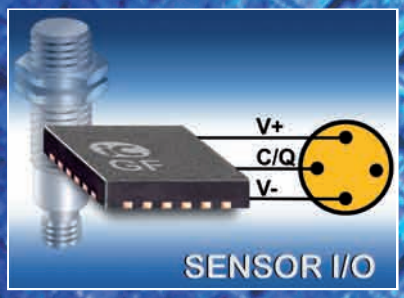
iC-GF

DUAL SENSOR INTERFACE



iC-GF is a monolithic interface iC with two independent switching channels which enables digital sensors to drive peripheral elements, such as programmable logic controllers (PLC) and relays, for example. All functions are controlled either by pins or via SPI interface, with extended functionality and configurability.

The output switches can be configured for push-pull, high-side or low-side operation and share a common tri-state function (separate tri-state switching in SPI mode).

The switches are designed to cope with high driver currents of at least 100 mA, are current limited and also short-circuit-proof in that they shut down with excessive temperature or overload.

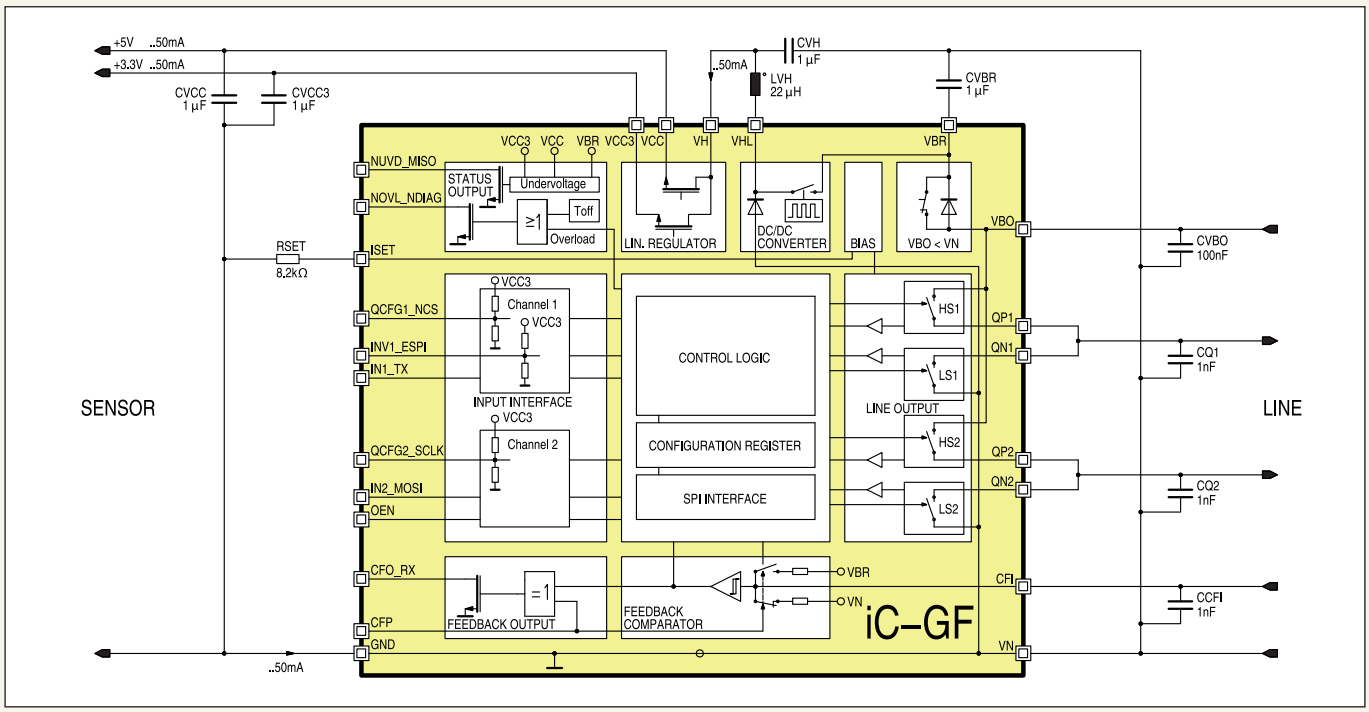
The output current limit can be easily set with a resistor at pin ISET.

Applications

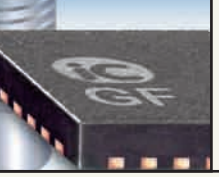
– I/O sensor interface
– Digital sensors
– Light barriers
– Proximity switches

Features

– Dual channel switches, configurable for high-side, low-side and push-pull operation with tri-state function
– Configuration via pins or SPI interface
– Switches are current limited
– Switches, iC supply and feedback channel are protected against reverse polarity
– Output current of up to 150 mA per channel
– Parallel connection of both channels possible
– The channels can be inverted for antivalent output
– Sensor communication request function
– Wide supply voltage range of 9 to 30 V
– Sensor parametrisation via a feedback channel (up to 30 V)
– Switching converters and regulators for 3.3 and 5 V voltage generation (50 mA max.)
– Error signalling at two open-collector outputs with excess temperature, overload and undervoltage
– Driver shutdown on all errors



Am Kuemmerling 18 • D-55294 Bodenheim, Germany
Tel. +49 61 35/92 92-300 • Fax +49 61 35/92 92-192 • http://www.ichaus.com



iC-GF DUAL SENSOR INTERFACE

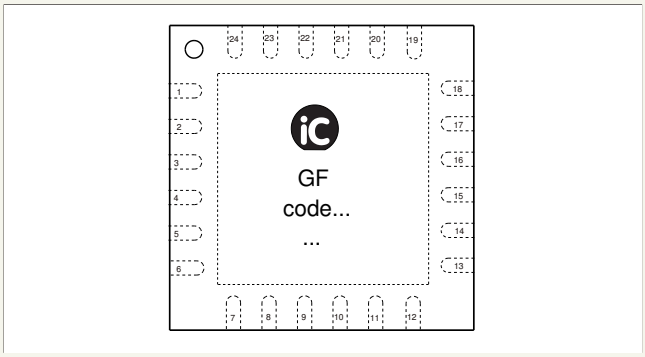
The protective overload feature is accomplished in a way so that capacitive loads can be switched with low repeat rates without the protective circuitry cutting in.
In the event of excess temperature an error message is generated immediately.

Errors are signalled by two open-collector outputs: NOVL (for excess temperature and overloads) and NUVD (for low voltage at VBR or VCC resp. VCC3).
The output switches are shut down with all types of errors.

To avoid error signalling during power-up, the output switches remain at high impedance for ca. 50 ms.

In SPI mode, the chip acts as an SPI slave and allows function configuration via register access.
It also features a diagnostic register and supports *communication requests* at pin CFI, which generate interrupt signals at pin NDIAG.

Pin Configuration QFN24 4 mm x 4 mm



The pins on the 24 V line side of the sensor interface (VBO, QP1, QN1, QP2, QN2, VN and CFI) are protected against reverse polarity. This makes any external reverse polarity protection diodes superfluous.

iC-GF features an integrated switching converter which generates voltages VCC (5 V) and VCC3 (3.3 V) with the aid of two downstream linear regulators. For *medium* currents the inductor may as well be replaced by a resistor (e.g. 170 Ω), resulting though in a considerably lesser efficiency. If only a low current is required inductor LVH may be omitted completely; the linear regulators are then powered directly by VBR.

The switching regulator comes equipped with a spread spectrum oscillator to reduce interferences.

Input INV1 permits the input signal at channel 1 (IN1) to be inverted and if left unconnected, switches the chip into SPI mode.

The connected sensor can be parametrised using the feedback channel with a high voltage input (CFI → CFO).

Key Specifications

General	
Permissible Supply Voltage (Referenced to VN)	9 to 30 V
Supply Current in VBO (No load, VH conected to VBR, I(QP1) = I(QP2) = 0, QPx switched on)	4.5 mA max.

Switch QN1, QN2, QP1, QP2	
Saturation Voltage at QN1, QN2, QP1, QP2 vs. VN RSET = 5.1 kΩ I() = 100 mA I() = 50 mA I() = 10 mA	 1.2 V max. 0.65 V max. 0.3 V max.
Short-Circuit Current in QN1, QN2 RSET = 8.2 kΩ RSET = 5.1 kΩ	 100 to 160 mA 160 to 260 mA
Short-Circuit Current in QP1, QP2 RSET = 8.2 kΩ RSET = 5.1 kΩ	 100 to 180 mA 160 to 310 mA
Slew Rate (switch off → on) VBO = 30 V, Cl = 2.2 nF	 45 V/µs max.

Pin Functions

No.	Name	Function
1	ISET	Reference Current for current limitation of driver outputs
2	INV1 ESPI	Inverting Input Channel 1 Enable SPI (pin open)
3	IN1 TX	Input Channel 1 Transmission Input (SPI mode)
4	QCFG1 NCS	Configuration Input Channel 1 Chip Select (SPI mode)
5	QCFG2 SCLK	Configuration Input Channel 2 Serial Clock (SPI mode)
6	IN2 MOSI	Input Channel 2 Master Output Slave Input (SPI mode)
7	OEN	Output Enable Input
8	NOVL NDIAG	Overload Error Output Diagnosis Output (SPI mode)
9	NUVD MISO	Undervoltage Error Output Master Input Slave Output (SPI mode)
10	CFO RX	Feedback Channel Output Transmission Output (SPI mode)
11	CFP	Configuration Input Feedback Channel
12	CFI	Feedback Channel Input
13	QP2	High Side Switch Output Channel 2
14	QN2	Low Side Switch Output Channel 2
15	VN	Ground
16	QN1	Low Side Switch Output Channel 1
17	QP1	High Side Switch Output Channel 1
18	VBO	Power Supply
19	VBR	Power Supply for switching converter
20	VHL	Inductor Switching Converter
21	VH	Input Linear Regulators
22	VCC	5 V Sensor Supply Output
23	VCC3	3.3 V Sensor Supply Output
24	GND	Sensor Ground