



SILICON LABORATORIES

Si3400

FULLY-INTEGRATED 802.3AF-COMPLIANT PD INTERFACE AND SWITCHING REGULATOR

Features

- Highly-integrated IC enables compact solution footprint
 - Minimal external components
 - Integrated diode bridges and transient surge suppressor
 - Integrated switching regulator controller with on-chip power FET
 - Integrated dual current-limited hotswap switch
- Supports non-isolated and isolated switching topologies
- ④ Comprehensive protection circuitry
 - ⌘ Transient overvoltage protection
 - ⌘ Undervoltage lockout
 - ⌘ Early power-loss indicator
 - ⌘ Thermal shutdown protection
 - ⌘ Foldback current limiting
- ④ Programmable classification circuit
- ④ IEEE 802.3af standard compliant solution with pre-standard PoE support
- ④ Low-profile 5 x 5 mm 20-pin QFN
- ④ Pb-Free and RoHS-compliant

Applications

- Voice over IP Telephones and Adapters
- Wireless Access Points
- Security Cameras
- ④ Point-of-Sale Terminals
- ④ Internet Appliances
- ④ Network Devices

Description

The Si3400 integrates all power management and control functions required in a power over Ethernet (PoE) powered device (PD) application. The Si3400 converts the high voltage supplied over the 10/100/1000BASE-T Ethernet connection into a regulated low-voltage output supply. The Si3400's optimized architecture minimizes the solution footprint, reduces the external BOM cost, and enables the use of low-cost external components while maintaining high performance. The Si3400 integrates the required diode bridges and transient surge suppressor thus enabling direct connection of the IC to the Ethernet RJ-45 connector. The switching power FET and all associated functions are also integrated. The integrated switching regulator supports isolated (flyback) and non-isolated (buck) converter topologies. The Si3400 supports IEEE 802.3af-2003 (future instances referred to as 802.3af) compliant solutions, as well as pre-standard products, all in a single IC.

Standard external resistors connected to the Si3400 provide the proper 802.3af signatures for the detection function and programming of the classification mode. Startup circuits ensure well-controlled initial operation of both the hotswap switch and the voltage regulator. The Si3400 is available in a low-profile, 20-pin, 5 x 5 mm QFN package.

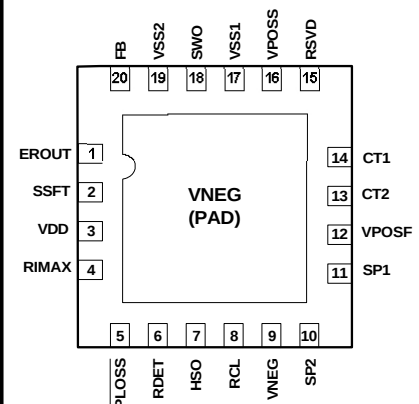


Ordering Information:

See Ordering Guide on page 18.

Pin Assignments

5 x 5 mm QFN
(top view)



Functional Block Diagram

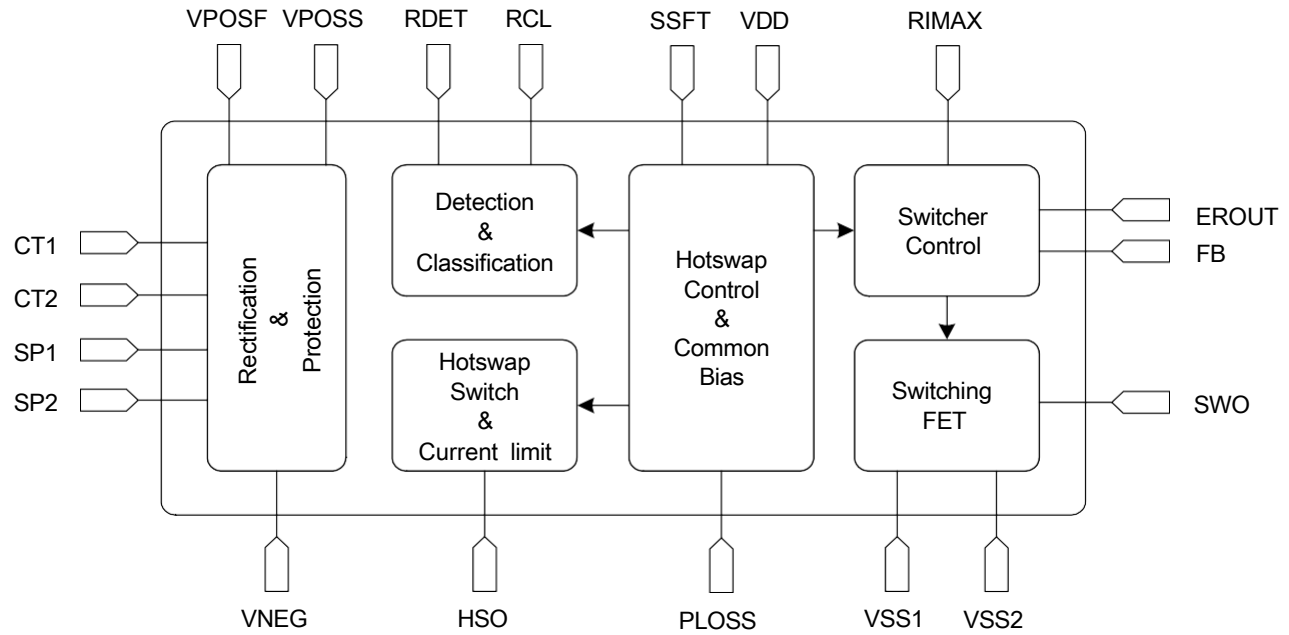


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1. Electrical Specifications

Table 1. Absolute Maximum Ratings (DC)¹

Type	Description	Min	Max	Unit
Voltage	CT1 to CT2	–60	60	V
	SP1 to SP2	–60	60	
	VPOS ²	–0.3	60	
	HSO	–0.3	60	
	VSS1 or VSS2	–0.3	60	
	SWO	–0.3	60	
	PLOSS to VPOS ²	–60	0.3	
	RDET	–0.3	60	
	RCL	–0.3	5	
	SSFT to VPOS ²	–5	0.3	
	EROUT to VSS1 or VSS2	–0.3	VDD + 0.3	
	FB to VPOS	–5	0.3	
	RIMAX to VSS1 or VSS2	–0.3	VDD + 0.3	
	VSS1 to VSS2	–0.3	0.3	
	VDD to VSS1 or VSS2	–0.3	5	
Current	RCL	0	100	mA
	RDET	0	1	
	CT1, CT2, SP1, SP2	–400	400	
	VPOS ²	–400	400	
	HSO	0	400	
	PLOSS	–0.5	0.5	
	VDD	0	2	
	SWO	0	400	
	VSS1 or VSS2	–400	0	
Ambient Temperature	Storage	–65	150	°C
	Operating	–40	85	

Notes:

1. Unless otherwise noted, all voltages referenced to VNEG. Permanent device damage may occur if the maximum ratings are exceeded. Functional operation should be restricted to those conditions specified in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may adversely affect device reliability.
2. VPOS is equal to VPOSF and VPOSS tied together for test condition purposes.

Table 2. Absolute Maximum Ratings (Transient)¹

Transient surge defined in IEC60060 as a 1000 V impulse of either polarity applied across CT1–CT2 or SP1–SP2. The shape of the impulse shall have a 300 ns full rise time and a 50 μ s half fall time, with 201 Ω source impedance.

Type	Description	Min	Max	Unit
Voltage	CT1 to CT2	–82	82	V
	SP1 to SP2	–82	82	
	VPOS ²	–0.7	80	
	HSO	–0.7	80	
	VSS1 or VSS2	–0.7	80	
	SWO	–0.7	80	
	PLOSS to VPOS ²	–80	0.7	
	RDET	–0.7	80	
Current	CT1, CT2, SP1, SP2	–5	5	A
	VPOS ²	–5	5	
ESD	HBM, all pins	2	—	kV
	CDM, all pins	2	—	

Notes:

1. Unless otherwise noted, all voltages referenced to VNEG. Permanent device damage may occur if the above maximum ratings are exceeded. Functional operation should be restricted to those conditions specified in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may adversely affect device reliability.
2. VPOS is equal to VPOSF and VPOSS tied together for test condition purposes.

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