



TrEOS Protection –
ESD protection
without compromise

Best system-chip ESD protection for 10 Gbps-ready devices

The unique product family from NXP, the global leader in ESD protection, includes single- and multi-line devices, optimized for use with high-speed lines. The technology delivers the ideal combination of low capacitance, low clamping voltage, and high ESD robustness, to safeguard the systems of today and tomorrow.

FEATURES

- ▶ Ultra-low capacitance down to 0.10 pF typ
 - Supports SuperSpeed USB at 10 Gbps
- ▶ Extremely low clamping voltages
 - Ultra-low dynamic resistance down to 0.10 Ω typ
 - Deep snap-back technology
 - Extremely fast switching times
 - Safeguards sensitive SoCs
- ▶ High ESD and surge robustness
 - Up to 20 kV contact discharge exceeds IEC 61000-4-2, level 4
 - Up to 9 A (8/20 μ s pulse IEC61000-4-5)

APPLICATIONS




- ▶ Ultra-high-speed data lines including USB 3.1 at 10 Gbps and HDMI 2.0
- ▶ Interface lines with very sensitive I/Os
- ▶ Generic ESD protection across the board

PACKAGE OPTIONS

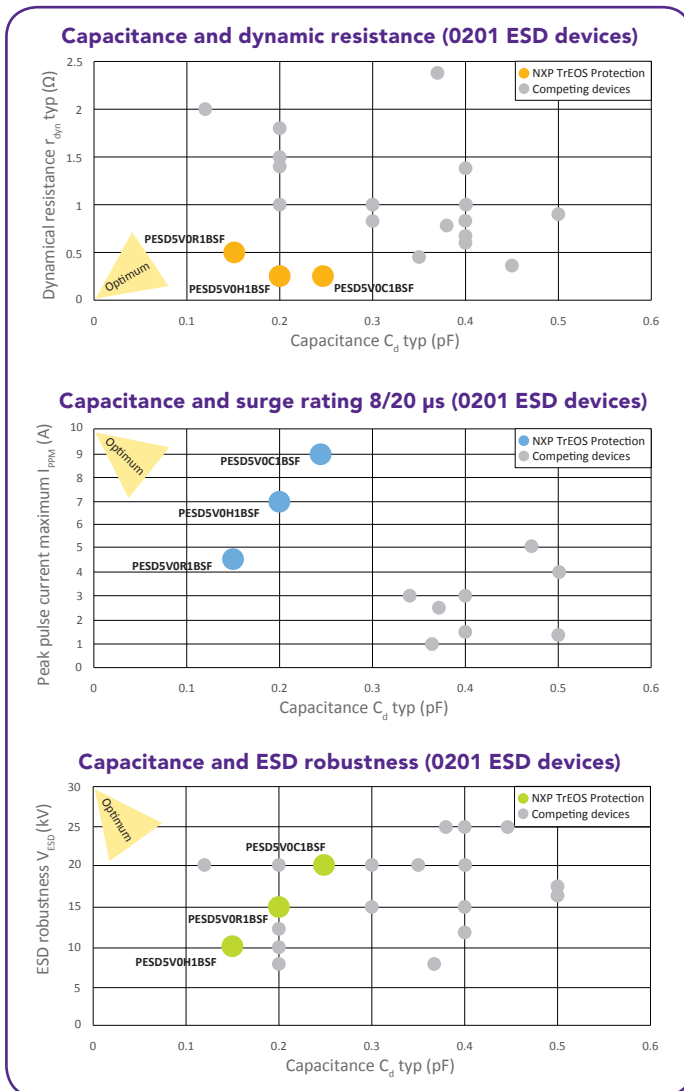
TrEOS Protection devices are available in small, multi-line packages or in a tiny single-line 0603 (0201-inch) package.



Selection guide

Package	Type	V_{RWM} (V)	Configuration	$C_{D\text{ typ/max}}$ (pF)	Size (mm)	$V_{ESD\ IEC}$ 61000-4-2 (kV)	I_{PPM} for 8/20 μ s surge pulse (A)	R_{DYN} (Ω)
 DSN0603-2	PESD5V0R1BSF	5	1 x bidirectional	0.1/ 0.15	0.6 x 0.3 x 0.3	10	4.5	0.45
	PESD5V0H1BSF	5	1 x bidirectional	0.15/ 0.19		15	7	0.25
	PESD5V0C1BSF	5	1 x bidirectional	0.2/ 0.25		20	9	0.23
	PESD5V0C1USF	5	1 x unidirectional	0.45/ 0.5		20	9	0.10
 DFN2510A-10	PUSB3FR4	5	4 x unidirectional	0.29/ 0.34	2.5 x 1 x 0.5	15	7	0.27
 DFN2111-7	PUSB3AB6	5	6 x bidirectional	0.15/ 0.2	2.1 x 1.1 x 0.5	15	7	0.40
	PUSB3FR6	5	6 x unidirectional	0.35/ 0.4		15	7	0.29

Benchmark performance: Single-line devices



Benchmark performance: Multi-line device

Device ruggedness: ESD gun test with standard USB 3.1 interface. The NXP TrEOS Protection PUSB3FR4 device absorbs the most pulse energy and safeguards the SoC. The same SoC was damaged, using an advanced snap-back competitor product, at half the IEC voltage.

Type number	$V_{ESD\ contact}$ (kV)	Minimum system survival of most sensitive pin (kV)
NXP TrEOS Protection PUSB3FR4	15	+10
Competing device	15	+5
Device with no protection	-	+2

RESOURCES & ORDERING
Visit: www.nxp.com/circuit-protection

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Date of release: May 2015

Document order number: 9397 750 17654

Printed in the Netherlands