

TVS Automotive Solutions



AEC-Q100 qualified TVS solutions featuring industry leading clamping voltage performance, high ESD immunity and low capacitance TVS arrays



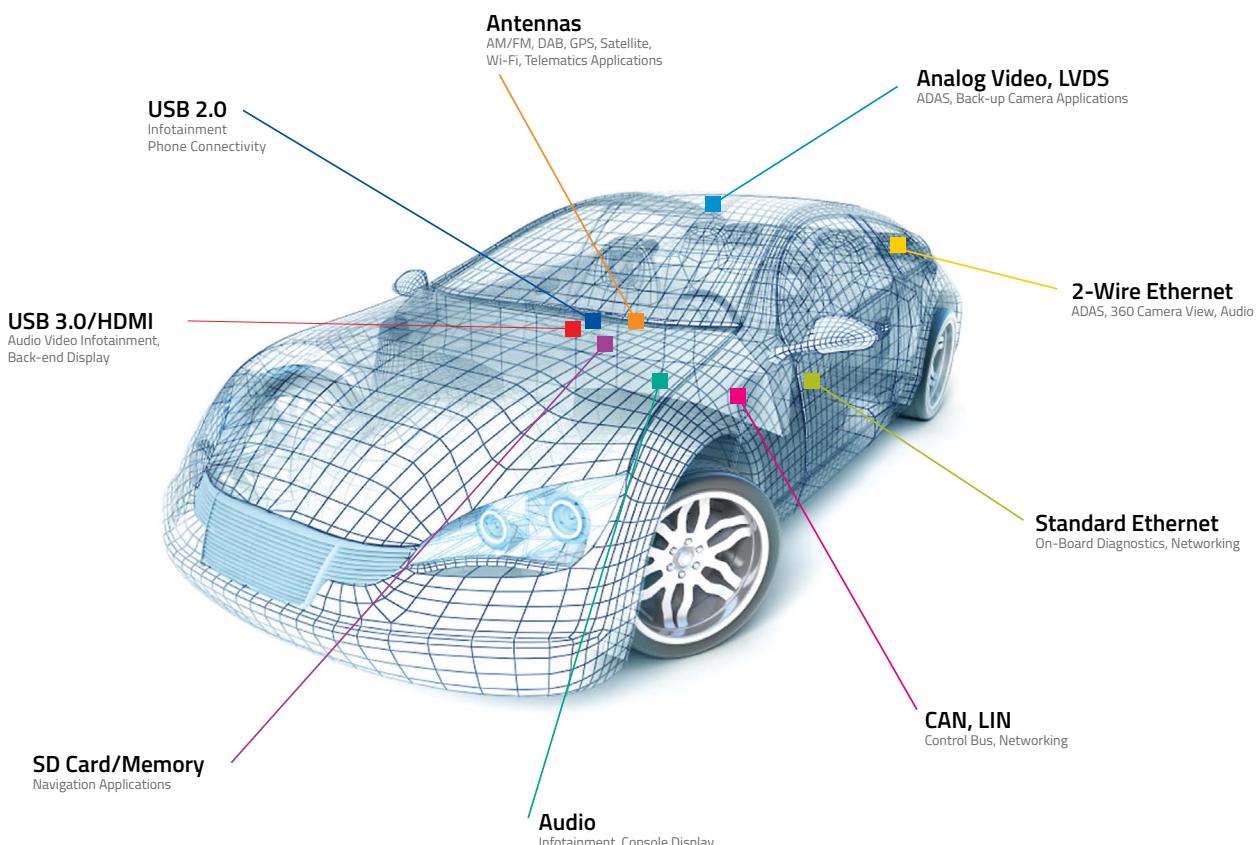
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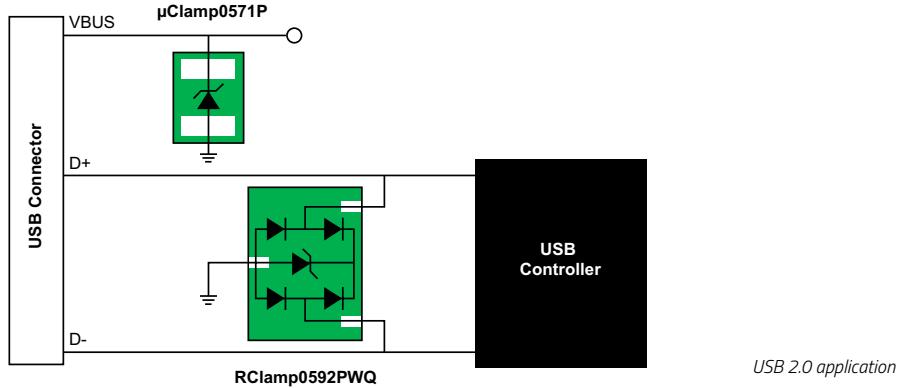
High Performance

Circuit Protection Automotive Products

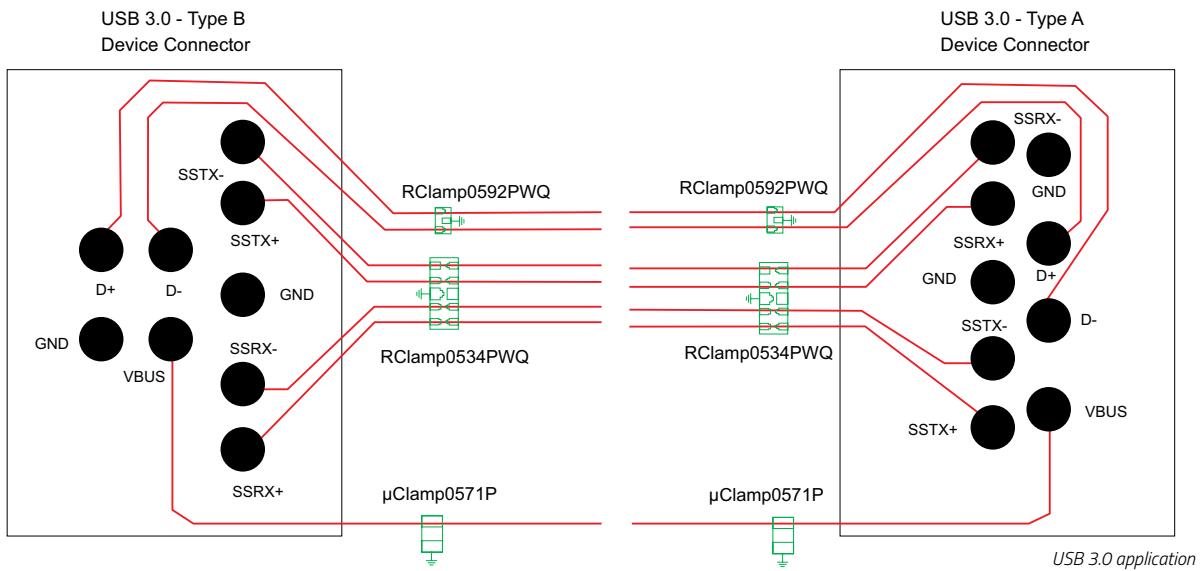
Semtech's industry leading TVS protection devices safeguard automotive data-line circuits from ESD and other overvoltage transients. With leading edge process technologies and applications expertise, Semtech is leading the way in automotive circuit protection.



USB Protection

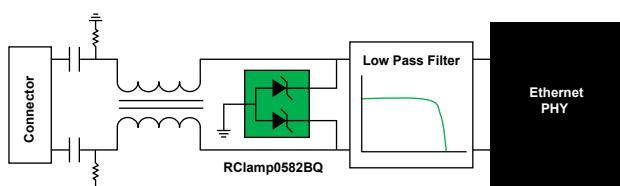


USB 2.0							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
USB 2.0	RClamp0592PWQ	5	2	±30kV / ±30kV	10A	1	1.0 x 0.6 x 0.55
	RClamp0531TQ	5	1	±20kV / ±12kV	4A	0.5	1.0 x 0.6 x 0.4
	RClamp0582BQ	5	2	±30kV / ±25kV	15A	1.2	1.6 x 1.6 x 0.75

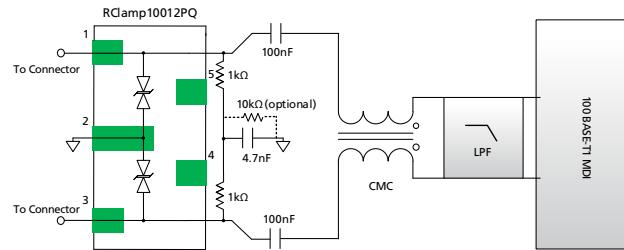


USB 3.0							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
USB 3.0	RClamp3552TQ	3.5	2	±20kV / ±17kV	4A	0.3	1.0 x 0.6 x 0.4
	RClamp0592PWQ	5	2	±30kV / ±30kV	10A	1	1.0 x 0.6 x 0.55
	RClamp0534PWQ	5	4	±15kV / ±10kV	4A	0.14	2.5 x 1.0 x 0.55

Ethernet Protection



2-Wire Ethernet application



2-Wire Ethernet (Line Side) application with RClamp10012PQ

**(Contact Semtech for more details)*

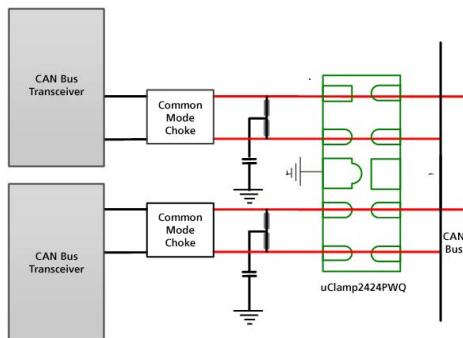
2-Wire Ethernet (PHY Side)

Interface to Protect	Part Number	V_{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
2-Wire Ethernet Single Twisted Pair	RClamp®01892PWQ	1.8	2	NA / $\pm 8kV$	2.5A	0.3	1.0 x 0.60 x 0.55
	RClamp0592PWQ	5	2	$\pm 30kV$ / $\pm 30kV$	10A	1	1.0 x 0.6 x 0.55
	RClamp0582BQ	5	2	$\pm 30kV$ / $\pm 25kV$	15A	1.2	1.6 x 1.6 x 0.75

2-Wire Ethernet (Line side)

Interface to Protect	Part Number	V_{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
2-Wire Ethernet Single Twisted Pair	EClamp10012PQ	30	2	$\pm 17kV$ / $\pm 12kV$	3A	1.2	2.0 x 1.0 x 0.60
	RClamp10012PQ	30	2	$\pm 17kV$ / $\pm 12kV$	3A	1.2	2.0 x 1.0 x 0.60
	RClamp10022PWQ	30	2	$\pm 25kV$ / $\pm 15kV$	6A	0.3	2.0 x 1.0 x 0.55

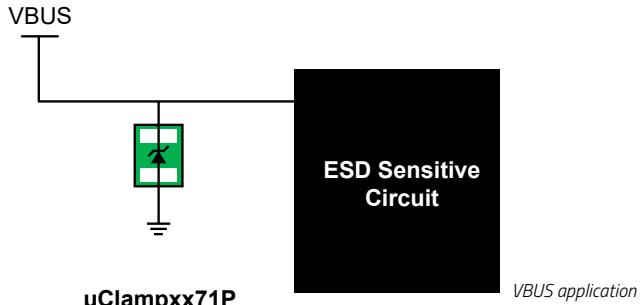
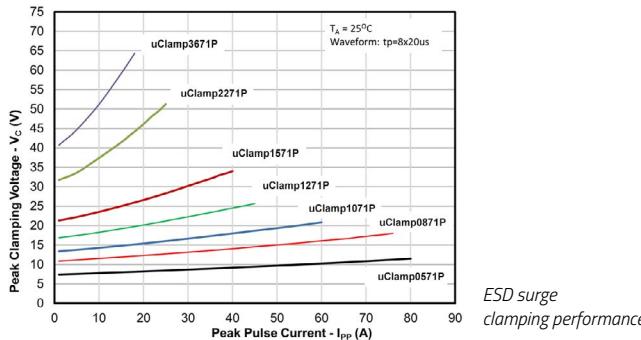
CAN Bus Protection



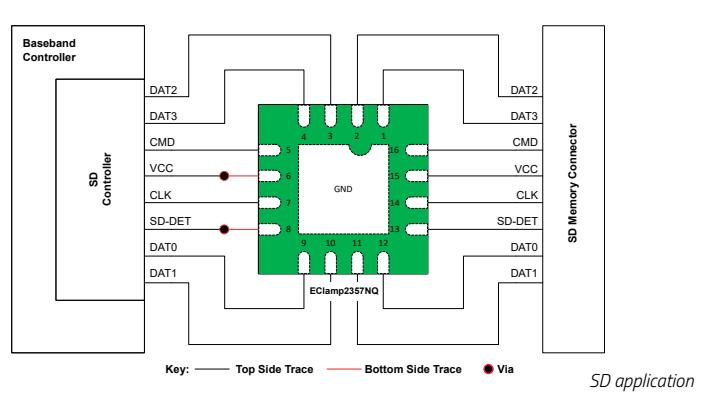
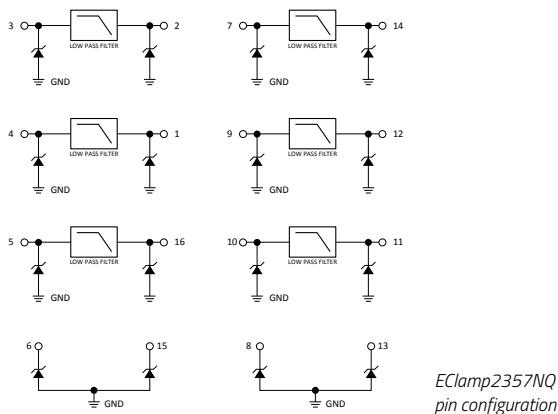
CAN Bus Protection

Part Number	V_{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
RClamp1631PQ	16	1	$\pm 30kV$ / $\pm 30kV$	8A	0.33	1.6 x 1.0 x 0.53
RClamp2831PQ	28	1	$\pm 30kV$ / $\pm 30kV$	7A	0.35	1.6 x 1.0 x 0.53
uClamp®2482PWQ	24	2	$\pm 30kV$ / $\pm 30kV$	5A	15	1.3 x 0.8 x 0.55
μClamp2424PWQ	24	4	$\pm 30kV$ / $\pm 30kV$	5A	15	2.5 x 1.0 x 0.55

VBUS/DC and SD Card Protection

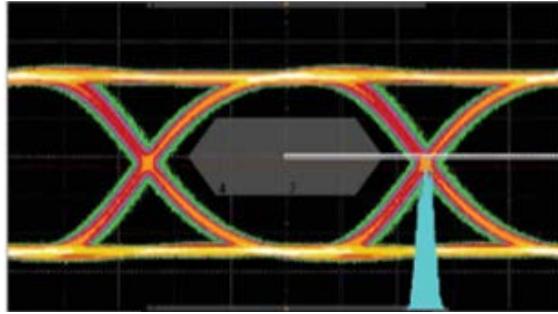


Qualified Single-line DC Bus Protection								
Type	Application	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
VBus Protection		μClamp®0571P	5	1	±30kV / ±30kV	80A	675	1.6 x 1.0 x 0.5
		μClamp0871P	8	1	±30kV / ±30kV	65A	475	1.6 x 1.0 x 0.5
		μClamp1071P	10	1	±30kV / ±30kV	60A	350	1.6 x 1.0 x 0.5
		μClamp1271P	12	1	±30kV / ±30kV	45A	275	1.6 x 1.0 x 0.5
		μClamp1571P	15	1	±30kV / ±30kV	40A	220	1.6 x 1.0 x 0.5
		μClamp1871P	18	1	±30kV / ±30kV	35A	220	1.6 x 1.0 x 0.5
		μClamp2271P	22	1	±30kV / ±30kV	25A	165	1.6 x 1.0 x 0.5
		μClamp2671P	26	1	±30kV / ±30kV	23A	155	1.6 x 1.0 x 0.5
		μClamp3671P	36	1	±30kV / ±30kV	18A	150	1.6 x 1.0 x 0.5
		TDS2211P	22	1	±30kV / ±30kV	40A	175	1.6 x 1.6 x 0.55
		TDS2201P	22	1	±30kV / ±8kV	16A	58	1.0 x 0.6 x 0.25

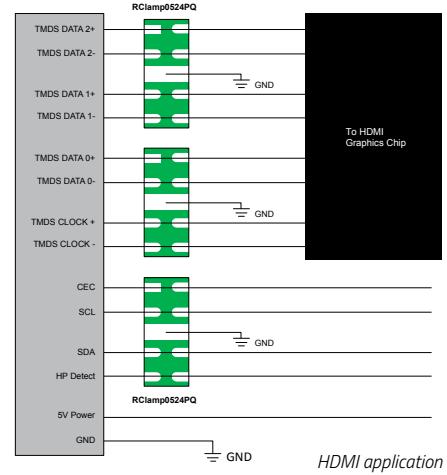


Filter Devices - TVS + EMC Filter								
Type	Application	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Filter Type	Cap (pF)	Pkg Size (mm)
SD Card		EClamp®2410PQ	5	6	±17kV / ±12kV	SD Card termination	15	4.0 x 1.6 x 0.58
		EClamp2357NQ	5	6	±20kV / ±12kV	RC filter SD Card termination	20	3.0 x 3.0 x 0.6

HDMI Protection



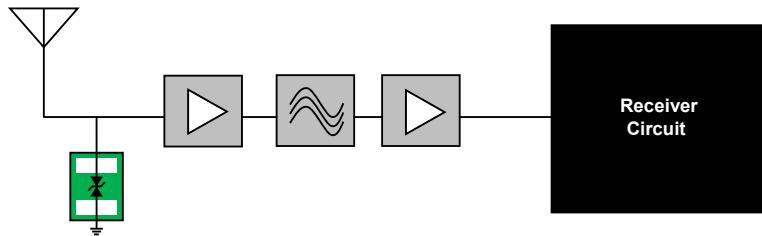
HDMI 1.4 eye pattern



HDMI application

HDMI, MIPI, MHL							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
HDMI, MIPI, MHL	RClamp0524PQ	5	4	±25kV / ±20kV	5A	0.6	2.5 x 1.0 x 0.5
	RClamp0534PWQ	5	4	±15kV / ±10kV	4A	0.14	2.5 x 1.0 x 0.55

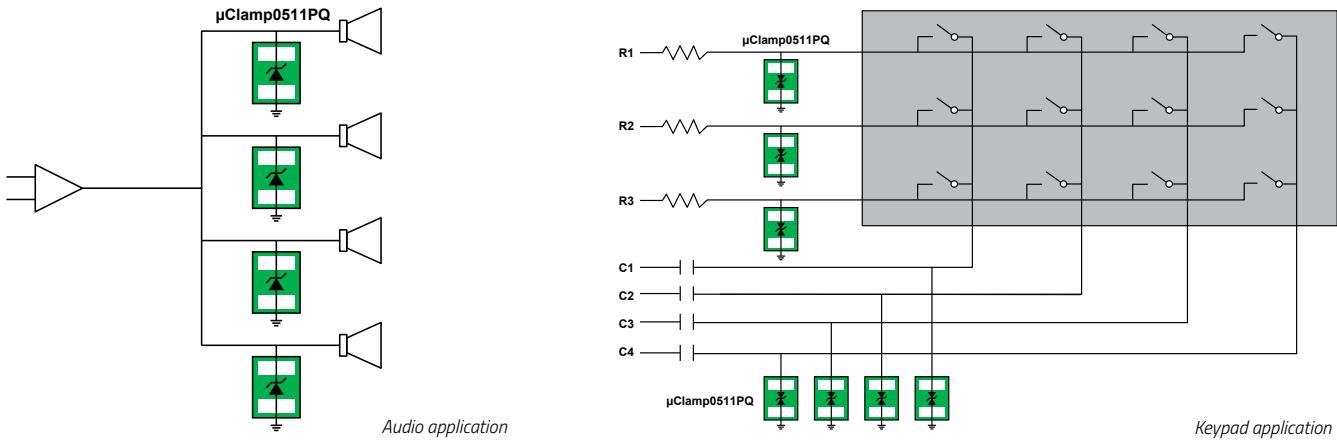
Antenna/RF Protection



Antenna application

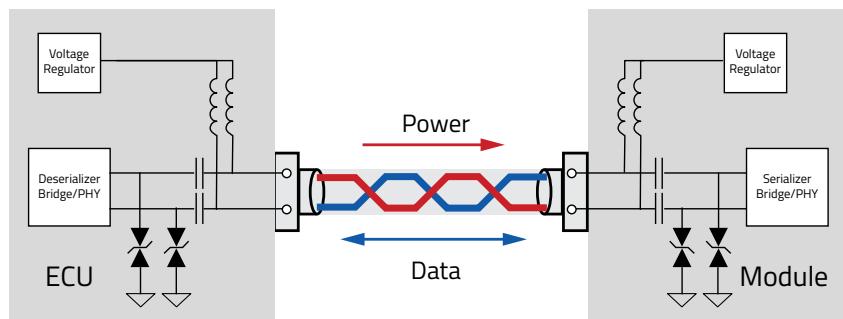
Antenna/RF							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
Antenna Interfaces	RClamp331PQ	3.3	1	±30kV / ±30kV	10A	0.35	1.0 x 0.6 x 0.5
	RClamp0531TQ	5	1	±20kV / ±12kV	4A	0.8	1.0 x 0.6 x 0.4
	RClamp0551PQ	5	1	±25kV / ±25kV	3A	0.45	1.0 x 0.6 x 0.5
	RClamp0561PQ	5.5	1	±18kV / ±15kV	2A	0.14	1.0 x 0.6 x 0.5
	RClamp0582BQ	5	2	±30kV / ±25kV	15A	1.2	1.6 x 1.6 x 0.75
	RClamp1521PQ	15	1	±15kV / ±8kV	4A	0.5	1.0 x 0.6 x 0.5
	RClamp1561PQ	15	1	±15kV / ±10kV	2A	0.25	1.0 x 0.6 x 0.5
	RClamp1631PQ	16	1	±30kV / ±30kV	8A	0.33	1.6 x 1.0 x 0.53
	RClamp2431TQ	24	1	±15kV / ±8kV	2A	0.5	1.0 x 0.6 x 0.4
	RClamp2831PQ	28	1	±30kV / ±30kV	7A	0.35	1.6 x 1.0 x 0.53

Audio and Touchkey/Keypad Protection



Touchkey/Keypad/Audio Protection							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
Audio	μClamp®0511PQ	5	1	±30kV / ±30kV	12A	75	1.0 x 0.6 x 0.5
Keypads, Touchbuttons, Control Lines	μClamp0301PQ	3.0	1	±30kV / ±25kV	5A	25	1.0 x 0.6 x 0.5
	μClamp3311PQ	3.3	1	±25kV / ±20kV	5A	12	1.0 x 0.6 x 0.5
	μClamp0511PQ	5	1	±30kV / ±30kV	12A	75	1.0 x 0.6 x 0.5

High speed SERDES



GMSL, FPD-Link, APIX, MIPI A-Phy, ASA							
Interface to Protect	Part Number	V _{RWM} (V)	Lines	ESD Rating (air/contact)	Surge (8x20μs)	Cap (pF)	Pkg Size (mm)
ADAS, Collision Avoidance, Break Assist; Emergency Breaking	RClamp®3331PQ	3.3	1	±30kV / ±30kV	10A	0.38	1.0 x 0.6 x 0.5
	RClamp3552TQ	3.5	2	±20kV / ±17kV	4A	0.35	1.0 x 0.6 x 0.4
	RClamp0534PWQ	5	4	±15kV / ±10kV	4A	0.14	2.5 x 1.0 x 0.55
	RClamp1561PQ	15	1	±15kV / ±10kV	2A	0.25	1.0 x 0.60 x 0.50
	RClamp1561PWQ	15	1	±15kV / ±10kV	2A	0.15	1.0 x 0.60 x 0.55
	RClamp1631PQ	16	1	±30kV / ±30kV	8A	0.33	1.6 x 1.0 x 0.53
	RClamp2831PQ	28	1	±30kV / ±30kV	7A	0.35	1.6 x 1.0 x 0.53



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