

2T8A1_3UP series

2W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated
COMPACT SMD PACKAGE

5Vin DC-DC Converter 2 Watt

- ⊕ Continuous short-circuit protection
- ⊕ No-load input current as low as 8mA
- ⊕ Operating ambient temperature range: -40°C to +105°C
- ⊕ High efficiency up to 86%
- ⊕ Compact SMD package
- ⊕ I/O isolation test voltage 3kVDC
- ⊕ Industry standard pin-out

The 2T8A1_3UP series are designed for use in distributed power supply systems and especially suitable in applications such as pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.



Common specifications	
Short circuit protection:	Continuous, self-recovery
Operation temperature:	-40 ~ +105°C (Derating when operating temperature ≥ 85°C, (see Fig. 2)
Storage temperature:	-55°C ~ +125°C
Case Temperature Rise	25°C TYP (Ta = 25°C)
Storage humidity:	5~95%RH (Non-condensing)
Reflow soldering temperature:*	Peak temp. ≤ 245°C, maximum duration time ≤ 60s over 217°C
Vibration:	10-150Hz, 5G, 0.75mm. along X, Y and Z
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Moisture Sensitivity Level(MSL):	Level 1; IPC/JEDEC J-STD-020D.1
Case Material:	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions:	13.20 x 11.40 x 7.25 mm
Weight:	1.4g TYP.
Cooling:	Free air convection

* Note: * See also IPC/JEDEC J-STD-020D.1.

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	5VDC input				
	• 3.3VDC output		339/8	357/-	mA
	• 5VDC/7VDC output		477/8	500/-	mA
	• 9VDC/12VDC output		471/8	494/-	mA
	• 15VDC/24VDC output		466/8	488/-	mA
Reflected ripple current*			15		mA
Surge Voltage (1sec. max.)		0.7		9	VDC
Input Filter	Capacitor Filter				
Hot plug	Unavailable				

Note: * Note: *Reflected ripple current testing method please refer to DC-DC Converter Application Note for specific operation.

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

Note: Refer to Fig.4 for recommended circuit test.

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
Voltage accuracy	See output regulation curve (Fig. 1)				
Line regulation	Input voltage change: ±1%			±1.5	%
	• 3.3VDC output			±1.2	%
Load regulation	Input voltage change: ±1%				
	• 3.3VDC output		10	20	%
	• 5VDC/7VDC output		9	15	%
	• 9VDC output		8	10	%
	• 12VDC/15VDC output		7	10	%
	• 24VDC output		6	10	%
Ripple & Noise*	20MHz Bandwidth		75	200	mVp-p
Switching frequency	Full load, nominal input		220	10	KHz

* 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, test time 1 min., leak current lower than 1mA	3000			VDC
Isolation resistance	Input-output, insulation voltage 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		20		pF

Example:

2T8A1_0505S3UP

2 = 2Watt; T8 = SMT8; A1 = Series; 12 = 12Vin; 05 = 5Vout; S = Single output; 3 = 3kVDC isolation; U = Unregulated output P = Short circuit protection

Note:

- If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
- The maximum capacitive load offered were tested at input voltage range and full load;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity < 75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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Product Selection Guide

Part Number	Input Voltage [V] [Nominal (Range)]	Output Voltage [VDC]	Output current [mA; max/min]	Efficiency @ full load [%; Min. / Typ]	Capacitive Load (μ F)
2T8A1_0503S3UP	5 (4.5-5.5)	3.3	400/40	74/78	2400
2T8A1_0505S3UP	5 (4.5-5.5)	5	400/40	80/84	2400
2T8A1_0507S3UP	5 (4.5-5.5)	7	286/29	80/84	1000
2T8A1_0509S3UP	5 (4.5-5.5)	9	222/22	81/85	1000
2T8A1_0512S3UP	5 (4.5-5.5)	12	167/17	81/85	560
2T8A1_0515S3UP	5 (4.5-5.5)	15	133/13	82/86	560
2T8A1_0524S3UP	5 (4.5-5.5)	24	83/8	82/86	220

Typical characteristics

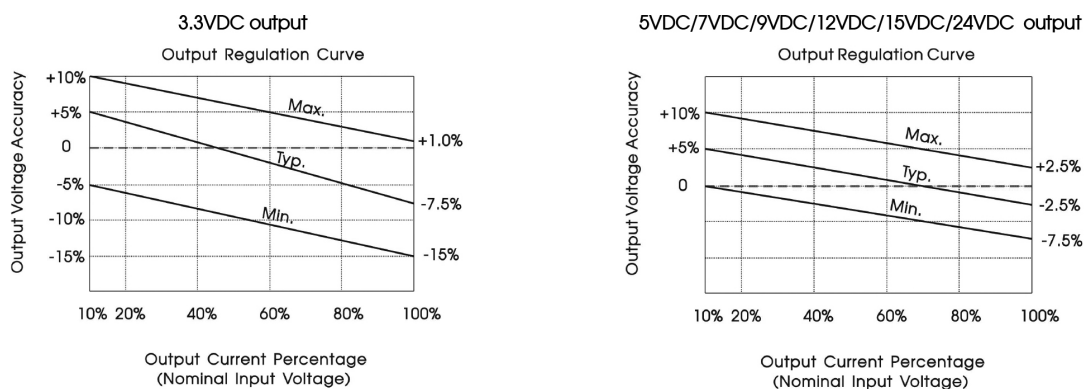
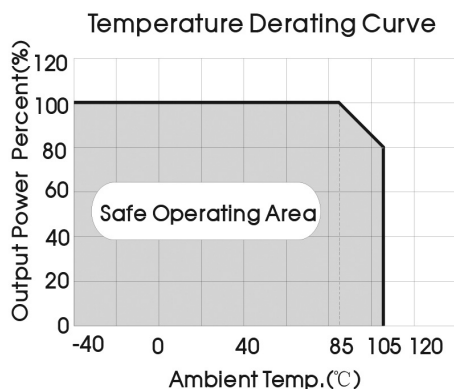
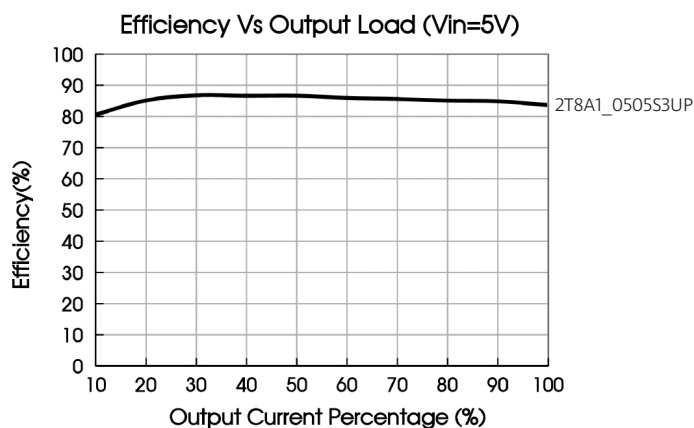
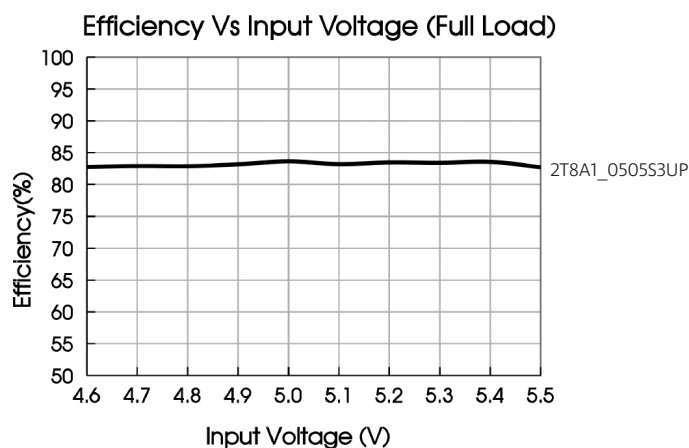


Fig. 1



Efficiency



2T8A1_3UP series

2W - Single Output DC-DC Converter - Fixed Input - Isolated & Unregulated
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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.3.

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.



Fig. 3

Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
12	2.2μF/25V	5	10/10V
15	1μF/25V	6	2.2/25V
24	1μF/50V	9	2.2/25V
		12	2.2/25V
-	-	15	1/25V
-	-	24	0.47/50V

Table 1: Recommended input and output capacitor values

EMC solution-recommended circuit

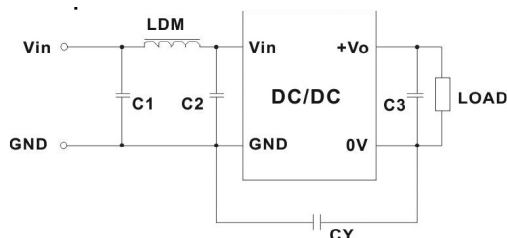
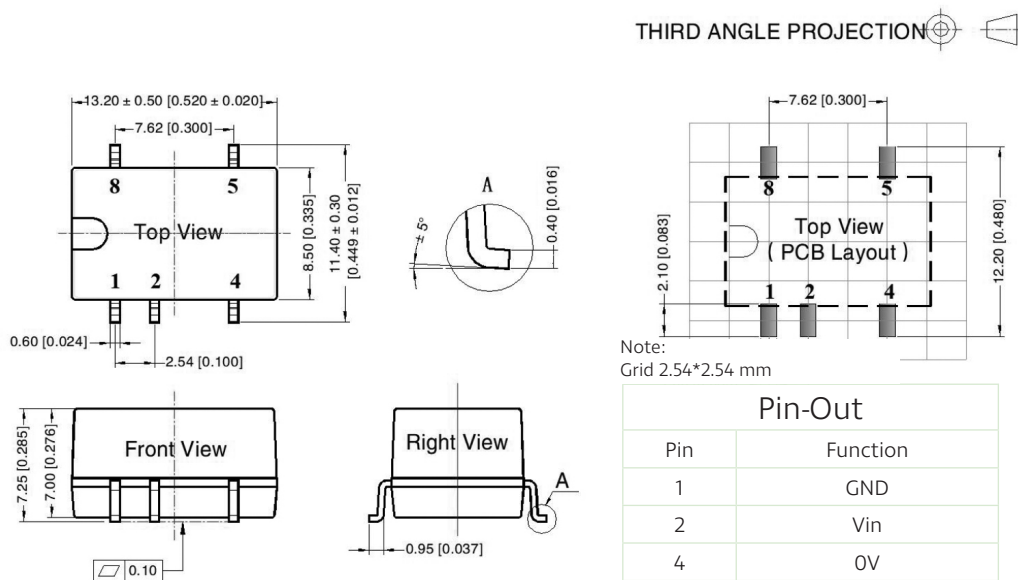


Fig. 4

Emissions	C1/C2	4.7μF /50V
Emissions	C3	Refer to the Cout in Fig. 3
Emissions	CY	270pF/2kV
Emissions	LDM	6.8μH

Mechanical dimensions



Note:

Unit: mm [inch]

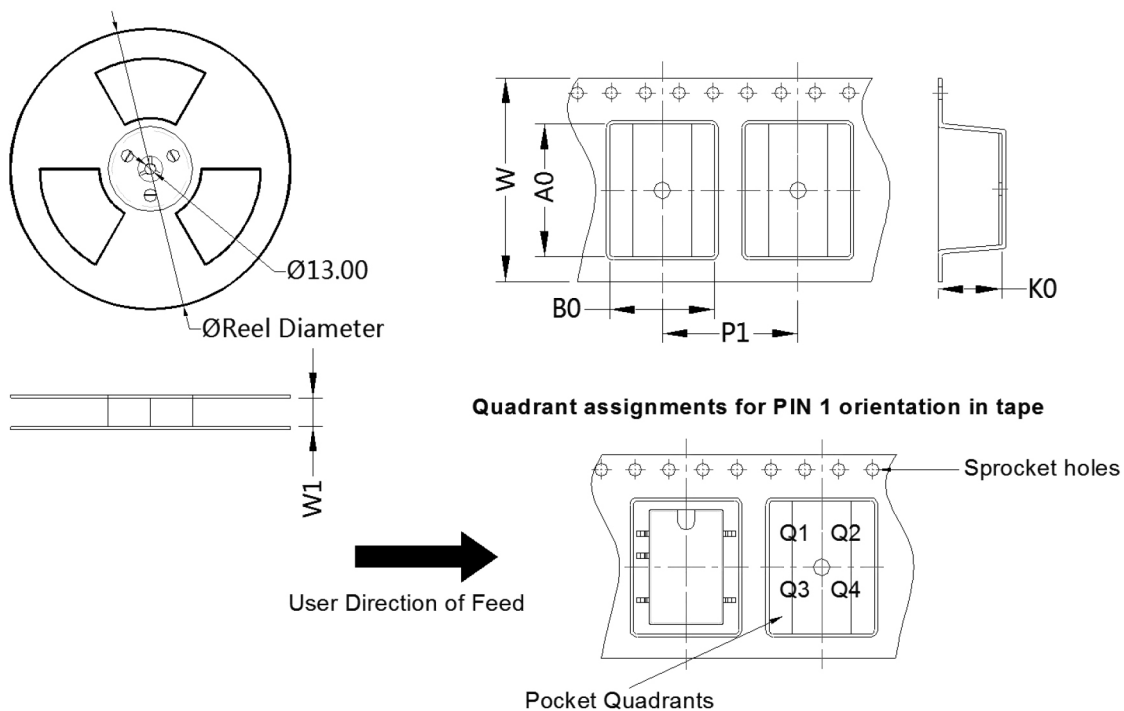
Pin section tolerances: ±0.10mm [± 0.004inch]

General tolerances: ±0.25mm [±0.010inch]

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Tape and Reel Info



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1



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12/15/24Vin

DC-DC Converter

2 Watt

- ⊕ Continuous short-circuit protection
- ⊕ No-load input current as low as 8mA
- ⊕ Operating ambient temperature range: -40°C to +105°C
- ⊕ High efficiency up to 85%
- ⊕ Compact SMD package
- ⊕ I/O isolation test voltage 3kVDC
- ⊕ Industry standard pin-out
- ⊕ EN62368 approved

The 2T8A1_3UP series are designed for use in distributed power supply systems and especially suitable in applications such as pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.



Common specifications	
Short circuit protection:	Continuous, self-recovery
Operation temperature:	-40 ~ +105°C (See Fig. 2)
Storage temperature:	-55°C ~+125°C
Case Temperature Rise	25°C TYP (Ta = 25°C, nominal input voltage, full load)
Storage humidity:	5~95%RH (Non-condensing)
Reflow soldering temperature:*	Peak temp.≤245°C, maximum duration time≤60s over 217°C
Vibration:	10-150Hz, 5G, 0.75mm. along X, Y and Z
MTBF (MIL-HDBK-217F@25°C):	>3,500,000 hours
Moisture Sensitivity Level(MSL):	Level 1; IPC/JEDEC J-STD-020D.1
Case Material:	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions:	13.20 x 11.40 x 7.25 mm
Weight:	1.4g TYP.
Cooling:	Free air convection

* Note: * See also IPC/JEDEC J-STD-020D.1.

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load / no load)	• 12V input		196/8		mA
	• 15V input		161/8		mA
	• 24V input		98/8		mA
Reflected ripple current*			30		mA
Surge Voltage (1sec. max.)	• 12V input	0.7		18	VDC
	• 15V input	0.7		21	VDC
	• 24V input	0.7		30	VDC
Input Filter	Capacitor Filter				
Hot plug	Unavailable				

Note: * Note: *Reflected ripple current testing method please refer to DC-DC Converter Application Note for specific operation.

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

Note: Refer to Fig.4 for recommended circuit test.

Output specifications					
Item	Operating condition	Min	Typ	Max	Units
voltage accuracy	See output regulation curve (Fig. 1)				
Line regulation	Input voltage change:±1%			±1.2	%
Load regulation	10% to 100% load				
	• 5VDC output		7	15	%
	• 6VDC output		7	15	%
	• 9VDC output		6	10	%
	• 12VDC output		5	10	%
	• 15VDC output		4	10	%
	• 24VDC output		3	10	%
Ripple & Noise*	20MHz Bandwidth	50	150		mVp-p
Temperature Coefficient	Full load		±0.02		%/°C
Switching frequency	Full load, nominal input		260		KHz

* 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, test time 1 min., leak current lower than 1mA	3000			VDC
Isolation resistance	Input-output, insulation voltage 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		20		pF

Example:
2T8A1_1205S3UP
 2 = 2Watt; T8 = SMT8; A1 = Series; 12 = 12Vin; 05 = 5Vout;
 S = Single output; 3 = 3kVDC isolation; U =Unregulated output

Note:

- If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
- The maximum capacitive load offered were tested at input voltage range and full load;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
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Product Selection Guide

Part Number	Input Voltage [V] [Nominal (Range)]	Output Voltage [VDC]	Output current [mA; max/min]	Efficiency @ full load [%; Min. / Typ]	Capacitive Load (μ F)
2T8A1_1205S3UP	12 (10.8-13.2)	5	400/40	79/83	2400
2T8A1_1206S3UP	12 (10.8-13.2)	6	333/33	79/83	1000
2T8A1_1209S3UP	12 (10.8-13.2)	9	222/22	79/83	1000
2T8A1_1212S3UP	12 (10.8-13.2)	12	167/17	80/84	560
2T8A1_1215S3UP	12 (10.8-13.2)	15	133/13	80/84	560
2T8A1_1224S3UP	12 (10.8-13.2)	24	83/8	81/85	220
2T8A1_1505S3UP	15 (13.5-16.5)	5	400/40	79/83	2400
2T8A1_1515S3UP	15 (13.5-16.5)	15	133/13	80/84	560
2T8A1_2405S3UP	24 (21.6-26.4)	5	400/40	77/83	2400
2T8A1_2409S3UP	24 (21.6-26.4)	9	222/22	77/83	1000
2T8A1_2412S3UP	24 (21.6-26.4)	12	167/17	78/84	560
2T8A1_2415S3UP	24 (21.6-26.4)	15	133/13	78/84	560
2T8A1_2424S3UP	24 (21.6-26.4)	24	83/8	79/85	220

Typical characteristics

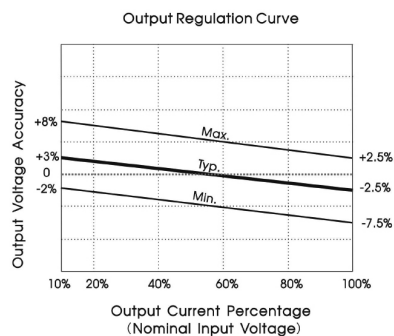


Fig. 1

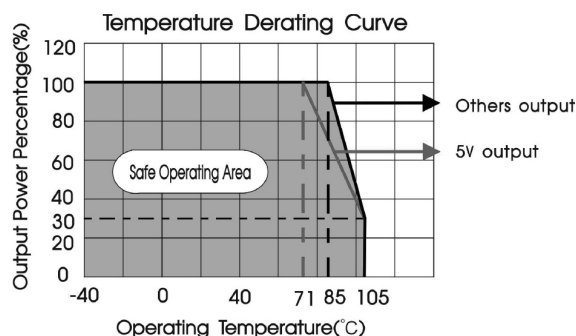
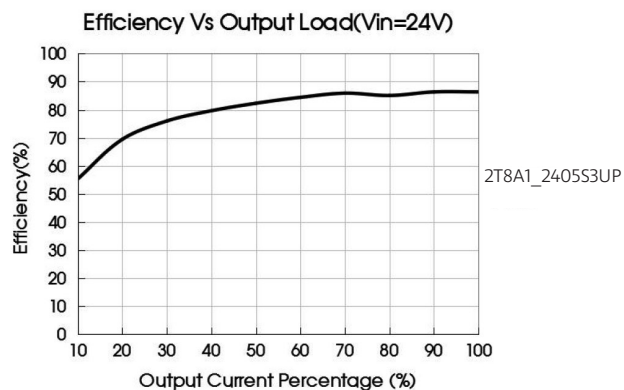
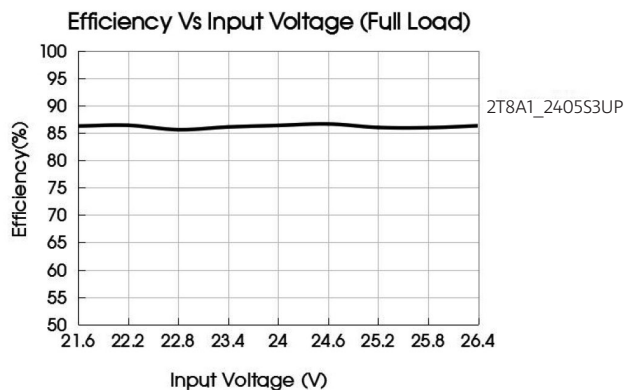
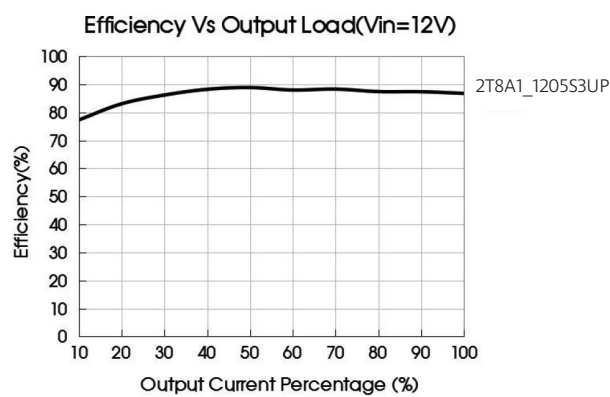
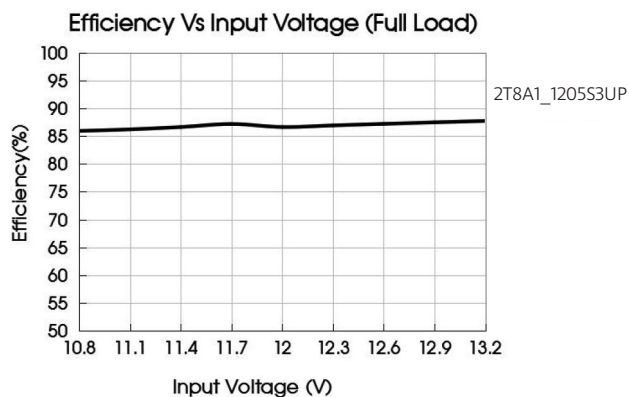


Fig. 2

Efficiency



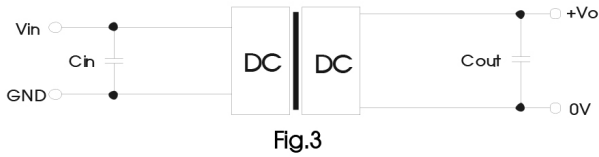
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Typical application circuit

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.3.

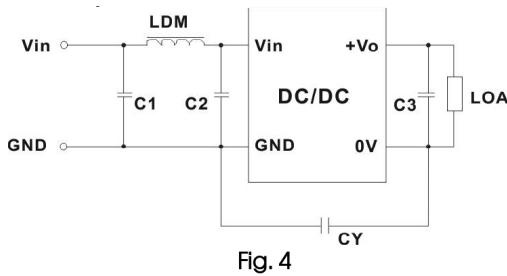
Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.



Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
12	2.2μF/25V	5	10/10V
15	1μF/25V	6	2.2/25V
24	1μF/50V	9	2.2/25V
		12	2.2/25V
-	-	15	1/25V
-	-	24	0.47/50V

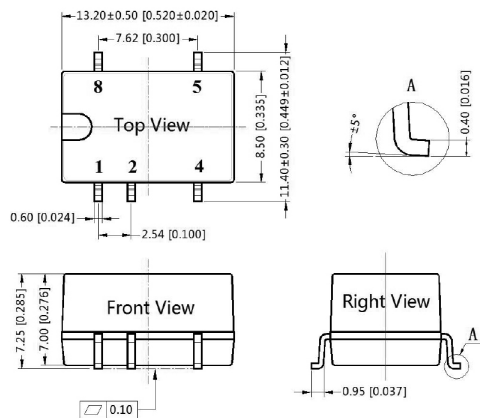
Table 1: Recommended input and output capacitor values

EMC solution-recommended circuit



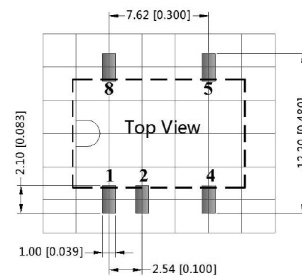
Emissions	C1/C2	4.7μF /50V
Emissions	C3	Refer to the Cout in Fig. 3
Emissions	CY	270pF/2kV
Emissions	LDM	6.8μH

Mechanical dimensions



Note:
Unit: mm [inch]
Pin section tolerances: ±0.10mm [± 0.004inch]
General tolerances: ±0.25mm [±0.010inch]

THIRD ANGLE PROJECTION



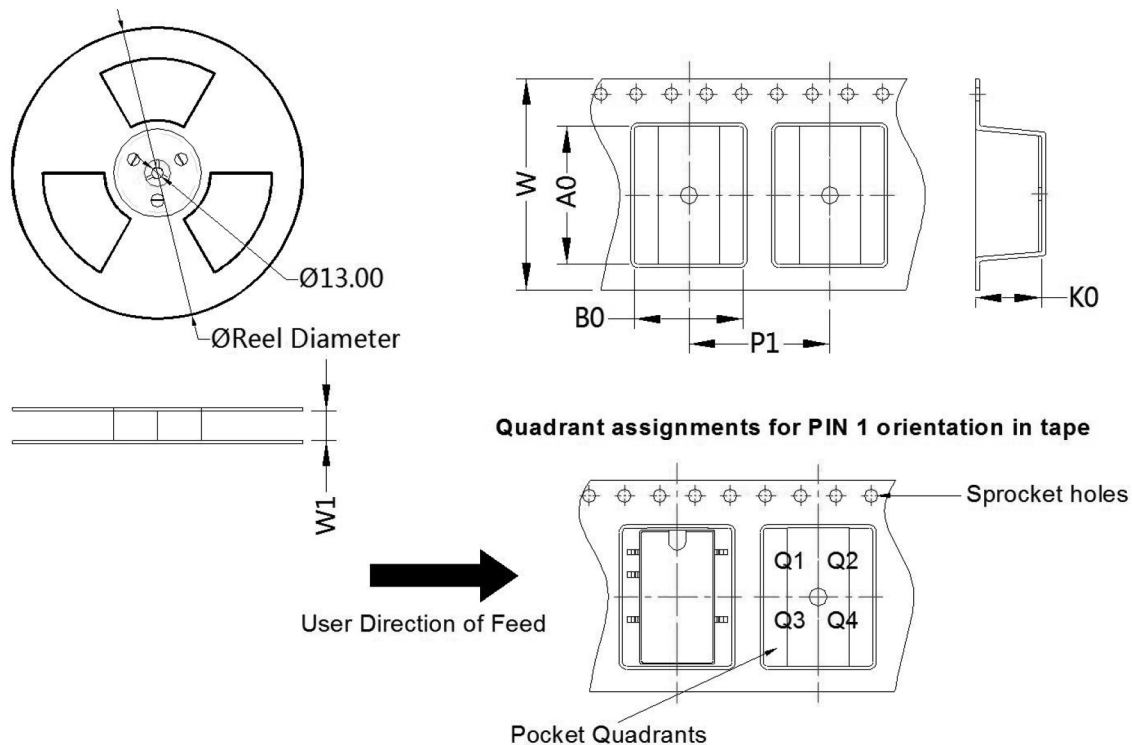
Note:
Grid 2.54*2.54 mm

Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

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Tape and Reel Info



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1