DESCRIPTION

The MPQ7920 is a complete power management solution which integrates four high efficiency step-down DC/DC converters, five low dropout regulators and flexible logic interface. COT control DC/DC converter provides fast transient response. Up to 2.2MHz fixed switching frequency during CCM mode greatly reduces external inductor and capacitor value. Full protection features include UVLO, OCP, OVP and thermal shutdown.

Output voltage is adjustable through I2C bus or preset by MTP (Multi Time Programmable). The power on/off sequence is also programmable by MTP or can be controlled through I2C bus online.

The MPQ7920 requires a minimal number external components, and is available in space-saving 26-pin QFN-26 (3.5mmx4.5mm) package.

FEATURES

- **High Efficiency Step-Down Converters**
  - Buck1: 4.5A DC/DC Converter
  - Buck2: 2.5A DC/DC Converter
  - Buck3: 4.5A DC/DC Converter
  - Buck4: 2A DC/DC Converter
  - Buck1 and Buck3 can Work in Parallel
  - Buck2 and Buck4 can Work in Parallel
  - 2.7V to 5.5V Operating Input Range
  - 0.4V to 3.58V or Vin Output Range
  - Adjustable Switching Frequency
  - Adjustable Soft-start Time
  - Adjustable Phase Delay
  - Programmable Forced PWM/Auto PFM/PWM Mode
  - Output OCP, OVP

- **Low Dropout Regulators**
  - One RTC Dedicate LDO
  - Four Low Noise LDOs
  - Two Separate Input Power Supplies
  - 50mV Dropout at 300mA Load

- **System**
  - I2C Bus and User Programmable MTP
  - 2 Times Programmable MTP*
  - Power On/off Control
  - Multi Function pin LDO2/EN1(EN1 input logic level<=3.3V)
  - Power On Reset Output
  - Flexible Power On/off Sequence via MTP(0.5ms/2ms/8ms/16ms time slot selectable)
  - Flexible DC/DC, LDO On/off via MTP
  - ±4kV HBM and ±2kV CDM ESD Rating for all pins

APPLICATIONS

- Automotive Infotainment
- Automotive Video Recorder
- Automotive Display Electronics

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

*Note: *2 Times Programmable MTP only for standard version MPQ7920GRM-0000-AEC1.
TYPICAL APPLICATION

```
VIN1  2.7V-5.5V  VOUT1: 1.375V
      1.35V  1.375V  0.675V  3V

C1    22µF
L1    22µFX2
C6    22µFX2

VIN2  GND2
      1.5µH
L2    22µFX2
C7    22µFX2

VIN3  C2    22µF
      2.2µF
C12   2.2µF
C11   0.675V

VIN4  C3    22µF
      2.2µF
C10   1µF
C15   10µF

AGND

VIN5  2.7V to 5.5V  VOUT5: 3.3V
      2.8V

RSTO

SDA

MPQ7920

MTP-EFUSE SELECTED TABLE BY DEFAULT (MPQ7920GRM-0001-AEC1):

<table>
<thead>
<tr>
<th>OTP Items</th>
<th>Buck1</th>
<th>Buck2</th>
<th>Buck3</th>
<th>Buck4</th>
<th>LDORTC</th>
<th>LDO2</th>
<th>LDO3</th>
<th>LDO4</th>
<th>LDO5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage</td>
<td>1.375V</td>
<td>1.35V</td>
<td>1.375V</td>
<td>0.675V</td>
<td>3V</td>
<td>0.675V</td>
<td>2.5V</td>
<td>2.8V</td>
<td>3.3V</td>
</tr>
<tr>
<td>Initial On/off</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>MODE</td>
<td>Auto PFM/PWM</td>
<td>Auto PFM/PWM</td>
<td>Auto PFM/PWM</td>
<td>Auto PFM/PWM</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power On Delay</td>
<td>1ms</td>
<td>2ms</td>
<td>1ms</td>
<td>2ms</td>
<td>Always ON</td>
<td>2ms</td>
<td>3ms</td>
<td>3ms</td>
<td>3ms</td>
</tr>
<tr>
<td>SOFT START Time</td>
<td>350µs</td>
<td>350µs</td>
<td>350µs</td>
<td>350µs</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic turn-on</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching Frequency</td>
<td>1.65MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PWRON MODE</td>
<td>0(Low)</td>
<td>Level trigger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSTODELAY</td>
<td>10ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buck1 Peak Current Limit</td>
<td>9.3A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buck2 Peak Current Limit</td>
<td>5.2A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buck3 Peak Current Limit</td>
<td>4.6A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buck4 Peak Current Limit</td>
<td>2.8A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I2C SLAVE ADDRESS</td>
<td>0x69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTP Configure Code</td>
<td>0001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```