

## Bill of materials

Table 1. STDES-VRECTFD bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	Table 2. Power board	-	Power board	ST	Not available for separate sale
2	1	Table 3. Control board	-	Control board	ST	Not available for separate sale

Table 2. Power board bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	28	C1, C9, C10, C11, C19, C20, C21, C29, C30, C33, C34, C44, C47, C48, C58, C65, C66, C76, C84, C86, C94, C102, C148, C149, C164, C178, C194, C206	SMD 0603 (1608)	Multilayer ceramic capacitors (not mounted)	-	-
2	1	C240	SMD 0805 (2012)	Multilayer ceramic capacitor (not mounted)	-	-
3	2	C8, C14	100 nF, SMD 0603 (1608), 16 V, $\pm 10\%$	Multilayer ceramic capacitors (not mounted)	Würth Elektronik	885012206046
4	5	C41, C55, C74, C93, C101	1 nF, SMD 0603 (1608), 25 V, $\pm 10\%$	Multilayer ceramic capacitors	Würth Elektronik	885012006044
5	50	C2, C4, C6, C12, C16, C17, C22, C24, C27, C28, C31, C35, C37, C39, C40, C42, C45, C49, C51, C53, C54, C56, C60, C61, C63, C67, C69, C71, C72, C73, C77, C78, C79, C81, C83, C85, C88, C90, C91, C96, C98, C99, C104, C105, C125, C127, C152, C160, C180, C186	100 nF, SMD 0603 (1608), 25 V, $\pm 10\%$	Multilayer ceramic capacitors	Würth Elektronik	885012206046
6	1	C7	1 $\mu$ F, SMD 0603 (1608), 440 V <sub>AC</sub> , $\pm 20\%$	Multilayer ceramic capacitor (not mounted)	Würth Elektronik	885012206076
7	33	C3, C5, C13, C15, C18, C23, C25, C26, C32, C36, C43, C46, C50, C57, C59, C62, C64, C68, C75,	1 $\mu$ F, SMD 0603 (1608), 305 V <sub>AC</sub> , $\pm 20\%$	Multilayer ceramic capacitors	Würth Elektronik	885012206076

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
		C80, C82, C87, C92, C95, C100, C103, C106, C123, C124, C151, C159, C179, C185				
8	5	C38, C52, C70, C89, C97	4.7 $\mu$ F, SMD 0603 (1608), 50 V, $\pm$ 10 %	Multilayer ceramic capacitors	Any	Any
9	10	C107, C108, C114, C116, C117, C118, C119, C120, C121, C122	Radial, Disc, 25 V, $\pm$ 5 %	Multilayer ceramic capacitors (not mounted)	-	-
10	6	C109, C110, C111, C112, C113, C115	Radial, 50 V, $\pm$ 10 %	Multilayer ceramic capacitors (not mounted)	-	-
11	30	C126, C128, C130, C132, C137, C138, C141, C142, C145, C150, C153, C154, C157, C161, C166, C167, C170, C173, C174, C176, C181, C182, C188, C189, C195, C196, C198, C200, C201, C204	2.2 $\mu$ F, SMD 1206 (3216), 50 V, $\pm$ 5 %	Multilayer ceramic capacitors	Any	Any
12	12	C129, C134, C140, C144, C156, C163, C169, C175, C184, C191, C197, C203	100 nF, SMD 1206 (3216), 50 V, $\pm$ 10 %	Multilayer ceramic capacitors	Würth Elektronik	885012208058
13	12	C131, C133, C139, C143, C155, C162, C168, C172, C183, C190, C193, C202	1 nF, SMD 1206(3216), 630 V <sub>DC</sub> V, $\pm$ 10 %	Multilayer ceramic capacitors	Würth Elektronik	885012208075
14	6	C135, C136, C158, C165, C187, C192	220 pF, SMD 0603 (1608), 500 V, $\pm$ 20 %	Multilayer ceramic capacitors	Würth Elektronik	885012206079
15	12	C146, C147, C171, C177, C199, C205, C219, C220, C223, C225, C226, C228	470 nF, SMD 0805(2012), 1K V <sub>DC</sub> , $\pm$ 10 %	Multilayer ceramic capacitors	Any	Any
16	6	C207, C210, C211, C213, C216, C217	100 nF, Radial, 25 V, $\pm$ 20 %	CAP FILM RADIAL	Würth Elektronik	890303425004CS
17	4	C208, C209, C214, C215	470 $\mu$ F, Radial, Can - Snap-In, 200 V, $\pm$ 10 %	Aluminium capacitors	Vishay BC Components	MAL215759471E3

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
19	1	C212	100 nF, Radial, 16 V, ±20 %	Film radial capacitor	KEMET	R474N310050A1K
20	7	C218, C221, C222, C224, C227, C229, C236	10 µF, SMD 0805 (2012)	Multilayer ceramic capacitors	Any	Any
21	1	C230	3.3 nF, SMD 1206 (3216), ±20 %	Multilayer ceramic capacitor	Any	Any
22	1	C231	560 µF, Radial, Can, 450 V, ±20 %	Aluminium capacitor	Panasonic Electronic Components	16SEPF560M
23	2	C232, C237	0805 (2012 Metric)	Capacitors (not mounted)	-	-
24	2	C233, C234	0805 (2012 Metric), ±20 %	Capacitors (not mounted)	-	-
25	1	C235	15 µF, Radial, Can, 50 V, ±10 %	Aluminium capacitor	Panasonic Electronic Components	EEU-EE2W150
26	1	C238	680 µF, Radial, Can, 50 V, ±5 %	Aluminium capacitor	Panasonic Electronic Components	EEU--FR1C681L
27	1	C239	15 µF, Radial, Can, 50 V, ±5 %	Aluminium capacitor	Würth Elektronik	860160572002
28	1	C241	100 nF, 0805 (2012 Metric), 30 V	Multilayer ceramic capacitor	Würth Elektronik	885012207098
29	1	C242	220 pF, 0805 (2012 Metric)	Multilayer ceramic capacitor	Any	Any
30	6	C243 C245 C246 C247 C248 C249	1 nF, SMD 0603 (1608), 20 V	Multilayer ceramic capacitors	Würth Elektronik	885012206083
31	3	D1, D2, D3	STPS1L30A, SMA	30 V, 1 A low drop power Schottky rectifiers (not mounted)	ST	<a href="#">STPS1L30A</a>
32	17	D4, D17, D18, D30, D32, D44, D46, D53, D54, D55, D56, D57, D58, D59, D60, D66, D67	LED RED, 1206 (3216 Metric), 20 A	Red LEDs	Lumex Opto/ Components Inc.	SML-LX1206SIC-TR
33	12	D7, D8, D12, D14, D21, D23, D24, D29, D35, D37, D38, D43	TZMB20-GS08, DO-213AC, MINI-MELF, SOD-80, 100 V	Zener diodes	Vishay Semiconductor Diodes Division	TZMB20-GS08
34	12	D11, D13, D15, D16, D26, D27, D28, D31, D39, D41, D42, D45	TZMB3V3-GS08, DO-213AC, MINI-MELF, SOD-80, 600 V	Zener diodes	Vishay Semiconductor Diodes Division	TZMB3V3-GS08
35	6	D47, D48, D49, D50, D51, D52	STPSC20H12WL, TO-220AC	1200 V, 20 A high surge silicon carbide power Schottky diode	ST	<a href="#">STPSC20H12WL</a>
36	1	D61	STPS2H100A, SMA	100 V, 2 A power Schottky rectifier	ST	<a href="#">STPS2H100A</a>

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
37	1	D62	STTH1L06A, SMA	600 V, 1 A low drop ultrafast diode	ST	STTH1L06A
38	2	D63, D65	STPS1150A, SMA	150 V, 1 A power Schottky rectifier	ST	STPS1150A
39	1	D64	STPS2L60A, SMA	60 V, 2 A low drop power Schottky rectifier	ST	STPS2L60A
40	6	DC1, DC2, DC3, DC4, DC5, DC6	R12P22005D, 0.77" L x 0.39" W x 0.49" H (19.5 mm x 9.8 mm x 12.5 mm)	DC-DC converters	Recom Power	R12P22005D
41	49	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F37, F38, F39, F40, F41, F42, F43, F44, F45, F46, F47, F48, F49, F50, F51, F52	22 ohm at 100 MHz, 0805 (2012 Metric)	Ferrite beads	Würth Elektronik	742792021
42	3	F34, F35, F36	Fuse10X38, 2Xclips + Fuse 250 V 30 A	Fuse clip cartridges	Eaton + Littelfuse	BK/1A3400-09-R + OFLM030, T
43	1	JP12	Con2, 2pos 7.62 mm	Connector terminal block	Phoenix Contact	1731721+M46:O46F46M46:N46
44	4	J1, JP55, JP56, JP57	Con2, 2pos 5.08 mm	Connector terminal blocks	Würth Elektronik	691213510002
45	1	J2	Digital power connector	Connector	ERNI	284166 32X2
46	2	P2 X 2	Male DIN 41612 through hole 90 degree	Adapter digital power connector	ERNI	384241
47	2	J3, J10	Con3_32A, 3P 9.52 mm 90DEG	Fixed terminal blocks	Phoenix Contact	1714984
48	6	J4, J5, J6, J7, J8, J9	Con3	Pin headers	Würth Elektronik	61300311121
49	2	J11, J12	Dev3, 20.5 A	Switches	Würth Electronics Inc.	450301014042
50	39	JP11, JP13, JP14, JP15, JP16, JP19, JP20, JP21, JP22, JP23, JP24, JP25, JP26, JP27, JP28, JP30, JP31, JP32, JP34, JP35, JP36, JP37, JP38, JP39, JP40, JP41, JP42, JP43, JP45, JP46, JP48, JP49, JP50,	Jp_pcb	Jumpers (not mounted)	-	-

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
		JP51, JP52, JP53, JP54, JP60, JP61				
51	8	JP17, JP18, JP29, JP33, JP44, JP47, JP58, JP59	3JP_pcb	Jumpers (not mounted)	-	-
52	3	L1, L2, L3	±20 %	Inductors (not mounted)	Pulse electronics	PA0431LNL
53	3	L4, L5, L6	514 µH	Boost inductors	Würth Electronics Inc.	750344313
54	1	L7		Inductor (not mounted)	-	-
55	6	L9, L10, L11, L12, L13, L14	22 µH 130 mA, 0805 (2012 Metric)	Fixed inductors	Taiyo Yuden	LBC2012T220M
56	2	LCM1, LCM2	3Phase_Cm_Choke	Common mode chokes (not mounted)	-	-
57	4	LEM1, LEM2, LEM3, LEM4	LTSR 15-NP, Ring Opening 0.126" Diam., 6 leads	Hall current sensors	LEM USA Inc.	LTSR 15-NP
58	2	2XP3	CON40A, 2X20, pitch 2.54 mm	Connector	Sullins Connector Solution	PPPC202LJBN-RC
59	13	PROBE1, PROBE2, PROBE3, PROBE4, PROBE5, PROBE6, PROBE8, PROBE9, PROBE10, PROBE11, PROBE12, PROBE13, PROBE14	Current_ProbE	Jumpers (not mounted)	-	-
60	1	Q1	STS6NF20V, SO-8	N-channel 20 V, 30 mOhm typ., 6 A, 2.7 V drive STripFET II power MOSFET in an SO-8 package	ST	STS6NF20V
61	6	Q2, Q3, Q4, Q5, Q6, Q7	2STF1360, SOT-89	Low voltage fast-switching NPN power transistor	ST	2STF1360
62	6	Q8, Q9, Q10, Q11, Q12, Q13	SCTW35N65G2V, HiP247	Silicon carbide power MOSFET 650 V, 55 mOhm typ., 45 A in an HiP247 package	ST	SCTW35N65G2V
63	8	R1, R3, R19, R21, R37, R39, R139, R141	7.5 k, SMD 0603(1608), ±1 %	Resistors	Any	Any
64	31	R2, R8, R10, R20, R26, R28, R38, R44, R45, R56, R57, R58, R62, R71, R78, R79, R80, R84,	SMD	Resistors	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
		R93, R100, R101, R102, R106, R115, R131, R140, R149, R163, R12, R30, R48				
65	22	R4, R24, R42, R128, R191, R195, R196, R197, R198, R199, R213, R214, R215, R222, R223, R224, R237, R238, R239, R244, R247, R248		Resistors (not mounted)	Any	Any
66	4	R147, R154, R161, R166	10.5k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
67	3	R70, R92, R114	12.4k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
68	31	R5, R6, R7, R13, R16, R22, R23, R25, R31, R34, R40, R41, R43, R49, R52, R74, R96, R118, R125, R127, R129, R134, R137, R151, R18, R36, R54, R67, R89, R111	10 k, SMD 0603(1608), $\pm 0.1\%$	Resistors	Any	Any
69	3	R15, R33, R51		Resistors	Any	Any
71	6	R11, R18, R29, R36, R47, R54	18.7 k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
72	6	R12, R30, R48, R59, R81, R103	36k, SMD 0603(1608), $\pm 1\%$	Resistors	Any	Any
73	3	R14, R32, R50 N.M.	69.8 k, SMD 0603 (1608), $\pm 0.1\%$	Resistors (not mounted)	Any	Any
74	3	R61, R83, R105	69.8 k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
75	15	R60, R64, R65, R82, R86, R87, R104, R108, R109, R142, R143, R144, R156, R157, R158	1 M, SMD1206 (3216), $\pm 0.1\%$	Resistors	Any	Any
76	3	R63, R85, R107	13.3 k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
77	6	R66, R68, R88, R90, R110, R112	2 k, SMD 0603(1608), $\pm 1\%$	Resistors	Any	Any
78	6	R76, R98, R120	8.06k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
79	5	R72, R94, R116, R150, R164	11.3 k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
80	5	R75, R97, R119, R152, R167	3.74 k, SMD 0603 (1608)	Resistors (not mounted)	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
81	1	R121	470, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
82	1	R122	5.6k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
83	1	R123	5.1 k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
84	1	R124	22, SMD 1206 (3216)	Resistors	Any	Any
85	6	R193, R194, R212, R221, R236, R246	22, SMD1210(3225), $\pm 0.1\%$	Resistors	Any	Any
86	1	R126	33 k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
87	2	R130, R136	24 k, SMD 0603 (1608), $\pm 0.1\%$	Resistors	Any	Any
88	2	R132, R138	9.1 k, SMD 0603(1608)	Resistors	Any	Any
89	1	R135 N.M.	30 k, SMD 0603(1608), %,	Resistors	Any	Any
90	4	R145, R155, R159, R169	16.9 k, SMD 0603 (1608), $\pm 1\%$	Resistors	Any	Any
91	4	R148, R153, R162, R168	1.6 k, SMD 0603 (1608)	Resistors	Any	Any
92	9	R170 R171 R172 R173 R174 R175 R176 R177 R178	SMD 0805 (2012)	Resistors (not mounted)	Any	Any
93	1	R179	SMD 1206 (3216)	Resistor (not mounted)	Any	Any
94	19	R180, R181, R202, R203, R205, R206, R226, R227, R229, R230, R250, R251, RLED1, RLED2, RLED3, RLED4, RLED5, RLED6, RLED7	1 k, SMD 0603 (1608)	Resistors	Any	Any
95	6	R184, R185, R209, R219, R233, R243	12, SMD 1210 (3225),	Resistors	Any	Any
96	6	R186, R188, R207, R217, R231, R241	100, SMD 0603 (1608)	Resistors	Any	Any
97	33	R9, R17, R35, R46, R53, R69, R72, R73, R91, R94, R95, R113, R116, R117, R133, R146, R149;R151, R160, R163, R165, R187, R189, R190, R192, R208, R211, R218, R220,	0, SMD 1210 (3225)	Resistors	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
		R232, R235, R242, R245				
98	6	R200, R201, R216, R225, R240, R249	47 k, SMD 1206 (3216)	Resistors	Any	Any
99	6	R252, R253, R254, R255, R256, R257	240 k, SMD 1206 (3216)	Resistors	Any	Any
100	2	R258, R259	750, SMD 0805 (2012)	Resistors	Any	Any
101	1	R260	750, SMD 1206 (3216)	Resistor	Any	Any
102	2	R261, R262	51k, SMD 1206 (3216)	Resistors	Any	Any
103	1	R263	10, SMD 0603(1608), %,	Resistor	Any	Any
104	2	R55, R77, R99, R264, R267	27 k, SMD 0603 (1608)	Resistors	Any	Any
105	1	R265	10.2 k, SMD 0603 (1608)	Resistor	Any	Any
106	1	R266	110 k, SMD 0603 (1608)	Resistor	Any	Any
107	3	RT1, RT2, RT3	5 A 32 mm	Inrush current limiters	Ametherm	SL32 5R020-B
108	1	T1	TRANSFORMER FLAT COMPACT	Transformer (not mounted)	Würth	750317707
109	103	TP1, TP2, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, TP47, TP48, TP49, TP50, TP51, TP52, TP53, TP54, TP55, TP56, TP57, TP58, TP59, TP60, TP61, TP62, TP63, TP64, TP65, TP66, TP67, TP68, TP69, TP70,	TestPoint_Ring, 1 mm	Test terminals	Any	Any



Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
		TP71, TP72, TP73, TP74, TP75, TP76, TP77, TP78, TP79, TP80, TP81, TP82, TP83, TP84, TP85, TP86, TP87, TP88, TP89, TP90, TP91, TP92, TP93, TP94, TP95, TP96, TP97, TP98, TP99, TP100, TP101, TP102, TP103, TP104				
110	7	U10, U12, U13, U1, U3, U5, U8	TSV914IDT, SO-14	Wide-bandwidth (8 MHz) rail to rail input/output 5 V CMOS Op-Amps, quad	ST	TSV914IDT
111	4	U11, U14, U15, U7	TSV912IDT, SO-8	Wide-bandwidth (8 MHz) rail to rail input/output 5V CMOS Op-Amps, dual	ST	TSV912IDT
112	5	U16, U17, U19, U21, U22	AMC1301DWVR, 8-SOIC (0.295", 7.50 mm Width)	IC op-amp isolation circuits	Texas Instruments	AMC1301DWVR
113	2	U18, U23	DCH010505SN7, SIP,	1-channel DC-DC power supply module 4-pin	Texas Instruments	DCH010505SN7
114	1	U20	STLM20W87F, SOT323-5L	Analog temperature sensor, ultra-low current 2.4 V, high precision	ST	STLM20W87F
115	6	U24, U25, U26, U27, U28, U29	STGAP2SICS, SO-8	Galvanically isolated 4 A single gate driver	ST	STGAP2SICS
116	4	U2, U4, U6, U9	TSV912IDT, SO-8	Wide-bandwidth (8 MHz) rail to rail input/output 5V CMOS Op-Amps, dual	ST	TSV912IDT
117	2	U30, U32	LD29080DT50R, DPAK	800 mA fixed and adjustable output very low drop voltage regulator	ST	LD29080DT50R
118	2	U31, U33	LD29080S33R, SOT-223	800 mA fixed and adjustable output very low drop voltage regulator	ST	LD29080S33R
119	1	U34	VIPER26HD, SO-16	Fixed frequency VIPer plus family	ST	VIPER26HD
120	5	TW1, TW2, TW3, TW4, TW5	M3X10, Male/ Female M3X10 mm	Spacers	Würth Elektronik	971100351

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
121	5	Screw M3 X 6mm	M3 Pan Head, M3X6mm	Screws	RS	482-8515
122	10	TW6, TW7, TW8, TW9, TW10, TW11, TW12, TW13, TW14, TW15	M3X40, Brass Hex Standoff	Brass Hex Standoff Male/Female, 40mm, M3 x M3	Würth Elektronik	971100354
123	10	M3	Hex Nut, M3	Hex nut	RS	483-0502

**Table 3. Control board bill of materials**

Item	Q.ty	Ref.	Part / Value	Description	Manufacturer	Order code
1	1	CN56	Jtag_SWD_Adapter	Connector	Samtec	FTSH-105-01-F-D-K
2	26	C1, C3, C5, C6, C7, C10, C28, C34, C36, C37, C45, C48, C49, C51, C52, C53, C55, C59, C61, C62, C65, C66, C134, C137, C138, C139	100nF/16V	CAPACITOR, 603	Any	Any
3	7	C2, C27, C35, C47, C50, C58, C64	1µF/25V	CAPACITOR, 603	Any	Any
4	17	C11, C12, C13, C14, C20, C21, C22, C24, C30, C31, C32, C33, C38, C40, C42, C43, C140	100pF/50V	CAPACITOR, 603	Any	Any
5	3	C15, C23, C135	220nF/50V	CAPACITOR, 603	Any	Any
6	1	C18	470nF/50V	CAPACITOR, 805	Murata	-
7	1	C29	220pF/50V	CAPACITOR, 603	Any	Any
8	1	C133	10µF/25V	CAPACITOR, 805	TDK	-
9	7	D2, D4, D5, D9, D12, D13, D15	GREEN	LED, SMD 0805	Any	Any
10	2	D3, D10	SMAJ5.0A-TR, SMA	400 W TVS in SMA	ST	SMAJ5.0A-TR
11	1	D7	RED	LED, SMD 0805	Any	Any
12	5	F1, F2, F3, F4, F5	30Ω@100MHz	-	TDK Corporation	MPZ2012S300AT000
13	2	JP1, JP7	3JP_pcb	-	-	-
14	1	JP2	STRIP_2X3 (not mounted)	-	-	-
15	1	J1	i2C	CONNECTOR, strip4_100m_v	Any	Any
16	1	J2	CON4	CONNECTOR, strip4_100m_v	Any	Any
17	1	LED1	-	LED	OSRAM	LSG T676
18	1	L1	WE-CBF	FERRITE, 603	WE	74279262
19	1	P1	64 male	Connector	ERNI	533406

Item	Q.ty	Ref.	Part / Value	Description	Manufacturer	Order code
20	16	R2, R4, R5, R8, R10, R13, R16, R19, R23, R30, R35, R44, R125, R128, R129, R130	10k	RESISTOR, 603	Any	Any
21	36	R6, R7, R9, R12, R14, R15, R20, R21, R22, R24, R25, R26, R27, R28, R29, R31, R33, R34, R36, R38, R40, R41, R42, R43, R47, R48, R49, R52, R54, R55, R57, R58, R59, R60, R61, R62	(not mounted)	RESISTOR, 603	Any	Any
22	10	R17, R39, R45, R46, R50, R51, R53, R56, R131, R133	1k	RESISTOR, 603	Any	Any
23	2	R126, R127	0	RESISTOR, 603	Any	Any
24	2	S1, S2	-	None	TE Connectivity	FSM4JSMATR
25	26	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP24, TP25, TP26, TP27	-	TestPoint, TestPoint	Any	Any
26	1	USB2	-	microUSB connector	MOLEX	47346-0001
27	5	U2, U5, U6, U9, U10	TSV912IDT, SO-8	Wide-bandwidth (8 MHz) rail to rail input/output 5V CMOS Op-Amps, dual	ST	TSV912IDT
28	1	U3	LD29080S33R, SOT-223	800 mA fixed and adjustable output very low drop voltage regulator	ST	LD29080S33R
29	1	U4	STM32G474RE, LQFP64	Mainstream Arm Cortex-M4 MCU 170 MHz with 512 Kbytes of Flash memory, Math Accelerator, HR Timer, High Analog level integration	ST	STM32G474RE
30	1	U22	ESDA6V1L, SOT23-3L	Dual Transil array for ESD protection	ST	ESDA6V1L

## Evaluation board license agreement

**Important:** All information on this document is subject to this Evaluation Board License Agreement.

By using this evaluation board or kit (together with all related software, firmware, components, and documentation provided by ST, "Evaluation Board"), You ("You") are agreeing to be bound by the terms and conditions of this Evaluation Board License Agreement ("Agreement"). Do not use the Evaluation Board until You have read and agreed to this Agreement. Your use of the Evaluation Board constitutes Your acceptance of this Agreement.

### LICENSE

STMicroelectronics ("ST") grants You the right to use the enclosed Evaluation Board offering limited features only to evaluate and test ST products solely for Your evaluation and testing purposes in a research and development setting. The Evaluation Board shall not be, in any case, directly or indirectly assembled as a part in any production of Yours as it is solely developed to serve evaluation purposes and has no direct function and is not a finished product. If software and/or firmware is accompanied by a separate end user license agreement ("EULA"), then such software and/or firmware shall be governed by such EULA.

### EVALUATION BOARD STATUS

The Evaluation Board offers limited features allowing You only to evaluate and test the ST products. The Evaluation Board is not intended for consumer or household use. You are not authorized to use the Evaluation Board in any production system, and it may not be offered for sale or lease, or sold, leased or otherwise distributed for commercial purposes. If the Evaluation Board is incorporated in an evaluation system, the evaluation system may be used by You solely for Your evaluation and testing purposes. Such evaluation system may not be offered for sale or lease or sold, leased or otherwise distributed for commercial purposes and must be accompanied by a conspicuous notice as follows: "This device is not, and may not be, offered for sale or lease, or sold or leased or otherwise distributed for commercial purposes".

### OWNERSHIP AND COPYRIGHT

Title to the Evaluation Board remains with ST and/or its licensors. You may not remove any copyright or other proprietary rights notices without prior written authorization from ST. You may make one copy of the software and/or firmware of the Evaluation Board for back up or archival purposes provided that You reproduce and apply to such copy any copyright or other proprietary rights notices included on or embedded in the software and/or firmware. You agree to prevent any unauthorized copying in whole or in part of the Evaluation Board.

### RESTRICTIONS AND WARNINGS

Before You handle or use the Evaluation Board, You must carefully review any related documentation provided by ST. Such documentation may contain important warnings. You shall comply with all such warnings and other instructions and employ reasonable safety precautions in using the Evaluation Board. Failure to do so may result in death, personal injury, or property damage. If You have any questions regarding the safe usage of the Evaluation Board, You should contact ST for guidance.

You may not sell, assign, sublicense, lease, rent or otherwise distribute the Evaluation Board for commercial purposes, in whole or in part, or use Evaluation Board in a production system, with the exception that if You are an authorized ST distributor, You may resell the Evaluation Board in compliance with the applicable terms and conditions. Except as provided in this Agreement or as explicitly permitted in the documentation of the Evaluation Board, You may not reproduce the Evaluation Board or modify,

reverse engineer, de-compile or disassemble its software and/or firmware, in whole or in part.

You shall not use the Evaluation Board in any safety critical or functional safety testing, including but not limited to testing of life supporting, military or nuclear applications. ST expressly disclaims any responsibility for such usage which shall be made at Your sole risk, even if ST has been informed in writing of such usage. Unless expressly designated in writing by ST as suitable for use in testing automotive or aerospace applications, You shall not use the Evaluation Board in such testing.

### Notice applicable to Evaluation Boards according to European Regulation

For the European Regulation of the Evaluation Board, the applicable EU directives are considered, with a particular attention to the Low Voltage Directive (LVD) 2014/35/EU, the Electromagnetic Compatibility (EMC) Directive 2014/30/EU, and the Radio Equipment Directive (RED) 2014/53/EU. If the Evaluation Board is outside the scope of the foregoing Directives, then the General Product Safety Directive (GPSD) 2001/95/EC and Council Directive 93/68/EEC, amending Directive 73/23/EEC on electrical equipment designed for use within certain voltage limits, are applicable.

The Evaluation Board meets the requirements of the Restriction of Hazardous Substances (RoHS 2 or RoHS recast) Directive 2011/65/EU, Annex II, as amended by Directive 2015/863/EU.

### Notice applicable to Evaluation Boards not FCC-Approved

This kit is designed to allow:

1. Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and
2. Software developers to write software applications for use with the end product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of 47 CFR, Chapter I ("FCC Rules"), the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

### For Evaluation Boards annotated as FEDERAL COMMUNICATIONS COMMISSION (FCC) Part 15 Compliant

- **FCC Interference Statement for Class A Evaluation Boards:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- **FCC Interference Statement for Class B Evaluation Boards:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### WARRANTY

ST WARRANTS THAT IT HAS THE RIGHT TO PROVIDE THE EVALUATION BOARD TO YOU. THIS WARRANTY IS PROVIDED BY ST IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY AS TO MERCHANTABILITY, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR UNINTERRUPTED OR ERROR-FREE OPERATION, ALL OF WHICH ARE EXPRESSLY DISCLAIMED. THE EVALUATION BOARD IS PROVIDED "AS IS".

YOU WARRANT TO ST THAT YOU WILL ENSURE THE EVALUATION BOARD IS USED ONLY BY ELECTRONICS EXPERTS WHO UNDERSTAND THE DANGERS OF HANDLING AND USING SUCH ITEMS, YOU ASSUME ALL RESPONSIBILITY AND LIABILITY FOR ANY IMPROPER OR UNSAFE HANDLING OR USE OF THE EVALUATION BOARD BY YOU, YOUR EMPLOYEES, AFFILIATES, CONTRACTORS, AND DESIGNEES.

#### **LIMITATION OF LIABILITIES**

IN NO EVENT SHALL ST BE LIABLE TO YOU, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR ANY OTHER LEGAL THEORY, FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, INCIDENTAL, PUNITIVE, OR EXEMPLARY DAMAGES WITH RESPECT TO ANY MATTERS RELATING TO THIS AGREEMENT, REGARDLESS OF WHETHER ST HAS BEEN ADVISED OF THE POSSIBILITY OF THE SAME. IN NO EVENT SHALL ST'S LIABILITY ARISING OUT OF THIS AGREEMENT IN THE AGGREGATE EXCEED THE AMOUNT PAID BY YOU UNDER THIS AGREEMENT FOR THE PURCHASE OF THE EVALUATION BOARD, OR TEN UNITED STATES DOLLARS (\$10.00) IF NO PURCHASE PRICE WAS PAID.

#### **INDEMNIFICATION**

You shall, at Your expense, defend ST and its Affiliates against a claim or action brought by a third party for infringement or misappropriation of any patent, copyright, trade secret or other intellectual property right of a third party to the extent resulting from (1) Your combination of the Evaluation Board with any other component, system, software, or firmware, (2) Your modification of the Evaluation Board, or (3) Your use of the Evaluation Board in a manner not permitted under this Agreement.

You shall indemnify ST and its Affiliates against and pay any resulting costs and damages finally awarded against ST or its Affiliates or agreed to in any settlement, provided that You have sole control of the defense and settlement of the claim or action, and ST cooperates in the defense and furnishes all related evidence under its control at Your expense. ST will be entitled to participate in the defense of such claim or action and to employ counsel at its own expense.

"Affiliates" means any corporation or other entity directly or indirectly controlled by, controlling or under common control with the entity in question, for so long as such ownership exists. "Control" means the direct or indirect beneficial ownership of more than fifty (50%) percent of the stock or other equity interests entitled to vote for the election of directors or an equivalent governing body. Any such corporation or other legal entity shall be deemed to be an Affiliate of such Party only as long as such Control exists.

#### **TERMINATION**

ST may terminate this Agreement without notice if You breach this Agreement. Upon termination, You shall immediately destroy or return all copies of the software, firmware, and documentation of the Evaluation Board to ST and certify in writing to ST that You have done so.

#### **APPLICABLE LAW AND JURISDICTION**

This Agreement shall be governed, construed and enforced in accordance with the laws of Switzerland, without regard to its conflict of laws rules. The UN Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. In case of dispute and in the absence of an amicable settlement, the only competent jurisdiction shall be the Courts of Geneva, Switzerland. Any breach of this Agreement by You may result in irreparable damage to ST for which ST will not have an adequate remedy at law. Accordingly, in addition to any other remedies and damages available, You acknowledge and agree that ST may immediately seek enforcement of this Agreement in any jurisdiction by means of specific performance or injunction, without any requirement to post a bond or other security.

#### **SEVERABILITY**

If any provision of this agreement is or becomes, at any time or for any reason, unenforceable or invalid, no other provision of this agreement shall be affected thereby, and the remaining provisions of this agreement shall continue with the same force and effect as if such unenforceable or invalid provisions had not been inserted in this Agreement. In addition, any unenforceable or invalid provision shall be deemed replaced by a provision that is valid and enforceable and that comes closest to expressing the intention of the unenforceable or invalid provision.

#### WAIVER

The waiver by either party of any breach of any provision of this Agreement shall not operate or be construed as a waiver of any other or a subsequent breach of the same or a different provision.

#### RELATIONSHIP OF THE PARTIES

Nothing in this Agreement shall create, or be deemed to create, any joint venture, partnership, principal-agent, employer-employee or other relationship between the Parties, except that of independent contractors. Neither Party has the authority or power to bind, to contract in the name of, or to create a liability for the other in any way or for any purpose.

#### SURVIVAL

Any provision of this Agreement which imposes an obligation after termination of this Agreement shall survive the termination of this Agreement.

#### SECTION HEADINGS

Section headings are inserted for convenience only and shall not be used to interpret this Agreement.

#### WASTE AND RECYCLING

**The Evaluation Board is not to be disposed of as urban waste. At the end of its life cycle, differentiated waste collection must be followed.** Consult the local authorities for more information on the proper disposal channels. It is mandatory to separately collect the Evaluation Board and make sure it is delivered it to the appropriate waste management and recycling centers.

As of 15 August 2018, in all the countries belonging to the European Union, the Evaluation Board is subject to the WEEE Directive 2012/19/EU requirement; therefore, it is forbidden to dispose of the Evaluation Board as undifferentiated waste or with other domestic wastes. Consult the local authorities for more information on the proper recycling centers.

Disposing of the Evaluation Board incorrectly may cause damage to the environment and may be subject to fines based on specific countries' rules.

**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

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