

ISSUE: [September 2020](#)

## CMOS LED ICs Replace Legacy Bipolar Drivers

[Taiwan Semiconductor](#)'s TSCR4 linear CMOS LED driver ICs are drop-in replacements for legacy bipolar drivers with much better performance than the bipolar drivers. These constant-current drivers provide stable LED current over a wide range of conditions including source-voltage variations, changes in load or temperature variations.

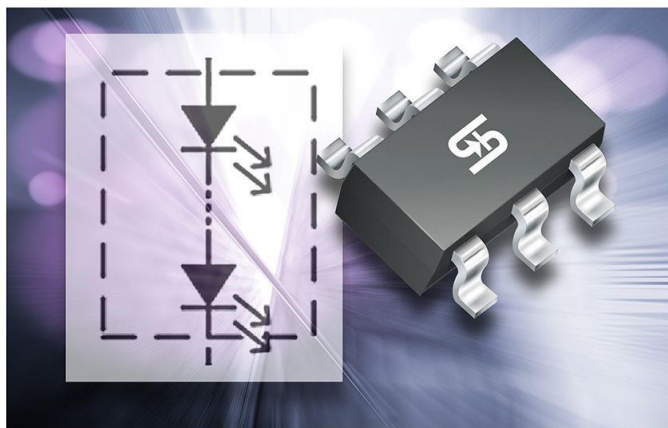
Compared to the bipolar drivers, the TSCR4 drivers offer higher current setpoint accuracy and stability, lower quiescent current, tighter output compliance voltage and improved temperature coefficient. According to the vendor, these ICs enable upgrades of existing designs for higher performance with no re-design effort required (see the figure).

The TSCR4 LED drivers' lower quiescent current reduces power dissipation and battery standby and operating power consumption. For example, at 24 Vdc, these drivers consume just 300 mA versus 1 A for the bipolar drivers. Their more precise output voltage drop enables operation closer to the rail. Meanwhile higher stability of output current translates to more consistent brightness control and extends LED life. The drivers' better temperature coefficient ( $-0.07\%/^{\circ}\text{C}$ ) controls output current with temperature increases to eliminate risk of thermal runaway.

This family includes AEC-Q100 parts for powering automotive lighting applications. Other features include PWM dimming with up to 10-kHz digital input for 0 to 100% dimming (TSCR421CX6/H); acceptance of supply voltages up to 40 V to support large LED arrays; and an easily parallelable driver structure.

Applications include automobile, truck and bus interior and exterior lighting, architectural lighting, signage, advertising and decorative lighting, lighting in refrigerators, freezer cases, kiosks and vending machines, emergency lighting (exit signs, stairstep and emergency exit pathway lighting systems).

Design resources include a comprehensive [datasheet](#) and an interactive [designer worksheet](#). In OEM quantities, unit pricing starts at \$0.46 for the AEC-Q100 version and at \$0.31 for the general-purpose version.



*Figure. The TSCR4 family of linear constant-current CMOS driver ICs provides direct socket replacement for legacy bipolar drivers, delivering improved performance at comparable cost.*