THE DATASHEET OF

AM6TW-2405DH30-NZ

Series AM6TW-NZ

6 Watt | DC-DC Converter

FEATURES:

- Over Voltage Protection
- Wide 4:1 input range
- High efficiency up to 88%
- Over current Protection
- Under voltage lockout
- Very low no load power consumption of 0.12W
- Input / Output Isolation 1500, 3000 & 6000VDC
- Continuous short circuit protection
- 1.5KV isolation models design to meet EN50155
- 6KV isolation models design to meet EN60601-1 3rd, 2xMOPP, Type CF applied part

RoHS

Models
Single output

Model	Input Voltage (V)	Output Voltage (V)	Output Current max (mA)	Max. Capacitive Load (µF)	Isolation (VDC)	Efficiency (%)
AM6TW-2403S-NZ	9-36	3.3	1500	1800	1500	79
AM6TW-2405S-NZ	9-36	5	1200	1000	1500	83
AM6TW-2412S-NZ	9-36	12	500	470	1500	87
AM6TW-2415S-NZ	9-36	15	400	220	1500	88
AM6TW-2424S-NZ	9-36	24	250	100	1500	87
AM6TW-4803S-NZ	18-75	3.3	1500	1800	1500	80
AM6TW-4805S-NZ	18-75	5	1200	1000	1500	84
AM6TW-4812S-NZ	18-75	12	500	470	1500	87
AM6TW-4815S-NZ	18-75	15	400	220	1500	88
AM6TW-4824S-NZ	18-75	24	250	100	1500	87
AM6TW-2403SH30-NZ	9-36	3.3	1500	2200	3000	77
AM6TW-2405SH30-NZ	9-36	5	1200	2200	3000	80
AM6TW-2409SH30-NZ	9-36	9	667	1000	3000	85
AM6TW-2412SH30-NZ	9-36	12	500	680	3000	83
AM6TW-2415SH30-NZ	9-36	15	400	680	3000	85
AM6TW-2424SH30-NZ	9-36	24	250	680	3000	85
AM6TW-4803SH30-NZ	18-75	3.3	1500	2200	3000	78
AM6TW-4805SH30-NZ	18-75	5	1200	2200	3000	81
AM6TW-4812SH30-NZ	18-75	12	500	680	3000	87
AM6TW-4815SH30-NZ	18-75	15	400	680	3000	86
AM6TW-4824SH30-NZ	18-75	24	250	680	3000	87
AM6TW-2405SH60-NZ#	9-36	5	1200	2700	6000	80
AM6TW-2406SH60-NZ	9-36	6	1000	2200	6000	81
AM6TW-2409SH60-NZ	9-36	9	667	1800	6000	83
AM6TW-2412SH60-NZ#	9-36	12	500	1000	6000	84
AM6TW-2415SH60-NZ	9-36	15	400	680	6000	85
AM6TW-2424SH60-NZ	9-36	24	250	470	6000	84
AM6TW-4805SH60-NZ#	18-75	5	1200	2700	6000	81
AM6TW-4809SH60-NZ	18-75	9	667	1800	6000	83
AM6TW-4812SH60-NZ	18-75	12	500	1000	6000	84
AM6TW-4815SH60-NZ	18-75	15	400	680	6000	85
AM6TW-4824SH60-NZ	18-75	24	250	470	6000	84

Models
Dual output

Model	Input Voltage (V)	Output Voltage (V)	Output Current max (mA)	Max. Capacitive Load (µF)	Isolation (VDC)	Efficiency (%)
AM6TW-2405D-NZ	9-36	±5	±600	±680	1500	83
AM6TW-2409D-NZ	9-36	±9	±333	±220	1500	86
AM6TW-2412D-NZ	9-36	±12	±250	±330	1500	87
AM6TW-2415D-NZ	9-36	±15	±200	±220	1500	88
AM6TW-2424D-NZ	9-36	±24	±125	±100	1500	87

AM6TW-4805D-NZ	18-75	±5	±600	±680	1500	83
AM6TW-4812D-NZ	18-75	±12	±250	±330	1500	87
AM6TW-4815D-NZ	18-75	±15	±200	±220	1500	88
AM6TW-2405DH30-NZ	9-36	±5	±600	±680	3000	80
AM6TW-2412DH30-NZ	9-36	±12	±250	±330	3000	84
AM6TW-2415DH30-NZ	9-36	±15	±200	±220	3000	84

Input Specifications

Parameters	Nominal	Typical	Maximum	Units
Voltage range	24 Vin	9-36		VDC
	48 Vin	18-75		VDC
Absolute Maximum Input Voltage (1 Sec max)	24 Vin		-0.7 - 50	VDC
	48 Vin		-0.7 - 100	VDC
Filter	π (Pi) Network			
Reflected Input ripple current		20		mA p-p
Input Under Voltage lockout	24 Vin	6.5		VDC
	48 Vin	15.5		VDC
Startup voltage	24 Vin		9	VDC
	48 Vin		18	VDC
Startup time	3000VDC isolated models	10		ms

Isolation Specifications

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, <1mA, 1500VDC isolated models	≥ 1500		VDC
	60 sec, <1mA, 3000VDC isolated models	≥ 3000		VDC
	60 sec, <1mA, 6000VDC isolated models	≥ 6000		VDC
Resistance	1500 & 3000VDC isolated models, 500VDC	≥ 1000		MOhm
	6000VDC isolated models, 500VDC	≥ 10000		MOhm
Capacitance (0.1V/100KHz)	1500 & 3000VDC isolated models	1000		pF
	6000VDC isolated models	13	20	pF
Isolation creepage and clearances (6000VDC isolated models)	PCB Clearance and Creepage	≥ 8.0		mm
	Optocoupler Creepage	≥ 8.0		mm
	Transformer Creepage	≥ 8.0		mm
	Transformer Clearance	≥ 5.0		mm
Insulation system	6000VDC isolated models	Reinforced isolation		
Leakage	6000VDC isolated models, 240VAC/60Hz	3.6	5	µA
Protection grade	6000VDC isolated models, 240VAC/60Hz	2xMOPP		
Applied part	6000VDC isolated models	Type CF		

Output Specifications

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy	5% to 100% load	±1	±3	%
Balanced Load	Dual output models	±0.5	±1.5	%
Over voltage protection		≥ 110	160	% of Vout
Over current protection	3000VDC isolated 24Vout model	220	290	% of Iout
	6000VDC isolated models	150	260	% of Iout
	others	140	190	% of Iout
Short Circuit protection	Continuous			
Short circuit restart	Auto-recovery			
Line voltage regulation	LL to HL, output 1	±0.2	±0.5	%
	LL to HL, output 2	±0.5	±1	%
Load voltage regulation	5% to 100% load, output 1	±0.5	±1	%
	5% to 100% load, output 2	±0.5	±1.5	%
Cross voltage regulation	Output 1 50% load, output 2 10-100% load		±5	%
Ripple & Noise	1500VDC models		85	mV p-p
	3000VDC models	85	120	mV p-p
	6000VDC models	100	180	mV p-p
Transient Recovery Time	25% load step change	300	500	µS
Transient Response Deviation	25% load step change, 1.5KV 3.3/ 5/ ±5Vout	±5	±8	%
	25% load step change, others	±3	±5	%

General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency		300		KHz
Operating temperature	Derating above +71	-40 to +85		°C
Storage temperature		-55 to +125		°C
Temperature coefficient		±0.03		%/°C
Max Case temperature			100	°C
Cooling	Free air convection			
Humidity			95	% RH
Soldering Temperature	1.5mm from lead for 10 sec.		300	°C
Case material	1500VDC Isolated models	Aluminum Alloy		
	3000 & 6000VDC Isolated models	Black flame-retardant plastic (UL94 V-0)		
Weight	1500VDC Isolated models	12		g
	3000 & 6000VDC Isolated models	13		g
Dimensions (L x W x H)	1500VDC Isolated models	1.26 x 0.79 x 0.42inches 32.00 x 20.00 x 10.80mm		
	3000 & 6000VDC Isolated models	1.24 x 0.80 x 0.40inches 31.60 x 20.30 x 10.20mm		
MTBF	>1 000 000hrs (MIL-HDBK -217F, Ground Benign, t=+25°C)			

NOTE: All specifications in this datasheet are measured at an ambient temperature of 25°C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

Environment Specifications

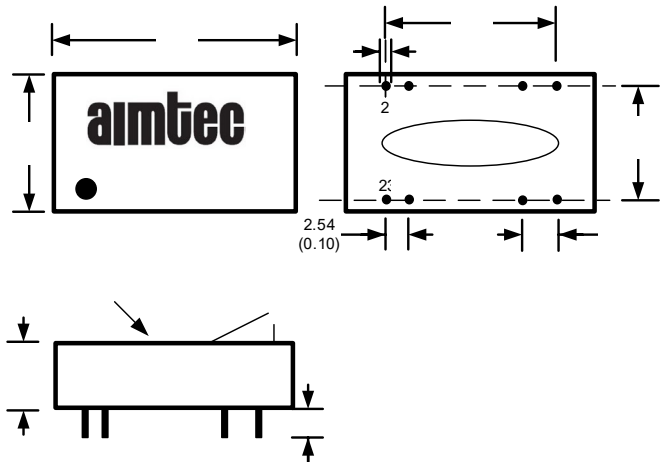
Test	Parameters	Conditions
Vibration	1500VDC Isolated models	IEC/EN 61373 Category 1, class B
	3000 & 6000VDC Isolated models	10-55Hz, 2g, 30min, every axis tested

Safety Specifications

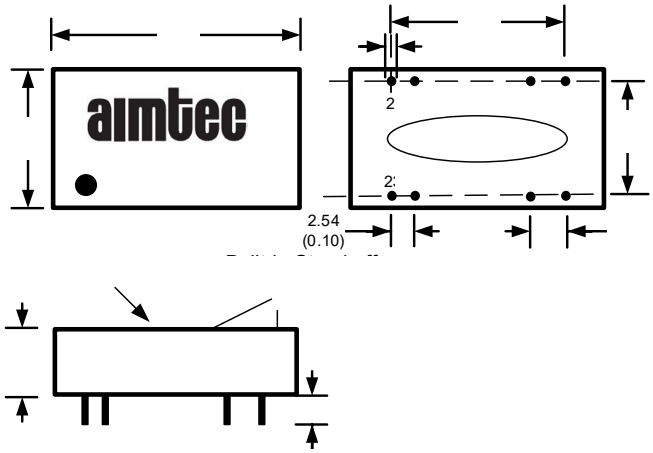
Parameters		
Standards	Design to meet EN50155 for 1.5KV isolated models Design to meet EN60601-1 3rd edition, 2xMOPP, Type CF applied part for 6KV isolated models Design to meet UL60950-1 for 1.5 and 3KV isolated models Design to meet UL62368-1(For models marked with **#** only)	
	EMI - Conducted and radiated emission	CISPER32/EN55032, class A, (without external component) class B, for 1.5 and 3KV isolated models (with the recommended EMC circuit part A) EN50121-3-2 for 1.5KV isolated models (with the recommended EMC circuit part A) EN55016-2-1 for 1.5KV isolated models (with the recommended EMC circuit part A)
	Electrostatic Discharge Immunity	IEC61000-4-2, contact ±4KV, Criteria B for 1.5 and 3KV isolated models IEC61000-4-2, contact ±6KV, Criteria B for 6KV isolated models EN50121-3-2, contact ±6KV, Air ±8KV, Criteria A for 1.5KV isolated models
	RF, Electromagnetic Field Immunity	IEC61000-4-3, 10V/m, Criteria A for 1.5 and 3KV isolated models EN50121-3-2, 20V/m, Criteria A for 1.5KV isolated models
	Electrical Fast Transient/Burst Immunity	IEC61000-4-4, ±2KV, Criteria B, (with the recommended EMC circuit part B) EN50121-3-2, ±2KV, Criteria A for 1.5KV isolated models (with the recommended EMC circuit part B)
	Surge Immunity	IEC61000-4-5, ±2KV, Criteria B, (with the recommended EMC circuit part B) EN50121-3-2, L-L ±1KV, Criteria A for 1.5KV isolated models (with the recommended EMC circuit part B)
	RF, Conducted Disturbance Immunity	IEC61000-4-6, 3Vrms, Criteria A EN50121-3-2, 10Vr.m.s, Criteria A for 1.5KV isolated models
	Voltage dips, short interruptions and voltage variations immunity	IEC61000-4-29, 0-70%, Criteria B

Dimensions

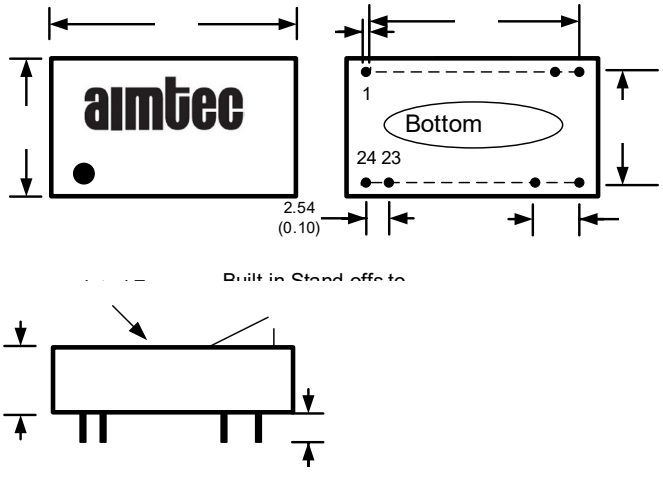
1500VDC Isolated models



3000VDC Isolated models



6000VDC Isolated models



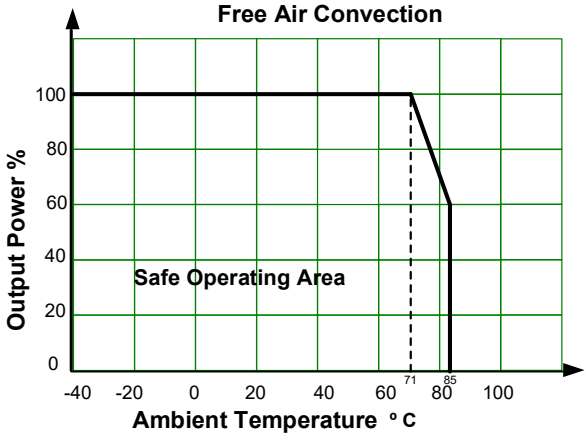
Pin Out Specifications

Pin	1500VDC & 3000VDC	
	Single	Dual
2	-V Input	-V Input
3	-V Input	-V Input
9	No pin	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

Pin Out Specifications

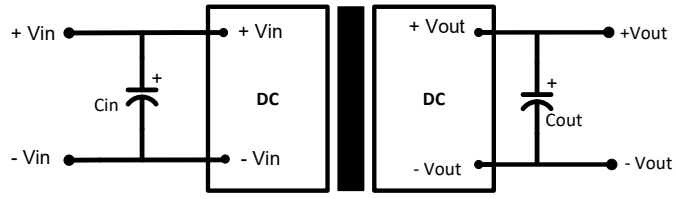
Pin	6000VDC
	Single
1	+V Input
11	No Pin
12	-V Output
13	+V Output
15	No Pin
23/24	-V Input

Derating curve



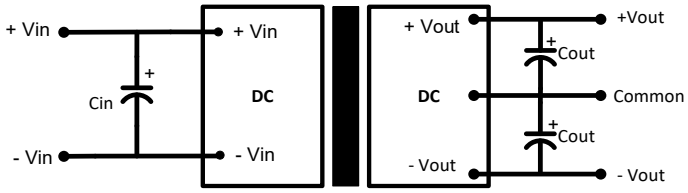
Typical application circuit

Single output models



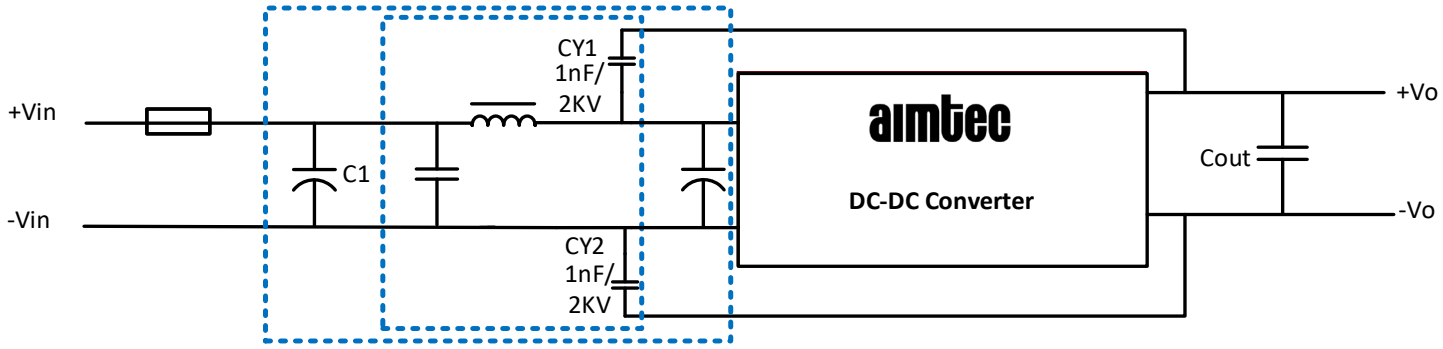
Vin	Cin	Cout
24V	100µF	10µF
48V	10-47µF	10µF

Dual output models



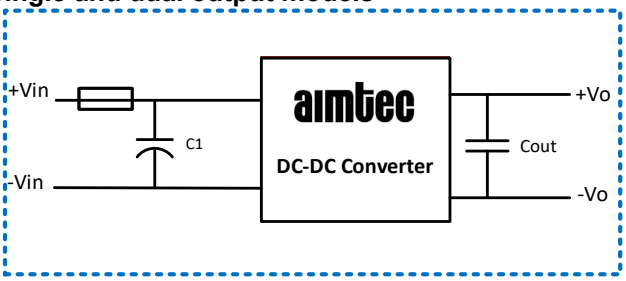
Recommended EMC circuit

1500VDC isolated models



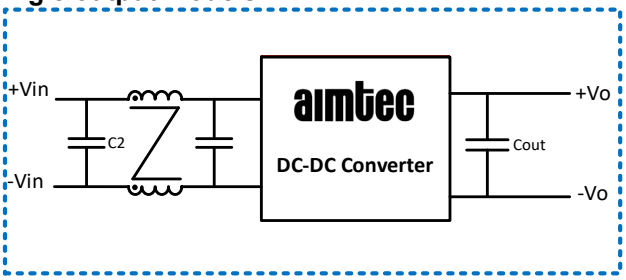
Vin	C1, C4	C2
24V	330µF/50V	1µF/50V
48V	330µF/100V	1µF/100V

3000VDC isolated models
Single and dual output models

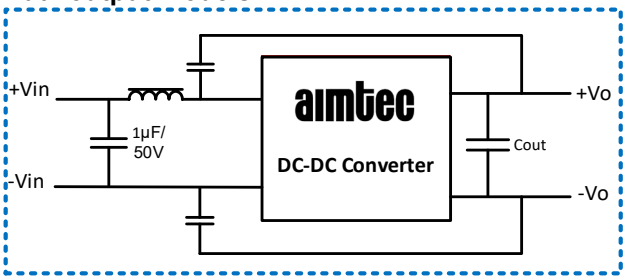


Vin	C1,	C2, C3
24V	1000μF/50V	2.2μF/50V
48V	680μF/100V	2.2μF/100V

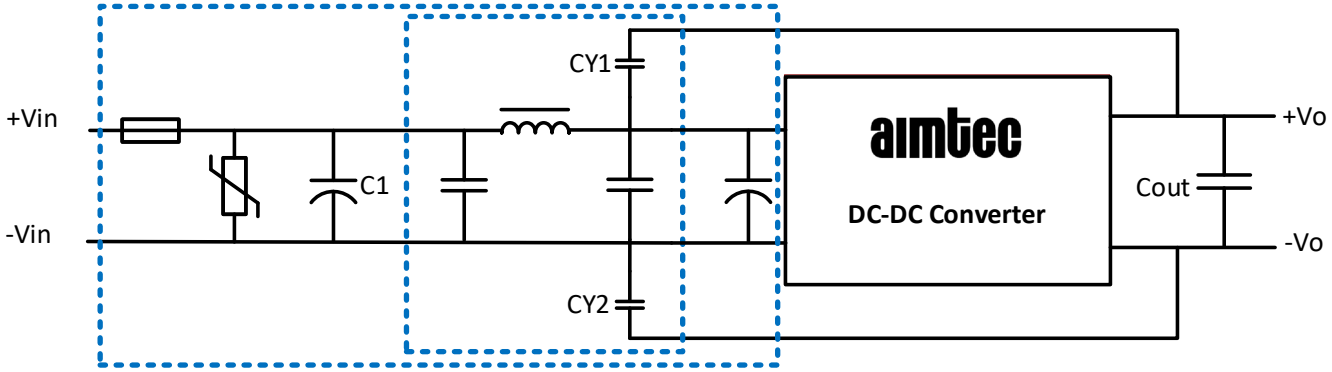
Single output models



Dual output models



6000VDC isolated models



Vin	MOV	C1, C4	C2, C3	LDM	CY1, CY2
24V	S20K30	330μF/50V	10μF/50V	10μH	1nF/6KV
48V	S14K60	330μF/100V	-	-	-

Part B for EMS, part A for EMI

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