

1S7AE_1U series

1W - Single/Dual Output DC-DC Converter - Fixed Input - Isolated & Unregulated

DC-DC Converter

1 Watt

- ⊕ High efficiency up to 86%
- ⊕ 1000VDC isolation
- ⊕ SIP package
- ⊕ Low ripple and noise
- ⊕ Operating temperature: -40°C to +85°C
- ⊕ International standard pinout
- ⊕ EMI complies with EN55032 Class B

Introducing our latest 1S7AE_1U series with high efficiency up to 86% and 1000VDC isolation in a compact SIP package. This unit boasts low ripple and noise, ensuring stable performance. It operates within a temperature range of -40°C to +85°C and features an international standard pinout. Additionally, it complies with EN55032 Class B EMI standards, making it an ideal choice for various applications.



Common specifications	
Short circuit protection:	1 sec. MAX
Cooling:	Nature convection
Operation temperature range:	-40°C – +85°C
Storage temperature range:	-40°C – +125°C
Case temperature:	100°C MAX
Lead temperature:	260°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
MTBF (MIL-HDBK-217F@25°C):	>1,121 Mhours
Safety standards/approvals:	Meets 60950-1, IEC/EN 60950-1
Case material:	Plastic [UL94-V0]
Weight:	2.3g
Dimensions:	19.3x6.1x9.9mm

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input voltage range				±10	%	
Input surge voltage (1sec. max.)	<ul style="list-style-type: none"> • 3.3V input • 5VDC input • 12VDC input • 15VDC input • 24VDC input • 48VDC input 			6	7	15
				18	28	54
Reflected Ripple Current*			20		mApk-pk	
Input filter	Capacitor					

* Reflected ripple current measured with a simulated source inductance of 12μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100KHz).

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Tested for 1 minute	1000			VDC	
Isolation resistance	Test at 500VDC	1000			MΩ	
Isolation capacitance			60		pF	

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy				±3	%	
Line regulation	For Vin change of ±1%			±1.2	%	
Load regulation	20% to 100% load			20	%	
	• 3.3V output			10	%	
	• Others					
Temperature coefficient	100% full load		±0.02		%/°C	
Ripple & Noise	20MHz Bandwidth			75	mVp-p	
Switching frequency	Full load, nominal input		80		KHz	

EMC specifications				
EMI	CE*	EN55032	CLASS B	
EMI	RE	EN55032	CLASS B	
EMS	ESD	IEC/EN61000-4-2	perf. Criteria A	
EMS	RS	IEC/EN61000-4-3	perf. Criteria A	
EMS	EFT**	IEC/EN61000-4-4	perf. Criteria A	
EMS	Surge**	IEC/EN61000-4-5	perf. Criteria A	
EMS	CS	IEC/EN61000-4-6	perf. Criteria A	
EMS	PfMF	IEC/EN61000-4-8	perf. Criteria A	

* Input filter components are required to help meet conducted emissions Class B, also see section EMI filter on page 5.

** An external filter capacitor is required if the module has to meet IEC61000-4-4/IEC61000-4-5.

Example:

1S7AE_0505D1U

1 = 1Watt; S7 = SIP7; A = Pinning; E = Cost effective; 5Vin; 5Vout; D = Dual Output; 1 = 1kVDC; U = Unregulated Output

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Single Output

Part Number	Input Voltage [V]	Output Voltage [VDC]	Input current		Output current [mA]	Capacitive load [μ F, max]	Efficiency [%, typ]
			No load [mA, max]	Full load [mA, typ]			
1S7AE_0303S1U	3.3	3.3	28	399	303	220	76
1S7AE_0305S1U	3.3	5	22	389	200	220	78
1S7AE_0309S1U	3.3	9	35	379	111	220	80
1S7AE_0312S1U	3.3	12	30	394	83	220	77
1S7AE_0315S1U	3.3	15	30	389	67	220	78
1S7AE_0318S1U	3.3	18	30	415	56	220	73
1S7AE_0324S1U	3.3	24	30	415	42	220	73
1S7AE_0503S1U	5	3.3	15	256	303	220	78
1S7AE_0505S1U	5	5	17	247	200	220	81
1S7AE_0507S1U	5	7.2	16	247	139	220	81
1S7AE_0509S1U	5	9	15	244	111	220	82
1S7AE_0512S1U	5	12	17	253	83	220	79
1S7AE_0515S1U	5	15	17	233	67	220	86
1S7AE_0518S1U	5	18	17	241	56	220	86
1S7AE_0524S1U	5	24	20	244	42	220	82
1S7AE_1203S1U	12	3.3	12	111	303	220	75
1S7AE_1205S1U	12	5	14	105	200	220	79
1S7AE_1207S1U	12	7.2	14	111	139	220	75
1S7AE_1209S1U	12	9	9	104	111	220	80
1S7AE_1212S1U	12	12	13	105	83	220	79
1S7AE_1215S1U	12	15	10	102	67	220	82
1S7AE_1218S1U	12	18	11	103	56	220	81
1S7AE_1224S1U	12	24	20	110	42	220	76
1S7AE_1503S1U	15	3.3	10	83	303	220	80
1S7AE_1505S1U	15	5	7	82	200	220	81
1S7AE_1505S1U	15	7.2	10	85	139	220	78
1S7AE_1509S1U	15	9	10	85	111	220	78
1S7AE_1512S1U	15	12	8	83	83	220	80
1S7AE_1515S1U	15	15	12	84	67	220	79
1S7AE_1518S1U	15	18	10	83	56	220	80
1S7AE_1524S1U	15	24	5	80	42	220	83
1S7AE_2403S1U	24	3.3	8	56	303	220	74
1S7AE_2405S1U	24	5	6	54	200	220	77
1S7AE_2407S1U	24	7.2	6	57	139	220	73
1S7AE_2409S1U	24	9	6	55	111	220	76
1S7AE_2412S1U	24	12	6	53	83	220	78
1S7AE_2415S1U	24	15	5	52	67	220	80
1S7AE_2418S1U	24	18	5	51	56	220	82
1S7AE_2424S1U	24	24	8	52	42	220	80
1S7AE_4803S1U	48	3.3	5	29	303	220	73
1S7AE_4805S1U	48	5	5	29	200	220	73
1S7AE_4807S1U	48	7.2	5	28	139	220	75
1S7AE_4809S1U	48	9	5	27	111	220	76
1S7AE_4812S1U	48	12	5	27	83	220	76
1S7AE_4815S1U	48	15	5	27	67	220	77
1S7AE_4818S1U	48	18	5	28	56	220	75
1S7AE_4824S1U	48	24	6	27	42	220	76

1S7AE_1U series

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Dual Output

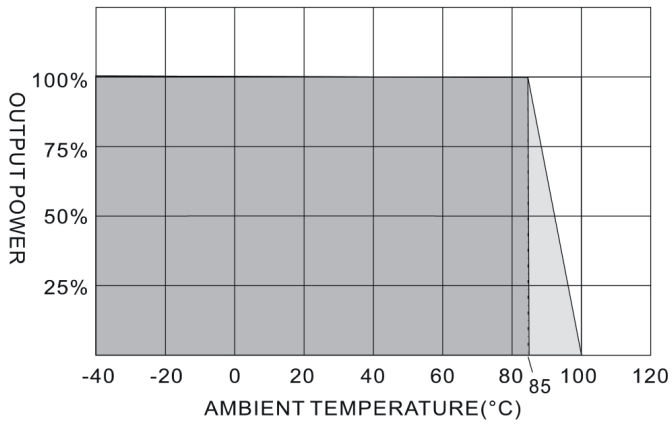
Part Number	Input Voltage [V]	Output Voltage [VDC]	Input current		Output current [mA]	Capacitive load [μ F, max]	Efficiency [%, typ]
			No load [mA, max]	Full load [mA, typ]			
1S7AE_0303D1U	3.3	\pm 3.3	30	459	\pm 152	\pm 100	66
1S7AE_0305D1U	3.3	\pm 5	30	433	\pm 100	\pm 100	70
1S7AE_0307D1U	3.3	\pm 7.2	26	421	\pm 69	\pm 100	72
1S7AE_0309D1U	3.3	\pm 9	26	404	\pm 56	\pm 100	75
1S7AE_0312D1U	3.3	\pm 12	30	394	\pm 42	\pm 100	77
1S7AE_0315D1U	3.3	\pm 15	25	389	\pm 33	\pm 100	78
1S7AE_0318D1U	3.3	\pm 18	25	404	\pm 28	\pm 100	75
1S7AE_0324D1U	3.3	\pm 24	25	404	\pm 21	\pm 100	75
1S7AE_0503D1U	5	\pm 3.3	20	299	\pm 152	\pm 100	67
1S7AE_0505D1U	5	\pm 5	20	270	\pm 100	\pm 100	74
1S7AE_0507D1U	5	\pm 7.2	15	253	\pm 69	\pm 100	79
1S7AE_0509D1U	5	\pm 9	15	247	\pm 56	\pm 100	81
1S7AE_0512D1U	5	\pm 12	20	250	\pm 42	\pm 100	80
1S7AE_0515D1U	5	\pm 15	20	244	\pm 33	\pm 100	82
1S7AE_0518D1U	5	\pm 18	22	247	\pm 28	\pm 100	81
1S7AE_0524D1U	5	\pm 24	22	247	\pm 21	\pm 100	81
1S7AE_1203D1U	12	\pm 3.3	13	123	\pm 152	\pm 100	68
1S7AE_1205D1U	12	\pm 5	10	123	\pm 100	\pm 100	74
1S7AE_1207D1U	12	\pm 7.2	10	110	\pm 69	\pm 100	76
1S7AE_1209D1U	12	\pm 9	13	110	\pm 56	\pm 100	78
1S7AE_1212D1U	12	\pm 12	10	102	\pm 42	\pm 100	82
1S7AE_1215D1U	12	\pm 15	10	102	\pm 33	\pm 100	82
1S7AE_1218D1U	12	\pm 18	10	102	\pm 28	\pm 100	82
1S7AE_1224D1U	12	\pm 24	20	111	\pm 21	\pm 100	75
1S7AE_1503D1U	15	\pm 3.3	20	89	\pm 152	\pm 100	75
1S7AE_1505D1U	15	\pm 5	20	89	\pm 100	\pm 100	75
1S7AE_1507D1U	15	\pm 7.2	18	89	\pm 69	\pm 100	75
1S7AE_1509D1U	15	\pm 9	18	87	\pm 56	\pm 100	77
1S7AE_1512D1U	15	\pm 12	20	87	\pm 42	\pm 100	77
1S7AE_1515D1U	15	\pm 15	20	87	\pm 33	\pm 100	77
1S7AE_1518D1U	15	\pm 18	15	89	\pm 28	\pm 100	75
1S7AE_1524D1U	15	\pm 24	15	89	\pm 21	\pm 100	75
1S7AE_2403D1U	24	\pm 3.3	7	62	\pm 152	\pm 100	67
1S7AE_2405D1U	24	\pm 5	6	56	\pm 100	\pm 100	74
1S7AE_2407D1U	24	\pm 7.2	7	56	\pm 69	\pm 100	78
1S7AE_2409D1U	24	\pm 9	7	56	\pm 56	\pm 100	78
1S7AE_2412D1U	24	\pm 12	6	52	\pm 42	\pm 100	80
1S7AE_2415D1U	24	\pm 15	8	52	\pm 33	\pm 100	80
1S7AE_2418D1U	24	\pm 18	6	51	\pm 28	\pm 100	81
1S7AE_2424D1U	24	\pm 24	8	51	\pm 21	\pm 100	82
1S7AE_4803D1U	48	\pm 3.3	6	34	\pm 152	\pm 100	62
1S7AE_4805D1U	48	\pm 5	5	31	\pm 100	\pm 100	68
1S7AE_4807D1U	48	\pm 7.2	5	29	\pm 69	\pm 100	72
1S7AE_4809D1U	48	\pm 9	5	29	\pm 56	\pm 100	73
1S7AE_4812D1U	48	\pm 12	6	28	\pm 42	\pm 100	74
1S7AE_4815D1U	48	\pm 15	5	27	\pm 33	\pm 100	77
1S7AE_4818D1U	48	\pm 18	5	28	\pm 28	\pm 100	75
1S7AE_4824D1U	48	\pm 24	6	28	\pm 21	\pm 100	74

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Typical characteristics

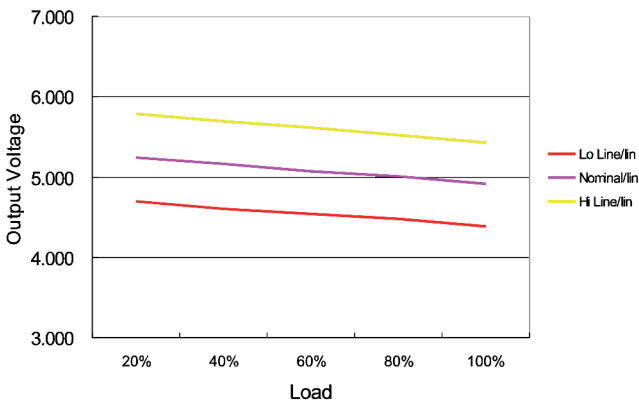
Derating Curve



Input voltage	Slow burning fuses
3.3 V _{in}	800mA
5 V _{in}	500mA
12, 15, 24, 48 V _{in}	300mA

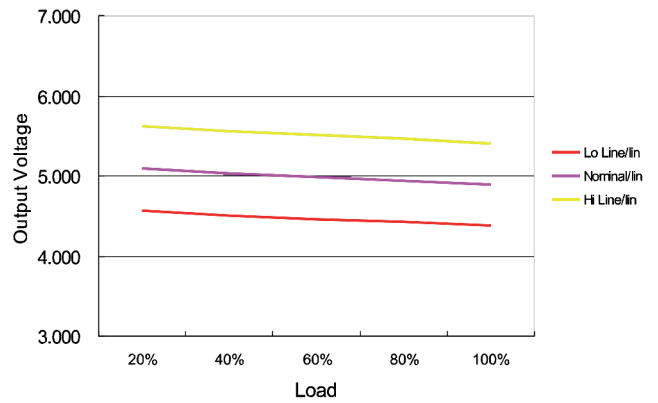
Loading vs. output

LOADING VS OUTPUT VOLTAGE



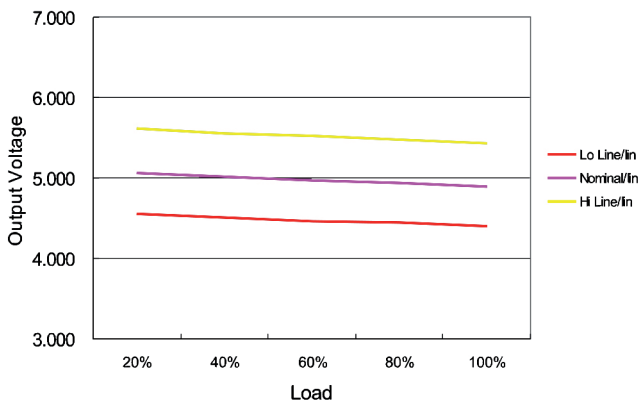
1S7AE_05yy type

LOADING VS OUTPUT VOLTAGE



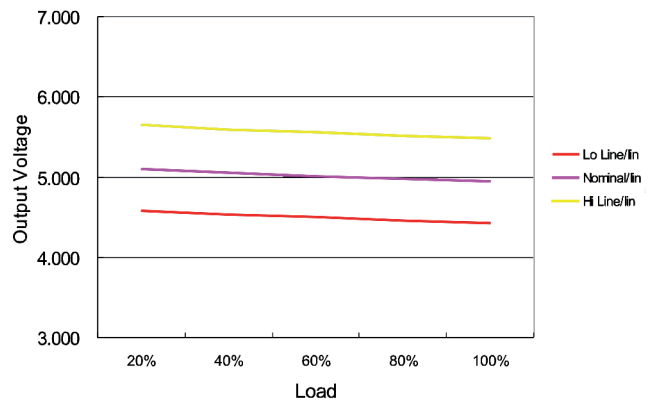
1S7AE_12yy type

LOADING VS OUTPUT VOLTAGE



1S7AE_24yy type

LOADING VS OUTPUT VOLTAGE

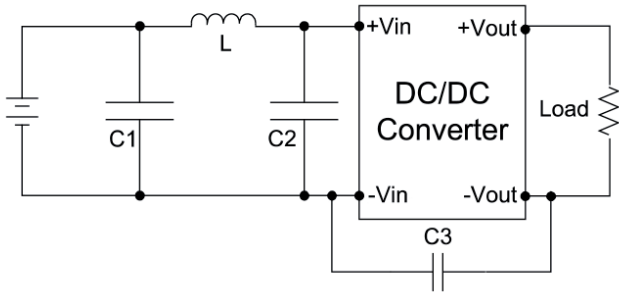


1S7AE_48yy type

1S7AE_1U series

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EMI filter

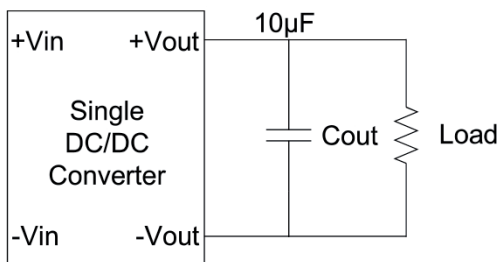


Model	C1	L	C2	C3
1S7AE_03xx1U	1210, 2.2μF/100V	18μH		
1S7AE_05xx1U	1210, 2.2μF/100V	18μH		
1S7AE_12xx1U	1210, 2.2μF/100V	18μH		
1S7AE_15xx1U	1210, 2.2μF/100V	18μH		
1S7AE_24xx1U	1210, 2.2μF/100V	18μH	1210, 2.2μF/100V	1206, 470pF/2KV
1S7AE_48xx1U	Electrolytic capacitor, 10μF/100V	18μH	1210, 2.2μF/100V	1206, 470pF/2KV

Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

Output ripple & noise reduction

To reduce ripple and noise, it is recommended to use a 10μF electrolytic capacitor at the output.

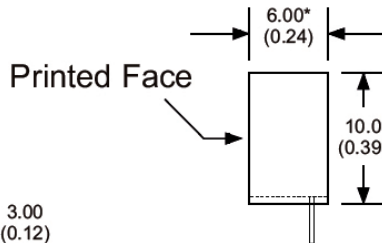
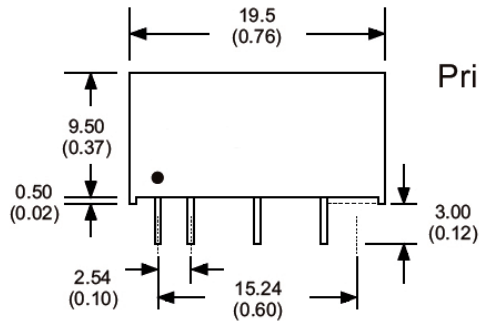


1S7AE_1U series

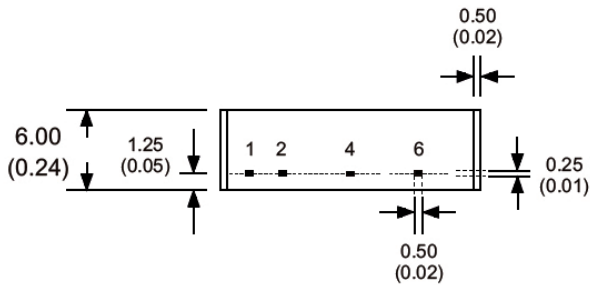
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Mechanical dimensions

Single

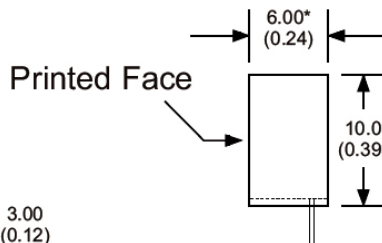
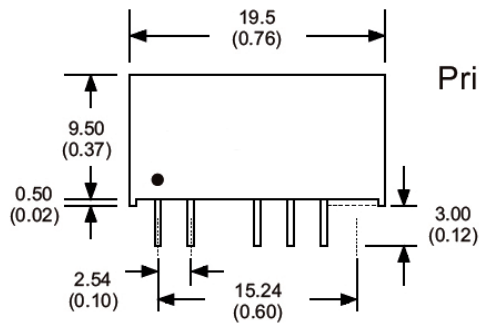


* The thickness of 48V input voltage model is 7.20(0.28)

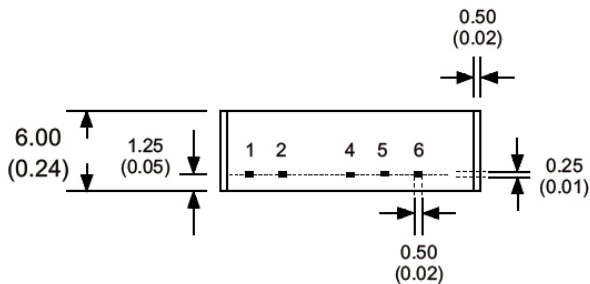


Pin connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	N.P.	Common
6	+Vout	+Vout

Dual



* The thickness of 48V input voltage model is 7.20(0.28)



All dimensions are typical in mm (inch)
 Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 Pin pitch and length tolerance: ± 0.35 (± 0.014)
 Case tolerance: ± 0.5 (± 0.02)