

# Embedded Switch Mode Power Supplies (SMPS)

## FEATURES

- Universal 85 - 264V AC and 100 - 370V DC Input
- High efficiency, 4KVAC high isolation voltage
- Operating temperature range -40°C to +70°C
- Output short circuit, over-current, over-voltage protection
- Regulated output, low output ripple & noise
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B
- IEC/EN/UL62368 and safety approval

## RS PRO Embedded Switch Mode Power Supplies

- RS Stock No: 2067688, 2067690, 2067691



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

Chassis mount PSU universal AC input and DC input voltage, low power consumption, high efficiency, high efficiency, high reliability. It offers good EMC performance compliant to CISPR32/EN55032 and the safety certifications to UL/IEC62368 and EN62368 standards and are widely used in industrial, medical, instrumentation.

## General Specifications

<b>Model</b>	LHE25-20BxxA2 series
<b>Mounting Type</b>	Chassis mount
<b>Package Type</b>	Chassis mounting with screw terminals
<b>MTBF</b>	MIL-HDBK-217F@25°C > 300,000 h
<b>Applications</b>	Industrial control systems, instrumentation and electrical equipment

RS Stock#	Input Voltage	Output Voltage	Output Current	Output Wattage	Efficiency (Typ)
<b>2067688</b>	85 to 264V ac 100 to 370V dc	+ 5V DC	4.1A	20.5W	79%
<b>2067690</b>	85 to 264V ac 100 to 370V dc	+ 12V DC	2.1A	25W	83%
<b>2067691</b>	85 to 264V ac 100 to 370V dc	+ 24V DC	1.1A	25W	85%

## Electrical Specifications

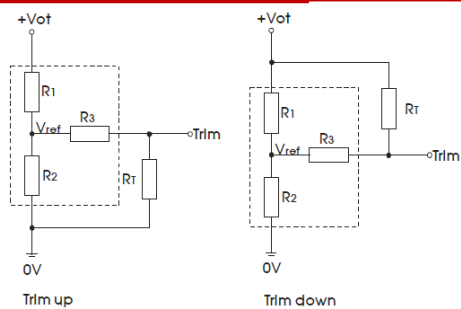
Input Specification	
<b>Voltage Range</b>	85 to 264V ac, 100 to 370V dc
<b>Frequency</b>	47 to 63Hz
<b>AC Current Rating</b>	0.6A/115V ac, 0.34A/230V ac
<b>Inrush Current</b>	40A / 230V ac
<b>Input Protection</b>	2A/250V, slow blow built in

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Output Specification			
Output voltage	5V	12V	24V
Rated Current	4.1A	2.1A	1.1A
Ripple & Noise (typ.)	50mVp-p	50mVp-p	50mVp-p
Ripple & Noise (max.)	100mVp-p	100mVp-p	100mVp-p
Rated Power	20.5W	25W	25W
Max. Capacitor Load	12240uF	5400uF	1440uF
Voltage Tolerance	±2.0%	±2.0%	±2.0%
Line Regulation typ.	±0.5%	±0.5%	±0.5%
Load Regulation typ.	±1%	±1%	±1%
Minimum Load	0%	0%	0%

Hold Up Time	60ms/230V ac, 10ms/115V ac
Over Voltage Protection	5V output ≤ 7.5 V
	12V output ≤ 20 V
	24V output ≤ 30 V
Over-current Protection	≥140%Io self-recovery
Short Circuit Protection	Hiccup, continuous, self-recovery
Switching Frequency	65Khz
Isolation	4KVAC

## Trim Calculations



Calculation formula of Trim resistance:

$$\begin{aligned} \text{up: } R_T &= \frac{\alpha R_2}{R_2 - \alpha} - R_3 & \alpha &= \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{\alpha R_1}{R_1 - \alpha} - R_3 & \alpha &= \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

$R_T$  is Trim resistance  
 $\alpha$  is a self-defined parameter, with no real meaning.

Applied circuits of Trim (Part in broken line is the interior of models):

Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)	Vot(V)
3.3V	3.3	1.98	1	1.24	Output voltage after regulation, variation ≤ ±10%
5V	3.3	3.3	1	2.5	
9V	7.5	2.87	1	2.5	
12V	3.83	1	1	2.5	
15V	7.5	1.5	1	2.5	
24V	8.66	1	1	2.5	
48V	68	3.73	1	2.5	

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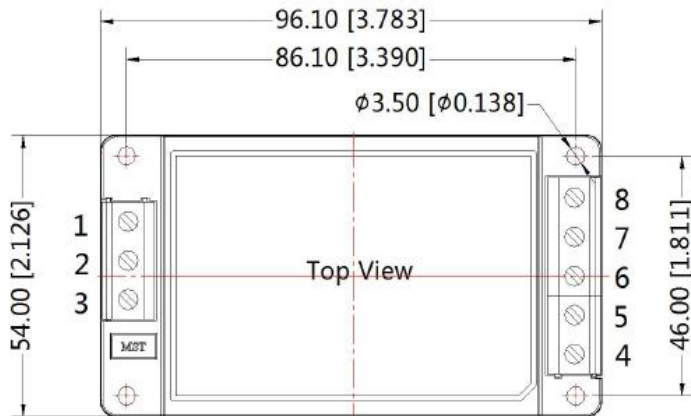
## EMC Specifications

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ / Air $\pm 8\text{KV}$	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria B
			$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 1\text{KV}$	perf. Criteria B
			line to line $\pm 2\text{KV}$ / line to ground $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
Voltage dips, short interruptions and voltage variations		IEC/EN61000-4-11	0%, 70%	perf. Criteria B

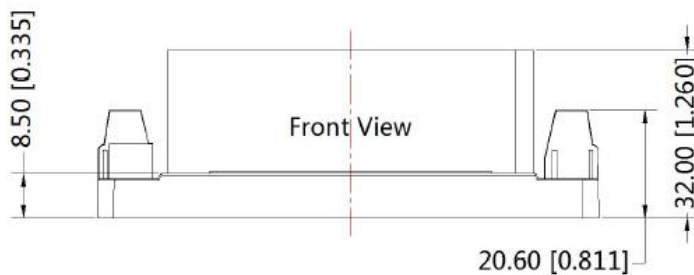
## Mechanical Specifications

Overall Length	96.10mm
Overall Depth	32mm
Overall Width	54mm
Weight	140g (Typ.)

THIRD ANGLE PROJECTION



Pin-Out	
Pin	Function
1	$\perp$
2	AC(N)
3	AC(L)
4	+Vo
5	NC
6	Trim
7	NC
8	-Vo



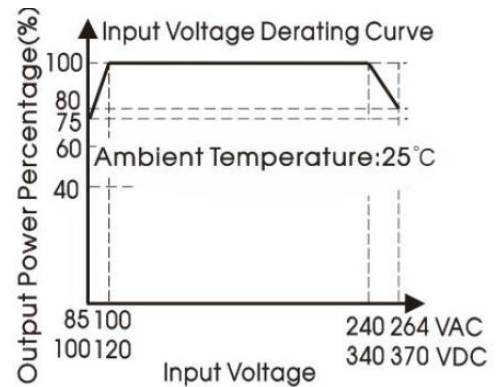
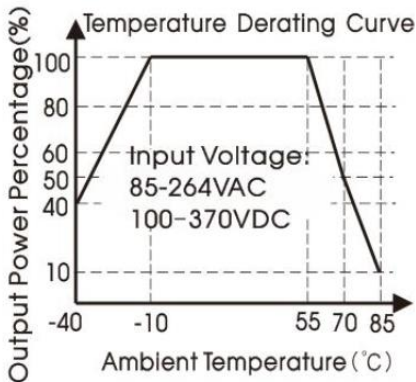
Note:  
 Unit: mm[inch]  
 Wire range: 24-12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:  $\pm 1.00[\pm 0.039]$

# Embedded Switch Mode Power Supplies (SMPS)

## Operation Environment Specifications

<b>Storage Humidity</b>	95% RH
<b>Cooling</b>	Natural convection
<b>Operating Temperature Range</b>	-40 to 85°C
<b>Storage Temperature Range</b>	-40 to 105°C
<b>Power Derating</b>	-40 to -10°C 2% /°C
	55 to 70°C 3.3% /°C
	85Vac to 100Vac 1.67% /VAC
	240Vac to 264Vac 0.83% /VAC

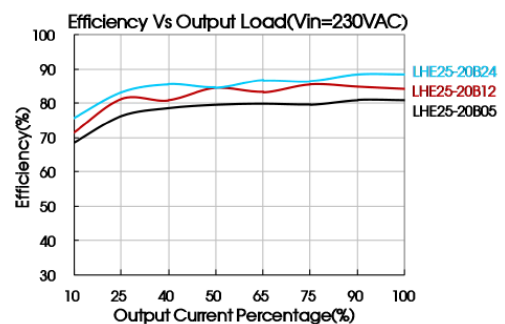
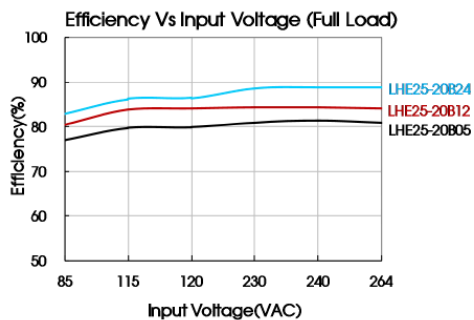
## Derating



With an AC input between 85-100V/240-264VAC and a DC input between 100-120V/340-370VDC, the output power must be derated as per temperature derating curves

This product is suitable for applications using natural air cooling.

## Efficiency





### Approvals

Safety Standard	UL62368/EN62368/EN60335/IEC62368/IEC60335 approval
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### Additional Information

Custom Tariff Number	85044030
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#### Notes

1. 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.
2. All index testing methods in this datasheet are based on our Company's corporate standards.
3. Products are related to laws and regulations: see "Features" and "EMC"
4. 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