

# 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
- EN62368 safety approval

## RS PRO Embedded Switch Mode Power Supplies

RS Stock No: 2067692



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 power supply features a 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 EN62368 standards and are widely used in industrial, medical, instrumentation.

## General Specifications

<b>Model</b>	LHE40-20BxxA5 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)
2067692	85 to 264V ac 100 to 370V dc	+ 12V DC	3.3A	40W	84%

## Electrical Specifications

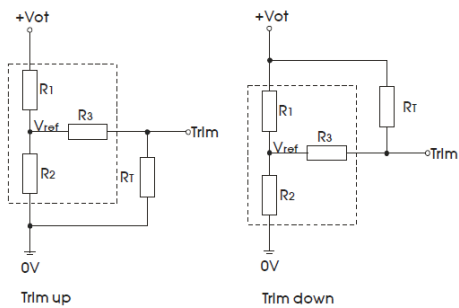
Input Specification	
<b>Voltage Range</b>	85 to 264V ac, 100 to 370V dc
<b>Frequency</b>	47 to 63Hz
<b>AC Current Rating</b>	1A/115V ac, 0.6A/230V ac
<b>Inrush Current</b>	50A / 115V ac and 70A / 230V ac
<b>Input Protection</b>	3.15A/250V, slow blow built in

# Embedded Switch Mode Power Supplies (SMPS)

Output Specification	
Output voltage	12V
Rated Current	3.3A
Ripple & Noise (typ.)	80mVp-p
Ripple & Noise (max.)	150mVp-p
Rated Power	40W
Max. Capacitor Load	9000uF
Voltage Tolerance	±2.0%
Line Regulation typ.	±0.5%
Load Regulation typ.	±1%
Minimum Load	0%

Hold Up Time	50ms/230V ac, 10ms/115V ac
Over Voltage Protection	12V output 16 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	

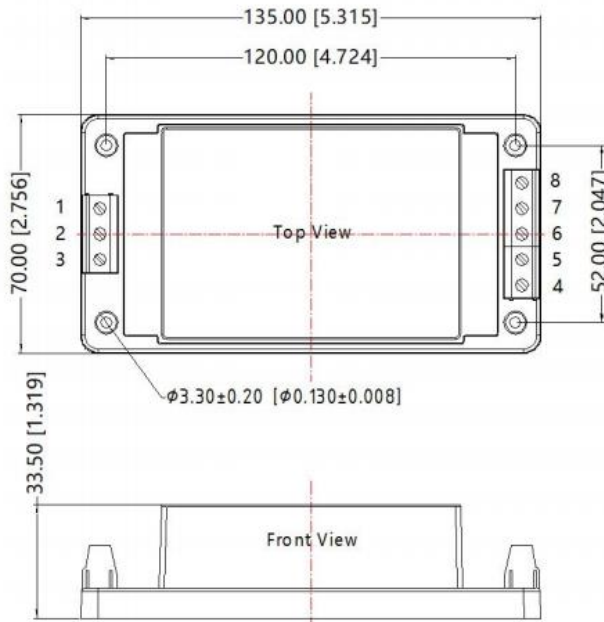
# Embedded Switch Mode Power Supplies (SMPS)

## 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
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)		perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 1\text{KV}$		perf. Criteria B
		IEC/EN61000-4-5	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	

## Mechanical Specifications

Overall Length	135mm
Overall Depth	33.5mm
Overall Width	70mm
Weight	300g (Typ.)



THIRD ANGLE PROJECTION

Pin-Out	
Pin	LHE40-20B
1	AC(L)
2	AC(N)
3	NC
4	Trim
5	NC
6	-Vo
7	NC
8	+Vo

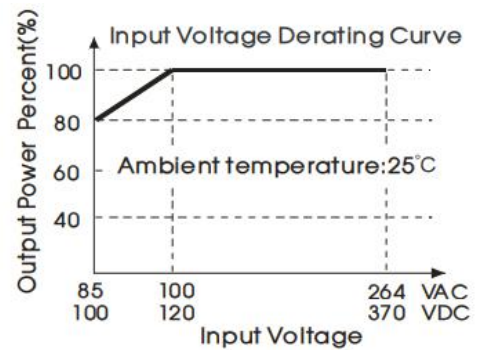
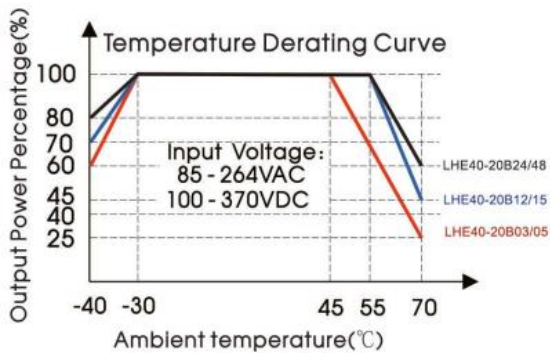
Note:  
 Unit: mm[inch]  
 Wire range: 24-12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:  $\pm 1.00[\pm 0.040]$

# Embedded Switch Mode Power Supplies (SMPS)

## Operation Environment Specifications

Storage Humidity	95% RH
Cooling	Natural convection
Operating Temperature Range	-40 to 70°C
Storage Temperature Range	-40 to 85°C
Power Derating	-40 to -30°C 3% /°C
	55 to 70°C 3.7% /°C
	85Vac to 100Vac 1.33% /VAC

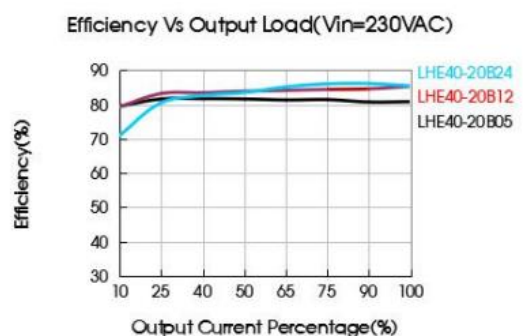
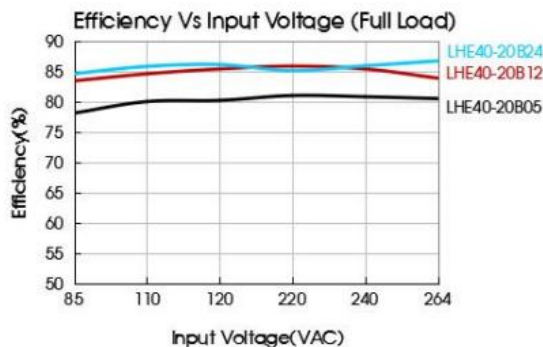
## Derating



With an AC input between 85-100V and a DC input between 100-120V, 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	EN62368 approval
-----------------	------------------

### Additional Information

Custom Tariff Number	85044030
----------------------	----------

#### 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