

### FEATURES

1. Continuous short-circuit protection
2. No-load input current as low as 8mA
3. Operating ambient temperature range: -40°C to +105°C
4. High efficiency up to 85%
5. Compact SMD package
6. I/O isolation test voltage: 3k VDC
7. Industry standard pin-out



**3 years  
Warranty**

### Selection Guide

Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.*
	Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
E0303XT-1WR3	3.3 (2.97-3.63)	±3.3	±152/±15	73/77	1200
E0305XT-1WR3		±5	±100/±10	78/82	1200
E0309XT-1WR3		±9	±56/±5	78/82	470
E0312XT-1WR3		±12	±42/±5	78/82	220
E0315XT-1WR3		±15	±34/±4	78/82	220
E0324XT-1WR3		±24	±21/±2	80/84	100
E0503XT-1WR3	5 (4.5-5.5)	±3.3	±152/±15	70/74	1200
E0505XT-1WR3		±5	±100/±10	78/82	1200
E0509XT-1WR3		±9	±56/±6	79/83	470
E0512XT-1WR3		±12	±42/±5	79/83	220
E0515XT-1WR3		±15	±34/±4	79/83	220
E0524XT-1WR3		±24	±21/±3	81/85	100
E0505XT-1WR3-TR	5 (4.5-5.5)	±5	±100/±10	78/82	1200
E0509XT-1WR3-TR		±9	±56/±6	79/83	470
E0512XT-1WR3-TR		±12	±42/±5	79/83	220
E0515XT-1WR3-TR		±15	±34/±4	79/83	220
E0524XT-1WR3-TR		±24	±21/±3	81/85	100
E1205XT-1WR3	12 (10.8-13.2)	±5	±100/±10	78/82	1200
E12Y7XT-1WR3(-TR)		±7.5	±67/±7	78/82	470
E1209XT-1WR3(-TR)		±9	±56/±6	79/83	470
E1212XT-1WR3(-TR)		±12	±42/±5	79/83	220
E1215XT-1WR3(-TR)		±15	±34/±4	79/83	220
E1224XT-1WR3(-TR)		±24	±21/±3	81/85	100
E1515XT-1WR3(-TR)	15 (13.5-16.5)	±15	±34/±4	79/83	220
E2405XT-1WR3(-TR)	24 (21.6-26.4)	±5	±100/±10	76/82	1200
E2409XT-1WR3(-TR)		±9	±56/±6	77/83	470
E2412XT-1WR3(-TR)		±12	±42/±5	77/83	220
E2415XT-1WR3(-TR)		±15	±34/±4	77/83	220
E2424XT-1WR3(-TR)		±24	±21/±3	79/85	100

Note: \* The specified maximum capacitive load for positive and negative output is identical.

### Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	-	394/12	416/-	mA
		5VDC/9VDC/12VDC/15VDC output	-	370/12	389/-	
		24VDC output	-	361/12	379/-	
	5VDC input	3.3VDC output	-	270/5	286/-	
		5VDC output	-	244/5	257/-	
		9VDC/12VDC output	-	241/12	254/-	
		15VDC/24VDC output	-	241/18	254/-	
	12VDC input	±5VDC/±7.5VDC output	-	102/8	107/-	
		±9VDC/±12VDC/±15VDC output	-	101/8	106/-	
		±24VDC output	-	99/8	103/-	
15VDC input		-	81/8	85/-		
24VDC input	±5VDC/±9VDC/±12VDC/±15VDC output	-	51/8	55/-		
	±24VDC output	-	50/8	53/-		
Reflected Ripple Current*	3.3VDC input		-	30	-	
	5VDC/12VDC/15VDC/24VDC input		-	15	-	
Surge Voltage(1sec. max.)	3.3VDC input		-0.7	-	5	VDC
	5VDC input		-0.7	-	9	
	12VDC input		-0.7	-	18	
	15VDC input		-0.7	-	21	
	24VDC input		-0.7	-	30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

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

### Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Voltage Accuracy			See output regulation curves (Fig. 1)				
Linear Regulation	Input voltage change: ±1% 3.3VDC input	3.3VDC output	-	-	±1.5	-	
		Other output	-	-	±1.2		
Load Regulation	10%-100% load	3.3VDC input	3.3VDC output	-	15	20	%
			5/9/12/15/24VDC output	-	10	15	
		5VDC input	3.3VDC output	-	15	20	
			5VDC output	-	10	15	
			9VDC output	-	8	10	
			12VDC output	-	7	10	
			15VDC output	-	6	10	
		24VDC output	-	5	10		
		12/15/24VDC input	±5/±7.5VDC output	-	5	15	%
			±9/±12/±15VDC output	-	3	10	
±24VDC output	-		2	10			
Ripple & Noise*	20MHz bandwidth	3.3VDC input	-	50	100	mVp-p	
		Other input	Other output	-	30		75
			24VDC output	-	50		100
Temperature Coefficient	Full load		-	±0.02	-	%/°C	
Short-Circuit Protection			Continuous, self-recovery				

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

### General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		3000	--	-	VDC	
Insulation Resistance	Input-output resistance at 500VDC		1000	--	-	MΩ	
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		-	20	-	pF	
Operating Temperature	3.3VDC input	Derating when operating temperature ≥ 85°C, (see Fig. 2)	-40	-	105	°C	
	Other input	Derating when operating temperature ≥ 100°C, (see Fig. 2)					
Storage Temperature			-55	--	125		
Case Temperature Rise	Ta=25°C	5VDC input	3.3VDC output	-	25		-
			Others output	-	15		-
		Other input	-	25	-		
Storage Humidity	Non-condensing	5VDC input	-	--	95	%RH	
		Other input	5	--	95		
Reflow Soldering Temperature*			Peak temp. ≤ 245°C, maximum duration time ≤ 60s over 217°C				
Vibration	3.3VDC/12VDC/15VDC/24VDC input		10-150Hz, 5G, 0.75mm. along X, Y and Z				
Switching Frequency	Full load, nominal input voltage	3.3VDC input	-	220	-	kHz	
		5VDC input	-	270	-		
		12VDC/15VDC/24VDC input	-	260	-		
MTBF	MIL-HDBK-217F@25°C		3500	--	-	k hours	
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 1				

Note: \* For actual application, please refer to IPC/JEDEC J-STD-020D.1.

### Mechanical Specifications

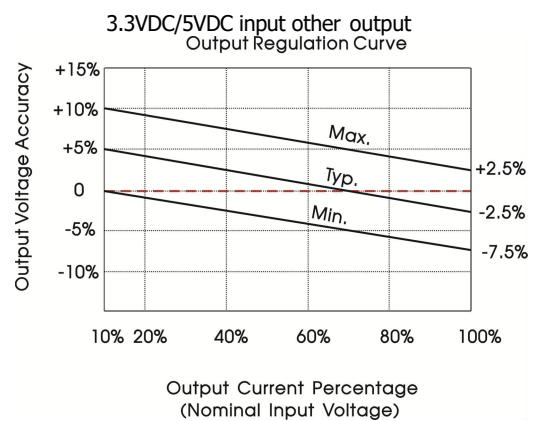
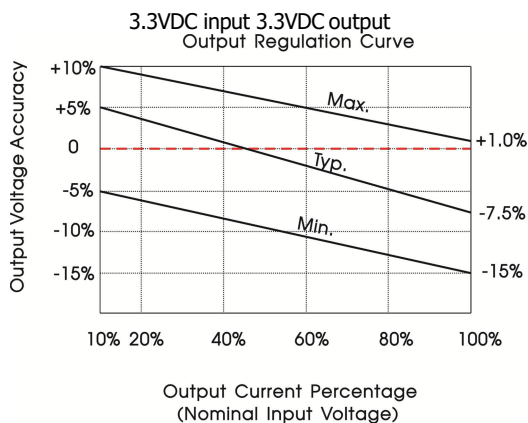
<b>Case Material</b>	Black plastic; flame-retardant and heat-resistant (UL94V-0)
<b>Dimensions</b>	15.24 x 11.40 x 7.25 mm
<b>Weight</b>	1.4g(Typ.)
<b>Cooling Method</b>	Free air convection

### Electromagnetic Compatibility (EMC)

<b>Emissions</b>	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
<b>Immunity</b>	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

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

### Typical Characteristic Curves



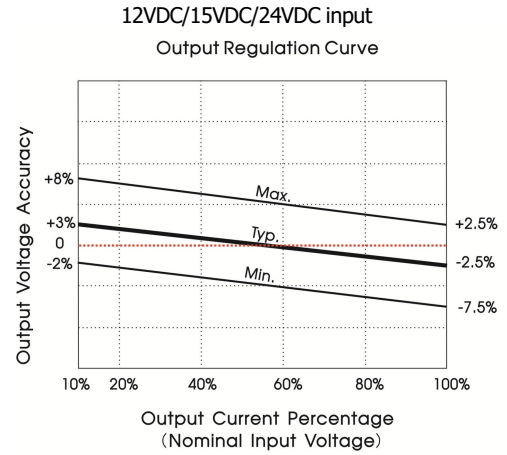
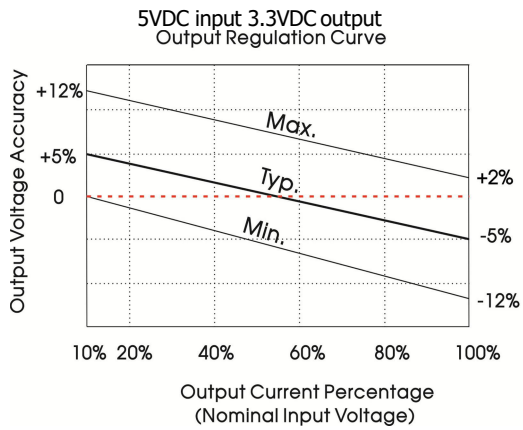


Fig. 1

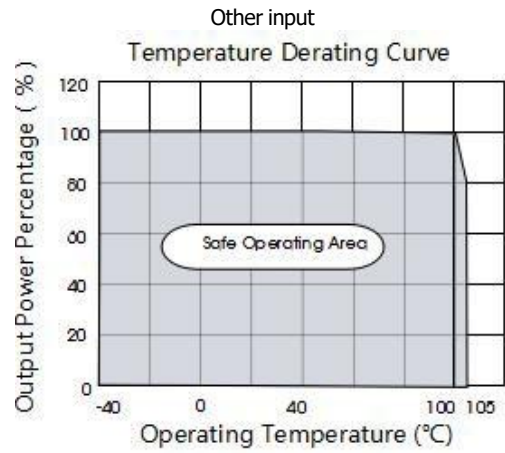
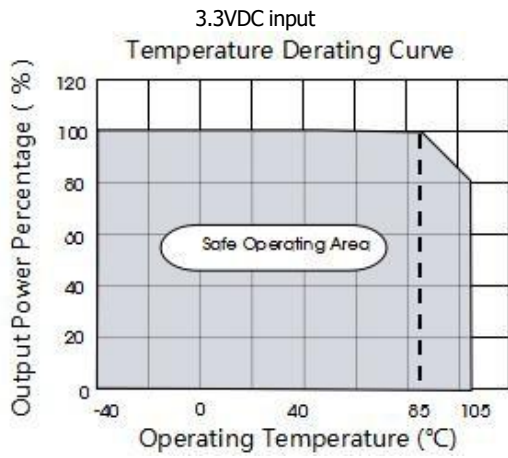
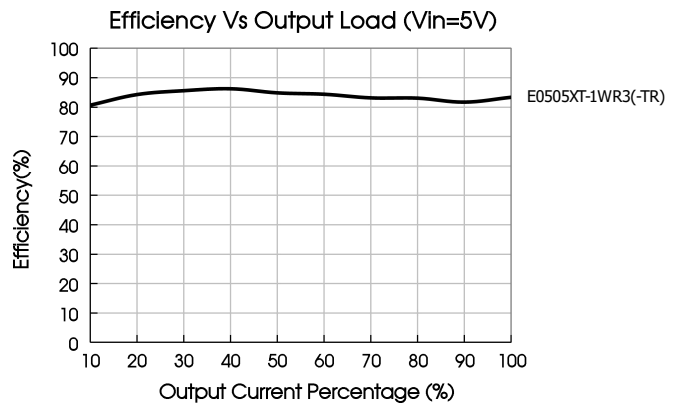
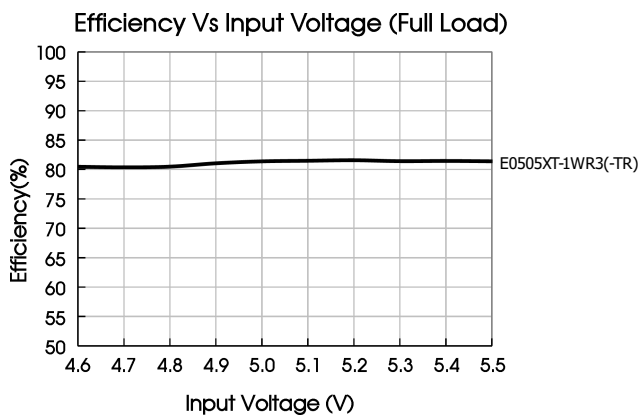
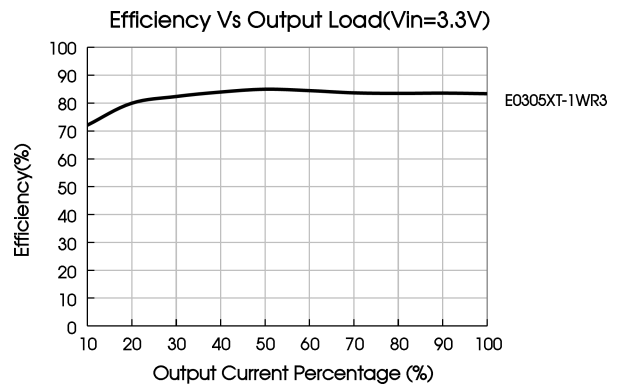
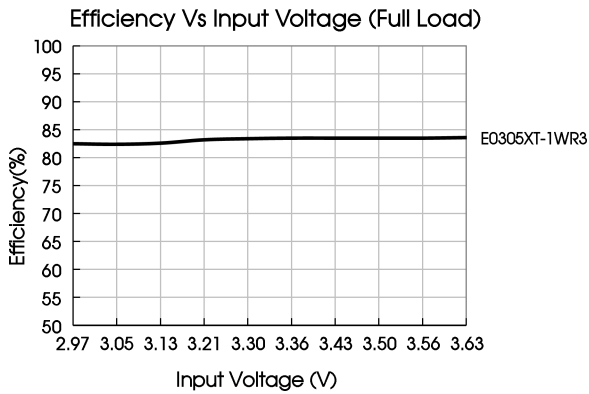
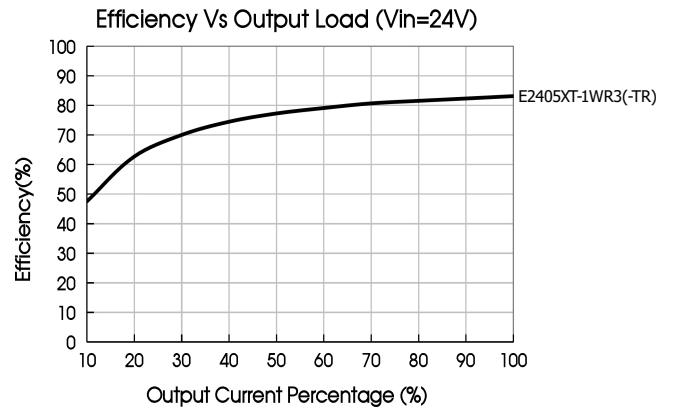
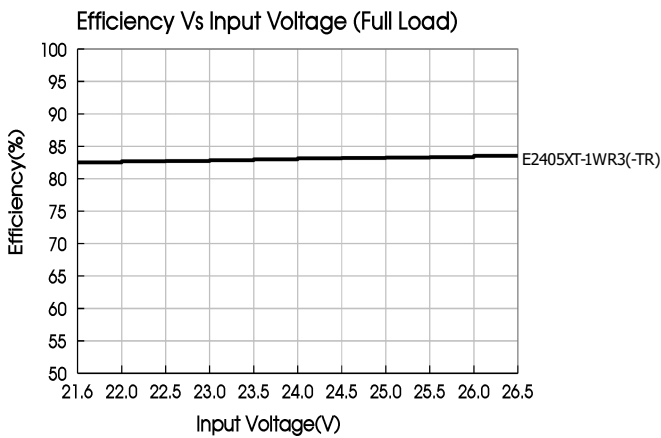
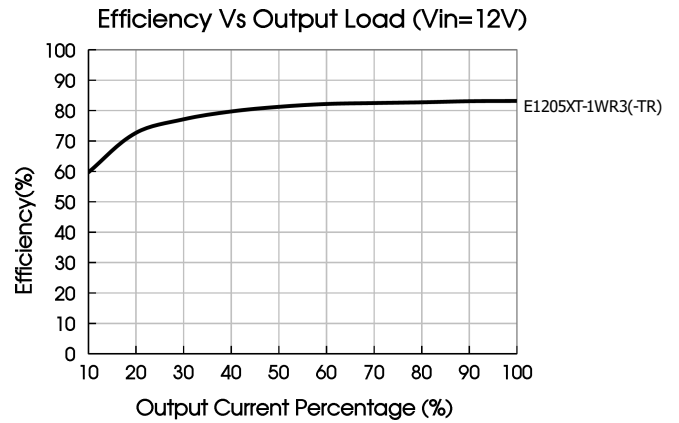
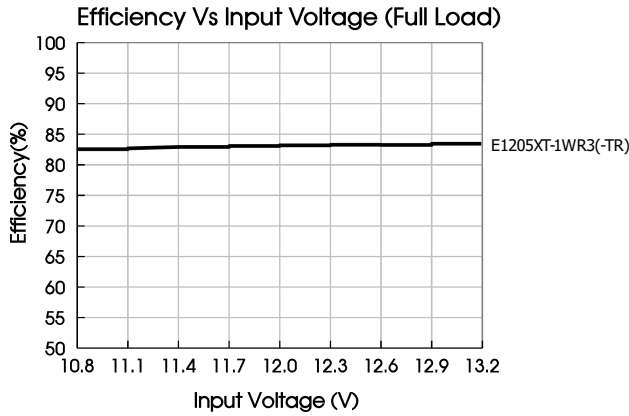


Fig. 2





## Design Reference

### 1. Typical application

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.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 4).



Fig. 3

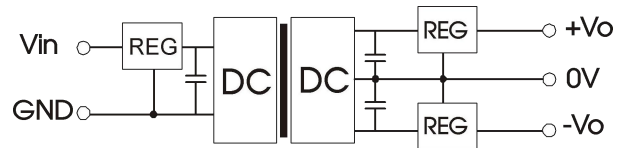


Fig. 4

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	10 $\mu$ F/16V	$\pm$ 3.3VDC	10 $\mu$ F/16V
5VDC	4.7 $\mu$ F/16V	$\pm$ 5VDC	4.7 $\mu$ F/16V
12VDC	2.2 $\mu$ F/25V	$\pm$ 7.5VDC	1 $\mu$ F/16V
15VDC	2.2 $\mu$ F/25V	$\pm$ 9VDC	1 $\mu$ F/16V
24VDC	1 $\mu$ F/50V	$\pm$ 12VDC	1 $\mu$ F/25V
-	-	$\pm$ 15VDC	0.47 $\mu$ F/25V
-	-	$\pm$ 24VDC	0.47 $\mu$ F/50V

### 2. EMC compliance circuit

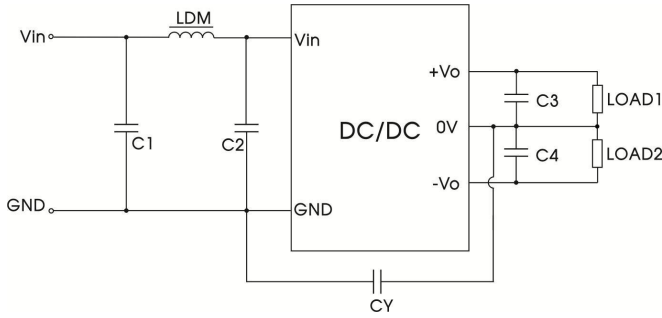


Fig. 5

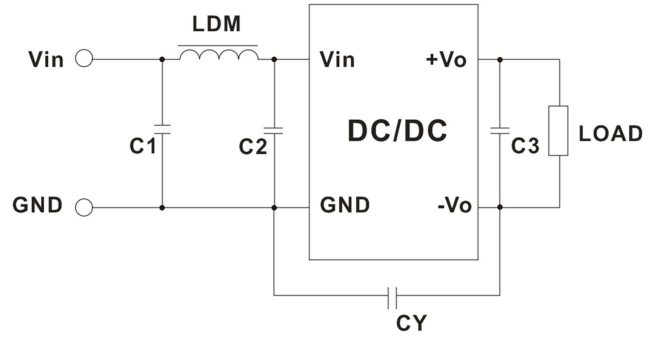


Fig. 6

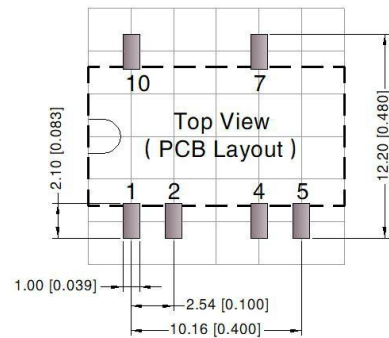
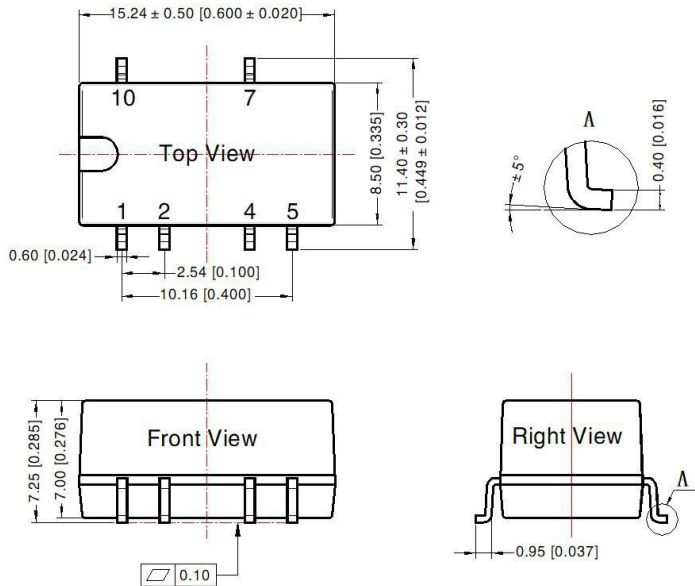
Table 2: EMC recommended circuit value table

Input voltage	Input voltage 3.3VDC	Input voltage 5VDC		Input voltage 12/15/24VDC
Output voltage	3.3/5/9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	5/7.5/9/12/15/24VDC
Emissions	C1, C2	4.7μF/25V		4.7μF/50V
	CY	270pF/4kV	100pF/4kV	1000pF/4kV
	C3	Refer to the Cout in table 1		
	LDM	6.8μH		

Note: In the case of actual use, the requirements for emissions are high, it is subject to CY.

## Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



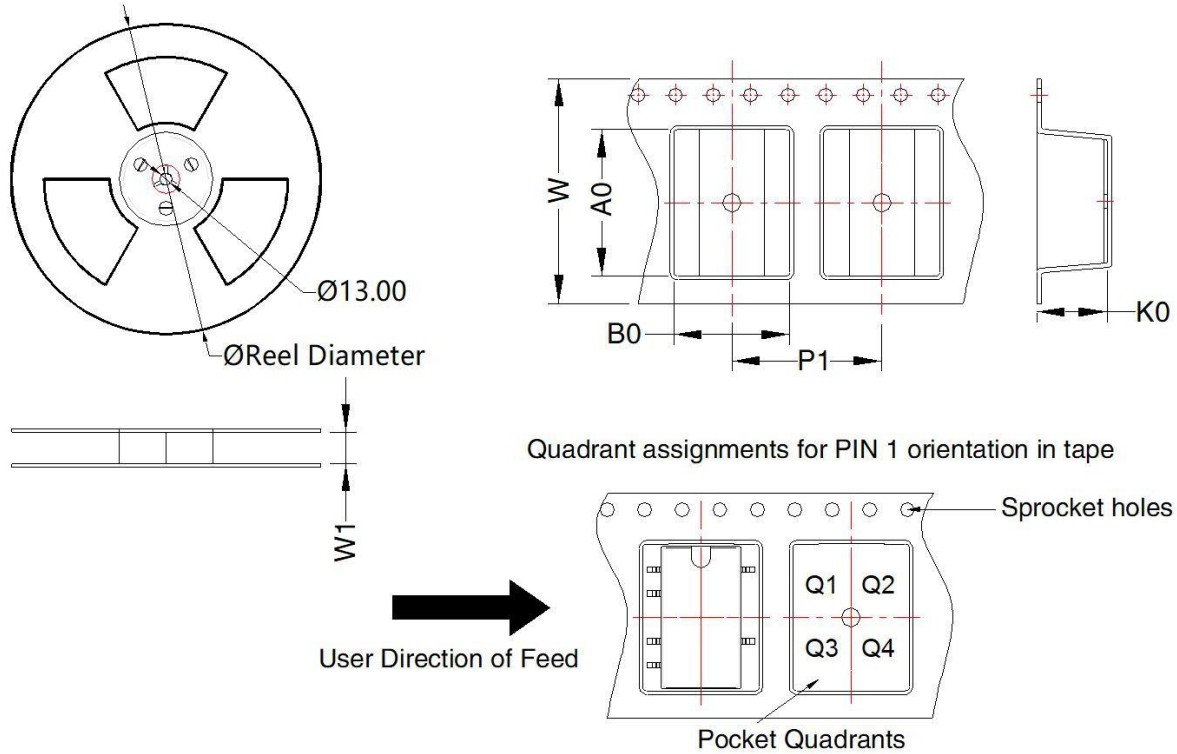
Note: Grid 2.54\*2.54mm

Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.25[\pm 0.010]$

Pin-Out	
Pin	Mark
1	GND
2	Vin
4	0V
5	-Vo
7	+Vo
10	NC

NC: Pin to be isolated from circuitry

### Tape and Reel Info



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
E_XT-1WR3-TR	SMD	6	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1

### Notes & Instructions

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at  $T_a=25^{\circ}\text{C}$ , humidity  $<75\%RH$ , nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;

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Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.norpas-power.com

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