

Bill of materials

Table 1. STDES-2KW5CH48V bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	1	C1	47pF, SMD 0805, 25 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
2	5	C2,C53,C131,C138,C147	10uF, SMD 1206, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
3	41	C3, C9, C10, C11, C12, C13, C15, C18, C21, C22, C23, C24, C25, C26, C27, C28, C30, C46, C47, C48, C49, C77, C79, C85, C97, C98, C104, C121, C122, C128, C129, C145, C146, C154, C155, C158, C160, C161, C163, C164, C180	100nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
4	10	C4,C20,C42,C43,C44,C45,C54,C89,C91,C152	1uF, SMD 0805, 25 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
5	6	C6, C74, C93, C78, C92, C130	100pF, SMD 0805, 50 V	Ceramic Capacitor, COG	Any	Any
6	4	C5,C7,C8,C19	10uF, SMD 0805, 50 V	Ceramic Capacitor, X7R	Any	Any
7	2	C14, C52	47nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
8	2	C16, C55	2.2nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
9	3	C17, C86, C156	DNM, SMD 0805	Ceramic Capacitor, X7R	Any	Any
10	4	C50, C124, C125, C135	470nF, SMD 0805, 50 V	Ceramic Capacitor, X7R	Any	Any
11	3	C51, C151, C159	2.2uF, SMD 0805, 50 V	Ceramic Capacitor, X7R	Any	Any
12	2	C56, C141	1nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
13	4	C62, C73, C80, C99	10nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
14	5	C64,C107,C112,C113,C114	470nF, 15mm Pitch, Through Hole, 305V(AC)/630V(DC) V, $\pm 20\%$	Film Capacitor	EPCOS - TDK Electronics	B32922C3474M000

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
15	1	C65	22uF, 10mm Pitch, Through Hole, 450 V, $\pm 20\%$,	Electrolytic Capacitor	Nichicon	UCA2W220MHD
16	1	C66	10uF, 15mm Pitch, Through Hole, 63 V, $\pm 10\%$	Film Capacitor	EPCOS - TDK Electronics	B32522C0106K189
17	3	C67,C68,C69	1200uF, 7.5mm Pitch, Through Hole, 63 V, $\pm 20\%$	Electrolytic Capacitor	Rubycon	63ZLH1200MEFC18X25
18	3	C71,C72,C143	15nF, 15mm Pitch, Through hole, 600V(AC)/1000V(DC) V, $\pm 5\%$	Film Capacitor	EPCOS - TDK Electronics	B32642B0153J
19	3	C81, C100, C102	100nF, SMD 1206, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
20	4	C82, C84, C101, C103	10uF, SMD 1206, 50 V, $\pm 10\%$,	Ceramic Capacitor, X7R	Any	Any
22	3	C87, C96, C115	470pF, SMD 0805, 50 V, $\pm 10\%$,	Ceramic Capacitor, X7R	Any	Any
23	2	C88, C142	22nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
24	1	C90	1uF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
25	2	C105, C106	680uF, 10mm Pitch, Through Hole, 450 V, $\pm 20\%$	Electrolytic Capacitor	Nichicon	LGG2W681MELC50
26	6	C108,C109,C110, C116,C117,C118	2.2nF, 10mm Pitch, Through Hole, 760 V AC V, $\pm 20\%$	Ceramic Capacitor, Y1, Safety Capacitor	Vishay Beyschlag/Draloric/BC Components	VY1222M43Y5UC63V0
27	1	C111	1.5uF, 15mm Pitch, Through Hole, 450 V, $\pm 5\%$	Film Capacitor	Panasonic Electronic Components	ECW-FE2W155J
28	1	C119	4.7nF, SMD 0805, 50 V, $\pm 10\%$	Ceramic Capacitor, X7R	Any	Any
29	2	C120,C144	100uF, 2.54mm Pitch, 5mm Diameter, Through Hole, 35 V, $\pm 20\%$	Electrolytic Capacitor	Any	Any
30	1	C133	470uF, 5.08mm Pitch, 10mm Diameter, Through Hole, 63 V, $\pm 20\%$	Electrolytic Capacitor	Any	Any
31	3	C134,C153,C162	22uF, 2.5mm Pitch, Through Hole, 100 V, $\pm 20\%$	Electrolytic Capacitor	Nichicon	UVZ2A220MED1TD
34	1	C139	220uF, 5.08mm Pitch, Through Hole, 63 V, $\pm 20\%$	Electrolytic Capacitor	Nichicon	UVR1J221MPD1TD
35	1	C140	1000pF, 7.5mm Pitch, Through	Film Capacitor	KEMET	C907U102MYVDBA7317

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
			Hole, 400 VAC V, ± 20 %			
36	1	C150	DNM, 15mm Pitch, Through hole	Film Capacitor	Any	Any
38	7	D1, D2, D3, D4, D53, D54, D60	BAT54JFILM, SOD323, 40 V, 300m A	40 V, 300 mA general purpose signal Schottky diodes	ST	BAT54JFILM
39	2	D5, D7	LED RED, SMD 0603	LED	Any	Any
40	1	D6	LED BLUE, SMD 0603	LED	Any	Any
41	2	D8, D9	LED YELLOW, SMD 0603	LED	Any	Any
42	8	D19, D37, D38, D41, D44, D45, D46, D47	STTH1L06A, SMA, 600 V, 1 A	600 V, 1 A low drop ultrafast diode	ST	STTH1L06A
43	2	D20, D21	STPS60SM200C W, TO-247, 200 V, 60 A	200 V, 60 A dual low leakage power Schottky rectifier	ST	STPS60SM200CW
44	1	D22	33V, SOD-323, 33 V, 200m W	Zener diode	Any	Any
45	1	D23	30V, SOD-323, 30 V, 200m W	Zener diode	Any	Any
46	1	D24	15V, SOD-323, 15 V, 200m W	Zener diode	Any	Any
47	1	D27	1N4148WS, SOD-323, 75 V, 150m A	Small signal diode	Fairchild/ON Semiconductor	1N4148WS
48	8	D28, D30, D31, D32, D33, D51, D56, D57	STTH1R06A, SMA, 600 V, 1 A	600 V, 1 A Turbo 2 ultrafast diode	ST	STTH1R06A
49	1	D34	1N5408, DO-201AD, 1000 V, 3 A	General purpose rectifier	Fairchild/ON Semiconductor	1N5408
50	1	D35	STPSC20H065C W, TO-247, 650 V, 40 A	650 V power Schottky silicon carbide diode	ST	STPSC40065CW
51	1	D36	PB5006, SIP-4, PB, 600 V, 35 A	Enhanced isoCink+™ Bridge Rectifiers	Vishay Semiconductors	PB5006-E3/45
52	1	D39	STPS1L60A, SMA, 60 V, 1 A	60 V, 1 A low drop power Schottky rectifier	ST	STPS1L60A
53	1	D40	5V, SOD-80, 5 V	5V Zener Diode	Any	Any
54	1	D42	1N4007, DO-41, 1000 V, 1 A	General purpose diode	Any	Any
55	1	D43	P6KE250A, DO-204AC	TVS Diodes / ESD Suppression Diodes	Any	Any
56	2	D48, D49	LED GREEN, SMD 0603	LED	Any	Any
57	1	D52	DNM	LED	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
58	1	F1	20A, 5.08mm Pitch, Through Hole, 350 V, 20 A	FUSE BRD MNT 20A 350VAC 72VDC	Bel Fuse Inc.	0697H9200-02
59	1	FAN	12V, To be placed as ashown in diagram, with air flow inwards (toward board), 12 V, 2.26 W	Fan 80mm x 80mm	CUI Devices	CFM-8015V-130-347
60	2	H1,H6	CR201-75AE, 75mm Pitch, Through hole	Heat Sink	Ohmite	CR201-75AE
61	2	H4,H5	C220-050-2AE, 50mm Pitch, Through hole,	Heat Sink	Ohmite	C220-050-2AE
62	1	H7	CR101-50AE, 50mm Pitch, Through hole	Heat Sink	Ohmite	CR101-50AE
63	2	IC2,IC3	L6491D, SO-14	High voltage high and low-side 4 A gate driver	ST	L6491D
64	1	IC4	VIPER16HN, PDIP 7	Fixed frequency VIPer™ plus family	ST	VIPER16HN
65	1	IC6	ESDALC6V1W5, SOT323-5L	Quad TRANSIL™ array for data protection	ST	ESDALC6V1W5
66	3	ISO3,ISO4,ISO5	PC817B, DIP-4,	Optoisolator Transistor	American Bright Optoelectronics Corporation	BPC-817 (B BIN)
67	1	J1	CON3, 5.08mm Pitch, Through Hole	3P 5.08mm pitch	Any	Any
68	1	J2	Con14-male	CONN HEADER SMD 14POS 1.27MM	Any	Any
70	2	J3, J4	2-pin berg-stick, Through Hole	2.54mm pitch	Any	Any
71	1	J5	DC_OUTPUT_7.5 mm_PITCH, 7.5mm Pitch, Through Hole	Terminal block 4POS 7.5mm	Phoenix Contact	1717046
72	1	J6	V(AC) I/P, 5.08mm Pitch, Through Hole, 16 A	Terminal block 3POS 5.08mm	CUI Devices	TB007-508-03BE
73	1	J8	VDD_LCC_12V, Through Hole	Test Point	Any	Any
74	1	J9	LLC_GND, Through Hole	Test Point	Any	Any
75	1	J10	LLC_HB1, Through Hole	Test Point	Any	Any
76	1	J11	LLC_HB2, Through Hole	Test Point	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
77	2	J12,J16	Pri. GND, Through Hole	Test Point	Any	Any
78	1	J13	Output Voltage, Through Hole	Test Point	Any	Any
79	1	J14	Sec. GND, Through Hole	Test Point	Any	Any
80	1	J15	PFC Output, Through Hole	Test Point	Any	Any
81	1	J17	PFC-CS, Through Hole	Test Point	Any	Any
82	1	J19	SPDT, Through Hole, 12 V, 500mA A	SWITCH SLIDE SPDT	EAO	09.03201.02
83	1	J20	PFC-Bridge, Through Hole	Test Point	Any	Any
84	1	J21	VDD-Pri., Through Hole	Test Point	Any	Any
85	1	J22	VDD-Sec., Through Hole	Test Point	Any	Any
86	1	J23	Pri.-GND, Through Hole	Test Point	Any	Any
87	1	J24	Sec.-GND, Through Hole	Test Point	Any	Any
88	1	J25	LLC_CV, Through Hole	Test Point	Any	Any
89	1	J26	LLC_CC, Through Hole	Test Point	Any	Any
90	1	J27	LLC_FB, Through Hole	Test Point	Any	Any
91	1	J28	LLC_CS, Through Hole	Test Point	Any	Any
92	1	J29	LLC_GD_HS1, Through Hole	Test Point	Any	Any
93	1	J30	LLC_GD_HS2, Through Hole	Test Point	Any	Any
94	1	J31	LLC_GD_LS2, Through Hole	Test Point	Any	Any
95	1	J32	LLC_GD_LS1, Through Hole	Test Point	Any	Any
96	1	J33	PFC_Source, Through Hole	Test Point	Any	Any
97	1	J34	PFC_Drain, Through Hole	Test Point	Any	Any
98	1	LS1	Relay 30A, Through Hole, V, A	General Purpose Relays Industrial Relays	Potter & brumfield	T9AV1L12-12
99	1	L2	160uH, Through Hole	160uH Sendust	Würth Electronics	750344954
100	2	L3,L4	2.2mH 16A, Though Hole	CMC 2.2MH 16A 2LN 2.6 KOHM TH	Pulse Electronics Power	PH9455.205NL

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
101	2	L5, L6	10uH , SMD, %	Fixed Inductors 10uH	Bourns	SRR7045-100M
102	1	L20	ETD39 Vertical, Through Hole	36uH LLC resonant inductor	Magsol	L0403901
103	7	Q1, Q2, Q10, Q12, Q13, Q14, Q17	2STR1160, SOT-23	Low voltage fast- switching NPN power transistor	ST	2STR1160
104	4	Q3, Q4, Q7, Q8	STO67N60DM6, TO-LL	N-channel 600 V, 48 mOhm typ., 58 A MDmesh DM6 Power MOSFET in a TO-LL package	ST	STO67N60DM6
105	2	Q5,Q6	STH310N10F7-2, H2PAK-2	N-channel 100 V, 1.9 mOhm typ., 180 A STripFET F7 Power MOSFET in H2PAK-2 package	ST	STH310N10F7-2
106	1	Q9	FMMT493TC, SOT-23,	100V NPN medium power transistor	Diodes Incorporated	FMMT493TC
107	2	Q15, Q16	2STR2160, SOT-23	Low voltage fast- switching PNP power transistor	ST	2STR1160
108	2	Q18, Q19	STW57N65M5, TO-247	N-channel 650 V, 0.056 Ohm typ., 42 A MDmesh M5 Power MOSFET in TO-247 package	ST	STW57N65M5
109	8	R1, R31, R32, R119, R128, R195, R201, R202	100E, SMD 0805	Thick Film Resistor	Any	Any
110	4	R2,R106, R134, R135	15k, SMD 0805	Thick Film Resistor	Any	Any
111	1	R3	43k, SMD 0805	Thick Film Resistor	Any	Any
112	3	R4,R96,R132	2.2k, SMD 0805	Thick Film Resistor	Any	Any
113	4	R6,R26, R104, R130	3.3k, SMD 0805	Thick Film Resistor	Any	Any
114	14	R7, R65, R143, R144, R145, R146, R147, R148, R150, R151, R152, R171, R177, R180	1M, SMD 0805	Thick Film Resistor	Any	Any
115	17	R8, R16, R18, R29, R74, R86, R87, R97, R98, R100, R113, R142, R157, R158, R166, R197, R219	10k, SMD 0805	Thick Film Resistor	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
116	6	R9, R88, R102, R127, R167, R213	4.7E, SMD 080	Thick Film Resistor	Any	Any
117	16	R10, R12, R21, R30, R55, R64, R66, R111, R118, R140, R154, R185, R194, R196, R217, R223	DNM	Resistors	Any	Any
118	4	R11, R53, R181, R224	4.7k, SMD 0805	Thick Film Resistor	Any	Any
119	10	R13, R17, R107, R108, R137, R183, R188, R216, R218, R266	0E, SMD 0805	Thick Film Resistor	Any	Any
120	7	R14, R19, R20, R22, R28, R36, R38	22k, SMD 0805	Thick Film Resistor	Any	Any
121	2	R15, R179	10E, SMD 0805	Thick Film Resistor	Any	Any
122	1	R23	27k, SMD 0805	Thick Film Resistor	Any	Any
123	1	R24	6.8k, SMD 0805	Thick Film Resistor	Any	Any
124	2	R25, R156	24k, SMD 0805	Thick Film Resistor	Any	Any
125	5	R27, R34, R37, R114, R123	220k, SMD 0805	Thick Film Resistor	Any	Any
126	3	R35, R39, R207	470k, SMD 0805	Thick Film Resistor	Any	Any
127	16	R40, R51, R52, R54, R120, R133, R149, R173, R175, R195, R198, R199, R200, R208, R214, R265	1k, SMD 0805	Thick Film Resistor	Any	Any
128	2	R41, R43	220E, SMD 0805	Thick Film Resistor	Any	Any
129	1	R42	91E, SMD 0805	Thick Film Resistor	Any	Any
130	2	R44, R45	150E, SMD 0805	Thick Film Resistor	Any	Any
131	1	R61	150k, SMD 0805	Thick Film Resistor	Any	Any
132	1	R62	2.2E, SMD 0805	Thick Film Resistor		
133	4	R83, R84, R93, R94	6.8E, SMD 0805	Thick Film Resistor	Any	Any
134	14	R85, R91, R101, R115, R116, R117, R121, R124, R126, R169, R190, R209, R210, R212	100k, SMD 0805	Thick Film Resistor	Any	Any

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
135	1	R89	DNM, Through hole	Metal Oxide Resistors	Any	Any
136	2	R90, R95	0.003E, SMD 2512	Thick Film Resistor	Any	Any
137	1	R99	470E, SMD 0805	Thick Film Resistor	Any	Any
138	2	R129, R189	68k, SMD 0805	Thick Film Resistor	Any	Any
139	3	R110, R139, R153	18k, SMD 0805	Thick Film Resistor	Any	Any
140	2	R122, R192	47k, SMD 0805	Thick Film Resistor	Any	Any
141	2	R125, R193	330E, SMD 0805	Thick Film Resistor	Any	Any
142	1	R155	16k, SMD 0805	Thick Film Resistor	Any	Any
143	6	R159, R160, R161, R162, R163, R164	0.15E, SMD 2512	Thick Film Resistor	Any	Any
144	3	R165, R168, R172	2.2M, SMD 1206	Thick Film Resistor	Any	Any
145	1	R170	750E, SMD 1206	Thick Film Resistor	Any	Any
146	2	R174, R176	3.3E, SMD 0805	Thick Film Resistor	Any	Any
147	1	R186	1k, SMD 1206	Thick Film Resistor	Any	Any
149	1	R211	47E, SMD 0805	Thick Film Resistor	Any	Any
150	1	R215	62k, SMD 0805	Thick Film Resistor	Any	Any
151	2	R131, R221	22E, SMD 0805	Thick Film Resistor	Any	Any
152	1	RT1	5E, 7.8mm Pitch, Through Hole	5 Ohm NTC Thermistor	Ametherm	SL32 5R020-B
153	3	RV1,RV2,RV3	VARISTOR, 7.5mm Pitch, Through Hole	Varistor, 14mm diameter	EPCOS / TDK	B72214S0301K101
154	4	SW1, SW2, SW3, SW4	Push Buttons, SMD	SWITCH TACTILE SPST-NO	Panasonic Electronic Components	EVQ-5PN05K
155	1	T1	CST7030-100LB, SMD	Current Transformers 1:100 20A 1.33mH	Coilcraft	CST7030-100LB
156	1	T2	760871131, Through hole	Power Transformers MID-UNIT STM Offline 1.396mH 1.60Ohm	Würth Elektronik	760871131
157	1	T3	LLC Transformer ETD59, Through Hole	LLC converter Transformer	Magsol	T0405901

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
158	1	U1	TL431ACL3T, SOT23	Adjustable micropower shunt voltage reference	ST	TL431ACL3T
159	1	U2	L6599AD, SO-16	Improved high- voltage resonant controller	ST	L6599AD
160	2	U3,U4	TS912ID, SO-8	Low power with CMOS inputs	ST	TS912ID
161	1	U6	SN65HVD231, SOIC	CAN Transceiver	Texas Instruments	SN65HVD231
162	1	U7	LD39150DT33-R, DPAK	Ultra low drop BiCMOS voltage regulator	ST	LD39150DT33-R
163	1	U8	STM32F072CBT6 , LQFP 48 7x7x1.4 mm	Mainstream Arm Cortex-M0 USB line MCU with 128 Kbytes of Flash memory, 48 MHz CPU, USB, CAN and CEC functions	ST	STM32F072CBT6
164	1	U9	L4984DTR, SSOP 10	CCM PFC controller	ST	L4984DTR
165	1	U11	L7805CD2T-TR, D ² PAK	Positive voltage regulator IC	ST	L7805CD2T-TR
166	2	U12,U13	LMV821ILT, SOT23-5L	Low power, high accuracy, general-purpose operational amplifier	ST	LMV321ILT
167	1	U14	ACPL-782T-500E, SMD-8	Automotive Isolation Amplifier with R2Coupler™ Isolation	Broadcom Limited	ACPL-782T-500E
168	2	U16,U17	ACPL-P484-000E, SO-6	Gate Drive Interface Optocoupler	Broadcom Limited	ACPL-P484-000E
169	9	MH2,MH3,MH4,M H5,MH6,MH7,MH 8,MH9,MH11	Moulting Holes, Spacer and Screw, Through Hole	Spacers (M3x12) Screw (M3x6)	Wakefield-Vette	CD-02-05-247
170	5	Isolation Pad (Q18,Q19,D35,D2 0,D21)	TO-247	Thermal Pad	Any	Any
171	1	Thermal Isolation Pad (Heat-Sink H7)	Thermal Isolation Pad , Customized cut thermal isolation pad "50mm x 28mm" with 0.5mm thickness	50mm x 28mm	Any	Any
172	2	LLC MOSFET Daughter Card assembled with heat-sink (H4,H5) and isolation pad	STO67N60DM6, 2 MOSFETs mounted on single Daughter card, TO-LL	N-channel 600 V, 48 mOhm typ., 58 A MDmesh DM6 Power MOSFET in a TO-LL package	ST	STO67N60DM6

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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 – 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 acknowledgment.

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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