Descriptions

1W isolated, DC/DC Converter



RoHS

3 Years Warranty

UL62368-1 | CE Report EN62368-1 | UKCA Report BS EN62368-1

Features

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

Applications

- Pure digital circuits
- Low frequency analog circuits
- Relay-driven circuits
- Data switching circuits

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DFXT1-F0303	3.3 (2.97-3.63)	3.3	303/30	73/77	2400
	DFXT1-F0305		5	200/20	78/82	2400
--	DFXT1-F0309		9	111/11	80/84	1000
	DFXT1-F0312		12	83/8	80/84	560
	DFXT1-F0315		15	67/7	80/84	560
	DFXT1-F0324		24	42/4	80/84	220
EN/BS EN	DFXT1-F0503	5 (4.5-5.5)	3.3	303/30	70/74	2400
UL/EN/BS EN	DFXT1-F0505		5	200/20	78/82	2400
EN/BS EN	DFXT1-F0509		9	111/12	79/83	1000
	DFXT1-F0512		12	84/9	79/83	560
	DFXT1-F0515		15	67/7	79/83	560
	DFXT1-F0524		24	42/4	81/85	220
UL/EN/BS EN	DFXT1-F1203	12 (10.8-13.2)	3.3	303/30	72/76	2400
	DFXT1-F1205		5	200/20	78/82	2400
EN/BS EN	DFXT1-F1209		9	111/12	79/83	1000
	DFXT1-F1212		12	84/9	79/83	560
	DFXT1-F1215		15	67/7	79/83	560

	DFXT1-F1224		24	42/4	81/85	220
	DFXT1-F1505	15 (13.5-16.5)	5	200/20	78/82	2400
	DFXT1-F1509		9	111/12	78/82	1000
UL/EN/BS EN	DFXT1-F1515		15	67/7	79/83	560
EN/BS EN	DFXT1-F2403	24 (21.6-26.4)	3.3	303/30	72/76	2400
	DFXT1-F2405		5	200/20	74/80	2400
	DFXT1-F2409		9	111/12	74/80	1000
	DFXT1-F2412		12	84/9	74/80	560
	DFXT1-F2415		15	67/7	74/80	560
	DFXT1-F2424		24	42/4	74/80	220

Note:*Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	394/12	416/--	mA
			5VDC output	--	370/12	389/--	
			9VDC/12VDC/15VDC/24VDC output	--	361/12	379/--	
		5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
			9VDC/12VDC output	--	241/12	254/--	
			15VDC/24VDC output	--	241/18	254/--	
		12VDC input	3.3VDC output	--	110/8	116/--	
			5VDC output	--	102/8	107/--	
			9VDC/12VDC/15VDC output	--	101/8	106/--	
			24VDC output	--	99/8	103/--	
		15VDC input	5VDC/9VDC output	--	82/8	86/--	
			15VDC output	--	81/8	85/--	
		24VDC input	3.3VDC output	--	55/8	58/--	
			5VDC output	--	53/8	57/--	
			9VDC/12VDC/15VDC output	--	51/8	55/--	
			24VDC output	--	53/8	57/--	
	Reflected Ripple Current	3.3VDC input		--	30	--	
		Other 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			
Output Specifications	Voltage Accuracy			See output regulation curves (Fig. 1)			
	Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
			Others	--	--	1.2	
	Load Regulation	10%-1	3.3VDC output	--	15	20	%

		00% load	input	5VDC output		--	10	15	
				9VDC/12VDC/15VDC output		--	8	15	
				24VDC output		--	6	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	
			12VDC/15VDC/24VDC input	3.3VDC output		--	8	20	
				5VDC output		--	5	15	
				9VDC output		--	3	10	
				12VDC output		--	3	10	
				15VDC output		--	3	10	
				24VDC output		--	2	10	
	Ripple & Noise①	20MHz bandwidth		3.3VDC input		--	50	100	mVp-p
				5VDC/12VDC/15VDC/24VDC input	Other output	--	30	75	
					24VDC output	--	50	100	
	Temperature Coefficient	Full load				--	±0.02	--	%/℃
	Short-Circuit Protection					Continuous, self-recovery			
General Specifications	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℃, (see Fig. 2)			-40	--	105	℃
		Other input	Derating when operating temperature≥100℃, (see Fig. 2)						
	Storage Temperature					-55	--	125	
	Case Temperature Rise	Ta=25℃	5VDC input	3.3VDC output		--	25	--	
					Other output	--	15	--	
			Other input			--	25	--	
	Storage Humidity	Non-condensing				5	--	95	%RH
	Reflow Soldering Temperature②					Peak temp.≤245℃, maximum duration time ≤60s over 217℃			
	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℃				3500	--	--	k hours
	Moisture	IPC/JEDEC J-STD-020D.1				Level 1			

	Sensitivity Level (MSL)		
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)	
	Dimensions	13.20 x 11.40 x 7.25 mm	
	Weight	1.4g(Typ.)	
	Cooling Method	Free air convection	

Note:

①The testing methods for ripple and noise use the parallel line testing method;

②Please refer to IPC/JEDEC J-STD-020D.1.

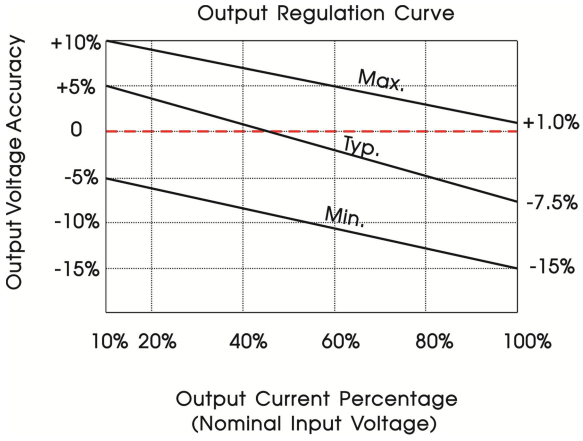
Electromagnetic Compatibility (EMC)

Emissions	CE		CISPR32/EN55032 CLASS B	
	RE		CISPR32/EN55032 CLASS B	
Immunity	ESD	5VDC	IEC/EN61000-4-2 Air ±8kV, Contact ±4kV	perf. Criteria B
		other	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV	perf. Criteria B

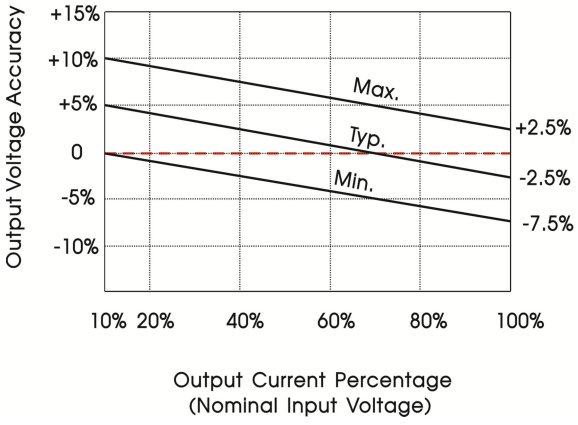
Note: Refer to Fig. 4 for recommended circuit test.

Typical Performance Curves

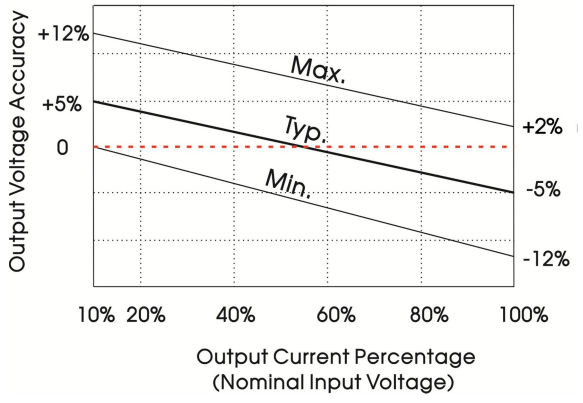
3.3VDC input 3.3VDC output
Output Regulation Curve



3.3VDC/5VDC input Other output
Output Regulation Curve



5VDC/12VDC/15VDC/24VDC input 3.3V output
Output Regulation Curve



12VDC/15VDC/24VDC input Other output
Output Regulation Curve

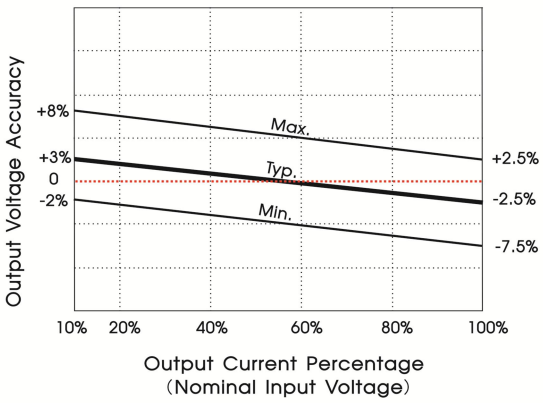
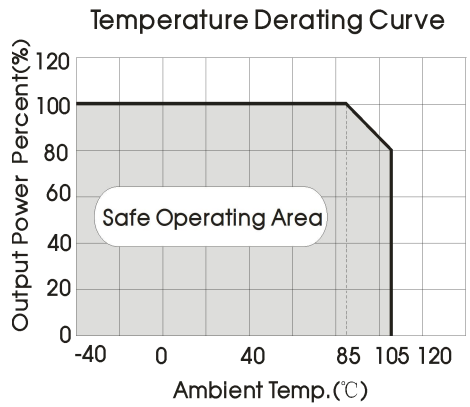


Fig. 1

3.3VDC input



Other input

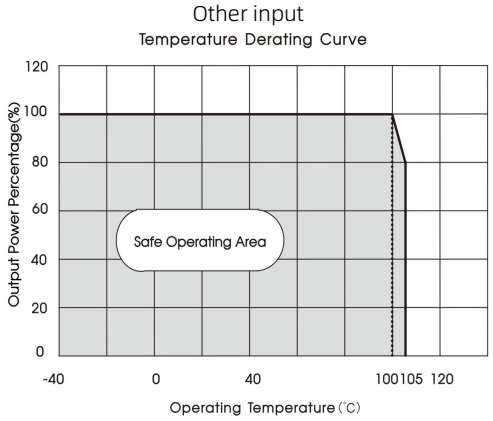
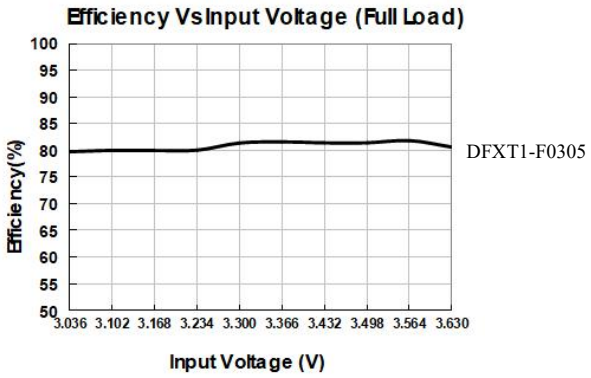
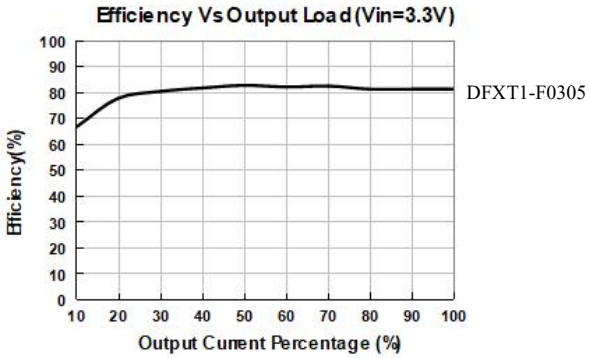
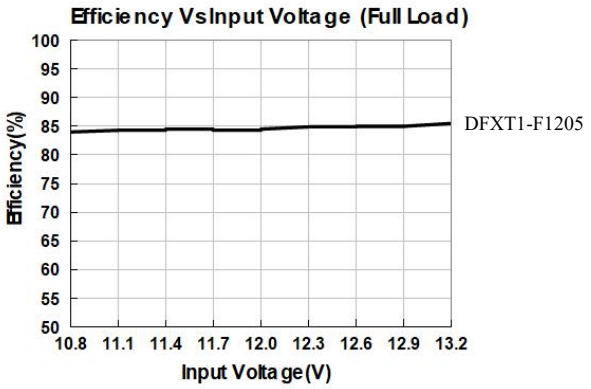
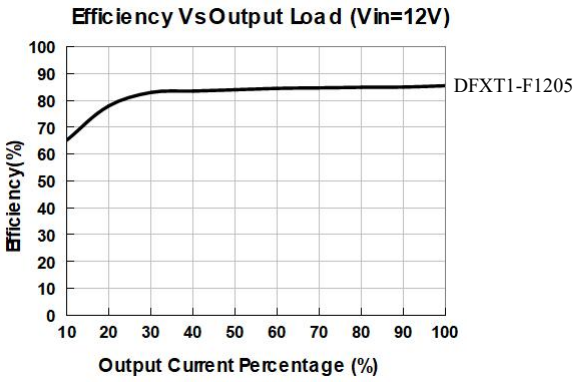


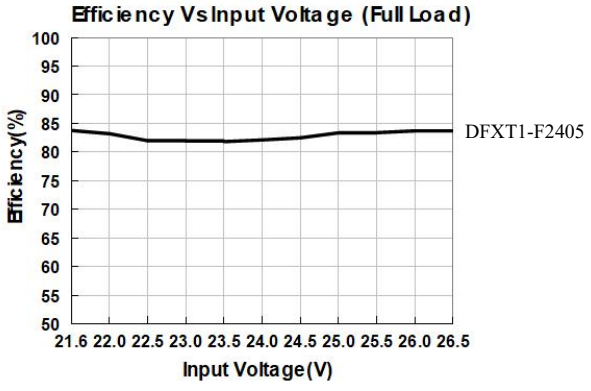
Fig. 2

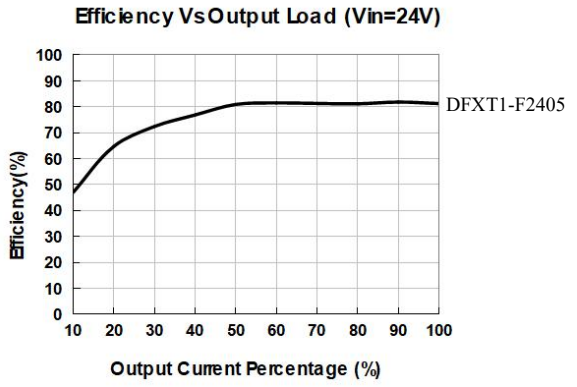












Design Reference

1. Typical application

①Input 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.

②Choosing 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.

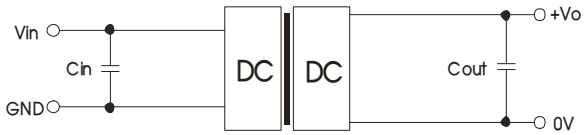


Fig. 3

Table2:Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	4.7μF/16V	3.3VDC/5VDC	10μF/16V
5VDC	4.7μF/16V	9VDC	2.2μF/16V
12VDC	2.2μF/25V	12VDC	2.2μF/25V
15VDC	2.2μF/25V	15VDC	1μF/25V
24VDC	1μF/50V	24VDC	1μF/50V

2. EMC compliance circuit

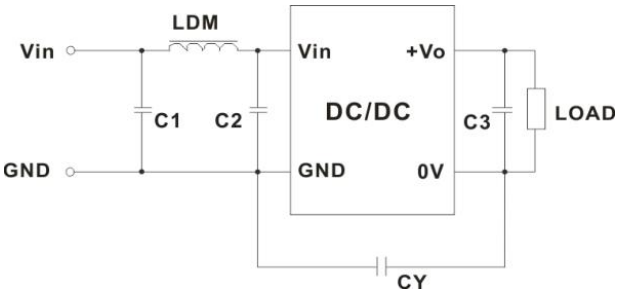


Fig. 4

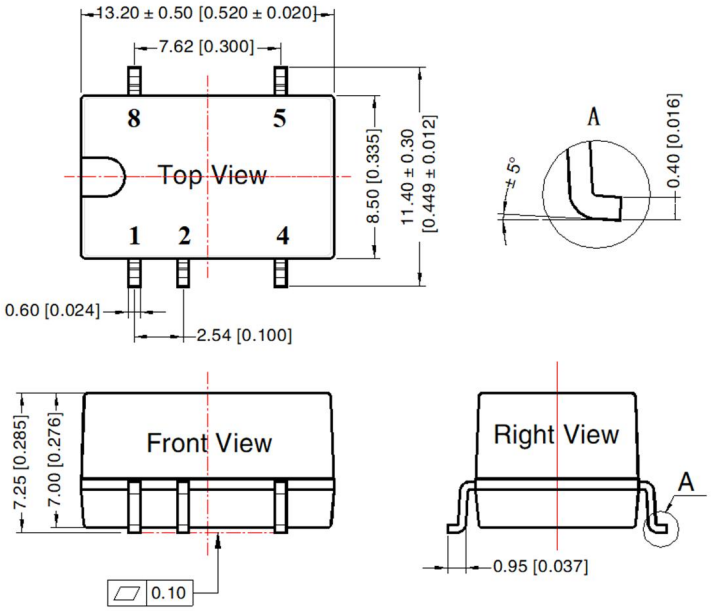
Table2: EMC recommended circuit value table

Input voltage		3.3VDC Input	5VDC Input		12/15/24VDC Input
Output voltage		--	3.3/5/9 VDC	12/15/24 VDC	--
EMI	C1, C2	4.7μF/16V	4.7μF/25V		4.7μF/50V
	CY	270pF/4kV	100pF /4kV	1000pF/ 4kV	270pF/4kV
	C3	Refer to the Cout in table 1			
	LDM	6.8μH			

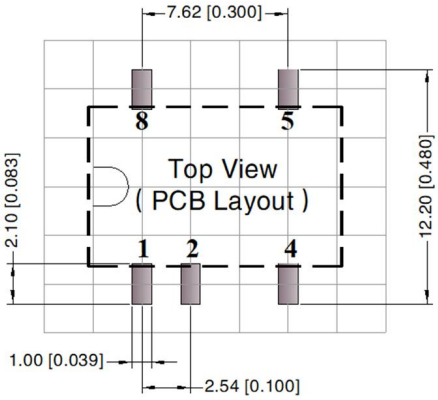
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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

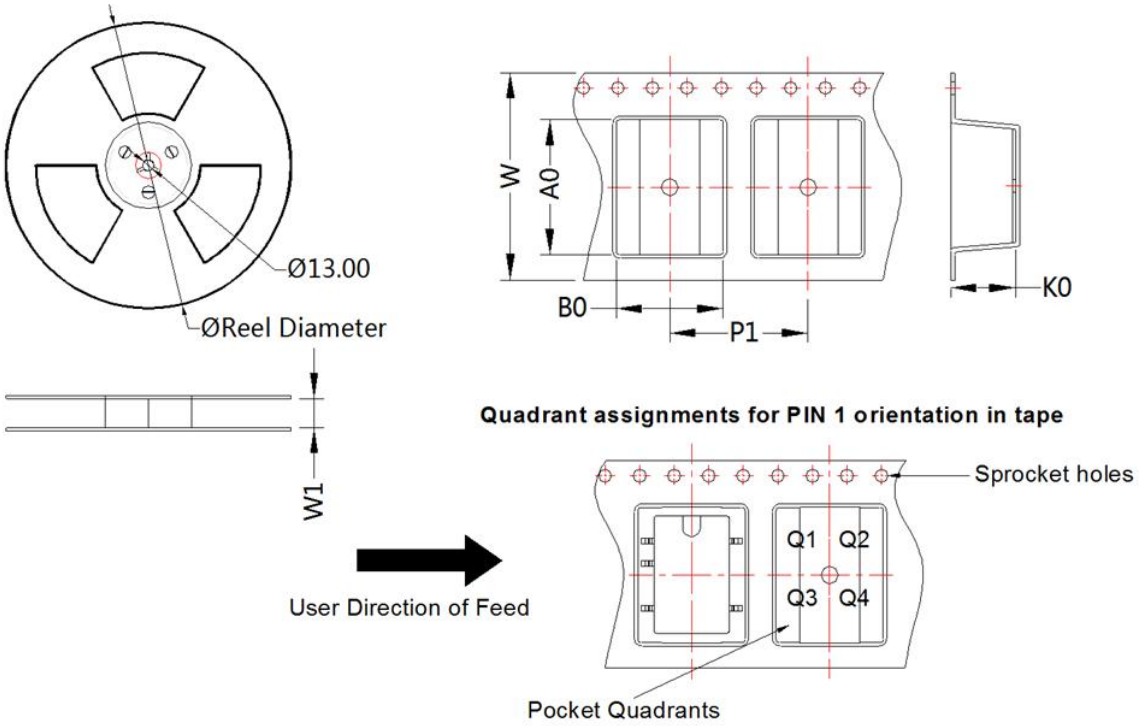


Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC: Pin to be isolated from circuitry

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

Notes:

1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.