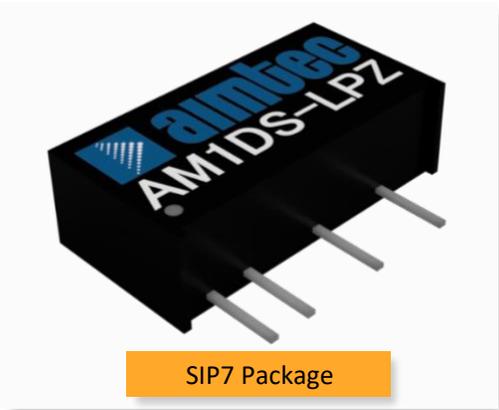


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AM1DS-LPZ



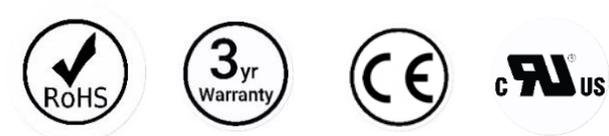
The AM1DS-LPZ is a 1W SIP7 DC/DC converter that offers great cost savings thanks to an improved manufacturing process. It also features excellent reliability and performance while offering a standard input voltage range of 3.3-24VDC as well as an output voltage of 3.3-24V. This compact SIP7 design will surely benefit your new system design.

This new series offers great operating temperatures, from -40 to 105°C with full power up to 85°C. Also, an isolation of 1500 or 3000VDC for improved reliability and system safety as well as a great 3,500,000h MTBF come standard.

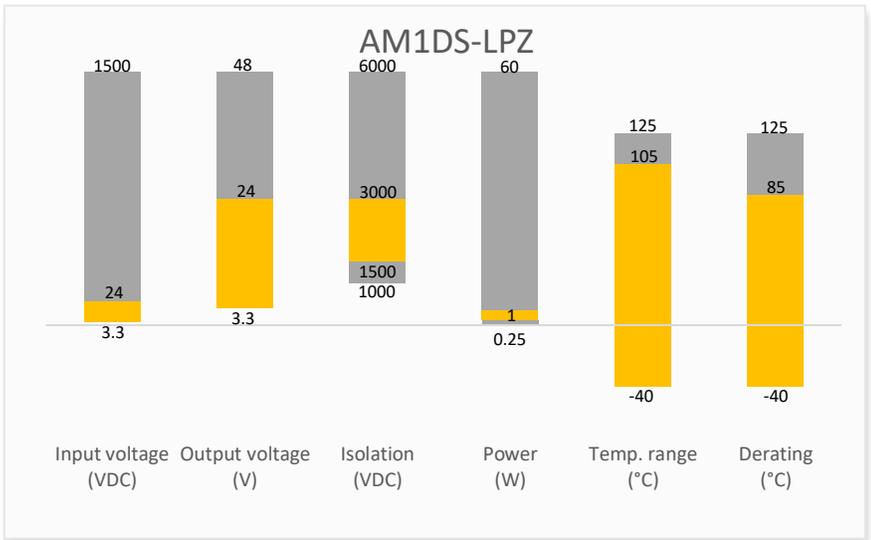
The AM1DS-LPZ is suitable for instrumentation, industrial controls, industrial applications, communication and IoT applications.

Features

- High I/O Isolation of 1500/3000VDC
- Continuous Short circuit protection
- Operating Temp: -40 °C to +105 °C
- Industry standard SIP7 pin-out
- Efficiency up to 89%
- Unregulated output



Summary



Training



Product Training Video
(click to open)



Application Notes

Applications



Models & Specifications



Single Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full No load typ. (mA)	Output Current max min (mA)*	Isolation (VDC)	Maximum capacitive Load (μF)	Efficiency Typ. (%)
AM1DS-0303SLPZ	3.3 (2.97-3.63)	3.3	370 / 3	303 / 30	1500	4000	82
AM1DS-0305SLPZ	3.3 (2.97-3.63)	5	370 / 3	200 / 20	1500	4000	83
AM1DS-0309SLPZ	3.3 (2.97-3.63)	9	370 / 3	111 / 11	1500	2000	84
AM1DS-0312SLPZ	3.3 (2.97-3.63)	12	370 / 3	83 / 8	1500	1000	85
AM1DS-0315SLPZ	3.3 (2.97-3.63)	15	370 / 3	67 / 7	1500	680	85
AM1DS-0324SLPZ	3.3 (2.97-3.63)	24	370 / 3	42 / 4	1500	560	84
AM1DS-0503SLPZ	5 (4.5-5.5)	3.3	230 / 3	303 / 30	1500	4000	83
AM1DS-0505SLPZ*	5 (4.5-5.5)	5	230 / 3	200 / 20	1500	4000	86
AM1DS-0509SLPZ	5 (4.5-5.5)	9	230 / 3	111 / 12	1500	2000	86
AM1DS-0512SLPZ*	5 (4.5-5.5)	12	230 / 3	84 / 9	1500	1000	88
AM1DS-0515SLPZ	5 (4.5-5.5)	15	230 / 3	67 / 7	1500	680	88
AM1DS-0524SLPZ	5 (4.5-5.5)	24	230 / 3	42 / 4	1500	560	89
AM1DS-1203SLPZ	12 (10.8-13.2)	3.3	99 / 3	303 / 30	1500	4000	84
AM1DS-1205SLPZ	12 (10.8-13.2)	5	99 / 3	200 / 20	1500	4000	86
AM1DS-1209SLPZ	12 (10.8-13.2)	9	99 / 3	111 / 12	1500	2000	87
AM1DS-1212SLPZ	12 (10.8-13.2)	12	99 / 3	84 / 9	1500	1000	87
AM1DS-1215SLPZ	12 (10.8-13.2)	15	99 / 3	67 / 7	1500	680	88
AM1DS-1224SLPZ	12 (10.8-13.2)	24	99 / 3	42 / 4	1500	560	89
AM1DS-1505SLPZ	15 (13.5-16.5)	5	78 / 3	200 / 20	1500	4000	86
AM1DS-1509SLPZ	15 (13.5-16.5)	9	78 / 3	111 / 12	1500	2000	87
AM1DS-1512SLPZ	15 (13.5-16.5)	12	78 / 3	84 / 9	1500	1000	87
AM1DS-1515SLPZ	15 (13.5-16.5)	15	78 / 3	67 / 7	1500	680	88
AM1DS-1524SLPZ	15 (13.5-16.5)	24	78 / 3	42 / 5	1500	560	84
AM1DS-2403SLPZ	24 (21.6-26.4)	3.3	51 / 3	303 / 30	1500	4000	84
AM1DS-2405SLPZ	24 (21.6-26.4)	5	51 / 3	200 / 20	1500	4000	87
AM1DS-2409SLPZ	24 (21.6-26.4)	9	51 / 3	111 / 12	1500	1000	88
AM1DS-2412SLPZ	24 (21.6-26.4)	12	51 / 3	84 / 9	1500	680	88
AM1DS-2415SLPZ	24 (21.6-26.4)	15	51 / 3	67 / 7	1500	560	88
AM1DS-2424SLPZ	24 (21.6-26.4)	24	51 / 3	42 / 4	1500	4000	89
AM1DS-0303SH30LPZ	3.3 (2.97-3.63)	3.3	370 / 3	303 / 30	3000	4000	82
AM1DS-0305SH30LPZ	3.3 (2.97-3.63)	5	370 / 3	200 / 20	3000	4000	83
AM1DS-0309SH30LPZ	3.3 (2.97-3.63)	9	370 / 3	111 / 11	3000	2000	84
AM1DS-0312SH30LPZ	3.3 (2.97-3.63)	12	370 / 3	84 / 8	3000	1000	85
AM1DS-0315SH30LPZ	3.3 (2.97-3.63)	15	370 / 3	67 / 7	3000	680	85
AM1DS-0324SH30LPZ	3.3 (2.97-3.63)	24	370 / 3	42 / 4	3000	560	84
AM1DS-0503SH30LPZ	5 (4.5-5.5)	3.3	235 / 3	303 / 30	3000	4000	83
AM1DS-0505SH30LPZ*	5 (4.5-5.5)	5	235 / 3	200 / 20	3000	4000	86
AM1DS-0509SH30LPZ	5 (4.5-5.5)	9	235 / 3	111 / 12	3000	2000	86
AM1DS-0512SH30LPZ*	5 (4.5-5.5)	12	235 / 3	84 / 9	3000	1000	88
AM1DS-0515SH30LPZ	5 (4.5-5.5)	15	235 / 3	67 / 7	3000	680	88
AM1DS-0524SH30LPZ	5 (4.5-5.5)	24	235 / 3	42 / 4	3000	560	89
AM1DS-1203SH30LPZ	12 (10.8-13.2)	3.3	99 / 3	303 / 30	3000	4000	84
AM1DS-1205SH30LPZ	12 (10.8-13.2)	5	99 / 3	200 / 20	3000	4000	86

AM1DS-1209SH30LPZ	12 (10.8-13.2)	9	99 / 3	111 / 12	3000	2000	87
AM1DS-1212SH30LPZ	12 (10.8-13.2)	12	99 / 3	84 / 9	3000	1000	87
AM1DS-1215SH30LPZ	12 (10.8-13.2)	15	99 / 3	67 / 7	3000	680	88
AM1DS-1224SH30LPZ	12 (10.8-13.2)	24	99 / 3	42 / 5	3000	560	89
AM1DS-1505SH30LPZ	15 (13.5-16.5)	5	78 / 3	200 / 20	3000	4000	86
AM1DS-1509SH30LPZ	15 (13.5-16.5)	9	78 / 3	111 / 12	3000	2000	87
AM1DS-1512SH30LPZ	15 (13.5-16.5)	12	78 / 3	84 / 9	3000	1000	87
AM1DS-1515SH30LPZ	15 (13.5-16.5)	15	78 / 3	67 / 7	3000	680	88
AM1DS-1524SH30LPZ	15 (13.5-16.5)	24	78 / 3	42 / 5	3000	560	84
AM1DS-2403SH30LPZ	24 (21.6-26.4)	3.3	51 / 3	303 / 30	3000	4000	84
AM1DS-2405SH30LPZ	24 (21.6-26.4)	5	51 / 3	200 / 20	3000	4000	87
AM1DS-2409SH30LPZ	24 (21.6-26.4)	9	51 / 3	111 / 12	3000	2000	88
AM1DS-2412SH30LPZ	24 (21.6-26.4)	12	51 / 3	84 / 9	3000	1000	88
AM1DS-2415SH30LPZ	24 (21.6-26.4)	15	51 / 3	67 / 7	3000	680	88
AM1DS-2424SH30LPZ	24 (21.6-26.4)	24	51 / 3	42 / 5	3000	560	89

* Performance will be degraded if the load is not within the output current range.

Dual Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full No load typ. (mA)	Output Current max min (mA)*	Isolation (VDC)	Maximum capacitive Load (μF)	Efficiency Typ. (%)
AM1DS-0503DLPZ	5 (4.5-5.5)	±3.3	230 / 3	±152 / ±15	1500	2000	76
AM1DS-0505DLPZ	5 (4.5-5.5)	±5	230 / 3	±100 / ±10	1500	2000	86
AM1DS-0509DLPZ	5 (4.5-5.5)	±9	230 / 3	±56 / ±6	1500	1000	86
AM1DS-0512DLPZ	5 (4.5-5.5)	±12	230 / 3	±42 / ±5	1500	560	88
AM1DS-0515DLPZ	5 (4.5-5.5)	±15	230 / 3	±34 / ±4	1500	220	88
AM1DS-0524DLPZ	5 (4.5-5.5)	±24	230 / 3	±21 / ±3	1500	100	88
AM1DS-1203DLPZ	12 (10.8-13.2)	±3.3	99 / 3	±152 / ±15	1500	2000	84
AM1DS-1205DLPZ	12 (10.8-13.2)	±5	99 / 3	±100 / ±10	1500	2000	86
AM1DS-1209DLPZ	12 (10.8-13.2)	±9	99 / 3	±56 / ±6	1500	1000	87
AM1DS-1212DLPZ	12 (10.8-13.2)	±12	99 / 3	±42 / ±5	1500	560	87
AM1DS-1215DLPZ	12 (10.8-13.2)	±15	99 / 3	±34 / ±4	1500	220	88
AM1DS-1224DLPZ	12 (10.8-13.2)	±24	99 / 3	±21 / ±3	1500	100	84
AM1DS-1505DLPZ	15 (13.5-16.5)	±5	78 / 3	±100 / ±10	1500	2000	86
AM1DS-1512DLPZ	15 (13.5-16.5)	±12	78 / 3	±42 / ±5	1500	560	87
AM1DS-1515DLPZ	15 (13.5-16.5)	±15	78 / 3	±34 / ±4	1500	220	88
AM1DS-1524DLPZ	15 (13.5-16.5)	±24	78 / 3	±21 / ±2	1500	100	84
AM1DS-2405DLPZ	24 (21.6-26.4)	±5	51 / 3	±100 / ±10	1500	2000	87
AM1DS-2409DLPZ	24 (21.6-26.4)	±9	51 / 3	±56 / ±6	1500	1000	88
AM1DS-2412DLPZ	24 (21.6-26.4)	±12	51 / 3	±42 / ±5	1500	560	88
AM1DS-2415DLPZ	24 (21.6-26.4)	±15	51 / 3	±34 / ±4	1500	220	88
AM1DS-2424DLPZ	24 (21.6-26.4)	±24	51 / 3	±21 / ±3	1500	100	84
AM1DS-0503DH30LPZ	5 (4.5-5.5)	±3.3	235 / 3	±152 / ±15	3000	2000	84
AM1DS-0505DH30LPZ	5 (4.5-5.5)	±5	235 / 3	±100 / ±10	3000	2000	86
AM1DS-0509DH30LPZ	5 (4.5-5.5)	±9	235 / 3	±56 / ±6	3000	1000	86
AM1DS-0512DH30LPZ	5 (4.5-5.5)	±12	235 / 3	±42 / ±5	3000	560	88
AM1DS-0515DH30LPZ	5 (4.5-5.5)	±15	235 / 3	±34 / ±4	3000	220	88
AM1DS-0524DH30LPZ	5 (4.5-5.5)	±24	235 / 3	±21 / ±3	3000	100	88
AM1DS-1203DH30LPZ	12 (10.8-13.2)	±3.3	99 / 3	±152 / ±15	3000	2000	84
AM1DS-1205DH30LPZ	12 (10.8-13.2)	±5	99 / 3	±100 / ±10	3000	2000	86

AM1DS-1209DH30LPZ	12 (10.8-13.2)	±9	99 / 3	±56 / ±5	3000	1000	87
AM1DS-1212DH30LPZ	12 (10.8-13.2)	±12	99 / 3	±42 / ±5	3000	560	87
AM1DS-1215DH30LPZ	12 (10.8-13.2)	±15	99 / 3	±34 / ±4	3000	220	88
AM1DS-1224DH30LPZ	12 (10.8-13.2)	±24	99 / 3	±21 / ±3	3000	100	84
AM1DS-1505DH30LPZ	15 (13.5-16.5)	±5	78 / 3	±100 / ±10	3000	2000	86
AM1DS-1512DH30LPZ	15 (13.5-16.5)	±12	78 / 3	±42 / ±5	3000	560	87
AM1DS-1515DH30LPZ	15 (13.5-16.5)	±15	78 / 3	±34 / ±4	3000	220	88
AM1DS-1524DH30LPZ	15 (13.5-16.5)	±24	78 / 3	±21 / ±2	3000	100	84
AM1DS-2405DH30LPZ	24 (21.6-26.4)	±5	51 / 3	±100 / ±10	3000	2000	87
AM1DS-2409DH30LPZ	24 (21.6-26.4)	±9	51 / 3	±56 / ±5	3000	1000	88
AM1DS-2412DH30LPZ	24 (21.6-26.4)	±12	51 / 3	±42 / ±5	3000	560	88
AM1DS-2415DH30LPZ	24 (21.6-26.4)	±15	51 / 3	±34 / ±4	3000	220	88
AM1DS-2424DH30LPZ	24 (21.6-26.4)	±24	51 / 3	±21 / ±3	3000	100	84

* Performance will be degraded if the load is not within the output current range.

Input Specification

Parameters	Conditions	Typical	Maximum	Units
Filter	Capacitor			
Absolute maximum rating	Maximum duration 1s, 3.3Vin	> -0.7	5	VDC
	Maximum duration 1s, 5Vin	> -0.7	9	VDC
	Maximum duration 1s, 12Vin	> -0.7	18	VDC
	Maximum duration 1s, 15Vin	> -0.7	21	VDC
	Maximum duration 1s, 24Vin	> -0.7	30	VDC
Input reflected ripple current		15		mA

Isolation Specification

Parameters	Conditions	Typical	Maximum	Units
Tested I/O voltage	60 sec, leakage ≤ 1mA	>1500		VDC
	60 sec, leakage ≤ 1mA for H30 models	>3000		VDC
Resistance	500VDC	>1000		MΩ
Capacitance	100kHz/0.1V	20		pF

Output Specification

Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy	See output voltage tolerance		10	%
Line regulation	Per 1% Vin change, 3.3Vout models		±1.5	%
	Per 1% Vin change, other models		±1.2	%
Load regulation	10-100% load, 3.3Vout models		10	%
	10-100% load, 5Vout & 9Vout models		8	%
	10-100% load, other 12Vout models		7	%
	10-100% load, 15Vout & 24Vout models		6	%
Ripple & Noise*		45	100	mV pk-pk
Temperature coefficient	Full load	±0.03		%/°C

* Ripple and Noise are measured at 20MHz bandwidth. Please refer to the application note for specific details.

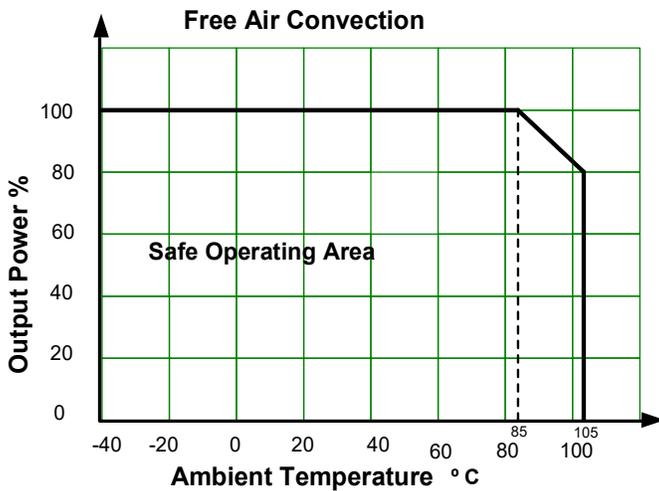
General Specifications

Parameters	Conditions	Typical	Maximum	Units
Switching frequency	Full load, nominal input	220		KHz

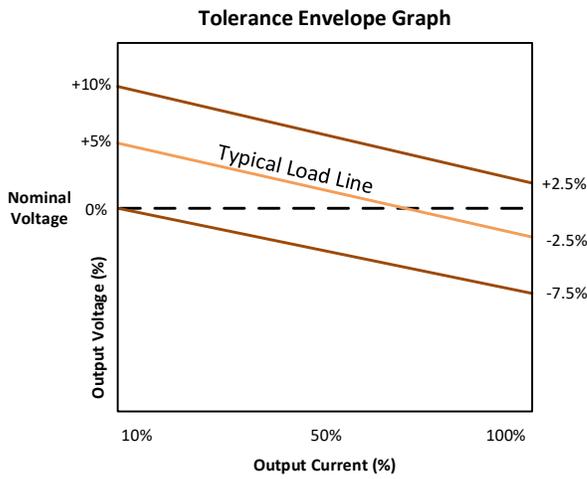
Short circuit protection	Continuous, Auto recovery			
Operating temperature	With derating	-40 to +105		°C
Storage temperature		-55 to +125		°C
Case temperature rise	Ambient temperature at 25°C	25		°C
Manual soldering temperature	1.5mm away from case, duration ≤ 10sec		300	°C
Cooling	Free air convection			
Humidity	Non-condensing	>5	95	% RH
Vibration	10-150Hz, 5G, 0.75mm, along all axis			
Case material	Black plastic (flammability to UL 94V-0)			
Weight		2.1		g
Dimensions (L x W x H)	0.77 x 0.24 x 0.40 inches (19.65 x 6.00 x 10.16 mm)			
MTBF	3 500 000 hrs (MIL-HDBK -217F, t=+25°C) / Full Load			
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.				

Safety Specifications		
Parameters		
Agency approvals	UL62368-1 models marked with * only	
Standards	Information technology Equipment	Designed to meet IEC/EN/UL62368-1
	EMC - Conducted and radiated emission	CISPR32 / EN55032, class B with the recommended EMI circuit
	Electrostatic Discharge Immunity	IEC 61000-4-2

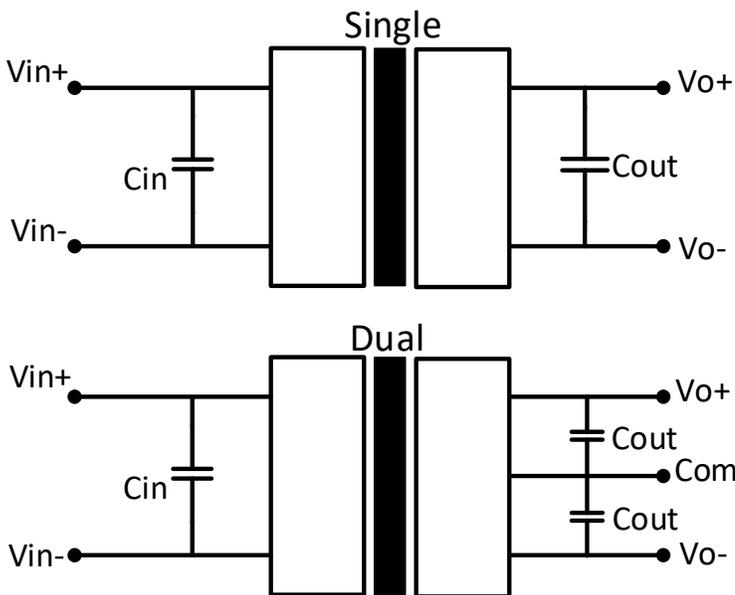
Derating



Output voltage tolerance



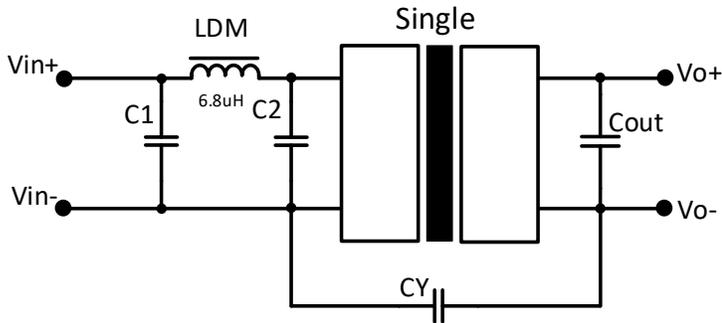
Typical application circuit



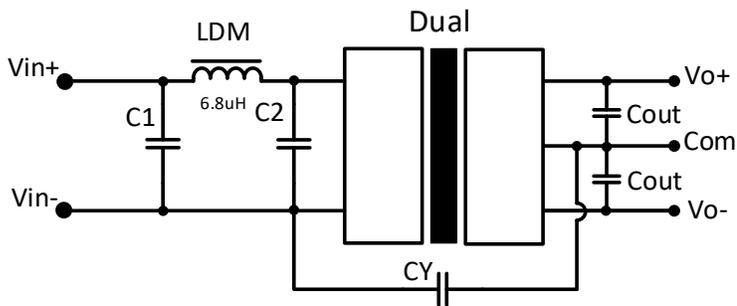
Vin	Cin
3.3/5V	4.7 μ F/16V
12/15V	2.2 μ F/25V
24V	1 μ F/50V

Vout	Cout
3.3V	10 μ F/16V
5V	10 μ F/16V
9V	4.7 μ F/16V
12V	2.2 μ F/25V
15V	1 μ F/50V
24V	0.47 μ F/50V

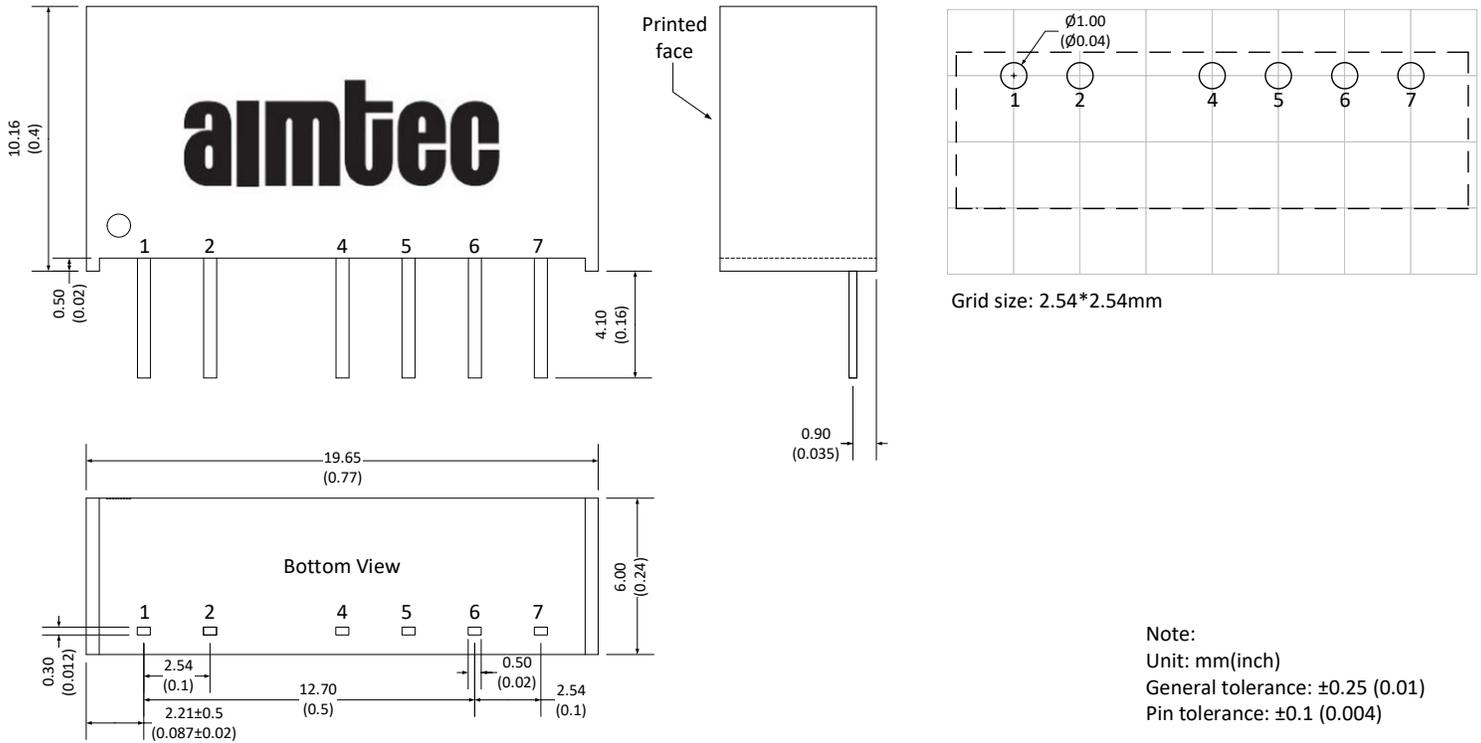
Recommended EMI circuit



C1/C2	CY	Cout
4.7 μ F/50V	1nF/2kVdc	Refer to above table



Dimensions



Pin Out Specifications

Pin	1.5KV isolation Single output	1.5KV isolation Dual output	3KV isolation Single output	3KV isolation Dual output
1	+V Input	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input	-V Input
4	-V Output	-V Output	No pin	No pin
5	No pin	Com	-V Output	-V Output
6	+V Output	+V Output	No pin	Com
7	No pin	No pin	+V Output	+V Output

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