



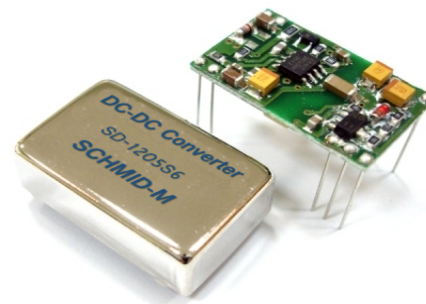
# SCHMID-M

## SD-6W Series

6W 2:1 Regulated Single & Dual output

### Features

- Wide 2:1 Input Range
- Full SMD Technology
- 1500 VDC Isolation, Up to 3500 VDC
- Continuous Short Circuit Protection
- Efficiency up to 83%
- -40 ~ 85°C Operation Temperature Range
- Metal Case Standard, Optional Plastic Case

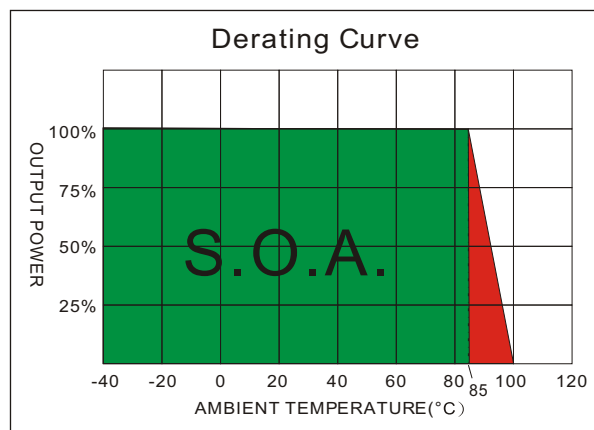
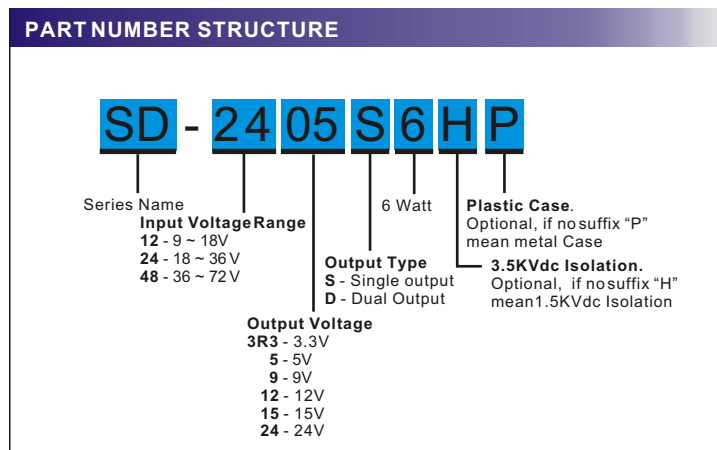


The SD series is a family of cost effective 6.0W single & dual output DC-DC converters. These converters are consisted with Nickel-coated copper in a 24-pin DIL package with high performance features such as 1500 VDC ~ 3500VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 12,24 and 48 with output voltage of 3.3,5,9,12,15, 24, ±3.3, ±5, ±9, ±12, ±15 and ±24 Vdc. High performance features include high efficiency operation up to 75% and output voltage accuracy of ±1% maximum.

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

| OUTPUT SPECIFICATIONS                       |                                   | PHYSICAL SPECIFICATIONS  |   |
|---|-----------------------------------|--|---|
| Voltage accuracy                            | ±1%                               | Case Material  | Nickel-coated Copper                        |
| Line regulation                             | ±0.5%                             |  | Non-conductive Black Plastic(UL94V-0 rated) |
| Load regulation                             | ±0.5%                             | Base Material  | Non-conductive Black Plastic(UL94V-0 rated) |
|   | (Output 3.3V / ±3.3V Model) ±1.5% | Pin Material   | Ø0.5mm Brass Solder-coated                  |
| Ripple & noise(20 MHz bandwidth)(1)         | 60mV pk-pk                        | Potting Material   | Epoxy (UL94V-0 rated)                       |
| Short circuit protection                    | Indefinite(Automatic Recovery)    | Weight   | 17.0g(Metal Case)/13.5g(Plastic Case)       |
| Temperature coefficient                     | ±0.02%/°C                         | Dimensions   | 1.25"x0.8"x0.4"                             |
| Capacitor load(2)                           | See table                         |  |   |
| INPUT SPECIFICATIONS                        |                                   | ENVIRONMENT SPECIFICATIONS   |   |
| Voltage Range                               | See table                         | Operating Temperature  | -40°C~85°C(See Derating Curve)              |
| Max. Input Current                          | See table                         | Maximum Case Temperature   | 100°C                                       |
| No-Load Input Current                       | See table                         | Storage Temperature  | -40°C~125°C                                 |
| Input Filter                                | PI Type                           | Cooling  | Nature Convection                           |
| Input Reflected Ripple Current(3)           | 35mA pk-pk                        |  |   |
| GENERAL SPECIFICATIONS                      |                                   | ABSOLUTE MAXIMUM RATINGS(4)  |   |
| Efficiency                                  | See table, typ.                   | These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. |   |
| I/O Isolation Voltage(3 sec)                |                                   | Input Surge Voltage(100mS)   |   |
| Input/Output                                | 1500~3500Vdc                      | 12 Models  | 24 Vdc, max.                                |
| Metal Case/Input & Output                   | 1000Vdc                           | 24 Models  | 40 Vdc, max.                                |
| I/O Isolation Capacitance                   | 500 pF, typ.                      | 48 Models  | 80 Vdc, max.                                |
| I/O Isolation Resistance                    | 1000M Ohm                         | Soldering Temperature  | 260°C, max.                                 |
| Switching Frequency                         | 266kHz, typ.                      | (1.5mm from case 10sec. max.)  |   |
| Humidity                                    | 95% rel H                         | EMC SPECIFICATIONS   |   |
| Reliability Calculated MTBF(MIL-HDBK-217 F) | >1.121 Mhrs                       | Radiated Emissions   | EN55022 CLASS A                             |
| Safety Standard : (designed to meet)        | IEC 60950-1                       | Conducted Emissions (5)  | EN55022 CLASS A                             |
|   |                                   | ESD  | IEC 61000-4-2 Perf. Criteria A              |
|   |                                   | RS   | IEC 61000-4-3 Perf. Criteria A              |
|   |                                   | EFT (6)  | 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              |

## SD - 6W 2:1 Regulated Single & Dual output



## MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current |                | OUTPUT Voltage (Vdc) | OUTPUT Current |                | EFFICIENCY @FL(%) | Capacitor Load(µF) |
|--------------|---------------------------|---------------|----------------|----------------------|----------------|----------------|-------------------|--------------------|
|              |                           | No-Load (mA)  | Full Load (mA) |                      | Min. load (mA) | Full load (mA) |                   |                    |
| SD-123R3S6   | 9-18                      | 30            | 527            | 3.3                  | 0              | 1400           | 73                | 1000               |
| SD-1205S6    | 9-18                      | 30            | 649            | 5                    | 0              | 1200           | 77                | 1000               |
| SD-1209S6    | 9-18                      | 30            | 641            | 9                    | 0              | 666            | 78                | 680                |
| SD-1212S6    | 9-18                      | 30            | 617            | 12                   | 0              | 500            | 81                | 330                |
| SD-1215S6    | 9-18                      | 30            | 625            | 15                   | 0              | 400            | 80                | 220                |
| SD-1224S6    | 9-18                      | 30            | 625            | 24                   | 0              | 250            | 80                | 68                 |
| SD-123R3D6   | 9-18                      | 30            | 527            | ±3.3                 | 0              | ±909           | 73                | ±680               |
| SD-1205D6    | 9-18                      | 30            | 649            | ±5                   | 0              | ±600           | 77                | ±330               |
| SD-1209D6    | 9-18                      | 30            | 625            | ±9                   | 0              | ±333           | 80                | ±220               |
| SD-1212D6    | 9-18                      | 30            | 625            | ±12                  | 0              | ±250           | 80                | ±100               |
| SD-1215D6    | 9-18                      | 30            | 632            | ±15                  | 0              | ±200           | 79                | ±47                |
| SD-1224D6    | 9-18                      | 30            | 625            | ±24                  | 0              | ±125           | 80                | ±33                |
| SD-243R3S6   | 18-36                     | 20            | 256            | 3.3                  | 0              | 1400           | 75                | 1000               |
| SD-2405S6    | 18-36                     | 20            | 313            | 5                    | 0              | 1200           | 80                | 1000               |
| SD-2409S6    | 18-36                     | 20            | 304            | 9                    | 0              | 666            | 82                | 680                |
| SD-2412S6    | 18-36                     | 20            | 313            | 12                   | 0              | 500            | 80                | 330                |
| SD-2415S6    | 18-36                     | 20            | 304            | 15                   | 0              | 400            | 82                | 220                |
| SD-2424S6    | 18-36                     | 20            | 305            | 24                   | 0              | 250            | 82                | 68                 |
| SD-243R3D6   | 18-36                     | 20            | 333            | ±3.3                 | 0              | ±909           | 75                | ±680               |
| SD-2405D6    | 18-36                     | 20            | 321            | ±5                   | 0              | ±600           | 78                | ±330               |
| SD-2409D6    | 18-36                     | 20            | 301            | ±9                   | 0              | ±333           | 83                | ±220               |
| SD-2412D6    | 18-36                     | 20            | 312            | ±12                  | 0              | ±250           | 80                | ±100               |
| SD-2415D6    | 18-36                     | 20            | 312            | ±15                  | 0              | ±200           | 80                | ±47                |
| SD-2424D6    | 18-36                     | 20            | 312            | ±24                  | 0              | ±125           | 80                | ±33                |
| SD-483R3S6   | 36-72                     | 12            | 128            | 3.3                  | 0              | 1400           | 75                | 1000               |
| SD-4805S6    | 36-72                     | 12            | 156            | 5                    | 0              | 1200           | 80                | 1000               |
| SD-4809S6    | 36-72                     | 12            | 152            | 9                    | 0              | 666            | 82                | 680                |
| SD-4812S6    | 36-72                     | 12            | 156            | 12                   | 0              | 500            | 80                | 330                |
| SD-4815S6    | 36-72                     | 12            | 151            | 15                   | 0              | 400            | 83                | 220                |
| SD-4824S6    | 36-72                     | 12            | 151            | 24                   | 0              | 250            | 83                | 68                 |

Suffix "H" means 3.5KVdc isolation

Suffix "P" means Plastic case instead of standard Metal Case

## SD - 6W 2:1 Regulated Single & Dual output

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current |                | OUTPUT Voltage (Vdc) | OUTPUT Current |                | EFFICIENCY @FL(%) | Capacitor Load(µF) |
|--------------|---------------------------|---------------|----------------|----------------------|----------------|----------------|-------------------|--------------------|
|              |                           | No-Load (mA)  | Full Load (mA) |                      | Min. load (mA) | Full load (mA) |                   |                    |
| SD-483R3D6   | 36-72                     | 12            | 171            | ±3.3                 | 0              | ±909           | 73                | ±680               |
| SD-4805D6    | 36-72                     | 12            | 158            | ±5                   | 0              | ±600           | 79                | ±330               |
| SD-4809D6    | 36-72                     | 12            | 158            | ±9                   | 0              | ±333           | 79                | ±220               |
| SD-4812D6    | 36-72                     | 12            | 156            | ±12                  | 0              | ±250           | 80                | ±100               |
| SD-4815D6    | 36-72                     | 12            | 156            | ±15                  | 0              | ±200           | 80                | ±47                |
| SD-4824D6    | 36-72                     | 12            | 156            | ±24                  | 0              | ±125           | 80                | ±33                |

Suffix "H" means 3.5KVdc isolation

Suffix "P" means Plastic case instead of standard Metal Case

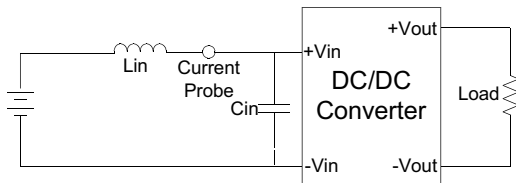
### NOTE

1. Ripple/Noise measured with a 1µF ceramic capacitor.
2. Test by nominal input voltage and constant resistor load.
3. Measured Input reflected ripple current with a simulated source inductance of 12µH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Input filter components are required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
6. An external filter capacitor is required if the module has to meet IEC 61000-4-4 and IEC 61000-4-5.  
The filter capacitor SCHMID-M suggest: Nippon - chemi- con KY series, 220µF/100V.

### TEST CONFIGURATIONS

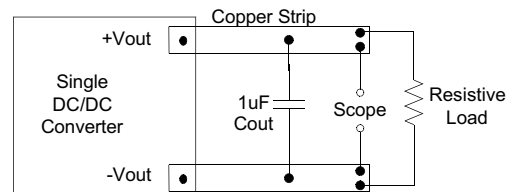
#### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$  (12µH) and a source capacitor  $C_{in}$  (47µF, ESR<1.0Ω at 100KHz) at nominal input and full load.



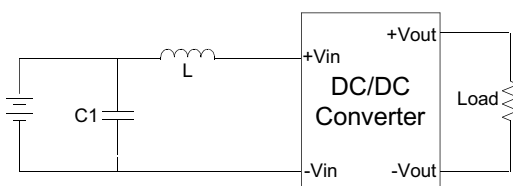
#### Output Ripple & Noise Measurement Test

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

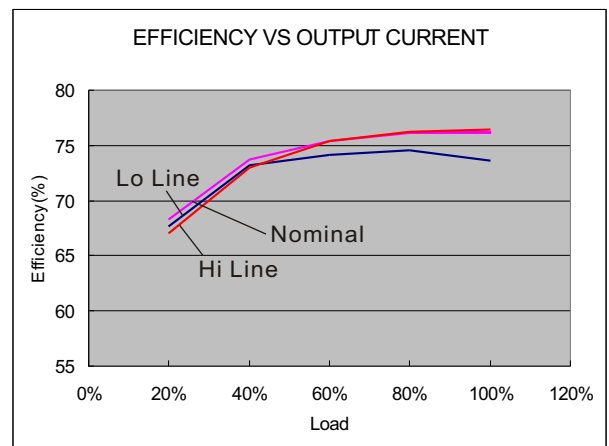


#### EMI Filter

Input filter components ( $C_1$ ,  $L$ ) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

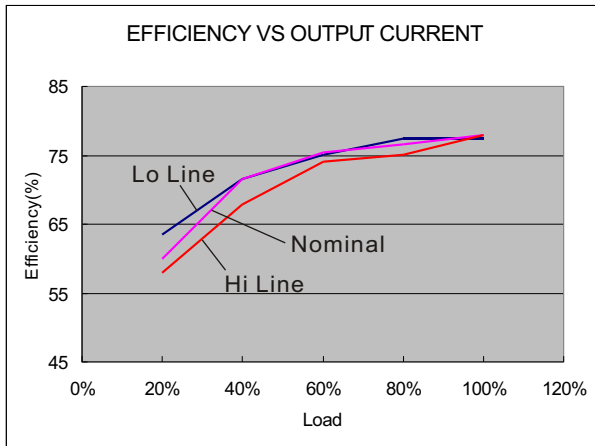


| C1          | L    |
|-------------|------|
| 100µF, 100V | 12µH |

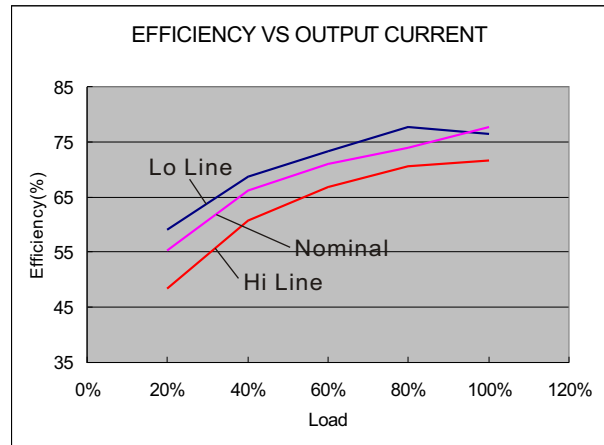


12 Models

## SD - 6W 2:1 Regulated Single & Dual output

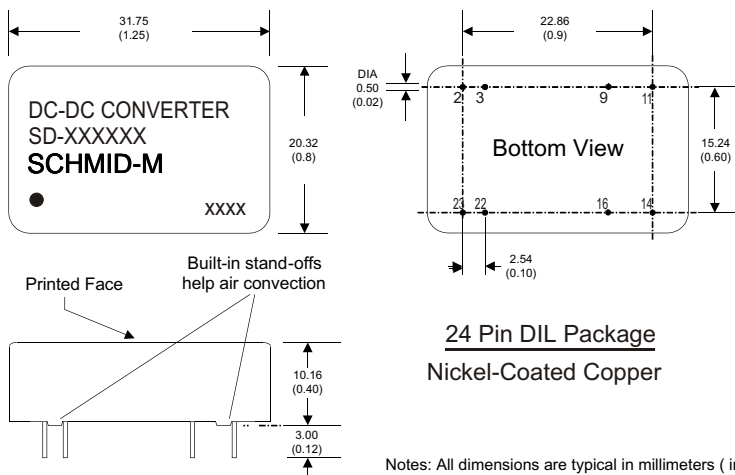


24 Models



48 Models

### MECHANICAL SPECIFICATIONS



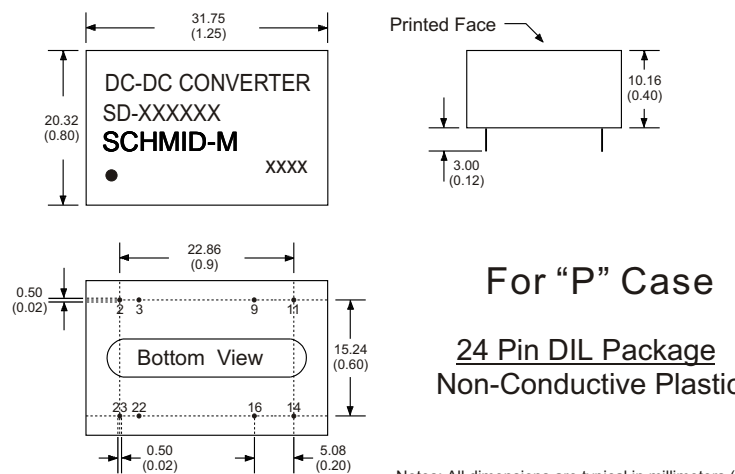
**24 Pin DIL Package**  
Nickel-Coated Copper

- Notes: All dimensions are typical in millimeters ( inches ).
1. Pin diameter:  $0.5 \pm 0.05$  (  $0.02 \pm 0.002$  )
  2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
  3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

| 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.)

### MECHANICAL SPECIFICATIONS



**For "P" Case**  
**24 Pin DIL Package**  
Non-Conductive Plastic

- Notes: All dimensions are typical in millimeters ( inches ).
1. Pin diameter:  $0.5 \pm 0.05$  (  $0.02 \pm 0.002$  )
  2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
  3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

| 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.)