

SPECIFIC TECHNICAL CRITERIA

UL 60950-1, First Edition Information technology equipment - Safety- Part 1: General Requirements	
Report Reference No.....	E135493-A4-UL-1
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Standards	UL 60950-1, 1st Edition, 2006-07-07 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-03, 1st Edition, 2006-07 (Information Technology Equipment - Safety - Part 1: General Requirements)
Test procedure	Component Recognition
Non-standard test method	N/A
Test item description	DC/DC Converter
Trademark	None
Model and/or type reference	VTM Series
	See Miscellaneous Enclosure for model nomenclature.
Rating(s)	Input:48V Output: 48V Max Power: 300W Max.

Particulars: test item vs. test requirements	
Equipment mobility	for building-in
Operating condition	continuous
Mains supply tolerance (%)	No direct connection
Tested for IT power systems	No
IT testing, phase-phase voltage (V)	-
Class of equipment	Class II (double insulated)
Mass of equipment (kg)	0.0125
Protection against ingress of water	IP X0

Possible test case verdicts:	
- test case does not apply to the test object	N / A
- test object does meet the requirement	Pass
- test object does not meet the requirement	Fail (acceptable only if a corresponding, less stringent national requirement is "Pass")

General remarks:

- "(see Enclosure #)" refers to additional information appended to the Test Report
- "(see appended table)" refers to a table appended to the Test Report
- Throughout the Test Report a point is used as the decimal separator

GENERAL PRODUCT INFORMATION:	
CA1.0	Report Summary
CA1.1	N/A
CB1.0	Product Description
CB1.1	The full size VI Chip VTM is an isolating DC-DC back end voltage Transformation module that is designed to be used with a VI Chip PRM to make a complete regulated DC-DC converter but may be used as a standalone device. the VTM DC-DC converters are designed for building-in and the input is intended to be derived from the output of a VI chip PRM, a TNV-2, SELV, or other non-hazardous secondary circuit. The VTM is a current rated device. The VTM output is rated for a max current as opposed to a max power. The max current rating is valid for the entire output voltage range for each model.
CC1.0	Model Differences
CC1.1	See Miscellaneous Enclosure for model nomenclature.
CD1.0	Additional Information
CD1.1	N/A
CE1.0	Technical Considerations
CE1.2	The product was submitted and tested for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of: semiconductor junction temperature of the VI Chip not exceeding 125°C
CF1.0	Engineering Conditions of Acceptability
CF1.1	For use only in or with complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc. When installed in an end-product, consideration must be given to the following:
CF1.2	The following Production-Line tests are conducted for this product: Electric Strength
CF1.3	The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 57.6 Vrms, 88 Vpk
CF1.5	The following secondary output circuits are SELV: All
CF1.7	The following secondary output circuits are at non-hazardous energy levels: All
CF1.11	The power supply terminals and/or connectors are: Not investigated for field wiring
CF1.13	The investigated Pollution Degree is: 2
CF1.19	The following end-product enclosures are required: Mechanical, Fire, Electrical
CF2.0	The input to the VTM is intended to be supplied from the output of a VI chip PRM. a TNV-2

	circuit, or other non-hazardous secondary circuit
CF2.1	The VTM provides 2250 Vdc of isolation from input to output.
CF2.2	The output of the VTM is considered SELV.
CF2.3	Max Temperature: Keep the maximum semiconductor junction temperature of the VI Chip at 125°C or less. There are two 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 inputmax - P outputmax. 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.
CF2.4	If the internal semiconductor junction temperature exceeds 125°C the module may be damaged.
CF2.5	The VTM is designed to be used with the VI Chip PRM. The PRM/VTM combination should be protected by Littelfuse Nano ² Fuse rated 10A or less in front of the PRM.
CF2.6	A standalone VTM used without a PRM should be protected by Littelfuse Nano ² Fuse rated 10A or less.

VI CHIP VTM Model Number: aVbbbcdddefff

Example: V048F480T006

aV = V

VTM Family (Voltage Transformation Module)	
V	Standard VTM (a = blank)
MV	Military VTM

bbb = 048

Input Voltage	
036	36 Vdc (26-50)
048	48 Vdc (26-55)

c = F

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

ddd = 480

Output Voltage Designator			
010	1.0	072	7.2
011	1.1	080	8.0
015	1.5	090	9.0
020	2.0	096	9.6
022	2.2	120	12.0
024	2.4	160	16.0
030	3.0	180	18.0
033	3.3	240	24.0
040	4.0	320	32.0
045	4.5	360	36.0
060	6.0	480	48.0

e = T

Product Grade	
T	-40 to 125C
M	-55 to 125C

fff = 006

Output Current Designator					
003	3 A	013	13 A	040	40 A
005	5 A	015	15 A	050	50 A
006	6 A	017	17 A	055	55 A
007	7 A	020	20 A	060	60 A
009	9 A	025	25 A	070	70 A
010	10 A	027	27 A	080	80 A
012	12 A	030	30 A	100	100 A