

MK-3W Series



3W 4:1 Regulated Single & Dual output

Features

- Wide 4:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation, Up to 3000 VDC
- Continuous Short Circuit Protection
- Efficiency up to 81%
- -40°C~ 85°C Operation Temperature Range
- EMC filter meets EN55022 Class A without adding external components
- Non-conductive Black Plastic DIL24-pin case



The MK series is a family of cost effective 3W single & dual output DC-DC converters. These converters combine Plastic case in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3000VDC input/output isolation voltage, continuous short circuit protection with automatic restart and high line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages are 24Vdc and 48Vdc, with output voltages are 3.3, 5, 12, 15, 24, ±3.3, ±5, ±12, ±15 and ±24 Vdc. Featuring high efficiency operation up to 81% and output voltage accuracy of ±2% maximum. Also, no additional components adding required to comply with EN55022 Class A.

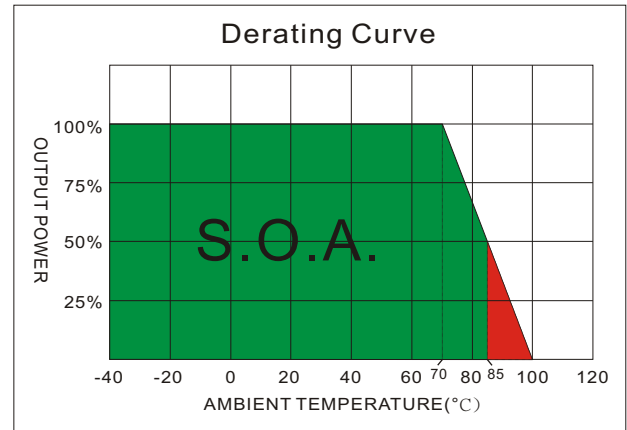
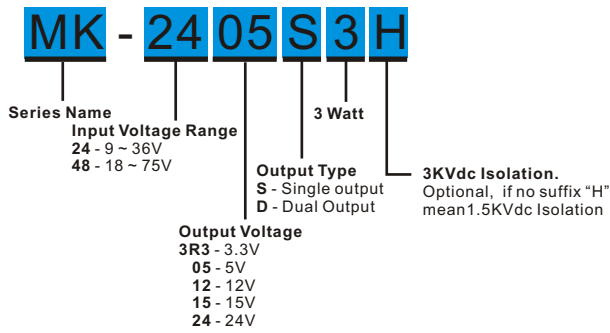
All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS		GENERAL SPECIFICATIONS	
Output Voltage Accuracy	±2%	Efficiency	See table, typ.
Output Voltage Blance(Dual Output)	±2%	I/O Isolation Voltage(60 sec) Input/Output	1500~3000Vdc
Maximum Output Current	See table	I/O Isolation Capacitance	1000 pF, typ.
Line Regulation	±0.5%, max.	I/O Isolation Resistance	1000M Ohm
Load Regulation(0% to 100%)	±1.2%, max.	Switching Frequency	330kHz, typ.
Cross Regulation (Dual Output) (1)	±5%	Humidity	95% rel H
Ripple&Noise (20MHz Bandwidth)(2)	80mVpk-pk, max. Dual Output 24V:100mVpk-pk, max.	Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Over Load Protection	160% of Iout, typ.	Safety Standard	UL/cUL 60950-1 , IEC/EN 60950-1
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)	Safety Approvals	UL/cUL 60950-1 , IEC/EN 60950-1
Temperature Coefficient	±0.02%/°C	PHYSICAL SPECIFICATIONS	
Capacitive Load (3)	See table	Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Transient Recovery Time (4)	300us, typ.	Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Transient Response Deviation (4)	±3%, max. Single Output 3.3V:±5%, max.	Pin Material	Φ0.5mm Brass Solder-coated
		Potting Material	Epoxy (UL94V-0 rated)
		Weight	13g
		Dimensions	1.25"x0.8"x0.4"
INPUT SPECIFICATIONS		ENVIRONMENT SPECIFICATIONS	
Input Voltage Range	See table	Operating Temperature	-40°C~85°C(See Derating Curve) -40°C ~ +70°C (For 100% load)
Under Voltage Lockout		Maximum Case Temperature	100°C
24V Models	Module ON / OFF	Storage Temperature	-55°C~125°C
48V Models	Module ON / OFF	Cooling	Nature Convection
Start up Time	20mS, typ.		
(Nominal Vin and constant resistive load)			
Input Filter	Pi Type		
Input Current (No-Load)	See table, max.		
Input Current (Full-Load)	See table, typ.		
Input Reflected Ripple Current (5)	20mApk-pk, typ.		
EMC SPECIFICATIONS		ABSOLUTE MAXIMUM RATINGS(7)	
Radiated Emissions	EN55022 CLASS A	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Conducted Emissions	EN55022 CLASS A	Input Surge Voltage(100mS)	
ESD	IEC 61000-4-2 Perf. Criteria A	24 Models	50 Vdc, max.
RS	IEC 61000-4-3 Perf. Criteria A	48 Models	100 Vdc, max.
EFT	IEC 61000-4-4 Perf. Criteria A	Soldering Temperature	260C, max.
Surge(6)	IEC 61000-4-5 Perf. Criteria A	(1.5mm from case 10 sec. max.)	
CS	IEC 61000-4-6 Perf. Criteria A		
PFMF	IEC 61000-4-8 Perf. Criteria A		

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(μF)
		No-Load (mA)	Full Load (mA)		Min. load (mA)	Full load (mA)		
MK-243R3S3	9-36	10	167	3.3	0	900	75	470
MK-2405S3	9-36	10	160	5	0	600	79	470
MK-24 12S3	9-36	10	156	12	0	250	81	100
MK-24 15S3	9-36	10	154	15	0	200	82	100
MK-24 24S3	9-36	10	154	24	0	125	82	47
MK-243R3D3	9-36	10	167	±3.3	0	±450	75	±220
MK-2405D3	9-36	10	160	±5	0	±300	79	±220
MK-24 12D3	9-36	10	156	±12	0	±125	81	±100
MK-24 15D3	9-36	15	156	±15	0	±100	81	±100
MK-24 24D3	9-36	20	159	±24	0	±63	80	±47
MK-483R3S3	18-75	7	84	3.3	0	900	75	470
MK-4805S3	18-75	7	80	5	0	600	79	470
MK-48 12S3	18-75	7	78	12	0	250	81	100
MK-48 15S3	18-75	7	77	15	0	200	82	100
MK-48 24S3	18-75	7	77	24	0	125	82	47
MK-483R3D3	18-75	7	84	±3.3	0	±450	75	±220
MK-4805D3	18-75	7	78	±5	0	±300	81	±220
MK-48 12D3	18-75	7	78	±12	0	±125	81	±100
MK-48 15D3	18-75	7	78	±15	0	±100	81	±100
MK-48 24D3	18-75	10	81	±24	0	±63	79	±47

Suffix "H" means 3000Vdc isolation

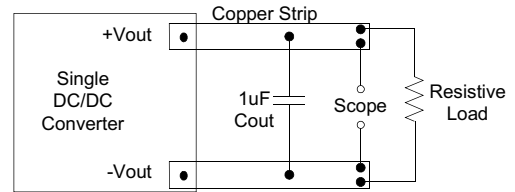
NOTE

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Ripple/Noise measured with a 1μF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12μH and a source capacitor Cin(47μF, ESR<1.0Ω at 100KHz).
- An external filter capacitor is required if the module has to meet IEC61000-4-5. The filter capacitor Motien suggest: Nippon chemi-con KY series, 220μF/100V.
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

TEST CONFIGURATIONS

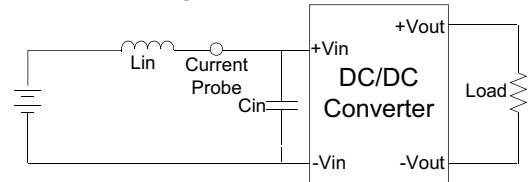
Output Ripple & Noise Measurement Test

Use a capacitor Cout(1.0uF) measurement.
The Scope measurement bandwidth is 0-20MHz.

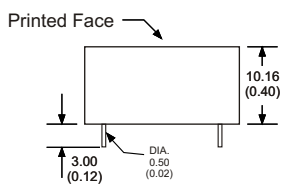
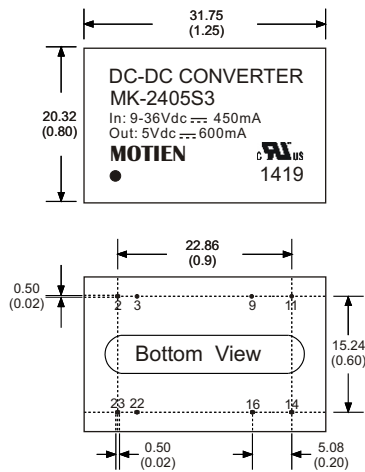


Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



MECHANICAL SPECIFICATIONS



**24 Pin DIL Package
Non-Conductive Plastic**

- Notes: All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
 2. Pin pitch and length tolerance: ±0.35 (±0.014)
 3. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
2	-V Input	-V Input
3	-V Input	-V Input
9	N.P.	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

(The Pin Connection of high isolation one is the same with normal one.)