SMK-6W(M) 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
- Nickel-coated Copper DIL24-pin case

The SMK series is a family of cost effective 6W 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 1500 VDC ~ 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 85% 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

Output Voltage Accuracy	±2%
Output Voltage Blance(Dual Output)	±2%
Maximum Output Current	See table
Line Regulation	±0.5%, max.
Load Regulation(0% to 100%)	±1.2%, max.
Cross Regulation (Dual Output) **(1)**	±5%
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
Transient Recovery Time **(4)**	300us, typ.
Transient Response Deviation **(4)**	±3%, max. Single Output 3.3V:±5%, max.

INPUT SPECIFICATIONS

Input Voltage Range		See table
Under Voltage Lockout		
24V Models	Module ON / OFF	8.5Vdc / 7.0Vdc, typ.
48V Models	Module ON / OFF	16.5Vdc / 14.5Vdc, typ.
Start up Time (Nominal Vin and constant resistive load)		20mS, typ.
Input Filter		Pi Type
Input Current (No-Load)		See table, max.
Input Current (Full-Load)		See table, typ.
Input Reflected Ripple Current **(5)**		20mAp-p, typ.

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

GENERAL SPECIFICATIONS

Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	1500~3000Vdc
Case/Input&Ouput	1000Vdc
I/O Isolation Capacitance	1000 pF typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	330kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Safety Standard : (designed to meet)	IEC/EN 60950-1

PHYSICAL SPECIFICATIONS

Case Material	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	16.5g
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS

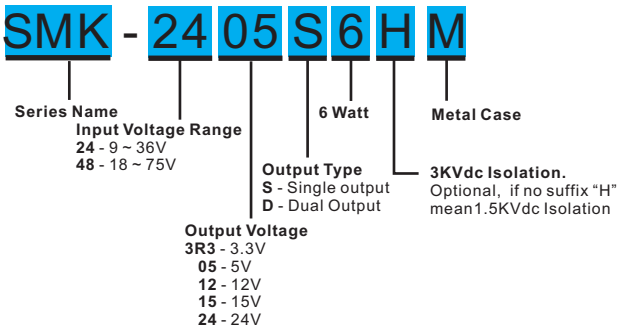
Operating Temperature	-40°C~85°C(See Derating Curve) -40°C ~ +60°C (For 100% load)
Maximum Case Temperature	100°C
Storage Temperature	-55°C~125°C
Cooling	Nature Convection

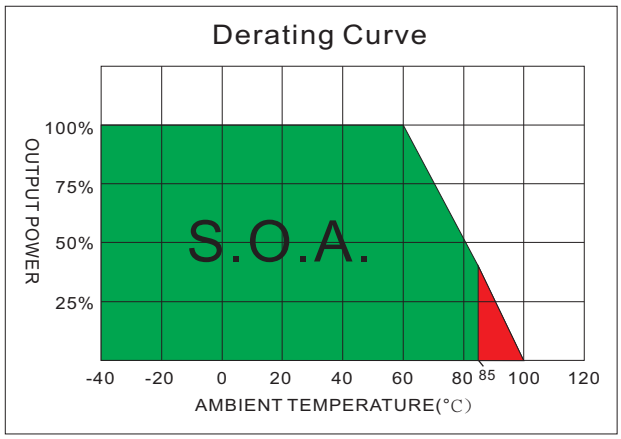
ABSOLUTE MAXIMUM RATINGS(7)

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

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

PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
SMK-243R3S6M	9-36	10	257	3.3	0	1400	76	470
SMK-2405S6M	9-36	10	316	5	0	1200	80	470
SMK-2412S6M	9-36	10	301	12	0	500	84	100
SMK-2415S6M	9-36	10	301	15	0	400	84	100
SMK-2424S6M	9-36	10	301	24	0	250	84	47
SMK-243R3D6M	9-36	10	325	3.3	0	909	78	220
SMK-2405D6M	9-36	10	309	5	0	600	82	220
SMK-2412D6M	9-36	10	301	12	0	250	84	100
SMK-2415D6M	9-36	15	301	15	0	200	84	100
SMK-2424D6M	9-36	20	309	24	0	125	82	47
SMK-483R3S6M	18-75	7	128	3.3	0	1400	76	470
SMK-4805S6M	18-75	7	154	5	0	1200	82	470
SMK-4812S6M	18-75	7	151	12	0	500	84	100
SMK-4815S6M	18-75	7	149	15	0	400	85	100
SMK-4824S6M	18-75	7	149	24	0	250	85	47
SMK-483R3D6M	18-75	7	160	3.3	0	909	79	220
SMK-4805D6M	18-75	7	154	5	0	600	82	220
SMK-4812D6M	18-75	7	151	12	0	250	84	100
SMK-4815D6M	18-75	7	151	15	0	200	84	100
SMK-4824D6M	18-75	10	156	24	0	125	81	47

Suffix "H" means 3000Vdc isolation

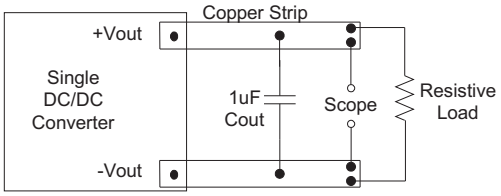
NOTE

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 Schmid-M 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

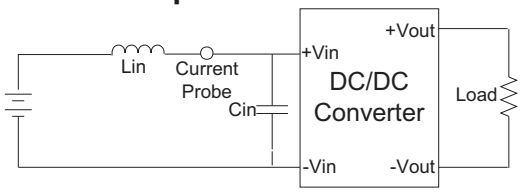
Output Ripple & Noise Measurement Test

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

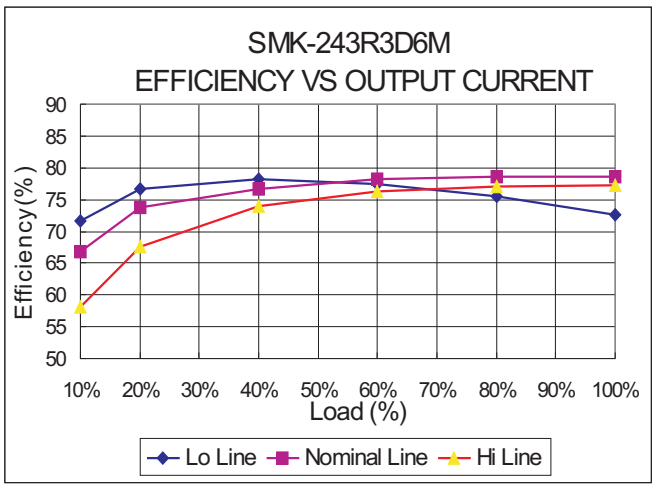


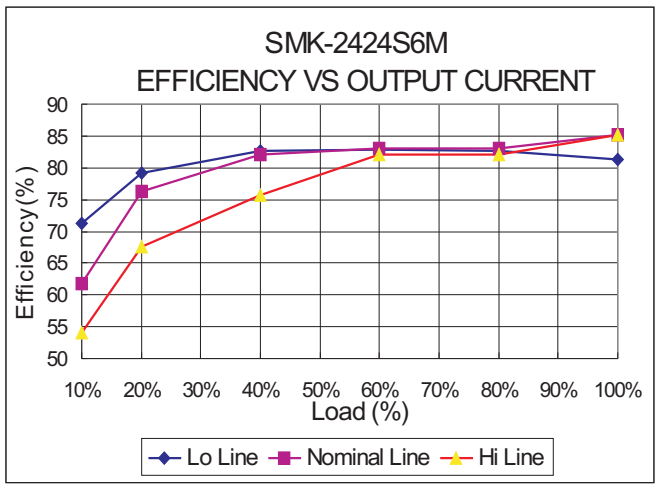
Input Reflected Ripple Current Test Step

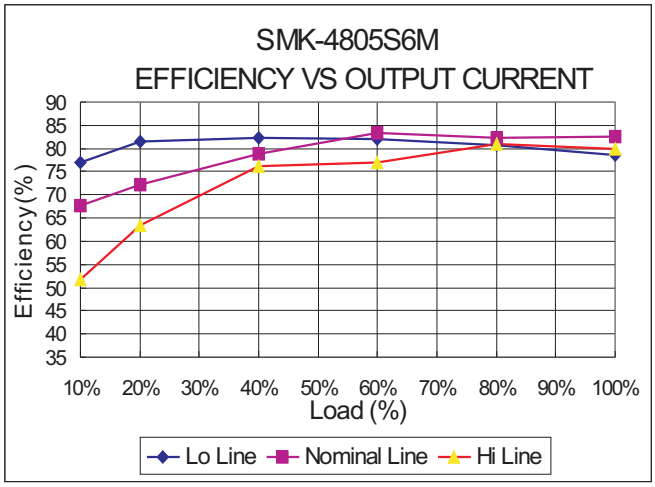
Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.

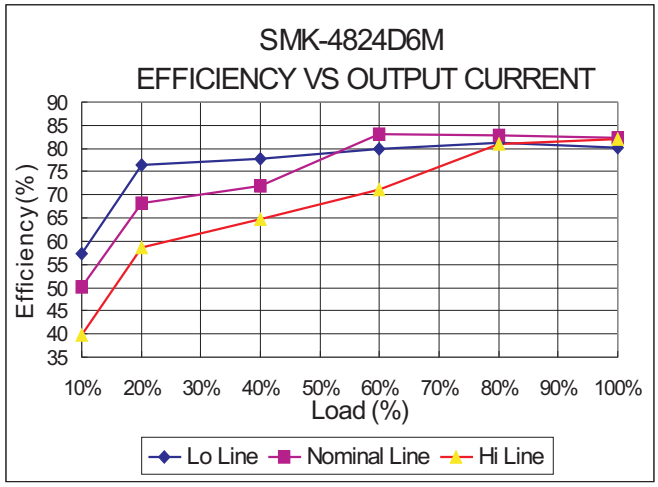


ELECTRICAL CHARACTERISTIC CURVES

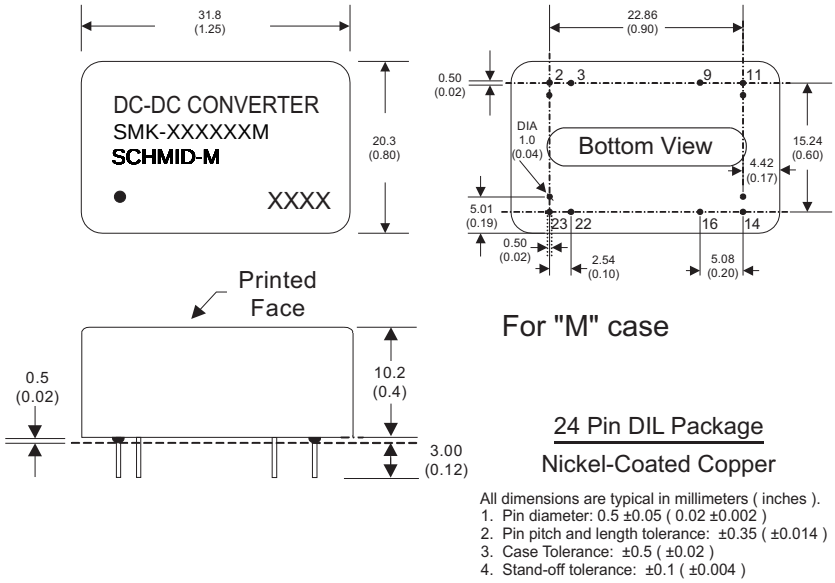








MECCHANICAL SPECIFICATIONS



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.)