

MICREL

MPD8020-0013

PWM "Smart" Lamp Driver

Design Concept

General Description

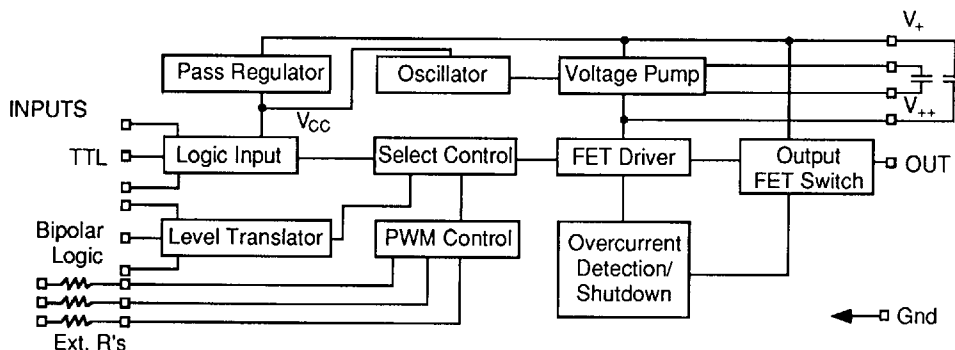
The MPD8020-0013 lamp driver is designed to operate from a 28 Volt DC, aircraft power source and drive up to four (4) 28 VDC incandescent lamps. Three duty cycle control modes set up the lamp intensities for different ambient conditions. In COM mode (100%) the lamps are full on for high ambient light. DIM mode (25%) accommodates reduced light and NV (10%) mode is used for very low ambient light. The PWM controlled intensity may be trimmed using external resistors. The intensity is controlled by logic input, either TTL/CMOS compatible or a relay/switch closure to system ground. The drive pulse rise and fall time is set at about 50 μ S to reduce current spikes and minimize EMI. The lamp driver is a high side switch for ground referenced load applications. This helps minimize corrosion due to moisture on lamp socket contacts, and potential arcing during lamp replacement. Overcurrent protection prevents damage to the IC should the lamp socket be accidentally shorted to ground while the lamp is on.

Features

The PWM Lamp Driver is a monolithic IC designed to drive 28 Volt incandescent lamps from an aircraft power source. The circuit has the following features:

- High side operation with lamp(s) connected to ground
- Input logic compatible with TTL/CMOS or switch closures
- Pre-driver with voltage pump, control and N-Channel FET Switch
- PWM to control lamp intensity from input logic
- PWM adjustment with external resistor or potentiometer
- Overcurrent detection and shutdown
- MIL STD 714A transient voltage protection
- MIL STD 883 qualification
- 16 pin ceramic side braze DIP package
- Bipolar logic compatible, <-5, >+5

Block Diagram



Technology

The fabrication technology chosen is CMOS/DMOS/Bipolar. It is the process of choice when combining analog, digital, and power MOSFET functions on a single IC. This technology is ideal for applications requiring interface between a microcontroller and electromechanical loads. The analog cells provide load current detection and control by using op-amps, comparators, a voltage regulator and a precision voltage reference. The N-Channel FETs provide high voltage (120V),

high current up to 2 Amps. The digital gate array provides logic interface to a microcontroller and output logic. Status output signals are accessed through the digital interface.

The CMOS/DMOS/Bipolar process technology is available for full custom and semicustom development programs requiring the use of intelligent control and power interface capability. Packaging is available for special needs.

Specifications

Operating Voltage	28 Volts nominal (18 to 31 V)
Load Current	500 mA Max (4 incandescent Lamps)
Logic Input (TTL)	$V_{SS} + 1.0V$ to $3.5/V_{CC}$
Logic Input (Bipolar)	"1" > +5V, "0" < -5V
Switch Control Input	-5V/+5V to 100K Ohm
DIM Mode	25% Duty Cycle +/-2% over temperature range
NV Mode	10% Duty Cycle +/-2% over temperature range
Pulse Rise and Fall time	30 μ S min to 100 μ S max.
Output Noise	200mV P-P
Voltage Transient Protection	80V with +/-1-100V/10 μ S pulse
Overcurrent Protection	700 mA
Overtemperature Protection	155 deg C max.

Lamp Driver Intensity Control

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