40V, 2.2MHz, Synchronous Buck Converters Deliver High Efficiency Across All Loads

The AP64350, AP64351, AP64352, AP64500, and AP64501 are 40V, high-efficiency, synchronous DC-DC buck converters. The special design of the gate drive/boost enables them to operate in LDO mode, enabling near 100% duty cycle.

As the load current approaches zero, the devices enter pulse frequency modulation (PFM) mode to increase the converter power efficiency.

The AP64350, AP64351, AP64352, AP64500, and AP64501 devices feature frequency spread spectrum (FSS) (±5% switching frequency jitter) to reduce EMI by not allowing emitted energy to stay at any one frequency for any significant period of time.

The AP64350, AP64352, and AP64500 have programmable switching frequencies, up to 2.2MHz, that can also be synchronized to an external clock. AP64351 and AP64501 have a nominal 570kHz switching frequency.

The AP64351, AP64352, and AP64501 have a programmable soft-start that reduces in-rush currents, while the AP64350, AP64351, AP64500, and AP64501 have external compensation to optimize the loop response.

All devices are available in the SO-8EP package.

**DIODES Advantage**

- **V\textsubscript{IN} 3.8V to 40V**
  - Works across the full supply rails of commercial and industrial applications

- **Programmable F\textsubscript{SW} (AP64350/AP64352/AP64500) with Synchronization**
  - Low frequency from 100kHz – high-efficiency solution
  - High frequency to 2.2MHz – small-form factor solution

- **Wide Output Voltage Range: 0.8V to near 100% of V\textsubscript{IN} (LDO Mode)**
  - Duty cycle can extend to 100% for several switching cycles, acts like an LDO

- **Low Quiescent Current (I\textsubscript{Q}) and Shutdown Current**
  - 22μA I\textsubscript{Q} for 3.5A Device; 25μA I\textsubscript{Q} for 5A device
  - 1μA shutdown current

- **Programmable Soft-Start Time (AP64351/AP64501)**
  - Reduces inrush current

- **Designed for Best-in-Class EMI Performance**
  - Ringing resistant switching node at 4ns rise time
  - Frequency spread spectrum

**Applications**

- 12V and 24V Industrial Distributed Power Bus
- White Goods and Small Home Appliances
- Home Audio & Network Systems
- Cordless Power Tools
New Product Announcement

AP64350/351/352
AP64500/501

October 2019

Typical Application Circuit

40V DC-DC Buck Converter Portfolio

<table>
<thead>
<tr>
<th>Part Number</th>
<th>$V_{IN}$ Range (V)</th>
<th>$V_{OUT}$ Range (V)</th>
<th>Output Current (A)</th>
<th>$R_{DS(ON)}$ (mΩ)</th>
<th>Switching Frequency (kHz)</th>
<th>$I_Q$ (µA)</th>
<th>Key Features</th>
<th>Ambient Temperature (°C)</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>AP64350</td>
<td>3.8 – 40</td>
<td>0.8 - $V_{IN}$</td>
<td>3.5</td>
<td>75/45</td>
<td>100 - 2200</td>
<td>22</td>
<td>Prog. F$_{SW}$, Ext. Sync, Ext. Comp</td>
<td>-40 to +85</td>
<td>SO-8EP</td>
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<td>3.8 – 40</td>
<td>0.8 - $V_{IN}$</td>
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<td>570</td>
<td>22</td>
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<td>-40 to +85</td>
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<td>AP64352</td>
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<td>0.8 - $V_{IN}$</td>
<td>3.5</td>
<td>75/45</td>
<td>100 - 2200</td>
<td>22</td>
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<td>SO-8EP</td>
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<tr>
<td>AP64500</td>
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<td>0.8 - $V_{IN}$</td>
<td>5.0</td>
<td>45/20</td>
<td>100 - 2200</td>
<td>25</td>
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<td>-40 to +85</td>
<td>SO-8EP</td>
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<tr>
<td>AP64501</td>
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<td>0.8 - $V_{IN}$</td>
<td>5.0</td>
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<td>570</td>
<td>25</td>
<td>Prog. SS, Ext. Comp</td>
<td>-40 to +85</td>
<td>SO-8EP</td>
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To find out more information:
Product Pages:
https://www.diodes.com/part/AP64350
https://www.diodes.com/part/AP64351
https://www.diodes.com/part/AP64352
https://www.diodes.com/part/AP64500
https://www.diodes.com/part/AP64501

Ordering Information

<table>
<thead>
<tr>
<th>Orderable Device</th>
<th>Package Code</th>
<th>Package</th>
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<td>13-inch</td>
<td>4000</td>
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<td>4000</td>
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<td>SO-8EP</td>
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<td>4000</td>
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