

## 2S4E\_1U series

2W - Single Output - Fixed Input - Isolated & Unregulated  
ECO - Miniature SIP Package

### DC-DC Converter

2 Watt

- ⊕ Efficiency up to 88%
- ⊕ Small footprint
- ⊕ SIP package
- ⊕ Single output voltage
- ⊕ 1kVDC Isolation
- ⊕ Temperature Range: -40°C~+85°C
- ⊕ Industry standard pinout
- ⊕ UL94-V0 Package
- ⊕ No heat sink required
- ⊕ EMI Complies With EN55022 Class B
- ⊕ Low ripple and noise

The 2S4E\_1U series are specially designed for applications where a single power supply is isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 10\%$ );
- 2) Where isolation is necessary between input and output (isolation voltage = 1000VDC)
- 3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits and IGBT power device driven circuits, etc.



Common specifications	
Short circuit protection:	1 second
Case temperature:	100°C MAX
Cooling:	Nature convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-40°C ~+125°C
Storage humidity range:	< 95%
Safety standard:	designed to meet IEC 60950-1
Case material:	Plastic [UL94-V0]
MTBF:	>1.121 Mhours
Dimensions:	11.68*7.5*10.15mm
Weight:	1.9g

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy				$\pm 3$	%
Line regulation	For $V_{in}$ change of 1%			$\pm 1.2$	%
Load regulation	• 20% to 100% full load • 3.3V model			10 20	% %
Temperature drift	100% full load			$\pm 0.03$	%/°C
Ripple & Noise	20MHz Bandwidth			150	mVp-p
Switching frequency	variable		70		KHz

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input voltage range			$\pm 10$		%
Input filter	Capacitors				
Input reflected ripple current*			20		mApk-pk
Input surge voltage	100ms • 5V models • 12V models • 15V models • 24V models • 48V models			7 15 18 28 54	VDC VDC VDC VDC VDC

EMC specifications					
EMI	CE*	EN55032	CLASS B		
EMI	RE	EN55032	CLASS B		
EMS	ESD	IEC/EN61000-4-2		perf. Criteria A	
EMS	RS	IEC/EN61000-4-3		perf. Criteria A	
EMS	EFT**	IEC/EN61000-4-4		perf. Criteria A	
EMS	Surge**	IEC/EN61000-4-5		perf. Criteria A	
EMS	CS	IEC/EN61000-4-6		perf. Criteria A	
EMS	PFMF	IEC/EN61000-4-8		perf. Criteria A	

\* Measured Input reflected ripple current with a simulated source inductance of 12uH.

\* Input filter components are be required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.

\*\* An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

#### Example:

**2S4E\_0505S1U**

2 = 2Watt; S4 = SIP4; E = Pinning; 05 = 5Vin; 05 = 5Vout;  
S = Single Output; 1 = 1kVDC; U = Unregulated Output

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	1000 3000			VDC VDC
Isolation resistance	Tested for 1 minute	1000			MΩ
Isolation capacitance			60		pF

#### Note:

1. All specifications measured at TA = 25°C, humidity < 75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.
3. If the power module such as the definition of the pin does not match with the hand book, please refer to the actual item.

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Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA; max]	Efficiency [%; typ]	Capacitor load* [μF, max]
		No load, max.	Full load, typ.				
2S4E_0503S1U	5	25	338	3.3	400	78	470
2S4E_0505S1U	5	25	494	5	400	81	470
2S4E_0507S1U	5	35	500	7.2	278	80	470
2S4E_0509S1U	5	25	482	9	222	83	470
2S4E_0512S1U	5	30	476	12	167	84	470
2S4E_0515S1U	5	30	471	15	133	85	470
2S4E_0524S1U	5	30	465	24	83	86	470

Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA; max]	Efficiency [%; typ]	Capacitor load* [μF, max]
		No load, max.	Full load, typ.				
2S4E_1203S1U	12	20	152	3.3	400	72	470
2S4E_1205S1U	12	20	206	5	400	81	470
2S4E_1207S1U	12	15	208	7.2	278	80	470
2S4E_1209S1U	12	15	196	9	222	85	470
2S4E_1212S1U	12	15	196	12	167	85	470
2S4E_1215S1U	12	15	196	15	133	85	470
2S4E_1224S1U	12	25	196	24	83	85	470

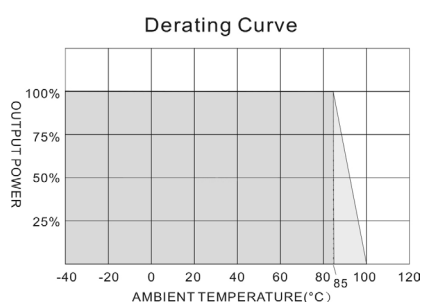
Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA; max]	Efficiency [%; typ]	Capacitor load* [μF, max]
		No load, max.	Full load, typ.				
2S4E_1503S1U	15	15	116	3.3	400	76	470
2S4E_1505S1U	15	15	165	5	400	81	470
2S4E_1507S1U	15	15	161	7.2	278	83	470
2S4E_1509S1U	15	15	167	9	222	80	470
2S4E_1512S1U	15	15	158	12	167	84	470
2S4E_1515S1U	15	13	155	15	133	86	470
2S4E_1524S1U	15	17	159	24	83	84	470

Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA; max]	Efficiency [%; typ]	Capacitor load* [μF, max]
		No load, max.	Full load, typ.				
2S4E_2403S1U	24	7	68	3.3	400	81	470
2S4E_2405S1U	24	8	100	5	400	83	470
2S4E_2407S1U	24	10	102	7.2	278	82	470
2S4E_2409S1U	24	6	98	9	222	85	470
2S4E_2412S1U	24	8	97	12	167	86	470
2S4E_2415S1U	24	8	97	15	133	86	470
2S4E_2424S1U	24	8	95	24	83	88	470

Part Number	Input Voltage [V]	Input current [mA]		Output Voltage [VDC]	Output current [mA; max]	Efficiency [%; typ]	Capacitor load* [μF, max]
		No load, max.	Full load, typ.				
2S4E_4803S1U	48	5	37	3.3	400	74	470
2S4E_4805S1U	48	5	53	5	400	79	470
2S4E_4807S1U	48	5	50	7.2	278	83	470
2S4E_4809S1U	48	5	50	9	222	83	470
2S4E_4812S1U	48	5	51	12	167	81	470
2S4E_4815S1U	48	5	51	15	133	82	470
2S4E_4824S1U	48	5	48	24	83	86	470

\* Tested by minimal Vin and constant resistive load.

## Typical characteristics

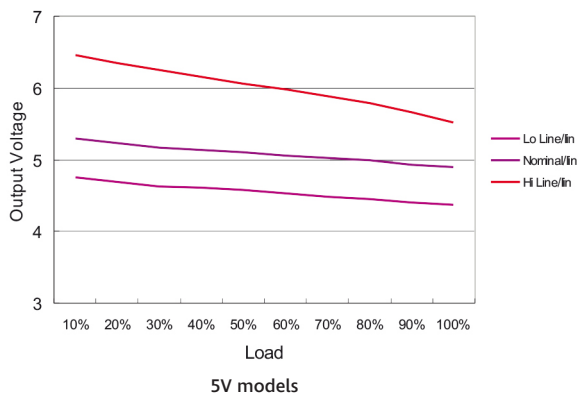


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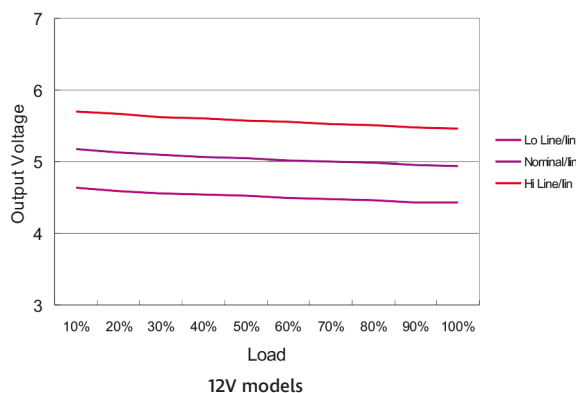
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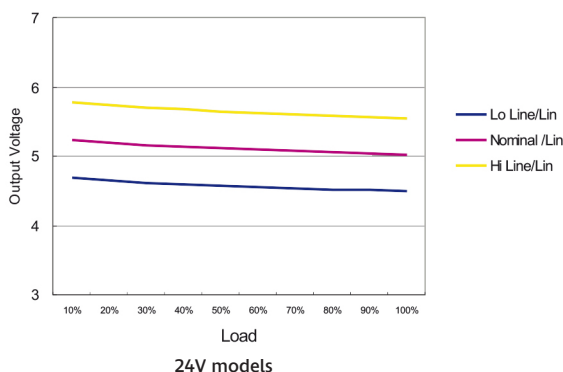
LOADING VS OUTPUT VOLTAGE



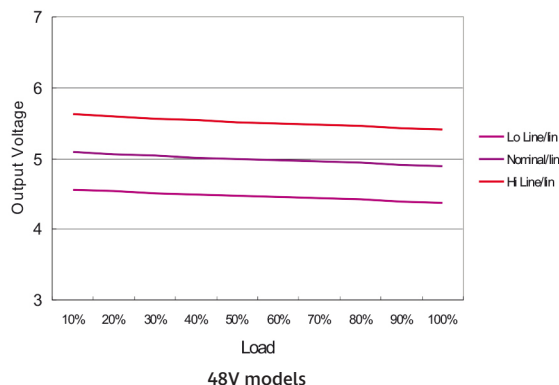
LOADING VS OUTPUT VOLTAGE



LOADING VS OUTPUT VOLTAGE

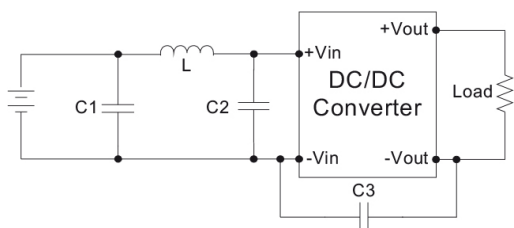


LOADING VS OUTPUT VOLTAGE



### 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.

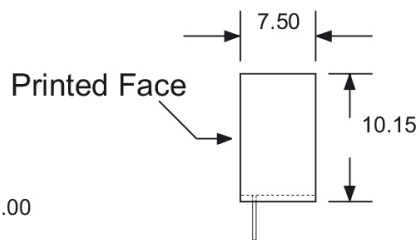
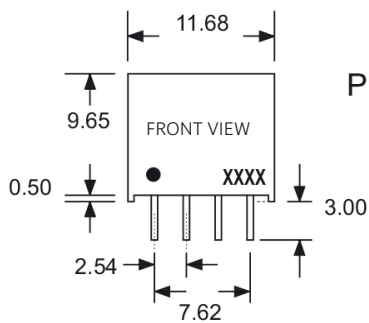


	C1	L	C2	C3
2S4E_05xxS1U	1210, 2.2uF/100V	18μH		
2S4E_12xxS1U	1210, 2.2uF/100V	18μH		
2S4E_15xxS1U	1210, 2.2uF/100V	18μH		
2S4E_24xxS1U	1210, 2.2uF/100V	18μH	1210, 2.2uF/100V	1206, 470pF/2KV
2S4E_48xxS1U	Electrolytic Capacitor, 10uF/100V	18μH	1210, 2.2uF/100V	1206, 470pF/2KV

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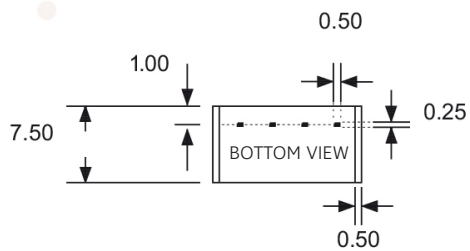
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### Mechanical dimensions



PIN CONNECTIONS	
PIN NUMBER	SINGLE
1	-V Input
2	+V Input
3	-V Output
4	+V Output

(The Pin Connection of high isolation one is the same with normal one.)



### 4 Pin SIL Package

Notes : All dimensions are typical in millimeters

1. Pin diameter:  $0.5 \pm 0.05$
2. Pin pitch and length tolerance:  $\pm 0.35$
3. Case Tolerance:  $\pm 0.5$