

MK-6W Series



6W 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 85%
- -40°C~ 85°C Operation Temperature Range
- EMC filter meets EN55022 Class A without adding external components
- Non-conductive Black Plastic DIL24-pin case



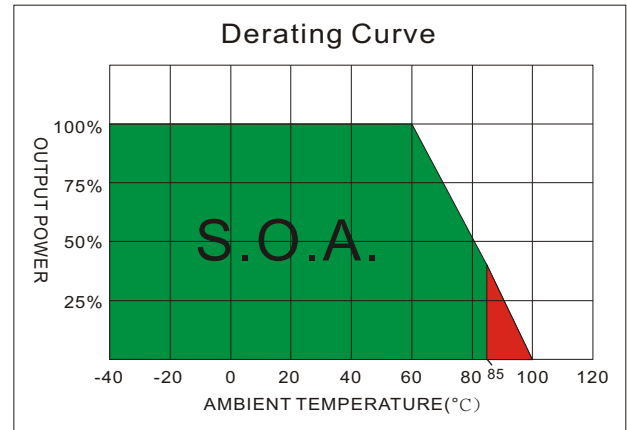
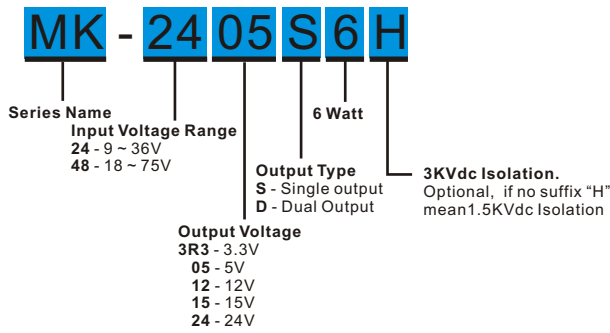
The MK series is a family of cost effective 6W single & dual output DC-DC converters. These converters combine Plastic case in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3000VDC input/output isolation voltage, continuous short circuit protection with automatic restart and 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 85% and output voltage accuracy of $\pm 2\%$ 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		$\pm 2\%$	Efficiency	See table, typ.
Output Voltage Blance(Dual Output)		$\pm 2\%$	I/O Isolation Voltage(60 sec) Input/Output	1500~3000Vdc
Maximum Output Current		See table	I/O Isolation Capacitance	1000 pF, typ.
Line Regulation		$\pm 0.5\%$, max.	I/O Isolation Resistance	1000M Ohm
Load Regulation(0% to 100%)		$\pm 1.2\%$, max.	Switching Frequency	330kHz, typ.
Cross Regulation (Dual Output) (1)		$\pm 5\%$	Humidity	95% rel H
Ripple&Noise (20MHz Bandwidth)(2)	80mVpk-pk, max.		Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
	Dual Output 24V:100mVpk-pk, max.		Safety Standard	UL/cUL 60950-1 , IEC/EN 60950-1
Over Load Protection		160% of Iout, typ.	Safety Approvals	UL/cUL 60950-1 , IEC/EN 60950-1
Short Circuit Protection		Indefinite(hiccup) (Automatic Recovery)		
Temperature Coefficient		$\pm 0.02\%/^{\circ}\text{C}$	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)		$\pm 3\%$, max.	Pin Material	$\Phi 0.5\text{mm}$ Brass Solder-coated
	Single Output 3.3V: $\pm 5\%$, max.		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 ~ +60°C (For 100% load)
Under Voltage Lockout			Maximum Case Temperature	100°C
24V Models	Module ON / OFF	8.5Vdc / 7.0Vdc, typ.	Storage Temperature	-55°C~125°C
48V Models	Module ON / OFF	16.5Vdc / 14.5Vdc, typ.	Cooling	Nature Convection
Start up Time		20mS, typ.		
(Nominal Vin and constant resistive load)				
Input Filter		Pi Type	ABSOLUTE MAXIMUM RATINGS(7)	
Input Current (No-Load)		See table, max.	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Current (Full-Load)		See table, typ.	Input Surge Voltage(100mS)	
Input Reflected Ripple Current (5)		20mA _{p-p} , typ.	24 Models	50 Vdc, max
			48 Models	100 Vdc, max
			Soldering Temperature	260C, max.
			(1.5mm from case 10 sec. max.)	
EMC SPECIFICATIONS				
Radiated Emissions	EN55022	CLASS A		
Conducted Emissions	EN55022	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(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Min. load (mA)	Full load (mA)		
MK-243R3S6	9-36	10	257	3.3	0	1400	76	470
MK-2405S6	9-36	10	316	5	0	1200	80	470
MK-24 12S6	9-36	10	301	12	0	500	84	100
MK-24 15S6	9-36	10	301	15	0	400	84	100
MK-2424S6	9-36	10	301	24	0	250	84	47
MK-243R3D6	9-36	10	325	±3.3	0	±909	78	±220
MK-2405D6	9-36	10	309	±5	0	±600	82	±220
MK-24 12D6	9-36	10	301	±12	0	±250	84	±100
MK-24 15D6	9-36	15	301	±15	0	±200	84	±100
MK-2424D6	9-36	20	309	±24	0	±125	82	±47
MK-483R3S6	18-75	7	128	3.3	0	1400	76	470
MK-4805S6	18-75	7	154	5	0	1200	82	470
MK-48 12S6	18-75	7	151	12	0	500	84	100
MK-48 15S6	18-75	7	149	15	0	400	85	100
MK-4824S6	18-75	7	149	24	0	250	85	47
MK-483R3D6	18-75	7	160	±3.3	0	±909	79	±220
MK-4805D6	18-75	7	154	±5	0	±600	82	±220
MK-48 12D6	18-75	7	151	±12	0	±250	84	±100
MK-48 15D6	18-75	7	151	±15	0	±200	84	±100
MK-4824D6	18-75	10	156	±24	0	±125	81	±47

Suffix "H" means 3000Vdc isolation

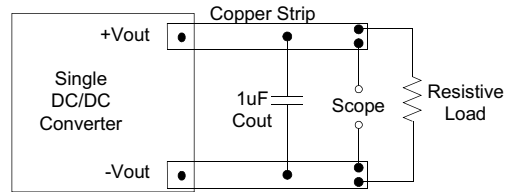
NOTE

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 1uF 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 12uH and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz).
6. 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, 220uF/100V.
7. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.

TEST CONFIGURATIONS

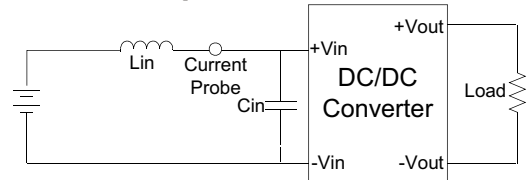
Output Ripple & Noise Measurement Test

Use a capacitor $C_{out}(1.0\mu F)$ measurement.
The Scope measurement bandwidth is 0-20MHz.

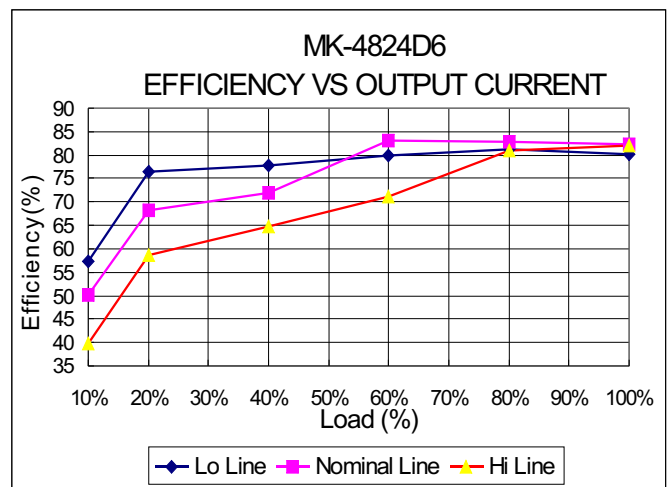
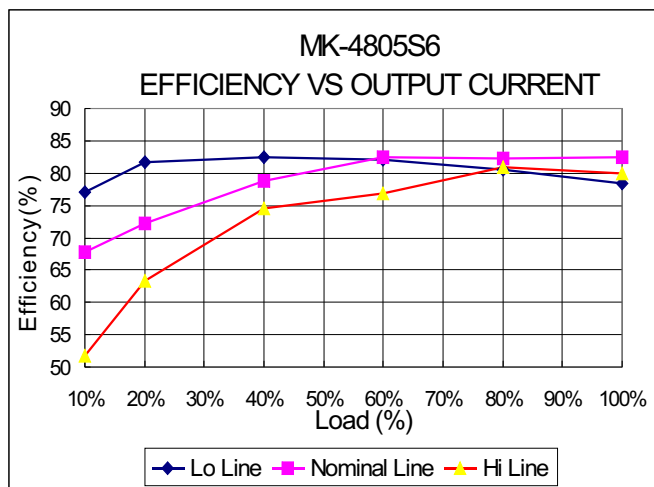
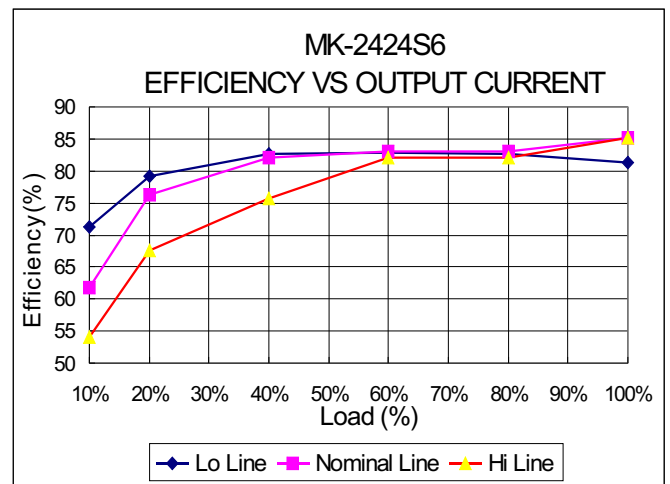
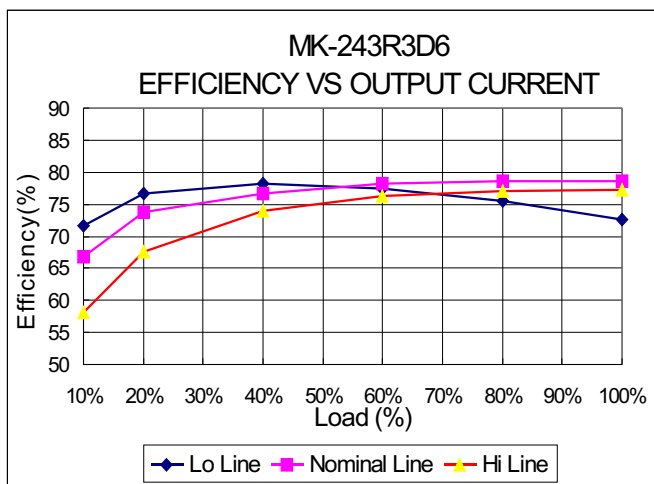


Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor $L_{in}(12\mu H)$ and a source capacitor $C_{in}(47\mu F, ESR < 1.0\Omega \text{ at } 100\text{KHz})$ at nominal input and full load.

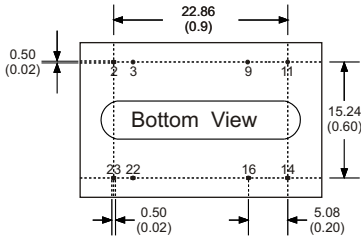
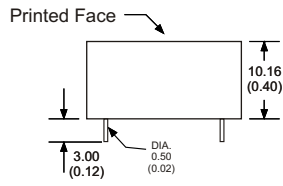
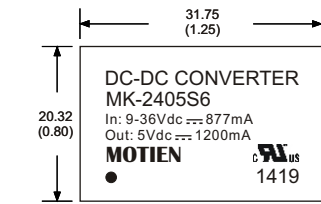


ELECTRICAL CHARACTERISTIC CURVES



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 : sales@motien.com.tw

MECCANICAL 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.)