

# S3-2W Series

2W Unregulated Single & Dual output

# SCHMID-M

## Features

- 7 Pin SIL / 14 Pin DIL Package
- 1000 VDC Isolation
- Up to 6000 VDC Isolation
- Low Ripple and Noise
- Efficiency up to 86%
- -40 ~ 85°C Operation Temperature Range
- Non-Conductive Black Plastic Case



The S3 series is a family of cost effective 2W single & dual output DC-DC converters. These converters achieve low cost and ultra-miniature SIP 7 pin or DIP 14 pin size. Devices are encapsulated using flame retardant resin. The models operate from input voltage of 3.3, 5, 12, 15, 24, 48 Vdc with output voltage of 3.3, 5, 7.2, 9, 12, 15, 18, 24, ±3.3, ±5, ±7.2, ±9, ±12, ±15, ±18, ±24 Vdc. High performance features include 1000Vdc~6000Vdc input/output isolation, high efficiency operation and output voltage accuracy of ±3% maximum. Standard features include an input range of ±10% tolerance and low output noise and ripple.

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

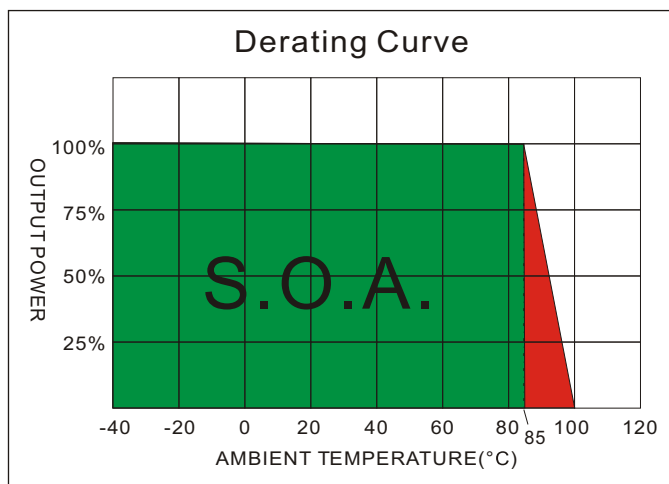
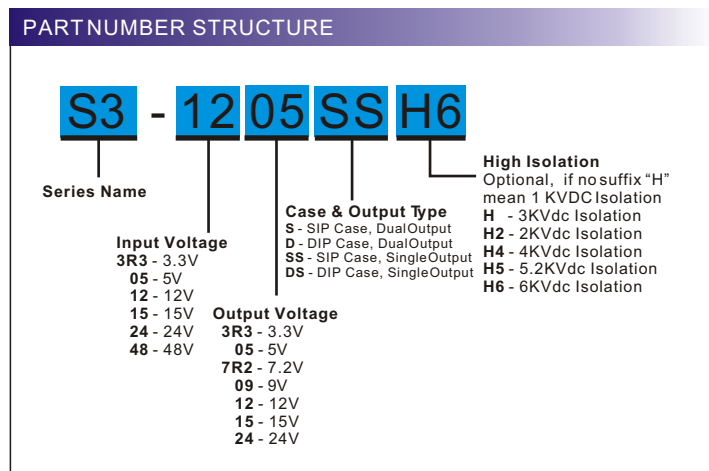
OUTPUT SPECIFICATIONS	
Voltage accuracy	±3%
Line regulation	±1.2% / Per 1% Vin Change
Load regulation	(From 20% to 100% Load) ±10% (Output 3.3V Model) ±20%
Ripple & noise (20 MHz bandwidth)(1)	75mV pk-pk
Temperature coefficient	±0.02%/°C
Capacitor load(2)	See table
INPUT SPECIFICATIONS	
Voltage Range	±10%
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitors
Input Reflected Ripple Current(3)	20mA pk-pk
ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-40°C~85°C(See Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-40°C~125°C
Cooling	Nature Convection
GENERAL SPECIFICATIONS	
Efficiency	See table
I/O Isolation Voltage(3 sec)	
Input/Output	1000~6000Vdc
I/O Isolation Capacitance	60 pF Typ.
I/O Isolation Resistance	1000M Ohm, min
Switching Frequency	Variable 80kHz
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>1.121 Mhrs
Safety Standard : (designed to meet)	IEC 60950-1

EMC SPECIFICATIONS		
Radiated Emissions	EN55022	CLASS B
Conducted Emissions (4)	EN55022	CLASS B
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (5)	IEC 61000-4-4	Perf. Criteria A
Surge (5)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

PHYSICAL SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	0.5mm Alloy42 Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	(SIP/2.3g) (DIP/2.6g)
Dimensions	SIP Case 0.76"x0.24"x0.39" DIP Case 0.80"x0.40"x0.27"

ABSOLUTE MAXIMUM RATINGS(6)		
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.		
Input Surge Voltage(100ms)		
3.3 Models		6 Vdc ,max.
5 Models		7 Vdc ,max.
12 Models		15 Vdc ,max.
15 Models		18 Vdc ,max.
24 Models		28 Vdc ,max.
48 Models		54 Vdc ,max.
Soldering Temperature (1.5mm from case 10sec. max.)		260°C ,max.

## S3 - 2W Unregulated 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)		Full load (mA)			
S3-3R3 3R3SS	3.3	26	797	3.3	400	76	470	
S3-3R3 05SS	3.3	30	797	5	400	76	470	
S3-3R3 7R2SS	3.3	30	808	7.2	278	75	470	
S3-3R3 09SS	3.3	30	758	9	222	80	470	
S3-3R3 12SS	3.3	35	748	12	167	81	470	
S3-3R3 15SS	3.3	40	777	15	133	78	470	
S3-3R3 18SS	3.3	35	787	18	111	77	470	
S3-3R3 24SS	3.3	35	767	24	83	79	470	
S3-05 3R3SS	5	16	513	3.3	400	78	470	
S3-0505S S	5	20	488	5	400	82	470	
S3-05 7R2SS	5	22	494	7.2	278	81	470	
S3-0509S S	5	35	476	9	222	84	470	
S3-0512S S	5	30	470	12	167	85	470	
S3-0515S S	5	25	465	15	133	86	470	
S3-0518S S	5	25	494	18	111	81	470	
S3-0524S S	5	22	471	24	83	85	470	
S3-12 3R3SS	12	20	242	3.3	400	69	470	
S3-1205S S	12	20	203	5	400	82	470	
S3-12 7R2SS	12	15	201	7.2	278	83	470	
S3-1209S S	12	17	201	9	222	83	470	
S3-1212S S	12	15	196	12	167	85	470	
S3-1215S S	12	20	196	15	133	85	470	
S3-1218S S	12	18	198	18	111	84	470	
S3-1224S S	12	15	201	24	83	83	470	
S3-24 3R3SS	24	5	107	3.3	400	78	470	
S3-2405S S	24	10	104	5	400	80	470	
S3-24 7R2SS	24	10	104	7.2	278	80	470	
S3-2409S S	24	10	100	9	222	83	470	
S3-2412S S	24	8	98	12	167	85	470	
S3-2415S S	24	8	99	15	133	84	470	
S3-2418S S	24	10	102	18	111	82	470	
S3-2424S S	24	13	100	24	83	83	470	

Suffix "H" means 3 KVdcisolation  
Suffix "H5" means 5.2 KVdcisolation

Suffix "H2" means 2 KVdcisolation  
Suffix "H6" means 6 KVdcisolation

Suffix "H4" means 4 KVdcisolation

### S3 - 2W Unregulated 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)		Full load (mA)			
S3-483R3SS	48	5	53	3.3	400	78	470	
S3-4805SS	48	5	53	5	400	78	470	
S3-487R2SS	48	10	52	7.2	278	80	470	
S3-4809SS	48	10	52	9	222	80	470	
S3-4812SS	48	10	50	12	167	82	470	
S3-4815SS	48	8	52	15	133	80	470	
S3-4818SS	48	8	51	18	111	81	470	
S3-4824SS	48	10	51	24	83	81	470	
S3-3R33R3DS	3.3	26	808	3.3	400	75	470	
S3-3R305DS	3.3	40	819	5	400	74	470	
S3-3R37R2DS	3.3	40	808	7.2	278	75	470	
S3-3R309DS	3.3	45	808	9	222	75	470	
S3-3R312DS	3.3	50	767	12	167	79	470	
S3-3R315DS	3.3	47	767	15	133	79	470	
S3-3R318DS	3.3	50	787	18	111	77	470	
S3-3R324DS	3.3	47	797	24	83	76	470	
S3-053R3DS	5	20	506	3.3	400	79	470	
S3-0505DS	5	20	470	5	400	85	470	
S3-057R2DS	5	25	482	7.2	278	83	470	
S3-0509DS	5	30	476	9	222	84	470	
S3-0512DS	5	30	471	12	167	85	470	
S3-0515DS	5	25	465	15	133	86	470	
S3-0518DS	5	32	500	18	111	80	470	
S3-0524DS	5	25	500	24	83	80	470	
S3-123R3DS	12	12	219	3.3	400	76	470	
S3-1205DS	12	10	211	5	400	79	470	
S3-127R2DS	12	16	201	7.2	278	83	470	
S3-1209DS	12	10	196	9	222	85	470	
S3-1212DS	12	13	194	12	167	86	470	
S3-1215DS	12	15	201	15	133	83	470	
S3-1218DS	12	18	198	18	111	84	470	
S3-1224DS	12	15	201	24	83	83	470	
S3-243R3DS	24	10	110	3.3	400	76	470	
S3-2405DS	24	8	102	5	400	82	470	
S3-247R2DS	24	10	104	7.2	278	80	470	
S3-2409DS	24	8	102	9	222	82	470	
S3-2412DS	24	8	100	12	167	83	470	
S3-2415DS	24	8	98	15	133	85	470	
S3-2418DS	24	10	102	18	111	82	470	
S3-2424DS	24	12	100	24	83	83	470	
S3-483R3DS	48	5	53	3.3	400	78	470	
S3-4805DS	48	5	53	5	400	78	470	
S3-487R2DS	48	10	52	7.2	278	80	470	
S3-4809DS	48	8	52	9	222	80	470	
S3-4812DS	48	5	50	12	167	84	470	
S3-4815DS	48	8	52	15	133	80	470	
S3-4818DS	48	8	51	18	111	81	470	
S3-4824DS	48	10	51	24	83	81	470	

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 Suffix "H6" means 6 KVdcisolation

Suffix "H4" means 4 KVdcisolation

S3 - 2W Unregulated Single & Dual output

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Full load (mA)			
S3-3R33 R3S	3.3	25	797	±3.3	±200	76	±220	
S3-3R30 5S	3.3	40	777	±5	±200	78	±220	
S3-3R37 R2S	3.3	40	797	±7.2	±139	76	±220	
S3-3R30 9S	3.3	40	797	±9	±111	76	±220	
S3-3R31 2S	3.3	45	777	±12	±83.5	78	±220	
S3-3R31 5S	3.3	45	777	±15	±66.6	78	±220	
S3-3R31 8S	3.3	45	777	±18	±55.5	78	±220	
S3-3R32 4S	3.3	45	767	±24	±41.6	79	±220	
S3-053 R3S	5	25	588	±3.3	±200	68	±220	
S3-050 5S	5	25	548	±5	±200	73	±220	
S3-057 R2S	5	25	519	±7.2	±139	77	±220	
S3-050 9S	5	30	506	±9	±111	79	±220	
S3-051 2S	5	30	494	±12	±83.5	81	±220	
S3-051 5S	5	30	488	±15	±66.6	82	±220	
S3-051 8S	5	26	482	±18	±55.5	83	±220	
S3-052 4S	5	30	488	±24	±41.6	82	±220	
S3-123 R3S	12	10	245	±3.3	±200	68	±220	
S3-120 5S	12	18	225	±5	±200	74	±220	
S3-127 R2S	12	15	211	±7.2	±139	79	±220	
S3-120 9S	12	13	203	±9	±111	82	±220	
S3-121 2S	12	23	203	±12	±83.5	82	±220	
S3-121 5S	12	20	201	±15	±66.6	83	±220	
S3-121 8S	12	16	198	±18	±55.5	84	±220	
S3-122 4S	12	15	196	±24	±41.6	85	±220	
S3-243 R3S	24	6	117	±3.3	±200	71	±220	
S3-240 5S	24	7	111	±5	±200	75	±220	
S3-247 R2S	24	12	110	±7.2	±139	76	±220	
S3-240 9S	24	7	103	±9	±111	81	±220	
S3-241 2S	24	6	99	±12	±83.5	84	±220	
S3-241 5S	24	6	98	±15	±66.6	85	±220	
S3-241 8S	24	6	97	±18	±55.5	86	±220	
S3-242 4S	24	8	97	±24	±41.6	86	±220	
S3-483 R3S	48	5	56	±3.3	±200	75	±220	
S3-480 5S	48	4	56	±5	±200	75	±220	
S3-487 R2S	48	5	53	±7.2	±139	78	±220	
S3-480 9S	48	5	54	±9	±111	77	±220	
S3-481 2S	48	4	50	±12	±83.5	83	±220	
S3-481 5S	48	5	50	±15	±66.6	83	±220	
S3-481 8S	48	6	52	±18	±55.5	80	±220	
S3-482 4S	48	6	52	±24	±41.6	80	±220	
S3-3R33 R3D	3.3	25	808	±3.3	±200	75	±220	
S3-3R30 5D	3.3	45	808	±5	±200	75	±220	
S3-3R37 R2D	3.3	40	797	±7.2	±139	76	±220	
S3-3R30 9D	3.3	40	797	±9	±111	76	±220	
S3-3R31 2D	3.3	45	777	±12	±83.5	78	±220	
S3-3R31 5D	3.3	45	777	±15	±66.6	78	±220	
S3-3R31 8D	3.3	45	777	±18	±55.5	78	±220	
S3-3R32 4D	3.3	45	767	±24	±41.6	79	±220	

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### S3 - 2W Unregulated Single & Dual output

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(µF)
		No-Load (mA)	Full Load (mA)				
S3-053R 3D	5	25	597	±3.3	±200	67	±220
S3-050 5D	5	15	533	±5	±200	75	±220
S3-057R 2D	5	35	556	±7.2	±139	72	±220
S3-050 9D	5	30	476	±9	±111	84	±220
S3-051 2D	5	25	488	±12	±83.5	82	±220
S3-051 5D	5	25	488	±15	±66.6	82	±220
S3-051 8D	5	25	476	±18	±55.5	84	±220
S3-052 4D	5	40	482	±24	±41.6	83	±220
S3-123R 3D	12	15	249	±3.3	±200	67	±220
S3-120 5D	12	20	225	±5	±200	74	±220
S3-127R 2D	12	20	219	±7.2	±139	76	±220
S3-120 9D	12	15	206	±9	±111	81	±220
S3-121 2D	12	23	203	±12	±83.5	82	±220
S3-121 5D	12	20	201	±15	±66.6	83	±220
S3-121 8D	12	16	198	±18	±55.5	84	±220
S3-122 4D	12	16	196	±24	±41.6	85	±220
S3-243R 3D	24	10	123	±3.3	±200	68	±220
S3-240 5D	24	8	110	±5	±200	76	±220
S3-247R 2D	24	15	111	±7.2	±139	75	±220
S3-240 9D	24	7	105	±9	±111	79	±220
S3-241 2D	24	7	100	±12	±83.5	83	±220
S3-241 5D	24	7	98	±15	±66.6	85	±220
S3-241 8D	24	10	99	±18	±55.5	84	±220
S3-242 4D	24	8	99	±24	±41.6	84	±220
S3-483R 3D	48	5	64	±3.3	±200	65	±220
S3-480 5D	48	4	56	±5	±200	75	±220
S3-487R 2D	48	10	56	±7.2	±139	74	±220
S3-480 9D	48	5	54	±9	±111	77	±220
S3-481 2D	48	5	52	±12	±83.5	80	±220
S3-481 5D	48	8	51	±15	±66.6	81	±220
S3-481 8D	48	6	52	±18	±55.5	80	±220
S3-482 4D	48	6	52	±24	±41.6	80	±220

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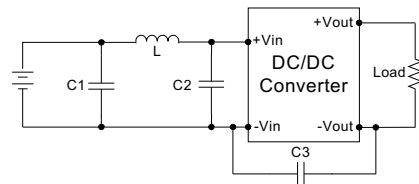
#### NOTE

1. Ripple/Noise measured with 20MHz bandwidth.
2. Tested by minimal Vin and constant resistive load.
3. Measured Input reflected ripple current with a simulated source inductance of 12µH.
4. Input filter components are required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.
5. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.  
 The filter capacitor Schmid-M suggest: Nippon - chemi - con KY series, 470µF/100V.
6. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
7. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

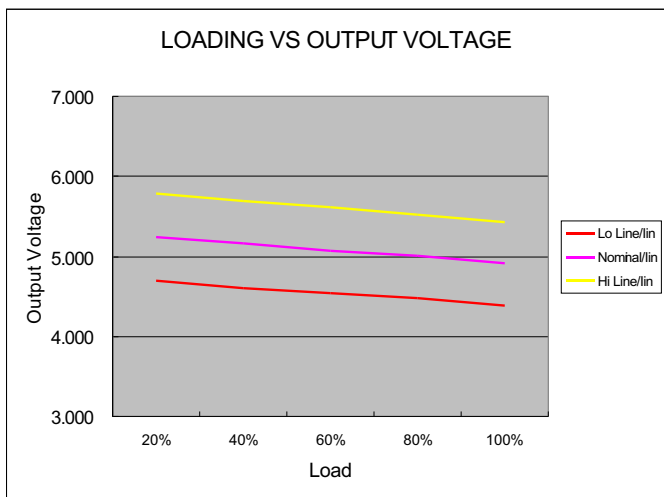
TEST CONFIGURATIONS

EMI Filter

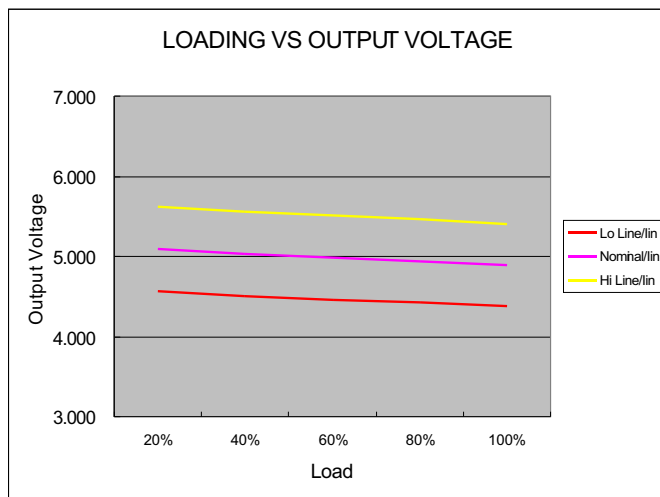
Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



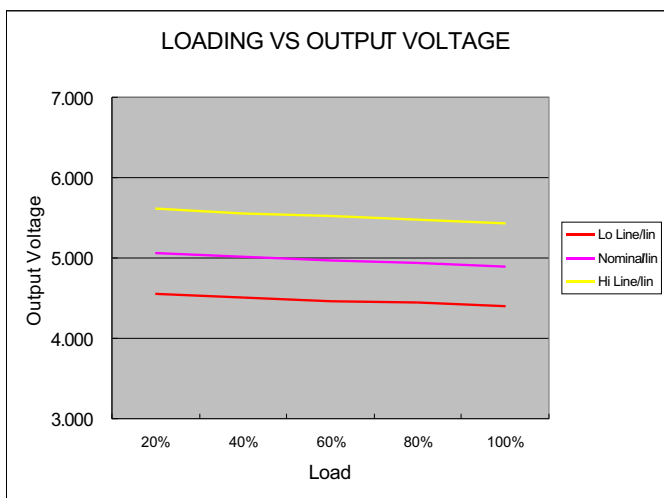
	C1	L	C2	C3
S3-3R3XXXXX	1210, 2.2uF/100V	18uH		
S3-05XXXXX	1210, 2.2uF/100V	18uH		
S3-12XXXXX	1210, 2.2uF/100V	18uH		
S3-15XXXXX	1210, 2.2uF/100V	18uH		
S3-24XXXXX	1210, 2.2uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV
S3-48XXXXX	Electrolytic capacitor, 10uF/100V	18uH	1210, 2.2uF/100V	1206, 470pF/2KV



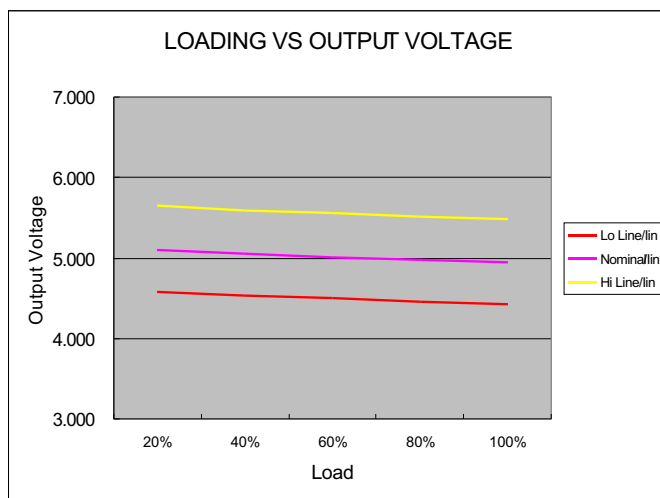
05 Models



12 Models



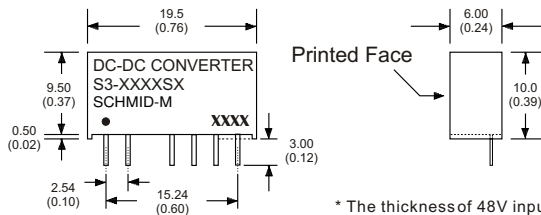
24 Models



48 Models

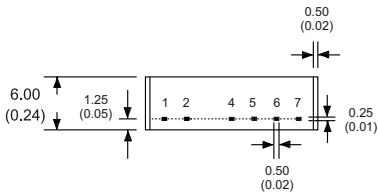
# S3 - 2W Unregulated Single & Dual output

## MECHANICAL SPECIFICATIONS

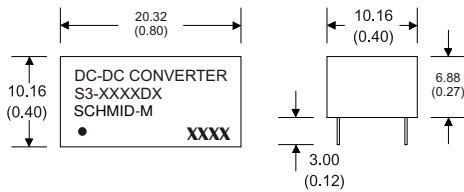


\* The thickness of 48V input voltage model is 7.20(0.28)

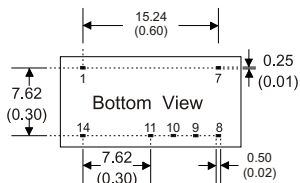
### 7 Pin SIL Package



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:  $\pm 0.5$  (  $\pm 0.02$  )



### 14 Pin DIL Package



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	SINGLE-H	DUAL-H
1	+V Input	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input	-V Input
4	-V Output	-V Output	N.P.	N.P.
5	N.P.	Common	-V Output	-V Output
6	+V Output	+V Output	N.P.	Common
7	N.P.	N.P.	+V Output	+V Output

### PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL	SINGLE-H	DUAL-H
1	-V Input	-V Input	-V Input	-V Input
7	N.C.	N.C.	N.C.	N.C.
8	N.P.	Common	+V Output	+V Output
9	+V Output	+V Output	N.P.	Common
10	N.P.	N.P.	-V Output	-V Output
11	-V Output	-V Output	N.P.	N.P.
14	+V Input	+V Input	+V Input	+V Input