

FEATURES

- Dual output 2/3/4+1-phase PWM Controller (CHL8212/13/14) and single output 3-phase PWM Controller (CHL8203)
- Easiest layout and fewest pins in the industry
- Footprint compatible with CHL8225 (CHL8213/14) for analog and power signals
- Up to 3 VID select lines for dynamic voltage transitions
- Slow OCP for Thermal Design Current (TDC) protection
- Programmable $I_{CRITICAL}$ signal
- I2C interface for configuration & telemetry
- Pin programmable I2C address (CHL8203/13/14)
- Overclocking support with I2C voltage override and V_{max} setting
- Flexible I2C bus security features
- I2C security enable pin (CHL8203/13/14)
- Independent loop switching frequencies from 200kHz to 1.2MHz per phase
- IR Efficiency Shaping with Dynamic Phase Control (DPC)
- 1-phase & Active Diode Emulation modes for light load efficiency
- IR Adaptive Transient Algorithm (ATA) on both loops minimizes output bulk capacitors and system cost
- Per-Loop Fault Protection: OVP, UVP, OCP
- Thermal Protection (OTP) and VRHOT# flag (CHL8203/13/14)
- Multiple time programmable (MTP) memory for custom configuration
- Compatible with IR ATL and 3.3V tri-state Drivers
- 3.3V +10%/-15% supply voltage; 0°C to 85°C operation
- Pb-Free, RoHS, QFN packages

APPLICATIONS

- Multi-phase GPU Systems
- GDDR Memory

DESCRIPTION

The CHL8212/13/14 are dual-loop digital multi-phase buck controllers and the CHL8203 is a single-loop digital multiphase buck controller designed for GPU voltage regulation. Dynamic voltage control is provided by registers which are programmed through I2C and then selected using a 3-bit parallel bus for fast access.

The CHL8203/12/13/14 include IR Efficiency Shaping Technology to deliver exceptional efficiency at minimum cost across the entire load range. IR Dynamic Phase Control adds/drops active phases based upon load current and can be configured to enter 1-phase operation and diode emulation mode automatically or by command.

IR's unique Adaptive Transient Algorithm (ATA), based on proprietary non-linear digital PWM algorithms, minimizes output bulk capacitors and Multiple Time Programmable (MTP) storage saves pins and enables a small package size. Device configuration and fault parameters are easily defined using the IR Digital Power Design Center (DPDC) GUI and stored in on-chip MTP.

The CHL8203/12/13/14 provides extensive OVP, UVP, OCP and OTP fault protection and the CHL8203/13/14 includes thermistor based temperature sensing with VRHOT signal.

The CHL8203/12/13/14 includes numerous features like register diagnostics for fast design cycles and platform differentiation, truly simplifying VRD design and enabling fastest time-to-market (TTM) with "set-and-forget" methodology.

PIN DIAGRAM

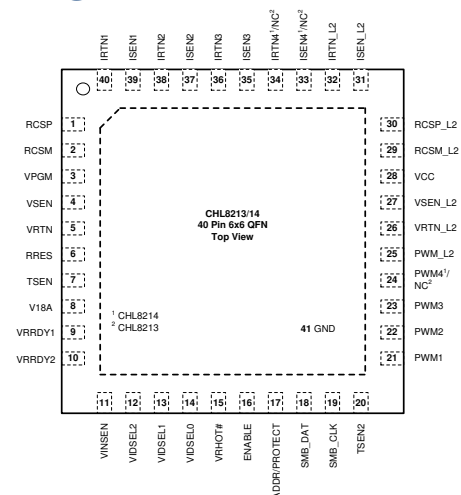
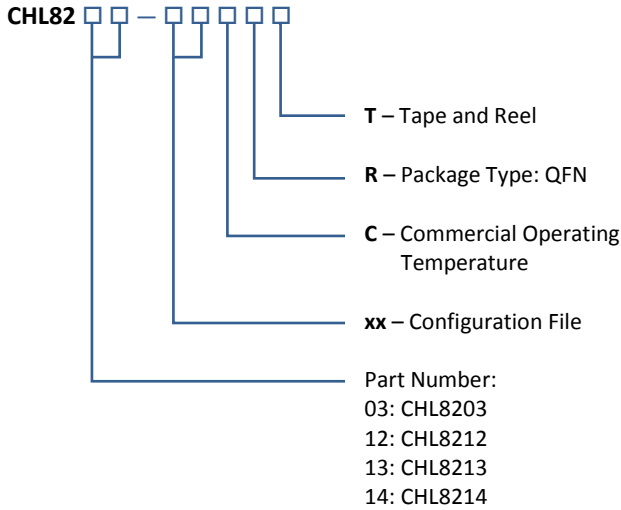


Figure 1: CHL8213/14 Package Top View

ORDERING INFORMATION



| Package | Tape & Reel Qty | Part Number |
|---------|-----------------|----------------------------------|
| QFN | 3000 | CHL8203-00CRT¹ |
| QFN | 3000 | CHL8203-xxCRT² |
| QFN | 3000 | CHL8212-00CRT¹ |
| QFN | 3000 | CHL8212-xxCRT² |
| QFN | 3000 | CHL8213-00CRT¹ |
| QFN | 3000 | CHL8213-xxCRT² |
| QFN | 3000 | CHL8214-00CRT¹ |
| QFN | 3000 | CHL8214-xxCRT² |

Notes:

1. For unprogrammed/default parts, use configuration file 00. Unprogrammed parts will not start up until programmed in order to insure a safe power up.
2. -xx indicates a customer specific configuration file.

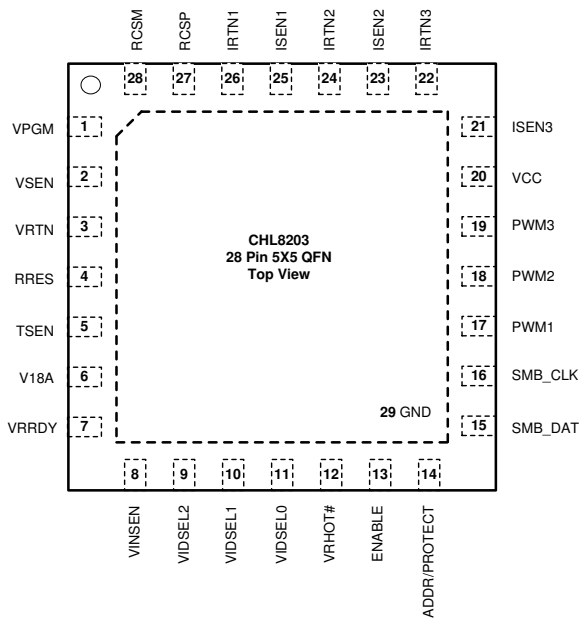


Figure 2: CHL8203 Package Top View

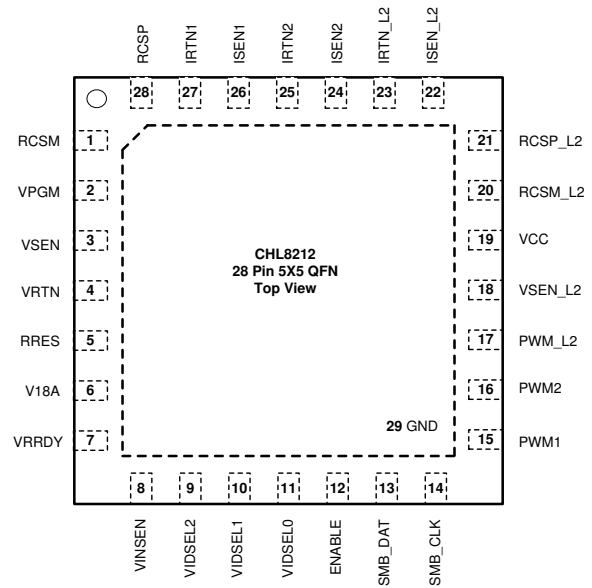


Figure 3: CHL8212 Package Top View