The 8W emergency lighting converter shown here can be constructed at a fraction of the cost of older TO220 transistor based designs. Using the ZTX851, which has a saturation voltage of only 150mV at 4A (the cycle by cycle peak current seen with this design), the circuit runs with an efficiency of over 70%, a key feature for these battery operated circuits. Care with the transformer design and construction will allow the use of the higher gain ZTX869 which will raise efficiencies even higher. The ZTX851 and ZTX869 are available in the E-Line (TO92 style) package which has a 1.2W power rating for these device types. This permits significant space savings to be made since the bulky TO220 transistors and corresponding heatsinks can be eliminated. The operating frequency has been limited to around 25kHz to minimise transformer losses, yet ensuring the converter is inaudible.

Emergency lighting systems provide illumination in the event of mains failure and consist of a monitor circuit, a battery pack with trickle charging, and a DC-AC inverter. The inverter is used with the existing fluorescent tubes or an additional smaller tube, and is enabled by the monitor circuit.

The combined features of low saturation voltage, a 5A continuous current capability, very high gain at high currents, and the compact dimensions of the TO92 style E-Line package, provide an attractive alternative to TO220 devices in this commonly used driver circuit.

The ZTX869 and ZTX968 produce typical $V_{CE(sat)}$ values at 5A collector current, of 180mV and 250mV respectively, and possess useful gains of 100 and 50 at 20A (typical: for the ‘869 and ‘968), ensuring cool and efficient operation under surge conditions. It is also possible in some designs to omit the collector-emitter diodes, as the very high inverse gain inherent to the Zetex process (which in low voltage variants can be approximately 33 to 50% of the forward $h_{fe}$) acts to conduct inductive transients. This prevents the subsequent degradation to the emitter-base junction, as must be considered and accounted for in conventional designs.

These features make it possible to construct this control unit for electric motors with input power requirements to over 40W continuous, at a fraction of the size and yielding a typical 4 times cost saving over the present MOSFET based designs.