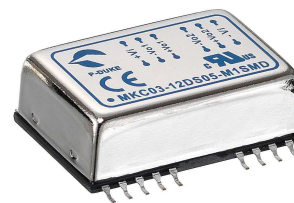


# MKC03 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 3Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 500VDC INPUT TO OUTPUT ISOLATION
- STANDARD 1.25 X 0.80 X 0.40 INCH
- FIVE-SIDED CONTINUOUS SHIELD
- STANDARD 24 PIN DIP PACKAGE & SMD TYPE PACKAGE
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

500VDC  
ISOLATION

OCP

SCP

## TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA		µF
MKC03-12S33	9 ~ 18	3.3	500	8	74	2200
MKC03-12S05	9 ~ 18	5	500	10	77	1000
MKC03-12S12	9 ~ 18	12	250	13	79	220
MKC03-12S15	9 ~ 18	15	200	13	80	150
MKC03-12D05	9 ~ 18	±5	±250	13	75	± 470
MKC03-12D12	9 ~ 18	±12	±125	16	80	± 100
MKC03-12D15	9 ~ 18	±15	±100	16	80	± 68
MKC03-12DS05	9 ~ 18	+5 / +5	250 / 250	18	75	470 / 470
MKC03-12DS12	9 ~ 18	+12 / +12	125 / 125	18	80	100 / 100
MKC03-12DS15	9 ~ 18	+15 / +15	100 / 100	18	80	68 / 68
MKC03-24S33	18 ~ 36	3.3	500	12	72	2200
MKC03-24S05	18 ~ 36	5	500	12	74	1000
MKC03-24S12	18 ~ 36	12	250	16	78	220
MKC03-24S15	18 ~ 36	15	200	16	78	150
MKC03-24D05	18 ~ 36	±5	±250	18	75	± 470
MKC03-24D12	18 ~ 36	±12	±125	18	78	± 100
MKC03-24D15	18 ~ 36	±15	±100	18	78	± 68
MKC03-24DS05	18 ~ 36	+5 / +5	250 / 250	16	75	470 / 470
MKC03-24DS12	18 ~ 36	+12 / +12	125 / 125	20	78	100 / 100
MKC03-24DS15	18 ~ 36	+15 / +15	100 / 100	20	78	68 / 68
MKC03-48S33	36 ~ 75	3.3	500	8	76	2200
MKC03-48S05	36 ~ 75	5	500	10	74	1000
MKC03-48S12	36 ~ 75	12	250	10	79	220
MKC03-48S15	36 ~ 75	15	200	10	79	150
MKC03-48D05	36 ~ 75	±5	±250	10	74	± 470
MKC03-48D12	36 ~ 75	±12	±125	12	77	± 100
MKC03-48D15	36 ~ 75	±15	±100	12	77	± 68
MKC03-48DS05	36 ~ 75	+5 / +5	250 / 250	18	74	470 / 470
MKC03-48DS12	36 ~ 75	+12 / +12	125 / 125	18	77	100 / 100
MKC03-48DS15	36 ~ 75	+15 / +15	100 / 100	18	77	68 / 68

**PART NUMBER STRUCTURE**
**MKC03 - 48 S 05 - M1 SMD**

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Version Code	Package
	12: 9-18 24: 18-36 48: 36-75	S: Single  D: Dual  DS: Dual Positive	33: 3.3 05: 5 12: 12 15: 15  05: ±5 12: ±12 15: ±15  05: 5 / 5 12: 12 / 12 15: 15 / 15	□: Standard Version M1: M1 Version	□: DIP Type SMD: SMD Type

**INPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)	9	12	18	VDC
	24Vin(nom)	18	24	36	
	48Vin(nom)	36	48	75	
Input reflected ripple current	Nominal input and Full load		20		mAp-p
Start up time	Constant resistive load			350	ms
Input surge voltage	100 ms, max.	12Vin(nom)		36	VDC
		24Vin(nom)		50	
		48Vin(nom)		100	
Input filter					Pi type

**OUTPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy		-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load	-0.2		+0.2	%
Load regulation	No Load to Full Load	Single		+0.2	%
		Dual / Dual Positive		+1.0	
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth		50		mVp-p
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	25% load step change		200		µs
Over load protection	% of Iout rated		180		%
Short circuit protection					Continuous, automatic recovery

**GENERAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	500		VDC
		Input(Output) to Case	500		
		V1out to V2out(Dual Positive)	500		
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				300	pF
Switching frequency		270	300	330	kHz
Safety approvals					UL60950-1 EN60950-1 IEC60950-1
Case material					Nickel-coated copper
Base material					Non-conductive black plastic
Potting material					Epoxy (UL94 V-0)
Weight	DIP Type SMD Type				16g (0.55oz)
					18g (0.62oz)
MTBF	MIL-HDBK-217F, Full load				7.213 x 10 <sup>6</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Standard M1 (2)	With derating	-25	+85	°C
		Without derating	-40	+85	
Maximum case temperature				+100	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM)		20		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

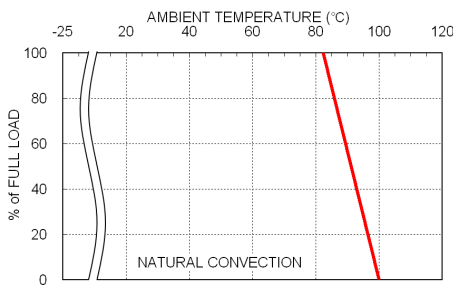
**EMC SPECIFICATIONS**

Parameter	Conditions		Level
EMI	EN55022		Class A
ESD	EN61000-4-2	Air $\pm 8kV$ and Contact $\pm 6kV$	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (3)	EN61000-4-4	$\pm 2kV$	Perf. Criteria B
Surge (3)	EN61000-4-5	$\pm 1kV$	Perf. Criteria B
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

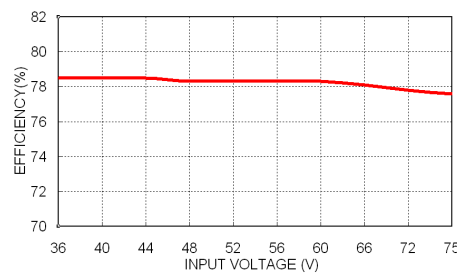
**Note:**

1. Test by minimum input and constant resistive load.
2. M1 version is more efficient, therefore, it can be operated in a more extensive temperature range than standard.
3. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220 $\mu F$ /100V.

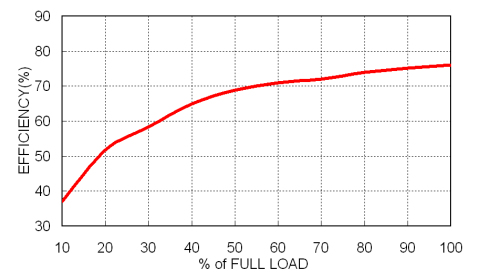
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

**CHARACTERISTIC CURVE**


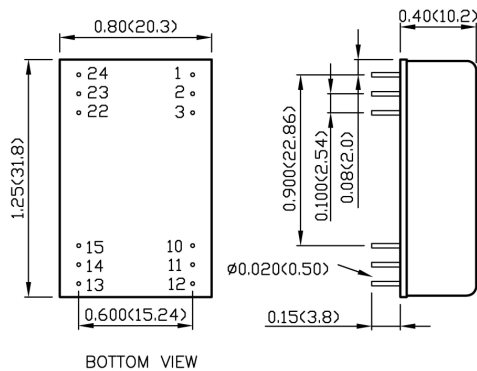
MKC03-48S05 Derating Curve



MKC03-48S05 Efficiency vs. Input Voltage



MKC03-48S05 Efficiency vs. Output Load

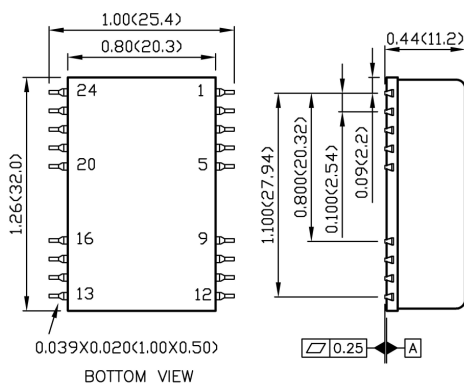
**MECHANICAL DRAWING**
**DIP TYPE**


BOTTOM VIEW

**DIP PIN CONNECTION**

PIN	SINGLE	DUAL	DS	PIN	SINGLE	DUAL	DS
1	+Vin	+Vin	+Vin	24	+Vin	+Vin	+Vin
2	NC	-Vout	-V1out	23	NC	-Vout	-V1out
3	NC	Common	+V1out	22	NC	Common	+V1out
10	-Vout	Common	-V2out	15	-Vout	Common	-V2out
11	+Vout	+Vout	+V2out	14	+Vout	+Vout	+V2out
12	-Vin	-Vin	-Vin	13	-Vin	-Vin	-Vin

\* NC : No Connection

**SMD TYPE**


BOTTOM VIEW

**SMD PIN CONNECTION**

PIN	SINGLE	DUAL	DS	PIN	SINGLE	DUAL	DS
1	+Vin	+Vin	+Vin	24	+Vin	+Vin	+Vin
2	NC	-Vout	-V1out	23	NC	-Vout	-V1out
3	NC	Common	+V1out	22	NC	Common	+V1out
10	-Vout	Common	-V2out	15	-Vout	Common	-V2out
11	+Vout	+Vout	+V2out	14	+Vout	+Vout	+V2out
12	-Vin	-Vin	-Vin	13	-Vin	-Vin	-Vin
Others	NC	NC	NC				

\* NC : No Connection

1. All dimensions in inch (mm)
2. Tolerance :x.xx $\pm 0.02$  (x.x $\pm 0.5$ )  
x.xxx $\pm 0.01$  (x.xx $\pm 0.25$ )
3. Pin pitch tolerance  $\pm 0.01$  (0.25)
4. Pin dimension tolerance  $\pm 0.004$  (0.1)