

EPM25-2V 60 W

60 Watt isolated DC-DC converter



Product features

- 60 Watt isolated DC-DC converter
- Input voltage: 9 Vdc - 36 Vdc
18 Vdc - 75 Vdc
- 2.0" x 1.0 " package
- Efficiency up to 92%
- Isolation voltage: 1.6 kVdc
- EMI class A without external circuit
- Operating ambient temperature from -40 °C to +105 °C
- No minimum load required
- EN62368-1/ IEC62368-1 certified
- Remote On/OFF

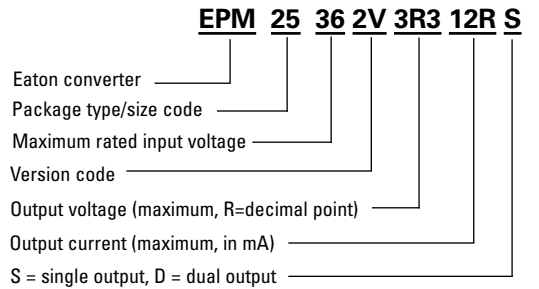
Applications

- 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	V _{in} = 24 Vdc	9		36	Vdc	
		V _{in} = 48 Vdc	18		75	Vdc	
	Input current @ no load				15	mA	
	Start-up time	100% Load at Nominal V _{in}			50	ms	
	Start-up voltage	V _{in} = 24 Vdc			9	Vdc	
		V _{in} = 48 Vdc			18	Vdc	
	UVLO	V _{in} = 24 Vdc		8		Vdc	
		V _{in} = 48 Vdc		16		Vdc	
	Input surge voltage (0.1 s max.)	V _{in} = 24 Vdc			50	Vdc	
V _{in} = 48 Vdc				100	Vdc		
Remote ON/OFF	DC-DC ON			Open or 3 - 12 Vdc			
	DC-DC OFF			Short or 0 - 1.2 Vdc			
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		-0.5		+0.5	%
		Dual output		-1.0		+1.0	%
	Cross regulation	25% to 100% load		-5		+5	%
	Voltage accuracy			-1		+1	%
	Operating frequency	100% Load at Nominal V _{in}			250		kHz
	Ripple & noise ¹	V _{out} = 3.3, 5 Vdc				100	mVp-p
V _{out} = 12, 15, ±12, ±15 Vdc					125	mVp-p	
V _{out} = 24 Vdc					200	mVp-p	
Voltage adjustability			-10		+10	%	
Transient response recovery time	25% load step change (75%-100% load)			500		µs	
Environment	Operating temperature (with derating)		-40		+105	°C	
	Storage temperature		-55		+125	°C	
	Max. case temperature				+110	°C	
	Temperature coefficient			-0.05		+0.05	%/°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			1500		pF	
	MTBF (MIL-HDBK-217F)	25 °C		205		khours	
	Short circuit protection		Continuous, automatic recovery				
	Overload protection			175		%	
	Over voltage protection Zener diode clamp	Vout = 3.3 Vdc		3.7		5.3	Vdc
		Vout = 5 Vdc		5.6		8.0	Vdc
		Vout = 12 Vdc		13.4		19.2	Vdc
		Vout = 15 Vdc		16.8		24.0	Vdc
		Vout = 24 Vdc		26.9		38.4	Vdc
		Vout = ±12 Vdc		±13.4		±19.2	Vdc
		Vout = ±15 Vdc		±16.8		±24.0	Vdc
	Over temperature protection				115	°C	
Certification			EN62368-1/ IEC62368-1				
Physical	Dimension		2.00 x 1.00 x 0.413 inch				
	Weight		37.6 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, 20 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, 10 Vr.m.s	Criteria A				
PFMF		IEC 61000-4-8, 10 A/m	Criteria A				

1. The ripple & noise are measured with 1 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

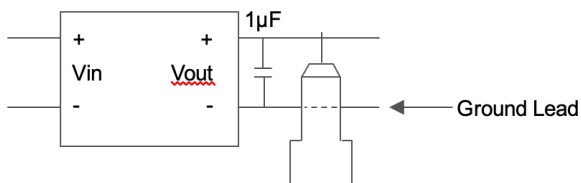
Part number	Input voltage (Vdc)	Output voltage (Vdc)	Output current @ full load (mA)	Efficiency ¹ minimum	Efficiency ¹ typical	Capacitive load ² maximum (µF)
EPM25362V-3R3-12RS	9-36 Nominal 24	3.3	12000	88%	89%	28000
EPM25362V-05R-12RS	9-36 Nominal 24	5	12000	90%	91%	28000
EPM25362V-12R-5R0S	9-36 Nominal 24	12	5000	90%	91%	5850
EPM25362V-15R-4R0S	9-36 Nominal 24	15	4000	91%	92%	3900
EPM25362V-24R-2R5S	9-36 Nominal 24	24	2500	91%	92%	2000
EPM25362V-12R-2R5D	9-36 Nominal 24	±12	±2500	90%	91%	±3900
EPM25362V-15R-2R0D	9-36 Nominal 24	±15	±2000	90%	91%	±2400
EPM25752V-3R3-12RS	18-75 Nominal 48	3.3	12000	88%	89%	28000
EPM25752V-05R-12RS	18-75 Nominal 48	5	12000	90%	91%	28000
EPM25752V-12R-5R0S	18-75 Nominal 48	12	5000	91%	92%	5850
EPM25752V-15R-4R0S	18-75 Nominal 48	15	4000	91%	92%	3900
EPM25752V-24R-2R5S	18-75 Nominal 48	24	2500	91%	92%	2000
EPM25752V-12R-2R5D	18-75 Nominal 48	±12	±2500	89%	90%	±3900
EPM25752V-15R-2R0D	18-75 Nominal 48	±15	±2000	89%	90%	±2400

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

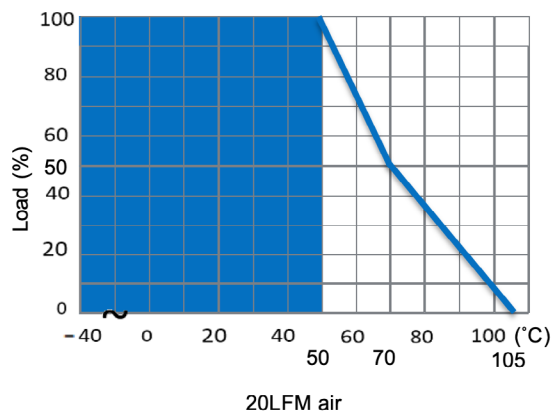
2. Capacitive load is tested at minimum input voltage and a constant resistive load.

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

Measure method

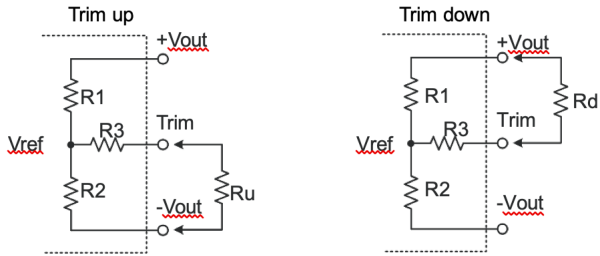


Derating curve



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, no actual meanings.
3. V_0' is mean trim up/down voltage.
4. Value for R1, R2, R3 and V_{ref} Refer to the table below.

Input voltage	Output voltage	R1	R2	R3	Vref
24 V	3.3 V	8.5 kΩ	5.1 kΩ	27.0 kΩ	1.24 V
	5 V	10.0 kΩ	10.0 kΩ	35.7 kΩ	2.5 V
	12 V	38.0 kΩ	10.0 kΩ	68.0 kΩ	2.5 V
	15 V	50.0 kΩ	10.0 kΩ	73.2 kΩ	2.5 V
	24 V	86.0 kΩ	10.0 kΩ	75.0 kΩ	2.5 V
48 V	3.3 V	8.5 kΩ	5.1 kΩ	27.0 kΩ	1.24 V
	5 V	15.47 kΩ	5.1 kΩ	33.0 kΩ	1.24 V
	12 V	38.0 kΩ	10.0 kΩ	68.0 kΩ	2.5 V
	15 V	50.0 kΩ	10.0 kΩ	73.2 kΩ	2.5 V
	24 V	86.0 kΩ	10.0 kΩ	75.0 kΩ	2.5 V

Trim up

3R3-12RS

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)	373.25	150.64	87.15	57.1	39.57	28.09	19.98	13.96	9.3	5.6

EPM25362V-05R-12RS

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

EPM25752V-05R-12RS

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)	361.17	161.42	96.03	63.56	44.14	31.23	22.02	15.12	9.76	5.47

12R-5R0S

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)	723.67	327.83	195.89	129.92	90.33	63.94	45.1	30.96	19.96	11.17

15R-4R0S

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)	760.13	343.47	204.58	135.13	93.47	65.69	45.85	30.97	19.39	10.13

24R-2R5S

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)	820.83	372.92	223.61	148.96	104.17	74.31	52.98	36.98	24.54	14.58

Trim down

3R3-12RS

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
Ru (kΩ)	407.36	206.24	130.75	91.18	66.83	50.33	38.41	29.4	22.35	16.68

EPM25362V-05R-12RS

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
Ru (kΩ)	454.3	204.3	120.97	79.3	54.3	37.63	25.73	16.8	9.86	4.3

EPM25752V-05R-12RS

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
Ru (kΩ)	1085.06	525.75	336.03	240.54	183.05	144.63	117.15	96.52	80.45	67.6

12R-5R0S

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
Ru (kΩ)	2902.33	1398.17	896.78	646.08	495.67	395.39	323.76	270.04	228.26	194.83

15R-4R0S

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
Ru (kΩ)	4043.47	1960.13	1265.69	918.47	710.13	571.24	472.04	397.63	339.76	293.47

24R-2R5S

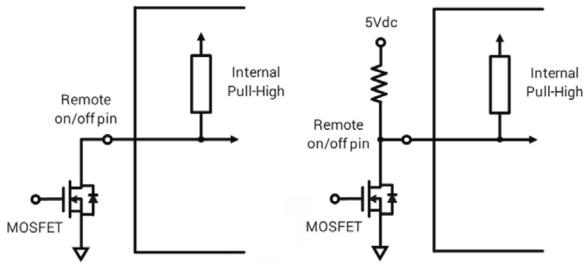
trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Ru (kΩ)	7543.17	3691.08	2407.06	1765.04	1379.83	1123.03	939.6	802.02	695.02	609.42

CTRL pin setting

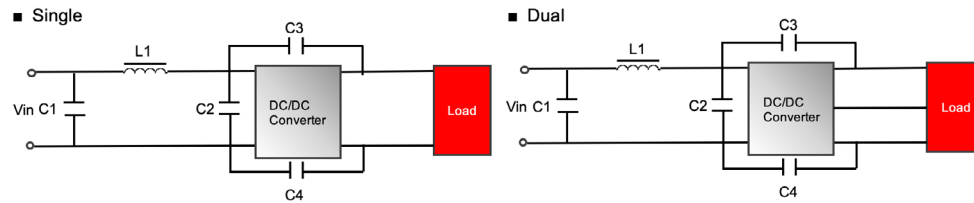
Remote ON/OFF	DC-DC ON	Open or 3 - 12 Vdc
	DC-DC OFF	Short or 0 - 1.2 Vdc

If not using CTRL function, leave CTRL pin floating.

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

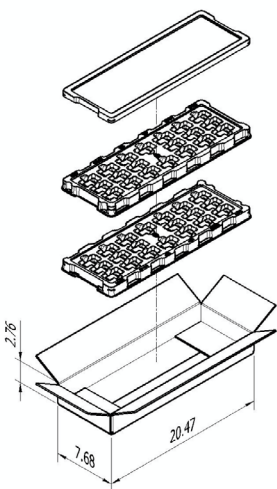


EMC filtering circuit

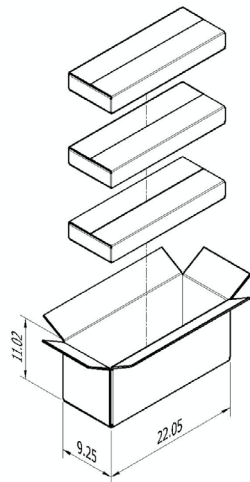


Class B	C1	L1	C2	C3	C4
24 Vin	10 μ F	1.5 μ H	10 μ F	2200 pF	2200 pF
48 Vin	4.7 μ F	3.3 μ H	4.7 μ F	2200 pF	2200 pF

Packaging- Inches



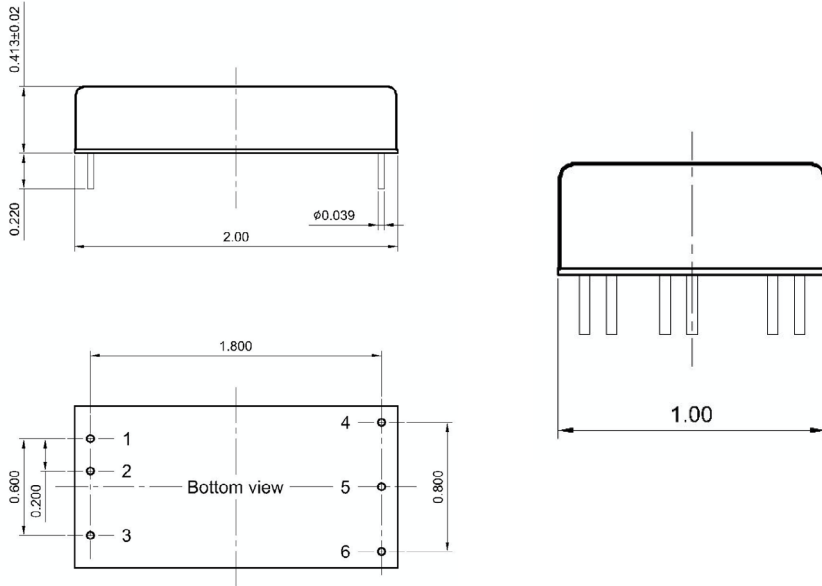
Unit:inch



Box accomodates
2 tray 40 converters per box

Carton accomodates
3 boxes 120 converters per carton

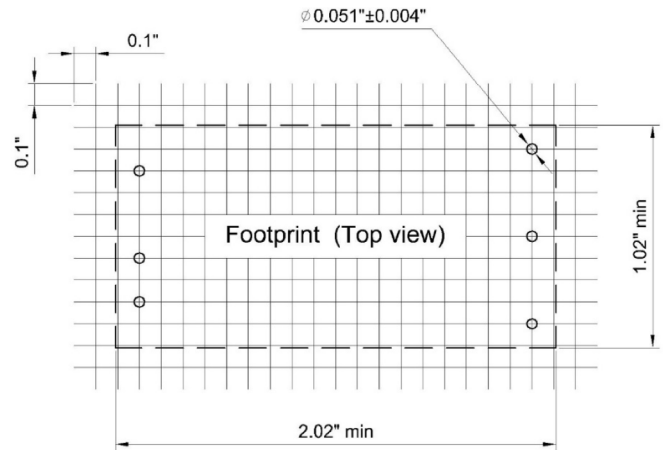
Dimensions - inches



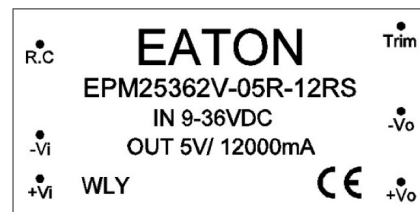
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	+Vout	+Vout
5	-Vout	Common
6	Trim	-Vout

Unit: inch
PIN tolerance: ± 0.004
Tolerance: X.XX ± 0.02 X.XXX ± 0.015

Recommended PCB layout



Marking



WLY = lot code

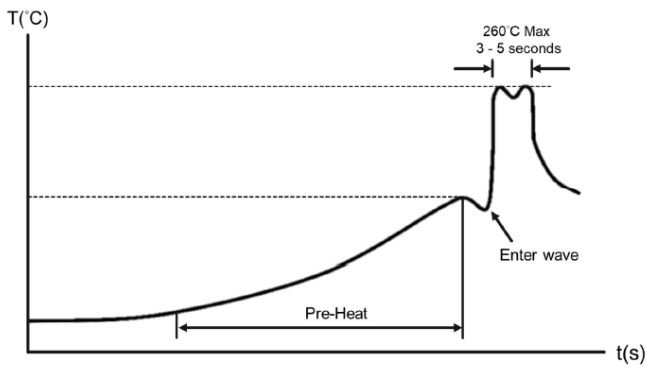
General information

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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