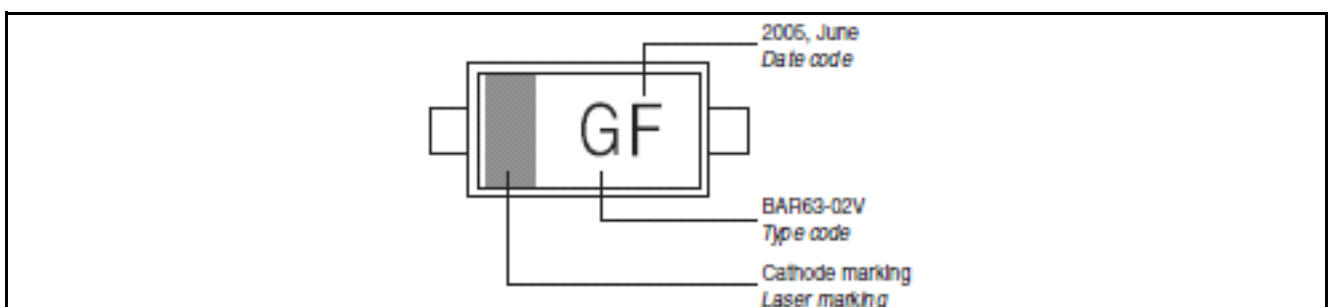


Figure 13 PG-SC79-2-1: Marking (example)

7 Date Code Marking¹⁾

one digit (SCD80, SC79, SC75¹⁾) CES-Code

Month	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
01	a	p	A	P	a	p	A	P	a	p	A	P
02	b	q	B	Q	b	q	B	Q	b	q	B	Q
03	c	r	C	R	c	r	C	R	c	r	C	R
04	d	s	D	S	d	s	D	S	d	s	D	S
05	e	t	E	T	e	t	E	T	e	t	E	T
06	f	u	F	U	f	u	F	U	f	u	F	U
07	g	v	G	V	g	v	G	V	g	v	G	V
08	h	x	H	X	h	x	H	X	h	x	H	X
09	j	y	J	Y	j	y	J	Y	j	y	J	Y
10	k	z	K	Z	k	z	K	Z	k	z	K	Z
11	l	2	L	4	l	2	L	4	l	2	L	4
12	n	3	N	5	n	3	N	5	n	3	N	5

Figure 14 Date Code marking for Discrete packages with one digit (SCD8, SC79, SC75¹⁾) CES-Code

1) New Marking Layout for SC75, implemented at October 2005

Terminology

C_L	Line capacitance
EFT	Electrical Fast Transient
ESD	Electrostatic Discharge
I_{PP}	Peak pulse current
I_R	Reverse current
RoHS	Restriction of Hazardous Substance Directive
T_A	Ambient Temperature
T_{OP}	Operation temperature
t_p	Pulse duration
T_{stg}	Storage temperature
V_{CL}	Reverse clamping voltage
V_{ESD}	Electrostatic discharge voltage
V_R	Reverse voltage
V_{RWM}	Reverse working voltage maximum
V_{BR}	Breakdown voltage
R_{DYN}	Dynamic resistance

www.infineon.com

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Infineon:](#)

[ESD5V0L1B-02V H6327](#) [ESD5V0L1B02VH6327XTSA1](#)