

## General Description

The MIC2142 is a micropower boost switching regulator housed in a SOT23-5 package. The input voltage range is between 2.2V to 16V, making the device suitable for one-cell Li Ion and 3 to 4-cell alkaline/NiCad/NiMH applications. The output voltage of the MIC2142 can be adjusted up to 22V.

The MIC2142 is well suited for portable, space-sensitive applications. It features a low quiescent current of 85μA, and a typical shutdown current of 0.1μA. It's 330kHz operation allows small surface mount external components to be used. The MIC2142 is capable of efficiencies over 85% in a small board area.

The MIC2142 can be configured to efficiently power a variety of loads. It is capable of providing a few mA output for supplying low power bias voltages; it is also capable of providing the 80mA needed to drive 4 white LEDs.

The MIC2142 is available in a SOT23-5 package with an ambient operating temperature range from -40°C to +85°C

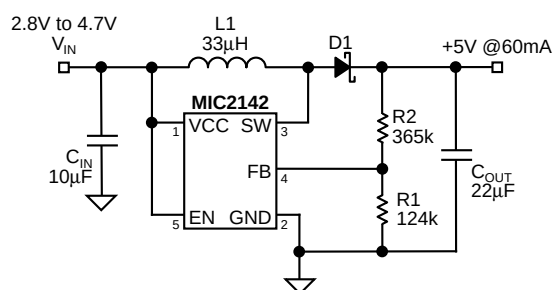
## Features

- 2.2V to 16V input voltage
- Up to 22V output voltage
- 330kHz switching frequency
- 0.1μA shutdown current
- 85μA quiescent current
- Implements low-power boost, SEPIC, or flyback
- SOT23-5 package

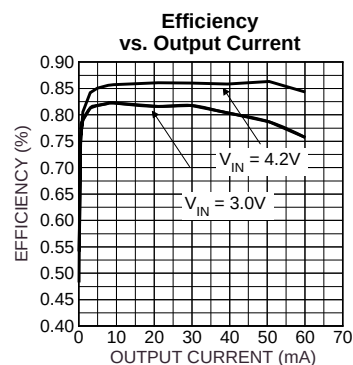
## Applications

- LCD bias supply
- White LED driver
- 12V Flash memory supply
- Local 3V to 5V conversion

## Typical Application



Typical Configuration

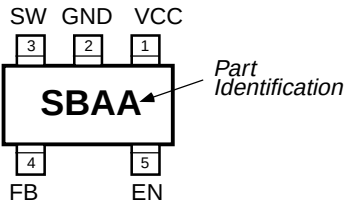


Efficiency vs. Output Current

Ordering Information

| Part Number | Voltage | Ambient Temp. Range | Package |
|-------------|---------|---------------------|---------|
| MIC2142BM5  | Adj     | −40°C to +85°C      | SOT23-5 |

Pin Configuration



SOT23-5 (BM5)

Pin Description

| Pin Number | Pin Name | Pin Function                                                               |
|------------|----------|----------------------------------------------------------------------------|
| 1          | VCC      | Chip Supply: +2.2V to +16V                                                 |
| 2          | GND      | Ground: Return for internal circuitry and internal MOSFET (switch) source. |
| 3          | SW       | Switch Node (Input): Internal MOSFET drain; 22V maximum.                   |
| 4          | FB       | Feedback (Input): Output voltage sense node.                               |
| 5          | EN       | Shutdown: Device shuts down to 0.1μA typical supply current.               |

**Absolute Maximum Ratings (Note 1)**

|                                               |                 |
|-----------------------------------------------|-----------------|
| Supply voltage ( $V_{CC}$ )                   | 18V             |
| Switch voltage ( $V_{SW}$ )                   | 24V             |
| Enable pin voltage ( $V_{EN}$ ) <b>Note 3</b> | 18V             |
| Feedback Voltage ( $V_{FB}$ )                 |                 |
| Adjustable version                            | 8V              |
| Ambient Storage Temperature ( $T_S$ )         | –65°C to +150°C |

**Operating Ratings (Note 2)**

|                                               |                 |
|-----------------------------------------------|-----------------|
| Supply Voltage ( $V_{CC}$ )                   | 2.2V to 16V     |
| Enable pin voltage ( $V_{EN}$ ) <b>Note 3</b> | 0V to 16V       |
| Switch Voltage ( $V_{SW}$ )                   | 22V             |
| Ambient Temperature ( $T_A$ )                 | –40°C to +85°C  |
| Junction Temperature Range ( $T_J$ )          | –40°C to +125°C |
| Package Thermal Impedance                     |                 |
| $\theta_{JA}$ SOT23-5                         | 220°C/W         |

**Electrical Characteristics**

$V_{CC} = 3.6V$ ,  $V_{OUT} = 5V$ ,  $I_{OUT} = 20mA$ ,  $T_A = 25^\circ C$ ; unless otherwise specified. **Bold** values indicate  $25^\circ C \leq T_J \leq 125^\circ C$ .

| Parameter                                    | Condition                                     | Min          | Typ          | Max          | Units       |
|----------------------------------------------|-----------------------------------------------|--------------|--------------|--------------|-------------|
| Input Voltage                                |                                               | 2.2          |              | 16           | V           |
| Quiescent Current                            | $V_{EN} = ON$ , $V_{FB} = 2.2V$               |              | 85           | <b>125</b>   | $\mu A$     |
|                                              | $V_{EN} = OFF$ (shutdown)                     |              | 0.1          | <b>2</b>     | $\mu A$     |
| Feedback Voltage ( $V_{FB}$ )                | ( $\pm 2\%$ )                                 | 1.254        | 1.28         | 1.306        | V           |
|                                              | ( $\pm 3\%$ )                                 | <b>1.241</b> |              | <b>1.312</b> | V           |
| Comparator Hysteresis                        |                                               |              | 18           |              | mV          |
| Feedback Input Bias Current<br><b>Note 4</b> |                                               |              | 30           |              | nA          |
| Enable Input Voltage                         | $V_{IH}$ (turn on)                            | $0.6V_{CC}$  | $0.55V_{CC}$ |              | V           |
|                                              | $V_{IL}$ (turn off)                           |              | 1.1          | 0.8          | V           |
| Enable Input Current                         |                                               | –1           | 0.01         | 1            | $\mu A$     |
| Load Regulation                              | $200\mu A \leq I_{OUT} \leq 20mA$             |              | 0.2          |              | $\%V_{OUT}$ |
| Line Regulation                              | $2.2V \leq V_{CC} \leq 16V$ ; $I_{OUT} = 4mA$ |              | 0.25         |              | $\%/V$      |
| SW on Resistance                             | $I_{SW} = 100mA$ , $V_{CC} = 2.5V$            |              | 5            |              | $\Omega$    |
|                                              | $I_{SW} = 100mA$ , $V_{CC} = 12V$             |              | 2            |              | $\Omega$    |
| Switch Leakage Current                       | $V_{EN} = OFF$ , $V_{SW} = 12V$               |              | 0.05         | <b>1</b>     | $\mu A$     |
| Oscillator Frequency                         |                                               | 295          | 330          | 365          | kHz         |
| Duty Cycle                                   |                                               | 50           | 57           | 65           | %           |

**Note 1:** Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature,  $T_{J(Max)}$ , the junction-to-ambient thermal resistance,  $\theta_{JA}$ , and the ambient temperature,  $T_A$ . The maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown. The  $\theta_{JA}$  of the power SOT23-5 is 220°C/W mounted on a PC board.

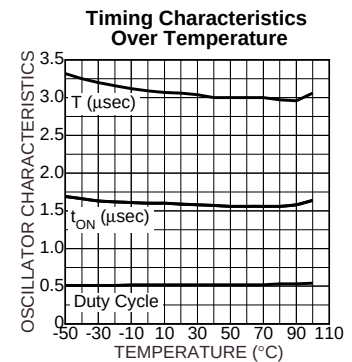
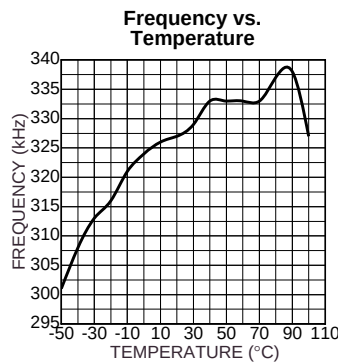
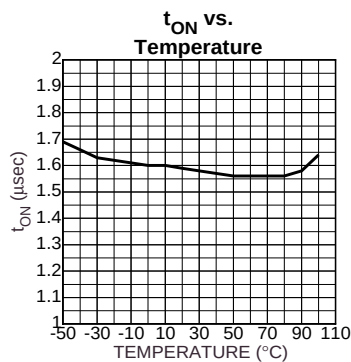
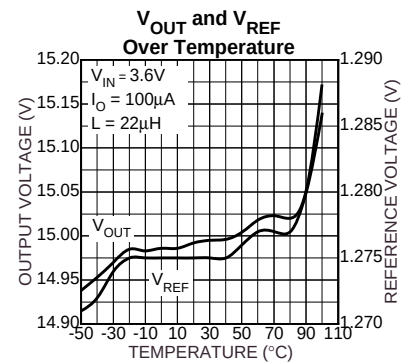
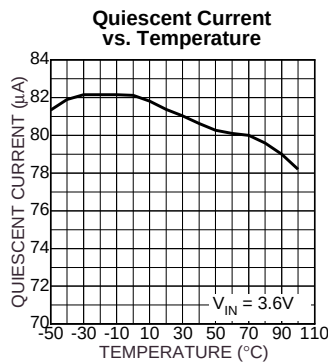
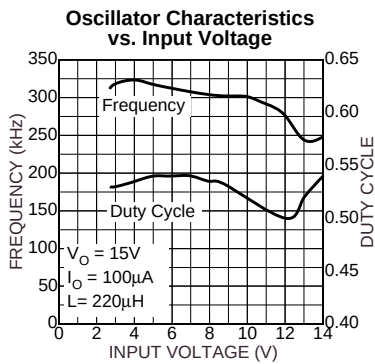
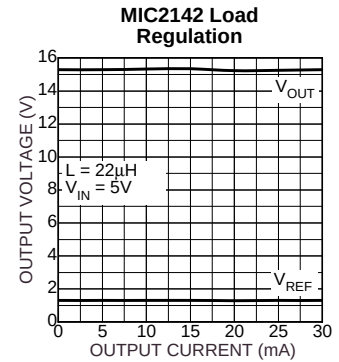
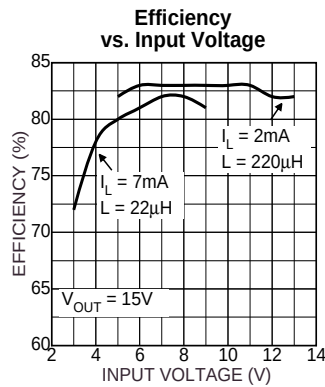
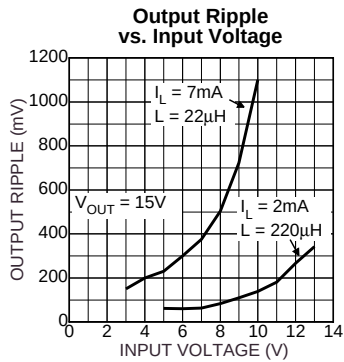
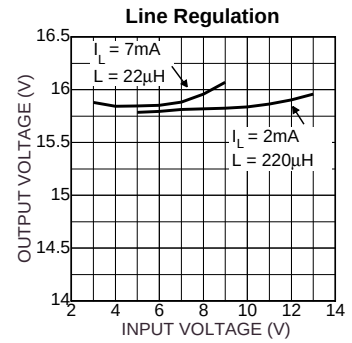
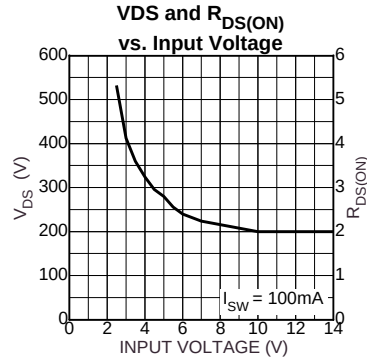
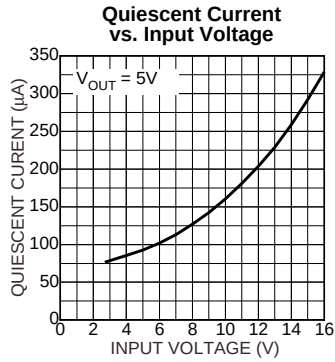
**Note 2:** The device is not guaranteed to function outside its operating rating.

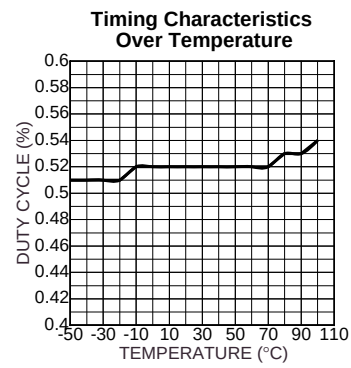
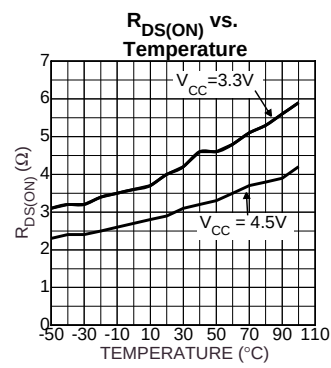
**Note 3:**  $V_{EN}$  must be  $\leq V_{IN}$

**Note 4:** The maximum suggested value of the programming resistor, whose series resistance is measured from feedback to ground, is 124k $\Omega$ . Use of larger resistor values can cause errors in the output voltage due to the feedback input bias current.

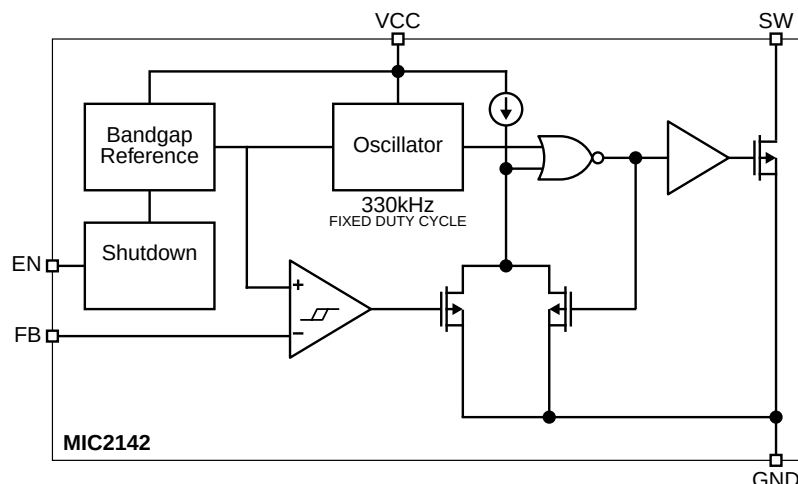
**Note 5:** Devices are ESD sensitive, handling precautions required.

# Typical Characteristics





## Functional Diagram



## Functional Description

This MIC2142 is a fixed duty cycle, constant frequency, gated oscillator, micropower, switch-mode power supply controller. Quiescent current for the MIC2142 is only 85 $\mu$ A in the switch off state, and since a MOSFET output switch is used, additional switch drive current is minimized. Efficiencies above 85% throughout most operating conditions can be realized.

A functional block diagram is shown above and typical schematic is shown on page 1. Regulation is performed by a hysteretic comparator, which regulates the output voltage by gating the internal oscillator. The internal oscillator operates at a fixed 57% duty cycle and 330kHz frequency. For the fixed output versions, the output is divided down internally and then compared to the internal  $V_{REF}$  input. An external resistive divider is used for the adjustable version.

The comparator has hysteresis built into it, which determines the amount of low frequency ripple that will be present on the

output. Once the feedback input to the comparator exceeds the control voltage by 18mV, the high frequency oscillator drive is removed from the output switch. As the feedback input to the comparator returns to the reference voltage level, the comparator is reset and the high frequency oscillator is again gated to the output switch. The 18mV of hysteresis seen at the comparator will be multiplied by the ratio of the output voltage to the reference voltage. For a five volt output this ratio would be 4, corresponding to a ripple voltage of 72mV at the output.

The maximum output voltage is limited by the voltage capability of the output switch. Output voltages up to 22V can be achieved with a standard boost circuit. Higher output voltages can be realized with a flyback configuration.

## Application Information

Predesigned circuit information is at the end of this section.

### Component Selection

#### Resistive Divider (Adjustable Version)

The external resistive divider should divide the output voltage down to the nominal reference voltage. Current drawn through this resistor string should be limited in order to limit the effect on the overall efficiency. The maximum value of the resistor string is limited by the feedback input bias current and the potential for noise being coupled into the feedback pin. A resistor string on the order of  $2M\Omega$  limits the additional load on the output to  $20\mu A$  for a 20V output. In addition, the feedback input bias current error would add a nominal 60mV error to the expected output. Equation 1 can be used for determining the values for R2 and R1.

$$(1) \quad V_{OUT} = \left( \frac{R1+R2}{R1} \right) V_{REF}$$

#### Boost Inductor

Maximum power is delivered to the load when the oscillator is gated on 100% of the time. Total output power and circuit efficiency must be considered when determining the maximum inductor value. The largest inductor possible is preferable in order to minimize the peak current and output ripple. Efficiency can vary from 80% to 90% depending upon input voltage, output voltage, load current, inductor, and output diode.

Equation 2 solves for the output current capability for a given inductor value and expected efficiency. Figures 7 through 12 show estimates for maximum output current assuming the minimum duty and maximum frequency and 80% efficiency. To determine the necessary inductance, find the intersection between the output voltage and current, and then select the value of the inductor curve just above the intersection. If the efficiency is expected to be different than the 85% used for the graph, Equation 2 can then be used to better determine the maximum output capability.

The peak inductor/switch current can be calculated from Equation 3 or read from the graph in Figure 13. The peak current shown in the graph in Figure 13 is derived assuming a max duty cycle and a minimum frequency. The selected inductor and diode peak current capability must be greater than this. The peak current seen by the inductor is calculated at the maximum input voltage. A wide ranging input voltage will result in a higher worst case peak current in the inductor than a narrow input range.

$$(2) \quad I_{O(max)} = \frac{(V_{IN(min)} t_{ON})^2}{2L_{MAX} T_S} \times \frac{1}{\frac{V_O}{eff} - V_{IN(min)}}$$

$$(3) \quad I_{PK} = \frac{t_{ON(max)} V_{IN(max)}}{L_{MIN}}$$

Table 1 lists common inductors suitable for most applications. Due to the internal transistor peak current limitation at low input voltages, inductor values less than  $10\mu H$  are not

recommended. Table 6 lists minimum inductor sizes versus input and output voltage. In low-cost, low-peak-current applications, RF-type leaded inductors may suffice. All inductors listed in Table 5 can be found within the selection of CR32- or LQH4C-series inductors from either Sumida or MuRata.

| Manufacturer | Series      | Device Type   |
|--------------|-------------|---------------|
| MuRata       | LQH1C/3C/4C | surface mount |
| Sumida       | CR32        | surface mount |
| J.W. Miller  | 78F         | axial leaded  |
| Coilcraft    | 90          | axial leaded  |

**Table 1. Inductor Examples**

#### Boost Output Diode

Speed, forward voltage, and reverse current are very important in selecting the output diode. In the boost configuration the average diode current is the same as the average load current and the peak is the same as the inductor and switch current. The peak current is the same as the peak inductor current and can be derived from Equation 3 or the graph in Figure 13. Care must be taken to make sure that the peak current is evaluated at the maximum input voltage.

The BAT54 and BAT85 series are low current Schottky diodes available from "On Semiconductor" and "Phillips" respectively. They are suitable for peak repetitive currents of 300mA or less with good reverse current characteristics. For applications that are cost driven, the 1N4148 or equivalent will provide sufficient switching speed with greater forward drop and reduced cost. Other acceptable diodes are On Semiconductor's MBR0530 or Vishay's B0530, although they can have reverse currents that exceed 1 mA at very high junction temperatures. Table 2 summarizes some typical performance characteristics of various suitable diodes.

| Diode   | 75°C<br>V <sub>FWD</sub><br>at<br>100mA | 25°C<br>V <sub>FWD</sub><br>at<br>100mA | Room<br>Temp.<br>Leakage<br>at 15V | 75°C<br>Leakage<br>at 15V | Package           |
|---------|-----------------------------------------|-----------------------------------------|------------------------------------|---------------------------|-------------------|
| MBR0530 | 0.275V                                  | 0.325V                                  | 2.5μA                              | 90μA                      | SOD123<br>SMT     |
| 1N4148  | 0.6V<br>(175°C)                         | 0.95V                                   | 25nA<br>(20V)                      | 0.2μA<br>(20V)            | leaded<br>and SMT |
| BAT54   | 0.4V<br>(85°C)                          | 0.45V                                   | 10nA<br>(25V)                      | 1μA<br>(20V)              | SMT               |
| BAT85   | 0.54<br>(85°C)                          | 0.56V                                   | 0.4μA                              | 2μA<br>(85°C)             | DO-34<br>leaded   |

**Table 2. Diode Examples**

#### Output Capacitor

Due to the limited availability of tantalum capacitors, ceramic capacitors and inexpensive electrolytics may be preferred. Selection of the capacitor value will depend upon the peak inductor current and inductor size. MuRata offers the GRM series with up to 10μF @ 25V with a Y5V temperature coefficient in a 1210 surface mount package. Low cost applications can use the M series leaded electrolytic capacitor from Panasonic. In general, ceramic, electrolytic, or tantalum values ranging from 1μF to 22μF can be used for the output capacitor.

| Manufacturer | Series   | Type         | Package       |
|--------------|----------|--------------|---------------|
| MuRata       | GRM      | ceramic Y5V  | surface mount |
| Vishay       | 594      | tantalum     | surface mount |
| Panasonic    | M-series | electrolytic | lead          |

Table 3. Capacitor Examples

### Design Example

Given a design requirement of 12V output and 1mA load with an minimum input voltage of 2.5V, Equation 2 can be used to calculate to maximum inductance or it can be read from the graph in Figure 7. Once the maximum inductance has been determined the peak current can be determined using Equation 3 or the graph in Figure 13.

$$V_{OUT} = 12V$$

$$I_{OUT} = 5mA$$

$$V_{IN} = 2.5V \text{ to } 4.7V$$

$$F_{max} = 360kHz$$

$$\eta = 0.8 = \text{efficiency}$$

$$D_{nom} = 0.55$$

$$T_{S(min)} = \frac{1}{F_{max}} = \frac{1}{360kHz} = 2.78\mu\text{sec}$$

$$t_{ON(min)} = \frac{D_{nom}}{f_{max}} = \frac{0.55}{360kHz} = 1.53\mu\text{sec}$$

$$L_{max} = \frac{V_{IN(min)}^2 \times t_{ON(min)}^2}{I_{O(max)} \times 2 \times T_{S(min)}} \times \frac{1}{\frac{V_O}{\eta} - V_{IN(min)}}$$

$$L_{max} = \frac{2.5^2 \times 1.53\mu\text{sec}^2}{5mA \times 2 \times 2.78\mu\text{sec}} \times \frac{1}{\frac{12}{0.8} - 2.5} = 42\mu\text{H}$$

Select 39 $\mu\text{H}$   $\pm 10\%$ .

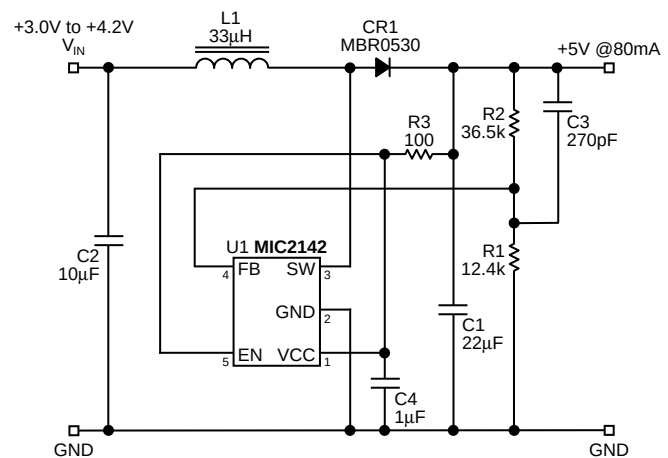
$$t_{ON(max)} = \frac{1.1 \times D_{nom}}{F_{min}} = \frac{1.1 \times 0.55}{300kHz} = 2\mu\text{sec}$$

$$I_{peak} = \frac{t_{ON(max)} \times V_{IN(max)}}{L_{min}} = \frac{2.0\mu\text{sec} \times 4.7V}{35\mu\text{H}} = 270mA$$

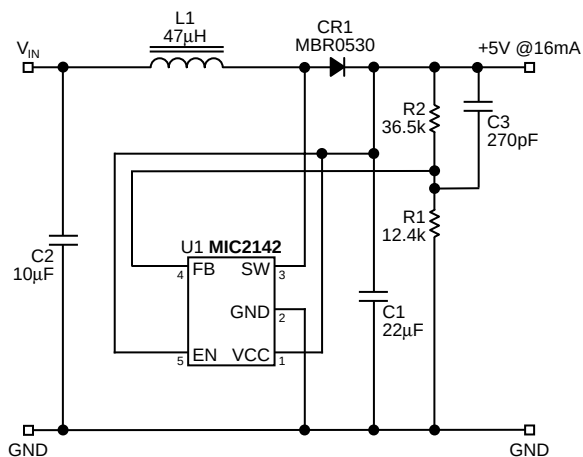
### Bootstrap Configuration

For input voltages below 4.5V the bootstrap configuration can increase the output power capability of the MIC2142. Figure 2 shows the bootstrap configuration where the output voltage is used to bias the MIC2142. This improves the power capability of the MIC2142 by increasing the gate drive voltage hence the peak current capability of the internal switch. This allows the use of a smaller inductor which increases the output power capability. Table 4 also summarizes the various configurations and power capabilities using the bootstrap configuration. This bootstrap configuration is limited to output voltage of 16V or less.

Figure 1 shows how a resistor (R3) can be added to reduce the ripple seen at the  $V_{CC}$  pin when in the bootstrap configuration. Reducing the ripple at the  $V_{CC}$  pin can improve output ripple in some applications.

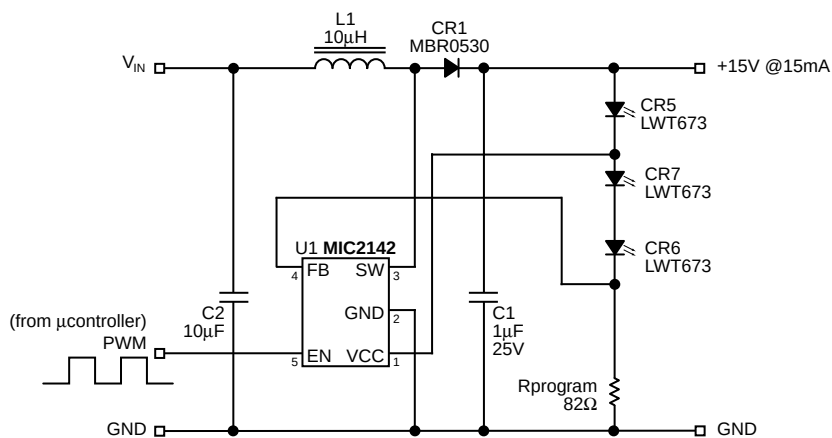
Figure 1. Bootstrap  $V_{CC}$  with  $V_{CC}$  Low Pass Filter



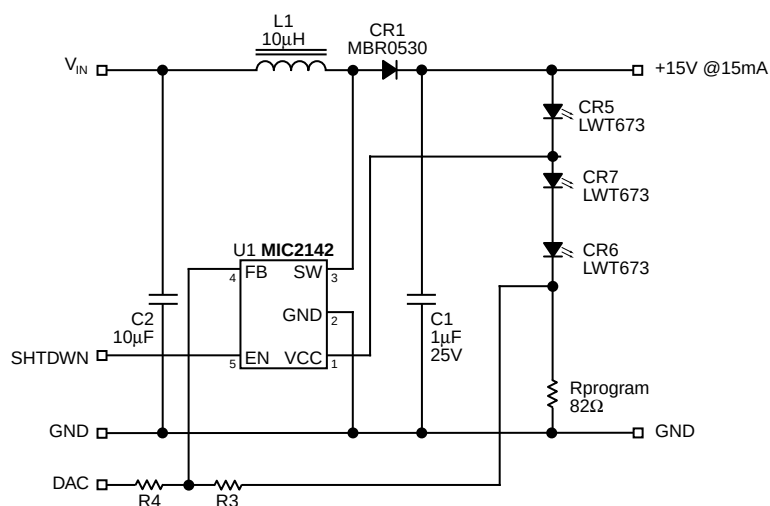


**Figure 2. Booststrap Configuration**

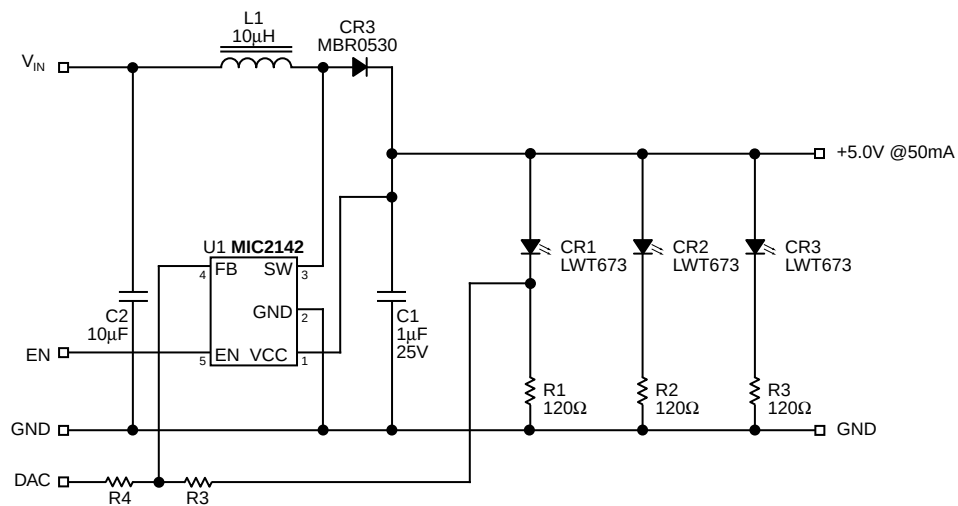
For additional predesigned circuits, see Table 4.



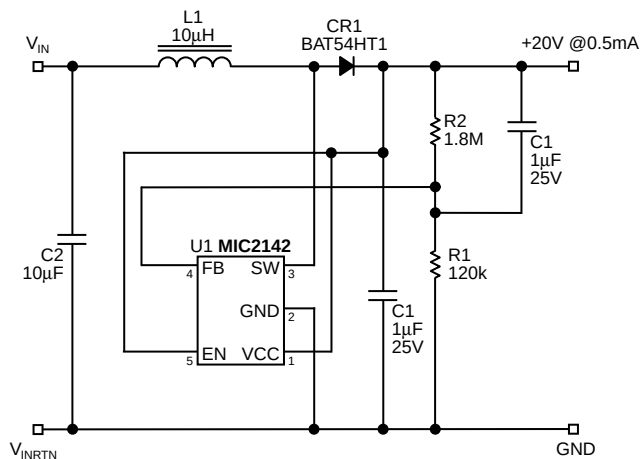
**Figure 3. Series White LED Driver with PWM Dimming Control**



**Figure 4. Series White LED Driver with Analog Dimming Control**



**Figure 5. Parallel White LED Driver with Analog Dimming Control**



**Figure 6. Handheld LCD Supply**

## Predesigned Circuit Values

| $V_{IN(min)}$ | $V_{IN(max)}$ | $V_{OUT}$     | $I_{OUT(max)}$ | L1          | $I_{PK} @ V_{IN(max)}$ | CR1     |
|---------------|---------------|---------------|----------------|-------------|------------------------|---------|
| 2.5V          | 3.0V          | 3.3V          | 40mA           | 47 $\mu$ H  | 129mA                  | BAT54   |
|               |               |               | 23mA           | 85 $\mu$ H  | 74mA                   | BAT54   |
|               |               |               | 10mA           | 180 $\mu$ H | 34VmA                  | BAT54   |
| 2.5V          | 4.5V          | 5V            | 16.5mA         | 47 $\mu$ H  | 193mA                  | BAT54   |
|               |               |               | 7.8mA          | 100 $\mu$ H | 91mA                   | BAT54   |
|               |               | boot strapped | 51             | 15          | 605                    | MBR0530 |
| 2.5           | 11.5          | 12            | 4.8            | 47          | 493                    | MBR     |
|               |               |               | 2.25           | 100         | 232                    | BAT     |
|               |               | boot strapped | 15             | 15          | 632                    | MBR     |
| 2.5           | 14.5          | 15            | 3.7            | 47          | 622                    | MBR     |
|               |               |               | 1.7            | 100         | 292                    | BAT     |
|               |               | boot strapped | 17.4           | 10          | 950                    | MBR     |
| 2.5           | 4.7           | 20            | 2.7            | 47          | 202                    | BAT     |
|               |               | boot strapped | 1.5            | 82          | 110                    | BAT     |
|               |               | boot strapped | 22             | 10          | 950                    | MBR     |
| 3.0           | 4.7           | 5             | 40             | 33          | 287                    | BAT     |
|               |               | boot strapped | 70             | 18          | 525                    | MBR     |
|               |               | boot strapped | 100            | 12          | 800                    | MBR     |
| 3.0           | 8.5           | 9             | 15             | 33          | 520                    | MBR     |
|               |               | boot strapped | 28             | 18          | 525                    | MBR     |
|               |               | boot strapped | 40             | 12          | 800                    | MBR     |
| 3.0           | 14.5          | 15            | 7.8            | 33          | 886                    | MBR     |
|               |               | boot strapped | 14             | 18          | 525                    | MBR     |
|               |               | boot strapped | 21             | 12          | 800                    | MBR     |
| 3.0           | 4.7           | 20            | 5.6            | 33          | 287                    | BAT     |
|               |               |               |                |             |                        |         |
|               |               |               |                |             |                        |         |
| 5.0           | 8.5           | 9             | 70             | 27          | 635                    | MBR     |
|               |               |               | 23             | 82          | 209                    | BAT     |
|               |               |               | 10             | 180         | 95                     | BAT     |
| 5.0           | 11.5          | 12            | 43             | 27          | 860                    | MBR     |
|               |               |               | 14             | 82          | 283                    | BAT     |
|               |               |               | 6              | 180         | 129                    | BAT     |
| 5.0           | 14.5          | 15            | 30             | 27          | 1083                   | MBR     |
|               |               |               | 10             | 82          | 357                    | MBR     |
|               |               | 9             | 30             | 27          | 672                    | MBR     |
| 5.0           | 8.0           | 20            | 8              | 68          | 237                    | BAT     |
| 9             | 11.5          | 12            | 118            | 56          | 414                    | MBR     |
|               |               |               | 66             | 100         | 232                    | BAT     |
|               |               |               | 30             | 220         | 105                    | BAT     |
| 9             | 14            | 15            | 70             | 56          | 504                    | MBR     |
|               |               |               | 40             | 100         | 282                    | BAT     |
|               |               |               | 18             | 220         | 128                    | BAT     |
| 9             | 14            | 20            | 20             | 120         | 235                    | BAT     |
|               |               |               | 10             | 220         | 128                    | BAT     |
|               |               |               | 6              | 390         | 72                     | BAT     |
| 12            | 14            | 15            | 156            | 68          | 415                    | MBR     |
|               |               |               | 71             | 150         | 182                    | BAT     |
|               |               |               | 27             | 390         | 72                     | BAT     |
| 12            | 14            | 20            | 35             | 150         | 188                    | BAT     |

Table 4. Typical Maximum Power Configuration

| $V_{IN}$ | $V_{OUT}$ | $I_{OUT}$ | L1   | CR1     | $I_{PEAK}$ | Configuration |
|----------|-----------|-----------|------|---------|------------|---------------|
| 3.3V±5%  | 5V        | 70mA      | 18μH | MBR0530 | 400        | Bootstrap     |
|          | 9V        | 30mA      | 18μH | MBR0530 | 400        | Bootstrap     |
|          | 12V       | 20mA      | 18μH | MBR0530 | 400        | Bootstrap     |
|          | 15V       | 15mA      | 18μH | MBR0530 | 400        | Bootstrap     |
|          | 20V       | 6mA       | 33μH | BAT54   | 214        | Bootstrap     |
| 5V±5%    | 9V        | 70mA      | 27μH | MBR0530 | 370        |               |
|          | 12V       | 40mA      | 27μH | MBR0530 | 370        |               |
|          | 15V       | 30mA      | 27μH | MBR0530 | 370        |               |
|          | 20V       | 8.0mA     | 68μH | BAT54   | 148        |               |
| 12V±5%   | 15V       | 158       | 68   | MBR0350 | 350        |               |
|          | 20V       | 35        | 150  | BAT54   | 160        |               |
| 15V±5%   | 20V       | 50        | 220  | BAT54   | 1140       |               |

Table 5. Typical Maximum Power Configurations for Regulated Inputs

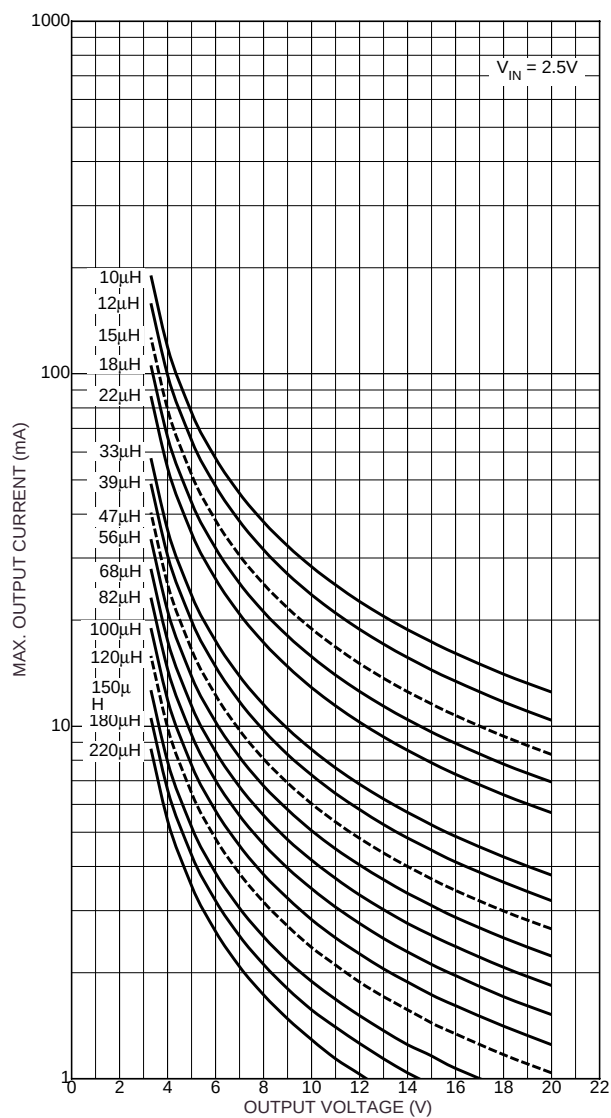
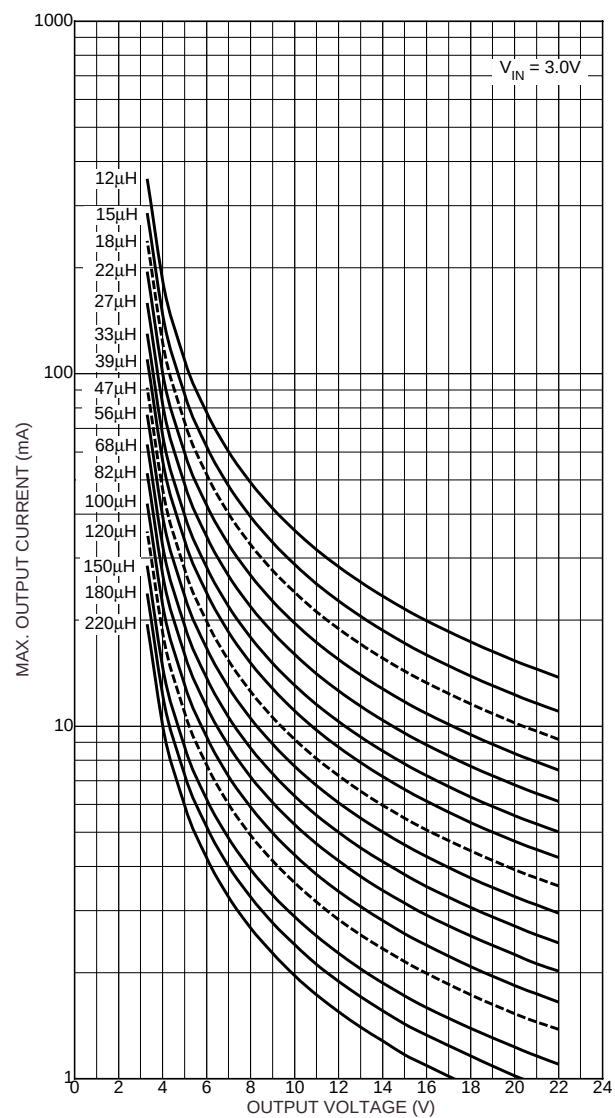
|                      | $V_{OUT} = 16V \text{ to } 22V$ | $V_{OUT} < 16V \text{ (bootstrapped)}$ | $V_{OUT} < 16 \text{ (bootstrapped)}$ |
|----------------------|---------------------------------|----------------------------------------|---------------------------------------|
|                      | 85C                             | 85C                                    | 40C                                   |
| $V_{IN} \text{ (V)}$ | $L_{MIN} \text{ (}\mu\text{H)}$ | $L_{MIN} \text{ (}\mu\text{H)}$        | $L_{MIN} \text{ (}\mu\text{H)}$       |
| 2.5                  | 47                              | 47 (15)                                | 47 (10)                               |
| 3                    | 33                              | 33 (18)                                | 33 (12)                               |
| 3.5                  | 47                              | 27 (22)                                | 27 (15)                               |
| 4                    | 56                              | 27 (22)                                | 22 (18)                               |
| 5                    | 68                              | 27                                     | 22                                    |
| 6                    | 82                              | 33                                     | 22                                    |
| 7                    | 100                             | 39                                     | 27                                    |
| 8                    | 100                             | 47                                     | 33                                    |
| 9                    | 120                             | 56                                     | 33                                    |
| 10                   | 150                             | 56                                     | 39                                    |
| 11                   | 150                             | 68                                     | 47                                    |
| 12                   | 150                             | 68                                     | 47                                    |
| 13                   | 180                             | 82                                     | 56                                    |
| 14                   | 180                             | 82                                     | 56                                    |
| 15                   | 220                             | 82                                     | 56                                    |
| 16                   | 220                             | 100                                    | 68                                    |

Table 6. Minimum Inductance

| Manufacturer | Web Address                                              |
|--------------|----------------------------------------------------------|
| MuRata       | <a href="http://www.MuRata.com">www.MuRata.com</a>       |
| Sumida       | <a href="http://www.sumida.com">www.sumida.com</a>       |
| Coilcraft    | <a href="http://www.coilcraft.com">www.coilcraft.com</a> |
| J. W. Miller | <a href="http://www.jwmiller.com">www.jwmiller.com</a>   |
| Micrel       | <a href="http://www.micrel.com">www.micrel.com</a>       |
| Vishay       | <a href="http://www.vishay.com">www.vishay.com</a>       |
| Panasonic    | <a href="http://www.panasonic.com">www.panasonic.com</a> |

Table 7. Component Supplier Websites

## Inductor Selection Guides

Figure 7. Inductor Selection for  $V_{IN} = 2.5V$ Figure 8. Inductor Selection for  $V_{IN} = 3.0V$

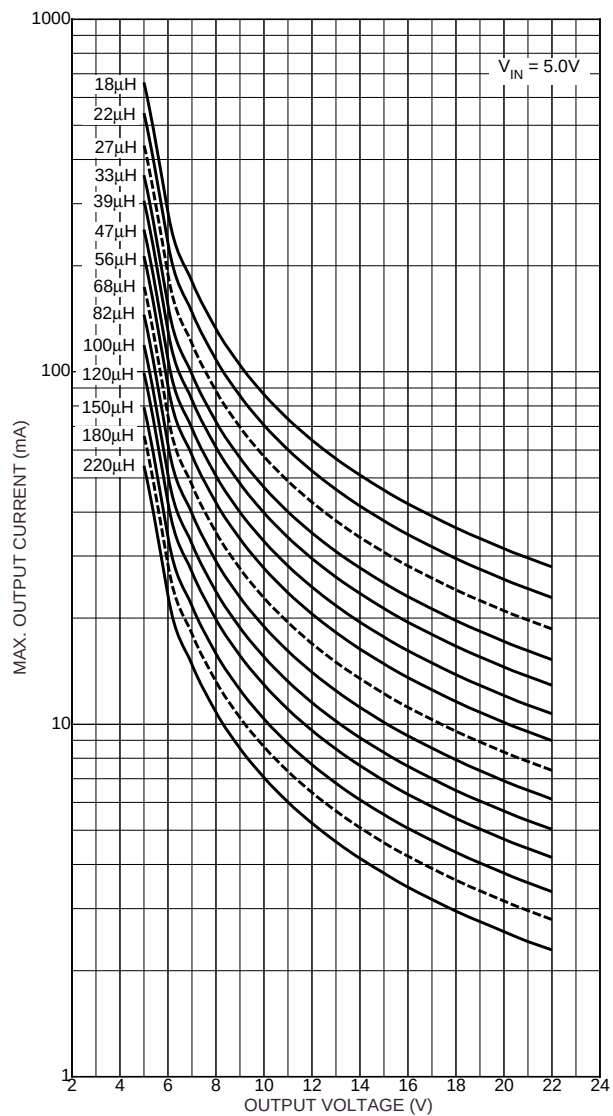


Figure 9. Inductor Selection for  $V_{IN} = 5V$

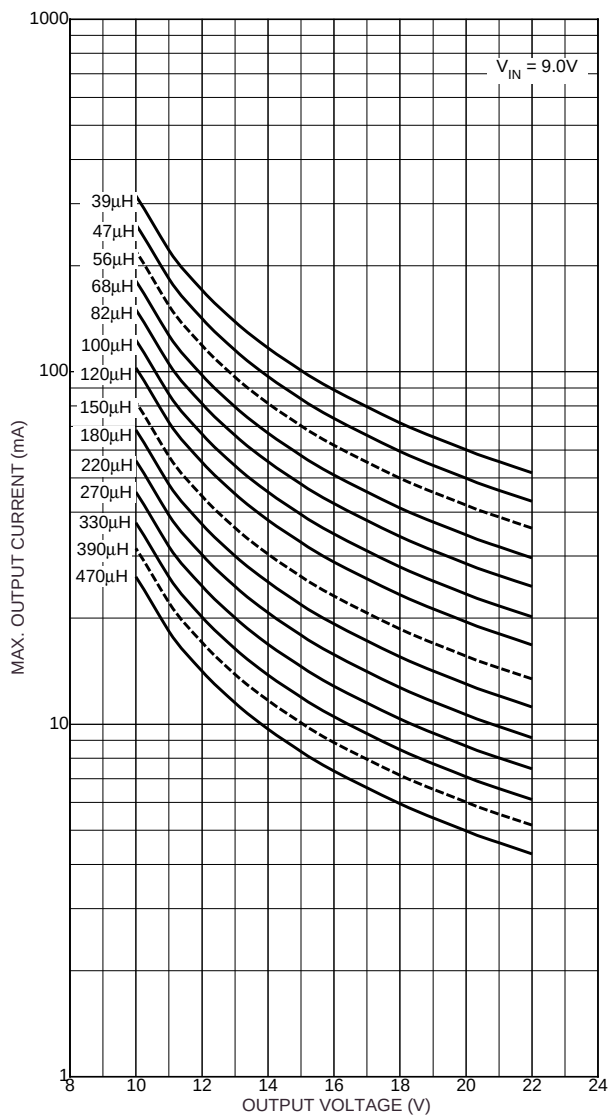


Figure 10. Inductor Selection for  $V_{IN} = 9V$

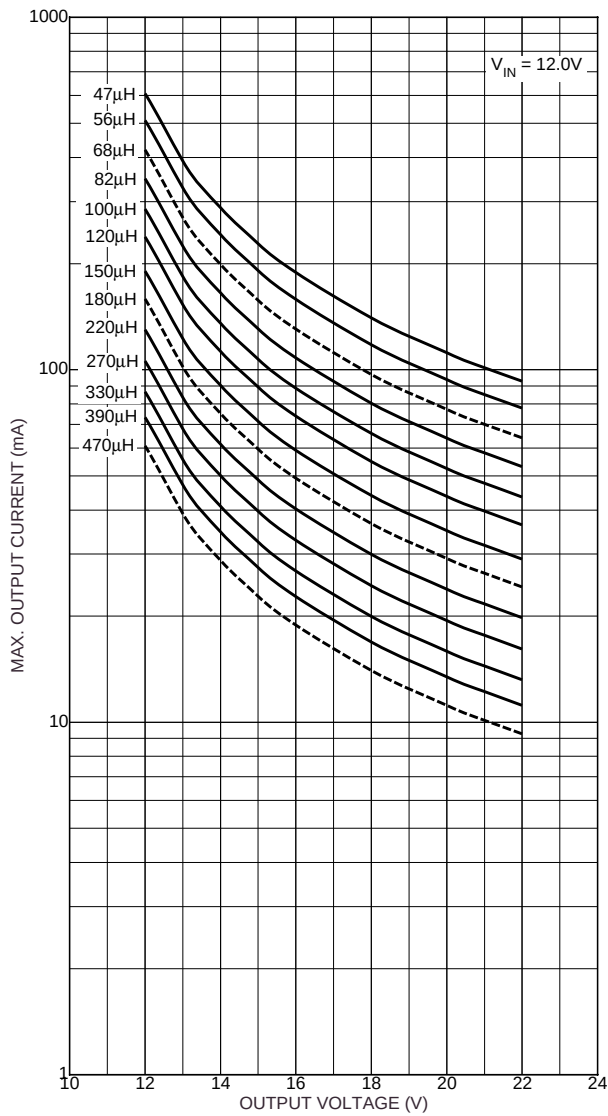


Figure 11. Inductor Selection for  $V_{IN} = 12V$

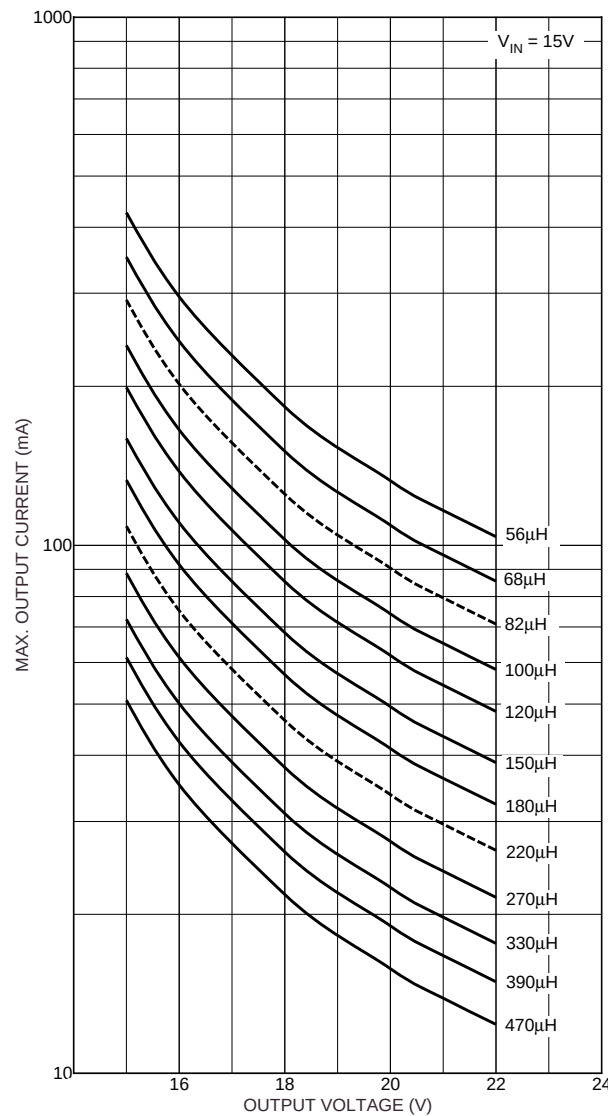


Figure 12. Inductor Selection for  $V_{IN} = 15V$

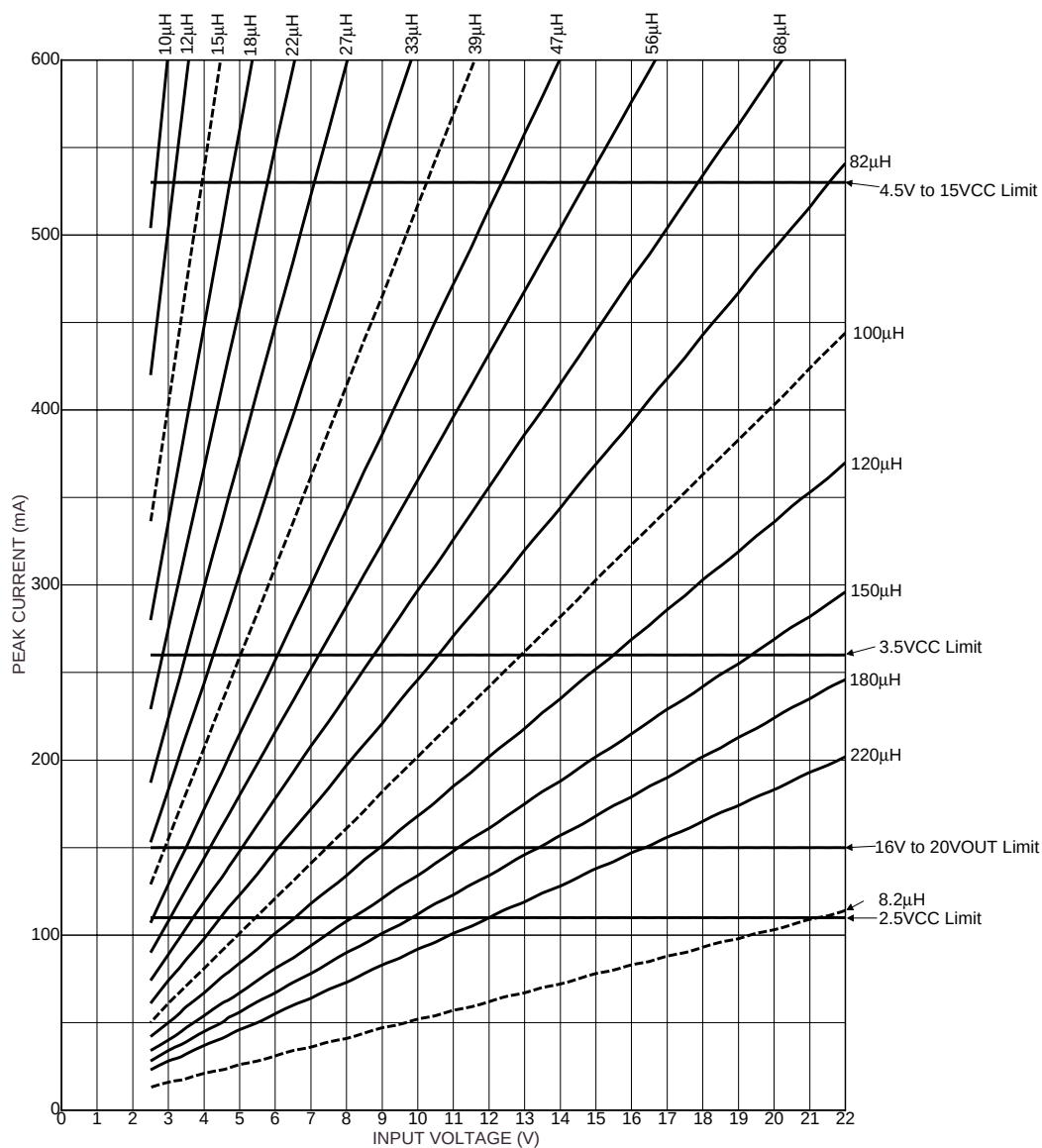
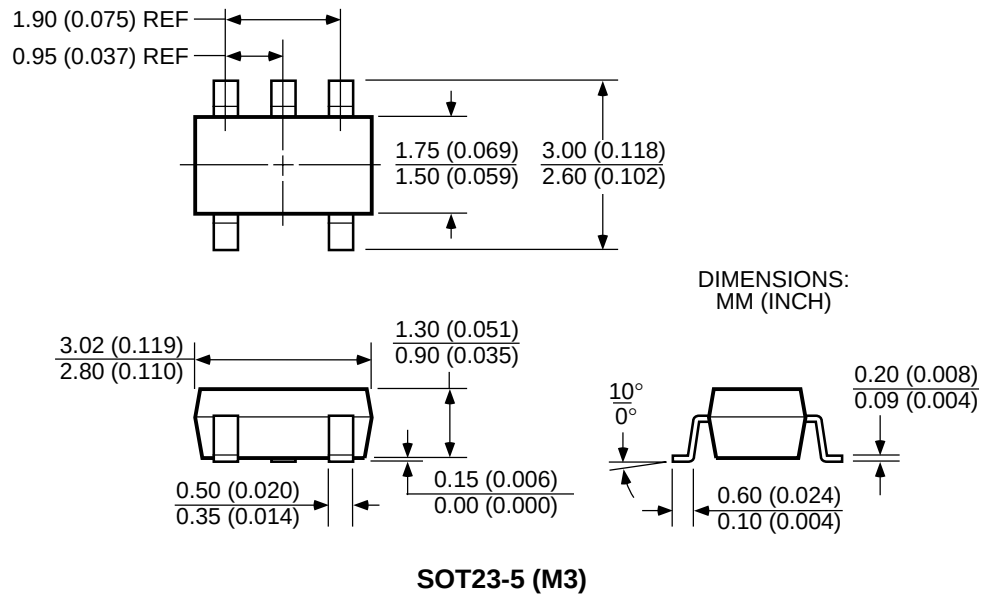


Figure 13. Peak Inductor Current vs. Input Voltage



## Package Information



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