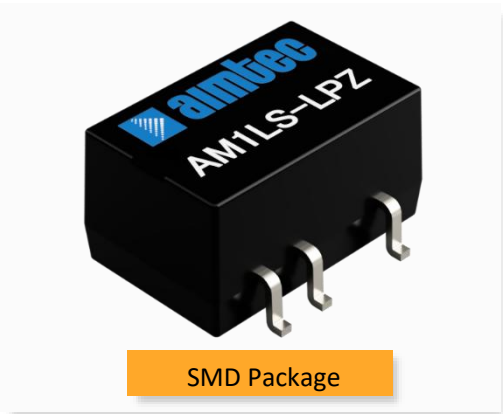


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AM1LS-LPZ



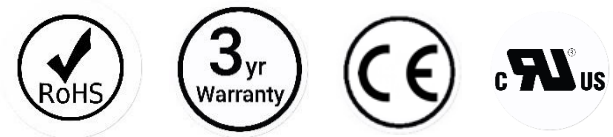
The AM1LS-LPZ is a 1W SMD DC/DC converter that offers great cost savings thanks to an improved manufacturing process. It also features excellent reliability and performance while offering a standard input voltage range of 3.3-24VDC as well as an output voltage of 3.3-24V. This compact SMD design will 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 1500VDC & 3000VDC for improved reliability and system safety as well as a great 3,500,000h MTBF come standard.

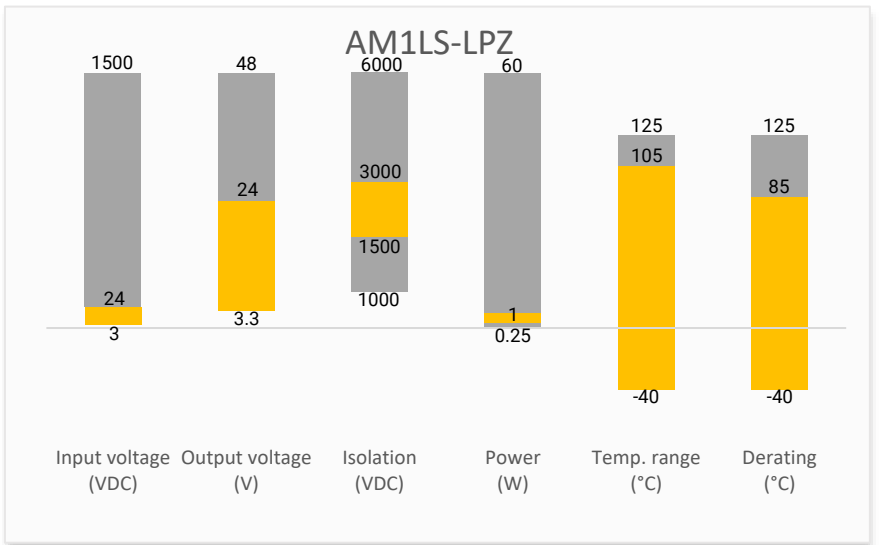
The AM1LS-LPZ is suitable for instrumentation, industrial controls, industrial applications, communication and IoT applications.

Features

- High I/O Isolation 1500VDC & 3000VDC
- Continuous Short circuit protection
- Operating Temp: -40 °C to +105 °C
- Low profile case height: 7.25mm
- Compact footprint and high-power Density
- Efficiency up to 89%
- Unregulated output



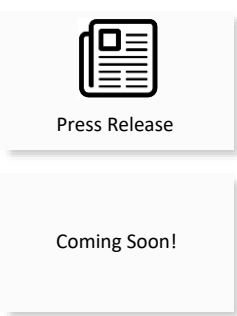
Summary



Training



Product Training Video
(click to open)



Application Notes

Applications



IoT

Industrial

Telecom

Portable Equipment

Models & Specifications



Single Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full load Typ. (mA)	Output Current max (mA)	Isolation (VDC)	Maximum capacitive Load (μF)	Efficiency Typ. (%)
AM1LS-0303SLPZ	3.3 (2.97-3.63)	3.3	365	303	1500	2400	82
AM1LS-0305SLPZ	3.3 (2.97-3.63)	5	365	200	1500	2400	83
AM1LS-0309SLPZ	3.3 (2.97-3.63)	9	365	111	1500	1000	84
AM1LS-0312SLPZ	3.3 (2.97-3.63)	12	365	84	1500	560	85
AM1LS-0315SLPZ	3.3 (2.97-3.63)	15	365	67	1500	560	85
AM1LS-0324SLPZ	3.3 (2.97-3.63)	24	365	42	1500	220	85
AM1LS-0503SLPZ	5 (4.5-5.5)	3.3	238	303	1500	2400	80
AM1LS-0505SLPZ*	5 (4.5-5.5)	5	238	200	1500	2400	84
AM1LS-0509SLPZ	5 (4.5-5.5)	9	238	111	1500	1000	86
AM1LS-0512SLPZ*	5 (4.5-5.5)	12	238	84	1500	560	89
AM1LS-0515SLPZ	5 (4.5-5.5)	15	238	67	1500	560	88
AM1LS-0524SLPZ	5 (4.5-5.5)	24	238	42	1500	220	88
AM1LS-1203SLPZ	12 (10.8-13.2)	3.3	97	303	1500	2400	83
AM1LS-1205SLPZ	12 (10.8-13.2)	5	97	200	1500	2400	86
AM1LS-1209SLPZ	12 (10.8-13.2)	9	97	111	1500	1000	89
AM1LS-1212SLPZ	12 (10.8-13.2)	12	97	84	1500	560	89
AM1LS-1215SLPZ	12 (10.8-13.2)	15	97	67	1500	560	89
AM1LS-1224SLPZ	12 (10.8-13.2)	24	97	42	1500	220	89
AM1LS-1503SLPZ	15 (13.5-16.5)	3.3	78	303	1500	2400	82
AM1LS-1505SLPZ	15 (13.5-16.5)	5	78	200	1500	2400	85
AM1LS-1509SLPZ	15 (13.5-16.5)	9	78	111	1500	1000	88
AM1LS-1512SLPZ	15 (13.5-16.5)	12	78	84	1500	560	89
AM1LS-1515SLPZ	15 (13.5-16.5)	15	78	67	1500	560	89
AM1LS-1524SLPZ	15 (13.5-16.5)	24	78	42	1500	220	89
AM1LS-2403SLPZ	24 (21.6-26.4)	3.3	48	303	1500	2400	84
AM1LS-2405SLPZ	24 (21.6-26.4)	5	48	200	1500	2400	87
AM1LS-2409SLPZ	24 (21.6-26.4)	9	48	111	1500	1000	89
AM1LS-2412SLPZ	24 (21.6-26.4)	12	48	84	1500	560	88
AM1LS-2415SLPZ	24 (21.6-26.4)	15	48	67	1500	560	89
AM1LS-2424SLPZ	24 (21.6-26.4)	24	48	42	1500	220	89
AM1LS-0303SH30LPZ	3.3 (2.97-3.63)	3.3	365	303	3000	2400	82
AM1LS-0305SH30LPZ	3.3 (2.97-3.63)	5	365	200	3000	2400	83
AM1LS-0309SH30LPZ	3.3 (2.97-3.63)	9	365	111	3000	1000	84
AM1LS-0312SH30LPZ	3.3 (2.97-3.63)	12	365	84	3000	560	85
AM1LS-0315SH30LPZ	3.3 (2.97-3.63)	15	365	67	3000	560	85
AM1LS-0324SH30LPZ	3.3 (2.97-3.63)	24	365	42	3000	220	85
AM1LS-0503SH30LPZ	5 (4.5-5.5)	3.3	238	303	3000	2400	80
AM1LS-0505SH30LPZ*	5 (4.5-5.5)	5	238	200	3000	2400	84
AM1LS-0509SH30LPZ	5 (4.5-5.5)	9	238	111	3000	1000	86
AM1LS-0512SH30LPZ*	5 (4.5-5.5)	12	238	84	3000	560	89
AM1LS-0515SH30LPZ	5 (4.5-5.5)	15	238	67	3000	560	88
AM1LS-0524SH30LPZ	5 (4.5-5.5)	24	238	42	3000	220	88
AM1LS-1203SH30LPZ	12 (10.8-13.2)	3.3	97	303	3000	2400	83

AM1LS-1205SH30LPZ	12 (10.8-13.2)	5	97	200	3000	2400	86
AM1LS-1209SH30LPZ	12 (10.8-13.2)	9	97	111	3000	1000	89
AM1LS-1212SH30LPZ	12 (10.8-13.2)	12	97	84	3000	560	89
AM1LS-1215SH30LPZ	12 (10.8-13.2)	15	97	67	3000	560	89
AM1LS-1224SH30LPZ	12 (10.8-13.2)	24	97	42	3000	220	89
AM1LS-1503SH30LPZ	15 (13.5-16.5)	3.3	78	303	3000	2400	82
AM1LS-1505SH30LPZ	15 (13.5-16.5)	5	78	200	3000	2400	85
AM1LS-1509SH30LPZ	15 (13.5-16.5)	9	78	111	3000	1000	88
AM1LS-1512SH30LPZ	15 (13.5-16.5)	12	78	84	3000	560	89
AM1LS-1515SH30LPZ	15 (13.5-16.5)	15	78	67	3000	560	89
AM1LS-1524SH30LPZ	15 (13.5-16.5)	24	78	42	3000	220	89
AM1LS-2403SH30LPZ	24 (21.6-26.4)	3.3	48	303	3000	2400	84
AM1LS-2405SH30LPZ	24 (21.6-26.4)	5	48	200	3000	2400	87
AM1LS-2409SH30LPZ	24 (21.6-26.4)	9	48	111	3000	1000	89
AM1LS-2412SH30LPZ	24 (21.6-26.4)	12	48	84	3000	560	88
AM1LS-2415SH30LPZ	24 (21.6-26.4)	15	48	67	3000	560	89
AM1LS-2424SH30LPZ	24 (21.6-26.4)	24	48	42	3000	220	89

Note: Use suffix "TR" for tape & reel packing (ex. AM1LS-0303SLPZTR)

Dual Output

Model	Input Voltage (VDC)	Output Voltage (VDC)	Input Current Full load Typ. (mA)	Output Current Max (mA)	Isolation (VDC)	Maximum capacitive Load (μF)	Efficiency Typ. (%)
AM1LS-0303DLPZ	3.3 (2.97-3.63)	±3.3	365	±152	1500	±1000	82
AM1LS-0305DLPZ	3.3 (2.97-3.63)	±5	365	±100	1500	±1000	83
AM1LS-0309DLPZ	3.3 (2.97-3.63)	±9	365	±56	1500	±470	82
AM1LS-0312DLPZ	3.3 (2.97-3.63)	±12	365	±42	1500	±220	82
AM1LS-0315DLPZ	3.3 (2.97-3.63)	±15	365	±34	1500	±220	82
AM1LS-0324DLPZ	3.3 (2.97-3.63)	±24	365	±21	1500	±220	84
AM1LS-0503DLPZ	5 (4.5-5.5)	±3.3	238	±152	1500	±1000	80
AM1LS-0505DLPZ	5 (4.5-5.5)	±5	238	±100	1500	±1000	84
AM1LS-0509DLPZ	5 (4.5-5.5)	±9	238	±56	1500	±470	86
AM1LS-0512DLPZ	5 (4.5-5.5)	±12	238	±42	1500	±220	89
AM1LS-0515DLPZ	5 (4.5-5.5)	±15	238	±34	1500	±220	88
AM1LS-0524DLPZ	5 (4.5-5.5)	±24	238	±21	1500	±220	88
AM1LS-1203DLPZ	12 (10.8-13.2)	±3.3	97	±152	1500	±1000	83
AM1LS-1205DLPZ	12 (10.8-13.2)	±5	97	±100	1500	±1000	86
AM1LS-1207DLPZ	12 (10.8-13.2)	±7.5	97	±67	1500	±470	82
AM1LS-1209DLPZ	12 (10.8-13.2)	±9	97	±56	1500	±470	89
AM1LS-1212DLPZ	12 (10.8-13.2)	±12	97	±42	1500	±220	89
AM1LS-1215DLPZ	12 (10.8-13.2)	±15	97	±34	1500	±220	89
AM1LS-1224DLPZ	12 (10.8-13.2)	±24	97	±21	1500	±220	89
AM1LS-1503DLPZ	15 (13.5-16.5)	±3.3	78	±152	1500	±1000	82
AM1LS-1505DLPZ	15 (13.5-16.5)	±5	78	±100	1500	±1000	85
AM1LS-1509DLPZ	15 (13.5-16.5)	±9	78	±56	1500	±470	88
AM1LS-1512DLPZ	15 (13.5-16.5)	±12	78	±42	1500	±220	89
AM1LS-1515DLPZ	15 (13.5-16.5)	±15	78	±34	1500	±220	89
AM1LS-1524DLPZ	15 (13.5-16.5)	±24	78	±21	1500	±220	89
AM1LS-2403DLPZ	24 (21.6-26.4)	±3.3	48	±152	1500	±1000	84
AM1LS-2405DLPZ	24 (21.6-26.4)	±5	48	±100	1500	±1000	87

AM1LS-2409DLPZ	24 (21.6-26.4)	±9	48	±56	1500	±470	89
AM1LS-2412DLPZ	24 (21.6-26.4)	±12	48	±42	1500	±220	88
AM1LS-2415DLPZ	24 (21.6-26.4)	±15	48	±34	1500	±220	89
AM1LS-2424DLPZ	24 (21.6-26.4)	±24	48	±21	1500	±220	89
AM1LS-0303DH30LPZ	3.3 (2.97-3.63)	±3.3	370	±152	3000	±1000	82
AM1LS-0305DH30LPZ	3.3 (2.97-3.63)	±5	370	±100	3000	±1000	83
AM1LS-0309DH30LPZ	3.3 (2.97-3.63)	±9	370	±56	3000	±470	82
AM1LS-0312DH30LPZ	3.3 (2.97-3.63)	±12	370	±42	3000	±220	82
AM1LS-0315DH30LPZ	3.3 (2.97-3.63)	±15	370	±34	3000	±220	82
AM1LS-0324DH30LPZ	3.3 (2.97-3.63)	±24	370	±21	3000	±220	84
AM1LS-0503DH30LPZ	5 (4.5-5.5)	±3.3	370	±152	3000	±1000	80
AM1LS-0505DH30LPZ	5 (4.5-5.5)	±5	238	±100	3000	±1000	84
AM1LS-0509DH30LPZ	5 (4.5-5.5)	±9	238	±56	3000	±470	86
AM1LS-0512DH30LPZ	5 (4.5-5.5)	±12	238	±42	3000	±220	89
AM1LS-0515DH30LPZ	5 (4.5-5.5)	±15	238	±34	3000	±220	88
AM1LS-0524DH30LPZ	5 (4.5-5.5)	±24	238	±21	3000	±220	88
AM1LS-1203DH30LPZ	12 (10.8-13.2)	±3.3	97	±152	3000	±1000	83
AM1LS-1205DH30LPZ	12 (10.8-13.2)	±5	97	±100	3000	±1000	86
AM1LS-1207DH30LPZ	12 (10.8-13.2)	±7.5	97	±67	3000	±470	89
AM1LS-1209DH30LPZ	12 (10.8-13.2)	±9	97	±56	3000	±470	89
AM1LS-1212DH30LPZ	12 (10.8-13.2)	±12	97	±42	3000	±220	89
AM1LS-1215DH30LPZ	12 (10.8-13.2)	±15	97	±34	3000	±220	89
AM1LS-1224DH30LPZ	12 (10.8-13.2)	±24	97	±21	3000	±220	89
AM1LS-1503DH30LPZ	15 (13.5-16.5)	±3.3	78	±152	3000	±1000	82
AM1LS-1505DH30LPZ	15 (13.5-16.5)	±5	78	±100	3000	±1000	85
AM1LS-1509DH30LPZ	15 (13.5-16.5)	±9	78	±56	3000	±470	88
AM1LS-1512DH30LPZ	15 (13.5-16.5)	±12	78	±42	3000	±220	89
AM1LS-1515DH30LPZ	15 (13.5-16.5)	±15	78	±34	3000	±220	89
AM1LS-1524DH30LPZ	15 (13.5-16.5)	±24	78	±21	3000	±220	89
AM1LS-2403DH30LPZ	24 (21.6-26.4)	±3.3	48	±152	3000	±1000	84
AM1LS-2405DH30LPZ	24 (21.6-26.4)	±5	48	±100	3000	±1000	87
AM1LS-2409DH30LPZ	24 (21.6-26.4)	±9	48	±56	3000	±470	89
AM1LS-2412DH30LPZ	24 (21.6-26.4)	±12	48	±42	3000	±220	88
AM1LS-2415DH30LPZ	24 (21.6-26.4)	±15	48	±34	3000	±220	89
AM1LS-2424DH30LPZ	24 (21.6-26.4)	±24	48	±21	3000	±100	89

Note: Use suffix "TR" for tape & reel packing (ex. AM1LS-0303DLPZTR)

Input Specification

Parameters	Conditions	Typical	Maximum	Units
Input current	No load	3~18		mA
Filter	Capacitor			
Absolute maximum rating	Maximum duration 1s, 3.3Vin models	> -0.7	5	VDC
	Maximum duration 1s, 5Vin models	> -0.7	9	VDC
	Maximum duration 1s, 12Vin models	> -0.7	18	VDC
	Maximum duration 1s, 15Vin models	> -0.7	21	VDC
	Maximum duration 1s, 24Vin models	> -0.7	30	VDC
Input reflected ripple current		15		mA

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

Output Specification				
Parameters	Conditions	Typical	Maximum	Units
Voltage accuracy	See output voltage tolerance curves	See the tolerance Curve		
Line regulation	Per 1% Vin change, 3.3Vout models		1.5	%
	Per 1% Vin change, others		1.2	%
Load regulation	10-100% load, 3.3/5Vout models	10		%
	10-100% load, 9/12/15Vout models	8		%
	10-100% load, 24Vout models	6		%
Temperature coefficient	Full load	\pm 0.02		%/ $^{\circ}$ C
Ripple & Noise	20MHz bandwidth	45	120	mV pk-pk
Minimum load*		10		%

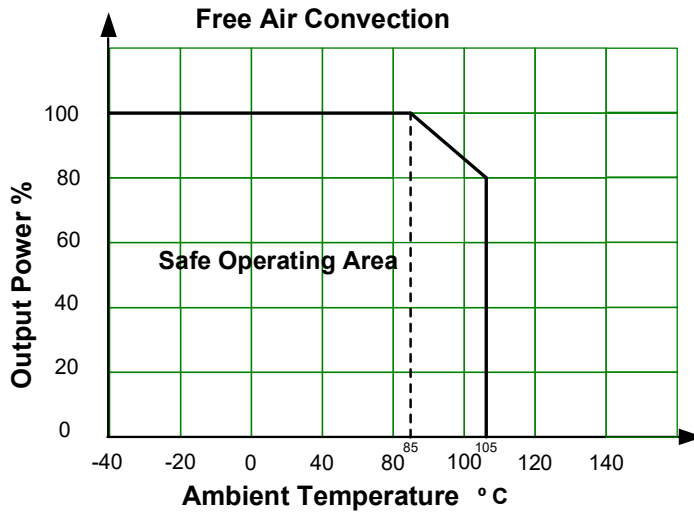
* Operating with less than 10% of rated load will not cause permanent damage to the converters, but the performance data may not fall into the specifications, and reliable operating is not assured. Dual output models need to operate with balanced load. The load difference between two outputs over 10% may cause unstable operating of the converter.

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 at 85 $^{\circ}$ C	-40 to +105		$^{\circ}$ C
Storage temperature		-55 to +125		$^{\circ}$ C
Reflow soldering temperature	Maximum duration 60s when over 217 $^{\circ}$ C		245	$^{\circ}$ C
Soldering method	IPC/JEDEC J-STD-020D.1			
Cooling	Free air convection			
Humidity	Non-condensing	>5	95	% RH
Moisture sensitivity level	Level 1			
Vibration	10-150Hz, 5G, 0.75mm. along X, Y and Z			
Case material	Black plastic (flammability to UL 94V-0)			
Weight		1.2		g
Dimensions (L x W x H)	Single output models	0.53 x 0.43 x 0.29 inches (13.50 x 11.00 x 7.25 mm)		
	Dual output models	0.60 x 0.45 x 0.29 inches (15.24 x 11.40 x 7.25 mm)		
MTBF	3 500 000 hrs (MIL-HDBK -217F, t $_{+25^{\circ}$ C) / Full Load			

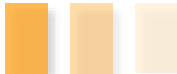
NOTE: All specifications in this datasheet are measured at an ambient temperature of 25 $^{\circ}$ C, humidity<75%, nominal input voltage and at rated output load unless otherwise specified.

Safety Specifications		
Parameters		
Agency approvals	UL62368-1 models marked with * only	
Standards	Information technology Equipment	Design to meet UL/IEC/EN 62368-1
	EMC - Conducted and radiated emission	CISPR32 / EN55032, class B with the recommended EMC circuit
	Electrostatic Discharge Immunity	IEC/EN 61000-4-2, contact \pm 6kV, Criteria B

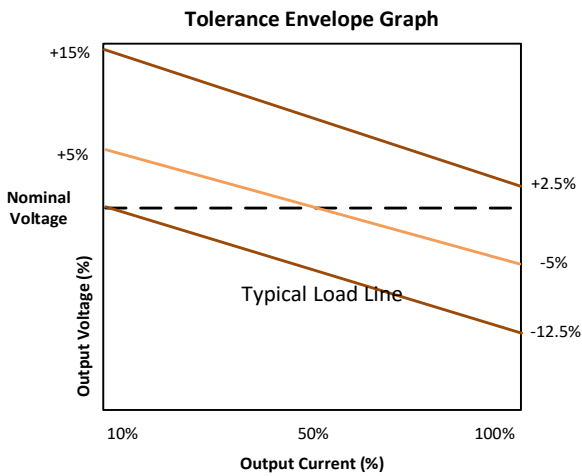
Derating



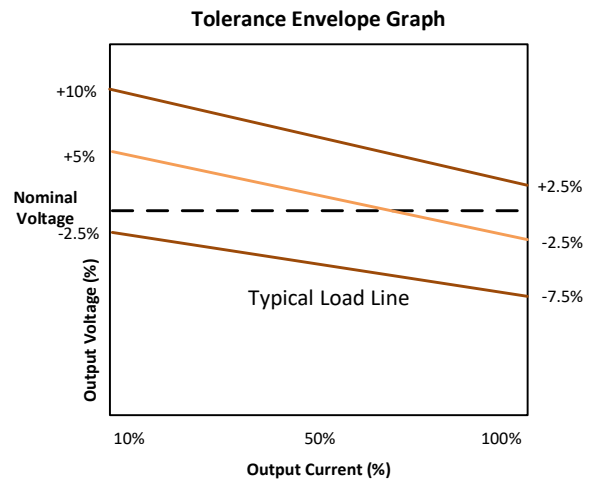
Output voltage tolerance



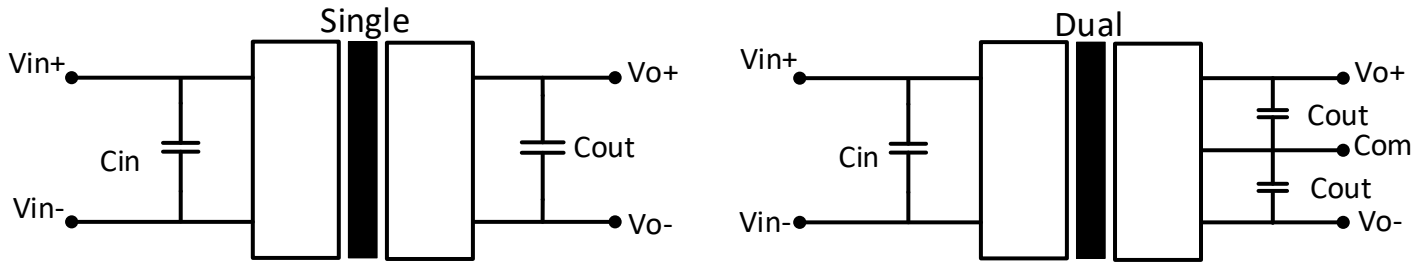
For 3.3V output models



For other output models

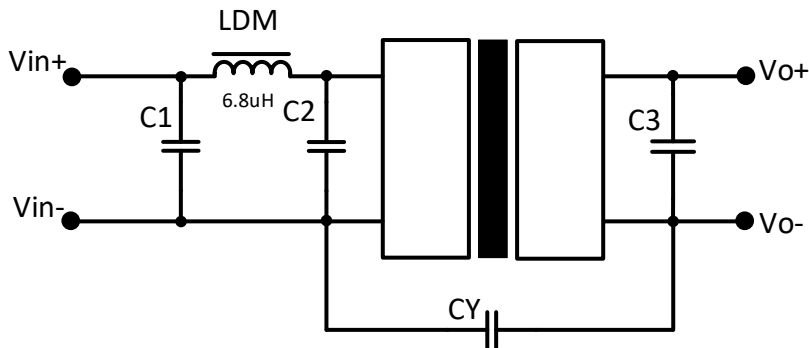


Typical application circuit



Single output models				Dual output models			
Vin	Cin	Vout	Cout	Vin	Cin	Vout	Cout
3.3	4.7μF/16V	3.3V	10μF/16V	3.3	4.7μF/16V	±3.3V	10μF/16V
5	4.7μF/16V	5V	10μF/16V	5	4.7μF/16V	±5V	10μF/16V
12	2.2μF/25V	9V	4.7μF/25V	12	2.2μF/25V	±9V	4.7μF/25V
15	1μF/25V	12V	4.7μF/25V	15	1μF/25V	±12V	4.7μF/25V
24	1μF/50V	15V	1μF/25V	24	1μF/50V	±15V	1μF/25V
-	-	24V	0.47μF/50V	-	-	±24V	0.47μF/50V

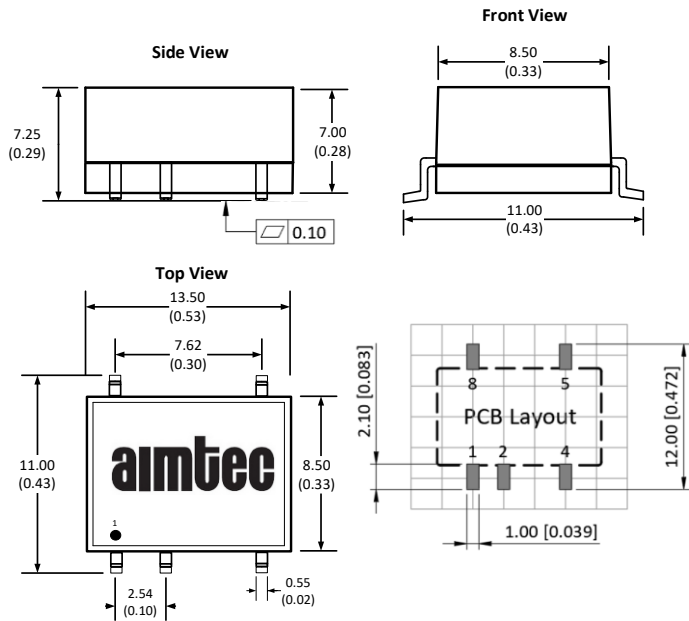
Recommended EMC circuit



Models	C1/C2	CY	C3
1500VDC	4.7μF/50V	1000pF/2kVdc	Refer to Cout in typical circuit
3000VDC	4.7μF/50V	1000pF/4kVdc	Refer to Cout in typical circuit

Dimensions

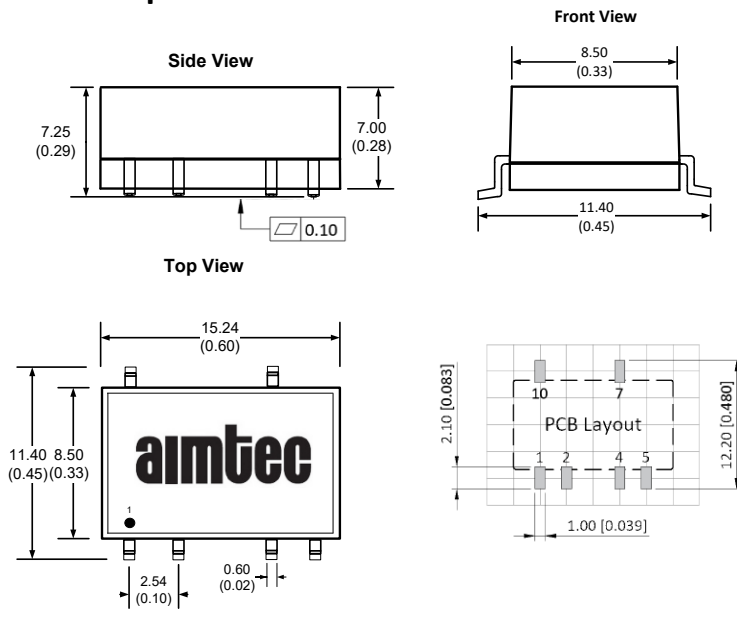
Single output models



Note:
Unit: mm(inch)
General tolerance: ± 0.25 (0.01)
Pin tolerance: ± 0.1 (0.004)
Footprint grid 2.54 x 2.54 mm

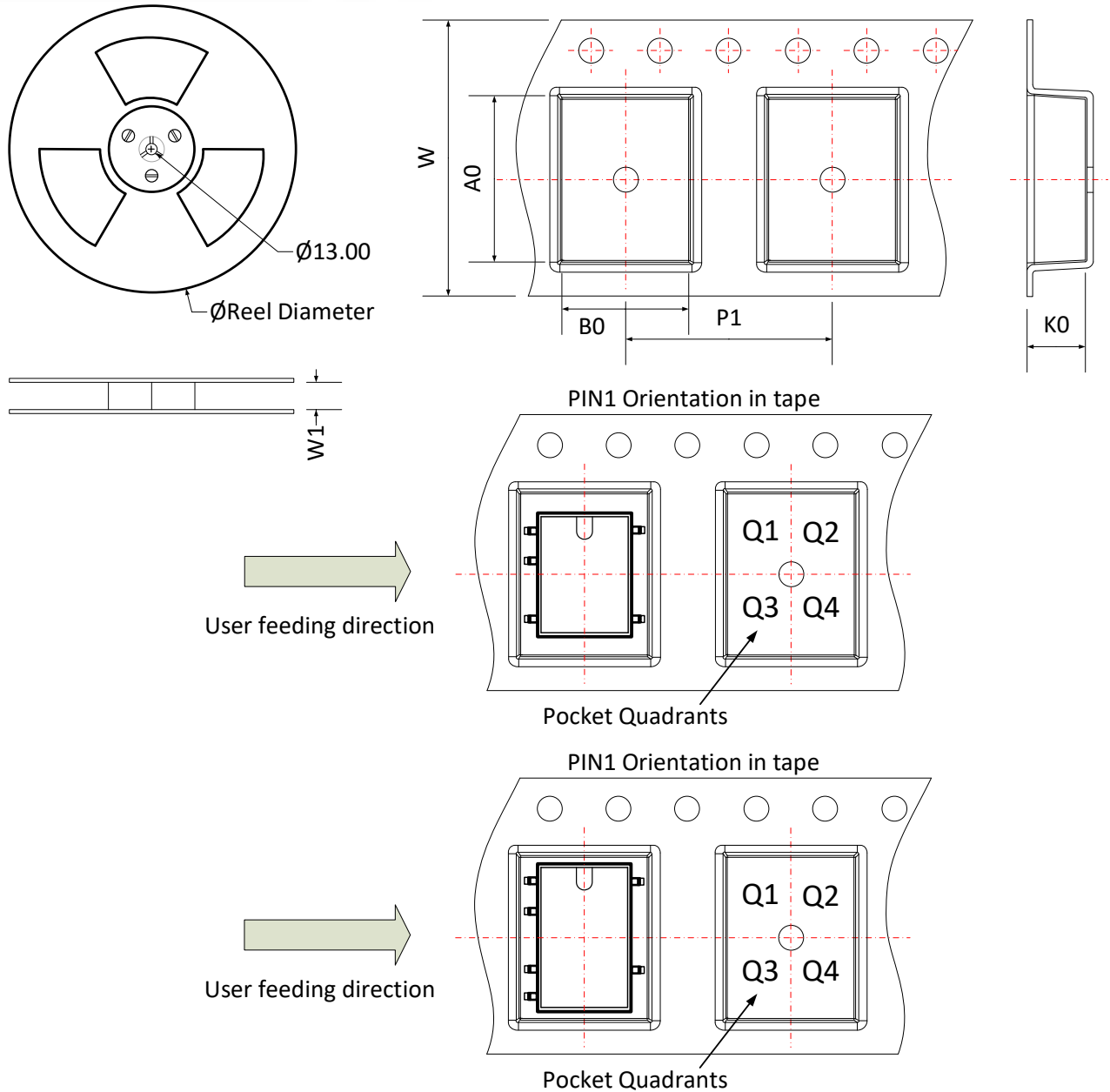
Pin Out Specifications		
Pin	Single	Dual
1	-V Input	-V Input
2	+V Input	+V Input
4	-V Output	Common
5	+V Output	-V Output
7	-	+V Output
8	NC	-
10	-	NC

Dual output models



Note:
Unit: mm(inch)
General tolerance: ± 0.25 (0.01)
Pin tolerance: ± 0.1 (0.004)
Footprint grid 2.54 x 2.54 mm

Packing Information



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0	B0	K0	P1	W	P1 Quadrant
AM1LS-LPZ Single output	SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1
AM1LS-LPZ Dual output	SMD	6	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1

NOTE: 1. Datasheets are updated as needed and as such, specifications are subject to change without notice. Once printed or downloaded, datasheets are no longer controlled by Aimtec; refer to www.aimtec.com for the most current product specifications. **2.** Product labels shown, including safety agency certifications on labels, may vary based on the date manufactured. **3.** Mechanical drawings and specifications are for reference only. **4.** All specifications are measured at an ambient temperature of 25°C, humidity < 75%, nominal input voltage and at rated output load unless otherwise specified. **5.** Aimtec may not have conducted destructive testing or chemical analysis on all internal components and chemicals at the time of publishing this document. CAS numbers and other limited information are considered proprietary and may not be available for release. **6.** This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems or other such applications which necessitate specific safety and regulatory standards other than the ones listed in this datasheet. **7.** Warranty is in accordance with Aimtec's standard Terms of Sale available at www.aimtec.com.