

STK581U3C2D-E Evaluation Board User's Manual



EVAL BOARD USER'S MANUAL

By using this board, STK581U3C2D-E (SIP3 / 1 shunt) can be evaluated.

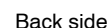


Figure 1. Evaluation Board Photos

Table 1.

ONPN of Evaluation Board	ONPN of IPM	Io
STK581U3C2DGEVB	STK581U3C2D-E	30 A

STK581U3C2DGEVB

CIRCUIT DIAGRAM

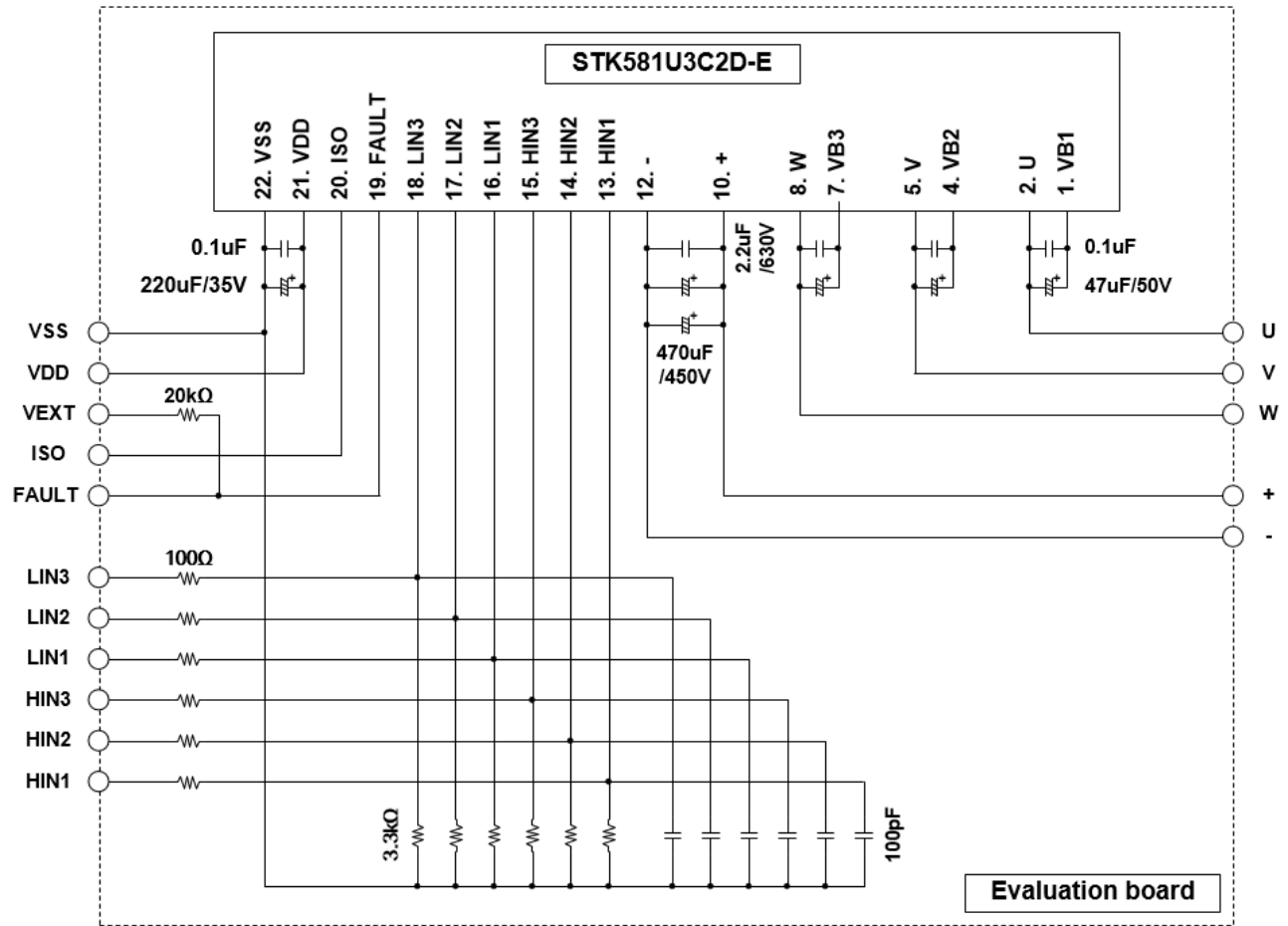


Figure 2. Circuit Diagram

PIN DESCRIPTION

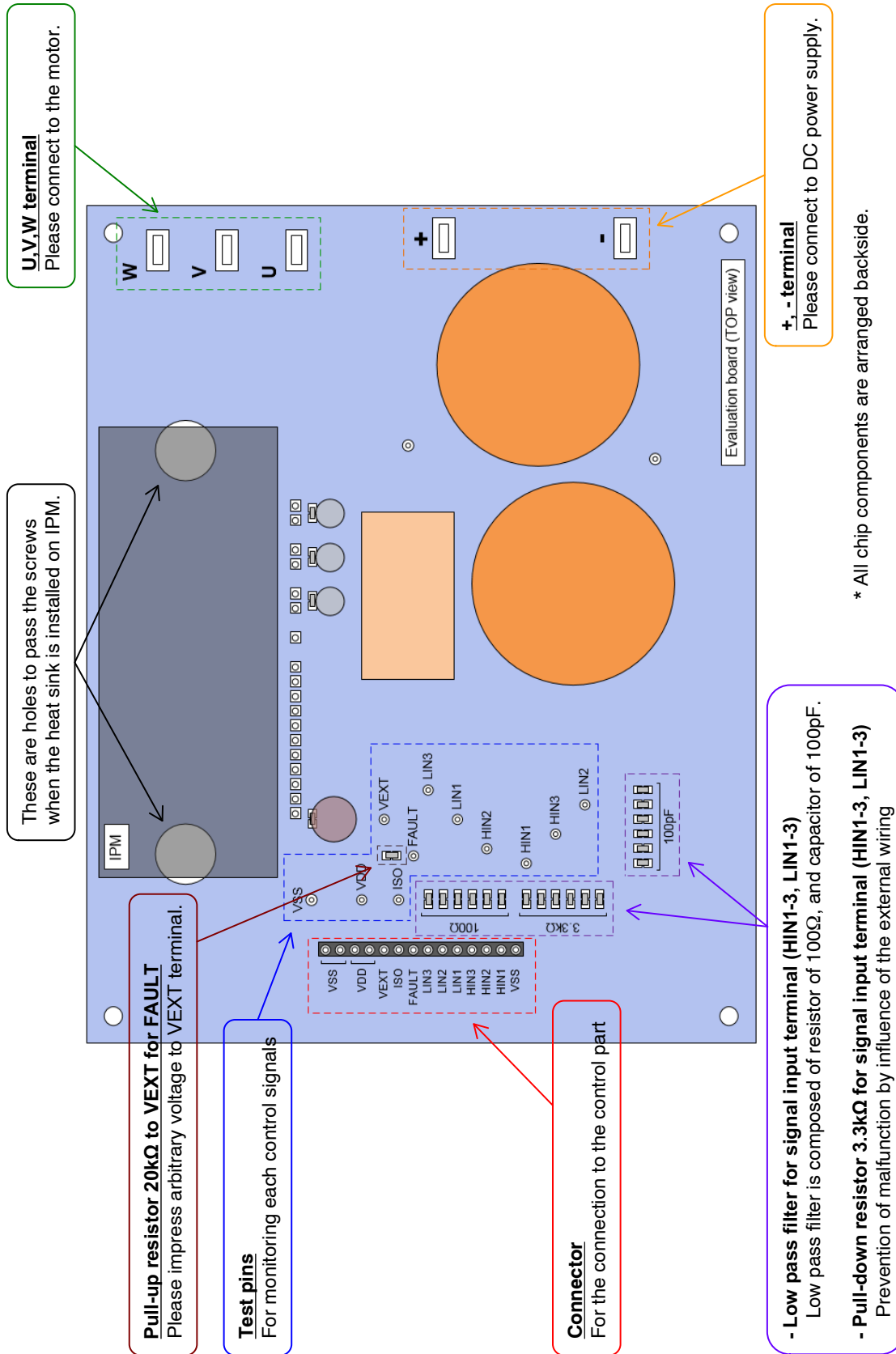


Figure 3. Description of Each Pin

STK581U3C2DGEVB

OPERATION PROCEDURE

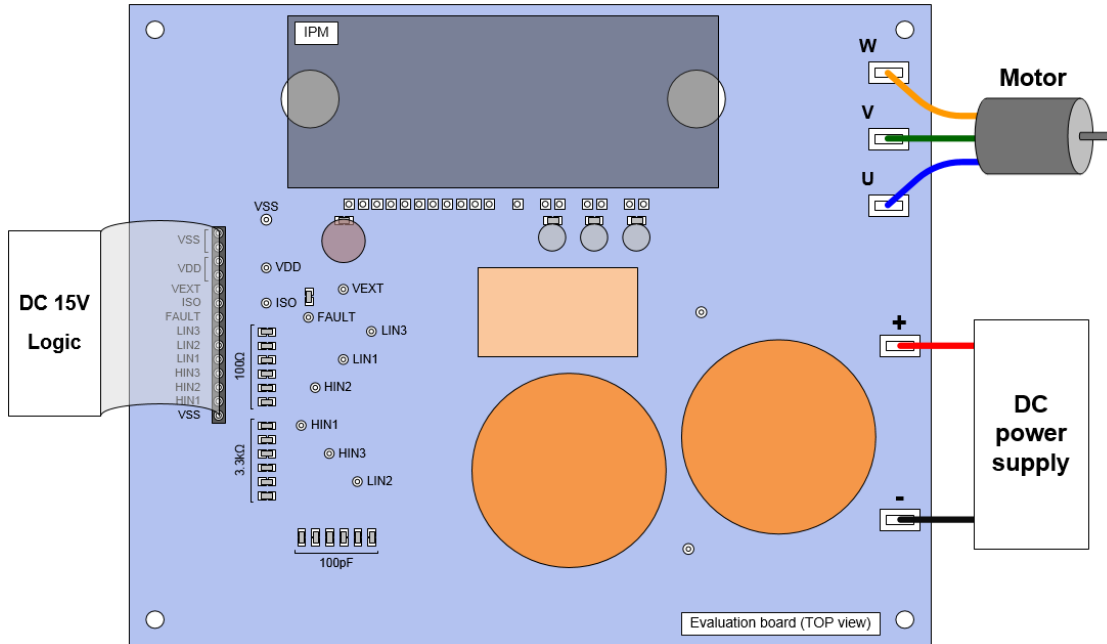


Figure 4.

Step 1: Please connect IPM, each power supply, logic parts, and the motor to the evaluation board, and confirm that each power supply is OFF at this time.

Step 2: Please impress the power supply of DC 15 V.

Step 3: Please perform a voltage setup according to specifications, and impress the power supply between the “+” and the “-” terminal.

Step 4: By inputting signal to the logic part, IPM control is started. (Therefore, please set electric charge to the boot-strap capacitor of upper side to turn on lower side IGBT before running.)

NOTE: When turning off the power supply part and the logic part, please carry out in the reverse order to above steps.

STK581U3C2DGEVB

LAYOUT

Length: 116 mm
Side: 145 mm
Thickness: 1.6 mm

Rigid double-sided substrate (Material: FR-4)
Both sides resist coating
Copper foil thickness: 70 μm

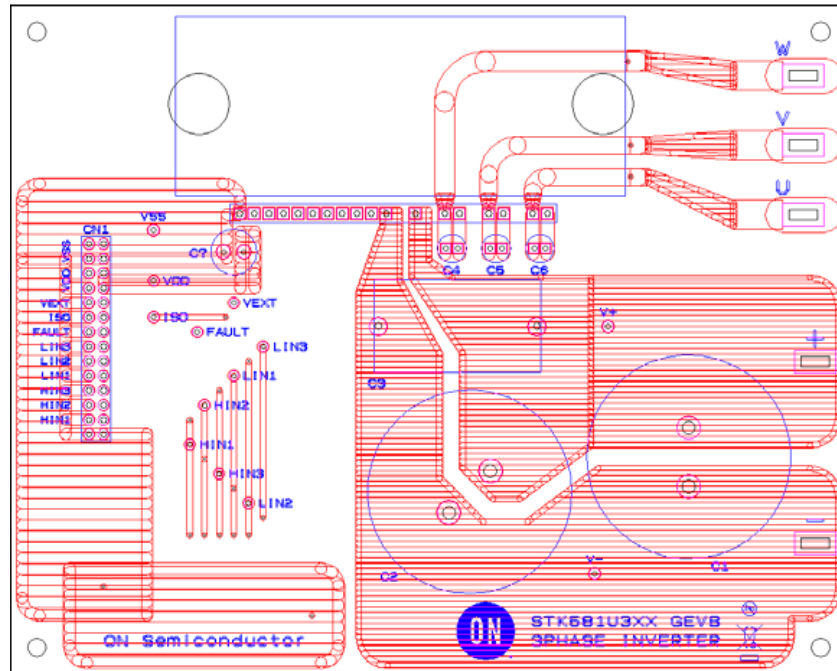


Figure 5. Layout (Top View) – Surface

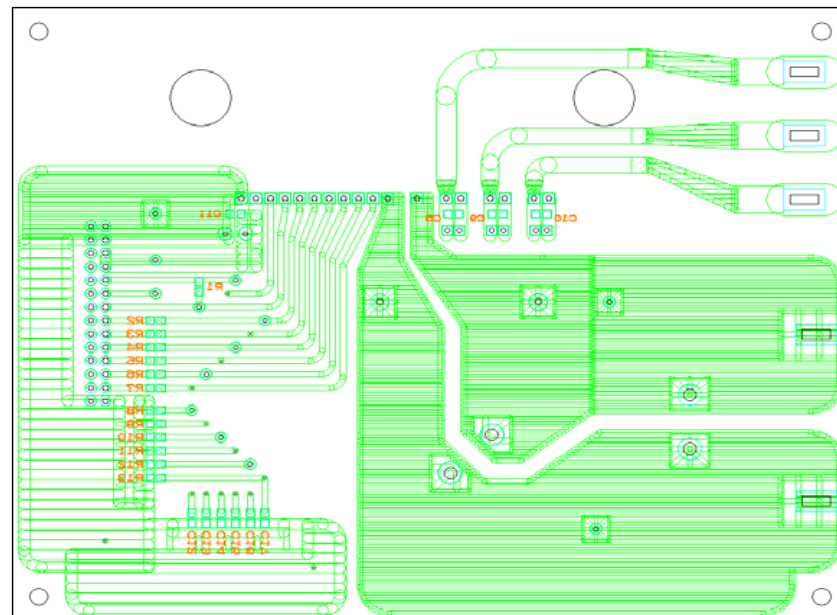


Figure 6. Layout (Top View) – Back Side

STK581U3C2DGEVB

BILL OF MATERIALS

Table 2. EVALUATION BOARD BILL OF MATERIALS

Component- s	Symbol	SMD	DIP	Manufacturer	Part Number	Specification	Supplement	
Resistor	R1	1		KOA	RK73H1JTTD2002F	20 k Ω / 0.1 W / $\pm$ 1%	Chip (1608 size)	Fault pull-up
	R2 – R7	6		KOA	RK73H1JTTD1000F	100 Ω / 0.1 W / $\pm$ 1%	Chip (1608 size)	Signal input low pass filter
	R8 – R13	6		KOA	RK73H1JTTD3301F	3.3 k Ω / 0.1 W / $\pm$ 1%	Chip (1608 size)	Signal input pull-down
Capacitor	C1, C2		2	Nippon Chemi-Con	EKMM451VSN471MA50S	470 μ F / 450 V / $\pm$ 20%	Aluminum electrolytic capacitor	Plus-Minus
	C3		1	PANASONIC	ECQE6225JT	2.2 μ F / 630 V / $\pm$ 5%	Film capacitor	Plus-Minus, Snubber
	C4-C6		3	Nippon Chemi-Con	EKMG350ELL470ME11D	47 μ F / 35 V / $\pm$ 20%	Aluminum electrolytic capacitor	VBx – VSx
	C7		1	Nippon Chemi-Con	EKMG350ELL221MHB5D	220 μ F / 35 V / $\pm$ 20%	Aluminum electrolytic capacitor	VDD-VSS
	C8 – C11	4		MURATA	GRM188B31H104K	0.1 μ F / 50 V / $\pm$ 10%	Chip (1608 size)	VBx – Vsx, VDD-VSS
	C12 – C17	6		MURATA	GRM1882C1H101J	100 pF / 50 V / $\pm$ 5%	Chip (1608 size)	Signal input low pass filter
Connector	CN1		1	HIROSE ELECTRIC	A2-14PA-2.54DSA(71)	14 pin / 2.54 pitch		
Pin (S)	VSS, VDD, VEXT, ISO, FAULT, HIN1-3, LIN1-3, V+, V-		13	Mac8	ST-1-3			
Pin (L)	U, V, W, +, -		5				Faston terminal (Tab)	
IC	IC1		1	ON Semiconductor	STK581U3C2D-E	SIP3 / 1shunt		
	Total	23	27					

Heat Sink Mounting

NOTE: When mounting the heat sink on IPM, first, tighten the screws roughly by temporary maintaining the balance of left and right. Next, tighten both screws gradually alternately until the end.

Table 3.

Item	Recommended Condition
Pitch	70.0 ± 0.1 mm (Please refer to Package Outline Diagram)
Screw	Diameter: M4 Bind machine screw, Truss machine screw, Pan machine screw
Washer	Plane washer The size is D = 9 mm, d = 4.2 mm and t = 0.8 mm (Figure 8) JIS B 1256
Heat Sink	Material: copper or Aluminum Warpage (the surface that contacts IPM): -50 ~ 100 μm Screw holes must be countersunk. No contamination on the heat sink surface that contacts IPM.
Torque	Final tightening: 0.79 ~ 1.17 Nm Temporary tightening: 20 ~ 30% of final tightening
Grease	Silicon grease Thickness: 100 ~ 200 μm Uniformly apply silicon grease to whole back. (Figure 9)

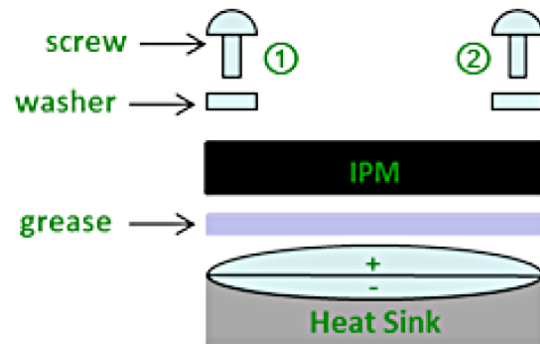


Figure 7. Mount HIC on a Heat Sink

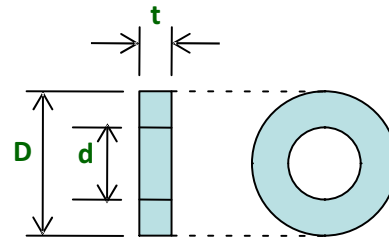


Figure 8. Size of Washer

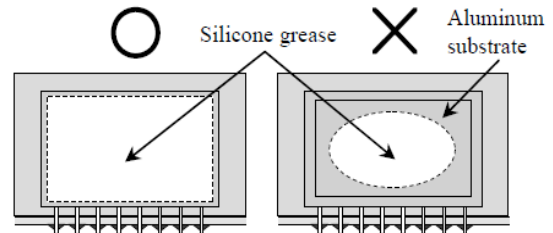


Figure 9. About Uniformly Application

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

The evaluation board/kit (research and development board/kit) (hereinafter the "board") is not a finished product and is as such not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and should as such only be used in laboratory/development areas by persons with an engineering/technical training and familiar with the risks associated with handling electrical/mechanical components, systems and subsystems. This person assumes full responsibility/liability for proper and safe handling. Any other use, resale or redistribution for any other purpose is strictly prohibited.

The board is delivered "AS IS" and without warranty of any kind including, but not limited to, that the board is production-worthy, that the functions contained in the board will meet your requirements, or that the operation of the board will be uninterrupted or error free. ON Semiconductor expressly disclaims all warranties, express, implied or otherwise, including without limitation, warranties of fitness for a particular purpose and non-infringement of intellectual property rights.

ON Semiconductor reserves the right to make changes without further notice to any board.

You are responsible for determining whether the board will be suitable for your intended use or application or will achieve your intended results. Prior to using or distributing any systems that have been evaluated, designed or tested using the board, you agree to test and validate your design to confirm the functionality for your application. Any technical, applications or design information or advice, quality characterization, reliability data or other services provided by ON Semiconductor shall not constitute any representation or warranty by ON Semiconductor, and no additional obligations or liabilities shall arise from ON Semiconductor having provided such information or services.

The boards are not designed, intended, or authorized for use in life support systems, or any FDA Class 3 medical devices or medical devices with a similar or equivalent classification in a foreign jurisdiction, or any devices intended for implantation in the human body. Should you purchase or use the board for any such unintended or unauthorized application, you shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the board.

This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and may not meet the technical requirements of these or other related directives.

FCC WARNING – This evaluation board/kit is intended for use for engineering development, demonstration, or evaluation purposes only and is not considered by ON Semiconductor to be a finished end product fit for general consumer use. It may generate, use, or radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment may cause interference with radio communications, in which case the user shall be responsible, at its expense, to take whatever measures may be required to correct this interference.

ON Semiconductor does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: ON Semiconductor shall not be liable for any special, consequential, incidental, indirect or punitive damages, including, but not limited to the costs of requalification, delay, loss of profits or goodwill, arising out of or in connection with the board, even if ON Semiconductor is advised of the possibility of such damages. In no event shall ON Semiconductor's aggregate liability from any obligation arising out of or in connection with the board, under any theory of liability, exceed the purchase price paid for the board, if any.

For more information and documentation, please visit www.onsemi.com.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Email Requests to: orderlit@onsemi.com

ON Semiconductor Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative