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America

CERTIFICATE

No. U8V 15 03 21433 434

Holder of Certificate: **Vicor Corporation**
25 Frontage Road
Andover, MA 01810
USA

Production Facility(ies): 67768

Certification Mark:

Product:
Converter
DC to DC Converter

Model(s):
PRM Model: P045F048T40RS
(See attachment for model nomenclature.)

Parameters:

Rated Input Voltage:	45 V DC
Rated Output Voltage:	48 V DC
Rated Output Power:	400 W
Degree of Protection:	IPX0

(See attachment for additional rating information and license conditions.)

Tested according to:
CAN/CSA C22.2 No.60950-1:2007/A1:2011
UL 60950-1:2007/R:2011-12
EN 60950-1:2006/A2:2013

The product was voluntarily tested according to the relevant safety requirements noted above. It can be marked with the certification mark above. The mark must not be altered in anyway. This product certification system operated by TÜV SÜD America Inc. most closely resembles system 3 as defined in ISO/IEC Guide 67. Certification is based on the TÜV SÜD "Testing and Certification Regulations". TÜV SÜD America Inc. is an OSHA recognized NRTL and a Standards Council of Canada accredited certification body.

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Date, 2015-03-19

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VI Chip PRM Model Number: Pbbbcdddeffxx Example: P045F048T40RS

P = P

PRM Family (Pre-regulator Module)			
P	Constant	MP	Military version

bbb = 045

Input Voltage	Nominal (range)	Input Voltage	Nominal (range)
024	24 Vdc (18-36)	045	45 Vdc (38-55)
028	28 Vdc (16-50)	048	48 Vdc (36-75)
036	36 Vdc (18-60)		

c = F

Package Size	In Board BGA	On Board J-Lead	Through Hole
Full VIC	K	F	T

ddd = 048

Output Voltage Designator			
036	36.0 Vdc (26-55)	048	48.0 Vdc (26-55)

e = T

Product grade			
T	-40 to 125°C	M	-55 to 125°C

ff = 32

Output Power Designator (can be any two digits from 01 to 60) non-inclusive list of examples below							
12	120 W	17	170 W	25	250 W	40	400 W
15	150 W	24	240 W	32	320 W	60	600 W

xx = AL

Feedback Style Designator (optional)			
AL	Adaptive Loop	RS	Remote Sense

Customer Special Models:

CUSTOMER SPECIAL Model Numbers	Equivalent Standard Model Number
VIP0001, VIP0001x	P045F048T40RS
VIZ0017, VIZ0017x	P045F048T32AL
VIZ0032, VIZ0032x	P048F048T24AL
VIZ0036, VIZ0036x	P045F048T32AL
VIZ0051, VIZ0051x (see license conditions)	P045F048T40RS
VIZ0055x (see license conditions)	P045F048T60RS
VIZ0067, VIZ0067x	P045F048T32AL
MP028F036M12AL, VIZ0076, VIZ0076x	P028F036M12AL
VIZ0079, VIZ0079x	P036F048T12AL
VIZ0081, VIZ0081x	P048F048T24AL
VIZ0082, VIZ0082x	P045F048T32AL
x = revision, any letter A through Z, non-safety related	

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VI Chip PRM2 Model Number: PRMbbbcdddefffxzz Example: PRM48BF480T400A00

PRM = Constant

PRM Family (Pre-regulator Module)	
PRM	Standard version
MPRM	Mil-COTS version

bbb = 48B

Input Voltage	Nominal (range)	Input Voltage	Nominal (range)
24A	**24 Vdc (18-36)**	**48A**	48 Vdc (36-75)
28A	28 Vdc (16-50)	48B	45 Vdc (38-55)
28B	28 Vdc (5-50)	48D	48 Vdc (38-60)
36A	36 Vdc (18-60)	48J	48 Vdc (42-55)
36B	**36 Vdc (26-50)**	48N	48 Vdc (36-60)

c = F

Package Size and Lead Designator	
F	Full VI Chip J-Lead
T	Full VI Chip Though-hole

ddd = 480

Output Voltage Designator	
360	36.0 Vdc (5-55)
480	48.0 Vdc (5-55)

e = T

Product grade	
T	-40 to 125°C
M	-55 to 125°C

fff = 400

Output Power Designator (can be any three digits from 001 to 600) non-inclusive list of examples below			
120	120W	320	320W
170	170W	400	400W
200	200W	500	500W
240	240W	600	600W

x = A

Revision (non-safety related)	
x	Any alphanumeric character

zz = 00

Customer reference (non-safety related)	
zz	Any alphanumeric character or blank

Customer Special Models:

Customer special Model Numbers	Equivalent Standard Model Number
VIZ0055, VIZ0055x (see license conditions)	PRM48BF480T600A00

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Customer Configured Full Size VI Chip PRM Model Number: PRMxy-aazzzzzz

Example: PRM2A-01zzzzzz

PRM = Constant

PRM Family (Pre-regulator Module)

x = 2

Controller Revision, 0 through 9 (non-safety related)

y = A

Product Revision, A through Z (non-safety related)

aa = 01

Hardware Configuration, max ratings, actual ratings may be less			
HW Configuration	Vin (Vdc)	Vout (Vdc)	Pout (W)
01 = full size narrow range	38-55V	55V	500W
02 = full size wide range	36-75V	55V	400W

zzzzzz = configuration

Any alphanumeric combination, customer specific configuration, non-safety related, J-Lead or Through-Hole, T or M grade, and Feedback Style

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Conditions of Acceptability – When installed in the end use equipment, the following are among considerations to be made:

1. The input to the PRM is intended to be supplied from a TNV-2, SELV, or other non-hazardous secondary circuit
2. The PRM is a non-isolating device. The output of the PRM can be considered SELV when the input is SELV with the exception of the VIZ0051. The output of the VIZ0051 can exceed the SELV limits under a fault condition but it does not exceed the limits of TNV-2 circuits.
3. The output of the VIZ0051 and VIZ0055 may be considered TNV-2 or external circuitry may be added and evaluated in the end product in order to provide output over voltage protection and compliance with the limits of SELV circuits.
4. **Max Temperature:** Keep the maximum semiconductor junction temperature of the VI Chip at 125°C or less. There are three methods to demonstrate compliance.

Method 1

Keep $T_{casemax}$ 100°C under all conditions where $T_{casemax}$ is the maximum case temp of the VI Chip

Method 2

Keep $T_{casemax}$ 125°C - ($P_{dissmax}$ X 1.5) under all conditions where

$P_{dissmax} = P_{Input\_max} - P_{Output\_max.}$

$P_{dissmax}$ is the amount of power in Watts dissipated within the device. The thermal resistance of the full size VI Chip from the internal semiconductor junction to the case is 1.5 °C / Watts.

Method 3

Measure the dc voltage at the TM (temperature monitor) lead and calculate the conversion of the voltage to temperature. The TM has a nominal +27C set point of 3.0 Vdc and a nominal gain of 10mV / °C.

Example where the TM voltage = 3.4Vdc, calculated Tj is the set point (27) + (10 x 4) = 67°C

5. If the internal semiconductor junction temperature exceeds 125°C the module may be damaged.
6. PRM models rated up to 320W were evaluated with a Littelfuse Nano^2 451/453 series fuse rated 10A
7. PRM models rated 400W were evaluated with a Littelfuse Nano^2 451/453 series fuse rated 15A
8. PRM models rated 600W were evaluated with a Littelfuse Nano^2 456 series fuse rated 20A and an SOC 25CF rated 18A

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