

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

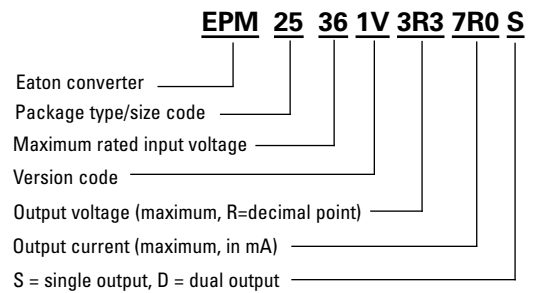
Applications

- 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



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				
	RS ²	IEC 61000-4-3, 3 V/m	Criteria A				
	EFT ²	IEC 61000-4-4, ± 2 kV	Criteria A				
	Surge ²	IEC 61000-4-5, ± 2 kV	Criteria A				
	CS ²	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

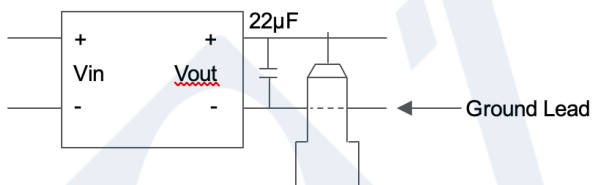
Part number	Input voltage (Vdc)	Output voltage (Vdc)	Output current @ full load (mA)	Efficiency ¹ minimum	Efficiency ¹ typical	Capacitive load ² maximum (µF)
EPM25361V-3R3-7R0S	9-36 Nominal 24	3.3	7000	87.50%	88.50%	10000
EPM25361V-05R-6R0S	9-36 Nominal 24	5	6000	88.00%	89.00%	7200
EPM25361V-12R-2R5S	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.

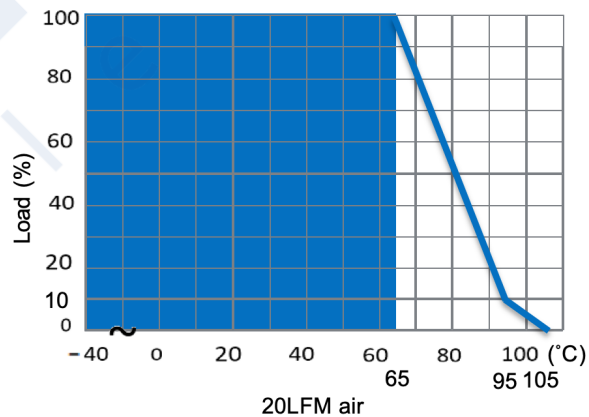
2. Capacitive load is tested at minimum input voltage and a constant resistive load.

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

Measure method

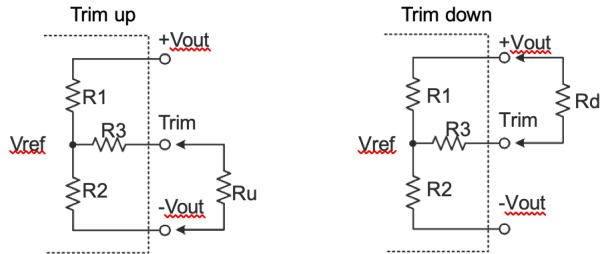


Derating curve



Application information

Single external output voltage trimming



Formula for trim resistor:

$$\text{UP: } R_u = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_0' - V_{ref}} \cdot R_1$$

$$\text{DOWN: } R_d = \frac{bR_1}{R_1 - b} - R_3 \quad b = \frac{V_0' - V_{ref}}{V_{ref}} \cdot R_2$$

1. Ru, Rd is mean trim resistor, please check the formula.
2. a & b: user define parameter.
3. V_0' 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

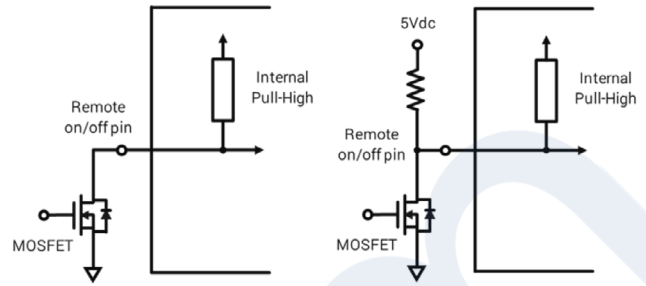
trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rd (kΩ)	7544.97	3692.88	2408.86	1766.84	1381.63	1124.83	941.4	803.82	696.82	611.22

CTRL pin setting

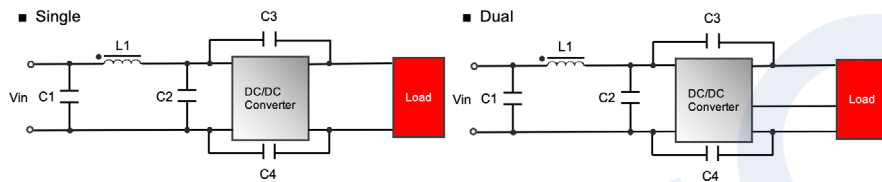
Remote ON/OFF	DC-DC ON	Open or 3.5 ~ 15 VDC
	DC-DC OFF	Short or 0 ~ 1.2 VDC

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

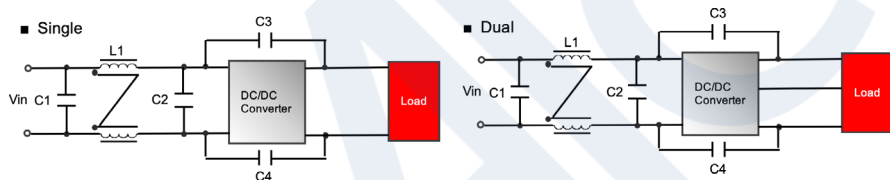
If using CTRL pin to control module to turn on and off; use either external circuit as shown below.



EMC filtering circuit

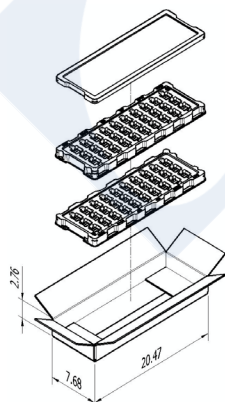


Class B	C1	C2	L1	C3	C4
24 Vin	4.7 μ F	4.7 μ F	10 μ H	2200 pF	2200 pF

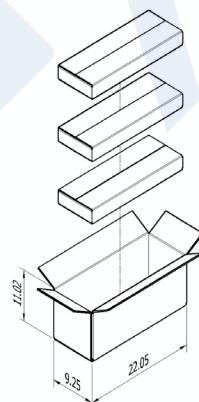


Class B	C1	C2	L1	C3	C4
48 Vin	4.7 μ F	4.7 μ F	Common mode choke K5B 32 μ H	2200 pF	2200 pF

Packaging- Inches

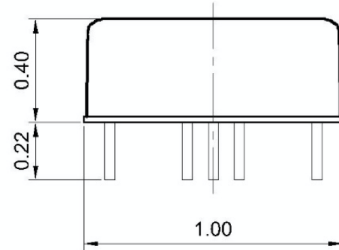
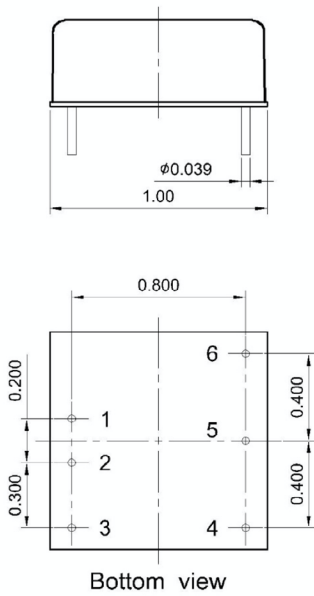


Box accommodates
2 tray 60 converters per box

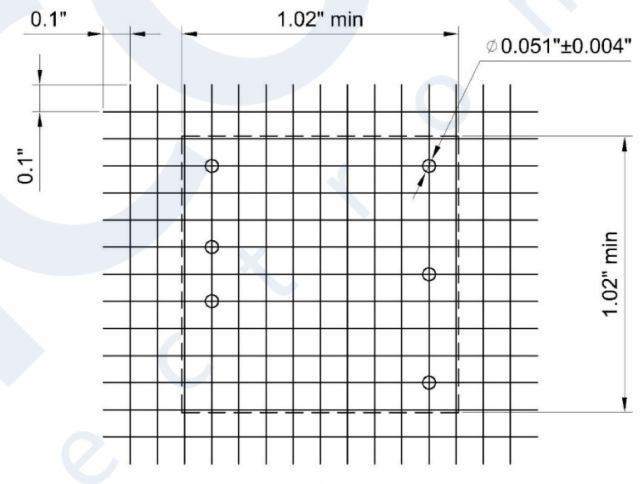


Carton accommodates
3 boxes 180 converters per carton

Dimensions - inches



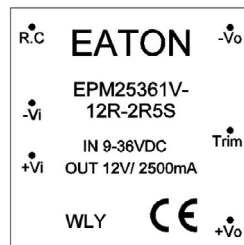
Recommended PCB layout



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

Marking



WLY = lot code

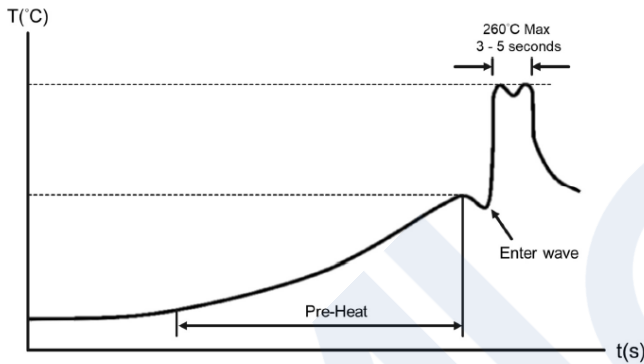
General information

Storage and handling

The shelf life will be a minimum of 36 months, when stored at the following conditions: < +40 °C, < 90% RH.

Wave solder profile

The wave solder profile is measured based on lead temperature. The recommended PCB pre-heat temperature is +80 °C to +100 °C, and the preheat rate of 1.5 to 2.5 °C/sec. The underside PCB temperature at the last pre-heat zone should be approximately +150 °C. The internal temperature of the solder parts should not exceed +210 °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 °C maximum.



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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

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