

# ESD Protection for Industrial Interfaces



Modern industrial networks rely on robust communication protocols and protection measures to ensure reliable data transmission and resilience against ESD and EOS in harsh environments.



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## High Performance

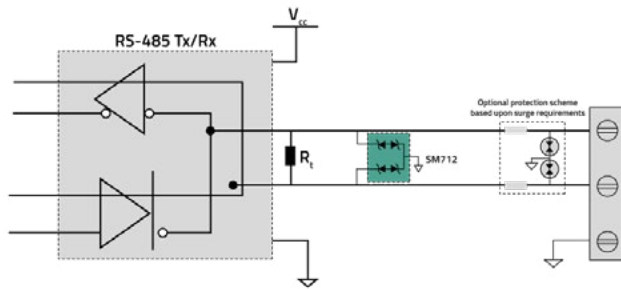
# ESD Protection for Industrial Interfaces

Modern industrial networks rely on robust communication protocols like RS-485, RS-232, CC-link, I/O link and CAN for data transmission. These networks operate in harsh electromagnetic environments and must be capable of withstanding electrical overstress (EOS) events without damage.

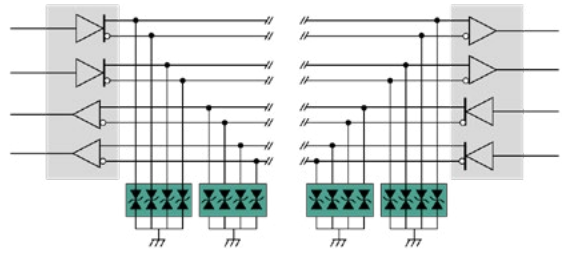
Semtech addresses these unique challenges related to Electrostatic Discharge (ESD) and Electrical Overstress (EOS) within industrial applications with its extensive product portfolio.



# 12V Protection for Industrial Interfaces



RS-485 protection circuit using SM712

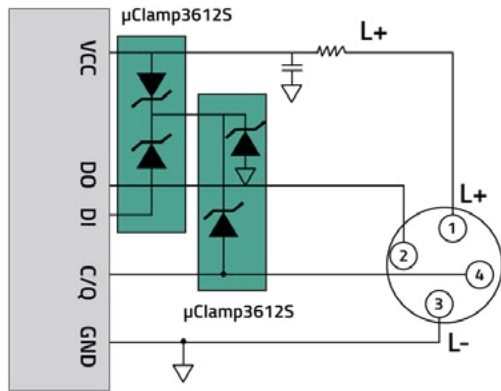


RS422 (SPI Extender)

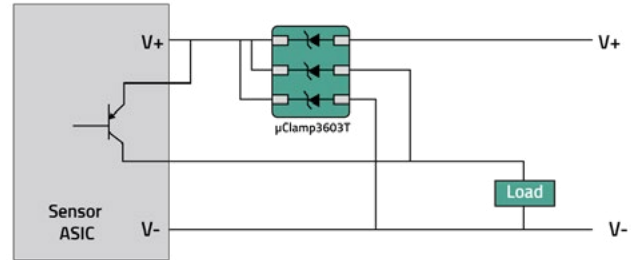
## Parts to protect 12V Industrial Interface

Interface to Protect	Part Number	VRWM (V)	Lines	ESD Rating (contact/air)	Surge (8x20µs)	Cap (pF) (max)	Package (mm)
12V Industrial Interface	<a href="#">LC04-12</a>	12	4	8kV / 15kV	100	15	6 x 9 x 1.35
	<a href="#">LCDA12</a>	12	2	8kV / 15kV	12	5	4.9 x 6.0 x 1.75
	<a href="#">LCDA12C-1</a>	12	1	8kV / 15kV	20	15	2.9 x 2.37 x 1.22
	<a href="#">SMDA12</a>	12	4	8kV / 15kV	12	150	4.9 x 6.0 x 1.75
	<a href="#">SMDA12C</a>	12	4	8kV / 15kV	12	120	4.9 x 6.0 x 1.75
	<a href="#">SMDA12C-7</a>	12	7	8kV / 15kV	12	120	4.9 x 6.0 x 1.75
	<a href="#">SMDA12C-8</a>	12	8	8kV / 15kV	12	120	8.6 x 6.0 x 1.75
	<a href="#">TClamp1282S</a>	12	2	30kV / 30kV	30	2.5	2.9 X 2.8 x 1.25
	<a href="#">TClamp1202P</a>	12	2	15kV / 20kV	100	12	2.0 x 2.0 x 0.6
	<a href="#">SM12</a>	12	2	8kV / 15kV	12	120	2.9 x 2.4 x 1.025
	<a href="#">SM712</a>	12	2	30kV / 30kV	21	75	2.9 x 2.4 x 1.025
	<a href="#">µClamp1201P</a>	12	1	8kV / 15kV	8	60	1.0 x 0.6 x 0.50
	<a href="#">µClamp1211T</a>	12	1	8kV / 12kV	-	7	1.0 x 0.6 x 0.40
	<a href="#">µClamp1211Z</a>	12	1	30kV / 30kV	7	25	0.6 x 0.3 x 0.25
	<a href="#">µClamp1261P</a>	12	1	30kV / 30kV	45	275	1.6 x 0.80 x 0.5
	<a href="#">µClamp1271P</a>	12	1	30kV / 30kV	45	275	1.6 x 1.0 x 0.5
	<a href="#">SMBJ12CA</a>	12	1	30kV / 30kV	151	NA	5.59 x 3.94 x 2.5
	<a href="#">RClamp1221PW</a>	12	1	10kV / 12kV	4	0.45	1.0 x 0.6 x 0.55
	<a href="#">µClamp1281ZV</a>	12	1	30kV / 30kV	30	400	1.0 x 0.6 x 0.25
	<a href="#">µClamp1211P</a>	12	1	8kV / 15kV	7	25	1.0 x 0.6 x 0.5
	<a href="#">RClamp1221ZA</a>	12	1	10kV / 18kV	4	0.45	0.6 x 0.3 x 0.25
	<a href="#">RClamp1265P</a>	12	4	25kV / 30kV	8	650	2.0 x 1.8 x 0.57
	<a href="#">µClamp1291ZV</a>	12	1	30kV / 30kV	30	400	1.0 X 0.6 X 0.25
<a href="#">RClamp1222B</a>	12	2	30kV / 30kV	10	0.8	1.6 x 1.6 x 0.6	
<a href="#">µClamp1291PW</a>	12	1	30kV / 30kV	10	90	1.0 x 0.6 x 0.55	

# 36V & 33V Protection for Industrial Interfaces



I/O link protection



Inductive proximity sensor protection

## Parts to protect 12V Industrial Interface

Interface to Protect	Part Number	VRWM (V)	Lines	ESD Rating (contact/air)	Surge (8x20 $\mu\text{s}$ )	Cap (pF) (max)	Package (mm)
33V & 36V Industrial Interface	<a href="#">μClamp3601P</a>	33	1	15kV / 20kV	2	35	1.0 x 0.6 x 0.5
	<a href="#">μClamp3612S</a>	33	2	30kV / 30kV	16	120	2.9 x 2.4 x 1.02
	<a href="#">SDC36</a>	33	2	8kV / 15kV	-	45	2.9 x 2.37 x 1.12
	<a href="#">SDC36C</a>	33	2	8kV / 15kV	4	120	2.9 x 2.6 x 1.2
	<a href="#">TDS3311P</a>	33	1	30kV / 30kV	35	175	1.6 x 1.6 x 0.55
	<a href="#">TDS3621P</a>	36	1	30kV / 30kV	24	80	1.6 x 1.6 x 0.55
	<a href="#">SMBJ33CA</a>	33	1	30kV / 30kV	56.5	NA	5.59 x 3.94 x 2.5
	<a href="#">μClamp3603T</a>	36	3	15kV / 20kV	2	50	1.7 x 1.0 x 0.4
	<a href="#">SM36</a>	36	2	8kV / 15kV	4	45	2.9 x 2.37 x 0.95
	<a href="#">TClamp3602P</a>	36	2	30kV / 30kV	20	4	2.0 x 1.0 x 0.55
	<a href="#">μClamp3661P</a>	36	1	30kV / 30kV	18	800	1.6 x 0.8 x 0.5
	<a href="#">μClamp3671P</a>	36	1	30kV / 30kV	18	150	1.6 x 1.0 x 0.5
	<a href="#">μClamp3673P</a>	36	3	30kV / 30kV	2	150	3.0 x 1.6 x 0.57
	<a href="#">SMBJ36CA</a>	36	1	30kV / 30kV	52	NA	5.59 x 3.94 x 2.5



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