FEATURES

- Efficiency up to 83%
- 2:1 wide input voltage range
- Operating Temperature range: -40 ~ +85℃
- No Power derating (≤85℃)
- 3.0KVDC isolation
- Ultra-Miniature, SMD Package
- Short Circuit Protection(automatic recovery)
- Low no-load power consumption
- External On/Off control

Z9K_MT3 Series

3W, *WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT , DC-DC CONVERTER*

PART NUMBER SYSTEM

Z9K-2405-MT3

- Rated power
- Package
- Output voltage
- Input voltage
- Product series

APPLICATION

The Z9K_MT3 Series are specially designed for applications where a wide range input voltage power supplies where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. For these DCDC converters, You can reduce the design point of failure and save the development of micro power supply's manpower, material and time costs, also better ensure product quality stability, protect safety and reliability of the end of products.

These products apply to where:
1) Input Voltage range ≤ 2:1;
2) 3 KVDC input and output isolation;
3) Regulated and low ripple noise is required

SELECTION GUIDE

Model	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load (μF)	Efficiency (%, Typ.) @Max. Load
	Nominal (Range)	Max.①		Max.	Min.	@Max. Load	@No Load			
Z9K-1203-MT3	12 (9-18)	20	3.3	909	45	342	20	30	2700	74
Z9K-1205-MT3			5	600	30	323			2200	77
Z9K-1212-MT3			12	250	12	316			680	79
Z9K-1215-MT3			15	200	10	316			470	79
Z9K-2403-MT3	24 (18-36)	40	3.3	909	45	166	7	110	2700	74
Z9K-2405-MT3			5	600	30	156			2200	81
Z9K-2412-MT3			12	250	12	152			680	82
Z9K-2415-MT3			15	200	10	152			470	82
Z9K-2424-MT3			24	125	6	157			330	80
Z9K-4803-MT3	48 (36-75)	80	3.3	909	45	84	7	45	2700	74
Z9K-4805-MT3			5	600	30	78			2200	80
Z9K-4812-MT3			12	250	12	74			680	83
Z9K-4815-MT3			15	200	10	74			470	83

Note:①.Absolute maximum rating without damage on the converter.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	12VDC input	-0.7	--	25	VDC
	24VDC input	-0.7	--	50	
	48VDC input	-0.7	--	100	
Start-up Voltage	12VDC input	4.5	--	9	
	24VDC input	11	--	18	
	48VDC input	24	--	36	
Input Filter		Capacitor			

Ctrl*	Models ON	Ctrl open or be insulated
	Models OFF	Connect high level voltage,and ensure the current into Ctrl to be 5-10mA
Note: *Please refer to "DESIGN CONSIDERATIONS" as the direction for use of Ctrl .		

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5% to 100% load	--	±1	±3	%
No-load Output Voltage Accuracy	Input voltage range	--	±1.5	±5	
Line Regulation	Full load, Input voltage from low to high	--	±0.2	±0.5	
Load Regulation	5% to 100% load	--	±0.2	±0.8	
Transient Recovery Time	25% load step change	--	0.5	3	ms
Transient Response Deviation		--	±2.5	±5	%
Temperature coefficient	100% load	--	±0.02	±0.03	%/°C
Ripple*	20MHz Bandwidth	--	30	45	mVp-p
Noise*		--	45	100	
Output Short Circuit Protection	Input voltage range	Continuous, automatic recovery			
Note:* Ripple and noise tested with “parallel cable” method. See detailed operation instructions at DC-DC Application Notes.					

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, Tested for 1 minute, leakage current less than 1 mA	3000	--	--	VDC
Isolation Resistance	Input-Output, Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz / 0.1V	--	35	45	pF
Switching Frequency(PFM Mode)	100% load, Nominal Input voltage	--	250	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours
Case Material		Epoxy Resin (UL94-V0)			
Weight		--	4.8	--	g

ENVIRONMENTAL SPECIFICATIONS

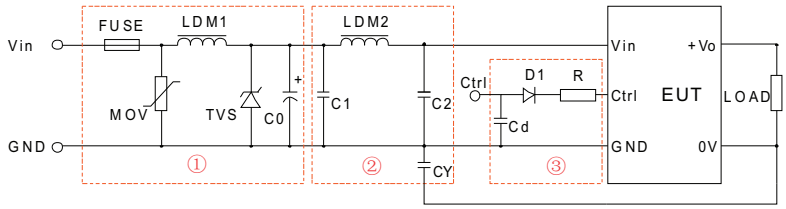
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85℃,see Figure 5)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load	Ta=25°C	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B(Recommended Circuit Refer to Figure1-② or Figure 3)	
	RE	CISPR22/EN55022 CLASS B(Recommended Circuit Refer to Figure1-② or Figure 3)	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV/ Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (Recommended Circuit Refer to Figure1-①)	perf. Criteria B
		IEC/EN61000-4-4 ±4KV (Recommended Circuit Refer to Figure 3)	perf. Criteria B
	Surge	IEC/EN61000-4-5 ±2KV (Recommended Circuit Refer to Figure1-① or Figure 3)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A
	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29 0%-70%	perf. Criteria B

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : info@zimtec-electronics.de

EMC RECOMMENDED CIRCUIT



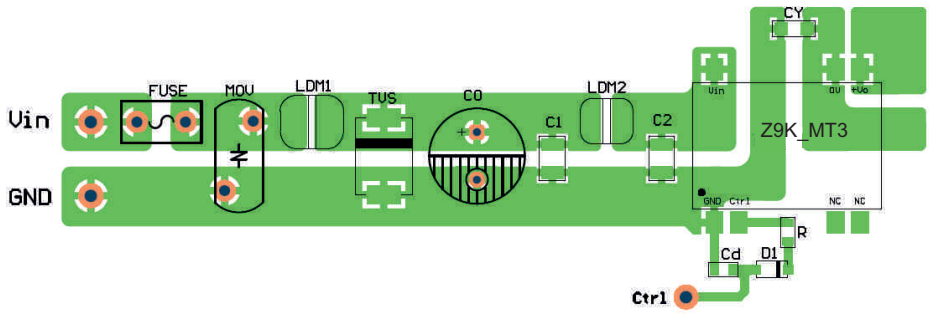
(Figure 1)

Recommended external circuit parameters:

Model	Vin:12V	Vin:24V	Vin:48V
FUSE	Slow blow ,choose according to actual input current		
MOV	--	S14K35	S14K60
LDM1	--	56μH	56μH
TVS	SMCJ28A	SMCJ48A	SMCJ90A
C0	680uF/50V	330μF/50V	330μF/100V
C1	4.7μF/50V		4.7μF/100V
LDM2	12μH		
C2	4.7μF/50V		4.7μF/100V
CY	1nF/3KV		
D1	RB160M-60/1A		
R	Follows: $R=\frac{V_C - V_D - 1.0}{I_C} - 300$		
Cd	47nF/100V		

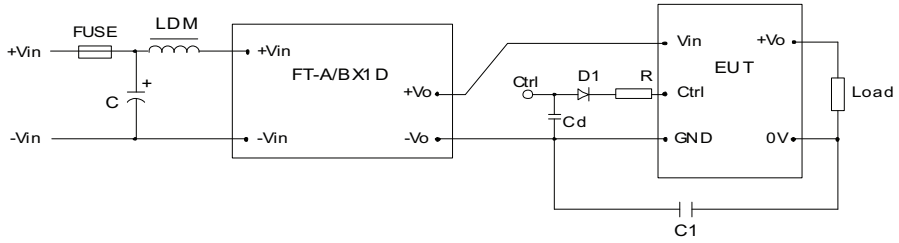
Note: 1. In Figure 1, part ① is the recommended external circuit for EMS, and part ② is for EMI. Choose according to requirements;
2. If there is no recommended parameters, the model no require the external component;
3. VC is the voltage Between Ctrl and GND, VD is the forward conduction voltage drop of D1, IC is the current through Ctrl pin which is normally 5-10mA, the external circuit of Ctrl is as shown in figure1-③.

EMC RECOMMENDED CIRCUIT PCB LAYOUT



(Figure 2)
Note: The pad space between input and output GND (CY) must be≥2mm.

EMC MODULE APPLICATION CIRCUIT



FT-A/BX1D is ZimTec's EFT suppresser. For specific model, please refer to the selection guide.
For nominal voltage <48V,C≥330μF/50V
For nominal voltage =48V,C≥330μF/100V
LDM=12uH,C1=1nF/3000V
(Figure 3)

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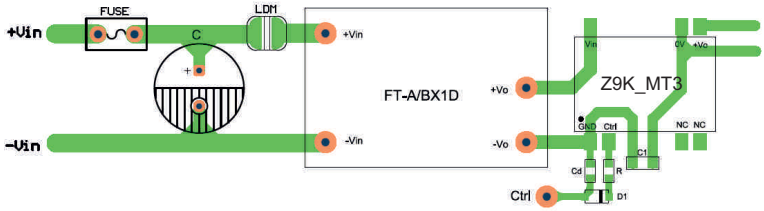
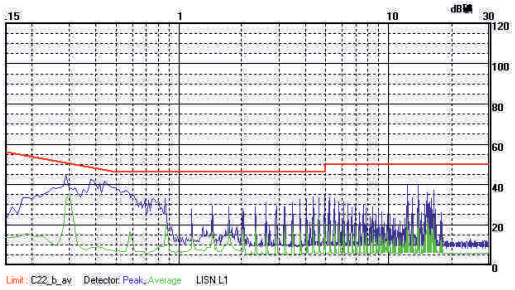
EMC MODULE RECOMMENDED CIRCUIT PCB LAYOUT

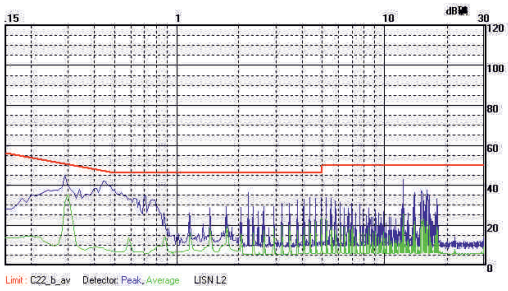


(Figure 4)

EMI TEST WAVEFORM (NOMINAL AND FULL LOAD)

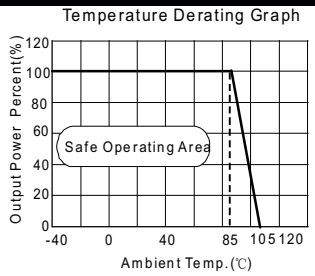


Z9K-2405-MT3 CE(Class B, Positive line)

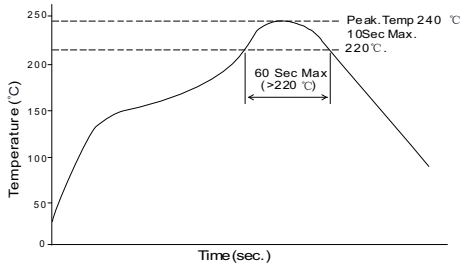


Z9K-2405-MT3 CE(Class B, Positive line)

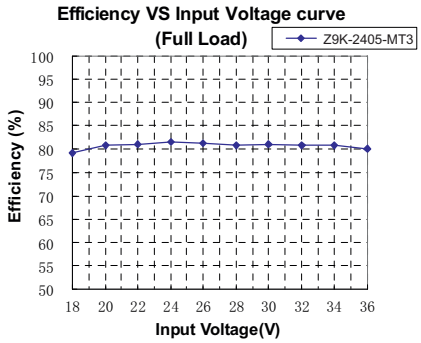
PRODUCT TYPICAL PERFORMANCE CURVE

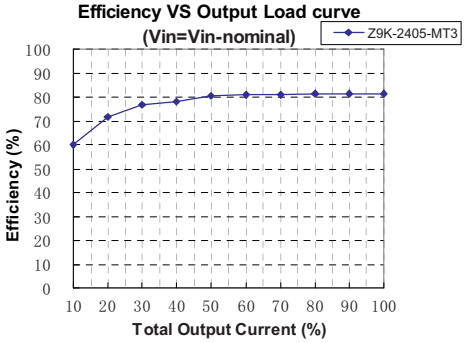


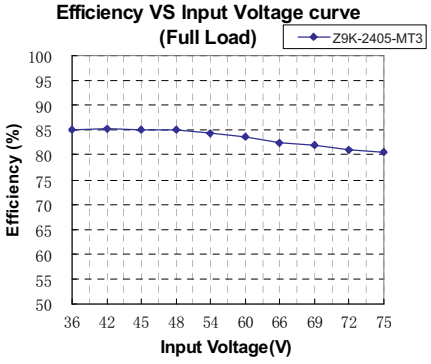
(Figure 5)

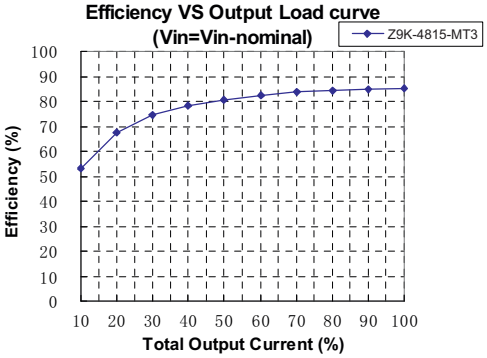


Note: The curve only applies to the hot air reflow soldering









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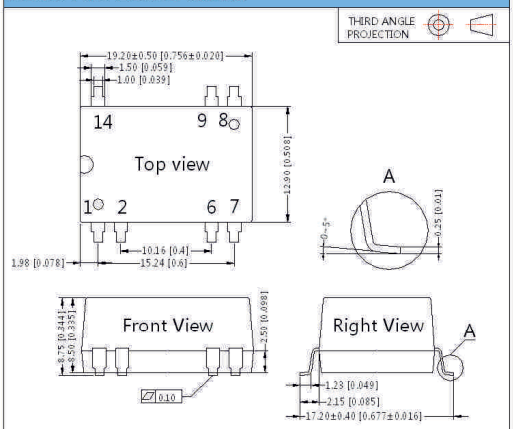
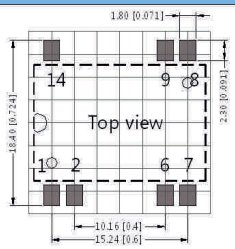
DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS



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

RECOMMENDED FOOTPRINT DETAILS

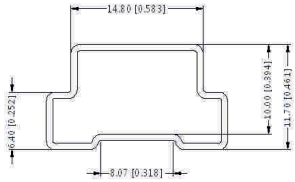


Note : Grid 2.54*2.54mm

PIN CONNECTION	
Pin	Function
1	GND
2	Ctrl
6	NC
7	NC
8	+Vo
9	0V
14	Vin

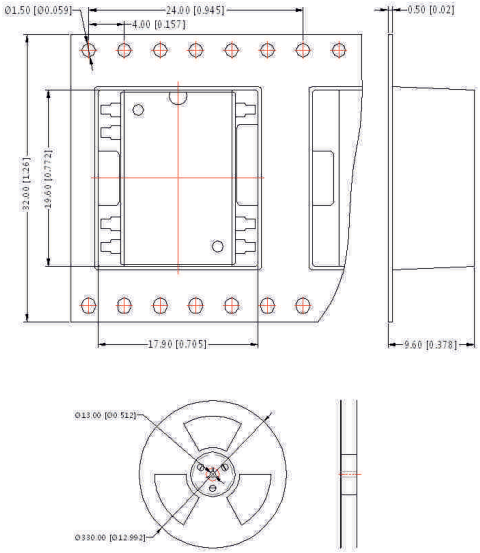
NC:No Connection

TUBE PACKAGING DIMENSIONS



Note:
Unit: mm[inch]
General tolerances:±0.50[±0.020]
L=530[20.866] Quantity:26pcs
L=220[8.661] Quantity:10pcs
Inner carton(S):L*W*H=255*170*80
Outer carton(S):L*W*H=375*280*270
Inner carton(L):L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220,2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325,3 inner cartons(L)

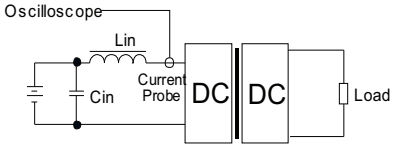
REEL PACKAGING DIMENSIONS



Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
Per reel of packing quantity: 250pcs
Inner carton: L*W*H=365*350*105
Quantity:750pcs
Outer carton: L*W*H=390*360*245
Quantity:1500pcs

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup
Input reflected-ripple current is measured with an inductor Lin and Capaciator Cin to simulate the source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

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DESIGN CONSIDERATIONS

1) Requirement of output load

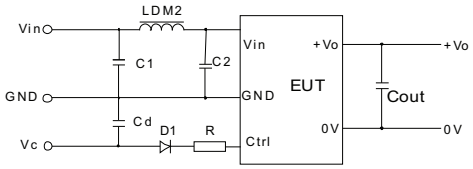
To ensure this module operate efficiently and reliably, during operation, the minimum output load could not be less than 5% of the full load, otherwise ripple maybe increase dramatically. To ensure this module operate normally, the load must be more than 5% of the full load.

2) Recommended circuit

All the Z9K-MT3 Series have been tested according to the following recommended test circuit (see Figure 6).

If you want to further decrease the input/output ripple increase a capacitance-values properly or choose capaciators with low ESR. However, the capacitance of the output filter capaciator must be proper. If the capacitance is too big, a startup problem might arise. Provided the safe and reliable operation is ensured, the greatest capacitance of its filter capaciator must be less than the Max. Capacitive Load.

Recommended circuit refer to"EMC RECOMMENDED CIRCUIT".



(Figure 6)

3)Ctrl Terminal

When open or high impedance, the converter works well. When this pin is "high", the converter shut down. It should be note that the input current could be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter. The value of R can be derived as follows:

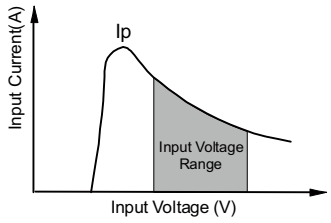
$$R = \frac{V_C - V_D - 1.0}{I_C} - 300$$

For detailed parameter, please refer to "EMC RECOMMENDED CIRCUIT".

4)Input current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the flash startup current of this kind of DC/DC module (Figure 7).

General: Vin=12V Ip =675mA
Vin=24V Ip =320mA
Vin=48V Ip =160mA



(Figure 7)

5) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increased dramatically. If the product operates under min. load, it may not be guaranteed to meet all specifications listed. Operation with minimum load will not damage the converter.
2. Recommended Dual output models unbalanced load is ≤±5%, if the product operates >±5%, it may not be guaranteed to meet all specifications listed. Please contact our technical support for more details.
3. Max. Capacitive Load is tested at nominal input voltage and full load.
4. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
5. In this datasheet, all test methods are based on our corporate standards.
6. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more details.
7. Please contact our technical support for any specific requirement.
8. Specifications of this product are subject to changes without prior notice.