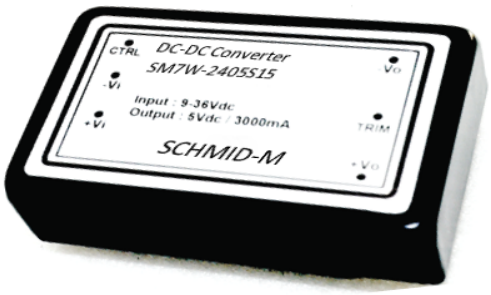
SM7W Series

15W 4:1 Regulated Single & Dual output

Features

- Ultra Wide 4:1 Input Range
- 3000 VDC Isolation
- No Minimum Load Required
- Efficiency up to 90%
- Extended Operating Temperature Range -40 ~ 100°C max.
- Adjustable Output Voltage
- Remote On/Off Control (CTRL)
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Soft Start
- Built-in EMI filter meets EN55032 classA without external components



The SM7W series is a family of cost effective 15W single & dual output DC-DC converters. These converters combine copper package in a 1.6"x1" case with high performance features , continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 24 and 48 with output voltage of 3.3, 5, 12, 15, ±5, ±12, ±15Vdc. High performance features include high efficiency operation up to 90% and output voltage accuracy of ±1% maximum.

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED.

OUTPUT SPECIFICATIONS

Output Voltage Accuracy	±1%
Output Voltage Adjustability(Trim)	Single output: ±10%, max.
Maximum Output Current	See table
Line Regulation	±0.5%, max.
Load Regulation(Io=0% to 100%)	Single: ±0.5%, max. Dual:±1%, max.(balanced load)
Cross Regulation (Dual Output) (1)	±5%
Ripple&Noise **Measured by 20MHz bandwidth** **With a 10uF/25V X7R MLCC** **With a 10uF/25V X7R MLCC for each output**	 Single output:75mVpk-pk,max. Dual output:60mVpk-pk,max.
Over Voltage Protection	140% of Vout, typ.
Over Current Protection	170% of FL, typ.
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load (2)	See table
Transient Recovery Time (3)	250us, typ.
Transient Response Deviation(3)	±3%, max. Single Output 3.3V:±5%, max.

INPUT SPECIFICATIONS

Input Voltage Range		See table
Under Voltage Lockout		
24V Modes	Module ON / OFF	8.8Vdc / 7.6Vdc, typ.
48V Modes	Module ON / OFF	17.5Vdc / 16.5Vdc, typ.
Start up Time (Nominal Vin and constant resistive load)		30mS, typ.
Input Filter		Pi Type
Input Current(No-Load)		See table, max.
Input Current(Full-Load)		See table, typ.
Input Reflected Ripple Current(4)		20mAp-p, typ.
Remote On/Off (Positive logic)(5)		
ON:		3.0 ... 12Vdc or open circuit
OFF:		0 ... 1.2Vdc or Short circuit pin2 and pin 6
OFF idle current:		2 mA, typ.

GENERAL SPECIFICATIONS

Efficiency		See table, typ.
I/O Isolation Voltage(60 sec)		
Input/Output		3000Vdc
Case/Input & Output		1600Vdc
Isolation Resistance		1000 MΩ, min.
Isolation Capacitance		2000 pF, typ.
Switching Frequency	3.3 & 05 Vout Models	270kHz, typ.
	other Models	330kHz, typ.
Humidity		95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)		>600 Khrs
Safety Standard (designed to meet)		IEC/EN 60950-1

ABSOLUTE SPECIFICATIONS (6)

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

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

PHYSICAL SPECIFICATIONS

Case Material	Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	Φ1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	29.0g
Dimensions	1.60"x1.00"x0.41"

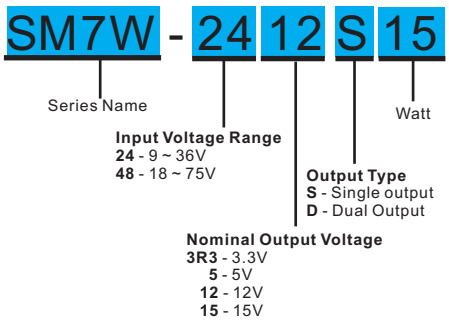
ENVIRONMENTAL SPECIFICATIONS

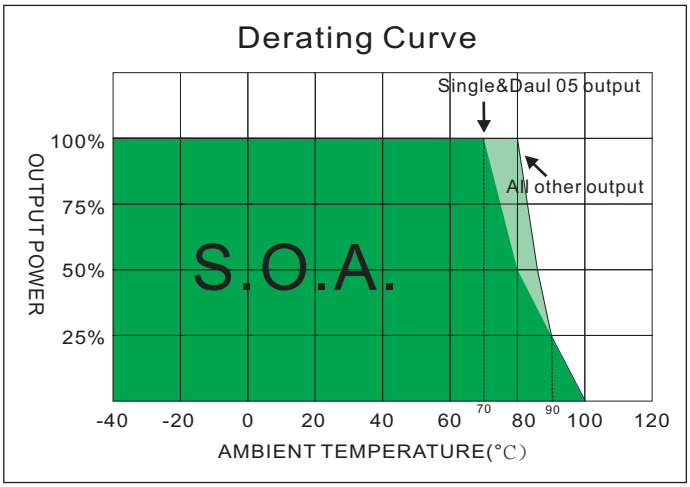
Operating Ambient Temperature	-40°C ~ +100°C(See Derating Curve) -40°C ~ +80°C(For 100% load)
Maximum Case Temperature	105°C
Thermal Impedance	12°C/W, min.
Storage Temperature	-55°C ~ +125°C
Cooling**(7)**	Nature Convection

EMC CHARACTERISTICS

Radiated Emissions	EN55032	CLASS A
Conducted Emissions	EN55032	CLASS A
ESD	IEC61000-4-2	Perf. Criteria B
RS	IEC61000-4-3	Perf. Criteria A
EFT**(8)**	IEC61000-4-4	Perf. Criteria A
Surge **(8)**	IEC61000-4-5	Perf. Criteria A
CS	IEC61000-4-6	Perf. Criteria A
PFMF	IEC61000-4-8	Perf. Criteria A

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.)
SM7W-243R3S15	9-36	10	509.25	3.3	0	3000	82	3300
SM7W-2405S15	9-36	10	748.5	5	0	3000	85	3300
SM7W-2412S15	9-36	10	735.3	12	0	1250	88	680
SM7W-2415S15	9-36	10	718.4	15	0	1000	89	470
SM7W-2405D15	9-36	10	753.01	±5	0	±1500	85	±2200
SM7W-2412D15	9-36	10	722.54	±12	0	±625	88	±470
SM7W-2415D15	9-36	15	714.86	±15	0	±500	89	±330
SM7W-483R3S15	18-75	10	254.63	3.3	0	3000	82	3300
SM7W-4805S15	18-75	10	376.51	5	0	3000	85	3300
SM7W-4812S15	18-75	10	367.64	12	0	1250	87	680
SM7W-4815S15	18-75	10	363.37	15	0	1000	88	470
SM7W-4805D15	18-75	8	372.02	±5	0	±1500	88	±2200
SM7W-4812D15	18-75	8	359.19	±12	0	±625	90	±470
SM7W-4815D15	18-75	10	363.37	±15	0	±500	88	±330

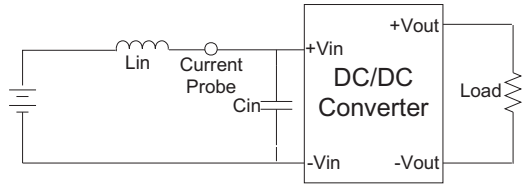
NOTE

1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Tested by minimal Vin and constant resistive load.
3. Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
4. Measured Input reflected ripple current with a simulated source inductance of 12uH and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz).
5. The remote on/off control pin is referenced to -Vin(pin2).
6. Exceeding the absolute ratings of the unit could cause damage.
   It is not allowed for continuous operating.
7. "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
8. An external filter is required if the module has to meet IEC61000-4-4,IEC61000-4-5.
   The SM7W-24XXXX15 recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330uF/100V) and a TVS (SMDJ58A,58V,3000Watt peak pulse power) to connect in parallel.
   The SM7W-48XXXX15 recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330uF/100V) and A TVS (SMDJ120A,120V,3000Watt peak pulse power) to connect in parallel.
   Which application refer to the EFT/Surge Filter of design & feature configuration.

TEST CONFIGURATIONS

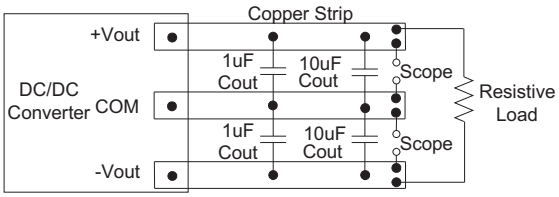
Input Reflected Ripple Current Test Step

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.



Output Ripple & Noise Measurement Test

To reduce ripple and noise, it is recommended to use a 1uF ceramic disk capacitor and a 10uF ceramic disk capacitor to at the output.



DESIGN & FEATURE CONFIGURATIONS

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup).

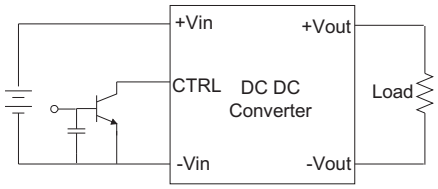
The module will try to restart after shut down.
If the over load condition still exists, the module will shut down again.

CTRL Module ON / OFF

Positive logic turns on the module during high logic and off during low logic.

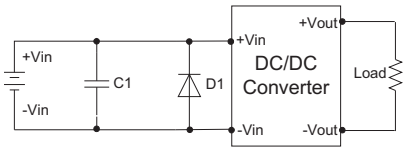
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain

For positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



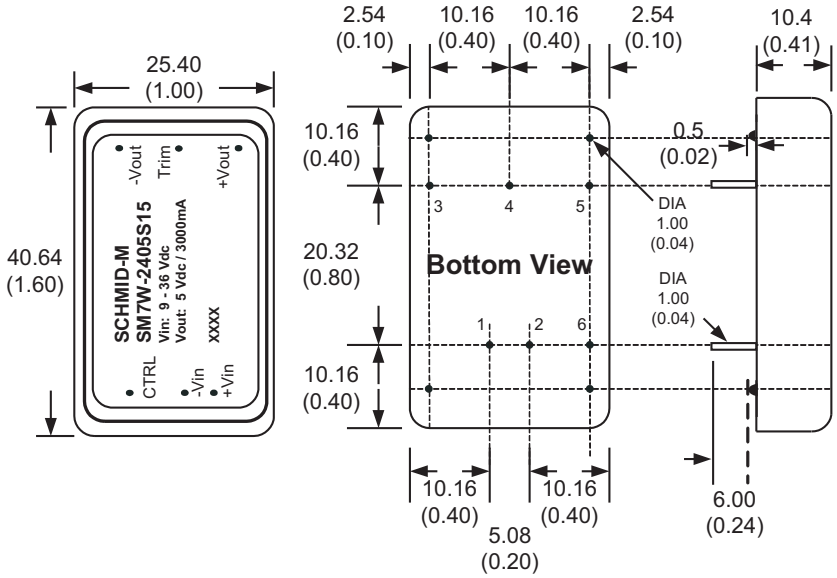
EFT/Surge Filter

Input filter components (C1,D1) are used to help meet IEC61000-4-4 and IEC61000-4-5 .



	C1	D1
SM7W-24XXXXX	330uF,100V	TVS,58V,3kW
SM7W-48XXXXX	330uF,100V	TVS,120V,3kW

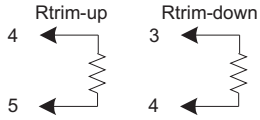
MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Com
5	-Vout	-Vout
6	CTRL	CTRL

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. (single output models only)



All dimensions are typical in millimeters (inches).

1. Pin diameter: 1.0 ±0.05 (0.04 ±0.002)
2. Pin pitch tolerance: ±0.35 (±0.014)
3. Pin to case tolerance: ±0.5 (±0.02)
4. Case Tolerance: ±0.5 (±0.02)
5. Stand-off tolerance: ±0.1 (±0.004)