Remote Control Servo Amplifier using Protection Free 1A DC Rated SOT23 Devices

The Zetex high performance SOT23 package, permitting power dissipation to 500mW (now up to 625mW with the FMMT618 and FMMT718 “SuperSOT” series), and the high efficiency of the ‘MATRIX’ geometry design, produces a performance previously only available in TO92, SOT89 or larger package styles. This advantage can be demonstrated by the servo amplifier driver shown above.

This circuit uses the high gain 30V BVCEO rated FMMT489 and FMMT589, that possess typical gains of 200 at 1A and 0.5A respectively, low VCE(sat) (0.3V and 0.35V at 1A), and capable of handling peak currents of up to 2A, and 1A continuous. These features allow surface mount designs to be realised at low cost, to exhibit better switching performance, and using a minimum of board area. Higher voltage variants are available as the FMMT491 and FMMT591, which are rated at 60V.

To handle tube striking and normal operating characteristics, the converter transistor used in this simple fluorescent lamp ballast requires a high current capability and a high breakdown voltage. The ZTX651, possessing a BVCEO rating of 80V, and a current rating of 2A continuous and 6A peak, performs more efficiently than the expensive TO220 transistor normally used. Due to the lower on-state losses of the Zetex transistor, the circuit is capable of 75% efficiency, with a resulting 12% increase in battery life. With a saturation voltage of only 0.2V at 2A, power dissipation in the E-Line (TO92 style) transistor is kept well within its 1W rating. The small size of the ZTX651 and the converter’s 25kHz oscillation frequency allows the circuit to be constructed in a compact form, small enough to fit in a torch handle, etc.

Higher gain variants (Super-β devices such as the ZTX688B and ZTX788B series) are now available to help reduce base drive requirements and thereby improve efficiency still further.