



157AE_1RP series

1W Single Output DC-DC Converter - Fixed Input - Isolated & Regulated SIP Package

DC-DC Converter

1 Watt

- ⊕ Continuous short-circuit protection
- ⊕ No-load input current as low as 8mA
- ⊕ Operating ambient temp. range: -40°C to +85°C
- ⊕ High efficiency up to 75%
- ⊕ I/O isolation test voltage 1.5kVDC
- ⊕ Industry standard pin-out SIP package
- ⊕ IEC62368, UL62368, EN62368 approved

The 157AE_1RP series is especially designed for distributed power supply systems where an isolated voltage is required. They are suitable for occasions of: pre-interference isolation, ground interference elimination, pure digital circuit, voltage isolation conversion, general low frequency analog circuit, relay drive circuit, etc.



Common specifications	
Short circuit protection:	Continuous, self-recovery
Operation temperature range:	-40°C – +85°C (Derating when operating temperature ≥ 71°C, see Fig.1)
Storage temperature range:	-55°C – +125°C
Temperature rise at full load: (Ta=25°C)	5VDC input • 3.3VDC output: 30°C TYP • Others: 25°C TYP
Lead temperature	300°C (1.5mm from case for 10 sec.)
Storage Humidity: (Non-condensing)	• 5VDC input 95% RH • Other 5% ~ 95% RH
MTBF (MIL-HDBK-217F@25°C):	3,500,000 hours
Vibration:	10-150Hz, 5G, 30 Min. along X, Y and Z
Case material:	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g (Typ.)
Cooling:	Free air convection

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (no-load/full load)	5VDC input				
	• 3.3/5VDC output		286/5	303/10	mA
	• 9/12VDC output		282/12	299/20	mA
	• 15/24VDC output		274/18	290/30	mA
	12VDC input				
	• 5/9/12VDC output		115/8	121/-	mA
	• 15VDC output		112/8	118/-	mA
	15VDC input				
	• 5VDC output		92/8	97/-	mA
	• 15VDC output		89/8	94/-	mA
	24VDC input				
	• 3.3VDC output		59/8	65/-	mA
• 5/9/12/15VDC output		58/8	63/-	mA	
Reflected ripple current*			15		mA
Input filter	Capacitance filter				
Hot plug	Unavailable				

*Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

EMC specifications			
Emissions	CE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)	
Emissions	RE	CISPR32/EN55032 CLASS B (see EMC recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B	

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Voltage Accuracy				±3	%
Line regulation	Vin change: ±1%			±0.25	%
Load regulation	10% to 100% full load • 3.3VDC output • Others			±3	%
				±2	%
Temperature drift	100% load		±0.02		%/°C
Ripple & Noise* (20MHz Bandwidth)	5VDC input				
	• Others		30	75	mVp-p
	• 24V output		50	100	mVp-p
	12/15/9VDC input				
Switching frequency	100% load, nominal input voltage • 5VDC input • Others			270	kHz
				260	kHz

Note: * The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output electric strength test for 1 minute with a leakage current of 1mA max.	1500			VDC
Isolation resistance	Input-output resistance at 500VDC	1000			MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		20		pF

Example:

157AE_0505S1RP

1 = 1Watt; S7 = SIP7; AE = Pinning; 05 = 5Vin; 05 = 5Vout; S = Single Output; 1 = 1kVDC; R = Regulated Output; P = Short Circuit Protection

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.

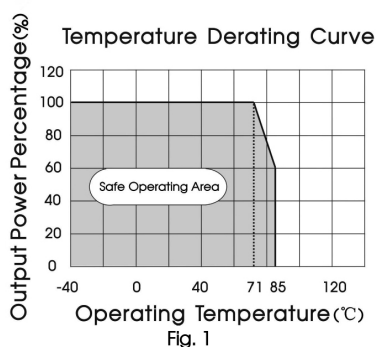
1S7AE_1RP series

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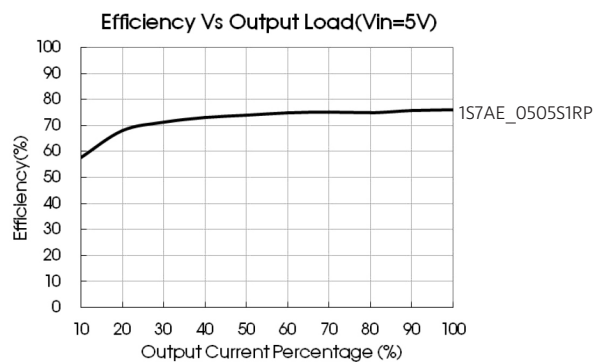
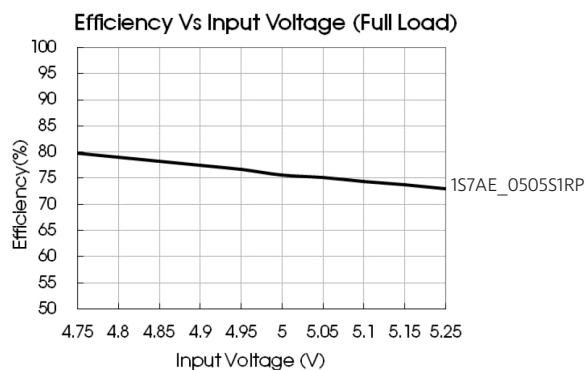
Product Selection Guide

Certification	Part Number	Input Voltage [VDC, Nominal (Range)]	Output Voltage [VDC]	Output Current [mA, Max./Min.]	Full Load Efficiency [%, Min./Typ.]	Capacitive Load [μ F, Max.]
	1S7AE_0305S1RP	5 (4.75-5.25)	3.3	250/25	63/67	2400
UL	1S7AE_0505S1RP	5 (4.75-5.25)	5	200/20	66/70	2400
UL	1S7AE_0509S1RP	5 (4.75-5.25)	9	111/12	67/71	1000
UL	1S7AE_0512S1RP	5 (4.75-5.25)	12	84/9	68/72	560
UL	1S7AE_0515S1RP	5 (4.75-5.25)	15	67/7	69/73	560
	1S7AE_0524S1RP	5 (4.75-5.25)	24	41/4	69/73	100
UL	1S7AE_1205S1RP	12 (11.4-12.6)	5	200/20	69/73	2400
	1S7AE_1209S1RP	12 (11.4-12.6)	9	111/12	69/73	1000
UL	1S7AE_1212S1RP	12 (11.4-12.6)	12	83/9	69/73	560
UL	1S7AE_1215S1RP	12 (11.4-12.6)	15	67/7	71/75	560
	1S7AE_1505S1RP	15 (14.25-15.75)	5	200/20	69/73	2400
	1S7AE_1515S1RP	15 (14.25-15.75)	15	67/7	71/75	560
	1S7AE_2403S1RP	24 (22.8-25.2)	3.3	250/25	65/71	2400
	1S7AE_2405S1RP	24 (22.8-25.2)	5	200/20	67/73	2400
	1S7AE_2409S1RP	24 (22.8-25.2)	9	111/12	67/73	1000
	1S7AE_2412S1RP	24 (22.8-25.2)	12	83/9	67/73	560
	1S7AE_2415S1RP	24 (22.8-25.2)	15	67/7	67/73	560

Typical characteristics



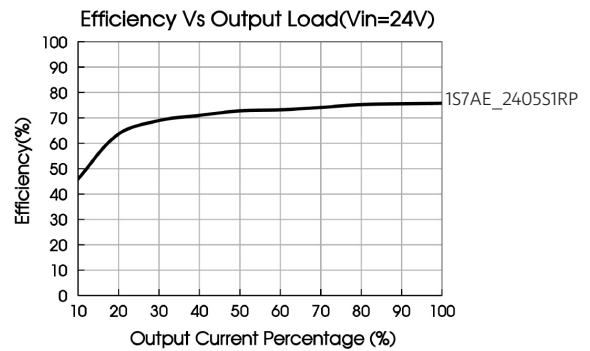
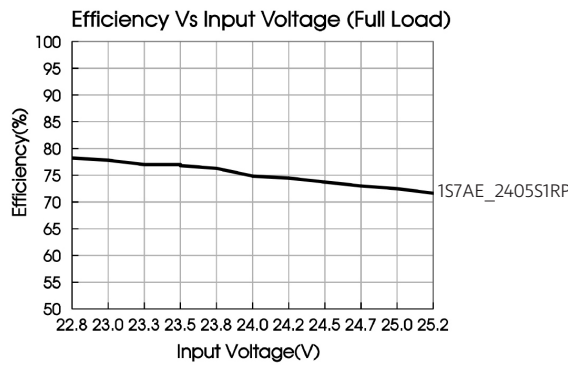
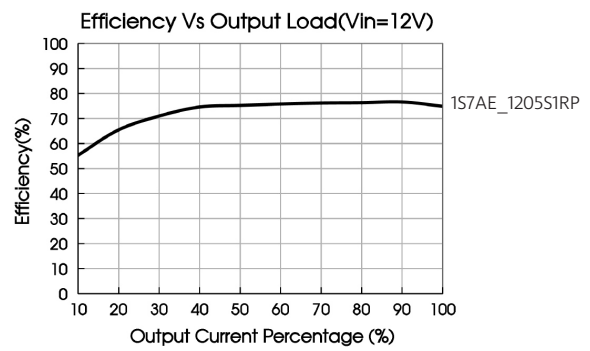
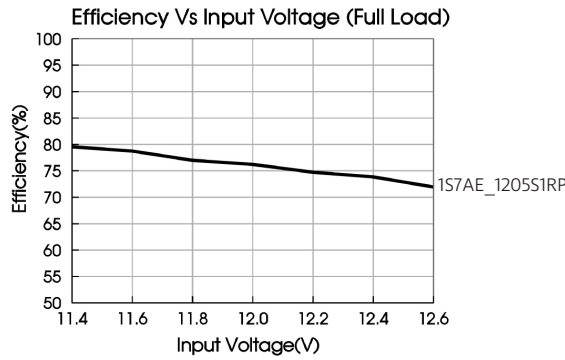
Efficiency



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Efficiency



Typical application circuit

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.2. Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

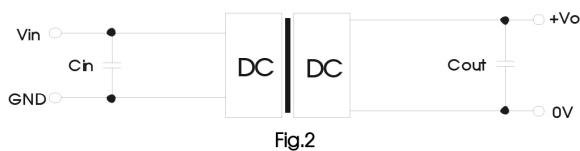


Table: Recommended input and output capacitor values (5VDC)

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
5	4.7	3.3/5	10
		9/12	2.2
		15	1

Table: Recommended input and output capacitor values (Others)

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
12VDC/15VDC	2.2μF/25V	3.3VDC/5VDC	10μF/16V
24VDC	1μF/50V	9VDC	2.2μF/16V
		12VDC	2.2μF/25V
		15VDC	1μF/25V

EMC compliance circuit

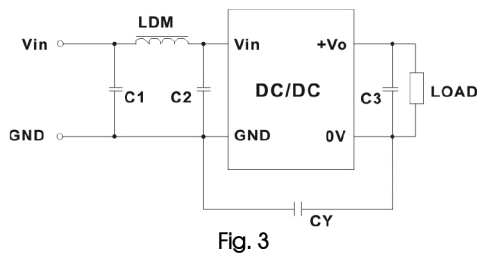


Table: EMC recommended circuit value table (5VDC)

Input voltage 5VDC	Output voltage (VDC)		Emissions
	3.3/5/9	12/15/24	
	C1/C2	4.7μF /25V	4.7μF /50V
	CY		1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
	C3/C4	Refer to the Cout in table 1 6.8μH	
	LDM	6.8μH	6.8μH

Table: EMC recommended circuit value table (others input)

Emissions	Output voltage (VDC)	
	C1/C2	4.7μF /50V
	CY	270pF /3kVDC
	C3/C4	Refer to the Cout in table 1 6.8μH
LDM	6.8VDC	

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Mechanical dimensions

