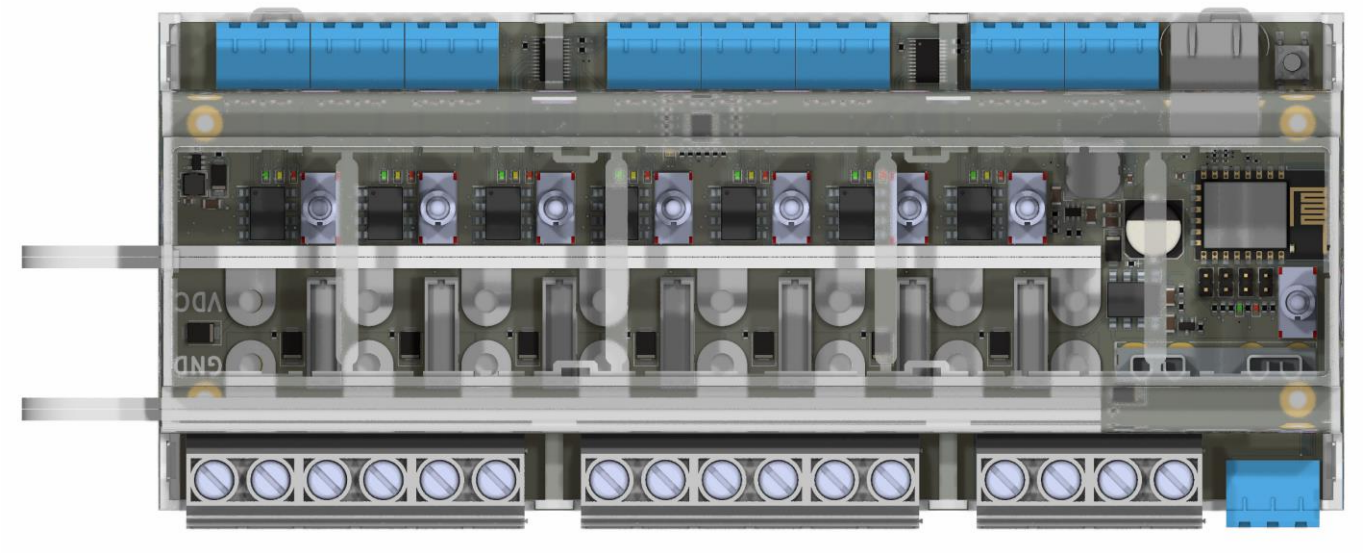
OPERATIONS AND MAINTENANCE MANUALS

MODULE YC-OB-D4

1. General Information	**Page 2**
2. Technical Data	**Page 7**
3. Manual	**Page 15**
4. Parts List	**Page 21**
5. Drawings	**Page 24**

1. General Information

The module reads the input states (short-circuit via an external relay) and powers the assigned output terminals.



SUPPORTED DEVICES	YC-OB-D1	YC-OB-D2	YC-OB-D3	YC-OB-D4	YC-OB-D5	YC-OB-D6
DC lighting	Yes	Yes*	Yes*	Yes*	No	No
DC motors.	No	Yes	No	No	No	No
Servomechanisms.	No	Yes	No	No	No	No
High-current devices (pumps, cranes, heaters).	No	No	Yes**	Yes	No	No
Buttons, switches, contact switches.	Yes	Yes	Yes	Yes	No	Yes
Measuring devices with resistance output (thermistors, liquid level sensors).	No	No	No	No	Yes	No
Measuring devices with voltage output (thermocouples, battery testing).	No	No	No	No	Yes	No
Other devices with documented interface via TTL inputs (BMS, navigation, others).	Yes	Yes	Yes	Yes	Yes	Yes

* - without dim

** - up to 5 A

- A smart yacht system can be built based on a network of modules that allow control both from one central point and from multiple points using the logic contained in the modules themselves.

- The module can operate without connection with central unit or an instance of a control application, but it is highly recommended to ensure such communication.
- Each module (mother board) contains a UNOR3 connector and a number of inputs and outputs whose type, and number, depend on the type.
- During a malfunction, the use of a universal connector makes it possible to use microprocessors readily available worldwide, or to quickly replace the damaged processor with a spare.
- Each module contains a SPIGPIO pinout that allows it to be extended with additional functions.

COMPLIANCE WITH DIRECTIVES

Directive GPS 2001/95/WE

Directive EMC 2014/30/UE

Directive RED 2014/53/UE

Directive RoHS 2011/65/UE

Directive RoHS 2018/736

IMPORTANT INFORMATION



READ THIS DATASHEET BEFORE ATTEMPTING TO INSTALL THE DEVICE

Read the contents of the datasheet before installation. Failure to follow the recommendations in the datasheet and other requirements of diligence appropriate to the nature of the equipment may: prove hazardous to life/health, cause damage to the equipment or the installation to which it is connected, result in damage to other property, or violate other applicable regulations. The manufacturer of the equipment, Yacht Concept sp. z o.o., assumes no liability for damages (property and non-property) resulting from installation and/or use of the equipment not in accordance with the datasheet and/or due care in handling the equipment in question.



WATCH THE PARAMETERS

The device's power supply, permissible load or other characteristic parameters must comply with the device's specifications.



DO NOT MODIFY

Do not modify this device in any way not included in this datasheet.



OTHER DEVICES

The manufacturer, Yacht Concept sp. z o.o. will not be held responsible for any damage or loss of warranty privileges for other connected devices if the connection is not compliant with their datasheets.



TECHNICAL SUPPORT

If you have any technical questions or comments on the operation of the device, contact Yacht Concept technical support.



NOT A TOY

The product is not intended for children or pets.

SAFETY INFORMATION



ELECTRICITY

Dangers of life caused by electricity.



PROPER USAGE

The components of the system (individual devices) are designed for operation on yachts. Incorrect connection or use may cause fire or electric shock.



INSTALLATOR

Any work related to the installation of the device, especially work involving interference with the electrical system, can only be performed by a person with the appropriate qualifications or authorizations.



POWER SUPPLY

When installing the device, make sure to disconnect the power supply voltage in the circuit in which this device is connected or in the vicinity of which the installation takes place.



MOISTNESS

To avoid risk of electrical shock, do not operate the device with wet or moist hands. Do not use in damp or wet locations, near a bathtub, sink, shower, swimming pool, or anywhere else where water is present.



CONNECTORS BRIDGE

Do not connect inputs or outputs by bridges to achieve higher current. This may result in exceeding the maximum current and destroying the device.

2. TECHNICAL DATA

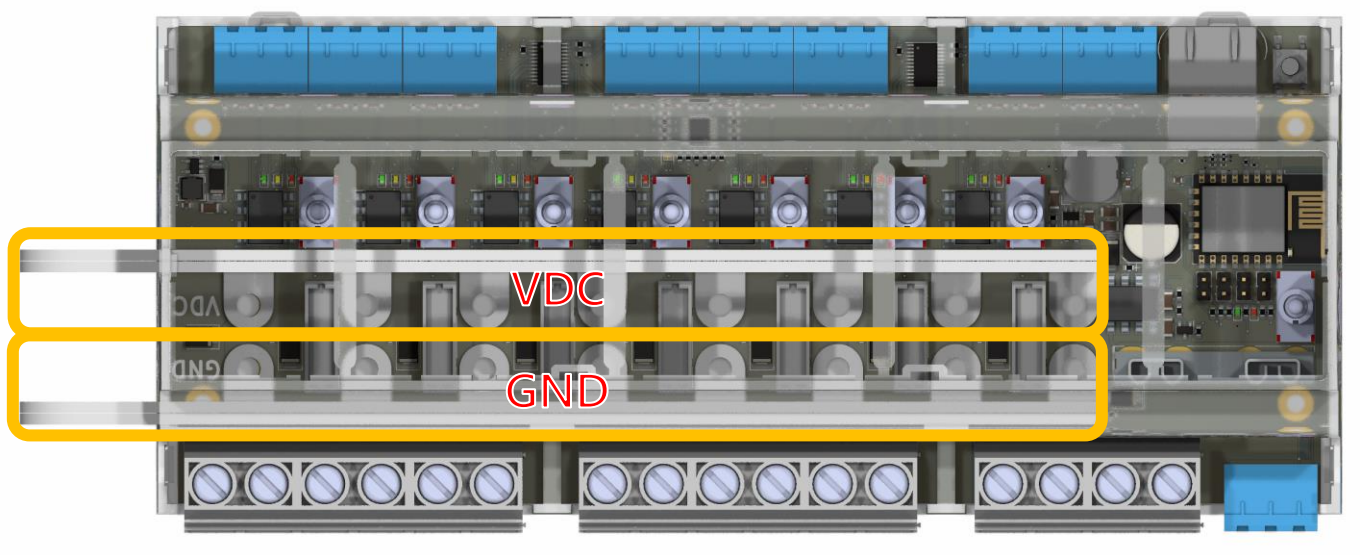
GENERAL DATA	
Module dimensions (h x d x l)	65.2 mm x 89.8 mm x 213.8 mm
Ambient temperature	-10°C to 50°C
Ambient humidity	75%
POWER SUPPLY	
Supply voltage – min.	17 V
Supply voltage – max.	33 V
Current consumption – idle, typ.	0.05 A
COMMUNICATION	
Interfaces	Ethernet, UART TTL, Wi-Fi
Inputs	8 x Button / Logic
Outputs	8 x 40 A Switch
POWER TERMINAL BLOCK	
Connection method	Screw
Size	Rail - 4 mm x 20mm
INPUT TERMINAL BLOCK	
Connection method	Push-in
Wire gauge min.	24 AWG
Wire gauge max.	12 AWG
OUTPUT TERMINAL BLOCK	
Connection method	Screw
Stud/tab size:	M5

INPUTS & OUTPUTS

POWER SUPPLY (back)

CONNECTORS	PARAMETERS	DESCRIPTION
Power In	17 V DC – 33 V DC	Module power input

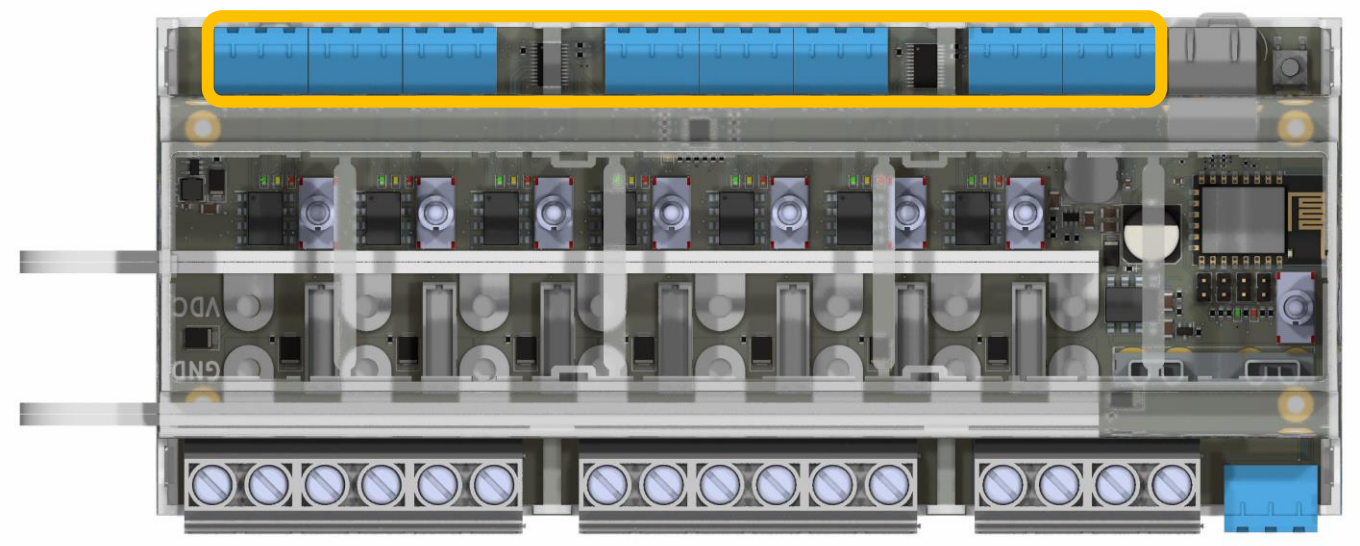
LIGHT	DESCRIPTION
BLINKS	Module works normally.
FIXED OR NONE	Indicates problem of the module or power supply.



- Module must be powered by 17VDC to 30VDC stabilized power supply with short circuit protection. Connecting higher voltage or voltage not matching the load's voltage may cause damage to the device.

INPUTS

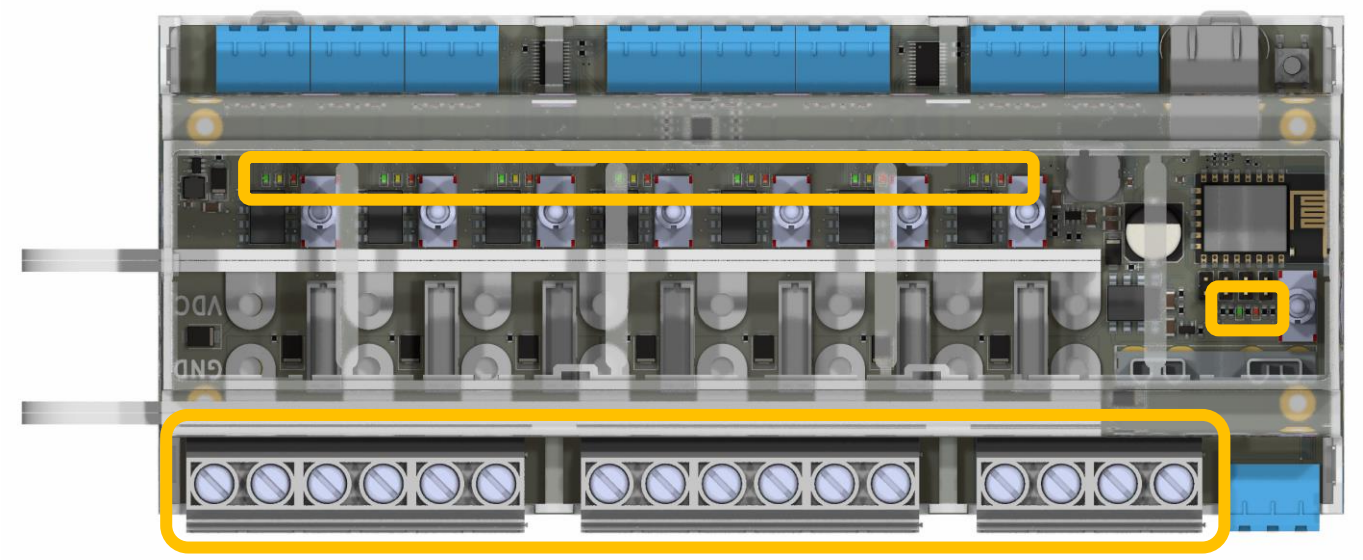
CONNECTORS	DESCRIPTION
Input 1 - 8	Open/short between Vdc and IN 2,5V to VDC for logic “1”



OUTPUTS

CONNECTORS	PARAMETERS	DESCRIPTION
Output 1 – 8	PWM signal of supply voltage, adjustable 100Hz – 20kHz frequency and fill factor (0-100%) of 12 bits resolution. Maximum current 40A.	Can power up loads up to 40A with PWM modulation.

LIGHT COLOR	DESCRIPTION
GREEN	Channel is active.
ORANGE	MOSFET-triggered backflow protection.
RED	Chennel fuse is burned or not present.
NONE	Channel is inactive.

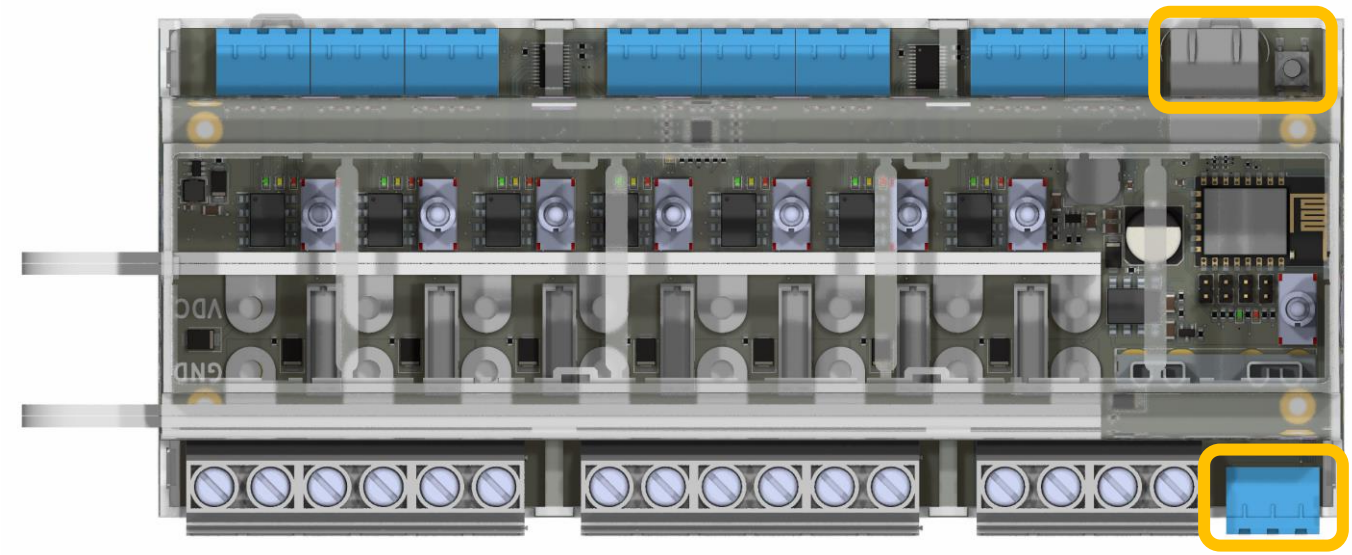


COMMUNICATION

The element responsible for the logic of the performed actions, and for communication with the central unit is the communication chip, which is mounted on each module. The circuit consists of 2 processors: Atmega1284 communicating with peripherals, and ESP8266 responsible for Ethernet network communication, and Wi-Fi wireless communication.

The microprocessors communicate with each other using the SPI bus. SPI was also used to communicate with the ENC2j50 chip responsible for Ethernet. An SPI bus has been provided on the ICSP pin for communication with additional peripherals in the future.

Each chip has a built-in wifi antenna for general-purpose use, or in cases where connecting a cable network is not possible. The chip itself can also serve with other Wi-Fi compatible devices.



WIRELESS COMMUNICATION

Wi-Fi

Each communication board has a built-in Wi-Fi modem based on the ESP8266 chip. The wireless network can be used for:

- Installation of modules in places where there is no cable network.
- Install software updates and scripts.
- Communication with other devices via API (Including light bulbs and smart sockets)

WI-FI	
Interfaces	Wi-Fi, nRF
Inputs	nRF socket
Protocols	802.11 b/g/n
Frequency range	2.4 GHz – 2.5 GHz (2 400 MHz – 2483.5 MHz)
Tx power	802.11 b: +20 dBm 802.11 g: +17 dBm 802.11 n: +14 dBm
Rx sensitivity	802.11 b: -91 dBm (11 Mbps) 802.11 g: -75 dBm (54 Mbps) 802.11 n: -72 dBm (MCS7)
Security	WPA/WPA2
Encryption	WEP/TKIP/AES
Network protocols	IPv4, TCP/UDP/HTTP

WIRED COMMUNICATION

Ethernet

Each communication system has an Ethernet interface operating in the 10/100Mbit standard. Through this interface, all communication of the modules with each other and with the central application takes place.

Ethernet	
Connector	RJ-45
Standard	802.3
Base-T Networks	10/100
Duplex modes	Full & half
SPI interface	Clock speed up to 20 MHz
Buffer	8 kB Transmit/Receive packet dual port SRAM

UART TTL

Each module has terminals for RS232 (TTL) 5V protocol. The connector is used for installing software in modules, and for communication with other peripheral devices using the API. With the help of an appropriate adapter, you can use any communication standard such as: RS232, RS485, Modbus.

UART TTL	
Connector	3 x push-in (TX, RX, GND)
Operation mode	Asynchronous
Voltage levels	0 V – 3.3 V
Data transfer	9 600 bps - 921 600 bps

FEATURES

MODULES	YC-OB-D1 LED IP	YC-OB-D2 SHUTTER IP	YC-OB-D3 CONTACT IP	YC-OB-D4 RELAY IP	YC-OB-D5 SENSOR IP	YC-OB-D6
Button / Logic inputs	8	0	8	8	0	12
Button / Logic override switches	No	No	Yes	Yes	No	No
Output status LED indicator	Yes	Yes	Yes	Yes	No	No
Voltage/current measurement inputs	8	4	0	0	7	0
Resistance measurement inputs	0	0	0	0	6	0
Temperature sensor inputs	0	0	0	0	6	0
LED outputs	8	0	0	0	0	0
Motor outputs	0	2	0	0	0	0
10A relay outputs	0	0	8	0	0	0
40A switch outputs	0	0	0	8	0	0

The modules according to the table have different features. Below are the specifications of the various inputs and outputs that support the features. Before installation, read the data sheet carefully and follow the recommendations.



READ IMPORTANT INFORMATION



READ SAFETY INFORMATION



FOLLOW THE PARAMETERS

3. MANUAL

INPUTS USAGE SCENARIOS

1. Interface with External Logic Signal Devices:

- Description: For devices that output a distinct logic signal.
- Connection:
    - Connect the signal output from the external device to the "In" terminal of the circuit.
    - Connect the ground of the external device to the "Ref" terminal of the circuit.

2. Interface with Ground-Shorting Devices:

- Description: For devices that communicate by alternately shorting their output to ground or leaving it open.
- Connection:
    - Connect the output of the device to the "In" terminal of the circuit.
    - Additionally, short the top pin (adjacent to the "In" terminal) to the "In" terminal. This ensures a defined voltage level when the device output is open.

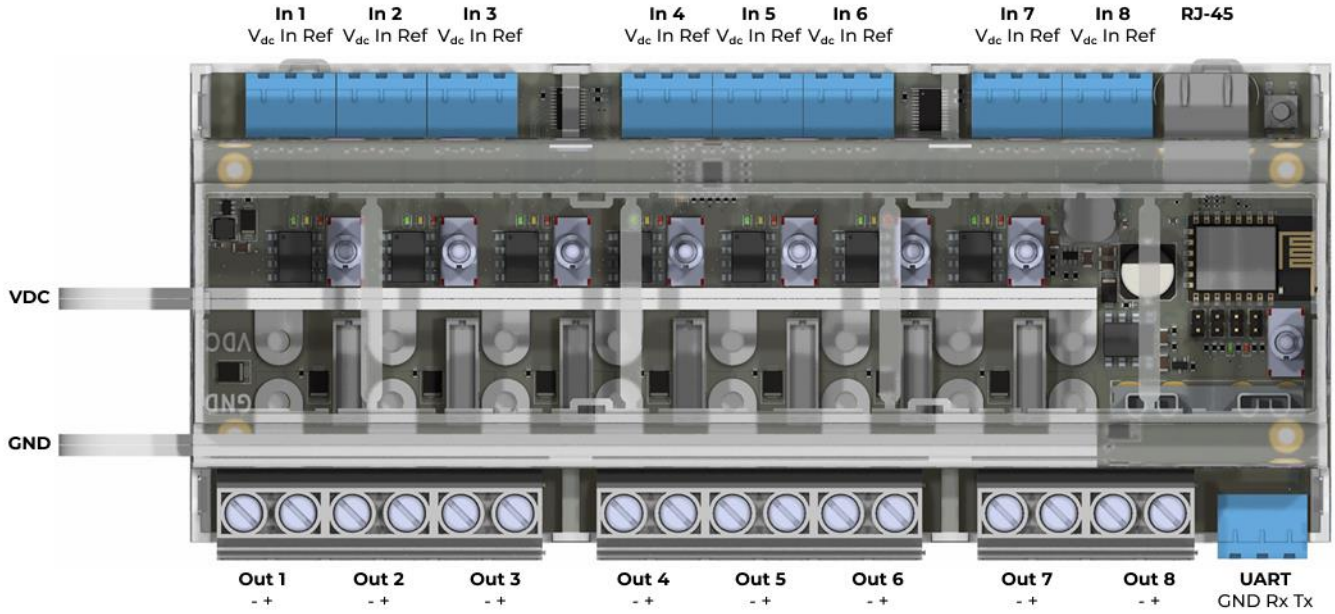
3. Interface with Contact-Based Devices:

- Description: For devices that use two contacts which either establish a connection (short) or break it (open).
- Connection:
    - Connect one of the contacts to the "+VDC" terminal of the circuit.
    - Connect the other contact to the "In" terminal of the circuit. The circuit will then interpret the connection status of the contacts based on the voltage at the "In" terminal.

Note:

Ensure that external devices comply with the voltage specifications of the circuit to prevent damage and ensure accurate operation. Proper grounding practices should be followed to minimize noise and interference.

INPUTS & OUTPUTS SCHEME

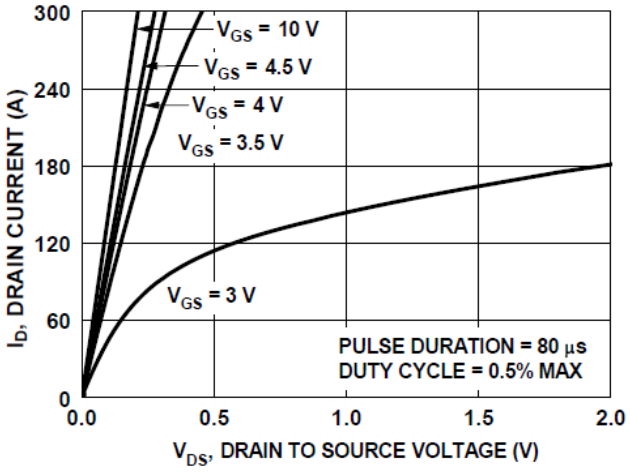


POWER TERMINAL BLOCK	
Connection method	M8 ring cable connection
Contact material	Copper
INPUT TERMINAL BLOCK	
Connection method	Screw
Wire gauge min.	28 AWG
Wire gauge max.	12 AWG
Contact material	Copper
Contact plating	Nickel
OUTPUT TERMINAL BLOCK	
Connection method	Screw
Stud/tab size:	M5
Contact material	Brass
Contact plating	Tin
FUSE 1	
Size	Maxi auto
Value	40 A
FUSE 2-8	
Size	Midi auto (ATO)
Value	Up to 40 A
BUTTON INPUT 1-8	
Input type	3.3 V logic input with pull-up
Pull-up resistance	20 – 60 kOhm
LEVER SWITCH 1-8	
Mechanical resistance	40 000 make-and-break cycles

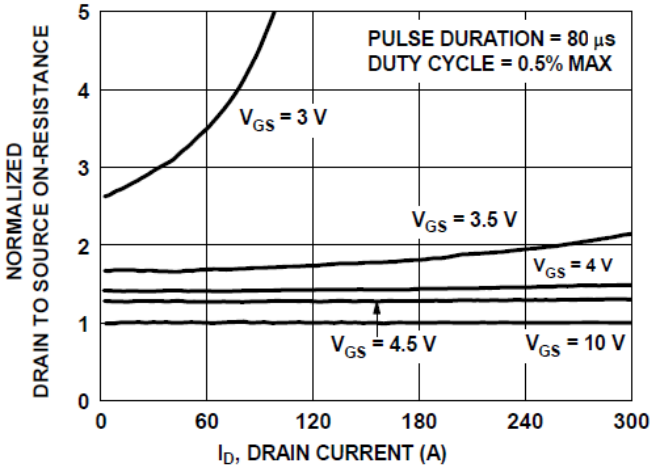
Contact resistance	10 mOhm initial @ 2-4VDC, 100 mA for both silver and gold plated contacts
Insulation resistance	1 000 MOhm
Dielectric strength	1 000 Vrms @sea level
40A SWITCH OUTPUT 1-8	
Switch type	Fused high side semiconductor switch
Input voltage range	17 V – 30 V
Rated output current	40 A
Electronic OC protection trip – max.	44 A
Overcurrent timeout – typ.	660 us
Output undervoltage threshold	15 V
Fuse type	Automotive 19 mm
Fuse rating	40 A
Turn-on delay time	29 ns – 47 ns
Rise time	22 ns – 36 ns
Turn-off delay time	83 ns – 133 ns
Fall time	18 ns – 33 ns
V_{DS} Drain to source voltage	40 V
V_{GS} Gate to source voltage	±20 V
I_D Drain current	47 A
E_{AS} Single pulse avalanche energy	800 mJ
P_D Power dissipation	2.7 W
BV_{DSS} Drain to source breakdown voltage	40 V @ I_D = 250 uA, V_{GS} = 0V
I_{DSS} Zero gate voltage drain current	1 uA @ V_{DS} = 32V, V_{GS} = 0V
I_{GSS} Gate to source leakage current	±100 nA @ V_{GS} = ±20V, V_{DS} = 0V
$V_{GS(th)}$ Gate to source threshold voltage	1 V – 3 V @ V_{GS} = V_{DS}, I_D = 250 uA

$r_{DS(on)}$	0.71 MOhm – 0.85 MOhm @ V_{GS} = 10V, I_D = 47 A
g_{FS} Forward transconductance	260 S @ V_{DS} = 5V, I_D = 47 A
V_{SD} Source to drain diode forward voltage	0.76 V – 1.3 V @ V_{GS} = 0V, I_S = 47 A
t_{π} Reverse recovery time	72 ns – 116 ns @ I_F = 47 A, di/dt = 100 A/us

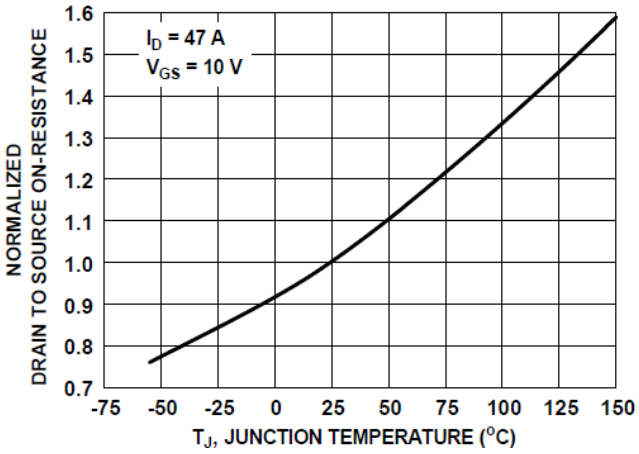
On region characteristics



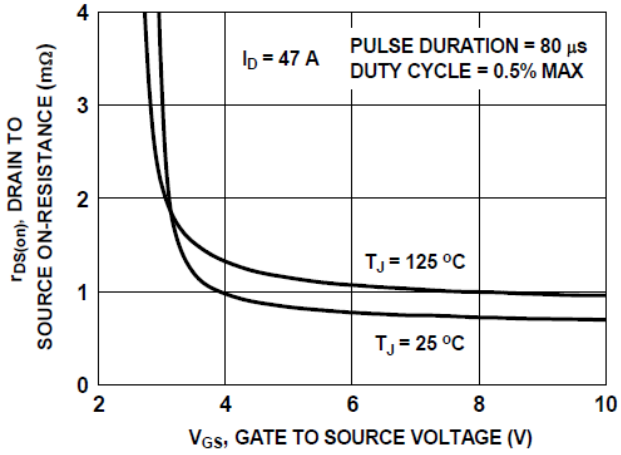
Normalized on-resistance vs drain current and gate voltage



Normalized on-resistance vs juntion temperature

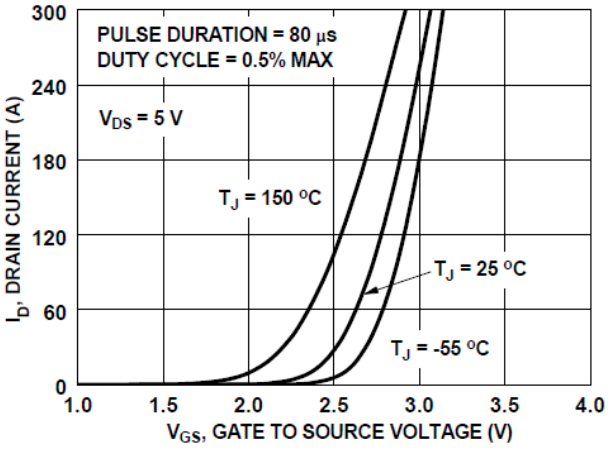


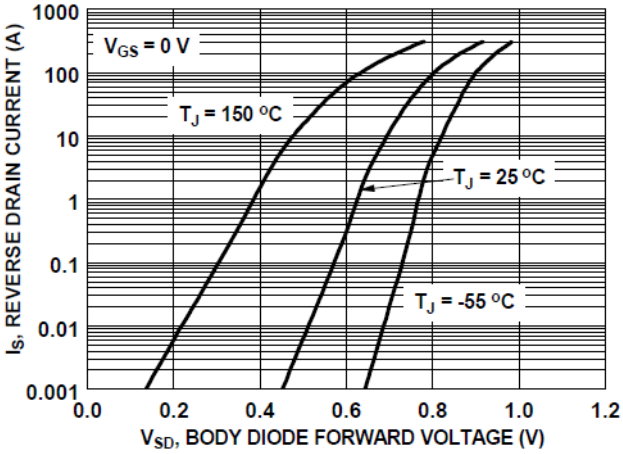
On-resistance vs gate to source voltage



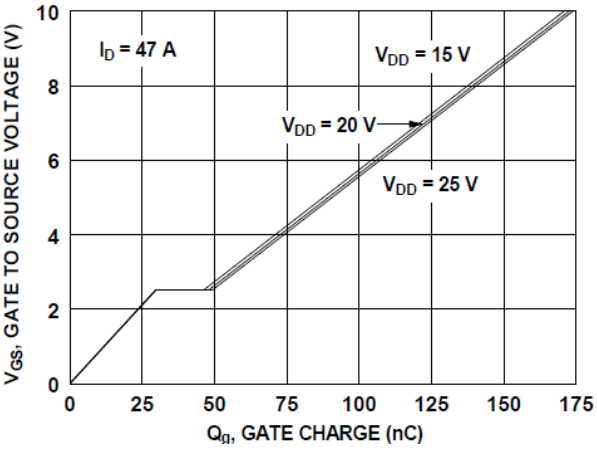
Transfer characteristics

Source to drain diode forward voltage vs source current

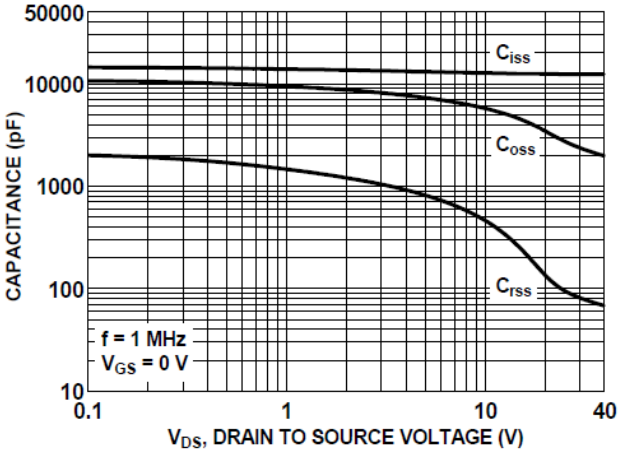




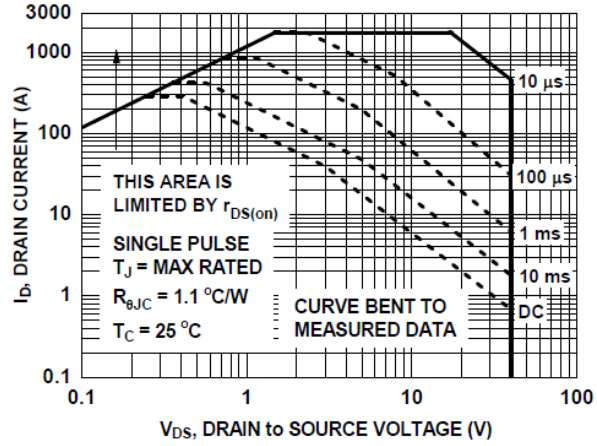
Gate charge characteristics



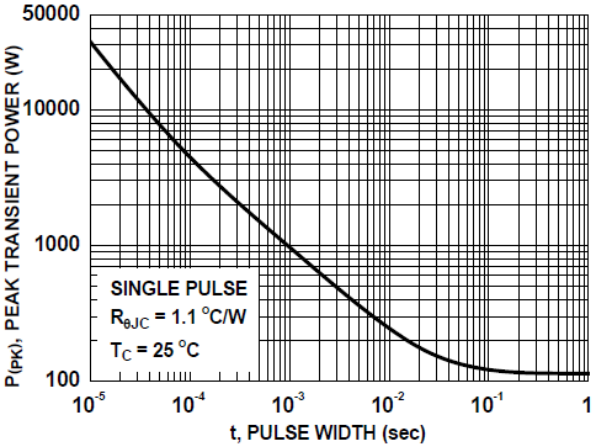
Capacitance vs drain to source voltage



Forward bias safe operating area



Single puls maximum power dissipation



4. PARTS LIST

Item	Qty	Reference(s)	Value	Footprint
1	22	C101, C301, C306, C401, C406, C501, C506, C601, C606, C701, C706, C801, C806, C901, C906, C1003, C1004, C1005, C1006, C1009, C1011, C1016	100n	Capacitor_SMD:C_0603_1608Metric
2	1	C102	100p	Capacitor_SMD:C_0603_1608Metric
3	1	C103	10u 25V	Capacitor_SMD:C_1206_3216Metric
4	1	C104	100n 25V	Capacitor_SMD:C_0603_1608Metric
5	1	C105	EEEFT1H331GP	Capacitor_SMD:CP_Elec_10x10.5
6	1	C106	10u 50V	Capacitor_SMD:C_1206_3216Metric
7	3	C107, C1107, C1207	100n 50V	Capacitor_SMD:C_1206_3216Metric
8	1	C108	100p 6V3	Capacitor_SMD:C_0603_1608Metric
9	2	C109, C110	22u 6V3	Capacitor_SMD:C_1206_3216Metric
10	1	C111	1u 6V3	Capacitor_SMD:C_0603_1608Metric
11	1	C112	1u 25V	Capacitor_SMD:C_1206_3216Metric
12	16	C202, C204, C302, C304, C402, C404, C502, C504, C602, C604, C702, C704, C802, C804, C902, C904	1u 100V	Capacitor_SMD:C_1206_3216Metric
13	8	C203, C303, C403, C503, C603, C703, C803, C903	10u 25V	Capacitor_SMD:C_1206_3216Metric
14	8	C207, C307, C407, C507, C607, C707, C807, C907	1n	Capacitor_SMD:C_0603_1608Metric
15	7	C305, C405, C505, C605, C705, C805, C905	10n	Capacitor_SMD:C_0603_1608Metric
16	2	C1001, C1002	18p	Capacitor_SMD:C_0402_1005Metric
17	3	C1007, C1008, C1010	10u	Capacitor_SMD:C_1206_3216Metric
18	2	C1014, C1015	10n	Capacitor_SMD:C_0402_1005Metric
19	24	C1101, C1102, C1103, C1104, C1105, C1106, C1108, C1109, C1110, C1111, C1112, C1113, C1201, C1202, C1203, C1204, C1205, C1206, C1208, C1209, C1210, C1211, C1212, C1213	1n 50V	Capacitor_SMD:C_1206_3216Metric
20	2	D101, D103	SK16	Diode_SMD:D_SMA
21	9	D102, D206, D306, D406, D506, D606, D706, D806, D906	BAT54S	Package_TO_SOT_SMD:SOT-23
22	9	D104, D209, D309, D409, D509, D609, D709, D809, D909	SM6T30A	Diode_SMD:D_SMB
23	8	D201, D301, D401, D501, D601, D701, D801, D901	BAT54A	Package_TO_SOT_SMD:SOT-23
24	8	D202, D302, D402, D502, D602, D702, D802, D902	LED_G	LED_SMD:LED_0603_1608Metric
25	24	D203, D207, D303, D307, D403, D407, D503, D507, D603, D607, D703, D707, D803, D807, D903, D907, D1101, D1102, D1105, D1106, D1201, D1202, D1205, D1206	BAT54J	Diode_SMD:D_SOD-323F
26	8	D208, D308, D408, D508, D608, D708, D808, D908	LED_R	LED_SMD:LED_0603_1608Metric
27	7	D304, D404, D504, D604, D704, D804, D904	LED_O	LED_SMD:LED_0603_1608Metric
28	8	D1103, D1104, D1107, D1108, D1203, D1204, D1207, D1208	BAT54C	Package_TO_SOT_SMD:SOT-23
29	1	F201	Keystone 3555-2	Fuse:Fuseholder_Keystone_3555-2
30	7	F301, F401, F501, F601, F701, F801, F901	178.6165.0001	Fuse:Fuseholder_Blade_ATO_Littelfuse_Pudenz_4_Pin

31	1	FB1002	Ferrite_Bead	Capacitor_SMD:C_0603_1608Metric
32	4	H101, H102, H103, H104	MountingHole	MountingHole:MountingHole_3.2mm_M3_Pad_TopBottom
33	16	H201, H202, H301, H302, H401, H402, H501, H502, H601, H602, H701, H702, H801, H802, H901, H902	M4	MountingHole:MountingHole_4.3mm_M4_Pad_Via
34	9	J102, J1101, J1102, J1103, J1104, J1201, J1202, J1203, J1204	TBP01R1-508-03BE	libs:CUI_TBP01R1-508-03BE
35	8	J201, J301, J401, J501, J601, J701, J801, J901	VP026584000AG	libs:VP026584000AG
36	1	J1003	RJ45_Amphenol_RJMG1BD3B8K1ANR	Connector_RJ:RJ45_Amphenol_RJMG1BD3B8K1ANR
37	1	L101	SRN1060-100M	Inductor_SMD:L_Bourns-SRN1060
38	1	L102	SRN4018-100M	Inductor_SMD:L_Bourns-SRN4018
39	23	Q201, Q203, Q301, Q303, Q308, Q401, Q403, Q408, Q501, Q503, Q508, Q601, Q603, Q608, Q701, Q703, Q708, Q801, Q803, Q808, Q901, Q903, Q908	2N7002	Package_TO_SOT_SMD:SOT-23
40	8	Q202, Q302, Q402, Q502, Q602, Q702, Q802, Q902	BSS84	Package_TO_SOT_SMD:SOT-23
41	16	Q204, Q205, Q304, Q305, Q404, Q405, Q504, Q505, Q604, Q605, Q704, Q705, Q804, Q805, Q904, Q905	AON6512	Package_DFN_QFN:AO_DFN-8-1EP_5.55x5.2mm_P1.27mm_EP4.12x4.6mm
42	16	Q206, Q306, Q406, Q506, Q606, Q706, Q806, Q906, Q1101, Q1102, Q1103, Q1104, Q1201, Q1202, Q1203, Q1204	BC857	Package_TO_SOT_SMD:SOT-23
43	8	Q207, Q307, Q407, Q507, Q607, Q707, Q807, Q907	BC846	Package_TO_SOT_SMD:SOT-23
44	66	R101, R103, R105, R106, R107, R108, R111, R114, R115, R116, R118, R313, R413, R513, R613, R713, R813, R913, R1103, R1104, R1106, R1107, R1109, R1110, R1112, R1114, R1115, R1116, R1117, R1118, R1121, R1122, R1124, R1125, R1127, R1128, R1130, R1132, R1133, R1134, R1135, R1136, R1203, R1204, R1206, R1207, R1209, R1210, R1212, R1214, R1215, R1216, R1217, R1218, R1221, R1222, R1224, R1225, R1227, R1228, R1230, R1232, R1233, R1234, R1235, R1236	10k	Resistor_SMD:R_0603_1608Metric
45	1	R109	30k	Resistor_SMD:R_0603_1608Metric
46	1	R110	150k	Resistor_SMD:R_0603_1608Metric
47	10	R112, R113, R1101, R1102, R1119, R1120, R1201, R1202, R1219, R1220	3k3	Resistor_SMD:R_0603_1608Metric
48	1	R117	180k	Resistor_SMD:R_0603_1608Metric
49	9	R119, R1105, R1108, R1123, R1126, R1205, R1208, R1223, R1226	NM	Resistor_SMD:R_0603_1608Metric
50	1	R120	68k	Resistor_SMD:R_0603_1608Metric
51	8	R121, R315, R415, R515, R615, R715, R815, R915	13k	Resistor_SMD:R_0603_1608Metric
52	1	R122	150k	Resistor_SMD:R_0603_1608Metric
53	1	R123	12k	Resistor_SMD:R_0603_1608Metric
54	24	R201, R202, R205, R301, R302, R305, R401, R402, R405, R501, R502, R505, R601, R602, R605, R701, R702, R705, R801, R802, R805, R901, R902, R905	10k	Resistor_SMD:R_0603_1608Metric
55	15	R203, R303, R307, R403, R407, R503, R507, R603, R607, R703, R707, R803, R807, R903, R907	1k	Resistor_SMD:R_0603_1608Metric

56	8	R204, R304, R404, R504, R604, R704, R804, R904	33k	Resistor_SMD:R_0603_1608Metric
57	8	R206, R306, R406, R506, R606, R706, R806, R906	3k3	Resistor_SMD:R_0603_1608Metric
58	8	R210, R310, R410, R510, R610, R710, R810, R910	240R	Resistor_SMD:R_0603_1608Metric
59	16	R211, R212, R311, R312, R411, R412, R511, R512, R611, R612, R711, R712, R811, R812, R911, R912	100R	Resistor_SMD:R_0603_1608Metric
60	8	R214, R314, R414, R514, R614, R714, R814, R914	10R	Resistor_SMD:R_0603_1608Metric
61	32	R217, R218, R219, R221, R317, R318, R319, R321, R417, R418, R419, R421, R517, R518, R519, R521, R617, R618, R619, R621, R717, R718, R719, R721, R817, R818, R819, R821, R917, R918, R919, R921	100k	Resistor_SMD:R_0603_1608Metric
62	8	R220, R320, R420, R520, R620, R720, R820, R920	1k	Resistor_SMD:R_0603_1608Metric
63	8	R222, R322, R422, R522, R622, R722, R822, R922	WSK1216L2000FEA	libs:SMT_61L000FEA_VIS
64	8	R223, R323, R423, R523, R623, R723, R823, R923	100R	Resistor_SMD:R_0603_1608Metric
65	7	R316, R416, R516, R616, R716, R816, R916	20k	Resistor_SMD:R_0603_1608Metric
66	5	R1001, R1010, R1011, R1014, R1015	3k3	Resistor_SMD:R_0402_1005Metric
67	3	R1002, R1012, R1013	NM	Resistor_SMD:R_0402_1005Metric
68	2	R1003, R1004	1k	Resistor_SMD:R_0402_1005Metric
69	1	R1005	2k 1%	Resistor_SMD:R_0402_1005Metric
70	4	R1006, R1007, R1008, R1009	50R 1%	Resistor_SMD:R_0402_1005Metric
71	1	R1016	10k	Resistor_SMD:R_0402_1005Metric
72	8	R1111, R1113, R1129, R1131, R1211, R1213, R1229, R1231	2k	Resistor_SMD:R_0603_1608Metric
73	1	SW101	2-1977223-4	libs:219772234
74	8	SW201, SW301, SW401, SW501, SW601, SW701, SW801, SW901	1MS3T1B1M2QES	libs:Switch-1MS3T1B1M2QES
75	2	U101, U102	PCAL6416APW	Package_SO:TSSOP-24_4.4x7.8mm_P0.65mm
76	1	U103	MAX11617	Package_SO:QSOP-16_3.9x4.9mm_P0.635mm
77	1	U104	SN74LVC1G14DBV	Package_TO_SOT_SMD:SOT-23-5
78	1	U105	MCP1416	Package_TO_SOT_SMD:SOT-23-5
79	1	U106	AP63200WU	Package_TO_SOT_SMD:TSOT-23-6
80	1	U107	AP3012	Package_TO_SOT_SMD:SOT-23-5
81	1	U108	LM75BTP,147	Package_SON:SON-8-1EP_3x2mm_P0.5mm_EP1.4x1.6mm
82	8	U202, U302, U402, U502, U602, U702, U802, U902	TLP250H(TP1,F)	libs:SOP254P1000X425-8N
83	8	U204, U304, U404, U504, U604, U704, U804, U904	INA180A4	Package_TO_SOT_SMD:SOT-23-5
84	7	U301, U401, U501, U601, U701, U801, U901	SN74LVC2G132DCTR	Package_SO:SSOP-8_2.95x2.8mm_P0.65mm
85	7	U303, U403, U503, U603, U703, U803, U903	TS3021A	Package_TO_SOT_SMD:SOT-23-5
86	1	U1001	ENC28J60x-SS	Package_SO:SSOP-28_5.3x10.2mm_P0.65mm
87	1	U1002	ESP32-PICO-D4	Package_DFN_QFN:QFN-48-1EP_7x7mm_P0.5mm_EP5.3x5.3mm
88	1	U1003	AMS1117-3.3	Package_TO_SOT_SMD:SOT-223-3_TabPin2
89	1	U1004	ESP-12E	RF_Module:ESP-12E

90	2	U1101, U1201	LM339DR	Package_SO:SOIC-14_3.9x8.7mm_P1.27mm
91	8	U1102, U1103, U1104, U1105, U1202, U1203, U1204, U1205	TLVH431	Package_TO_SOT_SMD:SOT-23
92	1	Y1001	ABM8-25.000MHZ-B2-T	Crystal:Crystal_SMD_3225-4Pin_3.2x2.5mm

5. DRAWINGS

