



EVAL6563-400W

L6563 400 W FOT-controlled PFC pre-regulator

Data Brief

General description

The board implements a 400 W, wide-range mains input, PFC pre-conditioner suitable for ATX PSU, flat screen displays, game console.

The low-cost L6563 can be used at such power level thanks to fixed-off-time control. This allows continuous conduction mode operation, which is usually achieved through expansive control chips and complex control architectures.

For technical details and demoboard performance, please refer to the available application note AN2485.

L6563 400 W FOT - controlled PFC evaluation board (EVAL6563-400W)



Main characteristics and circuit description:

- Line voltage range: 90 to 265 Vac
- Minimum Line frequency (f_L): 47 Hz
- Regulated output voltage: 400 V
- Rated output power: 400 W
- Maximum $2f_L$ output voltage ripple: 10 V pk-pk
- Hold-up time: 22 ms (V_{DROp} after hold-up time: 300 V)
- Maximum switching frequency: 85 kHz (@ $V_{in} = 90$ Vac, $P_{ou} t = 400$ W)
- Minimum estimated efficiency: 90% (@ $V_{in} = 90$ Vac, $P_{out} = 400$ W)
- Maximum ambient temperature: 50 °C
- EMI: In acc. with EN55022 Class-B
- PCB type and size: Single side, 70 um,CEM-1,148.5x132 mm

Table 1. EVAL6563-400W Evaluation board: bill of material

Ref. des.	Part type-part value	Case/package	Description	Supplier
C1	470 nF-X2	DWG	X2 FILM CAPACITOR R46-I 3470--M1-	ARCOTRONICS
C10	18N	1206	100V SMD CERCAP - GEN. PURPOSE	AVX
C11	470 nF/50 V	1206	50V SMD CERCAP - GEN. PURPOSE	AVX
C12	47 uF/50 V	DIA6.3X11	ALUMINIUM ELCAP - YXF SERIES - 105°C	RUBYCON
C13	100 nF	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C14	1 uF	1206	50V SMD CERCAP - GEN. PURPOSE	AVX
C15	100 pF	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C16	220 pF	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C17	10 nF	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C18	470nF	1206	50V SMD CERCAP - GEN. PURPOSE	AVX
C19	2nF2	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C18	470 nF	1206	50V SMD CERCAP - GEN. PURPOSE	AVX
C20	330 pF	0805	50V SMD CERCAP - GEN. PURPOSE	AVX
C21	10 nF	1206	50V SMD CERCAP - GEN. PURPOSE	AVX
C3	680 nF-X2	DWG	X2 FILM CAPACITOR R46-I 3680--M1-	ARCOTRONICS
C4	470 nF-630 V	DWG	FILM CAPACITOR MKP - B32653A6474J	EPCOS
C5	470 nF-630 V	DWG	FILM CAPACITOR MKP - B32653A6474J	EPCOS
C6	470 nF-630 V	DWG	FILM CAPACITOR MKP- B32653A6474J	EPCOS
C7	330 uF-450 V	DIA35x35	ALUMINIUM ELCAP - LLS SERIES - 85°C	NICHICON
D1	1N5406	DO-201	STD RECOVERY RECTIFIER	VISHAY
D2	D15XB60	DWG	RECTIFIER BRIDGE	SHINDENGEN
D3	STTH8R06	TO-220FP	ULTRAFast HIGH VOLTAGE RECTIFIER	STMicroelectronics

Table 1. EVAL6563-400W Evaluation board: bill of material (continued)

Ref. des.	Part type-part value	Case/package	Description	Supplier
D4	LL4148	MINIMELF	FAST SWITCHING DIODE	VISHAY
D5	BZX85-C15	MINIMELF	ZENER DIODE	VISHAY
D6	LL4148	MINIMELF	FAST SWITCHING DIODE	VISHAY
D7	LL4148	MINIMELF	FAST SWITCHING DIODE	VISHAY
D8	LL4148	MINIMELF	FAST SWITCHING DIODE	VISHAY
F1	8 A/250 V	5x20MM	8A MAINS INPUT FUSE	WICKMANN
J1			3-PINS CONN. (CENTRAL REM.) P 3.96 KK SERIES	MOLEX
J2			5-PINS CONN. (CENTRAL REM.) P 3.96 KK SERIES	MOLEX
JP101	JUMPER		WIRE JUMPER	
JP102	JUMPER		WIRE JUMPER	
L1	1.5mH-5 A	DWG	CM CHOKE - LFR2205B	DELTA ELECTRONICS
L3	DM-5 1uH-6 A	DWG	FILTER INDUCTOR - LSR2306-1	DELTA ELECTRONICS
L4	PQ40-500 uH	DWG	PFC INDUCTOR - 86H-5410B	DELTA ELECTRONICS
Q1	STP12NM50FP	TO-220FP	N-CHANNEL POWER MOSFET	STMicroelectronics
Q2	STP12NM50FP	TO-220FP	N-CHANNEL POWER MOSFET	STMicroelectronics
Q3	BC857C	SOT-23	SMALL SIGNAL BJT - PNP	VISHAY
R1	1M5	AXIAL	HV RESISTOR	BC COMPONENTS
R10	680 k	1206	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R11	680 k	1206	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R12	82 K	0805	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R13	15 k	0805	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R14	56 k	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R15	3K3	0805	SMD STD FILM RES - 1% - 100 ppm/°C	BC COMPONENTS
R16	15 K	0805	SMD STD FILM RES - 1% - 100 ppm/°C	BC COMPONENTS
R17	6R8	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R18	6R8	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R19	1K0	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R2	NTC 2R5-S237	DWG	NTC RESISTOR 2R5 S237	EPCOS
R20	0R39-1 W	AXIAL	AXIAL RES - 5% - 250 ppm/°C	BC COMPONENTS
R21	0R39-1 W	AXIAL	AXIAL RES - 5% - 250 ppm/°C	BC COMPONENTS
R22	0R39-1 W	AXIAL	AXIAL RES - 5% - 250 ppm/°C	BC COMPONENTS
R23	0R39-1 W	AXIAL	AXIAL RES - 5% - 250 ppm/°C	BC COMPONENTS
R24	36 k	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS

Table 1. EVAL6563-400W Evaluation board: bill of material (continued)

Ref. des.	Part type-part value	Case/package	Description	Supplier
R26	150 k	1206	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R27	240 k	0805	SMD STD FILM RES - 1% - 100 ppm/°C	BC COMPONENTS
R3	180 K	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R31	1k5	0805	SMD STD FILM RES - 1% - 100 ppm/°C	BC COMPONENTS
R32	620 k	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R33	620 k	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R34	10 k	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R35	3R9	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R36	3R9	0805	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R4	180 K	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R5	47R	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R6	2M2	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R7	2M2	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R8	2M2	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R9	680 k	1206	SMD STD FILM RES - 1% - 250 ppm/°C	BC COMPONENTS
R101	0R0	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
R102	0R0	1206	SMD STD FILM RES - 5% - 250 ppm/°C	BC COMPONENTS
U1	L6563	SO-14	ADVANCED TM PFC CONTROLLER	STMicroelectronics

2 Revision history

Table 2. Revision history

Date	Revision	Changes
26-Jan-2007	1	First issue

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2007 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com