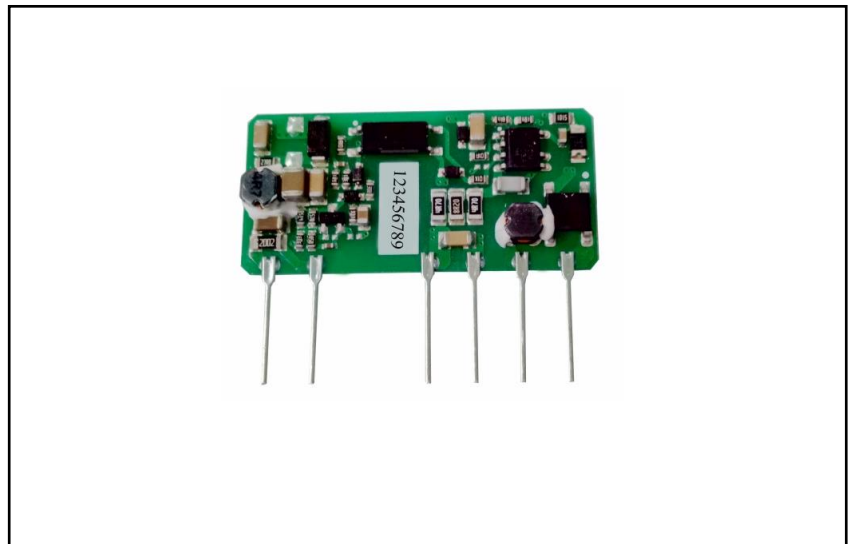


## FEATURES

- Input voltage range:  
85 - 264VAC and 100 - 400VDC
- Output short circuit, over-current, over-voltage protection
- High efficiency, 4KVAC high isolation voltage
- Compact size open frame
- Industrial-grade design
- IEC62368, UL62368, EN62368 approval

# RS PRO Embedded Switch Mode Power Supplies

RS Stock No: 2067694, 2067695, 2067696, 2067697, 2067698



RS Professionally Approved Products bring to you professional quality parts across all product categories. Our product range has been tested by engineers and provides a comparable quality to the leading brands without paying a premium price.

## Embedded Switch Mode Power Supplies (SMPS)

### Product Description

PCB mount power supply with universal AC and DC input, low stand-by power consumption. All models are suitable for industrial control, instrumentation, and smart home applications. We recommend using external components as shown in design reference for enhanced EMC performance in harsh environmental conditions

### General Specifications

<b>Model</b>	LS05-15BxxSS series
<b>Mounting Type</b>	PCB mount
<b>Package Type</b>	Open Frame
<b>MTBF</b>	MIL-HDBK-217F@25°C > 300,000 h
<b>Applications</b>	Industrial control system, Mechanical and electrical equipment

RS Stock	Input Voltage	Output Voltage	Output Current	Output Wattage	Efficiency (Typ)
<b>2067694</b>	85 to 264V ac 100 to 400V dc	+ 3.3V DC	1A	3.3W	67%
<b>2067695</b>	85 to 264V ac 100 to 400V dc	+ 5V DC	1A	5W	74%
<b>2067696</b>	85 to 264V ac 100 to 400V dc	+ 9V DC	0.56A	5W	75%
<b>2067697</b>	85 to 264V ac 100 to 400V dc	+ 12V DC	0.42A	5W	76%
<b>2067698</b>	85 to 264V ac 100 to 400V dc	+ 24V DC	0.21A	5W	79%

## Embedded Switch Mode Power Supplies (SMPS)

### Electrical Specifications

Input Specification	
Voltage Range	85 to 264V ac, 100 to 400V dc
Frequency	47 to 63Hz
Stand-By Power consumption	0.5W
AC Current Rating	0.2A/115V ac, 0.1A/230V ac
Inrush Current	10A / 230V ac
Leakage Current (max.)	<0.25mA / 240V ac
Input Protection	Recommend external 1A/250V, slow blow, required

Output Specification						
Output voltage	3.3V	5V	9V	12V	15V	24V
Rated Current	1A	1A	0.56A	0.42A	0.34A	0.21A
Ripple & Noise (max.)	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p
Rated Power	3.3W	5W	5W	5W	5W	5W
Max. Capacitor Load	2200uF	1500uF	680uF	470uF	330uF	100uF
Voltage Tolerance	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%	±2.0%
Line Regulation typ.	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
Load Regulation typ.	±1%	±1%	±1%	±1%	±1%	±1%

Hold Up Time	65-75ms/230V ac, 10-15ms/115V ac
No Load Power Consumption	≤0.5 W
Over Voltage Protection	3.3/5V output ≤ 7.5 V (Output voltage clamp)
	9V output ≤ 15 V (Output voltage clamp)
	12/15V output ≤ 20 V (Output voltage clamp)
	24V output ≤ 30 V (Output voltage clamp)
Over-current Protection	≥150%Io self-recovery
Short Circuit Protection	Continuous, self-recovery
Switching Frequency	100KHz
Isolation	4KVAC

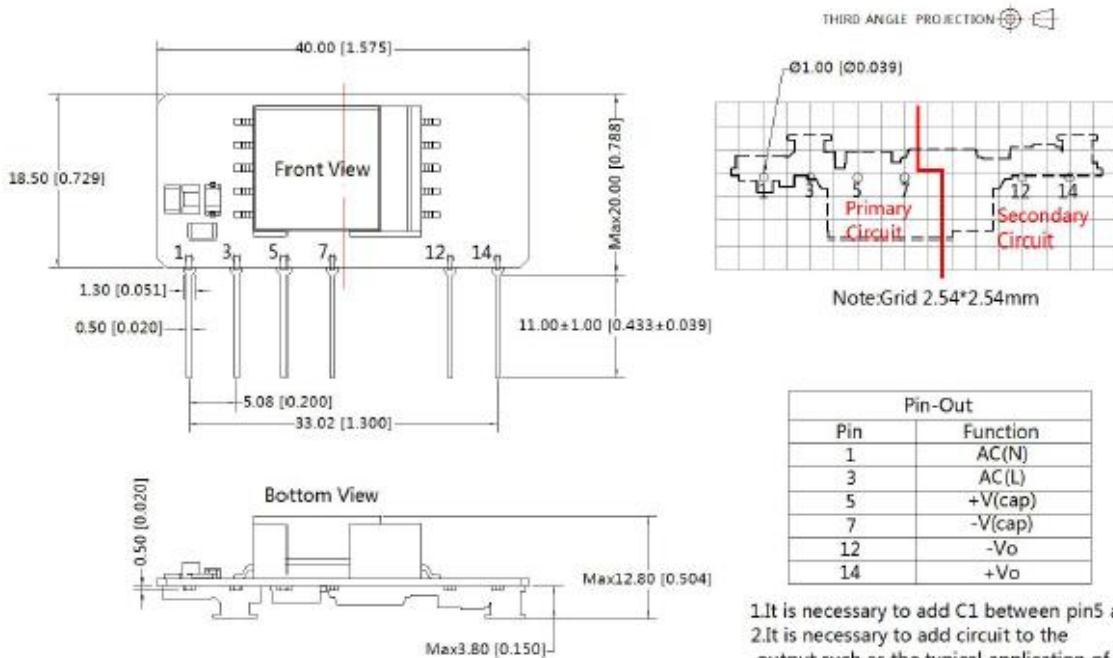
# Embedded Switch Mode Power Supplies (SMPS)

## EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS A (See Fig. 1 for typical application circuit)	
		CISPR32/EN55032	CLASS B (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (See Fig. 1 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV (See Fig. 1 for typical application circuit)	perf. Criteria B
		IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s (See Fig. 2 for recommended circuit)	perf. Criteria A
Voltage dips, short interruptions and voltage variations immunity		IEC/EN61000-4-11	0%/70%	perf. Criteria B

## Mechanical Specifications

Overall Length	40mm
Overall Depth	18.50mm
Overall Width	12.80mm
Weight	7g (Typ.)



Note:  
 Unit: mm[inch]  
 Pin section tolerances: ±0.10[±0.004]  
 General tolerances: ±0.50[±0.020]  
 The layout of the device is for reference only, please refer to the actual product

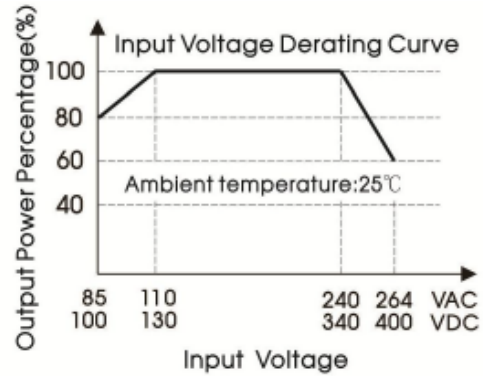
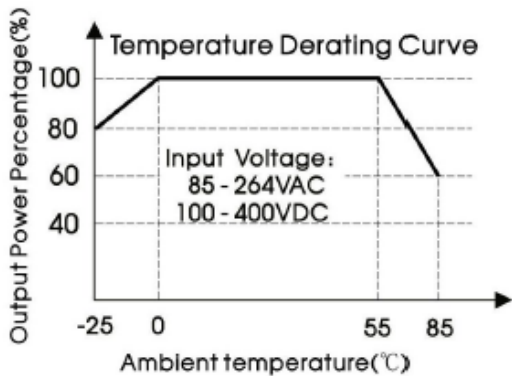
- 1.It is necessary to add C1 between pin5 and pin7.
- 2.It is necessary to add circuit to the output, such as the typical application of Figure 1.
- 3.It is needed to have distance ≥6.4mm for safety between external components in primary circuit and secondary circuit.

# Embedded Switch Mode Power Supplies (SMPS)

## Operation Environment Specifications

<b>Storage Humidity</b>	85% RH non-condensing
<b>Cooling</b>	Natural convection
<b>Operating Temperature Range</b>	-25 to 85°C
<b>Storage Temperature Range</b>	-40 to 105°C
<b>Power Derating</b>	-25 to 0°C 0.8% /°C
	55 to 85°C 0.8% /°C
	85Vac to 110Vac 0.8% /VAC
	240Vac to 264Vac 0.8% /VAC

## Derating



Input voltage should be derated based on temperature derating when it is 85-110VAC/240-264VAC/100-130VDC/340-400VDC

## Approvals

<b>Safety Standard</b>	UL62868, EN62868, IEC62868 approval
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# Embedded Switch Mode Power Supplies (SMPS)

## Design Reference

### 1. Typical application circuit

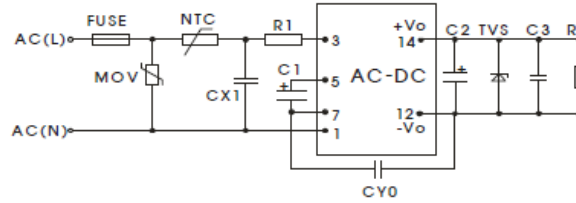


Fig. 1: Typical application circuit

Model	C1 (Required)	C2 (Required)	R1	C3	CX1	CY0	NTC	MOV	FUSE (Required)	TVS
LS05-15B03SS(-F)	10µF/400V	220µF/35V	12Ω/2W	100nF/ 50V	0.1µF/ 275VAC	1nF/400 VAC	13D-5	S14K350	1A/250V	SMBJ7.0A
LS05-15B05SS(-F)										SMBJ12A
LS05-15B09SS(-F)		150µF/35V								SMBJ20A
LS05-15B12SS(-F)										SMBJ30A
LS05-15B15SS(-F)										
LS05-15B24SS(-F)										

**Note:**

- C1: When AC Input, C1 is used as filter capacitor, the value of C1 is recommended to be 10µF /400V. When DC Input, C1 is used as EMC filter capacitor, the value of C1 is recommended to be 10µF/400V(when the Input voltage is above 370VDC, the recommended value of C1 is 10µF/450V).
- Output filtering capacitor C2 is electrolytic capacitor. C2 is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C3 is ceramic capacitor, which is used to filter high-frequency noise.

### 2. EMC solution-recommended circuit

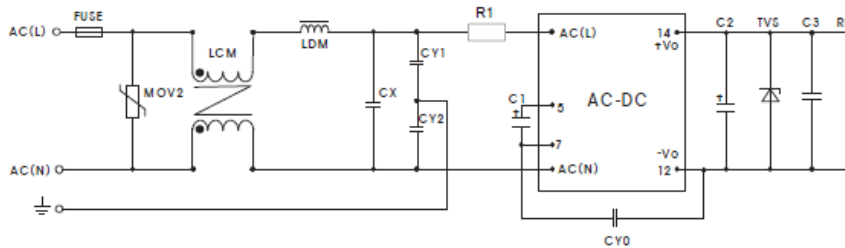


Fig 2: EMC application circuit with higher requirements

Components	Recommend Parameter
MOV2	S14K320
CY1, CY2	1nF/400VAC
CX	0.1µF/275VAC
LCM	3.5mH
LDM	330µH
R1	12 Ω /2W
FUSE	1A/250V, slow fusing, required

Note: The recommended value of other components refers to typical application circuit.

## Additional Information

Custom Tariff Number	85044030
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## Notes

1. This part is open frame, at least 6.4mm safety distance between the primary and secondary external components of the module is needed to meet the safety requirement.
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75% with nominal input voltage and rated output load.
3. All index testing methods in this datasheet are based on our Company's corporate standards.
4. Products are related to laws and regulations: see "Features" and "EMC"
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

Additional Information / Diagrams / Illustrations / Wiring  
Diagrams / Connector Images and Quantity