



MPQ7931

MPSafe™ QM, 5.5V, PMIC

6 Buck Converters

AEC-Q100 Qualified

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

DESCRIPTION

The MPQ7931 device is a Power Management IC designed meet the power management requirements of processors used in various safety-relevant automotive systems.

Six integrated synchronous buck converters can be configured as 3x dual phase or 6x single phase converters. With dynamic voltage scaling, the output voltage of each converter can be changed during normal operation. The PMBus interface with PEC and integrated multi-page OTP memory (MOTP) allows for a high degree of configurability.

Six enable pins are featured allowing each regulator to be sequenced independently for flexible timing control. This allows the device to meet a wide variety sequencing requirements.

To prevent overshoot during start-up, soft-start functionality is featured on each converter and the slew rate is configurable through the MOTP.

2MHz fixed frequency PWM control is used to regulate output voltage, offers fast transient performance, and allows for a large reduction in external inductor and capacitor values. Frequency Spread Spectrum reduces EMI noises. A full protection suite includes UVLO, OCP, UVP, OVP and thermal shutdown.

The MPQ7931 is available in 32 pin QFN (5mmx5mm) package.

APPLICATIONS

- Advanced Driver Assistance Systems
- Surround View System ECU
- ADAS Domain Controller
- Drive Assist ECU

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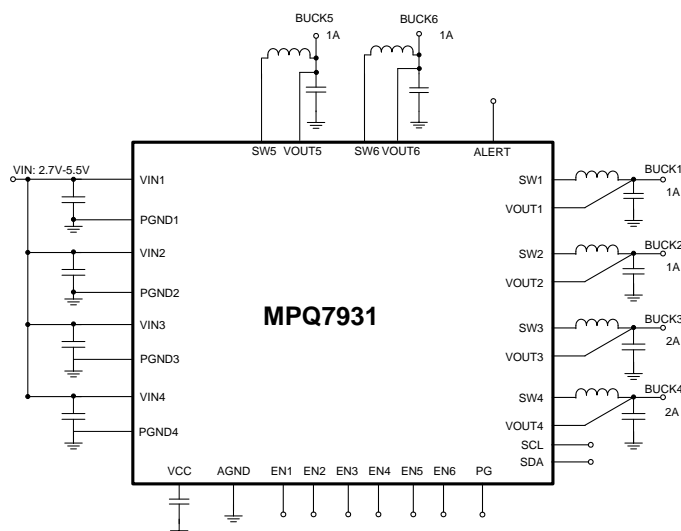
FEATURES

- **Designed for Automotive Applications**
 - Input Voltage range from 2.7V to 5.5V
 - Junction temperature rating of -40°C to +150°C
- **Reduces Board Size and BOM**
 - 2x 2A synchronous buck converters – independent or multiphase operation
 - 2x 1A synchronous buck converters – independent or multiphase operation
 - 2x 1A synchronous buck converters – independent or multiphase operation
 - Integrated and adjustable compensation network for each buck converter
 - Dynamic Voltage Scaling
 - PMBus interface with PEC
- **Optimized for EMC/EMI**
 - 180° phase shift between bucks 1 / 3 / 6 and bucks 2 / 4 / 5
 - 2MHz f_{sw}
 - Frequency Spread Spectrum
- **Additional Features**
 - Multi-Page One-Time Programmable (MOTP) Memory
 - Programmable sequencing
 - Power Good Output
 - ALERT Indicator
 - Hiccup over current protection
 - Hiccup over/under voltage protection
 - TQFN-32 (5mmx5mm) package with wettable flank
 - AEC-Q100 Grade-1





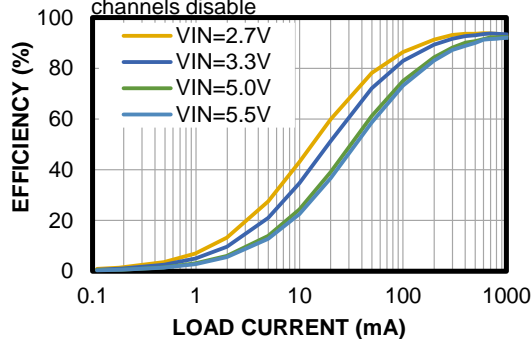
TYPICAL APPLICATION



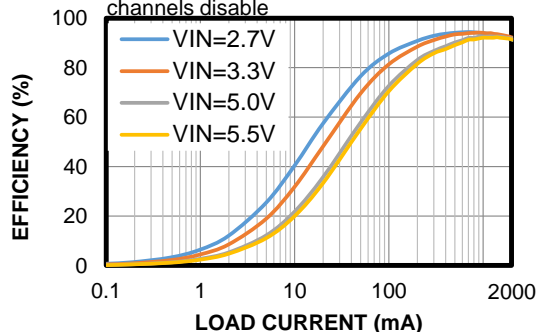
Typical Application Circuit

Efficiency vs. Load Current
(Buck1)

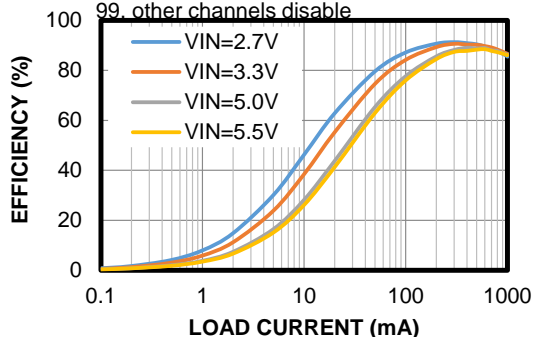
$V_{OUT1}=1.8V$, $f_{SW}=2MHz$, $L1=1.5\mu H$,
 $DCR=23.6m\Omega$, XAL4020-152MEB, other
 channels disable

Efficiency vs. Load Current
(Buck3)

$V_{OUT3}=1.8V$, $f_{SW}=2MHz$, $L3=1.0\mu H$,
 $DCR=14.6m\Omega$, XEL4020-102MEB, other
 channels disable

Efficiency vs. Load Current
(Buck5)

$V_{OUT5}=1.8V$, $f_{SW}=2MHz$, $L5=3.3\mu H$,
 $DCR=105m\Omega$, VCTA32251B-3R3MS6-
 99, other channels disable



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