TVS Diodes

Transient Voltage Suppressor Diodes

ESD5V0S1U-02V

Uni-directional ESD / Transient Protection Diode

ESD5V0S1U-02V

Data Sheet

Revision 1.1, 2012-05-31
Final

Powermanagement & Multimarket

Edition 2012-05-31

Published by
Infineon Technologies AG
81726 Munich, Germany

© 2012 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: Rev. 1.0, 2011-02-21	
Page or Item	**Subjects (major changes since previous revision)**
Revision 1.1, 2012-05-31	
Page 8	Table 3 updated

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™, MIPAQ™, ModSTACK™, my-d™, NovalithIC™, OmniTune™, OptiMOS™, ORIGA™, 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

1 Uni-directional ESD / Transient Protection Diode 5
1.1 Features 5
1.2 Application Examples 5

2 Product Description 5

3 Characteristics 6
3.1 Electrical Characteristics at T_A=25°C, unless otherwise specified 6
3.2 Typical Performance characteristics at T_A = 25 °C, unless otherwise specified 8

4 Application Information 10

5 Ordering information scheme (examples) 11

6 Package Information 12
6.1 SC79 Package 12

7 Date Code Marking for SC79 13

References 14

Terminology 15

1 Uni-directional ESD / Transient Protection Diode

1.1 Features

- ESD / transient protection according to:
  - **IEC61000-4-2 (ESD): ±25 kV (air) 20 kV (contact)**
  - **IEC61000-4-4 (EFT): 50 A / 2.5 kV (5/50 ns)**
  - **IEC61000-4-5 (surge): 5.5 A / 66 W (8/20 µs)**
- Uni-directional, working voltage: V_{RWM} = 5 V
- Ultra low clamping voltage, protects against both positive and negative ESD strikes
- Ultra low dynamic resistance: R_{DYN} down to 0.2 Ω
- Very fast response time
- Pb-free (RoHS compliant) and halogen free package

1.2 Application Examples

- Notebooks, computers and consumer electronics
- Industrial applications, white goods, portable instrumentation
- Mobile communication

2 Product Description

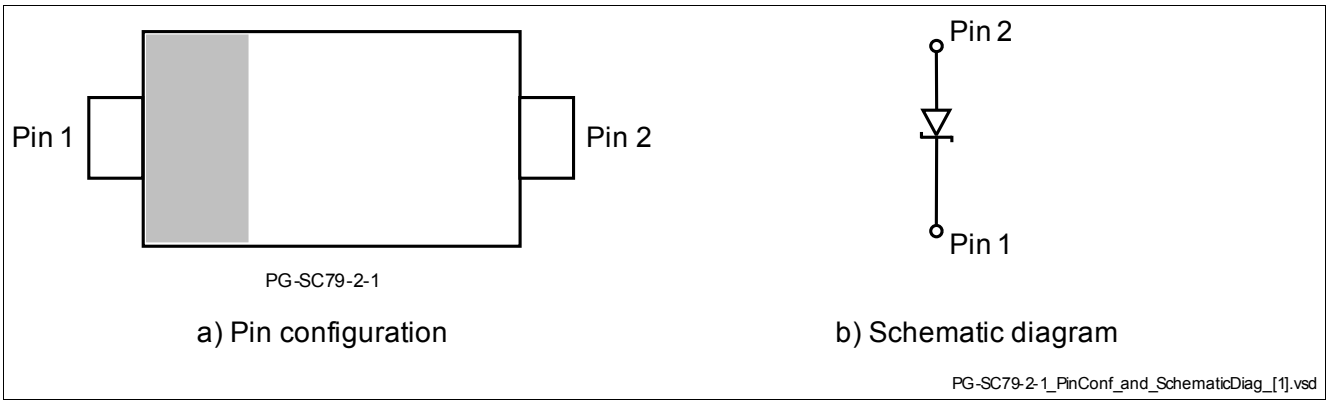


Figure 1 Pin configuration and schematic diagram

Table 1 Ordering information

Type	Package	Configuration	Marking code
ESD5V0S1U-02V	SC79	1 line, uni-directional	U

3 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}	-25	–	25	kV
ESD contact discharge[1]	V_{ESD}	-20	–	20	kV
Peak pulse current (t_p = 8/20 µs)[2]	I_{PP}	-5.5	–	5.5	A
Peak pulse power (t_p = 8/20 µs)[2]	P_{Pk}	–	–	66	W
Operating temperature range	T_{OP}	-55	–	125	°C
Storage temperature	T_{stg}	-65	–	150	°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°C, unless otherwise specified

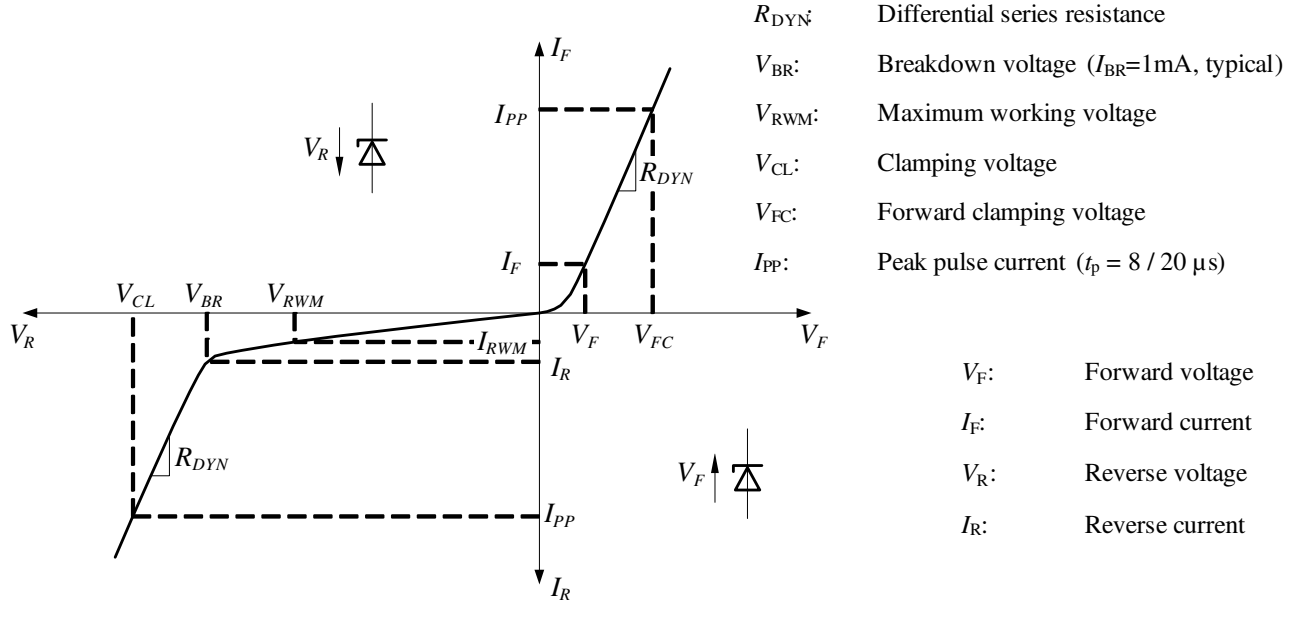


Figure 2 Definitions of electrical characteristics

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}	–	–	5	V	
Breakdown voltage	V_{BR}	5.7	6.5	7.5	V	I_R = 1 mA
Reverse current	I_R	–	–	0.1	µA	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.		
Diode capacitance	C_L	–	35	40	pF	V_R = 0 V, f = 1 MHz
Diode capacitance	C_L	–	20	–	pF	V_R = 2.5 V, f = 1 MHz

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}	–	7.6	–	V	I_{pp} = 5 A, t_p = 30 ns, pin 1-2
Clamping voltage[1)]	V_{CL}	–	10.5	–	V	I_{pp} = 16 A, t_p = 30 ns, pin 1-2
Clamping voltage[1)]	V_{CL}	–	14.5	–	V	I_{pp} = 30 A, t_p = 30 ns, pin 1-2
Forward clamping voltage[1)]	V_{FC}	–	2	–	V	I_{pp} = 5 A, t_p = 30 ns, pin 2-1
Forward clamping voltage[1)]	V_{FC}	–	4.3	–	V	I_{pp} = 16 A, t_p = 30 ns, pin 2-1
Forward clamping voltage[1)]	V_{FC}	–	7.3	–	V	I_{pp} = 30 A, t_p = 30 ns, pin 2-1
Dynamic resistance[1)]	R_{DYN}	–	0.2	–	Ω	t_p =30 ns, pin 2-1
Dynamic resistance[1)]	R_{DYN}	–	0.3	–	Ω	t_p =30 ns, pin 1-2

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

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

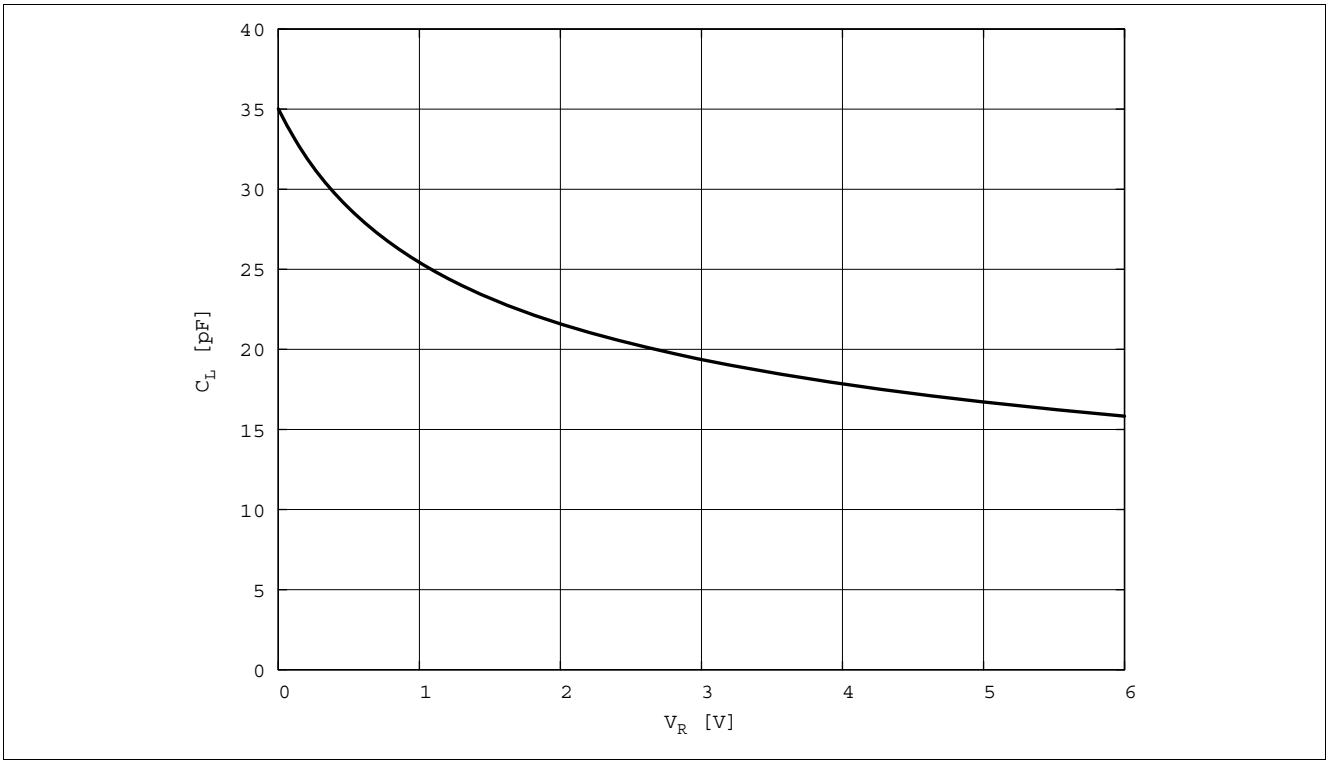


Figure 3 Capacitance characteristics: $C_L = f(V_R)$ - f = 1 MHz

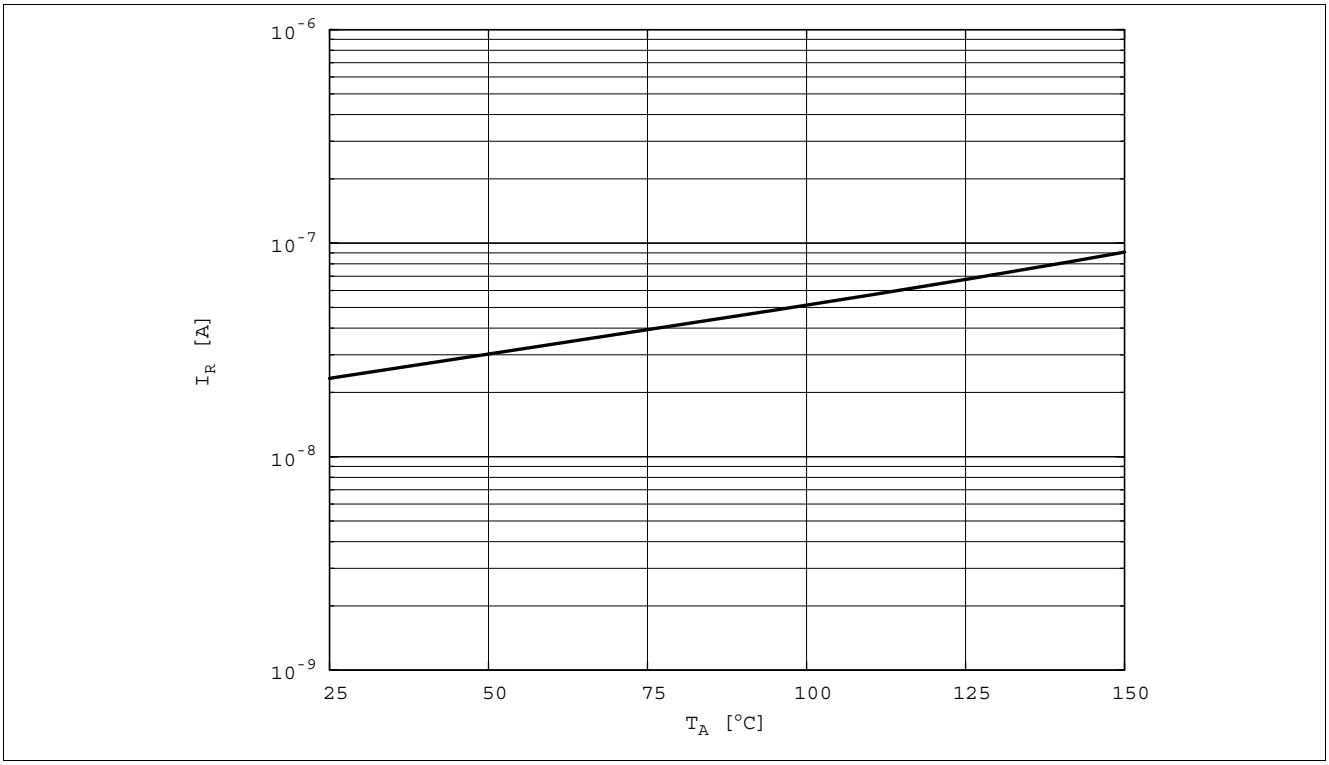


Figure 4 Reverse characteristics: $I_R = f(T_A)$ - V_R = 3.3 V

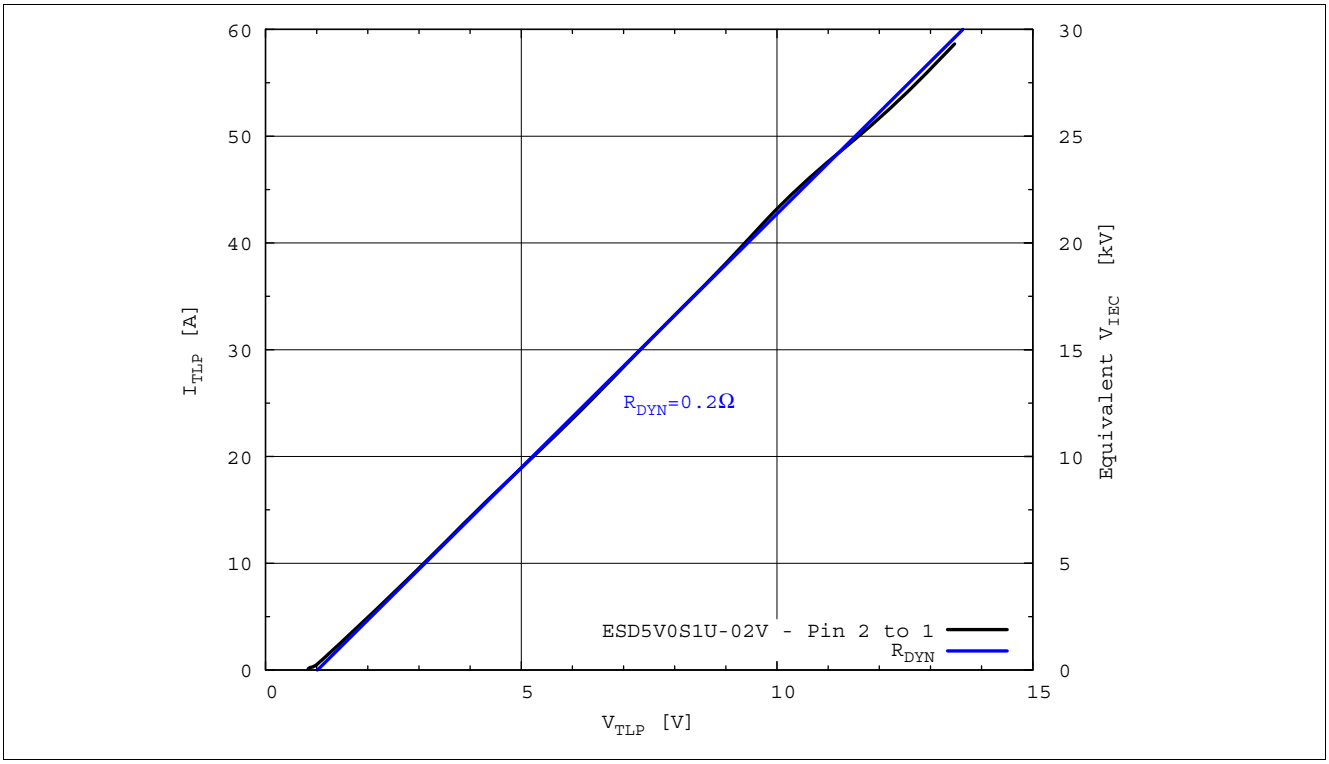


Figure 5 Forward TLP characteristics (Pin 2 to 1)

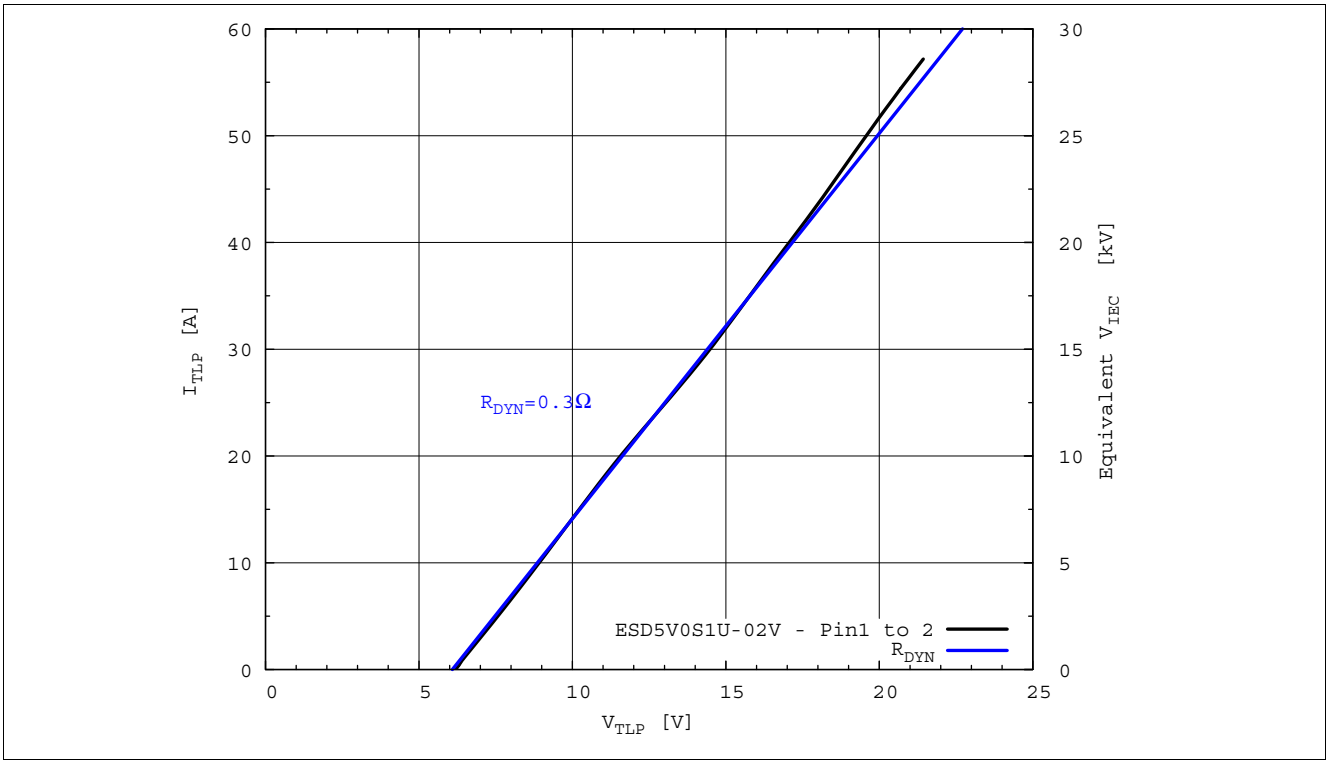


Figure 6 Reverse TLP characteristics (Pin 1 to 2)

4 Application Information

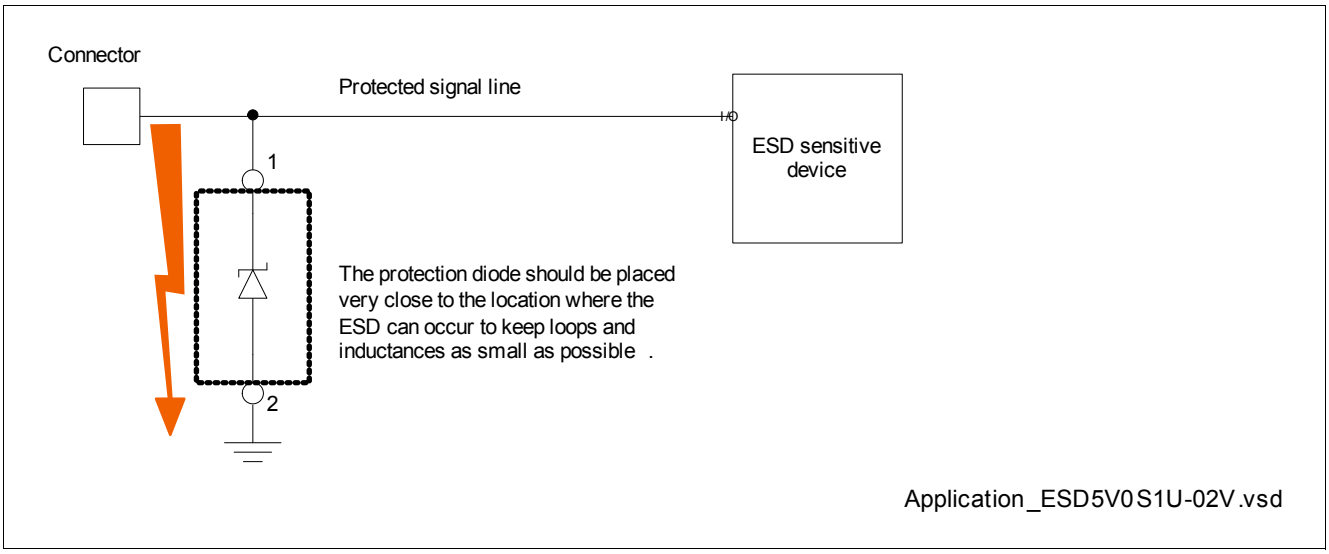


Figure 7 Single Channel, uni-directional ESD / Transient protection

5 Ordering information scheme (examples)

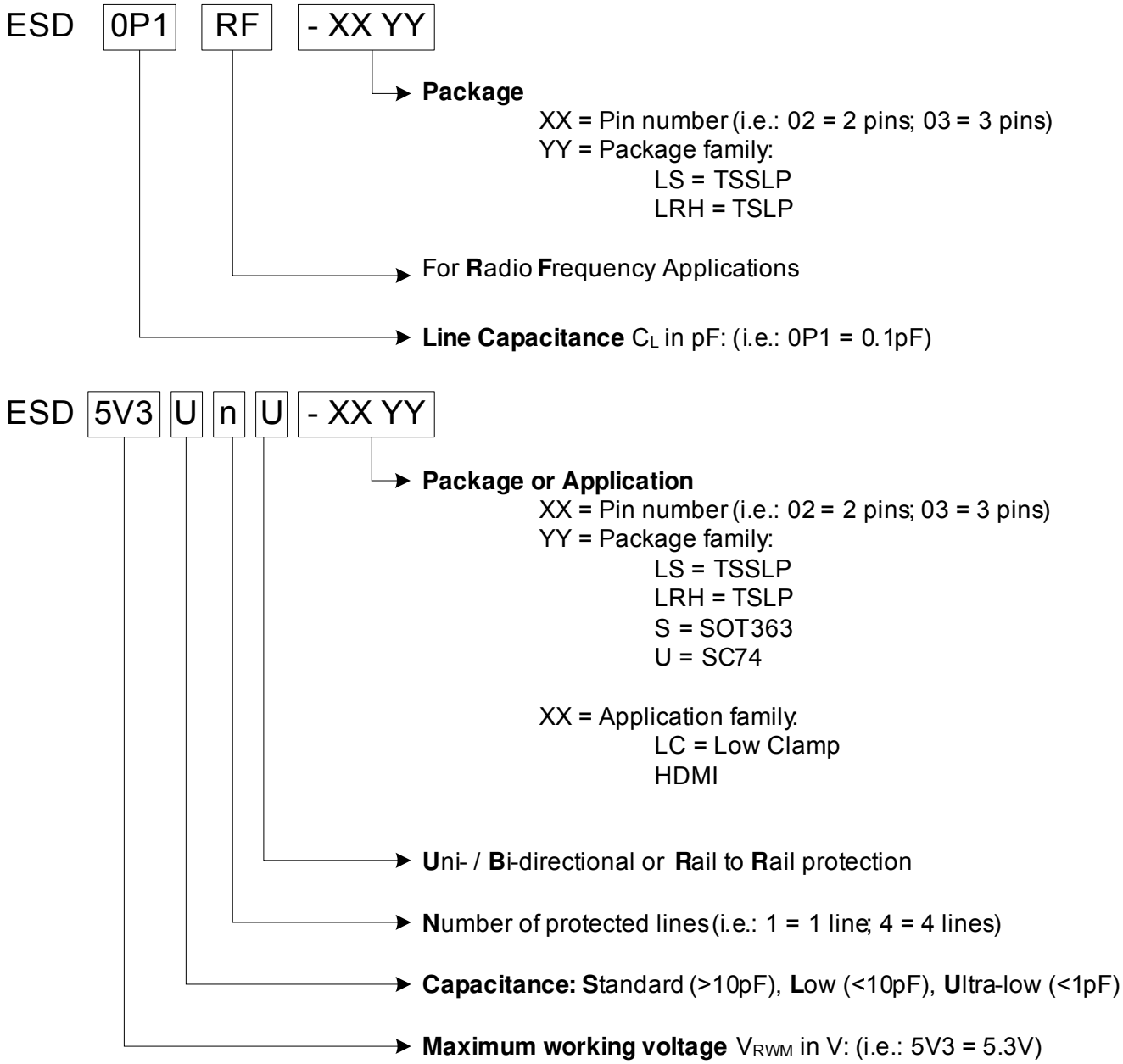


Figure 8 Ordering Information Scheme

6 Package Information

6.1 SC79 Package

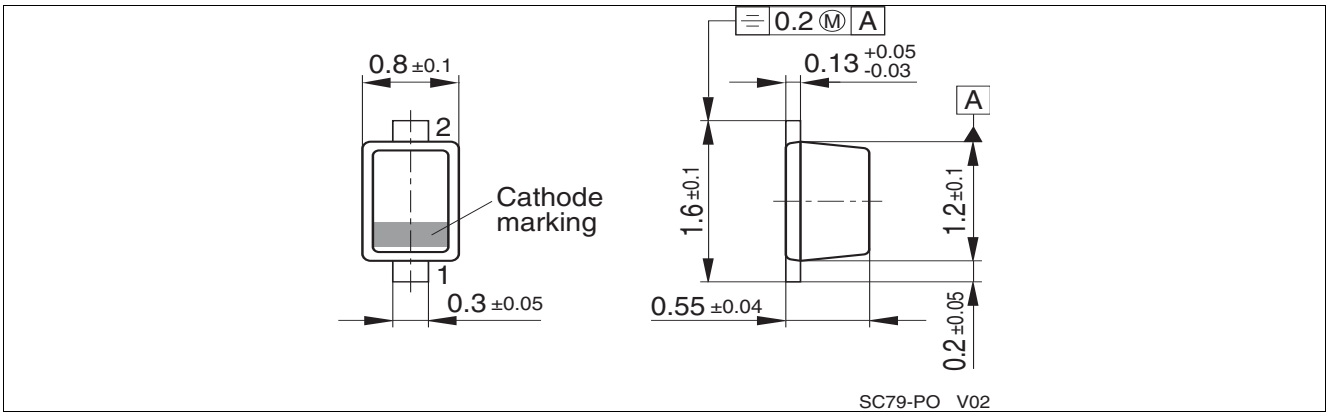


Figure 9 SC79: Package outline (dimension in mm)

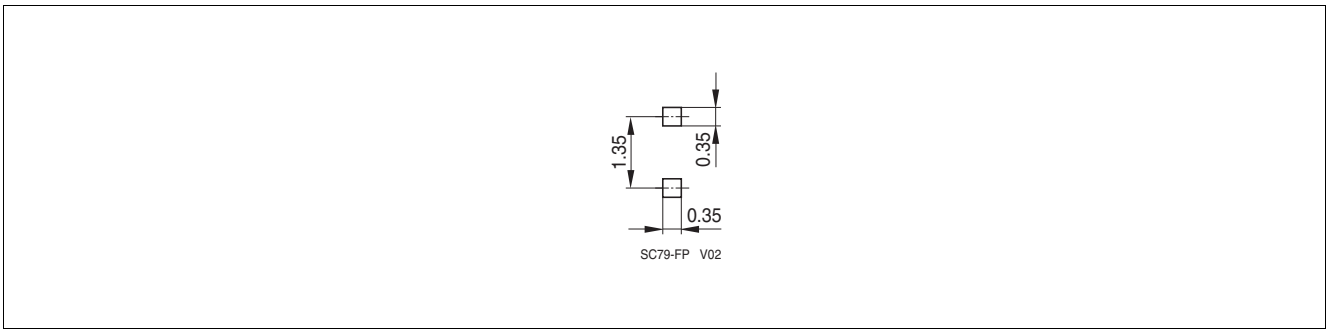


Figure 10 SC79: Footprint (dimension in mm)

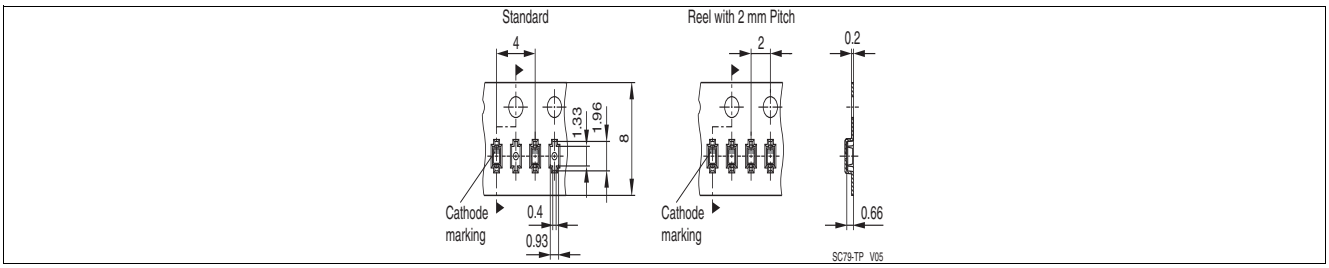


Figure 11 SC79: Packing (dimension in mm)

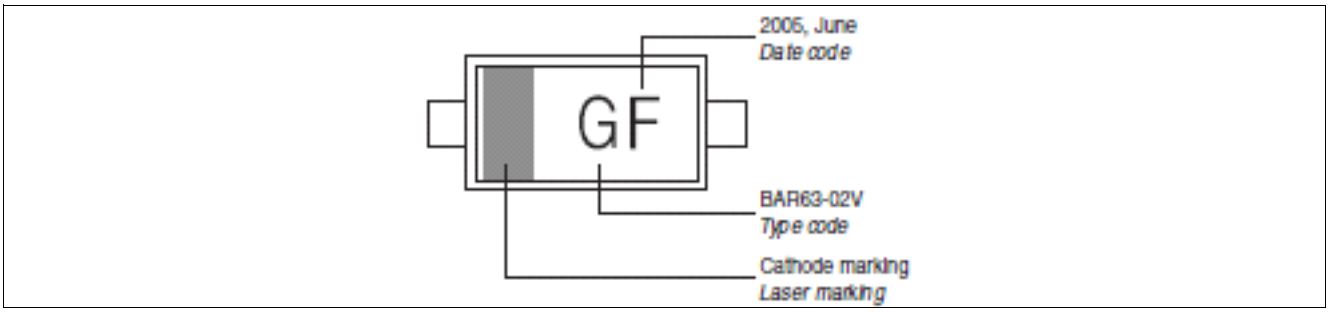


Figure 12 SC79: Marking (example)

7 Date Code Marking for SC79

one digit (SCD80, SC79, SC75[1)]) 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 13 Date Code marking for SC79 packages

References

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

Terminology

CES	Charactere Encoding Scheme
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_{FC}	Forward Clamping Voltage
V_R	Reverse voltage
V_{RWM}	Reverse working voltage maximum
V_{BR}	Breakdown voltage
R_{DYN}	Dynamic resistance

w w w . i n f i n e o n . c o m

Published by Infineon Technologies AG