

Flyback method Isolated Output Power 48W BD28C57HFJ-EVK-001

User's Guide

<High Voltage Safety Precautions>

 \bigcirc Read all safety precautions before use

Please note that this document covers only the BD28C57HFJ evaluation board (BD28C57HFJ-EVK-001) and its functions. For additional information, please refer to the datasheet.

To ensure safe operation, please carefully read all precautions before handling the evaluation board



Depending on the configuration of the board and voltages used,

Potentially lethal voltages may be generated.

Therefore, please make sure to read and observe all safety precautions described in the red box below.

Before Use

- [1] Verify that the parts/components are not damaged or missing (i.e. due to the drops).
- [2] Check that there are no conductive foreign objects on the board.
- [3] Be careful when performing soldering on the module and/or evaluation board to ensure that solder splash does not occur.
- [4] Check that there is no condensation or water droplets on the circuit board.

During Use

- [5] Be careful to not allow conductive objects to come into contact with the board.
- [6] Brief accidental contact or even bringing your hand close to the board may result in discharge and lead to severe injury or death.

Therefore, DO NOT touch the board with your bare hands or bring them too close to the board. In addition, as mentioned above please exercise extreme caution when using conductive tools such as tweezers and screwdrivers.

- [7] If used under conditions beyond its rated voltage, it may cause defects such as short-circuit or, depending on the circumstances, explosion or other permanent damages.
- [8] Be sure to wear insulated gloves when handling is required during operation.

After Use

- [9] The ROHM Evaluation Board contains the circuits which store the high voltage. Since it stores the charges even after the connected power circuits are cut, please discharge the electricity after using it, and please deal with it after confirming such electric discharge.
- [10] Protect against electric shocks by wearing insulated gloves when handling.

This evaluation board is intended for use only in research and development facilities and should by handled **only by qualified personnel familiar with all safety and operating procedures.**

We recommend carrying out operation in a safe environment that includes the use of high voltage signage at all entrances, safety interlocks, and protective glasses.

AC/DC Converter

ROHI

Flyback method Isolated 48 W 24 V 2 A BD28C57HFJ Evaluation Board BD28C57HFJ-EVK-001

General Description

This evaluation board outputs an isolated voltage of 24 V from an input of 300 VDC to 900 VDC,

and the maximum output current is 2 A.

A SiC MOSFET (SCT12H12NZ) with 1700 V, RdsON = 1.1Ω typ is used so that an input voltage of up to 900 VDC can be applied. The control IC used is the BD28C57HFJ, which is suitable for driving SiC MOSFET.

The control method is current mode. The oscillation frequency is approximately 65 kHz, and the duty max is 50%.



Figure 1. BD28C57HFJ-EVK-001

Performance Specification

Electrical characteristic

Not guarantee the characteristics is representative value.

Unless otherwise specified V_IN = 400V_DC, I_OUT = 2 A , Ta = 25 $^\circ\text{C}$

Parameter	Symbol	Min	Тур	Мах	Units	Conditions
Input Voltage Range	Vin	300	400	900	V	
Input Frequency	fline	47	-	63	Hz	
Output Voltage	Vout	22.6	24.0	25.2	V	
Output Current Range (Note 1)	Iout1	0	-	2.0	А	
Maximum Output Power (Note 1)	Роит			48	W	
Standby Input Power	PINSTBY	-	0.67	-	W	I _{OUT} = 0 A V _{IN} = 230V
Power supply efficiency	η	86	89.0	-	%	
Output Ripple Voltage (Note 2)	Vripple	-	0.21	0.48	Vpp	
Opareting Temperature		-10	+25	+60	°C	

(Note 1) Adjust the operating time so that surface temperature of no component exceeds 105 $^\circ$ C

(Note 2) Do not consider spike noise

Derating





Operation Procedure

1 Necessary Equipment

- (1) DC power supply (90 VDC to 1 k VDC, 200 W or more)
- (2) Load equipment (3 A at maximum value)
- (3) DC voltmeter

2 Connect to Each Equipment

- (1) Preset the AC power to 90 Vac to 264 Vac and turn off the power output.
- (2) Set the load below the rated current of each output to disable the load.
- (3) Connect the N terminal of the power supply to the CN1-1: AC (N) terminal and the L terminal to the CN1-2: AC (L) terminal with a pair of wires.
- (4) Connect load to VOUT terminal from the positive terminal and to GND terminal with a pair of wires.
- (5) When connecting a power meter, connect as follows. (For details, refer to the User's Manual of the electricity meter you are using.)
- (6) Connect the positive terminal of the DC voltmeter to VOUT terminal and the negative terminal to GND terminal for output voltage measurement.
- (7) DC power supply switch is ON.
- (8) Make sure that the DC voltmeter reading is at the set voltage (24 V).
- (9) Electronic load switch is ON.





Application Circuit

This evaluation board uses a flyback type PWM method. The oscillation frequency is set to approximately 65kHz.

The output (24V) voltage is monitored by a feedback circuit and fed back to the COM terminal of the BD28C57HFJ through a photocoupler.

At startup, the VDD terminal voltage rises as a result of the voltage being supplied to the VDD terminal through the startup circuit (Q5, Q6).

When the VDD terminal voltage exceeds the UVLO release voltage of 18.8V (Typ), the BD28C57HFJ starts operating.

When operation starts, 5V is output from the VREF terminal. This voltage turns Q8 ON, Q6 OFF, and the supply from Q6 is cut off, contributing to reducing standby power.

The oscillation frequency is determined by R21 (12kΩ) and C9 (1000pF). It is set to approximately 65kHz.

A leading edge blanking circuit is installed to prevent malfunction due to noise.

The leading edge blanking circuit consists of Q2, R27, C14, and R28.



Figure 4. Application Circuit

BD28C57HFJ General Description

Features

- PWM Type Current Mode Control
- Low power consumption
- UVLO function for VDD pin
- Overcurrent protection circuit for each cycle
- Switching frequency setting pin

Key Specifications

Operating Power Supply Voltage Range

6.90 V to 28.00 V

- Circuit Current 2.0 mA (Max.)
- Starting Current : 60 µA (Typ)
- Operating Temperature Range -40°C to +125 °C

(TOP VIEW) COMP 1 FB 2 CS 3 RTCT 4 B VREF 7 VDD 6 OUT 5 GND

Pin Configuration



W (Typ) x D (Typ) x H (Max) 4.9 mm x 8.0 mm x 1.65 mm Pitch: 1.27 mm (Typ)



Figure 5. Pin Configuration

Pin Descriptions

Table 1.BD28C57HFJ Pin Configuration

Pin No.	Pin Name I/O		Function	
1	COMP	0	Error amplifier output pin	
2	FB	FB I Feedback signal output pin		
3	CS I		Primary side current sense pin	
4	RTCT I/O		Switching frequency setting pin	
5	GND	- GND pin		
6	OUT	O Exernal MOS drive terminal pin		
7	VDD	I Power supply input pin		
8	VREF	V	5VOutput pin	

Measurement Data

1 Load Regulation



Figure 6. Load Regulation (VOUT vs IOUT)

2. Line Regulation



Figure 8. Line Regulation (V_{OUT} vs V_{IN})



Figure 7. Efficiency vs IOUT



Figure 9. Efficiency vs Input Voltage

3 Switching Frequency





Figure 10. VDS, ID $V_{\text{IN}}\!=\!300$ VDC,I_{OUT}\!=\!2A

4 Switching Wave Form



Figure 12. Secondary Diode at V_{IN} = 300 VDC, I_{OUT} = 2.0 A

Figure 11. VDS, ID V_{IN} = 900 VDC, I_{OUT}=2A



Figure 13. Secondary Diode at VIN = 900 VDC, IOUT = 2.0 A

Output current waveform during short circuit 4





Figure 14. Output waveform during short circuit V_{IN} = 300 Vdc Figure 15. Output waveform during short circuit V_{IN} = 900 Vdc

5 Startup Wave Form





Figure 16. VIN = 300 VDC, IOUT = 0 A

Figure 17. VIN = 900 VDC, IOUT = 0 A

6 Dynamic Load Fluctuation



Figure 18. V_{IN} = 930 VDC, I_{OUT} = switch 0 A / 2.0 A

 CONCERNE
 Security 150:150:21
 Neval
 Edge OF J 1.01 Å

 Stream
 Stream
 Stream
 Stream
 Stream

 VOULT
 Nm + 1.21 H
 10m:/der
 10m:/der

 VOULT
 1 V / Div
 1
 10m:/der

 Iour
 2 A / Div
 1
 1

 Iour
 2 A / Div
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Figure 19. V_{IN} = 900 VDC, I_{OUT} = switch 0 A / 2 A

7 Output Voltage Ripple Wave Form





Figure 20. V_{IN} = 300 VDC, I_{OUT} =2.0 A

Figure 21. V_{IN} = 900 VDC, I_{OUT} = 2.0 A

8 Temperature of Parts Surface

They are measured after 20 minutes from applying a power supply.

VIN(VDC)	IOUT(A)	Q1(°C)	T1(°C)	D4(°C)
300	2	48.7	64.0	65.4
600	2	61.0	71.1	66.0
900	2	80.2	91.3	71.7

Table 2. Surface Temperature of Parts (Ta = 24.8 °C)

Schematics

 V_{IN} = 300 VDC \sim 900 VDC $\$ V_{OUT} = 24 V 2.0 A



Figure 22. BD28C57HFJ-EVK-001 Schematics

Parts List

Table 3. BoM of BD28C54HFJ-EVK-001

C1,C2,C3 HB by μF B80002138024 Wumh Electronik C4 33 nF B32672L1333 J TDK C3 2200 pF RDERTA22ZX4X1H03B Murata C6,C7,C21,C24,C28,C30 - Non-Maunied Tay's Vulen C6,C7 C100 47 pF GRM1885C28473W07 Murata C11 22 yF HD11122MDD Nichicon Nichicon C12 47 yF GRM1885C28473W07 Murata C13 0.1 yF HM101757104MA-T Tay's Vulen C14 33 pF GCM18807143341W310 Murata C15 2200 pF DETE3RA222M4BP01F Murata C16 33 a9 F/MX S80000578019 Murata C22 10 µF GRM31C0711100KE11 Murata C33 a9 G GRM31C717034KA270 Tay's Vulen C12 1 Å BY0237 M3 W5HAY Murata C23 0 Å RCM31C0711100KE11 Murata D102 1 Å BY0237 M3 W5HAY D4 20	Item	Value		Parts name	Manufacture
C4 33 nF B26721.333.1 TDK C5 2200 pF RDER73A222K31H03B Murata C6.C7.02.0.C21.C24.C28.C30 - Non-Murned Inc. C6.0 1000 pF HMK107B7102KA-T Tajo Yuden C10 47 pF GRM1892CE477JW07 Murata C11 22 yF UHD1H220MDD Noi-Murata C12 47 µF 7075764 R5 PRO C13 0.1 µF HMK107B7104MA-T Tajo Yuden C14 33 pF GCM1880C1H30306A01 Murata C15 2200 pF DETE3RA22MJABP01F Murata C16 330 pF/HV GRM3147034M347D Murata C12 10 µF GRM3147034M347D Murata C22 10 µF GRM3147034M347D Murata C33 0.33 µF GCM188717034KA37D Tajo Yuden C34 0.33 µF GCM18871034K37D Myrata C32 1 MUrata Murata C32 0.3 RFU423738 Rohm	C1,C2,C3	180	μF	8600021382024	Wuerth Electronik
CS DERT 3A22XXXH03B Mural 66.07 (20.024, C24, C24, C24, C34, C34, C34, C34, C34, C34, C34, C3	C4	33	nF	B32672L1333J	ток
CRC.7.200,C21,C24,C29,C30 - Non-Mauried C8.C9 1000 pF MMR107B71028A-T TabyOVDR C10 A7 pF GRM1862CE47U.W07 Murata C11 22 µF UHD114220MDD Nichicon C12 A7 µF GRM1862CE47U.W07 Horata C13 D.1 µF HMR107B7104MA-T TabyO Yulen C14 D.3 µF GRM180C13304GD1 Murata C15 200 pF DE158A222M.M4BP01F Murata C16 GRM1507D334KA37D TabyO Yulen Murata C19 GRM1507D334KA37D TabyO Yulen Murata C19 GRM1507D334KA37D TabyO Yulen Murata C19 GRM1507D34KA37D TabyO Yulen Murata C10 GRM1507D34KA37D TabyO Yulen Murata C19 GRM1507D34KA37D TabyO Yulen Murata C10 GRM1507D4 Murata Murata C19 GRM1507D4 Murata Murata C10 I Murata Mu	C5	2200	pF	RDER73A222K2K1H03B	Murata
C 8. G 9 1000 pF HMK107E7102KA-T Tayo Yuden C10 47 pF GRM1985C2E470JW07 Murata C11 2 µF UH01H220MDD Nichicon C12 47 µF T075764 RS PRO C13 0. 1 µF HMK107E7104MA-T Tayo Yuden C14 33 µF GCM1980C1H330GA01 Murata C15 2200 µF DE153RA222M4BP01F Murata C18 330 µF GCM1980C1H330S1W1D Murata C19 GBM320501H105KE11 Murata C22 10 µF GCM198071H105KE11 Murata C33 0.33 µF GCM198071H105KE11 Murata C42 GB101710002 Wurth Electronik Murata C42 GB101710002 Wurth Electronik Murata D1D2 1 A BYG23T-M3 MyEAY D4 20 A RPU425TB3SNZ Rohm D5D6 1 A UF4007 On Semicondutor D7J701 0.1 A IS535VM	C6,C7,C20,C21,C24,C29,C30	-		Non-Maunted	
C10 47 pF GRM1888C2E470JW07 Murata C11 22 µF UHD1H220MDD Nichicon C12 47 µF 7075764 R5 PRO C13 0.1 µF MM10787104MA-T Tayo Yuden C14 33 0 pF/1kV GRM380CH330A0M Murata C15 2200 pF DE1E3RA222MJ4BP01F Murata C16 680.02758V GRM380CH3140A0T Murata C17 G80.0314/FG GRM38CD11406KE11 Murata C18 0.33 µF GRM38CD144KA31 Murata C19 GRM31CD711106KE11 Murata GRM38CD17100KE11 Murata C14 GRM31CD711106KE11 Murata GRM31CD71100KE11 Murata C12 1.1 A BY2256610003 Wurdth Electronik GNAV D1D2 1.1 A BY2371M3 Warth Electronik GNAV D12 1.1 A UF4207 On Semiconductor Dy21010 O.1 A IS3055M Rohm D5D6 1.1 A UF400YSMAS Rohm GNA	C 8 ,C9	1000	pF	HMK107B7102KA-T	Taiyo Yuden
C11 22 µF UH01H220MD0 Nichioon C12 47 µF 7075764 RS PRO C13 0.1 µF HMK10787104MAF Taiyo Yuden C14 33 pF GCM1880C11330GA01 Murata C15 2200 pF DF ERA222M48P01F Murata C18 330 pF/1kV GRM34A7U3A331JW31D Murata C19 680 µF36V 86006678019 Literata C22 10 µF GRM3607711106KE11 Murata C33 Q.33 µF GCM188871C334KA37D Taiyo Yuden C41 9125061003 Wuerth Electronik C CN2 1 BYC32T-M3 VSHAY D4 20 A RPUH27B35NZ Rohm D5D6 1 A UF4007 On Semiconductor D7D10 0.1 A ISS35VM Rohm D4 20 A RPUH27B35NZ Rohm C1 1< SAS35VM	C10	47	pF	GRM1885C2E470JW07	Murata
C12 AT µF 7075764 RS PRO C13 0.1 µF HMK107B7104MAT Tajoy Yuden C14 33 pF GCMI806CH330GA01 Murata C15 2200 pF DE1E3RA22MJABPO1F Murata C16 330 pF/14V 6RM3147U3A31M37D Murata C19 680 µF/35V 680080578019 Murata C22 10 µF GRM316CD711106KE11 Murata C33 0.33 µF GCM188R71C334KA370 Tajoy Yuden C41 9125061003 Wuerth Electronik C1/2 1 BY0237M3 VISHAY D1/2 1 BY2051M03 Wuerth Electronik D1/2 1 BY4257M3SNZ Rohm D5D6 1 A BY2357M3 Rohm D510 0.1 A ISS355M Rohm Rohm D52 1 KW E2A+722-38E OHMITE C1 14 kW E2A+722-38E OHMITE C1 C2 1 KW E2A+722-	C11	22	μF	UHD1H220MDD	Nichicon
C13 0.1 μF HMK10787104MAT Tayp Yuden C14 33 μF GCM1880C1H330GA01 Murata C15 2200 μF DE1E3RA22MJ48P01F Murata C19 680 μF/36V 86030878019 Murata C12 10 μF GRM34C071H106KE11 Murata C22 10 μF GRM34C071H106KE11 Murata C33 μF GCM188871C334KA370 Tayp Yuden C41 033 μF GCM188871C334KA370 Visent Electronik C19 691101710002 Wuerth Electronik Ch C14 20 A RPUE2TB3SNZ Rohm D5D6 1 A UF4007 On Semiconductor D7.D10 0.1 A 158355M Rohm D8 0.2 A REC257H5LB ROHM C1 BD2857H5LB ROHM C1 BD2857H5LB ROHM C2 14 kW E2A-T220-38E OHMITE C1 BD2857H5LB ROHM E16 C3 Soft HA180B27H	C12	47	μF	7075764	RS PRO
C14 33 pF CCM1880C11830CA01 Murata C15 2200 pF DE FE3RA222MJ4BP01F Murata C18 330 pF/1kV GRM31C0714106KE11 Murata C19 6800 µF/3kV 86000678019 E C22 10 µF GRM31C0714106KE11 Murata C23 0.33 µF GCM1887/1C334KA37D Talyo Yuden C34 69110710002 Wuerth Electronik CN2 1 A BYG23T-M3 VISHAY D4 20 A RFUH25T8SNZ Rohm D5,D6 1 A UF407 Con Semiconductor D7,D10 0.1 A ISS355VM Rohm D8 0.2 A RE62VSM4S Rohm D8 0.2 A RE62VSM4S Rohm C1 MAS13BDE2T T1 Semiconductor C14 D2 MWW EAR52STH2JLB Rohm C2 T431BDE2T T1 Semiconductor Semiconductor C11 Semiconductor Semiconductor Semiconduct	C13	0.1	μF	HMK107B7104MA-T	Taiyo Yuden
C15 DFISR/220/μF DFISR/2200/4331/W3D Murata C18 330 μF/1kV GRM31A7U3A31JW3D Murata C19 680 μF/3SV 86006057019 C22 10 μF GRM31CD71H108KE11 Murata C23 0.33 μF 69132061003 Wuerth Electronik C14 - 69110171002 Wuerth Electronik D1,D2 1 A VSQ3T-M3 VSHAV D4 20 A RFUH25TB3SN2 Rohm D5,D6 1 A UF4007 On Semiconductor D7,D10 0.1 A IS35SVM Rohm D8 0.2 A RRE02VSM4S Rohm D8 0.2 A RRE02VSM4S Rohm D8 0.2 A RRE02VSM4S Rohm D8 0.4 A B286257H5JLB RohM31CD C1 T1431BDEZT T1 T1 C3 A SC12H12NZ Rohm C3 A SS138WT106 Rohm C4 SS138WT106	C14	33	pF	GCM1880C1H330GA01	Murata
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C19 680 µF/3SV 86000578019 C22 10 µF GRM31CD711106KE11 Murata C3 0.33 µF GCM188R71C334KA37D Tayo Yuden CN1 691250610003 Wuerh Electronik CN2 1 691250610002 Wuerh Electronik D1D2 1 89101710002 Wuerh Electronik D1D2 1 VEVG2T-M3 WUErh Electronik D5D6 1 VEVASTSSN2 Rohm D5D6 1 VEVASTSSN2 Rohm D5D6 0.1 St355VM Rohm D5D6 1.4 VESSTL Schoorthouter D5D6 0.2 REG2VSM4S Rohm D8 0.2 REG2VSM4S Rohm D8 0.2 REG2VSM4S Rohm C1 14.1 VEXAT2D-38E OHMTE C1 14.1 StatisDEZ TI C1 14.1 StatisDEZ Rohm C2 1.4 VESSTL Schoort C1 3.7 StatisDEZ Rohm C2 1 T431BDEZ Rohm C2 1 Nort StatisDEZ Rohm C2 1 StatisDEZ Rohm <	C18	330	pF/1kV	GRM31A7U3A331JW31D	Murata
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CN1 ●	C23	0.33	μF	GCM188R71C334KA37D	Taiyo Yuden
CN2 ····································	CN1	-		691250610003	Wuerth Electronik
D1_D2 1 A BYG23T-M3 VISHAY D4 20 A RFUH2STB3SNZ Rohm D5,D6 1 A UF4007 On Semiconductor D7,D10 0.1 A ISS35VM Rohm D8 0.2 A RRE02XBM4S Rohm D8 D226,57H;J-LB Sankyo Thrmotech B0 D1 A BD28C57H;J-LB ROHM D2 TL431BDB2T T1 C L3 B SC12H12NZ Rohm D2 A SC52H12NZ Rohm Q2 1 A 25AR5138TL Rohm Q3 A BS5138WT106 Rohm Q4 A SS5138WT106 Rohm Q1 A SS5138WT106 Rohm R1	CN2	-		691101710002	Wuerth Electronik
D4 20 A RFUH25TB3SNZ Rohm D5,D6 1 A UF4007 On Semiconductor D7,D10 0.1 A 1S3355WM Rohm D8 0.2 A RRE02VSM4S Rohm B41 2.2 9 kW C-1625-STL Santyo Thrmotech HS1 2.2 9 kW C-1625-STL Santyo Thrmotech HS2 14 kW E2A-T220-38E OHMITE IC1 BD28C57/H5/LB ROHM ROHM IC2 1 Kasting ROHM IC2 1 Statistical Stat	D1,D2	1	A	BYG23T-M3	VISHAY
D5,D6 1 A UF4007 On Semiconductor D7,D10 0.1 A 1S3355VM Rohm D8 0.2 A RRE02VSM4S Rohm D8 0.2 A RRE02VSM4S Rohm B11 2.9 kW IC-1625-STL Sankyo Thrmotech HS2 14 kW E2A-1220-38E OHMITE IC1 BD28C57HF,J-LB ROHM IC1 IC2 IT431BID8ZT TI I IL3 Short IEOn IEOn Q1 3.7 A SCT2H12NZ Rohm Q2 1 A 2SAR513RTL Rohm Q3 A BSS138WT106 Rohm Q5,Q6 21 mA BSS128H9606XTSA1 Infinon Q7 0.2 A RU1C001UN Rohm R1 100 kD ERG-2SJ104 I R2 10 Q KR18EZPJ47A Rohm R1,R18,R19,R30,R59,Q4 Q Non-Maunted Rohm R14,R25 10 kD MCR03EZPJ474	D4	20	A	RFUH25TB3SNZ	Rohm
D7,D10 0.1 A 1SS355VM Rohm D8 0.2 A RRE02VSM4S Rohm HS1 2.2 k/W IC-162-STL Sankyo Thrmotech HS2 14 k/W E2A-T220-33E OHMITE IC1 BD28C57HFJ-LB ROHM IC2 14 k/W E2A-T220-33E OHMITE IC1 Short TL31BIDBZT TI IS3 A SCT2H12NZ Rohm Q2 1 A 2SAR518RTL Rohm Q3 A BSS138WT106 Rohm Rohm Q3,Q6 21 mA BSS128H690&KTSA1 Infineon Q7 Q.2 A RU10001UN Rohm Rohm R1 100 K ERG-2SJP4 Rohm ROHM R1 100 L ERG-2SJP4 Rohm ROH R1,R1,R19,R30,R59,Q4 - Q Non-Mauned Rohm R14,R25 100 KQ KTR18EZPJ474 Rohm Rohm R14,R25 100 KQ MCR0	D5,D6	1	A	UF4007	On Semiconductor
D8 0.2 Å RRE02VSM4S Rohm HS1 22.9 k/W IC-1625-STL Sankyo Thrmotech HS2 14 k/W E2A-T220-38E OHMITE IC1 BD28CS7HFJ-LB ROHM IC2 1 TL431BID8ZT TI L3 bhot PC1 International Context (Context	D7,D10	0.1	A	1SS355VM	Rohm
HS1 22.9 k/W IC-1625-STL Sankyo Thrmotech HS2 14 k/W E2A-T220-38E OHMTE IC1 BD28C57HFJ-LB ROHM IC2 IL BD28C57HFJ-LB ROHM IC2 IL Short III IS3 IL Short III Q1 3.7 A SCT2H12NZ Rohm Q2 1 A SSAT38TL Rohm Q3 A BSS138WT106 Rohm Q3 A BSS126H6906XTSA1 Infineon Q7 0.2 A RU1001UN Rohm Q3 A BSS128H6906XTSA1 Infineon Q7 0.2 A RU1001UN Rohm Q1 D ERG-25J104 IIII R1 100 Ω ERG-25J104 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	D8	0.2	A	RRE02VSM4S	Rohm
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Image: C2 Image: C2 TL431BIDBZT TI L3 short Image: C2 Short Image: C2 PC1 Image: C2 Image: C2 Rohm Image: C2 Rohm Q2 Image: C2 A SCT2H12NZ Rohm Q3 Image: C2 A SS138WT106 Rohm Q3 Image: C2 A SS12BH6906XTSA1 Infineon Q4 Q2 A R01001UN Rohm Rohm Q5,056 Image: C2 A R01001UN Rohm Rohm Q7 Q.2 A R01001UN Rohm Rohm R1 100 KQ ESR25JZPJ100 Rohm Rohm R1,R19,R30,R59,Q4 Image: C2 Q Non-Maunted Rohm Rohm R14,R25 Image: C2 Q Non-Maunted Rohm Rohm Rohm R14,R25 Image: C2 Q MCR03E2PFX1002 Rohm Rohm R14,R25 Image: C2 MCR03E2PFX1002 Rohm Rohm R2 R14,R25 Image: C2	IC1			BD28C57HFJ-LB	ROHM
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R41 1 kΩ KTR18EZPJ102 Rohm R42,R43 1 MΩ MCR03EZPJ105 Rohm R44 10 kΩ MCR03EZPJ105 Rohm R51 39 kΩ MCR03EZPFX3902 Rohm R52 1.6 kΩ MCR03EZPFX4601 Rohm R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R27	2	kΩ	MCR03EZPFX2001	Rohm
R42,R43 1 MΩ MCR03EZPJ105 Rohm R44 10 kΩ MCR18EZPJ103 Rohm R51 39 kΩ MCR03EZPFX3902 Rohm R52 1.6 kΩ MCR03EZPFX1601 Rohm R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R41	1	kΩ	KTR18EZPJ102	Rohm
R44 10 kΩ MCR18EZPJ103 Rohm R51 39 kΩ MCR03EZPFX3902 Rohm R52 1.6 kΩ MCR03EZPFX1601 Rohm R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX4701 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R42,R43	1	MΩ	MCR03EZPJ105	Rohm
R51 39 kΩ MCR03EZPFX3902 Rohm R52 1.6 kΩ MCR03EZPFX1601 Rohm R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Apa Trans ZD1 22 V UDZVTE1722B Rohm	R44	10	kΩ	MCR18EZPJ103	Rohm
R52 1.6 kΩ MCR03EZPFX1601 Rohm R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R51	39	kΩ	MCR03EZPFX3902	Rohm
R53 4.7 kΩ MCR03EZPFX4701 Rohm R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPFX2201 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R52	1.6	kΩ	MCR03EZPFX1601	Rohm
R54 2.2 kΩ MCR03EZPFX2201 Rohm R56 6.8 kΩ MCR03EZPJ682 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R53	4.7	kΩ	MCR03EZPFX4701	Rohm
R56 6.8 kΩ MCR03EZPJ682 Rohm R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R54	2.2	kΩ	MCR03EZPFX2201	Rohm
R57,R58 100 Ω ESR25JPZPZJ101 Rohm T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R56	6.8	kΩ	MCR03EZPJ682	Rohm
T1 1.66 mH XE2870YA Alpa Trans ZD1 22 V UDZVTE1722B Rohm	R57,R58	100	Ω	ESR25JPZPZJ101	Rohm
ZD1 22 V UDZVTE1722B Rohm	T1	1.66	mH	XE2870YA	Alpa Trans
	ZD1	22	V	UDZVTE1722B	Rohm

Materials may be changed without notifying.

Layout

Size: 155 mm x 60 mm



Figure 23. TOP Silkscreen (Top view)



Figure 24. Bottom Layout (Top View)

Specification of the Transformer

Manufacture Alphatrans Co., Ltd. (1-7-2, Bakurou-cho, Chuo-ku, Osaka City, 541-0059, Japan) http://www.alphatrans.jp/

Product Name: XE2870Y_A Bobbin: PQ2625-4 Core: PQ2625

- Primary Inductance: 1.866mH± 10 % (100 kHz, 1 V)
- Withstand Voltage
 Between Primary and Secondary : AC1500 V
 Between Primary and Core: AC1500 V
 Between Secondary and Core: AC500 V
- Insulation Resistance 100 M Ω or more (DC500 V)





Figure 25. Circuit Diagram

Figure 26. Structure Diagram

No	Transform	Windi	ing Pin	Miro	Turn	Таре	Wire
NO.	er	Start	Finish	WIE	Number	Layer	Specification
1	NP1	3	2	ТЕХ-Е / Ф0.30	25	2	COMPACT
2	NS1	12	9	2UEW / Ф0.35	17	2	COMPACT
3	ND	4	6	ТЕХ-Е / Ф0.20	15	2	COMPACT
4	NS1	11	8	2UEW / Ф0.35	17	2	COMPACT
5	NP2	2	1	ТЕХ-Е / Ф0.30	50	3	COMPACT

Table 4. Product Specification of XE2870Y_B

Revision History

Date	Rev.	Changes
12.November.2024	001	New Release

N	o t	i c	е
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