

3 A PowerLEDDriver with Dimming Control

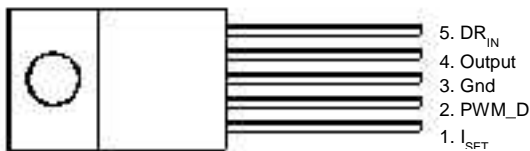
CMD736

FEATURES	DESCRIPTION
<p>Wide input voltage range, up to 40V</p> <p>Guaranteed 3A output current</p> <p>Wide adjustable version output current range, from 0A to 3A max over line and load conditions</p> <p>150 kHz fixed frequency internal oscillator</p> <p>Dimming control by PWM or Voltage Adjustment</p> <p>Requires only 6 external components</p> <p>Thermal shut down and current limit protection</p>	<p>The CMD736 series of regulators are step-down regulators with all required active functions. It is capable of driving 3A load with excellent line and load regulations.</p> <p>The CMD736 requires a minimum number of external components. These features substantially not only reduce the area of board size but also the size of the heat sink, and in some cases no heat sink is required.</p> <p>Other features include a guaranteed $\pm 4\%$ tolerance on output current within specified input voltages and output load conditions. And $\pm 10\%$ on the oscillator frequency. External shutdown is included, featuring 70μA (typical) standby current. The output switch includes cycle-by-cycle current limiting, as well as thermal shutdown for full protection under fault conditions.</p>

APPLICATIONS

- High Efficiency Step-Down LED Drivers
- LED Lighting
- LED Monitors
- Automotive LED Lighting

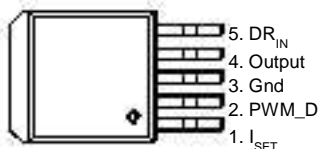
PACKAGE/ORDER INFORMATION



5-Pin Plastic TO-220
(Top View)

Order Part Number

CMD736P



5-Pin Plastic TO-263
(Top View)

CMD736PST

Append the letter "T" to part number for Tape & Reel of all surface-mount packages.

PIN FUNCTIONS

Pin No.	Pin Name	Function
1	I _{SET}	Output Current Set
2	PWM_D	Frequency Set and PWM Dimming
3	Gnd	Ground
4	Output	Output
5	DR _{IN}	Driver Input

ABSOLUTE MAXIMUM RATINGS

Input Voltage	45V
PWM_D Pin Input Voltage	-0.3V < V < + V _{IN}
Operating Junction Temperature, T _J	-40°C to 150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (soldering, 10 seconds)	260°C

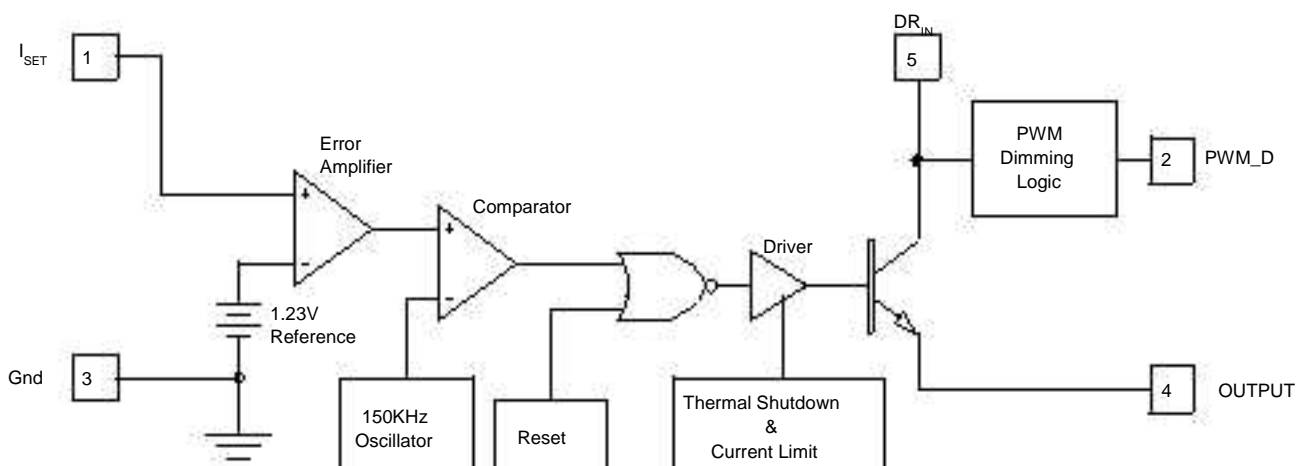
Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to ground. Currents are positive into, negative out of the specified terminal.

POWER DISSIPATION TABLE

Thermal Resistance-Junction to Tab, θ _{JT}	3.0°C / W
Thermal Resistance-Junction to Ambient, θ _{JA}	45°C / W

1. Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
2. The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system.
3. All of the above assume no ambient airflow.

BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Units
Input Voltage	DR_{IN}			40	V
Junction temperature	T_J	-40		125	$^{\circ}C$

TYPICAL APPLICATIONS

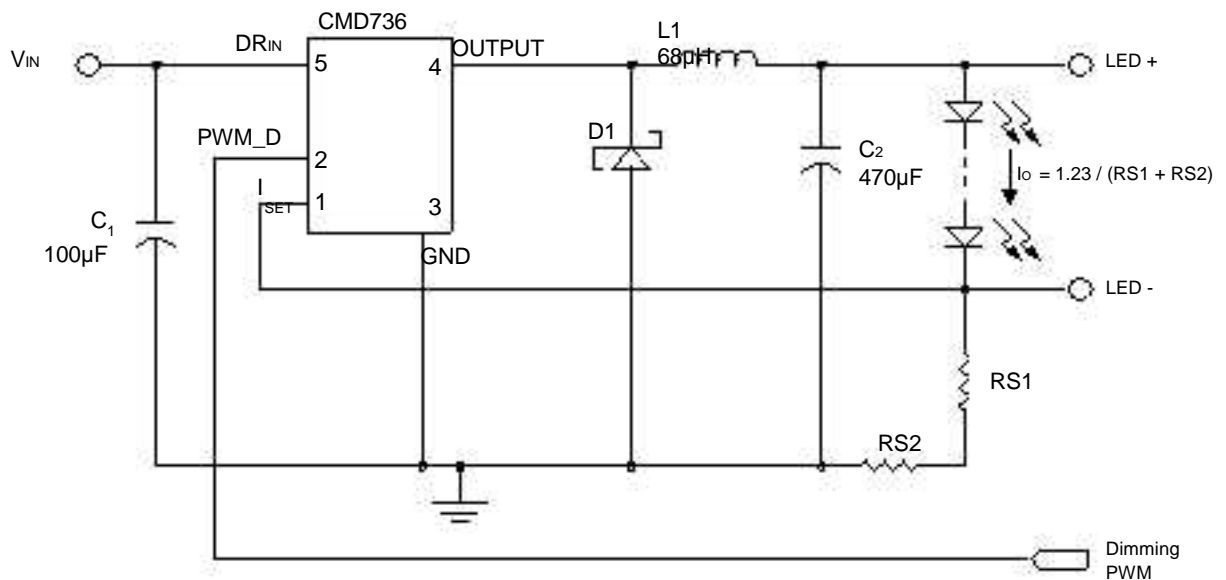


Figure 1 - PWM Dimming Application Circuits

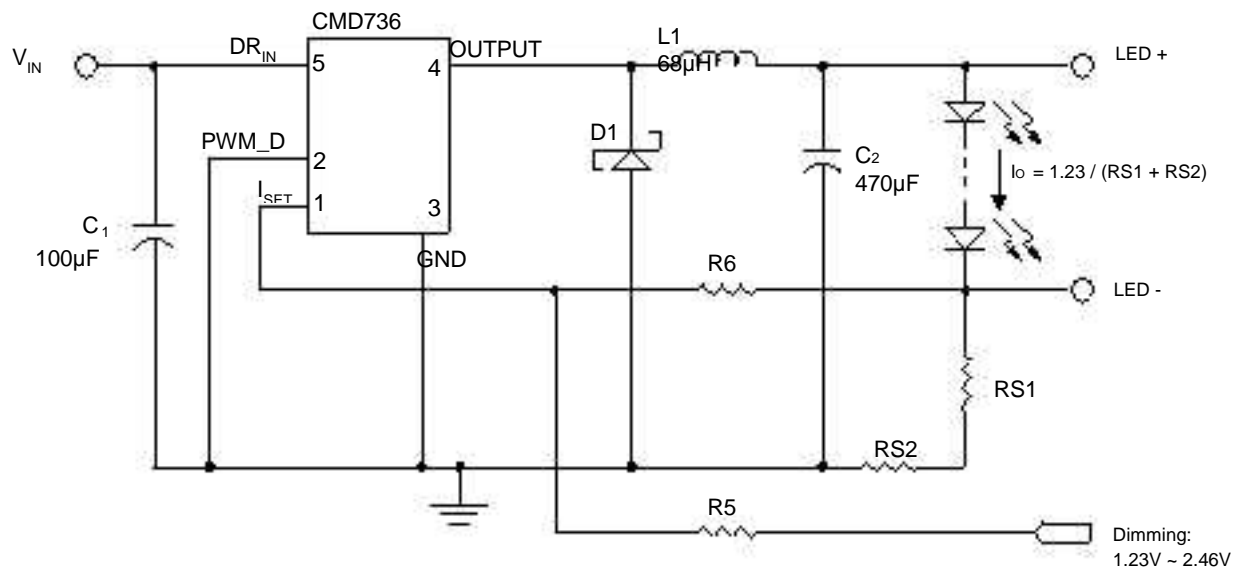


Figure 2 - Voltage Dimming Application Circuits

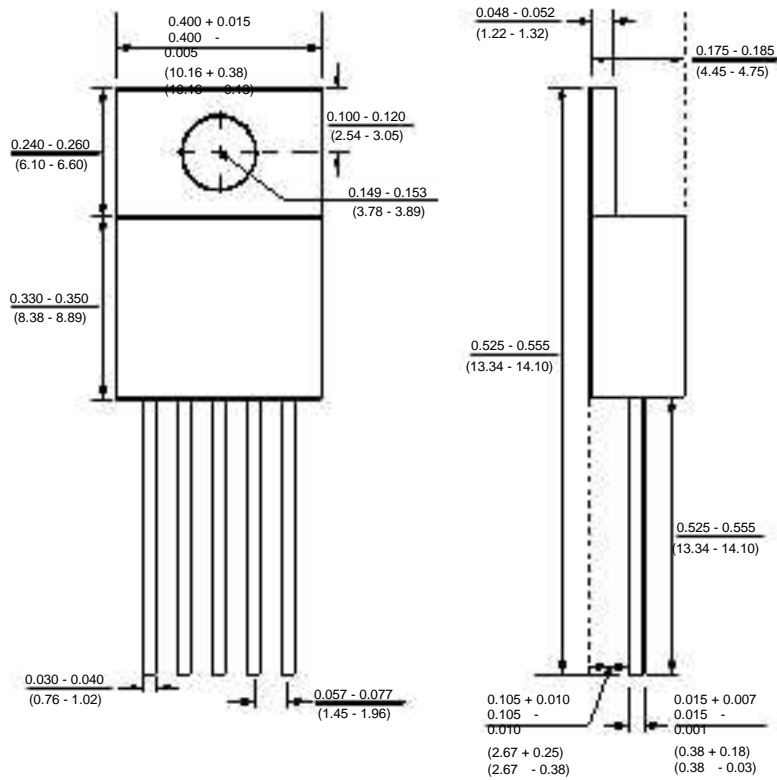
ELECTRICAL CHARACTERISTICS Unless otherwise specified, these specifications apply DR_{IN} = 12V, I_{LOAD} = 0.5A and the operating ambient temperatures T_a = 25°C

Parameter	Test Conditions	Min	Typ	Max	Units	
I _{SET} Voltage (Note 1)	V _{OUTPUT} = 5V	1.217	1.230	1.243	V	
	V _{OUTPUT} = 5V, 8V ≤ DR _{IN} ≤ 40V,	1.193	1.230	1.267		
	V _{OUTPUT} = 5V, 8V ≤ DR _{IN} ≤ 40V, 0.5A ≤ I _{LOAD} ≤ 3A, -40°C ≤ T _J ≤ 125°C	1.180	1.230	1.286		
Efficiency	I _{LOAD} = 0.7A, V _{OUTPUT} = 5V, DR _{IN} = 16V		79		%	
I _{SET} Bias Current	V _{OUTPUT} = 5V	T _J = 25°C		50	100	nA
		-40°C ≤ T _J ≤ 125°C			500	
Oscillator Frequency	(Note 6)	T _J = 25°C	127	150	173	kHz
Saturation Voltage	I _{LOAD} = 3A (Note 2)	T _J = 25°C		1.4	1.8	V
		-40°C ≤ T _J ≤ 125°C			2.0	
Duty Cycle (ON)	(Note 3)		93	98		%
Current Limit	(Note 2, 6)	T _J = 25°C	4.2	7	8.8	A
		-40°C ≤ T _J ≤ 125°C	3.5	7.2	9	
Output Leakage Current	(Note 4, 5)	V _{OUT} = 0V		0.3	2	mA
		V _{OUT} = -1V		9	20	
Quiescent Current	(Note 4)		5	10	mA	
Standby Current	I _{SET} = 5V		70	200	μA	
PWM_D Threshold Voltage High	V _{OUTPUT} = 0V	T _J = 25°C	2.2	1.4		V
		-40°C ≤ T _J ≤ 125°C	2.4			
PWM_D Threshold Voltage Low	V _{OUTPUT} = Normal Output Voltage	T _J = 25°C		1.2	1.0	V
		-40°C ≤ T _J ≤ 125°C			0.8	
PWM_D Pin Input Current	PWM_D = 5V		12	30	μA	
	PWM_D = 0V		0	10		

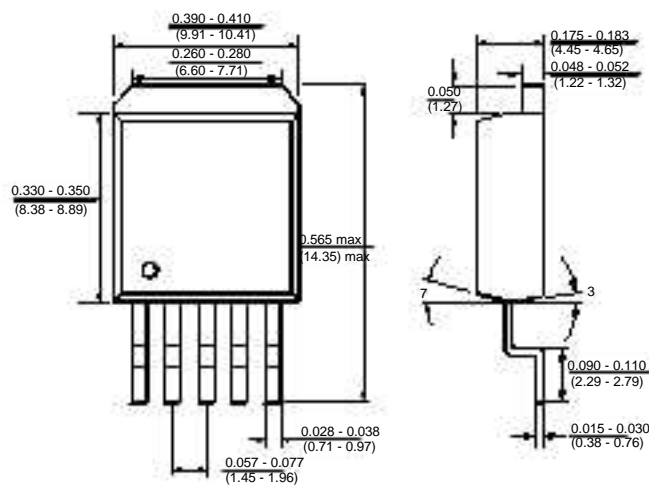
- Note 1: External components such as the catch diode, inductor, input and output capacitors can affect switching regulator system performance.
- Note 2: OUTPUT pin sourcing current. No diode, inductor or capacitor connect to OUTPUT.
- Note 3: I_{SET} is removed from V_{OUT} and connected to 0V.
- Note 4: For these parameters, I_{SET} is removed from OUTPUT and connected to +12V to force the output transistor OFF.
- Note 5: DR_{IN} = 40V
- Note 6: The oscillator frequency reduces to approximately 11kHz in the event of fault conditions, such as output short or overload. And the regulated output voltage will drop approximately 40% from the nominal output voltage. This self-protection feature lowers the average power dissipation by lowering the minimum duty cycle from 5% down to approximately 2%.

PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise specified

5 LeadTO 220

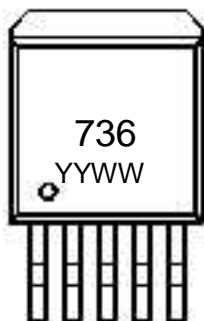


5 LeadTO 263



MARKING DIAGRAM

5L TO220 / 5L TO 263



YY = Year, WW = Working Week