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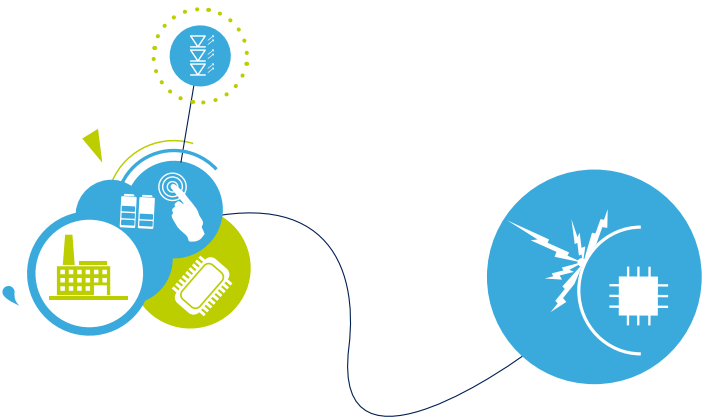
Protection devices and integrated EMI filtering

ESD Protection and EMI filtering interface conditioning



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ESD protection

GENERAL-PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R = 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	GHz		(mm)
ESDAXLC5-1U2(*)	Unidirectional	1	> 16/30	3.6	0.1	5	0.55	-	11.4	ST0201	0.60 x 0.30
ESDZL5-1F4(1)	Unidirectional	1	> 12/30	5.5	0.1	5.8	10	-	-	ST0201	0.60 x 0.30
ESDAULC6-1U2	Unidirectional	1	> 8/15	3	0.1	6	0.8	-	5.2	ST0201	0.60 x 0.30
ESDAVLC6-1V2	Unidirectional	1	> 12/15	3	0.05	6	7.5	-	-	ST01005	0.40 x 0.20
ESDAXLC6-1MY2	Unidirectional	1	> 8/15	3	0.1	6	0.35 max	-	-	SOD882	1.00 x 0.60
ESDA6V1-1J(1)	Unidirectional	1	> 8/15	5	0.5	6.1	210	-	-	SOD323	2.50 x 1.25
ESDALC6-1U2	Unidirectional	1	> 8/15	3	0.1	6.1	12	-	-	ST0201	0.60 x 0.30
ESDALC6V1-1M2	Unidirectional	1	> 8/15	3	0.1	6.1	22	-	-	SOD882	1.00 x 0.60
ESDALC6V1-1U2	Unidirectional	1	> 8 / -	3	0.1	6.1	12	-	-	ST0201	0.60 x 0.30
ESDA7P60-1U1M	Unidirectional	1	> 8/15	5	0.2	6.4	450	NA	-	1610	1.60 x 1.00
ESDA8V2-1J	Unidirectional	1	> 8/15	5	0.5	8.2	210	-	-	SOD323	2.50 x 1.25
ESDA8V2-1MX2	Unidirectional	1	> 8/15	5	0.5	8.2	350	-	-	QFN-2L	1.45 x 1.00
ESDA12-1K	Unidirectional	1	> 8/15	10	0.5	12	200	-	-	SOD523	1.60 x 0.80
ESDALC12-1T2	Unidirectional	1	> 8/15	10	0.2	12	15	-	-	SOD882T	1.00 x 0.60
ESDA13P70-1U1M	Unidirectional	1	> 8/15	12	0.2	12.5	400	NA	-	1610	1.60 x 1.00
ESDA15P60-1U1(*)	Unidirectional	1	> 8/15	13	0.1	13.6	335	NA	-	1610	1.60 x 1.00
ESDAVLC14-1V2	Unidirectional	1	> 12/15	12	0.1	14	7.5	-	-	ST01005	0.40 x 0.20
ESDALC14V2-1U2	Unidirectional	1	> 8/16	3	0.1	14.2	6	-	-	ST0201	0.60 x 0.30
ESDAVLC14-1U2	Unidirectional	1	> 8/15	12	0.1	14.2	6	-	-	ST0201	0.60 x 0.30
ESDA17P60-1U1M(*)	Unidirectional	1	> 8/15	15	0.2	15.5	290	NA	-	1610	1.60 x 1.00
ESDA18-1F2	Unidirectional	1	> 8/15	10	0.5	16	230	-	-	CSP 500 µm	0.92 x 0.92

GENERAL-PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R = 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	GHz		(mm)
ESDA18-1F4	Unidirectional	1	> 8/15	12	0.02	16	120	-	-	CSP 300 µm	0.64 x 0.64
ESDA18-1K	Unidirectional	1	> 8/15	16	0.5	18	200	-	-	SOD523	1.60 x 0.80
ESDA25P35-1U1M(*)	Unidirectional	1	> 8/15	22	0.2	23.3	190	NA	-	1610	1.60 x 1.00
ESDA8P80-1U1M(*)	Unidirectional	1	> 8/15	6	0.2		480	NA	-	1610	1.60 x 1.00
ESDARF01-1BF4	Bidirectional	1	> 8/15	0.1	0.3	0.6	3	-	-	ST0201	0.60 x 0.30
ESDARF01-1BM2	Bidirectional	1	> 8/15	0.1	1	0.7	3	-	-	SOD882	1.00 x 0.60
ESDAXLC4-1BF3	Bidirectional	1	> 8/8	3	0.1	4	0.35	-	-	ST0302	0.69 x 0.50
ESDALC5-1BM2	Bidirectional	1	> 8/15	5	0.1	5	27	-	-	SOD882	1.00 x 0.60
ESDALC5-1BT2	Bidirectional	1	> 8/15	5	0.06	5	27	-	-	Thin SOD882	1.00 x 0.60
ESDALCL5-1BM2	Bidirectional	1	> 8/15	1	0.001	5	26	-	-	SOD882	1.00 x 0.60
ESDARF02-1BU2CK	Bidirectional	1	> 8/20	3.6	0.1	5	0.2	-	-	ST0201	0.70 x 0.30
ESDA5-1BF4	Bidirectional	1	> 8/15	5	0.1	5.8	45	-	-	ST0201	0.60 x 0.30
ESDALC5-1BF4	Bidirectional	1	> 8/15	5	0.1	5.8	10	-	-	ST0201	0.60 x 0.30
ESDAULC5-1BF4	Bidirectional	1	> 30/30	3	0.07	5.8	1.5	-	4	ST0201	0.70 x 0.30
ESDAVLC5-1BF4	Bidirectional	1	> 8/15	5.3	0.1	5.8	7	-	-	ST0201	0.3 x 0.6
ESDZV5-1BF4(1)	Bidirectional	1	> 18/30	5.5	0.1	5.8	7	-	-	ST0201	0.60 x 0.30
ESDARF02-1BU2	Bidirectional	1	> 8/15	3	0.07	6	0.24	-	17	ST0201	0.60 x 0.30
ESDARF03-1BF3	Bidirectional	1	> 8/15	3	1	6	0.6	-	-	CSP 400 µm	0.82 x 0.82
ESDAVLC6-1BF4	Bidirectional	1	> 8/15	3	0.1	6	6	-	-	ST0201	0.60 x 0.30
ESDAVLC6-1BV2	Bidirectional	1	> 12/15	3	0.05	6	7.5	-	-	ST01005	0.40 x 0.20
ESDAXLC6-1BT2	Bidirectional	1	> 8/15	6	0.07	6	0.4	-	-	Thin SOD882	1.00 x 0.60
ESDAXLC6-1BU2	Bidirectional	1	> 8/15	3	0.07	6	0.4	-	-	ST0201	0.60 x 0.30
ESDAXLC6-1BU2K	Bidirectional	1	> 8/20	3	0.07	6	0.24	-	17	ST0201	0.60 x 0.30

GENERAL-PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R = 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	GHz		(mm)
ESDALC6V1-1BU2	Bidirectional	1	> 8/15	3	0.1	6.1	5	-	-	ST0201	0.60 x 0.30
ESDALC8-1BF4	Bidirectional	1	> 8/15	6	0.05	7	30	-	-	ST0201	0.60 x 0.30
ESDAVLC8-1BM2	Bidirectional	1	> 8/15	3	0.05	8.5	4.5	-	-	SOD882	1.00 x 0.60
ESDAVLC8-1BT2	Bidirectional	1	> 8/15	3	0.05	8.5	4.5	-	-	Thin SOD882	1.00 x 0.60
ESDAVLC8-1BU2	Bidirectional	1	> 8/15	3	0.1	8.5	5	-	-	ST0201	0.60 x 0.30
ESDAVLC12-1BV2	Bidirectional	1	> 8/15	10.5	0.07	12	7	-	-	ST01005	0.40 x 0.20
ESDALC14-1BF4	Bidirectional	1	> 8/15	12	0.1	14	22	-	-	ST0201	0.60 x 0.30
ESDA14V2-1BF3	Bidirectional	1	> 8/15	12	0.5	14.2	10	-	-	CSP 400 µm	0.69 x 0.50
ESDAXLC18-1BF4(*)	Bidirectional	1	> 10/30	18	0.03	18	0.45		12	ST0201	0.60 x 0.30
ESDALC20-1BF4	Bidirectional	1	> 20/30	20	0.01	22	1.5	-	0.5	ST0201	0.60 x 0.30
ESDA5V3L	Unidirectional	2	> 8/15	3	2	5.3	220	-	-	SOT23	2.95 x 2.40
ESDALCL6-2SC6	Unidirectional	2	> 8/15	1	0.001	6	2.5	-	-	SOT23-6L	2.90 x 2.80
ESDA6V1L	Unidirectional	2	> 8/15	5.25	20	6.1	140	-	-	SOT23	2.95 x 2.40
ESDALC6V1M3	Unidirectional	2	> 8/15	5	0.5	6.1	11	-	-	SOT883	1.00 x 0.60
ESDALC6V1M3R	Unidirectional	2	> 8/15	5	0.5	6.1	11	-	-	SOT883	1.00 x 0.60
ESDA14V2L	Unidirectional	2	> 8/15	12	5	14.2	90	-	-	SOT23	2.95 x 2.40
ESDA25L	Unidirectional	2	> 8/15	24	1	25	50	-	-	SOT23	2.95 x 2.40
ESDA25W	Unidirectional	2	> 8/15	24	1	25	65	-	-	SOT323-3L	2.10 x 2.00
ESDA14V2-2BF3	Bidirectional	2	> 8/15	12	0.5	14.2	12	-	-	CSP 400 µm	0.77 x 0.77
ESDAULC6-3BP6	Bidirectional	3	> 8/15	5	0.5	6	1	-	-	SOT666	1.60 x 1.60
ESDA5V3SC5	Unidirectional	4	> 8/15	3	2	5.3	280	-	-	SOT23-5L	2.90 x 2.80
ESDA5V3SC6	Unidirectional	4	> 8/15	3	2	5.3	280	-	-	SOT23-6L	2.90 x 2.80
ESDALCL6-4P6A	Unidirectional	4	> 8/15	1	0.001	6	2.5	-	-	SOT666	1.60 x 1.60

GENERAL-PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R = 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	GHz		(mm)
ESDA6V1P6	Unidirectional	4	> 8/15	3	0.5	6.1	70	-	-	SOT666	1.60 x 1.60
ESDA6V1SC5	Unidirectional	4	> 8/15	5.25	20	6.1	190	-	-	SOT23-5L	2.90 x 2.80
ESDA6V1SC6	Unidirectional	4	> 8/15	5.25	20	6.1	190	-	-	SOT23-6L	2.90 x 2.80
ESDA6V1W5	Unidirectional	4	> 8/15	3	1	6.1	90	-	-	SOT323-5L	2.10 x 2.00
ESDALC6-4N4	Unidirectional	4	> 8/15	3	0.1	6.1	9.5	-	-	QFN-4L	1.00 x 0.80
ESDALC6V1P5	Unidirectional	4	> 8/15	3	0.1	6.1	12	-	-	SOT665	1.60 x 1.60
ESDALC6V1P6	Unidirectional	4	> 8/15	3	0.1	6.1	12	-	-	SOT666	1.60 x 1.60
ESDALC6V1W5	Unidirectional	4	> 8/15	3	0.1	6.1	12	-	-	SOT323-5L	2.10 x 2.00
ESDA14V2SC5	Unidirectional	4	> 8/15	12	5	14.2	100	-	-	SOT23-5L	2.90 x 2.80
ESDA14V2SC6	Unidirectional	4	> 8/15	12	5	14.2	100	-	-	SOT23-6L	2.90 x 2.80
ESDA19SC6	Unidirectional	4	> 8/15	15	0.1	19	80	-	-	SOT23-6L	2.90 x 2.80
ESDA25SC6	Unidirectional	4	> 8/15	24	1	25	60	-	-	SOT23-6L	2.90 x 2.80
ESDA25W5	Unidirectional	4	> 8/15	24	1	25	30	-	-	SOT323-3L	2.10 x 2.00
ESDALC5-4BN4	Bidirectional	4	> 8/15	5	0.06	5.5	13	-	-	QFN-4L	1.00 x 0.80
ESDAVLC5-4BX4	Bidirectional	4	> 8/15	3	0.05	5.5	10	-	-	QFN-4L	0.80 x 0.80
ESDA6V1-4BC6	Bidirectional	4	> 8/15	3	1	6.1	45	-	-	SOT23-6L	2.90 x 2.80
ESDA6V1BC6	Bidirectional	4	> 8/15	5	1	6.1	20	-	-	SOT23-6L	2.90 x 2.80
ESDAVLC8-4BN4	Bidirectional	4	> 8/15	3	0.05	8.5	4.5	-	-	QFN-4L	1.00 x 0.80
DALC208SC6	Bidirectional	4	> 8/15	5	1	9	7	-	-	SOT23-6L	2.90 x 2.80
ESDA14V2-4BF2	Bidirectional	4	> 8/15	12	1	14.2	15	-	-	CSP 500 µm	1.12 x 1.12
ESDA14V2-4BF3	Bidirectional	4	> 8/15	12	0.5	14.2	15 (max)	-	-	CSP 400 µm	0.935 x 0.935
ESDA14V2BP6	Bidirectional	4	> 8/15	12	1	14.2	20	-	-	SOT666	1.60 x 1.60
DA108S1	Bidirectional	4	> 8/15	15	2	18	34	-	-	SO-8	6.00 x 4.90

GENERAL-PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R = 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	GHz		(mm)
ESDA25-4BP6	Bidirectional	4	> 8/15	24	1	25	22	-	-	SOT666	1.60 x 1.60
ESDA6V1-5M6	Unidirectional	5	> 8/15	3	0.5	6.1	70	-	-	QFN-6L	1.45 x 1.00
ESDA6V1-5P6	Unidirectional	5	> 8/15	3	0.5	6.1	70	-	-	SOT666	1.60 x 1.60
ESDA6V1-5SC6	Unidirectional	5	> 8/15	3	1	6.1	50	-	-	SOT23-6L	2.90 x 2.80
ESDA6V1-5T6	Unidirectional	5	> 8/15	3	0.1	6.1	12	-	-	QFN-6L	1.00 x 1.00
ESDA6V1-5W6	Unidirectional	5	> 8/15	3	1	6.1	50	-	-	SOT323-6L	2.10 x 2.00
ESDALC6-5T6	Unidirectional	5	> 8/15	3	0.1	6.1	7	-	-	QFN-6L	1.00 x 1.00
ESDALC6V1-5M6	Unidirectional	5	> 8/15	3	0.07	6.1	12	-	-	QFN-6L	1.45 x 1.00
ESDALC6V1-5P6	Unidirectional	5	> 8/15	3	0.07	6.1	12	-	-	SOT666	1.60 x 1.60
ESDALC6V1-5P6M	Unidirectional	5	> 8/15	3	0.07	6.1	12	-	-	SOT666	1.60 x 1.60
ESDALC6V1-5T6	Unidirectional	5	> 8/15	3	0.1	6.1	12	-	-	QFN-6L	1.00 x 1.00
ESDA17-5SC6	Unidirectional	5	> 8/15	14	0.075	17	35	-	-	SOT23-6L	2.90 x 2.80
ESDAVLC7-5BU6	Bidirectional	5	> 8/15	6	0.03	7	5	-	-	QFN-6L	0.85 x 0.82
ESDA6V1U1	Unidirectional	6	> 8/15	5	2	6.1	100	-	-	SO-8	6.00 x 4.90
DA112S1	Bidirectional	6	> 8/15	15	2	18	34	-	-	SO-8	6.00 x 4.90
DALC112S1	Bidirectional	6	> 6/8	15	2	18	7	-	-	SO-8	6.00 x 4.90
ESDA25B1	Bidirectional	6	> 8/15	24	2	25	15	-	-	SO-8	6.00 x 4.90
ESDAULC6-8F3	Unidirectional	8	> 8/15	3	0.1	6	1	-	-	CSP 400 µm	1.20 x 1.20
ESDA6V1S3	Unidirectional	18	> 8/15	5	2	6.1	120	-	-	SO-20	12.80 x 10.30

Notes: (*) Available in Q1/2016

(1) Under development 2016

HIGH-SPEED PORT PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) à V_{RM}	Breakdown voltage V_{BR} @ IR= 1 mA	Capacitance I/O to GND @ 0 V bias	Capacitance I/O to I/O @ 0 V	Bandwidth @ -3 dB	Package	Package size L x W
			(kV)	(V)	max (µA)	min (V)	typ (pF)	typ (pF)	(GHz)		(mm)
HSP061-2M6	Unidirectional	2	> 8/15	5	0.5	6	0.85	0.42	6	QFN-6L	1.45 x 1.00
HSP061-2N4	Unidirectional	2	> 8/15	3	0.1	6	0.6	0.3	6	QFN-4L	1.00 x 0.80
HSP061-2P6	Unidirectional	2	> 8/15	5	0.5	6	0.6	0.42	6	SOT666	1.60 x 1.60
HSP062-2M6	Unidirectional	2	> 8/15	5	0.5	6	0.8	0.55	6	QFN-6L	1.45 x 1.00
HSP062-2P6	Unidirectional	2	> 8/15	5	0.5	6	0.8	0.55	6	SOT666	1.60 x 1.60
HSP051-4M5(*)	Unidirectional	4	> 15/30	3.6	0.1	4.5	0.35	0.2	12	QFN-5L	1.30 x 0.80
DSILC6-4F2	Unidirectional	4	> 8/15	5	0.5	6	2.5	1.25	2.2	CSP 500 µm	1.57 x 1.10
DSILC6-4P6	Unidirectional	4	> 8/15	5	0.5	6	2	1.0	2.2	SOT666	1.60 x 1.60
DSILC6-4SC6	Unidirectional	4	> 8/ -	5	0.5	6	4.1	2.1	0.83	SOT23-6L	2.90 x 2.80
DVIULC6-4SC6	Unidirectional	4	> 8/15	5	0.5	6	0.85	0.42	6	SOT23-6L	2.90 x 2.80
HDMIULC6-4F3	Unidirectional	4	> 8/15	3	0.1	6	0.7	0.05	7	CSP 400 µm	1.60 x 1.10
HDMIULC6-4SC6	Unidirectional	4	> 8/15	5	0.5	6	0.85	0.42	6	SOT23-6L	2.90 x 2.80
HSP051-4M10	Unidirectional	4	> 8/15	3	0.07	6	0.5	0.3	10	QFN-10L	2.50 x 1.00
HSP051-4N10	Unidirectional	4	> 8/15	3	0.07	6	0.5	0.3	10	QFN-10L	1.90 x 1.00
HSP061-4M10	Unidirectional	4	> 8/15	3	0.07	6	0.6	0.3	8.7	QFN-10L	2.50 x 1.00
HSP061-4NY8	Unidirectional	4	> 8/15	5	0.1	6	0.5	-	6	QFN-2x1-8L	2.00 x 1.00
HSP051-6BM14	Bidirectional	6	> 8/15	3	0.07	6	0.5	0.3	8.7	QFN-14L	3.50 x 1.35
HSP061-8M16	Unidirectional	8	> 8/15	5	0.5	6	0.6	-	6.3	QFN-16L	3.30 x 1.50

Note: (*) Available in Q1/2016

USB PROTECTION

Part number	Protected lines	Directionality	Number of lines	IEC 61000-4-2 contact/air	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) à V_{RM}	Breakdown voltage V_{BR} @ IR= 1 mA	Capacitance I/O to GND @ 0 V bias	Bandwidth @ -3 dB	Package	Package size L x W
				(kV)	(V)	max (µA)	min (V)	typ (pF)	(GHz)		(mm)
ESDA7P60-1U1M	V_{BUS} protection	Unidirectional	1	> 8/15	5	0.2	6.4	450	-	1610	1.60 x 1.00
ESDA13P70-1U1M	V_{BUS} protection	Unidirectional	1	> 8/15	12	0.2	12.5	400	-	1610	1.60 x 1.00
ESDA15P60-1U1(*)	V_{BUS} protection	Unidirectional	1	> 8/15	13	0.1	13.6	335	-	1610	1.60 x 1.00
ESDA17P60-1U1M(*)	V_{BUS} protection	Unidirectional	1	> 8/15	15	0.2	15.5	290	-	1610	1.60 x 1.00
ESDA25P35-1U1M(*)	V_{BUS} protection	Unidirectional	1	> 8/15	22	0.2	23.3	190	-	1610	1.60 x 1.00
ESDA8P80-1U1M(*)	V_{BUS} protection	Unidirectional	1	> 8/15	6	0.2		480	-	1610	1.60 x 1.00
USBLC6-2P6	D+/D-	Unidirectional	2	> 8/15	5	1	6	2.5	3	SOT666	1.60 x 1.60
USBLC6-2SC6	D+/D-	Unidirectional	2	> 8/15	5	1	6	2.5	3	SOT23-6L	2.90 x 2.80
USBULC6-2F3	D+/D-	Unidirectional	2	> 8/15	3	0.1	6	1.2 (max)	4	CSP 400 µm	0.82 x 0.82
USBULC6-2M6	D+/D-	Unidirectional	2	> 8/15	5	0.5	6	0.95	6	QFN-6L	1.45 x 1.00
USBULC6-2N4	D+/D-	Unidirectional	2	> 8/15	3	0.1	6	0.6	6	QFN-4L	1.00 x 0.80
USBULC6-2P6	D+/D-	Unidirectional	2	> 8/15	5	0.5	6	0.95	5.3	SOT666	1.60 x 1.60
USBULC6-3F3	D+/D-/ID	Unidirectional	3	> 8/15	3	0.1	4	1	8.5	CSP 400 µm	0.82 x 0.82
USB6B1RL	D+/D-	Unidirectional	4	> 8/15	5.25	10	6	15	-	SO-8	6.00 x 4.90
USBLC6-4SC6	D+/D- (double port)	Unidirectional	4	> 8/15	5	2	6	3	0.8	SOT23-6L	2.90 x 2.80

Note: (*) Available in Q1/2016

Integrated EMI filtering and ESD protection (IPAD™)

AUDIO AND VIDEO IPAD™ (EMI FILTERS WITH ESD PROTECTION)

Part number	Application	Number of lines	Package	Pin count	Attenuation @ 900 MHz	Bandwidth (@ -3 dB)	Filter resistance (FR)
					(dB)	(MHz)	typ (Ω)
EMIF02-010ABRY	Video BroadR Reach™ AEC-Q101 compliant	2	Wettable flanks QFN 3.0 x 3.0	5	-20 dB from 60 MHz	250	-
EMIF08-VID1F3	Video	8	WLCSP 400µ	20	-43 dB	98	100
EMIF07-KB01F7	Video	7	WLCSP 350µ	20	-23 dB	320	330
EMIF02-AV01F3	Audio and Video	2	WLCSP 400µ	5	-35 dB	0.4	15
EMIF04-EAR02M8	Audio and Microphones	4	µQFN-8L	8	-30 dB	70	0.3
EMIF05-AUD02F3	Audio and Microphone	2	WLCSP 400µ	12	-28 dB	1.2	2200
EMIF02-MIC03M6	Microphones	2	µQFN-6L	6	-33 dB	100	68
EMIF02-MIC06F3	Microphones	2	WLCSP 400µ	8	-46 dB	2.0	2200
EMIF02-MIC02F2	Microphones	2	WLCSP 500µ	5	-30 dB	180	470
EMIF02-MIC02F3	Microphones	2	WLCSP 400µ	5	-30 dB	300	470
EMIF02-MIC03F2	Microphones	2	WLCSP 500µ	5	-40 dB	50	68
EMIF02-SPK02F2	Speaker	2	WLCSP 500µ	5	-40 dB	20	0.35
EMIF02-SPK03F2	Speaker	2	WLCSP 500µ	5	-40 dB	20	0.07

DISPLAY, CAMERA AND KEYPAD IPAD™: COMMON MODE FILTER

Serial interface camera and display IPAD

Part number	Application	ESD protection		Number of package lines		Pin count	Common-mode attenuation (S_{CC21})			
		Datalines	Vbus				700 MHz	900 MHz	2.4 GHz	5.0 GHz
ECMF02-3HSM6	MIPI D-PHY	Yes	-	3	µQFN-6L	6	-22 dB	-33 dB		
ECMF04-4AMX12	MIPI D-PHY	Yes	-	4	µQFN-12L	12	-16 dB	-35 dB	-15 dB	-22 dB
ECMF04-4HSM10	MIPI D-PHY	Yes	-	4	µQFN-10L	10	-20 dB	-33 dB		
ECMF06-6AM16	MIPI D-PHY	Yes	-	6	µQFN-16L	16	-17 dB	-24 dB		
ECMF06-6HSM16	MIPI D-PHY	Yes	-	6	µQFN-16L	16	-20 dB	-33 dB		
CMF2-0650A09H3	MIPI D-PHY	-	-	2	CSP - 5 microbumps	5	-27 dB	-35 dB	-23 dB	-25 dB
CMF2-24A60H3	MIPI D-PHY	-	-		CSP - 4 microbumps	4		-15 dB	-40 dB	-16 dB
ECMF4-20A42N10	USB 3.1 Gen 1 and HDMI 2.0	Yes	-		µQFN-10L	10	-13 dB	-16 dB	-25 dB	
ECMF04-4HSWM10	USB 3.1 Gen 1 and HDMI 2.0	Yes	-		µQFN-10L	10		-15 dB	- 28 dB	-16 dB
ECMF02-2HSMX6	USB 3.1 Gen 1 and HDMI 2.0	Yes	-		µQFN-6L	6	-20 dB	-25 dB	-20 dB	-20 dB
ECMF02-2BF3	USB 2.0	Yes	-		WLCSP 400µ	5	-13 dB	-24 dB	-16 dB	
ECMF02-3BF3	USB 2.0	Yes	-		WLCSP 400µ	6		-29 dB		
ECMF02-4CMX8	USB 2.0	Yes	Yes		µQFN-8L	8	-13 dB	-27 dB	-13 dB	
ECMF2-0730V12M12	USB 2.0	Yes	Yes		µQFN -12L	12	-18 dB	-30 dB	-20 dB	-13 dB
ECMF02-2AMX6	USB 2.0 and MIPI D-PHY/MDDI	Yes	-		µQFN-6L	6	-16 dB	-34 dB	-15 dB	

DISPLAY, CAMERA AND KEYPAD IPAD™: EMI FILTER AND ESD PROTECTION

Serial interface camera and display IPAD and keypad IPAD

Part number	General description	Number of lines	Package	Pin count	Bandwidth (@ -3 dB)	Attenuation		Line capacitance (C_{line})
					(MHz)	900 MHz	2.4 GHz	max (pF)
EMIF08-VID1F3	Video	8	WLCSP 400µ	20	98	-42 dB	-35 dB	7
EMIF06-VID01F2	Video	6	WLCSP 500µ	12	160	-40 dB	-25 dB	19
EMIF08-VID01F2	Video	8	WLCSP 500µ	19	160	-33 dB	-34 dB	19
EMIF07-KB01F7	Video	7	WLCSP 350µ	20	320	-23 dB	-27 dB	30
EMIF10-COM01F2	Display	10	WLCSP 500µ	23	120	-37 dB	-42 dB	50
EMIF10-LCD02F3	Display	10	WLCSP 400µ	25	200	-23 dB	-45 dB	30
EMIF07-LCD02F3	Display	7	WLCSP 400µ	19	200	-25 dB	-42 dB	30
EMIF08-LCD04M16	Display	8	µQFN-16L	16	400	-35 dB	-38 dB	19
EMIF10-1K010F2	Keypads	10	WLCSP 500µ	23	35	-25 dB	-18 dB	120
EMIF06-1005MX12Y	General purpose < 200MHz AEC-Q101 compliant	12	µQFN-12L	12	150	-35 dB	-33 dB	52
EMIF04-1005M8	General purpose < 200MHz	4	µQFN-8L	8	110	-35 dB	-32 dB	52
EMIF06-1005M12	General purpose < 200MHz	6	µQFN-12L	12	110	-35 dB	-32 dB	52
EMIF06-1005N12	General purpose < 200MHz	6	µQFN-12L	12	110	-35 dB	-32 dB	52
EMIF08-1005M16	General purpose < 200MHz	8	µQFN-16L	16	110	-35 dB	-33 dB	52
EMIF08-1005T16	General purpose < 200MHz	8	µQFN-16L	16	110	-35 dB	-33 dB	50
EMIF06-1502M12	General purpose < 300MHz	6	µQFN-12L	12	210	-25 dB	-32 dB	16.5
EMIF04-1502M8	General purpose < 300MHz	4	µQFN-8L	8	210	-25 dB	-32 dB	16.5
EMIF08-1502M16	General purpose < 300MHz	8	µQFN-16L	16	210	-30 dB	-27 dB	16.5
EMIF05-SK01F3	General purpose < 400MHz	5	WLCSP 400µ	11	300	-35 dB	-25 dB	1200
EMIF08-0402T16	General purpose < 400MHz	8	µQFN-16L	16	350		-24 dB	20

MEMORY AND SIM CARDS: EMI FILTERS AND ESD PROTECTION

Part number	Application	Number of lines	Package	Pin count	Specific application	Bandwidth (@ -3 dB)	Attenuation		Line capacitance (C_{line})
						(MHz)	900 MHz	2.4 GHz	max (pF)
EMIF03-SIM02F2	SIM card	3	WLCSP 500µ	8	3 lines + Vcc	200	-22 dB	-20 dB	20
EMIF03-SIM02M8	SIM card	3	µQFN-8L	8	3 lines + Vcc	280	-18 dB	-24 dB	20
EMIF03-SIM03F3	SIM card	3	WLCSP 400µ	8	3 lines + Vcc	350	-15 dB	-32 dB	12
EMIF03-SIM04F3	SIM card	3	WLCSP 400µ	12	3 lines + ESD	400	-12 dB	-22 dB	12
EMIF03-SIM05F3	SIM card	4	WLCSP 400µ	8	3 lines + ESD + NFC	300	-14 dB	-23 dB	12
EMIF03-SIM06F3	SIM card	3	WLCSP 400µ	11	3 lines + ESD + pull-up	400	-14 dB	-22 dB	12
EMIF06-MSD02N16	mini- and micro-SD card	6	µQFN-16L	16	With pull-up resistor	350	-18 dB	-24 dB	20
EMIF06-MSD04F3	mini- and micro-SD card	6	WLCSP 400µ	12	With pull-up resistor	550	-9 dB	-17 dB	10
EMIF06-mSD01F2	mini- and micro-SD card	6	WLCSP 500µ	12	With pull-up resistor	300	-14 dB	-25 dB	20
EMIF09-SD01F3	mini- and micro-SD card	9	WLCSP 400µ	25	With pull-up resistor	300	-16 dB	-22 dB	20
EMIF06-HSD03F3	mini- and micro-SD card	6	WLCSP 400µ	17	Without pull-up resistor	3000	-0.3 dB	-2.7 dB	3
EMIF06-HSD04F3	mini- and micro-SD card	6	WLCSP 400µ	15	With pull-up resistor	2000	-0.3 dB	-3 dB	4.5
EMIF06-USD05F3	mini- and micro-SD card	6	WLCSP 400µ	15	Without pull-up resistor	300	-30 dB	-26 dB	14
EMIF06-USD04F3	mini- and micro-SD card	6	WLCSP 400µ	15	Without pull-up resistor	600	-5 dB	-22 dB	12
EMIF06-USD14F3	mini- and micro-SD card	6	WLCSP 400µ	15	With pull-up resistor	600	-8 dB	-17 dB	12
EMIF06-HMC02F2	high speed multimedia card	6	WLCSP 500µ	16	With pull-up resistor	400	-14 dB	-27 dB	20

STANDARD MULTILINE BUS IPAD™: EMI FILTERS AND ESD PROTECTION

Part number	Number of lines	Package	Pin count	Bandwidth (@ -3 dB)	Attenuation		Line capacitance (C_{line})
				(MHz)	900 MHz	2.4 GHz	max (pF)
EMIF01-10005W5	2	SOT323-5L	5	150	-24 dB	-12 dB	50
EMIF01-1003M3	1	SOT-883	3	180	-27 dB	-20 dB	39
EMIF02-1003M6	2	µQFN-6L	6	180	-27 dB	-17 dB	39
EMIF04-1005M8	4	µQFN-8L	8	110	-35 dB	-33 dB	52
EMIF04-1502M8	4	µQFN-8L	8	210	-27 dB	-31 dB	16.5
EMIF06-1002F2	6	WLCSP 500µ	12	280	-19 dB	-20 dB	13.8
EMIF06-1005M12	6	µQFN-12L	12	110	-35 dB	-32 dB	52
EMIF06-1502M12	6	µQFN-12L	12	210	-25 dB	-32 dB	16.5
EMIF08-1005M16	8	µQFN-16L	16	110	-35 dB	-33 dB	52
EMIF08-1502M16	8	µQFN-16L	16	210	-35 dB	-32 dB	16.5
EMIF08-1005T16	8	µQFN-16L	16	110	-35 dB	-34 dB	50

USB IPAD™ : SINGLE ENDED EMI FILTER OR COMMON MODE FILTER

Part number	Application	ESD Protection		Number of package lines		Pin count	S_{21CC} or S_{21dd}	Attenuation (S_{21CC} or S_{21dd})			
		Datalines	Vbus					700 MHz	900 MHz	2.4 GHz	5.0 GHz
ECMF4-20A42N10	USB 3.1 Gen 1	Yes	-	4	µQFN-10L	10	S21cc	-13 dB	-16 dB	-25 dB	
ECMF04-4HSWM10	USB 3.1 Gen 1	Yes	-	4	µQFN-10L	10	S21cc		-15 dB	- 28 dB	- 16 dB
ECMF02-2HSMX6	USB 3.1 Gen 1	Yes	-	2	µQFN-6L	6	S21cc	-20 dB	-25 dB	-20 dB	-20 dB
ECMF02-2BF3	USB 2.0	Yes	-	2	WLCSP 400µ	5	S21cc	-13 dB	-24 dB	-16 dB	
ECMF02-3BF3	USB 2.0	Yes	-	3	WLCSP 400µ	6	S21cc		-29 dB		
ECMF02-4CMX8	USB 2.0	Yes	Yes	2	µQFN-8L	8	S21cc	-13 dB	-27 dB	-13 dB	
ECMF2-0730V12M12	USB 2.0	Yes	Yes	2	µQFN -12L	12	S21cc	-18 dB	-30 dB	-20 dB	-13 dB
ECMF02-2AMX6	USB 2.0	Yes	-	2	µQFN-6L	6	S21cc	-16 dB	-34 dB	-15 dB	
EMIF02-USB01F2	USB 2.0 Low Speed	Yes	Yes	2	WLCSP 500µ	6	S21dd	-20 dB	-24 dB	-30 dB	
EMIF02-USB01F2	USB 2.0 Low Speed	Yes	Yes	2	WLCSP 500µ	6	S21dd	-20 dB	-24 dB	-30 dB	
EMIF02-USB03F2	USB 2.0 Low Speed	Yes	Yes	2	WLCSP 500µ	5	S21dd	-14 dB	-16 dB	-30 dB	-22 dB
USBDF01W5	USB 2.0 Low Speed	Yes	-	2	SOT323-5L	5	S21dd	-27 dB	-23 dB	-17 dB	
USBDF02W5	USB 2.0 Low Speed	Yes	-	2	SOT323-5L	5	S21dd	-27 dB	-23 dB	-17 dB	
USBUF01W6	USB 2.0 Low Speed	Yes	-	2	SOT323-6L	6	S21dd	-20 dB	-28 dB	-13 dB	
USBUF02W6	USB 2.0 Low Speed	Yes	-	2	SOT323-6L	6	S21dd	-20 dB	-28 dB	-13 dB	
USBUF01P6	USB 2.0 Low Speed	Yes	-	2	SOT-666	6	S21dd	-19 dB	-16 dB		

ECMF™ AND CMF SERIES: COMMON MODE FILTER AND ESD PROTECTION

Part number	Application	ESD protection		Number of package lines		Pin count	Common mode attenuation (S_{21CC})			
		Datalines	Vbus				700 MHz	900 MHz	2.4 GHz	5.0 GHz
ECMF02-3HSM6	MIPI D-PHY	Yes	-	3	µQFN-6L	6	-22 dB	-33 dB		
ECMF04-4AMX12	MIPI D-PHY	Yes	-	4	µQFN-12L	12	-16 dB	-35 dB	-15 dB	-22dB
ECMF04-4HSM10	MIPI D-PHY	Yes	-	4	µQFN-10L	10	-20 dB	-33 dB		
ECMF06-6AM16	MIPI D-PHY	Yes	-	6	µQFN-16L	16	-17 dB	-24 dB		
ECMF06-6HSM16	MIPI D-PHY	Yes	-	6	µQFN-16L	16	-20 dB	-33 dB		
CMF2-0650A09H3	MIPI D-PHY	-	-	2	CSP - 5 microbumps	5	-27 dB	-35 dB	-23 dB	-25 dB
CMF2-24A60H3	MIPI D-PHY	-	-	2	CSP - 4 microbumps	4		-15 dB	-40 dB	-16 dB
ECMF4-20A42N10	USB 3.1 Gen 1 and HDMI 2.0	Yes	-	4	µQFN-10L	10	-13 dB	-16 dB	-25 dB	
ECMF04-4HSWM10	USB 3.1 Gen 1 and HDMI 2.0	Yes	-	4	µQFN-10L	10		-15 dB	- 28 dB	- 16 dB
ECMF02-2HSMX6	USB 3.1 Gen 1 and HDMI 2.0	Yes	-	2	µQFN-6L	6	-20 dB	-25 dB	-20 dB	-20 dB
ECMF02-2BF3	USB 2.0	Yes	-	2	WLCSP 400µ	5	-13 dB	-24 dB	-16 dB	
ECMF02-3BF3	USB 2.0	Yes	-	3	WLCSP 400µ	6		-29 dB		
ECMF02-4CMX8	USB 2.0	Yes	Yes	2	µQFN-8L	8	-13 dB	-27 dB	-13 dB	
ECMF2-0730V12M12	USB 2.0	Yes	Yes	2	µQFN -12L	12	-18 dB	-30 dB	-20 dB	-13 dB
ECMF02-2AMX6	USB 2.0 and MIPI D-PHY/MDDI	Yes	-	2	µQFN-6L	6	-16 dB	-34 dB	-15 dB	

HDMI SERIES

Part number	General description	HDMI standard	Interface type	Package size	Package	Pitch	TMDS line protection	Bandwidth	HDMI long cable drive	5 V backdrive	Enable
HDMI2C1-5DIJ	Signal conditioning and ESD protection for HDMI control line interfaces	HDMI 1.4 and 2.0	Source	5.0 mm x 4.0 mm	DFN-16L	500 µm	-	-	Yes	No	No
HDMI2C1-6C1	Signal conditioning and ESD protection for HDMI control line interfaces	HDMI 1.4 and 2.0	Source	3.5 mm x 3.5 mm	QFN-18L	500 µm	-	-	Yes	No	No
HDMI2C1-14HD	Signal conditioning and ESD protection for HDMI control and TMDS line interfaces	HDMI 1.4 and 2.0	Source	6.5 mm x 3.5 mm	µQFN-36L	500 µm	Yes	6.5 GHz	Yes	Yes	No
HDMI2C2-14HD	Signal conditioning and ESD protection for HDMI control and TMDS line interfaces	HDMI 1.4 and 2.0	Sink	6.5 mm x 3.5 mm	µQFN-36L	500 µm	Yes	6.5 GHz	Yes	No	No
HDMI2C1-14HDS	Signal conditioning and ESD protection for HDMI control and TMDS line interfaces	HDMI 1.4 and 2.0	Source	4.0 mm x 4.0 mm	µQFN-36L	500 µm	Yes	6.0 GHz	Yes	No	No
HDMI2C2-5F2	Signal conditioning and ESD protection for HDMI control line interfaces	HDMI 1.4 and 2.0	Source	2.0 mm x 1.35 mm	WLCSP-12b	500 µm	-	-	Yes	Yes	Yes
HDMI2C3-5F2	Signal conditioning and ESD protection for HDMI control line interfaces	HDMI 1.4 and 2.0	Source	2.1 mm x 1.5 mm	WLCSP-12b	500 µm	-	-	Yes	Yes	Yes
HDMI2C4-5F2	Signal conditioning and ESD protection for HDMI control line interfaces	HDMI 1.4 and 2.0	Sink	2.1 mm x 1.5 mm	WLCSP-10b	500 µm	-	-	Yes	Yes	Yes
HDMI05-CL01F3	ESD protection for HDMI control line with pull-up resistor on DDC bus and pull-down on HPD	HDMI 1.4 and 2.0	Source and sink	1.1 mm x 1.1 mm	WLCSP-8b	400 µm	-	-	No	No	No
HDMI05-CL02F3	ESD protection for HDMI control line with pull-up resistor on DDC bus/CEC and pull-down on HPD	HDMI 1.4 and 2.0	Source and sink	1.1 mm x 1.1 mm	WLCSP-9b	400 µm	-	-	No	No	No

Automotive protection devices

AUTOMOTIVE GRADE GENERAL PURPOSE ESD PROTECTION

Part number	Directionality	Number of lines	IEC 61000-4-2 contact/air	ISO 7637-2 pulse compliance	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage V_{BR} @ I_R	Capacitance I/O to GND @ 0V bias	Junction temperature (T_j)	Package	Package size L x W
			(kV)		(V)	max (µA)	min (V)	typ (pF)	max (°C)		(mm)
ESDALC5-1BT2Y	Unidirectional	1	> 8/15	3a, 3b	3	1	5	25	150	0402	1.0 x 0.6
ESDAXLC6-1BT2Y	Bidirectional	1	> 8/15	3a, 3b	6	0.07	6	0.4	150	Thin SOD882	1.00 x 0.60
ESDAVLC8-1BT2Y	Bidirectional	1	> 8/15	3a, 3b	3	0.05	8.5	4.5	125	Thin SOD882	1.00 x 0.60
ESDAXLC18-1BF4Y(*)	Bidirectional	1	> 8/30	3a, 3b	18	0.03	18	0.45	150	ST0201	0.60 x 0.30
ESDA5V3LY	Unidirectional	2	> 8/15	3a, 3b	3	2	5.3	280	150	SOT23	2.90 x 2.80
ESDA6V1LY	Unidirectional	2	> 8/15	3a, 3b	5.2	20	6.1	140	150	SOT23	2.90 x 2.80
ESDA14V2LY	Unidirectional	2	> 8/15	1, 2, 3a, 3b	12	5	14.2	90	150	SOT23	2.95 x 2.40
ESDA25LY	Unidirectional	2	> 8/15	1, 2, 3a, 3b	24	1	25	50	150	SOT23	2.95 x 2.40
USBLC6-2SC6Y	Unidirectional	2	> 8/15	3a, 3b	5.25	0.15	6	2.5	150	SOT23-6L	2.90 x 2.80
HSP061-2P6Y	Unidirectional	2	> 8/15	3a, 3b	5	0.5	6	0.6	125	SOT666	1.60 x 1.60
ESDA5V3SC6Y	Unidirectional	4	> 8/15	3a, 3b	3	2	5.3	280	150	SOT23-6L	2.90 x 2.80
ESDA6V1SC6Y	Unidirectional	4	> 8/15	3a, 3b	5.2	20	6.1	190	150	SOT23-6L	2.90 x 2.80
DALC208SC6Y	Unidirectional	4	> 8/15	3a, 3b	5	1	9	7	150	SOT23-6L	2.90 x 2.80
ESDA14V2SC5Y	Unidirectional	4	> 8/15	1, 2, 3a, 3b	12	5	14.2	100	150	SOT23-5L	2.90 x 2.80
ESDA25SC6Y	Unidirectional	4	> 8/15	1, 2, 3a, 3b	24	1	25	60	150	SOT23-6L	2.90 x 2.80
USBLC6-4SC6Y	Unidirectional	4	> 8/15	3a, 3b	5.25	0.15	6	3	150	SOT23-6L	2.90 x 2.80
DVIULC6-4SC6Y	Unidirectional	4	> 8/15	3a, 3b	5	0.5	6	0.85	150	SOT23-6L	2.90 x 2.80
HDMIULC6-4SC6Y	Unidirectional	4	> 8/15	3a, 3b	5	0.5	6	0.85	150	SOT23-6L	2.90 x 2.80
HSP061-4M10Y	Unidirectional	4	> 8/15	3a, 3b	5	0.5	6	0.6	150	QFN-10L	2.50 x 1.0

Note: (*) New products, available in Q2-2016

AUTOMOTIVE GRADE COMMUNICATION BUS PROTECTION

Part number	Number of protected lines	ISO 7637-2 pulse compliance	ISO 10605 - C=330 pF, R=330 Ω contact/air	Peak pulse power 8/20 µs	Stand-off voltage (V_{RM})	Leakage current (I_{RM}) @ V_{RM}	Breakdown voltage (V_{BR}) @ I_R		Capacitance (C_{line}) @ 0 V	Junction temperature (T_j)	Package
			(kV)	(W)	(V)	(µA)	V_{BR} + / V_{BR} - min (V)	(mA)	max (pF)	max (°C)	
LIN bus protection											
ESDLIN1524BJ	1	3a, 3b	> 8/15	160/200	15/- 24	0.5	17.1 / -25.4	5	20	125	SOD323
ESDLIN03-1BWY	1	3a, 3b	> 8/15	160/200	24/- 24	0.5	17.1 / -25.4	5	20	125	SOD323
CAN bus protection											
ESDCAN24-2BLY	2	3a, 3b	> 30/30	230	24	0.1	27 / -27	1	30	150	SOT23-3L
ESDCAN01-2BLY	2	3a, 3b	> 30/30	230	24	0.1	25 / -25	1	30	150	SOT23-3L
ESDCAN02-2BWY	2	3a, 3b	> 30/30	250	26.5	0.01	28.5 / -28.5	1	3.5	175	SOT323-3L
ESDCAN03-2BWY	2	3a, 3b	> 30/30	250	24	0.01	26.5 / -26.5	1	3.5	175	SOT323-3L
ESDCAN04-2BWY(*)	2	3a, 3b	> 30/30	250	24	0.01	26.5 / -26.5	1	17	175	SOT323-3L
ESDCAN05-2BWY(*)	2	3a, 3b	> 30/30	250	36	0.01	37 / -37	1	3.5	175	SOT323-3L
ESDCAN06-2BWY(*)	2	3a, 3b	> 30/30	250	35	0.01	36 / -36	1	15	175	SOT323-3L

Note: (*) New products, available in Q2-2016

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