

## Features

- Compact SMD package
- Input / Output Isolation Voltage: 1.5K Vdc or 3K Vdc
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +105°C
- Continuous Short -Circuit Protection
- Meet Safety Standard / Approval: IEC / EN60950-1



## Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

**Technical Specification** All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) <sup>(1)</sup>	Input Current (mA) Typ.		Eff. (%) <sup>(2)</sup> Typ.	Capacitive Load, max. <sup>(3)</sup> (uF)
			Full Load	No Load	Full Load		
<b>Single Output Series (3KVdc)</b>							
F0303XT-1WR3	2.97-3.63 Nominal:3.3	3.3	200	35	405	74	220
F0305XT-1WR3		5	300		404	75	
F0503XT-1WR3	4.5-5.5 Nominal:5	3.3	300	28	264	75	
F0505XT-1WR3		5	200		260	80	
F0509XT-1WR3		9	110		248	80	
F0512XT-1WR3		12	83		247	81	
F0515XT-1WR3		15	67		247	81	
F1203XT-1WR3	10.8-13.2 Nominal:12	3.3	300	17	109	76	
F1205XT-1WR3		5	200		107	78	
F1209XT-1WR3		9	110		107	78	
F1212XT-1WR3		12	83		104	80	
F1215XT-1WR3		15	67		104	80	
F1503XT-1WR3	13.5-16.5 Nominal:15	3.3	300	15	86	75	
F1505XT-1WR3		5	200		85	77	
F1509XT-1WR3		9	110		84	80	
F1512XT-1WR3		12	83		84	81	
F1515XT-1WR3		15	67		84	81	
F2403XT-1WR3	21.6-26.4 Nominal:24	3.3	300	12	58	76	
F2405XT-1WR3		5	200		57	78	
F2409XT-1WR3		9	110		55	78	
F2412XT-1WR3		12	83		55	80	

<b>Dual Output Series (1.5 KVdc)</b>							
A0303XT-1WR3	2.97-3.63 Nominal:3.3	±3.3	±150	35	405	74	100/100
A0305XT-1WR3		±5	±100		404	75	
A0503XT-1WR3	4.5-5.5 Nominal:5	±3.3	±150	28	264	75	
A0505XT-1WR3		±5	±100		260	77	
A0509XT-1WR3		±9	±55		248	80	
A0512XT-1WR3		±12	±42		247	81	
A0515XT-1WR3		±15	±34		247	81	
A1203XT-1WR3	10.8-13.2 Nominal:12	±3.3	±150	17	109	76	
A1205XT-1WR3		±5	±100		107	78	
A1209XT-1WR3		±9	±55		107	78	
A12012XT-1WR3		±12	±42		104	80	
<b>Dual Output Series (3KVdc)</b>							
E1203XT-1WR3	4.5-5.5 Nominal:5	±12	±42	28	248	80	100/100

Input Specifications		
	3.3V nominal input	2.97-3.63V
	5V nominal input	4.5-5.5V
	12V nominal input	10.8-13.2V
	15V nominal input	13.5-16.5V
Input filter		Capacitor
Environmental Specifications		
Operating ambient temperature		-40°C to +105°C
Maximum case temperature		+125°C
Storage temperature range		-55°C to +125°C
Relative humidity		95% RH max.
Output Specifications		
Output power		1Watts max.
Voltage accuracy	Nominal Vin and full load	
	3.3Vdc	3.135-3.399V
	5Vdc	4.75-5.15V
	9Vdc	8.73-9.18V
	12Vdc	11.64-12.24V
	15Vdc	14.55-15.30V
Minimum load		10% load of full load
Line regulation	For Vin change of 1%	±1.2% Typ.
Load regulation	Nominal Vin and 10%-100% load	
	3.3Vdc	15% Typ.
	5Vdc	13% Typ.
	9Vdc	9% Typ.
	12Vdc	8% Typ.
	15Vdc	7% Typ.
Ripple and Noise (20MHz Bandwidth)		50mVp-p Typ. 100mVp-p Max.
Maximum capacitive load		See table
Output short circuit protection	SR1-03SXP	3S Max.
	Other models	Continuous, Automatic recovery
Temperature coefficient		±0.03%/°C Typ.
General Specifications		
Efficiency	Nominal input and full load	See table
Isolation voltage	Input to output	1500VDC/3000VDC (60 second)
Isolation resistance	500VDC	1000MΩ min.
Isolation capacitance		30pF typ.
Switching frequency		150kHz typ.
		300kHz max.
Reliability, calculated MTBF		2×10 <sup>6</sup> Hrs

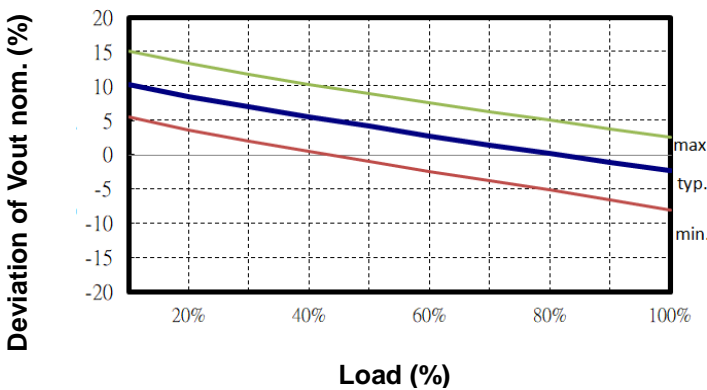
Physical Specifications	
Case material	Plastic (UL94 V-0)
Potting material	PU (UL94 V-0)
Dimensions (Single output)	13.6× 8.8× 7.85 mm
Dimensions (Dual output)	15.2× 8.4× 7.6 mm
Weight	2g Typ.

**Note**

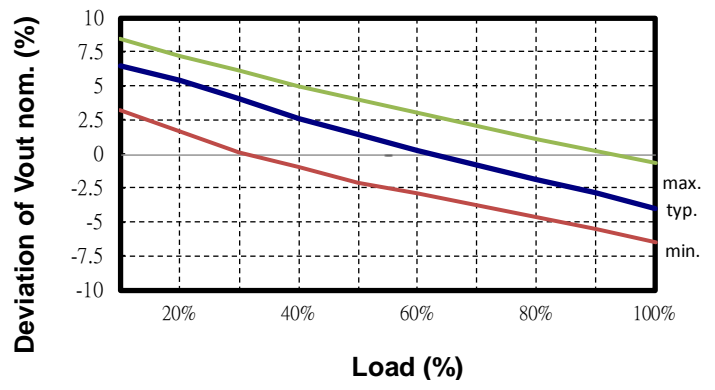
1. Lo below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's input pins.
4. Specifications subject to change without notice.

**Output voltage variation dependent on load (at nominal input voltage)**

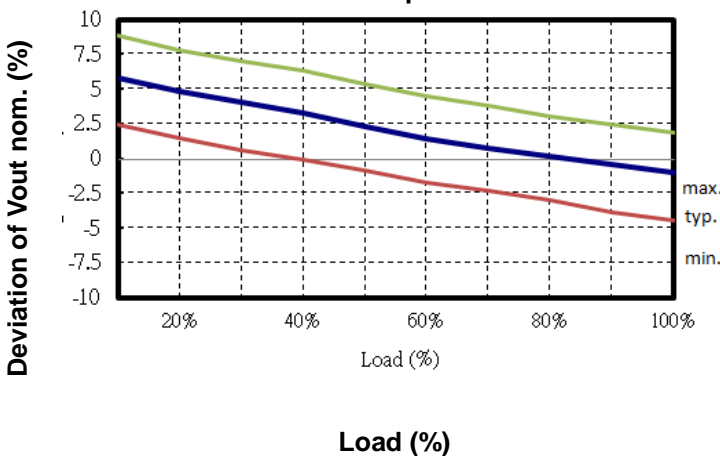
**3.3VDC Output**



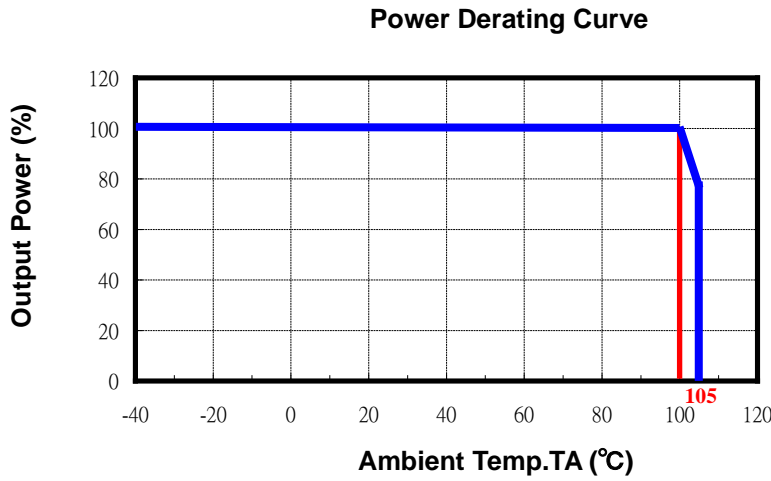
**5VDC Output**



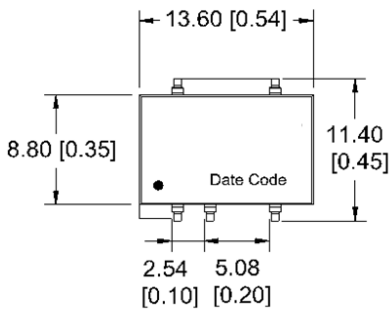
**Other Output**



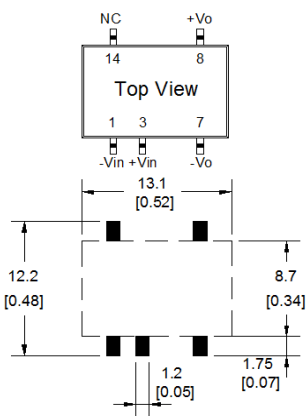
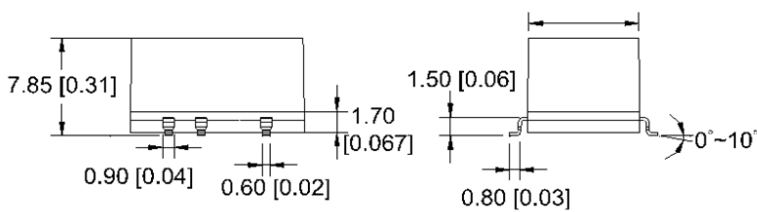
**Power Derating Curve**



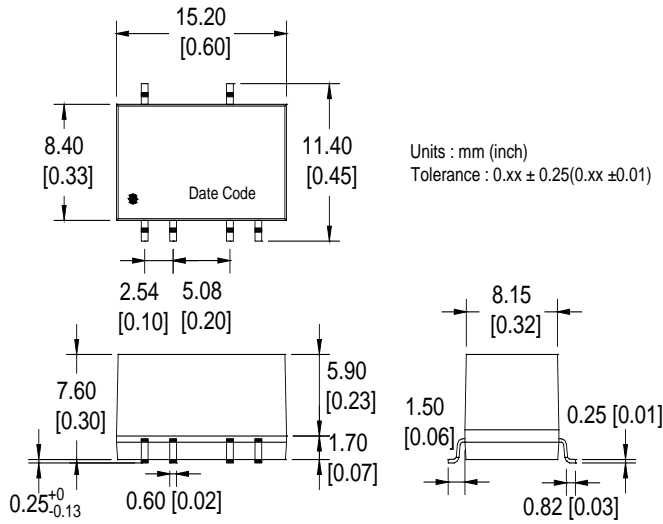
**Mechanical Dimensions**  
**Single output**



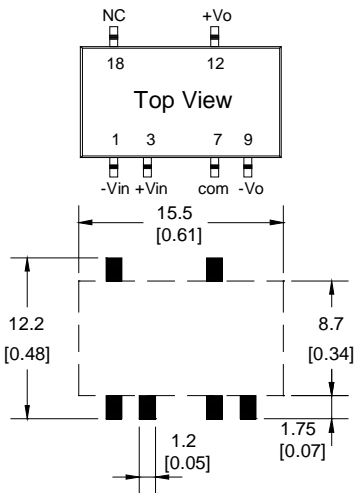
Pin	3KVdc - Single		Pin
1	-Vin	NC	14
3	+Vin	---	12
5	---	---	10
7	Vo (-)	Vo (+)	8



**Dual output**



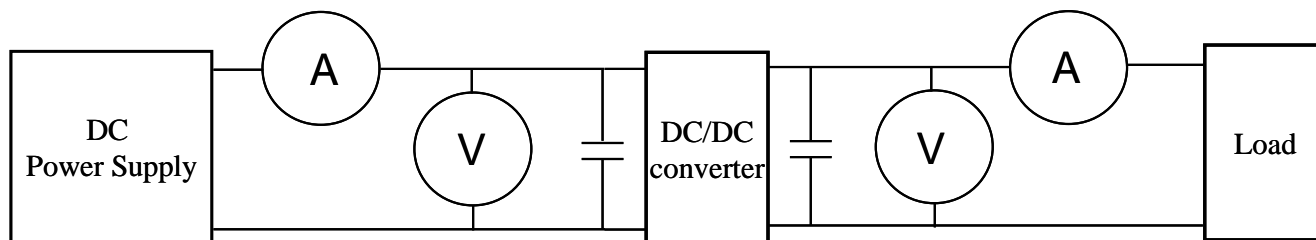
Pin	1.5 KVdc /3KVdc - Dual		Pin
1	-Vin	N.C.	18
3	+Vin	---	16
5	---	---	14
7	Com	Vo (+)	12
9	Vo (-)	---	10



( SR1-xxDxxP )

## Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



⊙DC Power Supply: It offers a wide voltage and current range precisely.

⊙Current meter (A): Accuracy → 200μA ~ 200mA 4 ranges  $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$

2000mA ~ 20A 2 ranges  $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$ .

⊙Voltage meter (V): Accuracy →  $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$ .

⊙Load: At full load.

⊙Wires: The resistance of the wires must be small.

### 1. Input voltage range: Narrow input voltage range ( $\pm 10\%$ )、wide input voltage range (2:1 and 4:1)。

EX: Narrow input voltage range ( $\pm 10\%$ )

5V nominal input	→	4.5~5.5V
12V nominal input	→	10.8~13.2V
24V nominal input	→	21.6~26.4V

Wide input voltage range 2:1

5V nominal input	→	4.5~9V
12V nominal input	→	9~18V
24V nominal input	→	18~36V
48V nominal input	→	36~75V

Wide input voltage range 4:1 (W)

24V nominal input	→	9~36V
48V nominal input	→	18~75V

### 2. Input power :

$$P_{in} = V_{in} \times I_{in}$$

$V_{in}$  : Input voltage

$I_{in}$  : Input current

### 3. Output power :

$$P_{out} = V_{out} \times I_{out}$$

$V_{out}$  : Output voltage

$I_{out}$  : Output current

### 4. Efficiency :

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

$P_{out}$ : Output power

$P_{in}$ : Input power

### 5. Voltage accuracy:

$$\frac{|V_{out} - V_{out(nominal)}|}{V_{out}} \times 100\%$$

$V_{out}$  : Output voltage

Vout(nominal) : Nominal output voltage

6. Line regulation:

Narrow input voltage range ( $\pm 10\%$ ) and unregulated output voltage series.

$$\text{Line regulation} = \frac{\Delta V_{out}}{\Delta V_{in}}$$

$$\Delta V_{out} = \frac{V_{out(+10\%)} - V_{out(-10\%)}}{V_{out}} \times 100\%$$

Vout(+10%) : Output voltage at Vin = 1.1xVin(nominal)&full load

Vout(-10%) : Output voltage at Vin = 0.9xVin(nominal)&full load

Vout : Output voltage at Vin = Vin(nominal)&full load

$$\Delta V_{in} = \frac{V_{in(+10\%)} - V_{in(-10\%)}}{V_{in(nominal)}} \times 100\%$$

Vin(+10%) : Input voltage = 1.1xVin(nominal)

Vin(-10%) : Input voltage = 0.9xVin(nominal)

Vin(nominal) : Nominal Input voltage

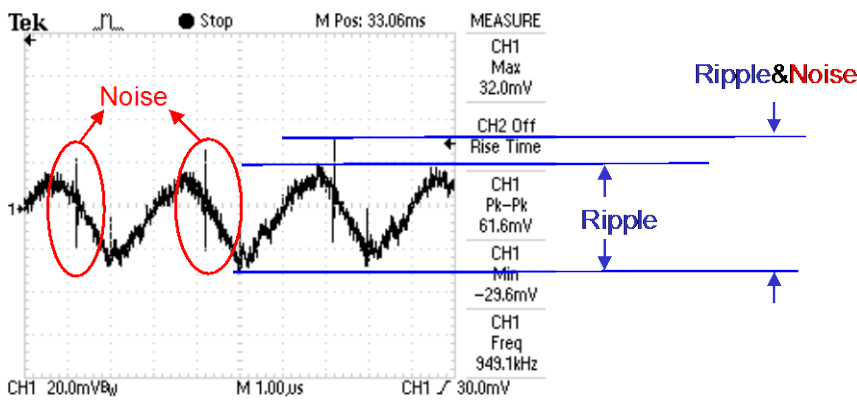
7. Load regulation :

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

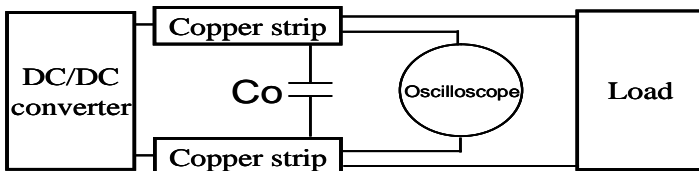
Vout(FL): Output voltage at full load

Vout(NL): Output voltage at 10% full load

8. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.



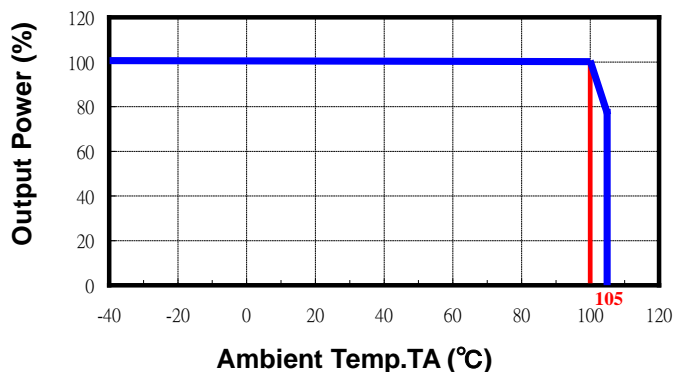
Output Ripple&Noise measurement test circuit: as shown below.



Co: usually 0.47uF.



9. **Temperature derating curve:** The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



10. **Switching frequency:** The nominal operating frequency of the DC-DC converters.
11. **Input to output isolation:** The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.
12. **Input souce impedance:** The power module should be connected to low ac-impedance input souce. Highly inductive souce impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it maybe necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit, it is commended to use a good quality low Equivalent Series Resistance ( ESR <math>< 0.1\Omega</math> at 100KHz ) capacitor of a 22uF for the power module.

