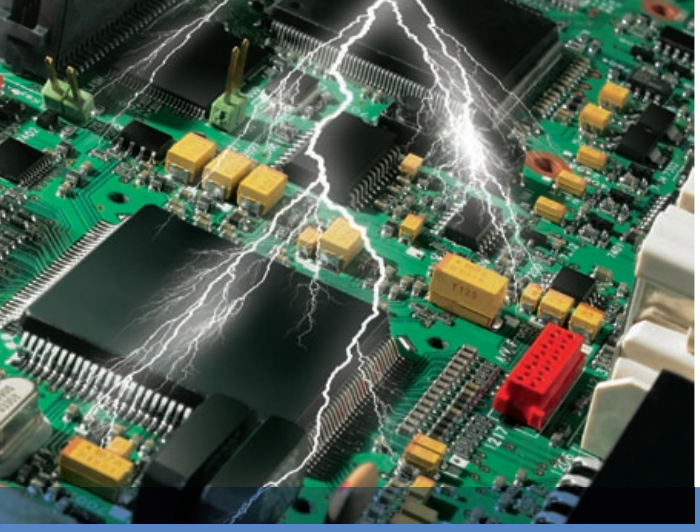
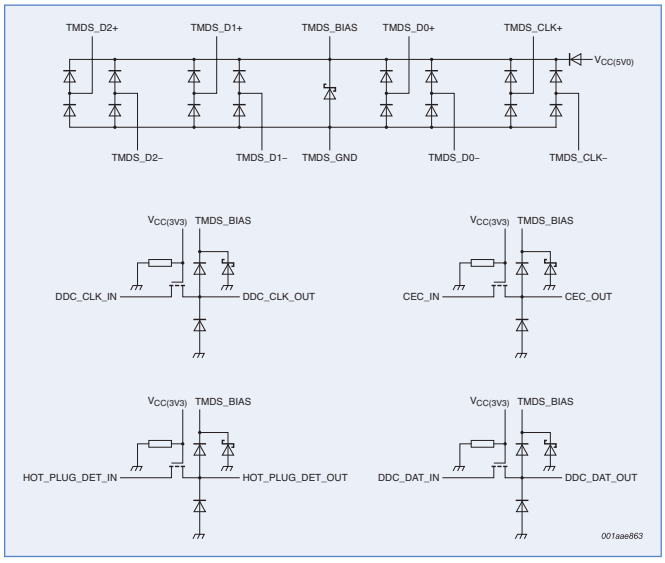
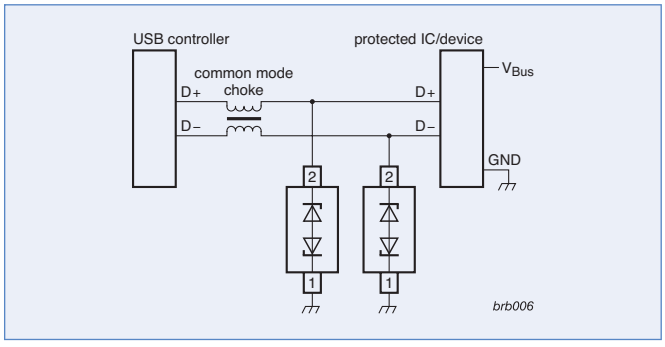


ESD protection
EMI filter
Level shifter and buffer

Interface protection products selection guide



ESD protection for HDMI transceivers with integrated level shifter IP4776CZ38



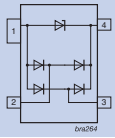
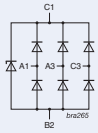
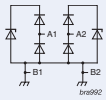
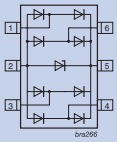
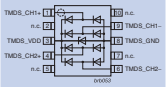
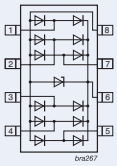
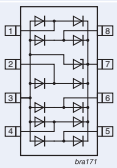
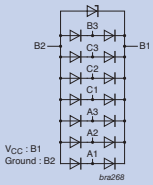
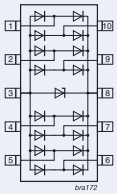
USB2.0 protection with PESD5V0U1BL in SOD882

Portfolio key features

- Level shifting, buffering, ESD protection, termination, pull-up resistors, EMI filtering
- Superior size / performance ratio
- Fully integrated passive and active components
- Lowest line capacitance for high-speed interfaces, C_{line} = 1.0 pF
- High-level ESD protection in compliance with IEC 61000-4-2, level 4
- Lead-free products

founded by Philips

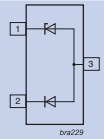
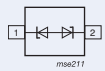
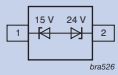
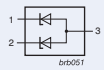
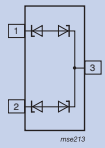
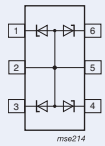
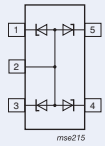
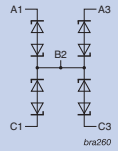
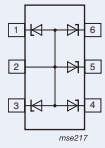
Rail-to-Rail ESD protection diodes, ultra low capacitance < 5 pF

Number of protected lines	I_R @ V_R max (µA)	(V)	C_{line} typ (pF)	ESD rating* max (kV)	Configuration	Type	Package	Size (mm)
2	0.1	3	1	8		PRTR5V0U2X	SOT143B	2.9 x 1.3 x 1.0
	0.1	3	1.8	12		**PRTR5V0U2AX**		
3	0.1	3	4	8		IP4059CX5/LF	5 ball CSP	1.34 x 0.96 x 0.65
	0.1	3	1.3	15		**IP4359CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.65
4	0.1	3	1	8		**PRTR5V0U4Y**	SOT363 (SC-88)	2.0 x 1.25 x 0.95
						PRTR5V0U4D	SOT457 (SC-74)	2.9 x 1.5 x 1.0
						IP4221CZ6-S	SOT886 (XSON6)	1.45 x 1.0 x 0.5
	1.0	3	0.7	8		IP4280CZ10	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
6	0.1	3	1	8		PRTR5V0U6S	SOT96 (SO8)	4.9 x 3.9 x 1.75
	0.1	3	1	8		PRTR5V0U6AS		
7	0.1	3	4	8		IP4067CX9/LF	9 ball CSP	1.52 x 1.46 x 0.65
8	0.1	3	1	8		PRTR5V0U8S	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1

* acc. to IEC 61000-4-2 (contact discharge)

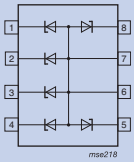
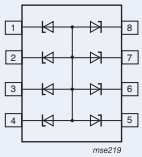
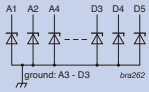
types in **bold red** represent new products

ESD protection diodes, very low capacitance < 25 pF

Number of protected lines uni-	bi- directional	I_{RM} max (µA)	@ V_{RWM} (V)	C_{line} typ (pF)	P_{PP}* max (W)	ESD rating** max (kV)	Configuration	Type	Package	Size (mm)
1		2	3.3	0.6	80	30		PESD3V3U1UT	SOT23	2.9 x 1.3 x 1.0
		1	5	0.6	80	30		PESD5V0U1UT		
		0.05	12	0.6	200	30		PESD12VU1UT		
		0.05	15	0.6	200	30		PESD15VU1UT		
		0.05	24	0.6	200	23		PESD24VU1UT		
	1	0.1	5	2.9	25	10		**PESD5V0U1BA**	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		0.1	5	2.9	25	10		**PESD5V0U1BB**	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		0.1	5	2.9	25	10		**PESD5V0U1BL**	SOD882	1.0 x 0.6 x 0.5
	1	0.05	15 (diode 1)	13	160	23		PESD1LIN	SOD323 (SC-76)	1.7 x 1.25 x 0.95
			24 (diode 2)							
2	1	0.3	3.3	22	30	15		PESD3V3L2UM	SOT883 (SC-101)	1.0 x 0.6 x 0.5
		0.025	5	16	30	15		PESD5V0L2UM		
	2	0.1	5	2.8	25	10		**PESD5V0U2BT**	SOT23	2.9 x 1.3 x 1.0
		0.05	24	11	200	23		PESD1CAN		
		0.01	24	25	230	30		**PESD2CAN**		
		0.05	24	11 ***	200	23		**PESD1FLEX**		
4	3	0.3	3.3	22	30	20		***PESD3V3L4UF***	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		0.025	5	16	30	20		***PESD5V0L4UF***		
		0.3	3.3	15	16	10		***PESD3V3V4UF***		
		0.025	5	12	16	10		***PESD5V0V4UF***		
		0.3	3.3	22	30	20		PESD3V3L4UG	SOT353 (SC-88A)	2.0 x 1.25 x 0.95
		0.025	5	16	30	20		PESD5V0L4UG		
		0.3	3.3	15	16	10		PESD3V3V4UG		
		0.025	5	12	16	10		PESD5V0V4UG		
		0.3	3.3	22	30	20		PESD3V3L4UW	SOT665	1.6 x 1.2 x 0.55
		0.025	5	16	30	20		PESD5V0L4UW		
		0.3	3.3	15	16	10		PESD3V3V4UW		
		0.025	5	12	16	10		PESD5V0V4UW		
	4	0.01	5	16	-	8		IP4043CX5/LF	5 ball CSP	1.12 x 1.12 x 0.65
5	4	0.3	3.3	22	25	20		***PESD3V3L5UF***	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		0.025	5	16	25	20		***PESD5V0L5UF***		
		0.3	3.3	22	25	20		PESD3V3L5UY	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		0.025	5	16	25	20		PESD5V0L5UY		
		0.3	3.3	22	25	20		PESD3V3L5UV	SOT666	1.6 x 1.2 x 0.55
		0.025	5	16	25	20		PESD5V0L5UV		

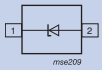
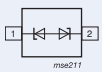
types in **bold red** represent new products
types in ***bold red italic underlined*** represent products in development

ESD protection diodes, very low capacitance < 25 pF (continued)

Number of protected lines uni-	bi- directional	I_{RM} @ max (µA)	V_{RWM} (V)	C_{line} typ (pF)	P_{PP}* max (W)	ESD rating** max (kV)	Configuration	Type	Package	Size (mm)
6	5	0.025	5	16	35	20		PESD5V0L6US	SOT96 (SO8)	4.9 x 3.9 x 1.75
		0.025	5	16	35	20		PESD5V0L6UAS	SOT505 (TSSOP8)	3.0 x 3.0 x 1.1
	7	0.025	5	7	35	20		PESD5V0L7BS	SOT96 (SO8)	4.9 x 3.9 x 1.75
								PESD5V0L7BAS	SOT505 (TSSOP8)	3.0 x 3.0 x 1.1
16	15	0.01	3	15	-	15		IP4080CX20/LF	WLCSP	2.51 x 2.01 x 0.65

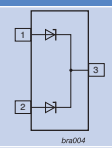
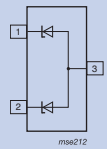
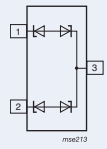
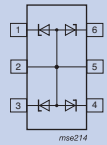
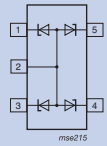
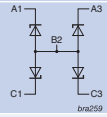
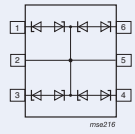
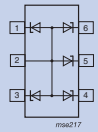
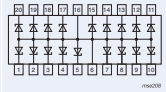
* 8/20 µs surge pulse acc. to IEC 61000-4-5
** acc. to IEC 61000-4-2 (contact discharge)
*** f = 5 MHz; V_R = 0 V

ESD protection diodes, standard capacitance

Number of protected lines uni-	bi- directional	I_{RM} @ max (µA)	V_{RWM} (V)	C_{line} typ (pF)	P_{PP}* max (W)	ESD rating** max (kV)	Configuration	Type	Package	Size (mm)
1		2	3.3	200	150	30		PESD3V3S1UL	SOD882	1.0 x 0.6 x 0.5
		1	5	150	150	30		PESD5V0S1UL		
		0.05	12	38	150	30		PESD12VS1UL		
		0.05	15	32	150	30		PESD15VS1UL		
		0.05	24	23	150	23		PESD24VS1UL		
		2	3.3	207	330	30		PESD3V3S1UB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		1	5	152	260	30		PESD5V0S1UB		
		0.05	12	38	180	30		PESD12VS1UB		
		0.05	15	32	160	30		PESD15VS1UB		
		0.05	24	23	160	23		PESD24VS1UB		
		6	2.5	229	260	30		**PESD5Z2.5**		
		0.05	3.3	172	260	30		**PESD5Z3.3**		
		0.05	5	89	180	30		**PESD5Z5.0**		
		0.01	6	78	180	30		**PESD5Z6.0**		
		0.01	7	69	180	30		**PESD5Z7.0**		
		0.01	12	35	200	30		**PESD5Z12**		
	1	0.1	5	35	120	30		PESD5V0S1BA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
								PESD5V0S1BB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
								PESD5V0S1BL	SOD882	1.0 x 0.6 x 0.5
		2	3.3	101	500	30		PESD3V3L1BA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		1	5	75	500	30		PESD5V0L1BA		
		0.05	12	19	200	30		PESD12VL1BA		
		0.05	15	16	200	30		PESD15VL1BA		
		0.05	24	11	200	23		PESD24VL1BA		

types in **bold red** represent new products

ESD protection diodes, standard capacitance (continued)

Number of protected lines uni-	bi- directional	I_{RM} @ max (µA)	V_{RWM} (V)	C_{line} typ (pF)	P_{PP}* max (W)	ESD rating** max (kV)	Configuration	Type	Package	Size (mm)
2	1	2	3.3	207	330	30		PESD3V3S2UAT	SOT23	2.9 x 1.3 x 1.0
		1	5	152	260	30		PESD5V0S2UAT		
		0.05	12	38	180	30		PESD12VS2UAT		
		0.05	15	32	160	30		PESD15VS2UAT		
		0.05	24	23	160	23		PESD24VS2UAT		
		3	3.3	200	150	30		PESD3V3S2UQ	SOT663	1.6 x 1.2 x 0.55
		0.3	5	150	150	30		PESD5V0S2UQ		
		0.03	12	38	150	30		PESD12VS2UQ		
		0.05	15	32	150	30		PESD15VS2UQ		
		0.05	24	23	150	23		PESD24VS2UQ		
		2	3.3	207	330	30		PESD3V3S2UT	SOT23	2.9 x 1.3 x 1.0
		1	5.25	152	260	30		PESD5V2S2UT		
		1	12	38	180	30		PESD12VS2UT		
		1	15	32	160	30		PESD15VS2UT		
		1	24	23	160	23		PESD24VS2UT		
	2	0.1	5	35	120	30		PESD5V0S2BT	SOT23	2.9 x 1.3 x 1.0
		2	3.3	101	350	30		PESD3V3L2BT		
		1	5	75	350	30		PESD5V0L2BT		
		0.05	12	19	200	30		PESD12VL2BT		
		0.05	15	16	200	30		PESD15VL2BT		
		0.05	24	11	200	23		PESD24VL2BT		
4	3	0.8	3.3	215	200	30		***PESD3V3S4UF***	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		0.2	5	165	200	30		***PESD5V0S4UF***		
		2	3	200	-	8		BZA456A	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		0.7	4	165	-	8		BZA462A		
		0.075	14	37	-	8		BZA418A		
		0.1	15	37	-	8		BZA420A		
		0.8	3.3	215	200	30		**PESD3V3S4UD**		
		0.2	5	165	200	30		**PESD5V0S4UD**		
		0.01	12	73	200	30		**PESD12VS4UD**		
		0.01	15	60	200	30		**PESD15VS4UD**		
		0.01	24	45	200	23		**PESD24VS4UD**		
		2	3	200	-	8		BZA856A	SOT353 (SC-88A)	2.0 x 1.25 x 0.95
		0.7	4	165	-	8		BZA862A		
		0.2	4.3	145	-	8		BZA868A		
		0.01	15	37	-	8		BZA820A		
		1	3	107	-	8		BZA856AL		
		0.5	4	90	-	8		BZA862AL		
		0.01	4.3	78	-	8		BZA868AL		
		1	3	107	-	8		BZA956A	SOT665	1.6 x 1.2 x 0.55
		0.5	4	90	-	8		BZA962A		
		0.01	4.3	78	-	8		BZA968A		
		0.01	3.3	30	-	15		IP4042CX5/LF	5 ball CSP	1.34 x 0.94 x 0.65
	4	0.01	5	48	-	15		BZA408B	SOT457 (SC-74)	2.9 x 1.5 x 1.0
5	4	0.8	3.3	215	200	30		**PESD3V3S5UD**	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		0.2	5	165	200	30		**PESD5V0S5UD**		
		0.01	12	73	200	30		**PESD12VS5UD**		
		0.01	15	60	200	30		**PESD15VS5UD**		
		0.01	24	45	200	23		**PESD24VS5UD**		
18	17	1	5.2	100	100	8		BZA100	SOT163 (SO20)	12.8 x 7.5 x 2.65
								PESD5V2S18U	SOT339 (SSOP20)	7.2 x 5.3 x 2.0

* 8/20 µs surge pulse acc. to IEC 61000-4-5
** acc. to IEC 61000-4-2 (contact discharge)

types in **bold red** represent new products
types in ***bold red italic underlined*** represent products in development

EMI filter and ESD protection

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed	Remark	Type	Package	Size (mm)
		R_{line}	C_{line}					
Reverse battery	1	-	240 pF	-	overvoltage and reverse battery protection	**IP4085CX4/LF**	4 ball CSP	0.91 x 0.91 x 0.65
		-	450 pF	-	overvoltage and reverse battery protection	**IP4385CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.61
Audio	2	0.9 Ω	290 pF	-	low-ohmic speaker (< ~8 Ω)	IP4047CX6/LF	6 ball CSP	1.56 x 1.01 x 0.65
		10 Ω	200 pF	-	high-ohmic speaker (> ~8 Ω)	IP4048CX5/LF	5 ball CSP	0.91 x 1.28 x 0.65
		68 Ω	110 pF	-	single-ended or differential microphone	IP4049CX5/LF	5 ball CSP	0.91 x 1.28 x 0.65
		470 Ω	35 pF	-	single-ended or differential microphone	IP4055CX6/LF	6 ball CSP	1.56 x 1.03 x 0.65
		470 Ω	< 20 pF	-	single-ended or differential microphone	**IP4355CX6/LF**	6 ball CSP	1.16 x 0.76 x 0.65
		50 Ω / 2200 Ω	2000 pF	-	single-ended to quasi-differential microphone channel with integrated biasing network	**IP5002CX8/LF**	8 ball CSP	1.67 x 1.67 x 0.65
		50 Ω	4000 pF	-	differential microphone filter with integrated biasing network for ∑Δ ADC converters	**IP5006CX11/LF**	11 ball CSP	1.41 x 1.91 x 0.65
	5	15 Ω / 95 Ω	65 pF / 33 pF	-	single-ended microphone and high-ohmic speaker (> ~8 Ω) with integrated 2 kΩ pull-up resistor	**IP4363CX10/LF**	10 ball CSP	0.76 x 1.96 x 0.61
	6	40 Ω / 1450 Ω / 10 Ω	55 pF / 20 pF / 200 pF	-	fully integrated audio interface protection for differential microphone and differential speaker, including EMI filtering and pull up resistors	IP4027CX20/LF	20 ball CSP	1.91 x 2.52 x 0.65
		50 Ω / 10 Ω	50 pF / 100 pF / 1000 pF	-	fully integrated audio interface protection for differential microphone and differential speaker, including EMI filtering and pull up resistors	**IP4125CX20/LF**	20 ball CSP	2.00 x 2.66 x 0.65
USB	2	33 Ω / 1.3 kΩ	30 pF	~5.5 MHz	fully integrated USB2.0 low / full-speed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4056CX8/LF	8 ball CSP	1.27 x 1.83 x 0.65
		33 Ω / 1.3 kΩ / 10 kΩ	30 pF	~5.5 MHz	fully integrated USB2.0 low / full-speed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4057CX10/LF	10 ball CSP	1.56 x 1.91 x 0.65
		33 Ω / 1.3 kΩ / 17 kΩ / 15 kΩ	27 pF	~5.5 MHz	fully integrated USB2.0 low / full-speed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4065CX11/LF	11 ball CSP	1.47 x 1.97 x 0.65
		33 Ω / 1.5 kΩ	35 pF	~5.5 MHz	fully integrated USB2.0 low / full-speed interface with EMI filter, ESD protection, pull-up resistors and impedance matching on NXP ISP110x, ISP130x, ISP136x	IP4058CX8/LF	8 ball CSP	0.91 x 1.91 x 0.65
		17 Ω / 1.5 kΩ	35 pF	~5.5 MHz	fully integrated USB2.0 low / full-speed interface with EMI filter, ESD protection, pull-up resistors and impedance matching on NXP ISP110x, ISP130x, ISP136x	**IP4158CX8/LF**	8 ball CSP	0.91 x 1.91 x 0.65
		33 Ω	35 pF	~5.5 MHz	fully integrated USB1.0 low / full-speed interface with EMI filter, ESD protection and impedance matching on NXP ISP1110	IP4078CX6/LF	6 ball CSP	0.91 x 1.41 x 0.65
		-	1.4 pF	~1 GHz	USB2.0 high-speed ESD protection on NXP ISP1504/01 HS transceiver	**IP4359CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.61
	3	-	3 pF	~240 MHz	USB2.0 high-speed ESD protection on NXP ISP176x and ISP1504	IP4059CX5/LF	5 ball CSP	0.96 x 1.34 x 0.65
		-	1.0 pF	~240 MHz	USB2.0 high-speed ESD protection on NXP ISP1504/01 HS transceiver	IP4221CZ6-S	SOT886	1.45 x 1.0 x 0.5
SIM card	3	47 Ω / 100 Ω	35 pF	~12 MHz	EMI filter, ESD protection	IP4044CX8/LF	8 ball CSP	1.46 x 1.49 x 0.65
		47 Ω / 100 Ω	< 20 pF	~20 MHz	EMI filter, ESD protection	IP4064CX8/LF	8 ball CSP	1.41 x 1.41 x 0.65
		47 Ω / 100 Ω	< 20 pF	~20 MHz	EMI filter, ESD protection, extremely small size	**IP4364CX8/LF**	8 ball CSP	1.16 x 1.16 x 0.61
		-	1 pF	~240 MHz	ESD protection	IP4221CZ6-S	SOT886 (XSON6)	1.45 x 1.0 x 0.5

types in **bold red** represent new products

EMI filter and ESD protection (continued)

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed	Remark	Type	Package	Size (mm)
		R_{line}	C_{line}					
Memory cards	4	47 Ω / 13 kΩ / 56 kΩ	25 pF	-	MMC ESD protection, pull-up resistors	IP4051CX11/LF	11 ball CSP	1.44 x 1.96 x 0.65
		50 Ω / 75 kΩ / 7 kΩ	18 pF	~25 MHz	high-speed MMC ESD protection, pull-up resistors	IP4060CX16/LF	16 ball CSP	1.96 x 1.97 x 0.65
	7	40 Ω / 50 kΩ / 25 kΩ	18 pF	~20 MHz	(mini) SD/trans flash-card ESD protection, EMI filter, pull-up resistors	IP4052CX20/LF	20 ball CSP	2.54 x 1.96 x 0.65
		-	5 pF	~24 MHz	memory stick PRO ESD protection	IP4067CX9/LF	9 ball CSP	1.46 x 1.52 x 0.65
	9	40 Ω / 50 kΩ / 15 kΩ	20 pF	> 52 MHz	(mini) SD card/trans flash ESD protection, EMI filter, pull-up resistor	**IP4352CX24/LF**	24 ball CSP	2.02 x 2.01 x 0.61
		-	-	> 52 MHz	(mini) SD/SDIO memory cardlevel shifter, can be combined with IP4352CX24/LF	**IP4852CX24/LF**	24 ball CSP	2.01 x 2.01 x 0.61
		-	-	> 52 MHz	(mini) SD/SDIO memory cardlevel shifter and voltage regulator, incl. ESD and EMI filter	***IP4853CX24/LF***	24 ball CSP	2.01 x 2.01 x 0.61
Multi-channel filters e.g.:	4	100 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4254CZ8**	8 pin QFN	1.7 x 1.35 x 0.5
	6	100 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4254CZ12**	12 pin QFN	2.5 x 1.35 x 0.5
	8	100 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4254CZ16**	16 pin QFN	3.3 x 1.35 x 0.5
	4	200 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4253CZ8**	8 pin QFN	1.7 x 1.35 x 0.5
	6	200 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4253CZ12**	12 pin QFN	2.5 x 1.35 x 0.5
	8	200 Ω	45 pF	~30 MHz	EMI filter, ESD protection	**IP4253CZ16**	16 pin QFN	3.3 x 1.35 x 0.5
	6	100 Ω	60 pF	~20 MHz	EMI filter, ESD protection	IP4053CX15/LF	15 ball CSP	2.98 x 1.33 x 0.65
Bottom connector	8	100 Ω	50 pF	~25 MHz	EMI filter, ESD protection	IP4088CX20/LF	20 ball CSP	3.91 x 1.28 x 0.65
	6	100 Ω	30 pF	~40 MHz	EMI filter, ESD protection	**IP4153CX15/LF**	15 ball CSP	2.91 x 1.28 x 0.65
	10	80 Ω	40 pF	~30 MHz	EMI filter, ESD protection	IP4032CX25/LF	25 ball CSP	2.41 x 2.41 x 0.65
LCD display		80 Ω	40 pF	~30 MHz	EMI filter, ESD protection (higher tolerances as IP4032CX25/LF)	IP4033CX25/LF	25 ball CSP	2.41 x 2.41 x 0.65
		84 Ω	14 pF	~40 MHz	EMI filter, ESD protection	IP4040CX25/LF	25 ball CSP	2.41 x 2.46 x 0.65
		200 Ω	50 pF	~20 MHz	EMI filter, ESD protection	IP4041CX25/LF	25 ball CSP	2.41 x 2.41 x 0.65
Camera interface		1 kΩ	50 pF	< 1 MHz	EMI filter, ESD protection	IP4035CX24/LF	24 ball CSP	2.46 x 2.44 x 0.65
		200 Ω	50 pF	~20 MHz	EMI filter, ESD protection, extremely small size	**IP4341CX25/LF**	25 ball CSP	2.01 x 2.01 x 0.61
Keypad connector	7	70 Ω	25 pF	~40 MHz	EMI filter, ESD protection, extremely small size	**IP4337CX18/LF**	18 ball CSP	1.96 x 1.61 x 0.61
	10	70 Ω	25 pF	~40 MHz	EMI filter, ESD protection, extremely small size	**IP4338CX24/LF**	24 ball CSP	1.96 x 2.01 x 0.61
	1	75 Ω	36 pF	-	EMI filter, ESD protection with common ground	**IP4307CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.61
Generic ESD protection	4	-	30 pF	~30 MHz	4x single diode with one common ground	IP4042CX5/LF	5 ball CSP	0.94 x 1.34 x 0.65
		-	14 pF	~40 MHz	4x single diode with one common ground	**IP4142CX5/LF**	5 ball CSP	0.91 x 1.28 x 0.65
		-	16 pF	~40 MHz	4x back-to-back diode with one common ground	IP4043CX5/LF	5 ball CSP	1.12 x 1.12 x 0.65
		-	16 pF	~40 MHz	4x back-to-back diode with one common ground, extremely small size	**IP4343CX5/LF**	5 ball CSP	0.93 x 0.93 x 0.61
	2	-	10 pF	~40 MHz	2x back-to-back diode with one common ground, extremely small size	**IP4303CX4/LF**	4 ball CSP	0.76 x 0.26 x 0.61
	1	-	10 pF	~40 MHz	1x back-to-back diode with one common ground, extremely small size	***IP4302CX2/LF***	2 ball CSP	0.52 x 0.7 x 0.61

types in **bold red** represent new products
types in ***bold red italic underlined*** represent products in development

Level shifter, buffer and EMI filter for consumer and computing

Interface	Number of protected lines	Buffer	Level shifter	C_{line}	Resistor	Remark	Type	Package	Size (mm)
VGA	7	yes	yes	5 pF	55 Ω	sync buffer, DDC level shifter	IP4770CZ16	SOT519 (SSOP16)	4.9 x 3.9 x 1.73
		yes	yes	5 pF	65 Ω	sync buffer, DDC level shifter	IP4771CZ16		
		yes	yes	5 pF	10 Ω	sync buffer, DDC level shifter	IP4772CZ16		
IEEE1394	4	-	-	5 pF	55 Ω	common mode filter	IP4224CZ6	SOT457 (SC-74)	2.9 x 1.5 x 1.0
LVDS	10	-	-	5 pF	100 Ω	100 Ω termination	IP4263CZ14	SOT108 (SO14)	8.65 x 3.9 x 1.75
USB	2	-	-	1 pF	-	ESD protection	PRTR5V0U2X	SOT143B	2.9 x 1.3 x 1.0
	4	-	-	1 pF	-	ESD protection	**IP4220CZ6**	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	-	1 pF	-	ESD protection, as IP4220CZ6 but different bonding	PRTR5V0U4AD	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	-	1 pF	-	ESD protection, as IP4220CZ6 but higher tolerances	**IP4223CZ6**	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	-	1 pF	-	USB2.0 high-speed SD card, SIM card	**IP4221CZ6-S**	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		-	-	1 pF	-	USB2.0 high-speed SD card, SIM card	**IP4221CZ6-XS**	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		-	-	3 pF	1 Ω	> 15 kV contact ESD protection with pi-filter	IP4225CZ10	SOT457 (SC-74)	2.9 x 1.5 x 1.0
HDMI	4	-	-	1 pF	-	ESD protection	PRTR5V0U4D	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	-	1 pF	-	ESD protection	**PRTR5V0U4Y**	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		-	-	0.7 pF		ESD protection	**IP4280CZ10**	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
	8	-	-	1 pF	-	ESD protection	PRTR5V0U8S		
		yes	yes	0.7 pF	-	level shifter, ESD protection	**IP4776CZ38**	SOT510 (TSSOP38)	9.7 x 4.4 x 1.1
		yes	yes	0.7 pF	-	I^2C buffer, level shifter, ESD protection, back drive protection, CEC buffer	***IP4778CZ38***		

types in **bold red** represent new products
types in ***bold red italic underlined*** represent products in development

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