

EPM25-1V 30 W

30 Watt isolated DC-DC converter



Product features

- 30 Watt isolated DC-DC converter
- Input voltage: 9 Vdc - 36 Vdc
18 Vdc - 75 Vdc
- Efficiency up to 91%
- Isolation voltage: 1.6 kVdc
- 1.0" x 1.0 " package
- Operating ambient temperature from -40 °C to +105 °C
- EMI class A without external circuit
- No minimum load required
- IEC62368-1/ EN55032&35 certified
- Remote On/OFF

Applications

- Computing/telecom
- Distributed power architectures
- Servers and workstations
- LAN /WAN applications
- Data processing applications
- Industrial IoT equipment, sensors
- Power supply, battery backup
- Wireless TX/RX modules
- Renewable energy products

Environmental compliance



Ordering part number

	<u>EPM</u>	<u>25</u>	<u>36</u>	<u>1V</u>	<u>3R3</u>	<u>7R0</u>	<u>S</u>
Eaton converter	_____	_____	_____	_____	_____	_____	_____
Package type/size code	_____	_____	_____	_____	_____	_____	_____
Maximum rated input voltage	_____	_____	_____	_____	_____	_____	_____
Version code	_____	_____	_____	_____	_____	_____	_____
Output voltage (maximum, R=decimal point)	_____	_____	_____	_____	_____	_____	_____
Output current (maximum, in mA)	_____	_____	_____	_____	_____	_____	_____
S = single output, D = dual output	_____	_____	_____	_____	_____	_____	_____



Powering Business Worldwide

Specifications

	Parameter	Conditions	Minimum	Typical	Maximum	Unit
Input	Input filter			Pi type		
	Input voltage range	Vin = 24 Vdc	9		36	Vdc
		Vin = 48 Vdc	18		75	Vdc
	Input current @ no load			10		mA
	Start-up time	100% Load at Nominal Vin		30		ms
	Start-up voltage	Vin = 24 Vdc		9		Vdc
		Vin = 48 Vdc		18		Vdc
	UVLO	Vin = 24 Vdc		7.5		Vdc
		Vin = 48 Vdc		16		Vdc
	Input surge voltage (0.1 s max.)	Vin = 24 Vdc			50	Vdc
		Vin = 48 Vdc			100	Vdc
	Remote ON/OFF	DC-DC ON		Open or 3.5 ~ 15 Vdc		
		DC-DC OFF		Short or 0 ~ 1.2 Vdc		
		Input current (remote off mode)		2		mA
Output	Efficiency			Selection guide		
	Minimum load		0			%
	Line regulation	Single output	-0.2		+0.2	%
		Dual output	-0.5		+0.5	%
	Load regulation (10-100% Load)	Single output	-0.2		+0.2	%
		Dual output	-1.0		+1.0	%
	Cross regulation		-5		+5	%
	Voltage accuracy		-1		+1	%
	Operating frequency	Vout = 3.3 Vdc		300		kHz
		Vin = 24 Vdc Vout = 5, 12, 15, 24, ±12, ±15 V		400		kHz
		Vin = 48 Vdc Vout = 5, 12, 24, ±12 V		370		kHz
		Vin = 48 Vdc Vout = 15 V, ±15 Vdc		430		kHz
	Ripple & noise ¹				75	mVp-p
	Voltage adjustability		-10		+10	%
	Transient response recovery time	25% load step change (75%-100% load)		250		µs
Environment	Operating temperature (with derating)		-40		+105	°C
	Storage temperature		-55		+125	°C
	Max. case temperature				+110	°C
	Relative humidity		5		95	%RH
	Vibration			MIL-STD-202G		

Specifications

	Parameter	Conditions	Minimum	Typical	Maximum	Unit
Function	Isolation voltage 1 min., Input to Output		1.6			kVdc
	Isolation resistance		1000			MΩ
	Isolation capacitance			2400		pF
	MTBF (MIL-HDBK-217F)	+25 °C		560		khours
	Short circuit protection		Continuous, automatic recovery			
	Overload protection	Vin = 24 Vdc		170		%
		Vin = 48 Vdc		190		%
	Over voltage protection	Vout = 3.3 Vdc		5.3		Vdc
		Vout = 5 Vdc		6.2		Vdc
		Vout = 12 Vdc		15		Vdc
		Vout = 15 Vdc		18		Vdc
		Vout = 24 Vdc		30		Vdc
		Vout = ±12 Vdc		±15		Vdc
		Vout = ±15 Vdc		±18		Vdc
	Certification			IEC62368-1/ EN55032&35		
Physical	Dimension		1.00 x 1.00 x 0.40 inch			
	Weight		17 g			
	Case material		metal case			
	Base material		FR4 PCB			
	Potting material		Silicone			
	EMC	EMI	EN 55032		Class A without external circuit, Class B with external circuit	
ESD		IEC 61000-4-2 Air ± 8 kV; Contact ± 6 kV		Criteria A		
RS²		IEC 61000-4-3, 3 V/m		Criteria A		
EFT²		IEC 61000-4-4, ± 2 kV		Criteria A		
Surge²		IEC 61000-4-5, ± 2 kV		Criteria A		
CS²		IEC 61000-4-6, 3 Vrms		Criteria A		
PFMF		IEC 61000-4-8, 1 A/m		Criteria A		

1. The ripple & noise are measured with 22 µF capacitor at 20 MHz BW.
2. Test with E-CAP 680 µF/100 V at input terminal.
3. All specifications valid at nominal input, full load and +25 °C after warm-up time unless otherwise stated.
4. The product information and specifications are subject to change without prior notice.

Selection guide

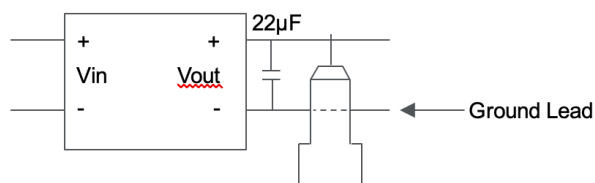
Part number	Input voltage (Vdc)	Output voltage (Vdc)	Output current @ full load (mA)	Efficiency ¹ minimum	Efficiency ¹ typical	Capacitive load ² maximum (μ F)
EPM25361V-3R3-7R0S	9-36 Nominal 24	3.3	7000	87.50%	88.50%	10000
EPM25361V-05R-6R0S	9-36 Nominal 24	5	6000	88.00%	89.00%	7200
EPM25361V-12R-2R5S	9-36 Nominal 24	12	2500	89.00%	90.00%	1200
EPM25361V-15R-2R0S	9-36 Nominal 24	15	2000	89.50%	90.50%	1000
EPM25361V-24R-1R2S	9-36 Nominal 24	24	1250	89.50%	90.50%	380
EPM25361V-12R-1R2D	9-36 Nominal 24	± 12	± 1250	88.00%	89.00%	± 750
EPM25361V-15R-1R0D	9-36 Nominal 24	± 15	± 1000	89.00%	90.00%	± 500
EPM25751V-3R3-7R0S	18-75 Nominal 48	3.3	7000	87.00%	88.00%	10000
EPM25751V-05R-6R0S	18-75 Nominal 48	5	6000	89.00%	90.00%	7200
EPM25751V-12R-2R5S	18-75 Nominal 48	12	2500	89.50%	90.50%	1200
EPM25751V-15R-2R0S	18-75 Nominal 48	15	2000	89.50%	90.50%	1000
EPM25751V-24R-1R2S	18-75 Nominal 48	24	1250	89.50%	90.50%	380
EPM25751V-12R-1R2D	18-75 Nominal 48	± 12	± 1250	89.50%	90.50%	± 750
EPM25751V-15R-1R0D	18-75 Nominal 48	± 15	± 1000	90.00%	91.00%	± 500

1. Efficiency is nominal input voltage and full load @ +25 °C.

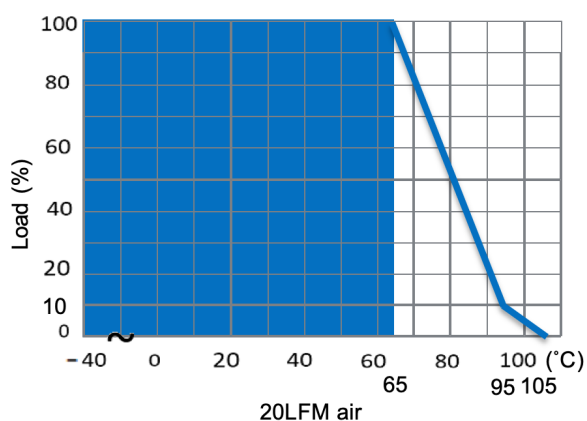
2. Capacitive load is tested at minimum input voltage and a constant resistive load.

3. All specifications valid at nominal input voltage, full load and +25 °C after warm-up time unless otherwise stated.

Measure method

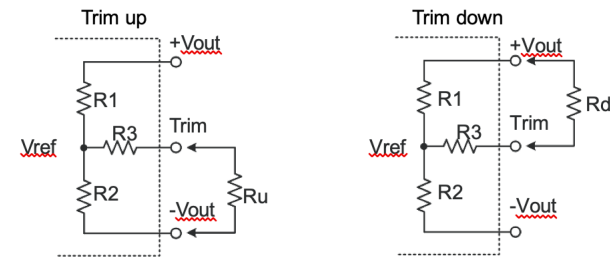


Derating curve



Application information

Single external output voltage trimming



Formula for trim resistor:

UP: $Ru = \frac{aR_2}{R_2 - a} - R_3$ $a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$

DOWN: $Rd = \frac{bR_1}{R_1 - b} - R_3$ $b = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$

1. Ru, Rd is mean trim resistor, please check the formula.
2. a & b: user define parameter.
3. V_o' is mean trim up/down voltage.
4. Value for R1, R2, R3 and V_{ref} Refer to the table below.

Output voltage	R1	R2	R3	Vref
3.3 V	16.6 kΩ	10 kΩ	52.3 kΩ	1.25 V
5 V	10.0 kΩ	10 kΩ	35.7 kΩ	2.5 V
12 V	38.0 kΩ	10 kΩ	48.7 kΩ	2.5 V
15 V	50.1 kΩ	10 kΩ	64.9 kΩ	2.5 V
24 V	86.0 kΩ	10 kΩ	73.2 kΩ	2.5 V

Trim up

3R3-7R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63
Ru (kΩ)	2541.45	453.8	228.11	141.63	95.91	67.64	48.43	34.52	23.99	15.73

5R0-6R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Ru (kΩ)	464.3	214.3	130.97	89.3	64.3	47.63	35.73	26.8	19.86	14.3

12R-2R5S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Ru (kΩ)	742.97	347.13	215.19	149.22	109.63	83.24	64.4	50.26	39.26	30.47

15R-2R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Ru (kΩ)	951	404.45	243.71	166.83	121.76	92.14	71.2	55.6	43.53	33.92

24R-1R2S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Ru (kΩ)	822.63	374.72	225.41	150.76	105.97	76.11	54.78	38.78	26.34	16.38

Trim down

3R3-7R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97
Rd (kΩ)	524.98	309.62	208.88	150.49	112.39	85.56	65.65	50.29	38.07	28.13

05R-6R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rd (kΩ)	454.3	204.3	120.97	79.3	54.3	37.63	25.73	16.8	9.86	4.3

12R-2R5S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rd (kΩ)	2921.63	1417.47	916.08	665.38	514.97	414.69	343.06	289.34	247.56	214.13

15R-2R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rd (kΩ)	3484.63	1829.68	1219.96	902.9	708.58	577.28	482.62	411.15	355.27	310.38

24R-1R2S

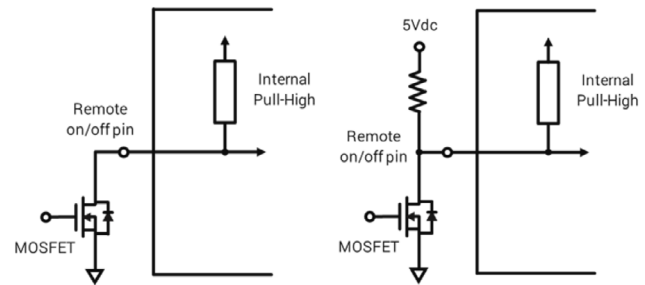
trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rd (kΩ)	7544.97	3692.88	2408.86	1766.84	1381.63	1124.83	941.4	803.82	696.82	611.22

CTRL pin setting

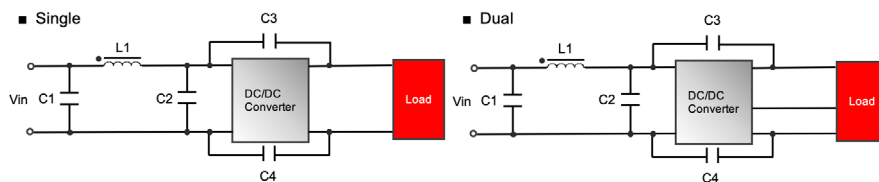
Remote ON/OFF	DC-DC ON	Open or 3.5 ~ 15 VDC
	DC-DC OFF	Short or 0 ~ 1.2 VDC

If not using CTRL function, please leave CTRL pin floating.

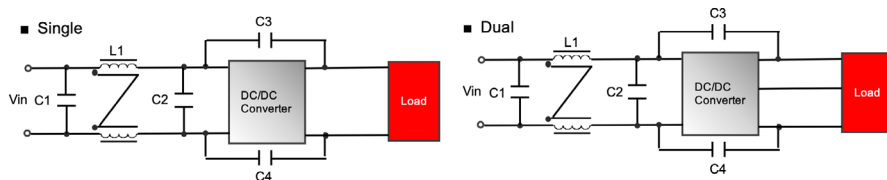
If using CTRL pin to control module to turn on and off; use either external circuit as shown below.



EMC filtering circuit

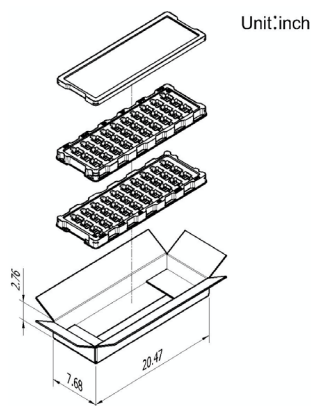


Class B	C1	C2	L1	C3	C4
24 Vin	4.7 μ F	4.7 μ F	10 μ H	2200 pF	2200 pF

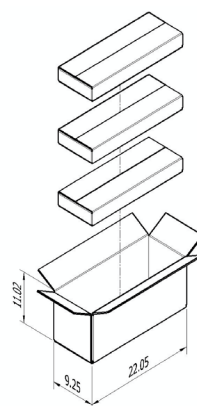


Class B	C1	C2	L1	C3	C4
48 Vin	4.7 μ F	4.7 μ F	Common mode choke K5B 32 μ H	2200 pF	2200 pF

Packaging- Inches



Box accommodates
2 tray 60 converters per box

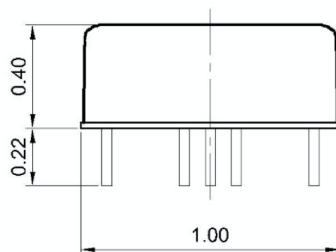


Carton accommodates
3 boxes 180 converters per carton

Technical drawing of a mechanical part showing front and bottom views.

Front View: A rectangle with a width of 1.00 and a height of 0.400. The top edge is rounded. The bottom edge has two vertical slots. The distance between the centerlines of the slots is 1.00. The diameter of the slots is $\phi 0.039$.

Bottom View: A rectangle with a width of 0.800 and a height of 0.800. The bottom view shows six holes arranged in a 3x2 grid. The holes are numbered 1 through 6. The distance between the centerlines of the holes in the horizontal direction is 0.400, and the distance between the centerlines in the vertical direction is 0.400. The holes are located at the intersections of the centerlines and the lines 0.200 from the top and bottom edges.



Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	-Vout	-Vout
5	Trim	Common
6	+Vout	+Vout

Unit: inch
PIN tolerance: ± 0.004
Tolerance: X.XX ± 0.02 X.XXX ± 0.01

R.C. EATON -Vo
EPM25361V-
12R-2R5S
IN 9-36VDC Trim
+Vi OUT 12V/ 2500mA
WLY CE +Vo

www.eaton.com/electronics

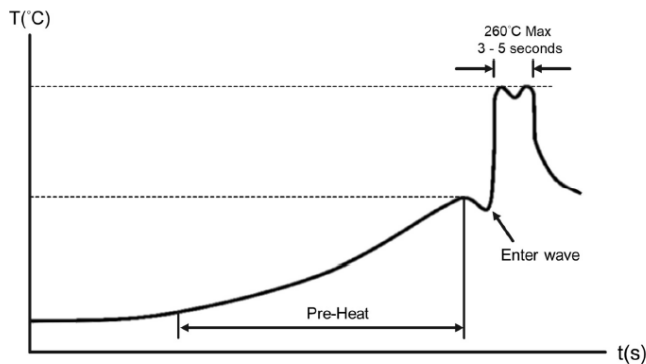
General information

Storage and handling

The shelf life will be a minimum of 36 months, when stored at the following conditions: $< +40\text{ }^{\circ}\text{C}$, $< 90\% \text{ RH}$.

Wave solder profile

The wave solder profile is measured based on lead temperature. The recommended PCB pre-heat temperature is $+80\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$, and the preheat rate of 1.5 to $2.5\text{ }^{\circ}\text{C/sec}$. The underside PCB temperature at the last pre-heat zone should be approximately $+150\text{ }^{\circ}\text{C}$. The internal temperature of the solder parts should not exceed $+210\text{ }^{\circ}\text{C}$. The duration of solder dwell time should be between 3 to 5 seconds, and not to exceed 10 seconds at a temperature of $+260\text{ }^{\circ}\text{C}$ maximum.



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Printed in USA
Publication No. ELX1166 BU-ELX22025
March 2022

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