

FAN5031

8-Bit Programmable, 2 to 4 Phase, Synchronous Buck Controller

Features

- Selectable 2, 3, or 4 phase operation at up to 1MHz per phase
- $\pm 7.7\text{mV}$ worst-case differential sensing error over temperature
- Active current balancing between the output phases
- Power good and Crowbar blanking supports on-the-fly VID code changes
- 0.5V to 1.6V output
- Fully compliant to both Intel's VR10 and VR11 specifications
- Selectable VR10 extended (7 bit) and VR11 (8 bit) VID tables
- Programmable soft start ramp
- Programmable short circuit protection and latch-off delay

Applications

- Desktop PC/Server processor power supplies for existing and next generation Intel processors
- VRM modules

Description

The FAN5031 device is a multi-phase buck switching regulator controller, that is optimized to convert a 12V input supply to the processor core voltage required by high performance Intel processors. It has an internal 8-bit DAC that converts a digital voltage identification (VID) code, that is sent from the processor, to set the output voltage between 0.5V and 1.6V in 6.25 mV steps. It outputs a PWM signals to external MOSFET drivers that, in turn, drive the switching power MOSFETs. The switching frequency of the design is easily programmable by a single resistor value and the number of phases can be programmed to support 2, 3, or 4 phase applications.

The FAN5031 also includes programmable no-load offset and droop functions to adjust the output voltage as a function of the load current, as required by the Intel specifications. The FAN5031 also provides an accurate and reliable short circuit protection function with an adjustable over current set-point.

The FAN5031 is specified over the commercial temperature range of 0°C to +85°C and is available in a 40-lead MLP package.

Ordering Information

Part Number	Temperature Range	Package Type	Packing Method	Quantity per Reel
FAN5031MPX*	0°C to 85°C	MLP-40	Tape and Reel	3,000

*Lead free part

FAN5031 Block Diagram

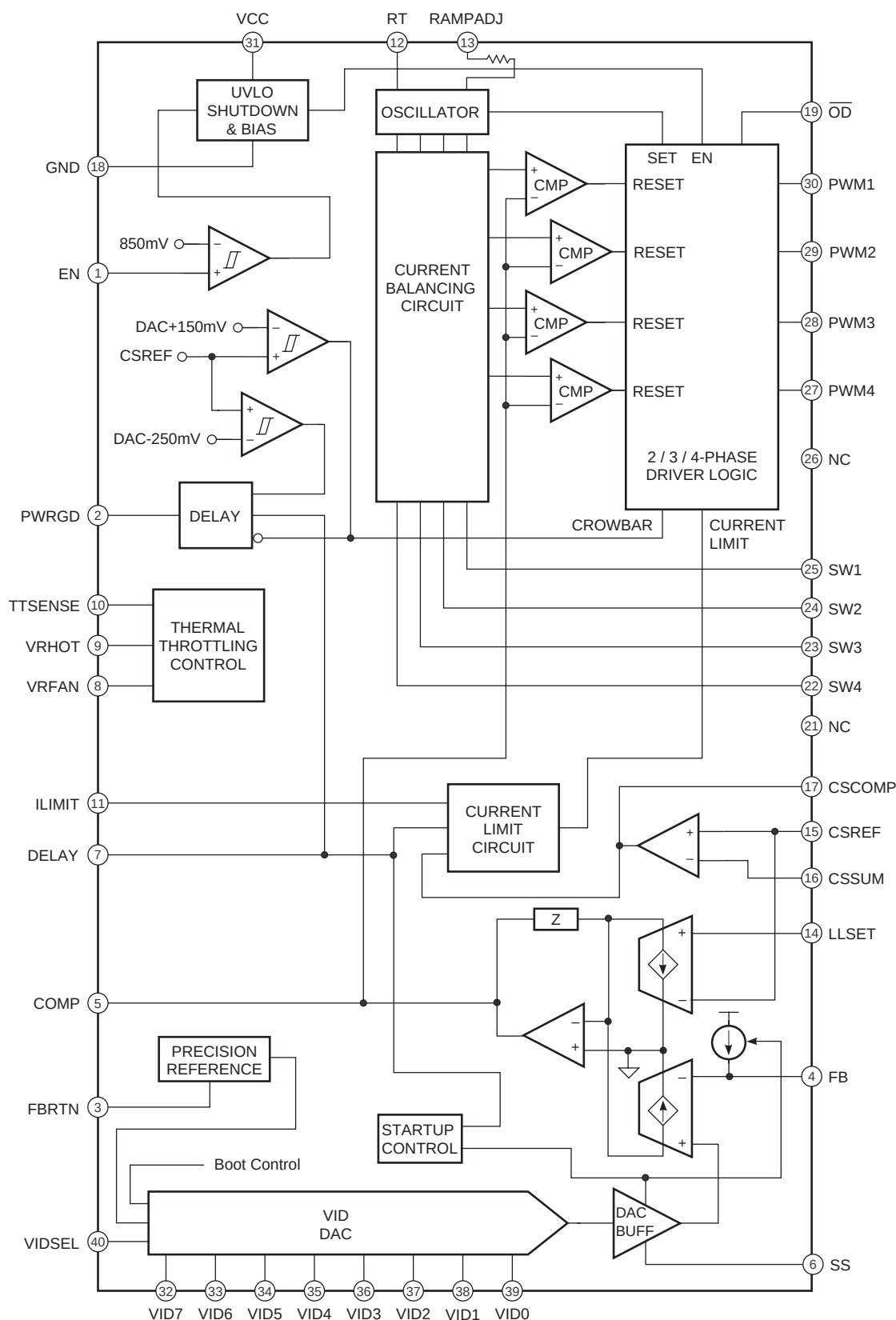


Figure 1. Block Diagram

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE ^x TM	FAST [®]	ISOPLANAR TM	PowerSaver TM	SuperSOT TM -6
ActiveArray TM	FAST ^r TM	LittleFET TM	PowerTrench [®]	SuperSOT TM -8
Bottomless TM	FP ^S TM	MICROCOUPLER TM	QFET [®]	SyncFET TM
Build it Now TM	FRFET TM	MicroFET TM	QS TM	TCM TM
CoolFET TM	GlobalOptoisolator TM	MicroPak TM	QT Optoelectronics TM	TinyLogic [®]
CROSSVOLT TM	GTO TM	MICROWIRE TM	Quiet Series TM	TINYOPTO TM
DOMET TM	HiSeC TM	MSX TM	RapidConfigure TM	TruTranslation TM
EcoSPARK TM	I ² C TM	MSXPro TM	RapidConnect TM	UHC TM
E ² CMOS TM	i-Lo TM	OCX TM	μSerDes TM	UltraFET [®]
EnSigna TM	ImpliedDisconnect TM	OCXPro TM	ScalarPump TM	UniFET TM
FACT TM	IntelliMAX TM	OPTOLOGIC [®]	SILENT SWITCHER [®]	VCX TM
FACT Quiet Series TM		OPTOPLANAR TM	SMART START TM	Wire TM
Across the board. Around the world. TM		PACMAN TM	SPM TM	
The Power Franchise [®]		POP TM	Stealth TM	
Programmable Active Droop TM		Power247 TM	SuperFET TM	
		PowerEdge TM	SuperSOT TM -3	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

Rev. 118