

TVS Diodes

Transient Voltage Suppressor Diodes

ESD5V0L1B-02V

Bi-directional Low Capacitance TVS Diode

ESD5V0L1B-02V

Data Sheet

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Final

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Revision History

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

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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

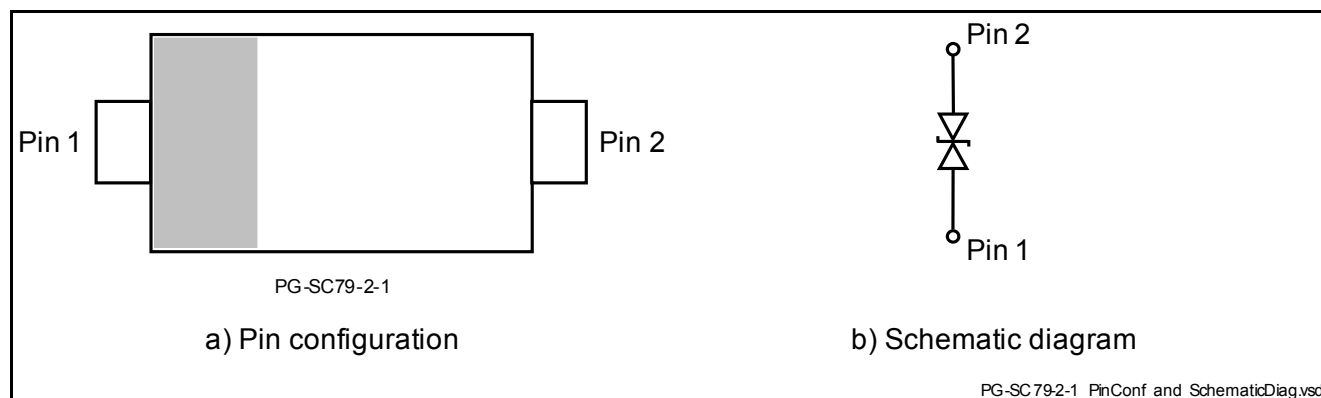


Figure 1 Pin configuration and schematic diagram

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 $T_A = 25\text{ °C}$, 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	°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 $T_A=25\text{ °C}$, unless otherwise specified

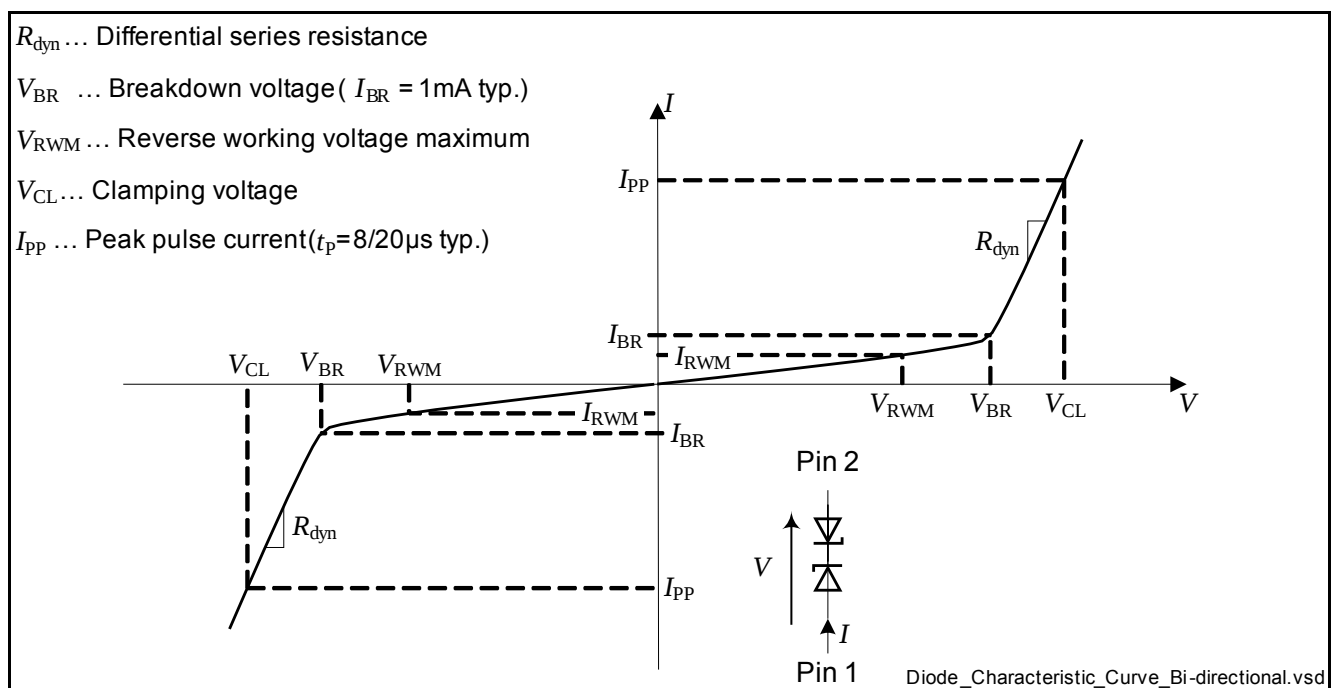

Figure 2 Definitions of electrical characteristics

Table 3 DC characteristics at $T_A = 25\text{ °C}$, 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	$I_R = 1\text{ mA}$
Reverse current	I_R	–	≤ 1	50	nA	$V_R = 3\text{ V}$

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

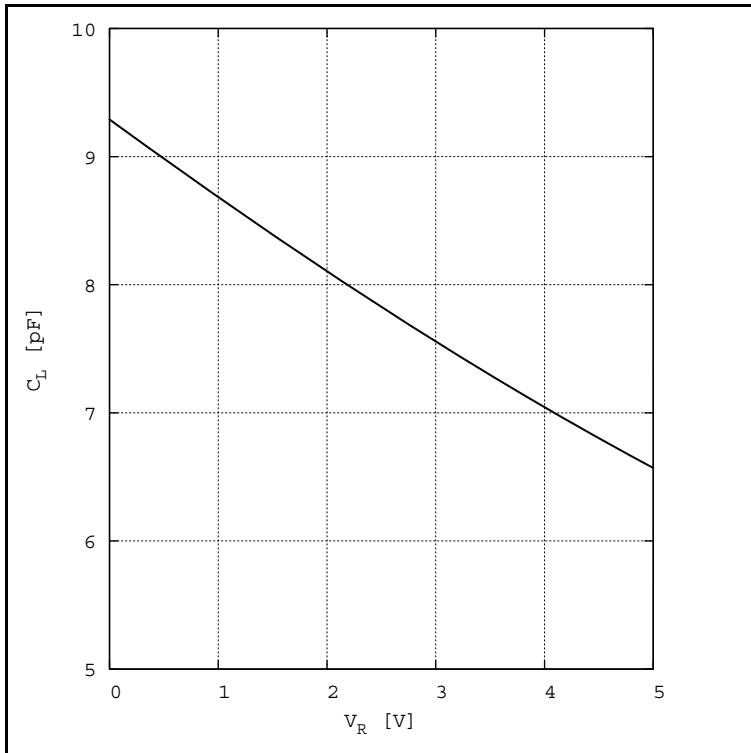


Figure 3 Capacitance characteristics: $C_L = f(V_R)$

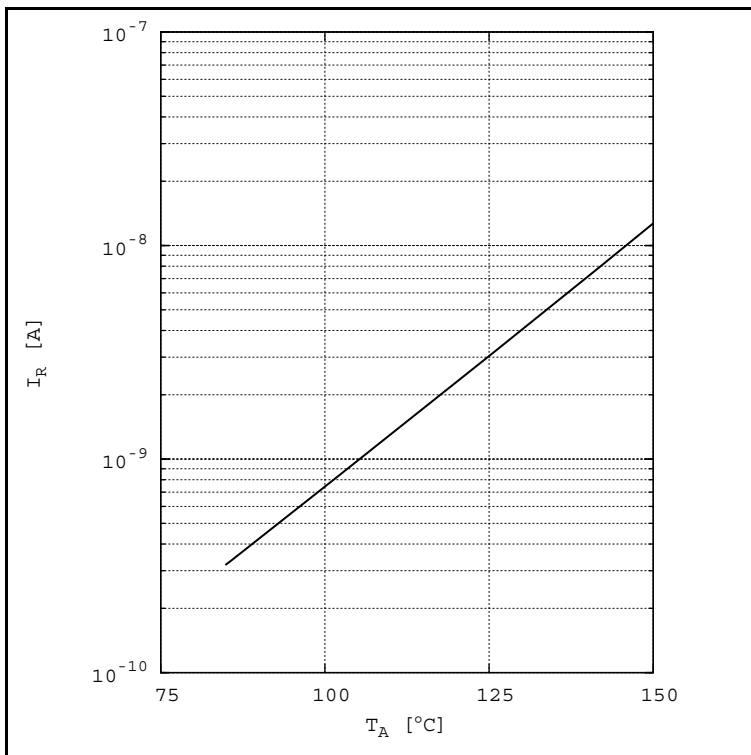


Figure 4 Reverse characteristics: $I_R = f(V_R)$

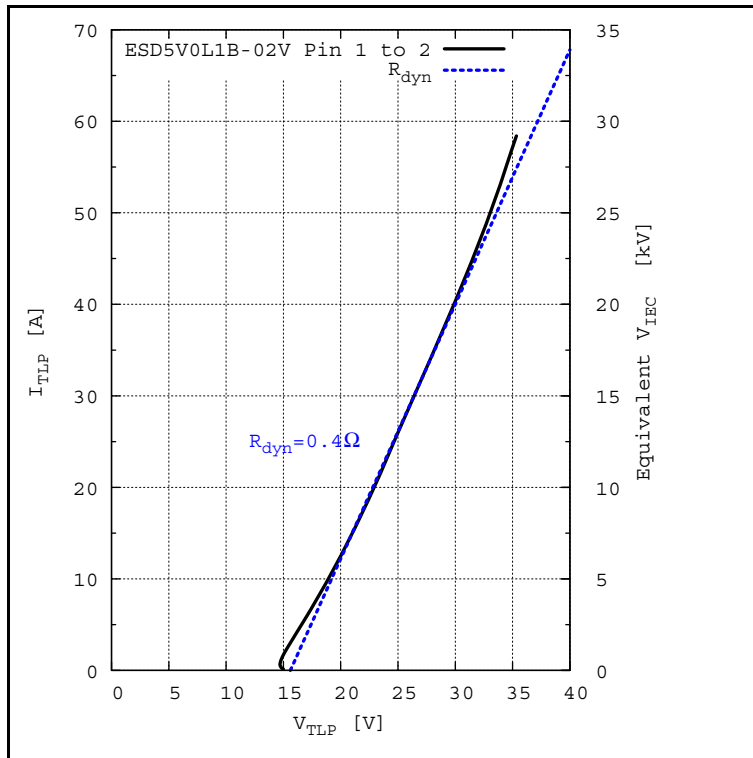


Figure 5 Reverse TLP characteristics

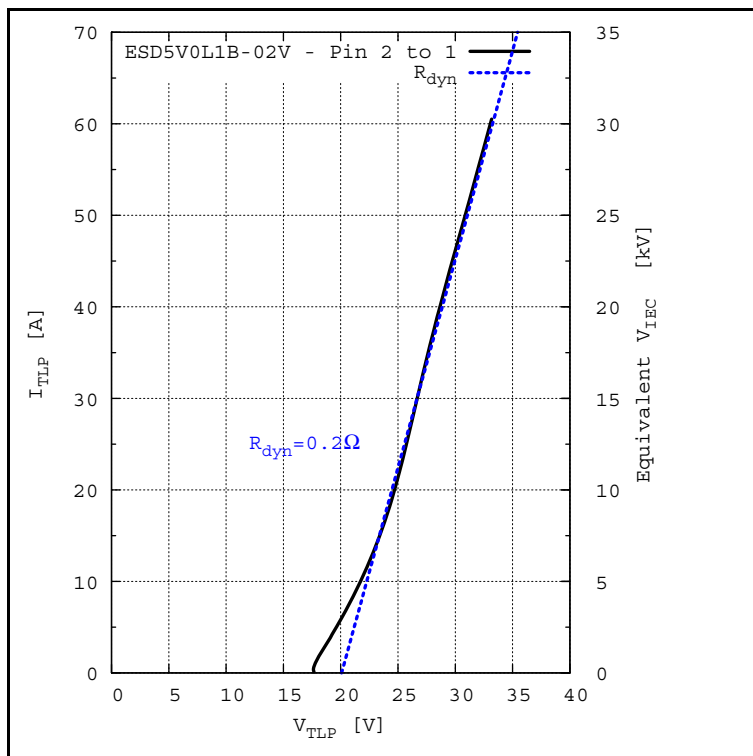


Figure 6 Forward TLP characteristics

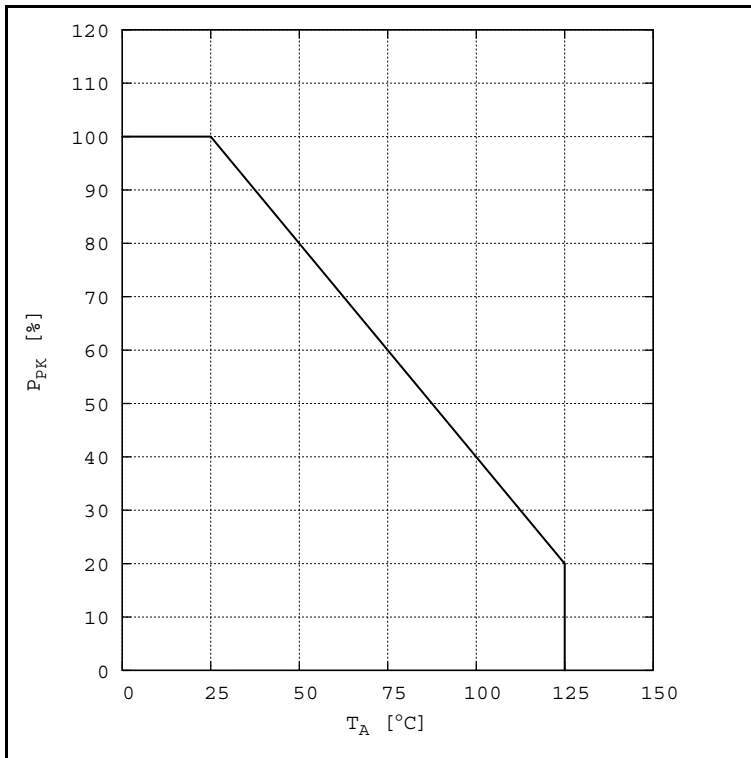


Figure 7 Power derating curve: $P_{PK} = f(T_A)$

4 Application Information

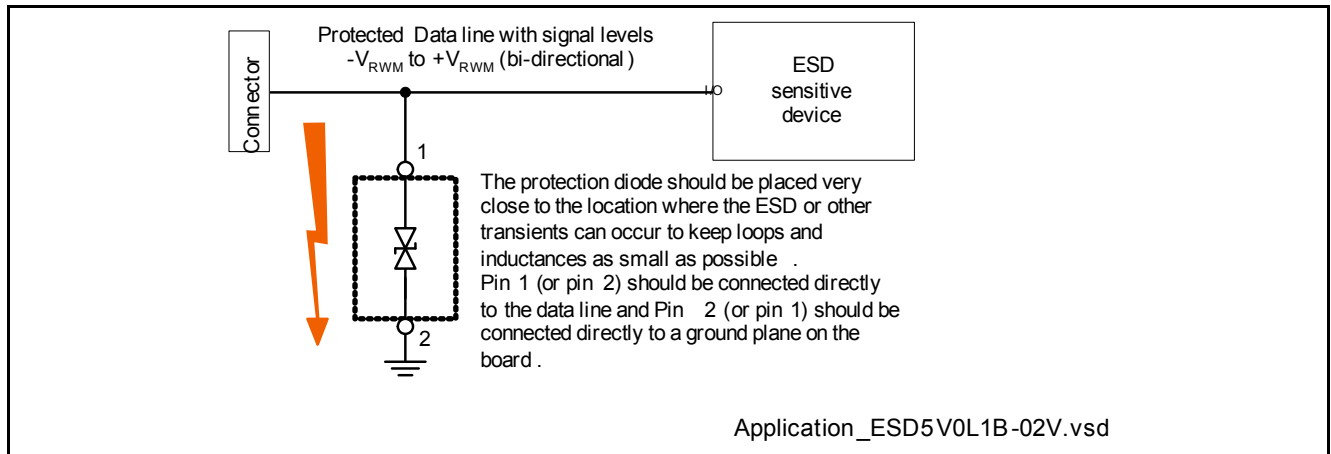


Figure 8 Single Channel, uni-directional TVS protection

5 Ordering information scheme

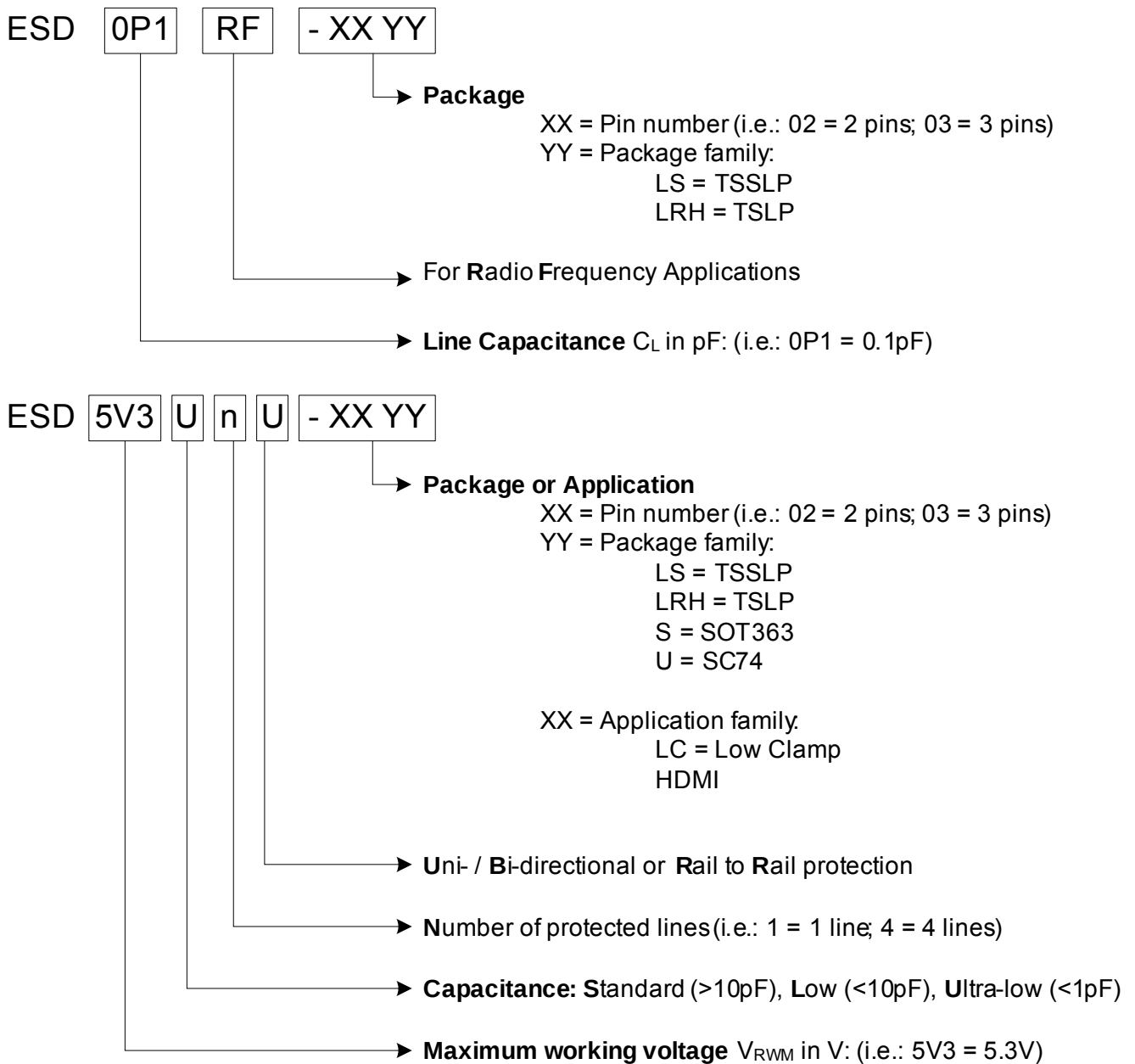


Figure 9 Ordering Information Scheme

6 Package Information

6.1 PG-SC79-2-1

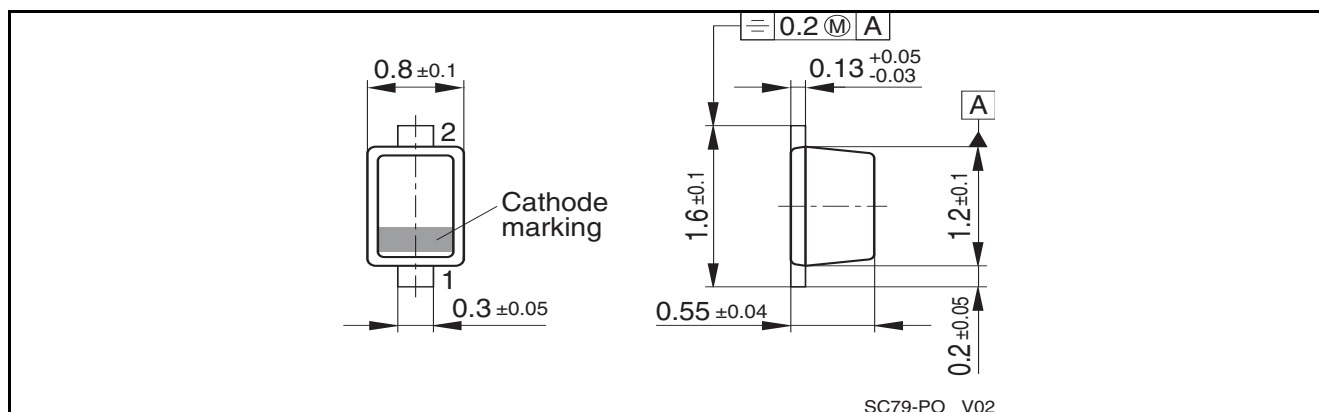


Figure 10 PG-SC79-2-1: Package Overview

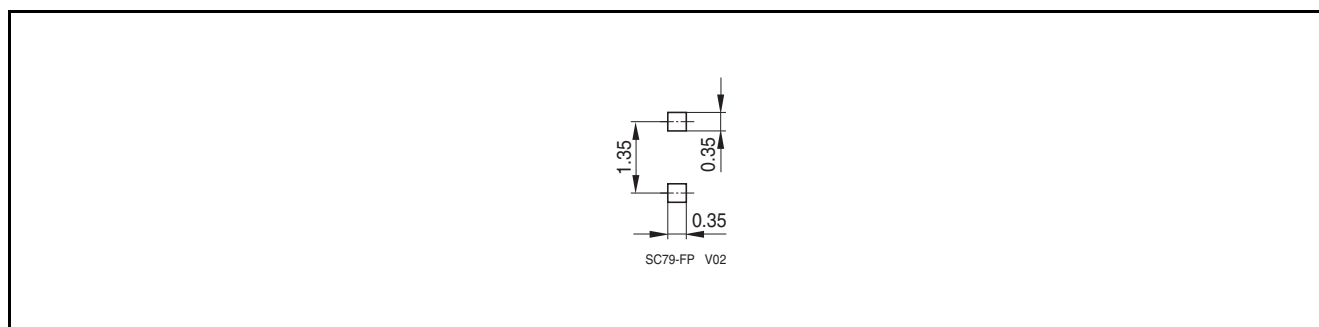


Figure 11 PG-SC79-2-1: Footprint

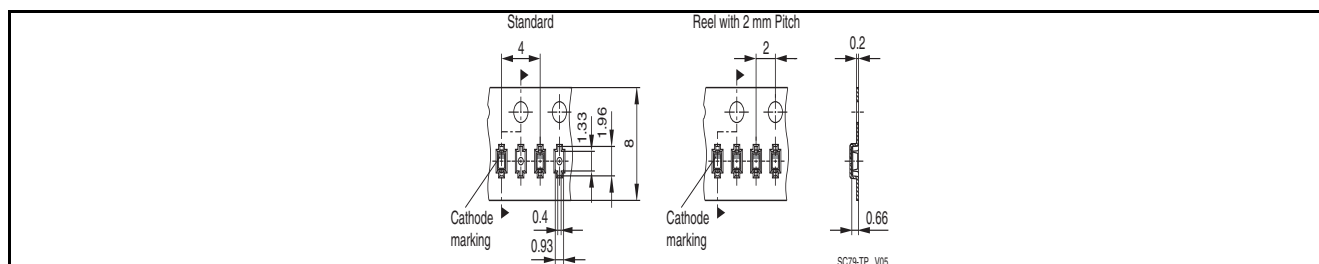


Figure 12 PG-SC79-2-1: Packing

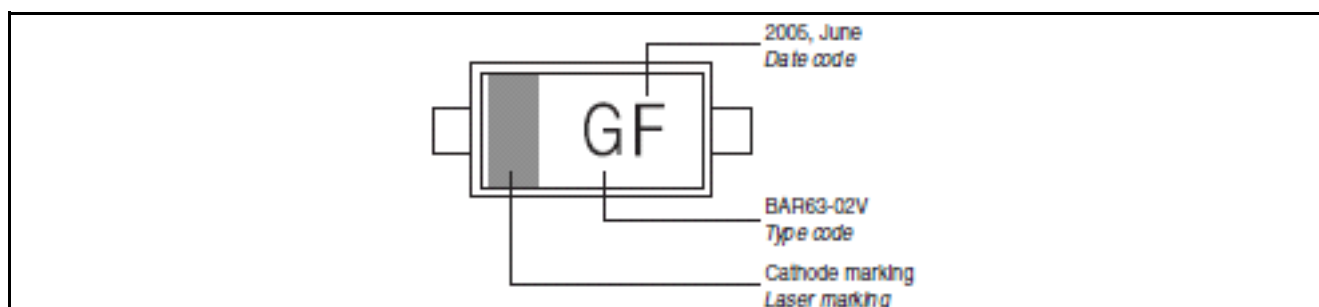


Figure 13 PG-SC79-2-1: Marking (example)

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

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