

010239 REV E2 Bill of Materials

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
IPC81	1		10239	Any	Printed Circuit Board	
C1, C11	2	68pF	GRM21A5C2E680JW01D	MuRata	CAP, CERM, 68 pF, 250 V, +/- 5%, C0G/NP0, 0805	0805
C2, C3	2	3.3nF	DE1E3RA332MN4AP01F	Murata	Cap Ceramic Disc 3300pF 20% 300VAC Thru-Hole 10.0x5.0x10.0 Ammo pack	RADIAL_CAP_10MM0 5MM0 10MM0
C4, C12	2	100µF	860010473007	Würth Elektronik	WCAP-ATG8 Aluminum Electrolytic Capacitor, Radial, THT, D6.3 x H11mm, 100uF, 25V	
C5, C10, C21, C22, C23, C24, C45, C46, C48, C49, C58, C59	12	22uF	CC1210KKX7R8BB226	Yageo	CAP, CERM, 22 µF, 25 V, +/- 10%, X7R, 1210	1210
C6, C7	2	0.1uF	C1812W104KDRACU	Kemet	CAP, CERM, 0.1 uF, 1000 V, +/- 10%, X7R, 1812	1812
C8	1	1000pF	VJ1206Y102KXEAT5Z	Vishay-Vitramon	CAP, CERM, 1000 pF, 500 V, +/- 10%, X7R, 1206	1206
C9, C15, C20	3	100nF	890493425009CS	Würth Elektronik	WCAP-FTBE Film Capacitor, THT, L18 x W8.5 x H15mm, 100nF, 1000V	
C13, C14, C16, C17	4	68µF	860021380017	Würth Elektronik	WCAP-ATG5 Aluminum Electrolytic Capacitor, Radial, THT, D16 x H25mm, 68µF, 400V	
C18, C29, C32, C39, C41, C43, C44, C47, C52, C60, C61, C64, C67, C73	14	0.1uF	C1608X7R1H104K080AA	TDK	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, 0603	0603
C19	1	2.2uF	GRM188Z71C225KE43	MuRata	CAP, CERM, 2.2 uF, 16 V, +/- 10%, X7R, 0603	0603
C25, C26	2	680µF	860040475009	Würth Elektronik	WCAP-ATUL Aluminum Electrolytic Capacitor, Radial, THT, D10 x H20mm, 680µF, 25V	
C27	1	100pF	GRM21A5C2E101JW01D	MuRata	CAP, CERM, 100 pF, 250 V, +/- 5%, C0G/NP0, 0805	0805
C28	1	2200pF	C0603C222K5RAC	Kemet	CAP, CERM, 2200 pF, 50 V, +/- 10%, X7R, 0603	0603
C30, C37	2	10uF	CL31B106KBHNNNE	Samsung	CAP, CERM, 10 uF, 50 V, +/- 10%, X7R, 1206	1206
C31	1	4.7uF	C2012X7R1E475K125AB	TDK	CAP, CERM, 4.7 uF, 25 V, +/- 10%, X7R, 0805	0805
C33, C38	2	100pF	885012006057	Würth Elektronik	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, NP0, 100pF, 50VDC	0603
C34	1	47nF	885012206093	Würth Elektronik	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, X7R, 47nF, 50VDC	0603
C35	1	220pF	C0603C221J5GACTU	Kemet	CAP, CERM, 220 pF, 50 V, +/- 5%, C0G/NP0, 0603	0603
C36	1	4700pF	885012206087	Würth Elektronik	CAP, CERM, 4700 pF, 50 V, +/- 10%, X7R, 0603	0603
C40, C42	2	2.5F	PHVL-3R9V255-R	Cooper Bussmann	2.5 F (EDLC) Supercapacitor 3.9 V Radial 80mOhm 5000 Hrs @ 85°C	RADIAL
C50	1	6.8pF	CC0603CRNP00BN6R8	Yageo	CAP, CERM, 6.8 pF, 100 V, +/- 3.7%, C0G/NP0, 0603	0603
C51	1	470pF	885012206081	Würth Elektronik	CAP, CERM, 470 pF, 50 V, +/- 10%, X7R, 0603	0603
C53	1	0.01uF	C0603C103K5RACTU	Kemet	CAP, CERM, 0.01 uF, 50 V, +/- 10%, X7R, 0603	0603
C54, C55, C56	3	1uF	B32923C3105M	TDK	CAP, Film, 1 uF, 630 V, +/- 20%, 0.018 ohm, TH	B32923 20.5mm
C57	1	100nF	PHE850ED6100MD18R06L2	Kemet	Cap Film Suppression Y2 0.1uF 1250VDC/300VAC PP 20% (26 X 10.5 X 19mm) Radial 22.5mm 110C Tray	RADIAL
C62, C65, C69, C71	4	1nF	VY2102M29Y5US6TV7	Vishay	1000 pF ±20% 440VAC Ceramic Capacitor Y5U (E) Radial, Disc	RADIAL
C63, C68, C70, C72	4	47pF	C0603C470J1GACAUTO	Kemet	CAP, CERM, 47 pF, 100 V, +/- 5%, C0G/NP0, AEC-Q200 Grade 1, 0603	0603
C66	1	100pF	06033C101KAT2A	AVX	CAP, CERM, 100 pF, 25 V, +/- 10%, X7R, 0603	0603
C74	1	1uF	GCM188R71E105KA64D	MuRata	CAP, CERM, 1 uF, 25 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603
C75	1	2200pF	GRM31BR73A222KW01L	MuRata	CAP, CERM, 2200 pF, 1000 V, +/- 10%, X7R, 1206	1206
C76	1	1nF	885012206083	Würth Elektronik	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, X7R, 1nF, 50VDC	0603
C77	1	220nF	CC0603KRX7R7BB224	Yageo	0603 0.22 uF 16 V ±10 % Tolerance X7R SMT Multilayer Ceramic Capacitor	0603
D1, D5, D16	3	200V	SS1200-LTP	Micro Commercial Components	Diode, Schottky, 200 V, 1 A, SMA	SMA
D2, D6	2	40V	MBR0540T1G	ON Semiconductor	Diode, Schottky, 40 V, 0.5 A, SOD-123	SOD-123
D3, D8	2	1000V	TBS22M-TP	Micro Commercial Components	Diode, Switching-Bridge, 1000 V, 2.2 A, 8.25x6.6mm	8.25x6.6mm
D4	1		SMCJ130A	Littelfuse Inc	209V Clamp 7.2A Ipp Tvs Diode Surface Mount DO-214AB (SMCJ)	DO-214AB
D7, D35	2	1000V	US1M-13-F	Diodes Inc.	Diode, Ultrafast, 1000 V, 1 A, SMA	SMA
D9, D19	2	Red	150120RS75000	Würth Elektronik	LED, Red, SMD	3.2x1.6mm
D10	1	400V	US1G-13-F	Diodes Inc.	Diode, Ultrafast, 400 V, 1 A, SMA	SMA
D11	1	30V	BAT54SLT1G	ON Semiconductor	Diode, Schottky, 30 V, 0.2 A, SOT-23	SOT-23
D12, D14, D17, D18	4	200V	BAS20HT1G	ON Semiconductor	Diode, Switching, 200 V, 0.2 A, AEC-Q101, SOD-323	SOD-323
D13	1		BZX384C43-E3-08	Vishay	Diode Zener Single 43V ±5% 200mW 2-Pin SOD-323 T/R	SOD323
D15	1	16V	SZMM3Z16VST1G	ON Semiconductor	Diode, Zener, 16 V, 300 mW, AEC-Q101, SOD-323	SOD-323
D20	1	40V	MBRS2040LT3G	ON Semiconductor	Diode, Schottky, 40 V, 2 A, SMB	SMB
D21, D36	2	Green	150060GS75000	Würth Elektronik	LED, Green, SMD	LED 0603
D22, D24, D25, D27, D29	5		GSRB751S-40	Good-Ark	Diode 30 V 30mA Surface Mount SOD-523	SOD523
D23, D26, D28, D30	4	5.1V	GDZ5V1LP3-7	Diodes Inc.	Diode, Zener, 5.1 V, 250 mW, 2-XFDFN	2-XFDFN
F1, F2, F3	3		0443001.DR	Littelfuse	Fuse, 1 A, 250VAC/VDC, SMD	FUSE 10.1x3.12x3.13mm
F4	1		044001.5WR	Littelfuse	Fuse, 1.5 A, 50VAC/VDC, SMD	1206
FID1, FID2, FID3	3		N/A	N/A	Fiducial mark. There is nothing to buy or mount.	N/A
H1, H2, H3, H4	4		NY PMS 440 0025 PH	B&F Fastener Supply	Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw
J1, J2, J3, J4, J5, J6	6		FCR7350N	CLIFF Electronic Components	Banana Test Connector, Socket, PCB Mount, 24 A, 1 kV, Gold Plated Contacts, Brown	CONN_BANANA_JA CK
J7, J8	2		FCR7350G	CLIFF Electronic Components	Banana Test Connector, Socket, PCB Mount, 24 A, 1 kV, Gold Plated Contacts, Green	CONN_BANANA_JA CK
J9	1		61301821121	Würth	Connector Header Through Hole 18 position 0.100" (2.54mm)	HDR18
K1	1		G9KC-4A1B DC12	Omron	General Purpose Relay 5PST-4NO/1NC (4 Form A, 1 Form B) 12VDC Coil Through Hole	PTH_RELAY_58MM0 35MM0
L1, L3	2	1000 ohm	74279205	Würth Elektronik	Ferrite Bead, 1000 ohm @ 100 MHz, 0.2 A, 0805	0805
L2, L4, L6	3	150uH	7447480151	Würth Elektronik	WE-TI Radial Leaded Wire Wound Inductor, size 1014, 150uH, 2A, 0.18Ohm	1014

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
L5	1	6.8mH	7446121007	Würth Electronics	6.8 mH @ 10 kHz 2 Line Common Mode Choke Through Hole 1A DCR 300mOhm	PTH_CMC_18MM5_1 3MM5
L8	1	3.3uH	XEL4030-332MEB	Coilcraft	Inductor, Shielded, 3.3 uH, 5 A, 0.0286 ohm, SMD	4x4mm
L9	1	280 ohm	74279221281	Würth Elektronik	Ferrite Bead, 280 ohm @ 100 MHz, 3.5 A, 1206	1206
LBL1	1		THT-14-423-10	Brady	Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch
Q1	1	BSC500N2 0NS3G	BSC500N20NS3G	Infineon	Mosfet, N-Ch, 200V, 24A, 150Deg C Rohs Compliant: Yes	TSOP-8
Q2	1		IPD95R2K0P7ATMA1	Infineon Technologies	Trans MOSFET N-CH 950V 4A 3-Pin(2+Tab) DPAK T/R	DPAK
Q3, Q6, Q7, Q8	4	30V	CSD17585F5T	Texas Instruments	MOSFET, N-CH, 30 V, 5.9 A, YJK0003A (PICOSTAR-3)	YJK0003A
Q4	1		IRFIZ24GPBF	Vishay	N-Channel 60 V 14A (Tc) 37W (Tc) Through Hole TO-220-3	TO-220-3
Q5	1	40 V	MMBT3904LT1G	ON Semiconductor	Transistor, NPN, 40 V, 0.2 A, SOT-23	SOT-23
R1, R6	2	1.0k	ERJ-6GEYJ102V	Panasonic	RES, 1.0 k, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	0805
R2, R4, R7, R9, R12, R16, R19	7	470k	CRCW1206470KJNEA	Vishay-Dale	RES, 470 k, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206
R3, R10, R15	3	10.0k	CRCW080510K0FKEA	Vishay-Dale	RES, 10.0 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805
R5, R8, R13, R17	4	1.0Meg	CRCW12061M00JNEA	Vishay-Dale	RES, 1.0 M, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206
R11	1	10	CRCW120610R0JNEA	Vishay-Dale	RES, 10, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206
R14, R18, R59, R60, R61, R62	6	0	RC1206JR-070RL	Yageo America	RES, 0, 5%, 0.25 W, 1206	1206
R20, R37, R41, R48	4	4.70k	RC0603FR-074K7L	Yageo	RES, 4.70 k, 1%, 0.1 W, 0603	0603
R21	1	100	CRCW0805100RFKEA	Vishay-Dale	RES, 100, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805
R22	1	49.9	CRCW060349R9FKEA	Vishay-Dale	RES, 49.9, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R23	1	1.0k	CRCW12061K00JNEA	Vishay-Dale	RES, 1.0 k, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206
R24	1	20	CRCW080520R0JNEA	Vishay-Dale	RES, 20, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	0805
R25	1	2.49k	CRCW06032K49FKEA	Vishay-Dale	RES, 2.49 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R26	1	6.81k	CRCW06036K81FKEA	Vishay-Dale	RES, 6.81 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R27, R29	2	60.4k	ERJ-6ENF6042V	Panasonic	RES, 60.4 k, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805
R28	1	38.3k	RC0603FR-073K3L	Yageo	RES, 38.3 k, 1%, 0.1 W, 0603	0603
R30, R33, R40, R43, R44, R50, R56, R58, R66, R68, R69, R72, R77, R80, R92	15	10.0k	RC0603FR-0710KL	Yageo	RES, 10.0 k, 1%, 0.1 W, 0603	0603
R31, R38, R51	3	100k	CRCW0603100KFKEA	Vishay-Dale	RES, 100 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R32	1	33.2k	RC0603FR-0733K2L	Yageo	RES, 33.2 k, 1%, 0.1 W, 0603	0603
R34, R46, R47, R81	4	1.00k	CRCW06031K00FKEA	Vishay-Dale	RES, 1.00 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R35	1	0.5	CSRN2010FKR500	Stackpole Electronics Inc	RES, 0.5, 1%, 1 W, 2010	2010
R36	1	33.0k	RC0603FR-0733KL	Yageo	RES, 33.0 k, 1%, 0.1 W, 0603	0603
R39	1	100	CRCW0603100RJNEA	Vishay-Dale	RES, 100, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R42	1	4.99	CRCW06034R99FKEA	Vishay-Dale	RES, 4.99, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R45	1	11.8k	RC0603FR-0711K8L	Yageo	RES, 11.8 k, 1%, 0.1 W, 0603	0603
R49	1	100	CRCW0603100RFKEA	Vishay-Dale	RES, 100, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603
R52	1	510k	RC0603FR-07510KL	Yageo	RES, 510 k, 1%, 0.1 W, 0603	0603
R53	1	47.0k	RC0603FR-0747KL	Yageo	RES, 47.0 k, 1%, 0.1 W, 0603	0603
R54	1	2.70k	RC0603FR-072K7L	Yageo	RES, 2.70 k, 1%, 0.1 W, 0603	0603
R55	1	46.4k	RT0603DRE0746K4L	Yageo America	RES, 46.4 k, 0.5%, 0.1 W, 0603	0603
R57	1	620	RC0603FR-07620RL	Yageo	RES, 620, 1%, 0.1 W, 0603	0603
R63, R85	2	470	RC0402FR-07470RL	Yageo America	RES, 470, 1%, 0.063 W, 0402	0402
R64, R67, R70, R71, R86	5	0	RCS06030000Z0EA	Vishay-Dale	RES, 0, 0%, 0.25 W, AEC-Q200 Grade 0, 0603	0603
R73, R75	2	1.00Meg	RC0603FR-071ML	Yageo	RES, 1.00 M, 1%, 0.1 W, 0603	0603
R78	1	150	RC0603FR-07150RL	Yageo	RES, 150, 1%, 0.1 W, 0603	0603
R79	1	11.5k	RC0603FR-0711K5L	Yageo	RES, 11.5 k, 1%, 0.1 W, 0603	0603
R82	1	39k	RC0603JR-0739KL	Yageo	RES, 39 k, 5%, 0.1 W, 0603	0603
R83, R84	2	390k	CRCW1206390KJNEA	Vishay-Dale	RES, 390 k, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206
RT1, RT2, RT3	3	4.7	B57153S0479M051	TDK	Thermistor NTC, 4.70 ohm, 20%, 8.5mm Disc	8.5mm Disc
T1	1		750320029	Würth	TRANSFORMER	PTH14_32MM25_27 MM05
TP1, TP2, TP3, TP5	4		5012	Keystone Electronics	Test Point, Multipurpose, White, TH	White Multipurpose Testpoint
TP4	1		5010	Keystone Electronics	Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint
TP6	1		5000	Keystone Electronics	Test Point, Miniature, Red, TH	Red Miniature Testpoint
TP7, TP10, TP12, TP13, TP14, TP15, TP16, TP18, TP21	9		5003	Keystone Electronics	Test Point, Miniature, Orange, TH	Orange Miniature Testpoint
TP8, TP22	2		5011	Keystone Electronics	Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint
TP9	1		5001	Keystone Electronics	Test Point, Miniature, Black, TH	Black Miniature Testpoint
U1	1		UCC24612-1DBVR	Texas Instruments	High-Frequency Multi-Mode Synchronous Rectifier Controller, DBV0005A (SOT-23-5)	DBV0005A
U2	1		FOD817ASD	Fairchild Semiconductor	Optocoupler, 5 kV, 80-160% CTR, SMT	DIP-4L Gullwing
U3	1		UCC28742DBVR	Texas Instruments	High-Efficiency Low-Cost Flyback Controller with Secondary-Side Regulation, DBV0006A (SOT-23-6)	DBV0006A
U4	1		TL431AIDBZT	Texas Instruments	Adjustable Precision Shunt Regulator, 34 ppm / degC, 100 mA, -40 to 85 degC, 3-pin SOT-23 (DBZ), Green (RoHS & no Sb/Br)	DBZ0003A
U5	1		TL7705AIDR	Texas Instruments	Single Supply Voltage Supervisor for 5 V Systems with Programmable Time Delay, 1 Supply Monitored, -40 to 85 degC, 8-pin SOIC (D), Green (RoHS & no Sb/Br)	D0008A
U6	1		ATL431AQDBZR	Texas Instruments	V-Ref Adjustable/Precision 2.5V to 36V 100mA 3-Pin SOT-23 T/R	SOT23-3
U7	1		TPS55330RTER	Texas Instruments	Integrated 5-A 24-V Wide Input Range Boost/SEPIC/Flyback DC-DC Regulator, RTE0016C (WQFN-16)	RTE0016C
U8	1		DRV8220DRLR	Texas Instruments	18V, 1A H-bridge motor driver, PWM, PH/EN, ½ bridge control, with low power sleep mode	SOT563
U9	1		SN74AUP1G08DBVT	Texas Instruments	Low-Power Single 2-Input Positive-AND Gate, DBV0005A (SOT-23-5)	DBV0005A

Designator	Quantity	Value	PartNumber	Manufacturer	Description	PackageReference
U10, U12, U13, U15	4		TSM24CADBZR	Texas Instruments	±24 V Low Capacitance Surge Diode for Industrial Networks in SOT-23 Package	SOT23-3
U11	1		TLV7021DCKR	Texas Instruments	Small-Size Micropower Low-Voltage Comparator, DCK0005A (SOT-SC70-5)	DCK0005A
U14	1		TL431AQDBVR	Texas Instruments	Adjustable Precision Shunt Regulator, 34 ppm / degC, 100 mA, -40 to 125 degC, 5-pin SOT-23 (DBV), Green (RoHS & no Sb/Br)	DBV0005A
U20	1		FOD817AS	Fairchild Semiconductor	Optocoupler, 5 kV, 80-160% CTR, SMT	DIP-4L Gullwing
D31, D32, D33, D34	0		GSRB751S-40	Good-Ark	Diode 30 V 30mA Surface Mount SOD-523	SOD523
L7	0	1uH	7447730	Wurth Elektronik	Inductor, Shielded Drum Core, Ferrite, 1 uH, 4 A, 0.049 ohm, SMD	4.5x3.2x4.0mm
R74	0	0	RCS06030000Z0EA	Vishay-Dale	RES, 0, 0%, 0.25 W, AEC-Q200 Grade 0, 0603	0603
R76	0	1.00Meg	RC0603FR-071ML	Yageo	RES, 1.00 M, 1%, 0.1 W, 0603	0603
R87, R88, R89, R90	0	0	RC1206JR-070RL	Yageo America	RES, 0, 5%, 0.25 W, 1206	1206
U16, U17, U18, U19	0		RES60ADWV	Texas Instruments	RES60ADWV	SOIC8

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