

Use case

Eaton power modules (EPM78Vx, EPM12V1 & EPM12V2)



Eaton Power Modules (EPM) provide significant DC-DC conversion benefits over conventional solutions

Linear regulators, such as the popular LM78, are ideal for low-power applications having a small ratio between the input and output voltage. However, despite their cost-effectiveness and ease of use, linear regulators are inefficient. The difference between input and output voltages usually dissipates itself as heat.

Power Dissipation = $(V_{in} - V_{out}) \times \text{Load Current}$

From the equation above, we can see that the power dissipated in a linear regulator increases proportionally with the difference between output voltage (V_{in}) and input voltage (V_{out}). Higher power dissipation translates into lower efficiency of the linear regulator.

In today's dynamic applications, it is highly beneficial to have

a large disparity between the input and the output voltage. Also, increasingly complex designs require lower power consumption, greater efficiency, and ultra-low quiescent (standby) current. Switching regulators meet all of these requirements and enable greater design flexibility with cost savings.

High-Efficiency Power Management Solutions from Eaton

Eaton Power Modules (EPM) are non-isolated DC-DC converters available in two families; EPM78Vx and EPM12V1/EPM12V2. These products have higher efficiencies than LM78 linear regulators with a wide input voltage range, lower power consumption, programmable features, and compact packaging. Both families also

offer short circuit protection; in this mode, the EPM will shut down to protect the module and restore itself automatically once the overcurrent passes.

EPM78Vx is a non-isolated DC-DC switching regulator in a 3-pin SIP package compatible with LM78xx linear voltage regulators and meets the EN62368 safety standard. EPM78 features a wide input voltage range from 4.75 V to 32 Vdc and delivers an output voltage from 1.8 V to 15 V and a maximum of 1 A output current over six part numbers. The product achieves an efficiency of 96% and performs reliably in operating temperatures from -40 °C to +82 °C with continuous short circuit protection and meets the EN62368 safety standard.

EPM12V1 has programmable output voltage from 0.9 V to 5.5 V and 1A maximum output current in a standard SMT package. The output voltage ranges from 3 V to 14 Vdc, with an efficiency of 89.5%. The product has operating temperatures from -40 °C to +82 °C with continuous short circuit protection and meets the EN62368 safety standard. Eaton's EPM12V2 is a higher current version delivering an output current up to 12 A. This variant has a 3 V to 14.4 Vdc input voltage range and output voltage from 0.6 V to 5.5 V, with an efficiency of 91%. The product can withstand operating temperatures from -40 °C to +90 °C with continuous short circuit protection and is compliant with the EN62368 safety standard.