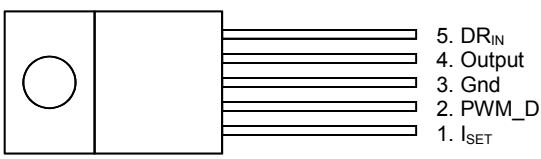
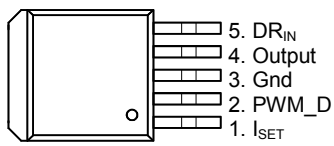


3 A Power LED Driver with Dimming Control

SMD736

| FEATURES | DESCRIPTION |
|--|---|
| <ul style="list-style-type: none"> ■ Wide input voltage range, up to 40V ■ Guaranteed 3A output current ■ Wide adjustable version output current range, from 0A to 3A max over line and load conditions ■ 150 kHz fixed frequency internal oscillator ■ Dimming control by PWM or Voltage Adjustment ■ Requires only 6 external components ■ Thermal shut down and current limit protection | <p>The SMD736 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 SMD736 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 |
|--|
| <ul style="list-style-type: none"> ■ High Efficiency Step-Down LED Drivers ■ LED Lighting ■ LED Monitors ■ Automotive LED Lighting |

| PACKAGE/ORDER INFORMATION | |
|--|--|
|  <p style="text-align: center;">5-Pin Plastic TO-220 (Top View)</p> | <h3>Order Part Number</h3> <p style="text-align: center;">SMD736P</p> |
|  <p style="text-align: center;">5-Pin Plastic TO-263 (Top View)</p> | <p style="text-align: center;">SMD736PST</p> <p>Append the letter "T" to part number for Tape & Reel of all surface-mount packages.</p> |

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

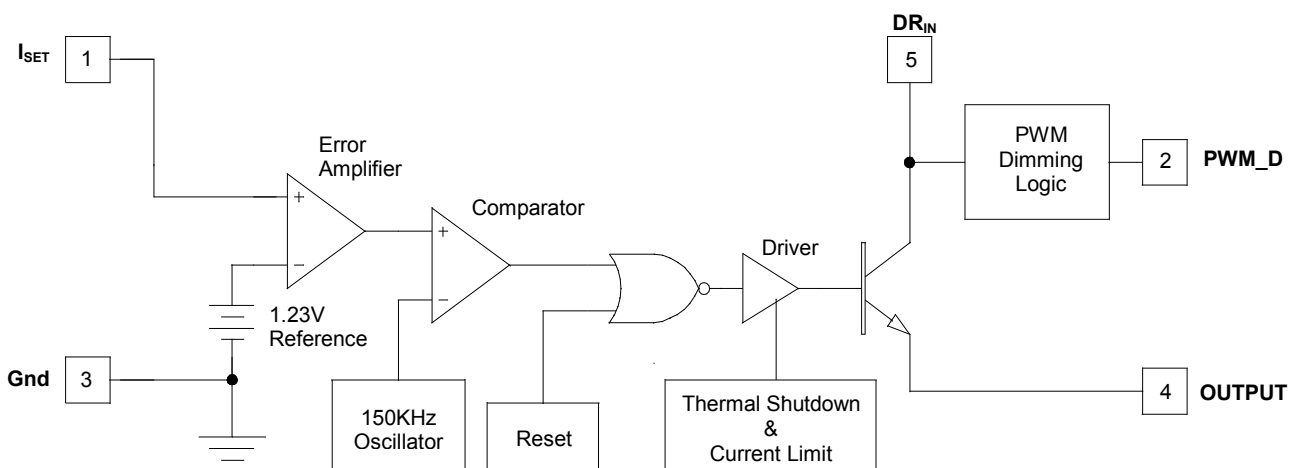
| | |
|--|----------------------------|
| Input Voltage | 45V |
| PWM_D Pin Input Voltage | $-0.3V \leq V \leq V_{IN}$ |
| Operating Junction Temperature, T _J | -40°C to 150°C |
| Storage Temperature Range | -65°C to 150°C |
| Lead Temperature (soldering, 10 seconds) | 260°C |

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

SMD736

RECOMMENDED OPERATING CONDITIONS

| Parameter | Symbol | Min | Typ | Max | Units |
|----------------------|------------------|-----|-----|-----|-------|
| Input Voltage | DR _{IN} | | | 40 | V |
| Junction temperature | T _J | -40 | | 125 | °C |

TYPICAL APPLICATIONS

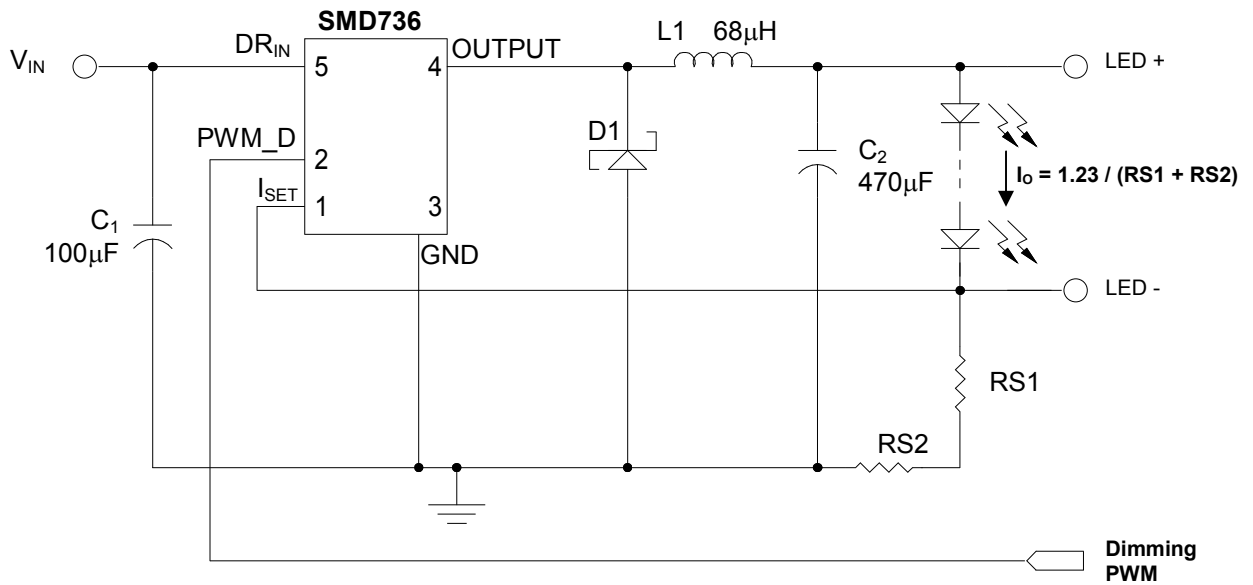


Figure 1 - PWM Dimming Application Circuits

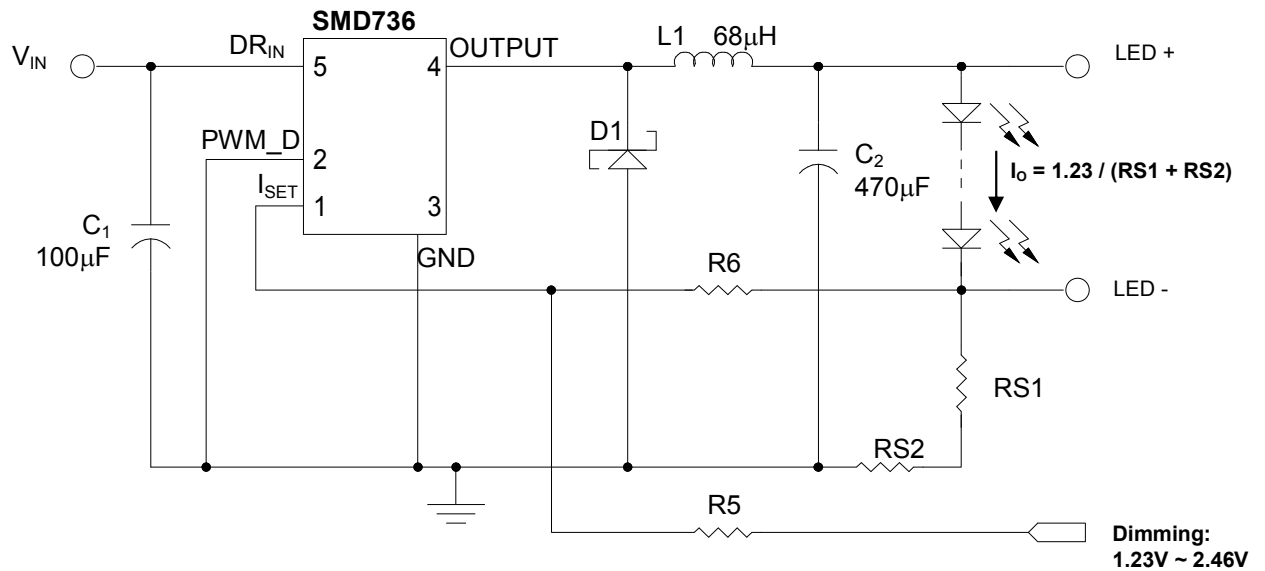


Figure 2 - Voltage Dimming Application Circuits

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, these specifications apply $DR_{IN} = 12V$, $I_{LOAD} = 0.5A$ and the operating ambient temperatures $T_A = 25^{\circ}C$

| Parameter | Test Conditions | Min | Typ | Max | Units | |
|-------------------------------|---|---|-------|-------|---------|-----|
| I_{SET} Voltage (Note 1) | $V_{OUTPUT} = 5V$ | 1.217 | 1.230 | 1.243 | V | |
| | $V_{OUTPUT} = 5V, 8V \leq DR_{IN} \leq 40V,$ | 1.193 | 1.230 | 1.267 | | |
| | $V_{OUTPUT} = 5V, 8V \leq DR_{IN} \leq 40V,$ $0.5A \leq I_{LOAD} \leq 3A, -40^{\circ}C \leq T_J \leq 125^{\circ}C$ | 1.180 | 1.230 | 1.286 | | |
| Efficiency | $I_{LOAD} = 0.7A, V_{OUTPUT} = 5V, DR_{IN} = 16V$ | | 79 | | % | |
| I_{SET} Bias Current | $V_{OUTPUT} = 5V$ | $T_J = 25^{\circ}C$ | | 50 | 100 | nA |
| | | $-40^{\circ}C \leq T_J \leq 125^{\circ}C$ | | | 500 | |
| Oscillator Frequency | (Note 6) | $T_J = 25^{\circ}C$ | 127 | 150 | 173 | kHz |
| Saturation Voltage | $I_{LOAD} = 3A$ (Note 2) | $T_J = 25^{\circ}C$ | | 1.4 | 1.8 | V |
| | | $-40^{\circ}C \leq T_J \leq 125^{\circ}C$ | | | 2.0 | |
| Duty Cycle (ON) | (Note 3) | | 93 | 98 | | % |
| Current Limit | (Note 2, 6) | $T_J = 25^{\circ}C$ | 4.2 | 7 | 8.8 | A |
| | | $-40^{\circ}C \leq T_J \leq 125^{\circ}C$ | 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 | $V_{OUTPUT} = 0V$ | $T_J = 25^{\circ}C$ | 2.2 | 1.4 | | V |
| | | $-40^{\circ}C \leq T_J \leq 125^{\circ}C$ | 2.4 | | | |
| PWM_D Threshold Voltage Low | $V_{OUTPUT} = \text{Normal Output Voltage}$ | $T_J = 25^{\circ}C$ | | 1.2 | 1.0 | |
| | | $-40^{\circ}C \leq T_J \leq 125^{\circ}C$ | | | 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.

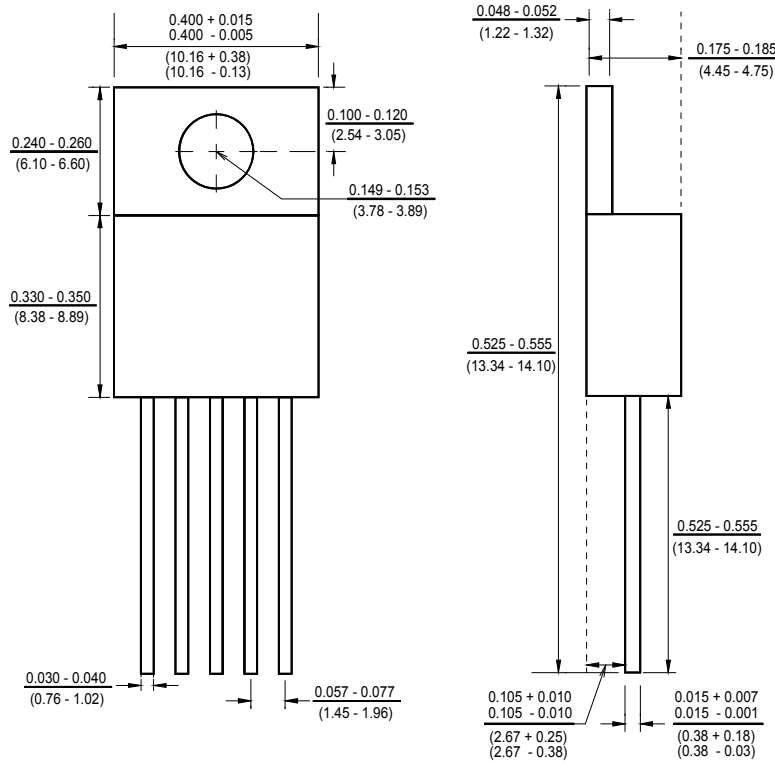
Note 4: For these parameters, I_{SET} is removed from OUTPUT and connected to +12V to force the output transistor OFF.

Note 5: $DR_{IN} = 40V$

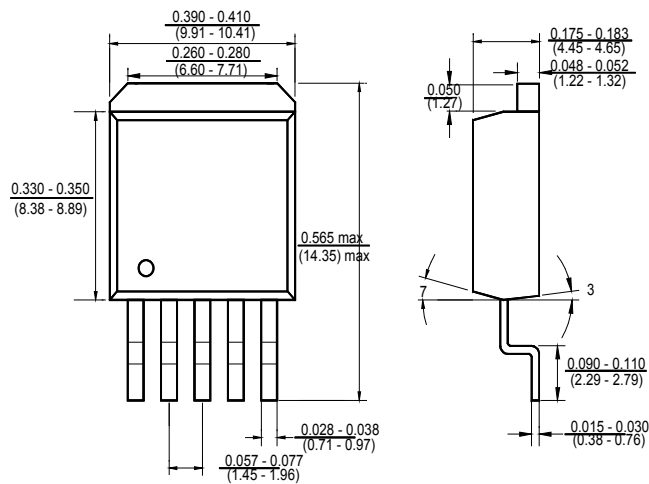
Note 6: The oscillator frequency reduces to approximately 11kHz in the event of fault conditions, such as output short or overload. And the regulated output voltage will drop approximately 40% from the nominal output voltage. This self-protection feature lowers the average power dissipation by lowering the minimum duty cycle from 5% down to approximately 2%.

PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise specified

5 Lead TO 220



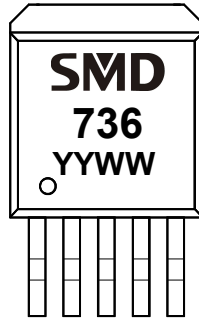
• 5 Lead TO 263



SMD736

MARKING DIAGRAM

5L TO220 / 5L TO 263



YY = Year, WW = Working Week