MK-3W 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
- 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 1500VDC ~ 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 EN55032 Class A.

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

OUTPUT SPECIFICATIONS

Output Voltage Accuracy	±2%, max.
Output Voltage Blance (Dual Output)	±2%, max.
Output Current	See table, max.
Line Regulation	±0.5%, max.
Load Regulation (0% to 100%)	±1.2%, max.
Cross Regulation (Dual Output) **(1)**	±5%, max.
Ripple&Noise (20MHz Bandwidth)**(2)**	80mVpk-pk, max.
	Dual Output 24V:100mVpk-pk, max.
Over Load Protection	160% of Iout, typ.
Short Circuit Protection	Indefinite(hiccup)
	(Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load **(3)**	See table, max.
Transient Recovery Time **(4)**	300μs, typ.
Transient Response Deviation **(4)**	±3%, max.
	Single Output 3.3V:±5%, max.

INPUT SPECIFICATIONS

Input Voltage Range		See table
Under Voltage Lockout		
24 Models	Module ON / OFF	8.5Vdc / 7.0Vdc, typ.
48 Models	Module ON / OFF	16.5Vdc / 14.5Vdc, typ.
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

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

GENERAL SPECIFICATIONS

Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	1500~3000Vdc
I/O Isolation Capacitance	1000pF, typ.
I/O Isolation Resistance	1000MΩ, min.
Switching Frequency	330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Safety Approvals	UL/cUL 60950-1 , 62368-1
	IEC/EN 60950-1 , 62368-1

PHYSICAL SPECIFICATIONS

Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	13.0g
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS

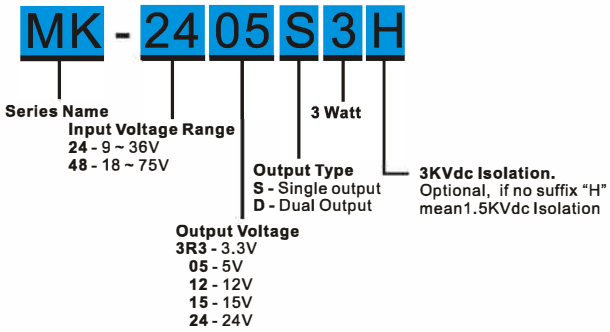
Operating Temperature	-40°C~85°C(See Derating Curve)
	-40°C ~ +70°C (For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-55°C~125°C
Cooling	Nature Convection

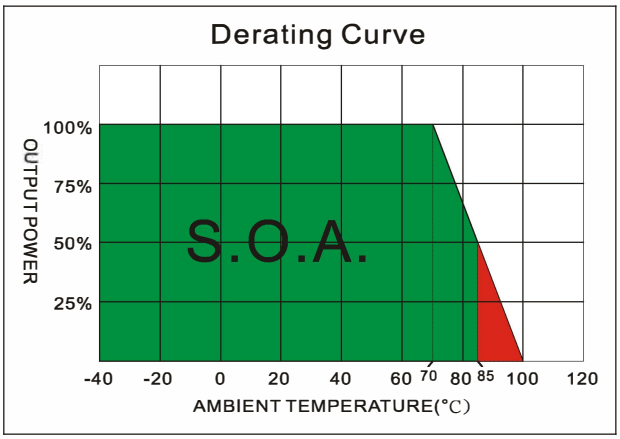
ABSOLUTE MAXIMUM RATINGS(7)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage(100mS)	
24 Models	50Vdc, max.
48 Models	100Vdc, max.
Soldering Temperature	260°C, max.
(1.5mm from case 10sec max.)	

PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA, max.)	INPUT Current Full Load (mA, typ.)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. Load (mA)	OUTPUT Current Full Load (mA)	EFFICIENCY @FL (%, typ.)	Capacitor Load @FL (μF, max.)
MK-243R3S3	9-36	10	167	3.3	0	900	75	470
MK-2405S3	9-36	10	160	5	0	600	79	470
MK-2412S3	9-36	10	156	12	0	250	81	100
MK-2415S3	9-36	10	154	15	0	200	82	100
MK-2424S3	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-2412D3	9-36	10	156	±12	0	±125	81	±100
MK-2415D3	9-36	15	156	±15	0	±100	81	±100
MK-2424D3	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-4812S3	18-75	7	78	12	0	250	81	100
MK-4815S3	18-75	7	77	15	0	200	82	100
MK-4824S3	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-4812D3	18-75	7	78	±12	0	±125	81	±100
MK-4815D3	18-75	7	78	±15	0	±100	81	±100
MK-4824D3	18-75	10	81	±24	0	±63	79	±47

Suffix "H" means 3000Vdc isolation

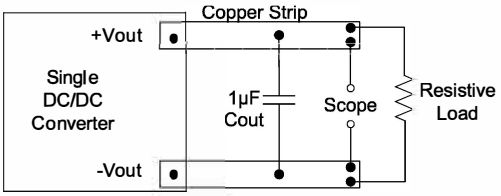
NOTE

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

TEST CONFIGURATIONS

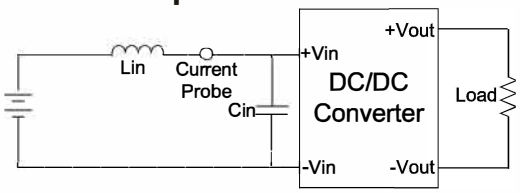
Output Ripple & Noise Measurement Test

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

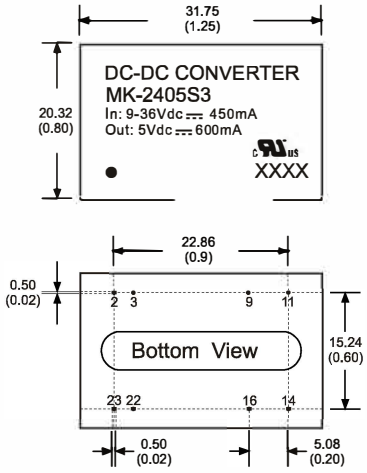


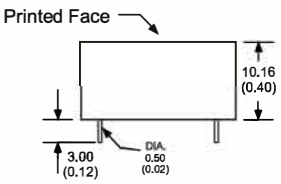
Input Reflected Ripple Current Test Step

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.



MECCHANICAL 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.)

ALL PSU LTD, Unit D6 Laser Quay, Culpeper Close
Medway City Estate, Rochester, Kent, ME2 4HU
Tel: 01634 725527, Email: sales@allpsu.co.uk, Web: www.allpsu.co.uk

DRAWING: APPROVED:

Last Update : 26.AUG.2020