

## FEATURES

- ◆ RoHS compliant
- ◆ Efficiency up to 86%
- ◆ SIP/DIP Package
- ◆ Wide temperature performance at full 1 Watt load, -40°C to 85°C
- ◆ UL 94V-0 package material
- ◆ No heatsink required
- ◆ Low ripple and good EMC Features
- ◆ Industry standard pinout
- ◆ Power sharing on output
- ◆ 3KVDC isolation
- ◆ Continuous Short Circuit Protection
- ◆ Internal SMD construction
- ◆ No external components required
- ◆ Good dynamic feature

## MODEL SELECTION

F<sup>①</sup>05<sup>②</sup>05<sup>③</sup>X<sup>④</sup>S<sup>⑤</sup>R<sup>⑥</sup>

- ① Product Series
- ② Input Voltage
- ③ Output Voltage
- ④ Fixed Input
- ⑤ SIP Package
- ⑥ Regulated output

## DESCRIPTION

The F-XSR&F-XDR series are specially designed for applications where a group of polar power supplies are 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  $\leq \pm 5\%$ );
- 2) where isolation is necessary between input and output (isolation voltage  $\leq 3000\text{VDC}$ );
- 3) where the regulation of the output voltage and the output ripple noise are demanded.



## SELECTION GUIDE

Order code	Input		Output			Efficiency (% Typ)	Switching Frequency (KHz, Typ)
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max	Min		
F0505XSR*	5	4.75-5.25	5	150	15	68	83
F0505XSR	5	4.75-5.25	5	200	20	66	83
F0509XSR	5	4.75-5.25	9	111	12	70	83
F0512XSR	5	4.75-5.25	12	83	9	72	83
F0515XSR	5	4.75-5.25	15	67	7	73	250
F1205XSR	12	11.4-12.6	5	150	15	68	100
F1205XSR	12	11.4-12.6	5	200	20	67	83
F1209XSR	12	11.4-12.6	9	111	12	71	83
F1212XSR	12	11.4-12.6	12	83	9	73	83
F1215XSR	12	11.4-12.6	15	67	7	74	83
F2405XSR	24	22.8-25.2	5	150	15	68	83
F2405XSR	24	22.8-25.2	5	200	20	67	83
F2409XSR	24	22.8-25.2	9	111	12	72	83
F2412XSR	24	22.8-25.2	12	83	9	73	83
F2415XSR	24	22.8-25.2	15	67	7	74	300
F0505XDR	5	4.75-5.25	5	150	15	68	83
F0505XDR	5	4.75-5.25	5	200	20	66	83
F0509XDR	5	4.75-5.25	9	111	12	70	83
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F2409XDR	24	22.8-25.2	9	111	12	72	83
F2412XDR	24	22.8-25.2	12	83	9	73	83
F2415XDR	24	22.8-25.2	15	67	7	74	300

\*Series F-XSR output pin -Vout(5), +Vout(7) eg: F0505XSR.5.7

## ISOLATION SPECIFICATIONS

Parameter	Test conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 minute and 1mA max	3000			VDC
Isolation resistance	Test at Viso=500VDC	1000			MΩ

## OUTPUT SPECIFICATIONS

Parameter	Test conditions	Min	Typ.	Max.	Units
Output power		0.1		1	W
Line regulation	For Vin change of $\pm 5\%$			$\pm 0.25$	%
Load regulation	10% to 100% full load			$\pm 1$	%
Output voltage accuracy	100% full load			$\pm 3$	%
Temperature drift	100% full load			0.03	%/°C
Output Ripple*	20MHz Bandwidth		10	20	MV p-p
Output Noise*	20MHz Bandwidth		50	100	MV p-p
Switching frequency	Full load, nominal input		100		Khz

\* Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

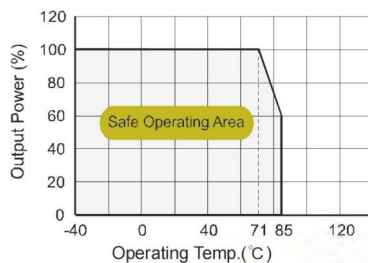
### TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage humidity range				95	%
NO-load power consumption					°C
Operating temperature		-40		85	°C
Storage temperature		-55		125	°C
Lead temperature	1.5mm from case for 10 seconds		15	300	
Temp.rise at full load				25	°C
Cooling		Free air convection			
Case material		Plastic(UL94-V0)			
Short circuit protection	IF(XX)05X(S)D	Continuous			
	Others			1'	s
MTBF		3500			K hours
Weight			5.2		g

\*Supply voltage must be discontinued at the end of short circuit duration.

### TYPICAL CHARACTERISTICS

Temperature Derating Graph

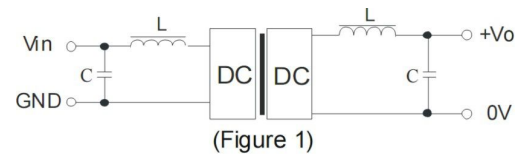


### OUTLINE DIMENSIONS & PIN CONNECTIONS

F-XSR SIP	SIZE Graph	F-XDR DIP																										
	<p>RECOMMENDED FOOTPRINT Top view, grid: 2.54mm(0.1inch) diameter: 1.00mm(0.039inch)</p>																											
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### Filtering

To get an extreme low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter. Which may produce a more significant filtering effect. It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference see (Figure 1).



In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1).

EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	5	10
12	2.2	9	4.7
24	1.0	12	2.2
-	-	15	1.0

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

### Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

### Requirement On Output Load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is not less than 10% of the full load, and that this product should never be operated under no load! If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power (IF\_S(D)-W25 Series).

**When the environment temperature is higher than 71°C, the product output power should be less than 60% of the rated power.**

**No parallel connection or plug and play.**

**Use dual output simultaneously, forbid opening output pin (0V) to use as single output.**

### RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

### REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.