

MK-3W(M) Series



3W 4:1 Regulated Single & Dual output

Features

- Wide 4:1 Input Range
- Full SMD Technology
- 1500VDC Isolation, Up to 3000VDC
- Continuous Short Circuit Protection
- Efficiency up to 81%
- -40°C~ 85°C Operation Temperature Range
- EMC filter meets EN55032 Class A without adding external components
- Nickel-coated Copper DIL24-pin case



The MK series is a family of cost effective 3W single & dual output DC-DC converters. These converters are consisted with Nickle-coated copper in a 24-pin DIL package with high performance features such as 1500VDC ~ 3000VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight 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 EN55032 Class A.

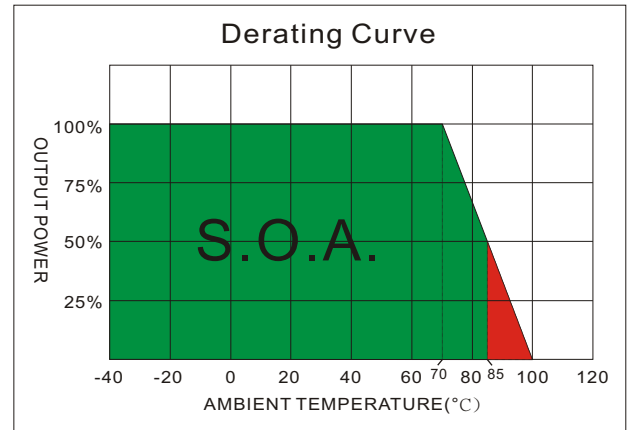
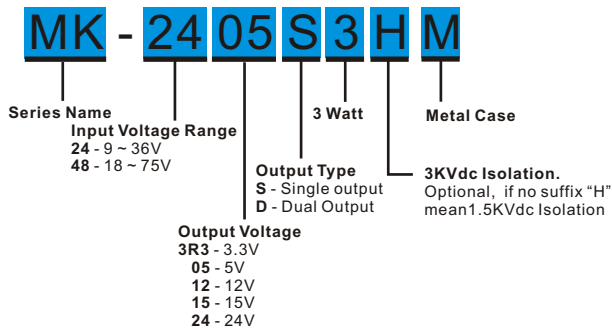
All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified.

OUTPUT SPECIFICATIONS			GENERAL SPECIFICATIONS	
Output Voltage Accuracy	±2%, max.		Efficiency	See table, typ.
Output Voltage Blance (Dual Output)	±2%, max.		I/O Isolation Voltage (60sec)	
Output Current	See table		Input / Output	1500~3000Vdc
Line Regulation	±0.5%, max.		Case / Input&Ouput	1000Vdc
Load Regulation (0% to 100%)	±1.2%, max.		I/O Isolation Capacitance	1000pF, typ.
Cross Regulation (Dual Output) (1)	±5%, max.		I/O Isolation Resistance	1000MΩ, min.
Ripple&Noise (20MHz Bandwidth)(2)	80mVpk-pk, max.		Switching Frequency	330kHz, typ.
	Dual Output 24V:100mVpk-pk, max.		Humidity	95% rel H
Over Load Protection	160% of Iout, typ.		Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)		Safety Standard (designed to meet)	IEC/EN 60950-1
Temperature Coefficient	±0.02%/°C		PHYSICAL SPECIFICATIONS	
Capacitive Load (3)	See table		Case Material	Nickel-coated Copper
Transient Recovery Time (4)	300µs, typ.		Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Transient Response Deviation (4)	±3%, max.		Pin Material	Φ0.5mm Brass Solder-coated
	Single Output 3.3V:±5%, max.		Potting Material	Epoxy (UL94V-0 rated)
			Weight	17.5g
			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
24 Models Module ON / OFF	8.5Vdc / 7.0Vdc, typ.		Storage Temperature	-55°C~125°C
48 Models Module ON / OFF	16.5Vdc / 14.5Vdc, typ.		Cooling	Nature Convection
Start up Time	20mS, typ.		ABSOLUTE MAXIMUM RATINGS (7)	
(Nominal Vin and constant resistive load)			These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Filter	Pi Type		Input Surge Voltage (100mS)	
Input Current (No-Load)	See table, max.		24 Models	50Vdc, max.
Input Current (Full-Load)	See table, typ.		48 Models	100Vdc, max.
Input Reflected Ripple Current (5)	20mApk-pk, typ.		Soldering Temperature	260°C, max.
			(1.5mm from case 10sec max.)	
EMC SPECIFICATIONS				
Radiated Emissions	EN55032	CLASS A		
Conducted Emissions	EN55032	CLASS A		
ESD	IEC 61000-4-2	Perf. Criteria A		
RS	IEC 61000-4-3	Perf. Criteria A		
EFT	IEC 61000-4-4	Perf. Criteria A		
Surge (6)	IEC 61000-4-5	Perf. Criteria A		
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 (% , typ.)	Capacitor Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. Load (mA)	Full Load (mA)		
MK-243R3S3M	9-36	10	167	3.3	0	900	75	470
MK-2405S3M	9-36	10	160	5	0	600	79	470
MK-2412S3M	9-36	10	156	12	0	250	81	100
MK-2415S3M	9-36	10	154	15	0	200	82	100
MK-2424S3M	9-36	10	154	24	0	125	82	47
MK-243R3D3M	9-36	10	167	±3.3	0	±450	75	±220
MK-2405D3M	9-36	10	160	±5	0	±300	79	±220
MK-2412D3M	9-36	10	156	±12	0	±125	81	±100
MK-2415D3M	9-36	15	156	±15	0	±100	81	±100
MK-2424D3M	9-36	20	159	±24	0	±63	80	±47
MK-483R3S3M	18-75	7	84	3.3	0	900	75	470
MK-4805S3M	18-75	7	80	5	0	600	79	470
MK-4812S3M	18-75	7	78	12	0	250	81	100
MK-4815S3M	18-75	7	77	15	0	200	82	100
MK-4824S3M	18-75	7	77	24	0	125	82	47
MK-483R3D3M	18-75	7	84	±3.3	0	±450	75	±220
MK-4805D3M	18-75	7	78	±5	0	±300	81	±220
MK-4812D3M	18-75	7	78	±12	0	±125	81	±100
MK-4815D3M	18-75	7	78	±15	0	±100	81	±100
MK-4824D3M	18-75	10	81	±24	0	±63	79	±47

Suffix "H" means 3000Vdc isolation

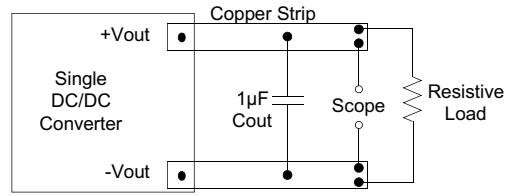
NOTE

- 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

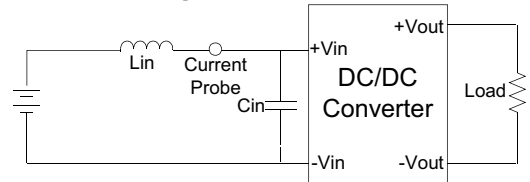
Output Ripple & Noise Measurement Test

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

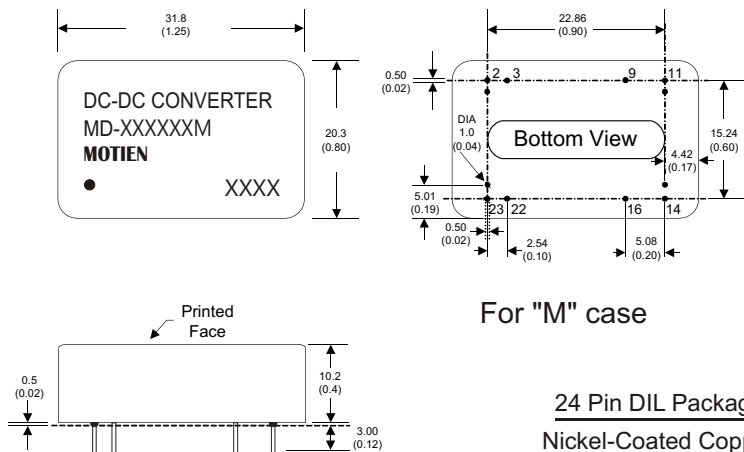


Input Reflected Ripple Current Test Step

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



MECHANICAL SPECIFICATIONS



For "M" case

24 Pin DIL Package
Nickel-Coated Copper

- 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)
 4. Stand-off tolerance: ±0.1 (±0.004)

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.)