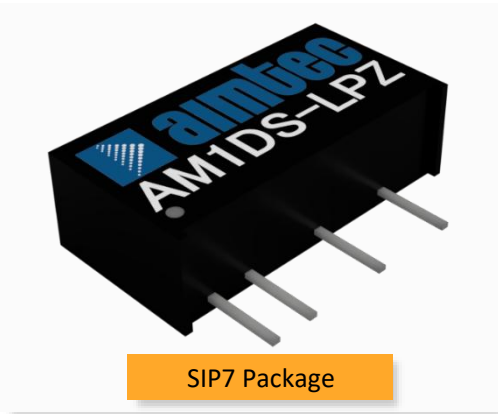


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AM1DS-LPZ



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.

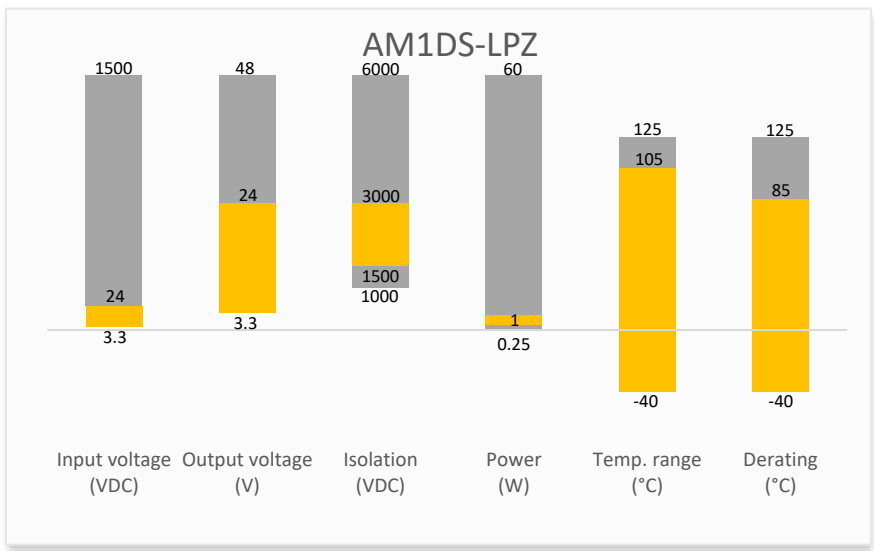
This new series offers great operating temperatures, from -40 to 105°C with full power up to 85°C. Also, an isolation of 1500 or 3000VDC for improved reliability and system safety as well as a great 3,500,000h MTBF come standard.

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

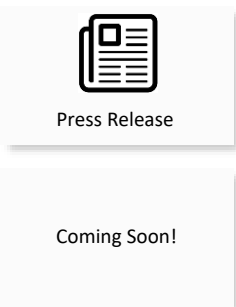
Summary



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

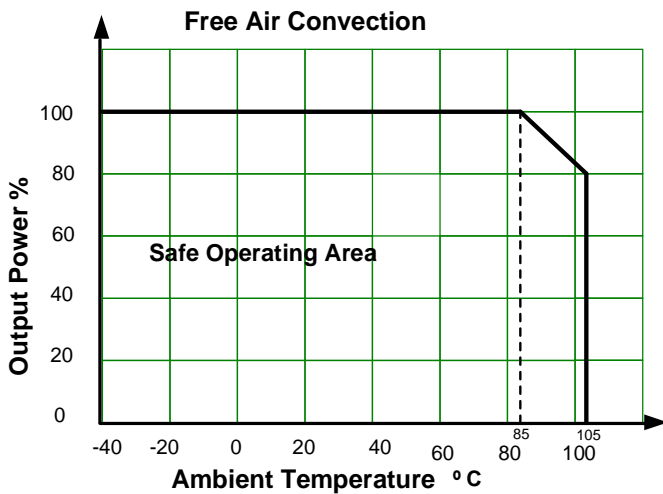
Parameters	Conditions	Typical	Maximum	Units
Switching frequency	Full load, nominal input	220		KHz

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		
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

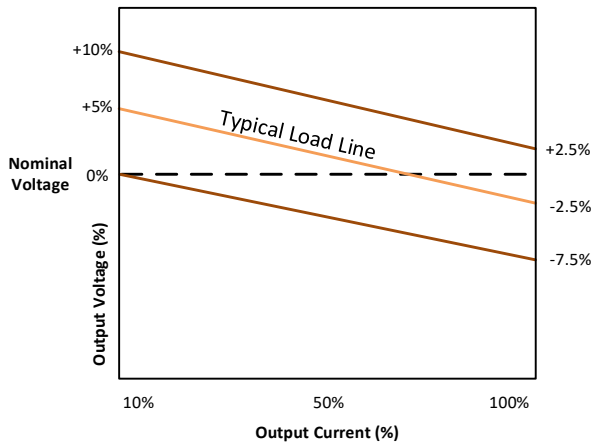
## Derating



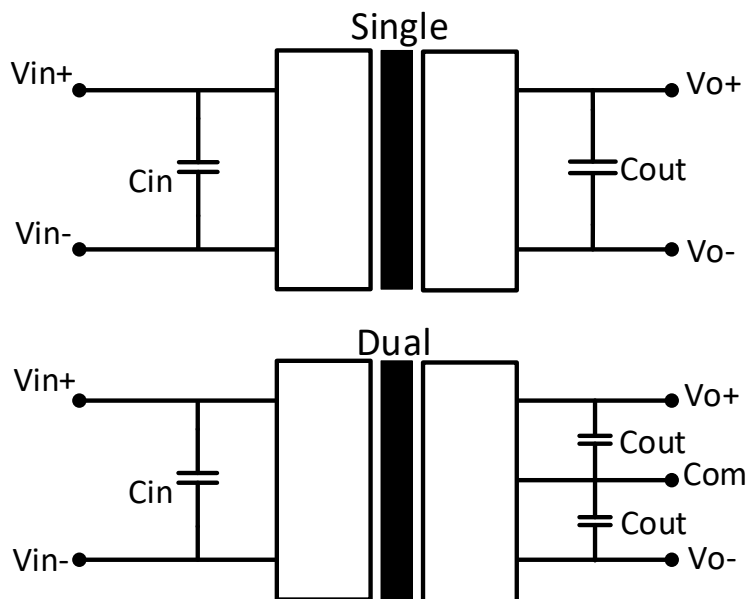
## Output voltage tolerance



Tolerance Envelope Graph



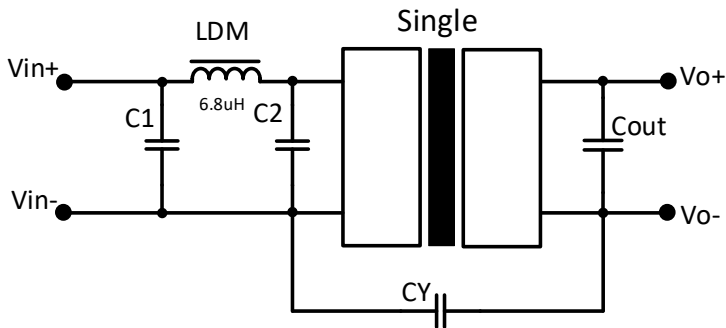
## Typical application circuit



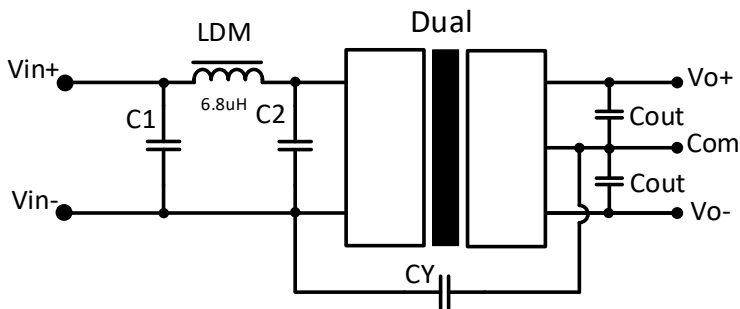
Vin	Cin
3.3/5V	4.7μF/16V
12/15V	2.2μF/25V
24V	1μF/50V

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

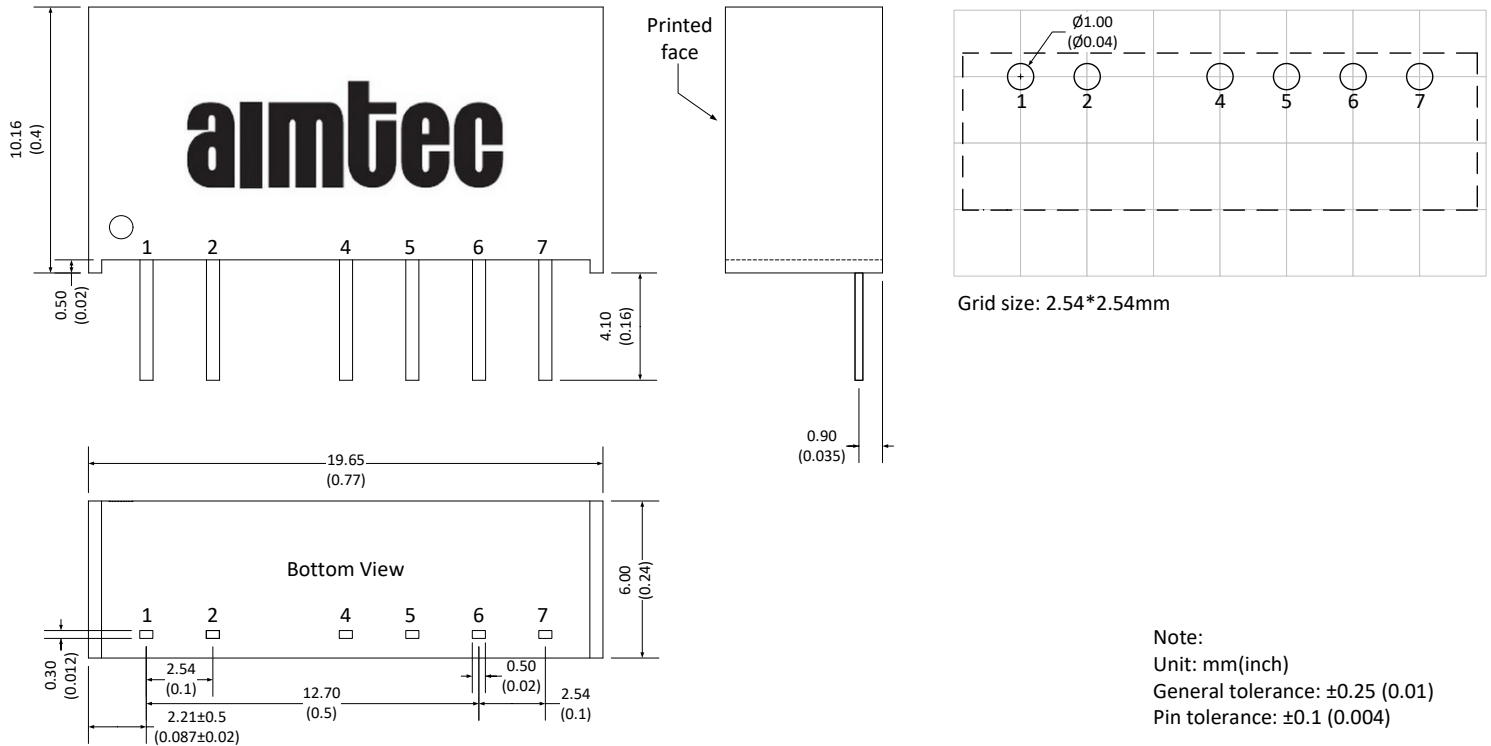
Recommended EMI circuit



C1/C2	CY	Cout
4.7μF/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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