

EPM25-2V 40 W

40 Watt isolated DC-DC converter



Product features

- 40 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

	<u>EPM</u>	<u>25</u>	<u>36</u>	<u>2V</u>	<u>3R3</u>	<u>10R</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				15	mA
	Start-up time	100% Load at Nominal Vin			40	ms
	Start-up voltage	Vin = 24 Vdc			9	Vdc
		Vin = 48 Vdc			18	Vdc
	UVLO	Vin = 24 Vdc		8		Vdc
		Vin = 48 Vdc		16		Vdc
	Input surge voltage (0.1 s max.)	Vin = 24 Vdc			50	Vdc
		Vin = 48 Vdc			100	Vdc
Output	Remote ON/OFF	DC-DC ON		Open or 3 V - 12 Vdc		
		DC-DC OFF		Short or 0 V - 1.2 Vdc		
	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		-5		+5	%
	Voltage accuracy		-1		+1	%
	Operating frequency	100% Load at Nominal Vin		250		kHz
	Ripple & noise ¹	Vout = 3.3, 5 Vdc			100	mVp-p
		Vout = 12, 15, ±12, ±15 Vdc			125	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		779		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 = ±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		
RS²		IEC 61000-4-3, 20 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, 10 Vrms		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

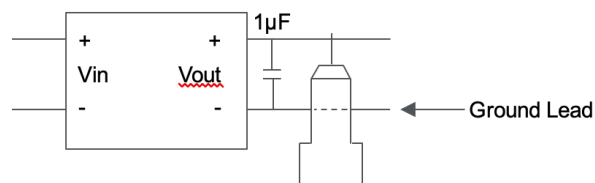
Part number	Input voltage (Vdc)	Output voltage (Vdc)	Output current @ full load (mA)	Efficiency ¹ minimum	Efficiency ¹ typical	Capacitive load ² maximum (μF)
EPM25362V-3R3-10RS	9-36 Nominal 24	3.3	10000	88%	89%	26600
EPM25362V-05R-8R0S	9-36 Nominal 24	5	8000	89%	90%	20000
EPM25362V-12R-3R3S	9-36 Nominal 24	12	3333	91%	92%	3900
EPM25362V-15R-2R6S	9-36 Nominal 24	15	2666	91%	92%	2600
EPM25362V-12R-1R6D	9-36 Nominal 24	±12	±1666	89%	90%	±2600
EPM25362V-15R-1R3D	9-36 Nominal 24	±15	±1333	89%	90%	±1600
EPM25752V-3R3-10RS	18-75 Nominal 48	3.3	10000	88%	89%	26600
EPM25752V-05R-8R0S	18-75 Nominal 48	5	8000	89%	90%	20000
EPM25752V-12R-3R3S	18-75 Nominal 48	12	3333	91%	92%	3900
EPM25752V-15R-2R6S	18-75 Nominal 48	15	2666	91%	92%	2600
EPM25752V-12R-1R6D	18-75 Nominal 48	±12	±1666	89%	90%	±2600
EPM25752V-15R-1R3D	18-75 Nominal 48	±15	±1333	89%	90%	±1600

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

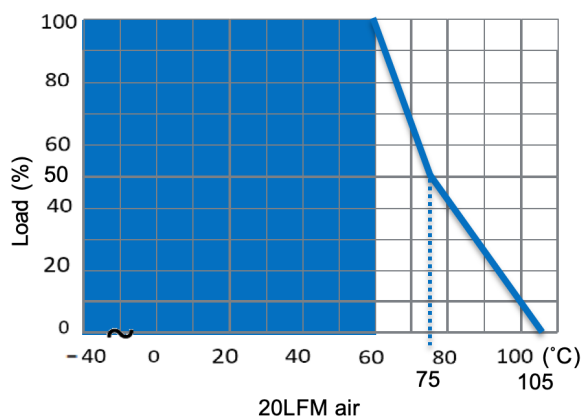
2. Capacitive load is tested at minimum input voltage and a constant resistive load.

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

Measure method

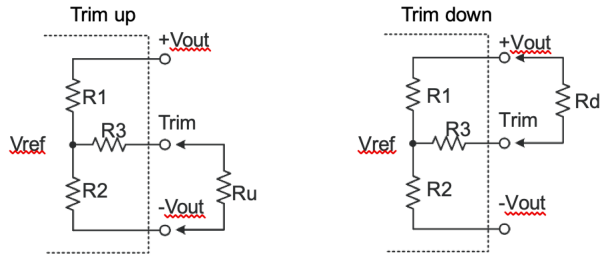


Derating curve



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, no actual meanings.
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	8.5 kΩ	5.1 kΩ	27 kΩ	1.24 V
5 V	15.47 kΩ	5.1 kΩ	33 kΩ	1.24 V
12 V	12.62 kΩ	3.3 kΩ	22 kΩ	2.5 V
15 V	15.1 kΩ	3 kΩ	22 kΩ	2.5 V

Trim up

3R3-10RS

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

05R-8R0S

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-3R3S

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)	509.2	153.87	83.38	53.23	36.49	25.85	18.48	13.08	8.95	5.69

15R-2R6S

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)	544.25	152.23	80.95	51.06	34.63	24.22	17.05	11.81	7.8	4.65

Trim down

3R3-10RS

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)	407.36	206.24	130.75	91.18	66.83	50.33	38.41	29.4	22.35	16.68

05R-8R0S

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)	1085.06	525.75	336.03	240.54	183.05	144.63	117.15	96.52	80.45	67.6

12R-3R3S

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)	633.44	366.75	252.24	188.56	148.02	119.95	99.35	83.6	71.16	61.09

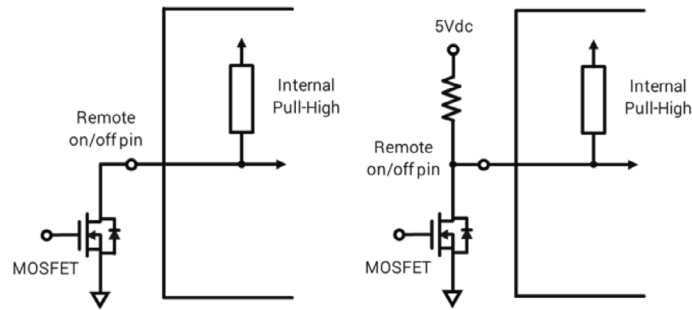
15R-2R6S

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)	777.22	458.57	319.17	240.96	190.91	156.13	130.55	110.96	95.46	82.91

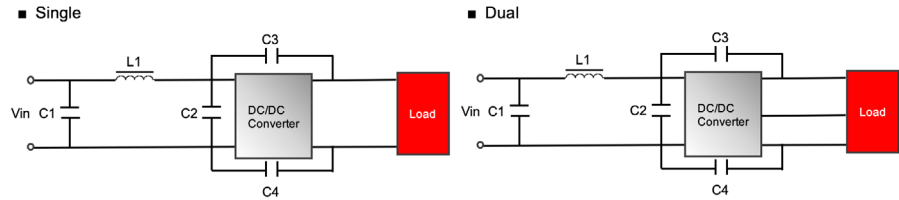
CTRL pin setting

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.

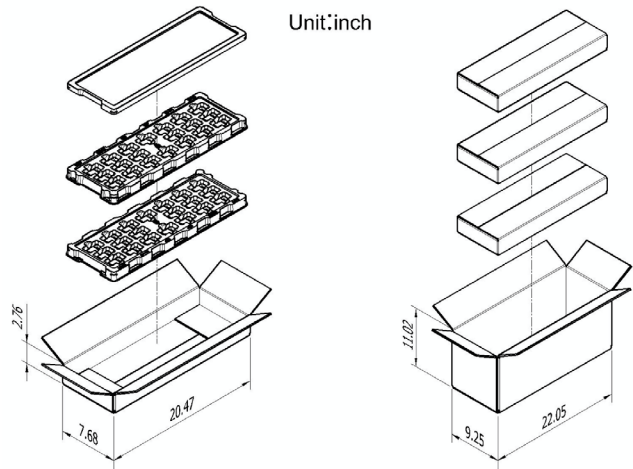


EMC filtering circuit



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

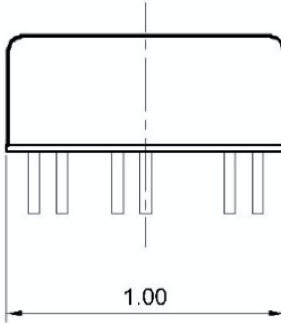
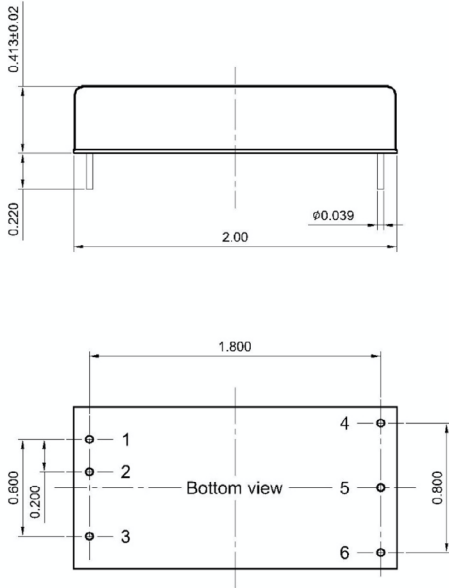
Packaging- Inches



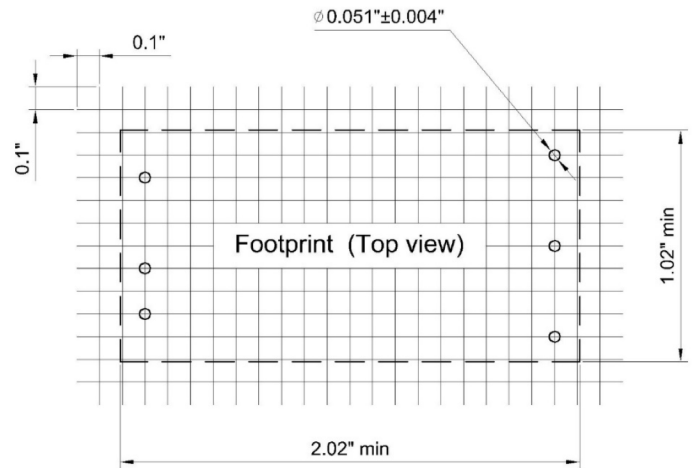
Box accomodates
2 tray 40 converters per box

Carton accomodates
3 boxes 120 converters per carton

Dimensions - inches



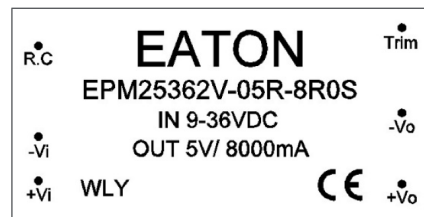
Recommended PCB layout



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

Marking



WLY = lot code

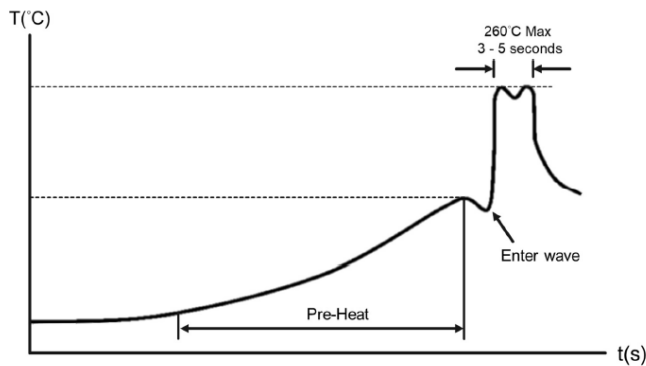
General information

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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