

Over Voltage and Adjustable Current Protector with Fault Report

Description

SA8204 can disconnect the systems from its output pin (OUT) in case wrong input operating conditions are detected. The system is positive overvoltage protected up to 36V.

The internal over voltage thresholds (OVLO) is 6.1V and internal over current thresholds (OCP) is adjustable by an external resistor from 100mA to 2.5A.

SA8204 also has ENB function to turn on or off OUT, It also integrate internal over temperature protect (OTSD) function and it can monitor chip temperature to protect the device.

The device is packaged in advanced full-Green Packaging.

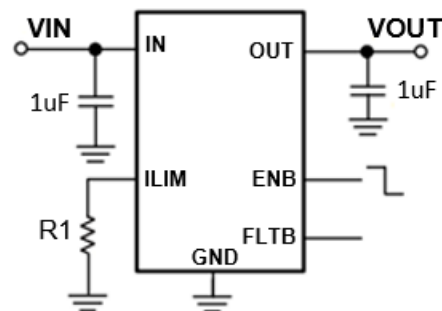
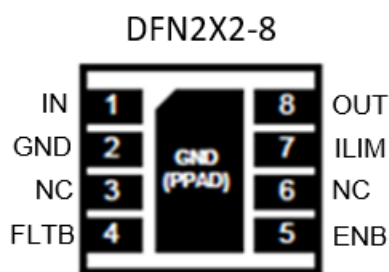
Features

- Typical Ron: 120mΩ@1.0A
- VIN Operating Range: 2.5 to 36V
- Internal Overvoltage Lockout: 6.1V
- Adjustable Current Limited
- OVP Response time: < 500ns
- Output Discharge
- Startup Debounce Time: 8ms
- Output Power on time: 8ms
- Internal OTSD Protection
- ENB Pin Control
- Fault report function
- DFN2X2-8 Package

Applications

- GPS
- MID
- SLR Digital Cameras
- Industrial Handheld and Enterprise Equipment

SA8204 Package & Simplified Schematic

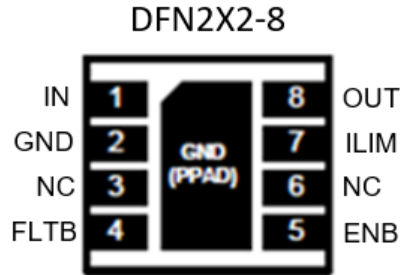


Device Information

Part No.	Package	Quality	Operation Temp.
SA8204	DFN2X2-8	3000	-40~85 °C

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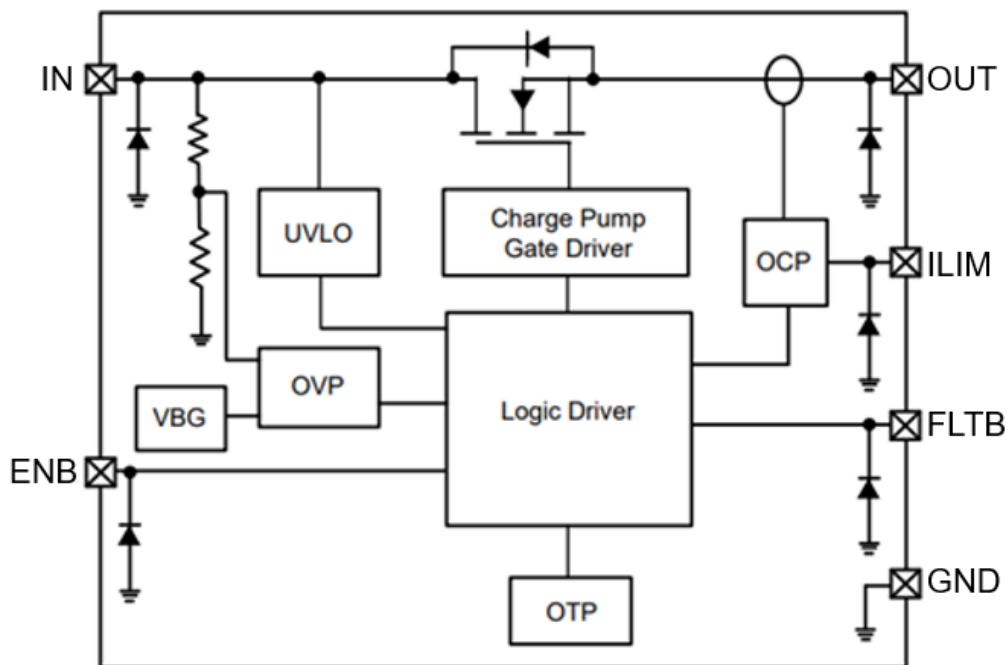
Pin Descriptions



NAME	DFN2X2-8	TYPE	DESCRIPTION
IN	1	P	Input pin, connect to AC adaptor or VBUS. A 1uF low ESR ceramic capacitor or larger must be connected as close as to this pin. It is recommended to use 50V capacitor or according to application.
GND	2	P	Power ground
NC	3,6	NC	No Connection
FLT B	4	O	Open drain output, FLT B will trigger at OVP, OCP and OTSD status
ENB	5	I	Chip enable pin, Active Low
ILIM	7	I	Current Program pin, Connection a resistor to ground
OUT	8	O	Output pin, Connect to load.

(1) Directions: I = input, O = output, OZ = tri-state output, OD = open-drain output, IO = input/output

Function Block Diagram



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Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$)

Parameter		Min.	Max.	Unit
Input voltage (IN pin)	VIN	-0.3	36	V
Output voltage (OUT pin)	VOUT	-0.3	7.0	V
Power dissipation	P _D		0.5	W
Thermal resistance	SOT23-6 θ_{JA}	260		$^{\circ}\text{C/W}$
	DFN2X2-8 θ_{JA}	50		$^{\circ}\text{C/W}$
ESD(HBM)		4.0		kV
Operation temp.	T _J	-40	150	$^{\circ}\text{C}$
Storage temp.	T _{stg}	-65	150	$^{\circ}\text{C}$

Recommended operating conditions ($T_A=25^{\circ}\text{C}$)

Parameter		Min.	Max.	Unit
Input voltage (IN pin)	VIN	3.0	28.0	V
Output voltage (OUT pin)	VOUT	0	5.5	V
Output Continuous Current	I _{OUT}	0	1.5*	A

Notes: * Using 25mm² FR4 Signal layer PCB (1 oz) under VM=5.0V test.

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Electrical Characteristics ($V_{IN}=5V$, $T_A=25\text{ }^{\circ}C$, $R_{LOAD}=20\Omega$)

over operating free-air temperature range (unless otherwise noted)

Parameter		Test Condition	Min.	Typ.	Max.	Unit
DC characteristics and Power-ON-Reset						
VIN operating voltage	V_{IN}		2.5		36	V
VIN operating supply current	I_{VIN_ON}	$V_{IN}=5V$		160	250	μA
VIN-to-VOUT ON resistance	R_{ON}	$V_{IN}=5V$, $I_{OUT}=0.1A$		110		$m\Omega$
		$V_{IN}=5V$, $I_{OUT}=1.0A$		120		$m\Omega$
Output discharge resistance	R_{DIS}			500		Ω
VIN undervoltage lockout	V_{UVLO_R}	VIN rising		2.20		V
	V_{UVLO_F}	VIN falling		1.90		V
Output power on time	T_{ON}	VIN = 0 -> 5V to output ON		8		ms
Input Over-Voltage Protection (OVP)						
VIN OVLO Protection	V_{OVLO_R}		5.8	6.1	6.4	V
Input low level voltage	V_{OVLO_HYS}			150		mV
OVP active time	T_{OVP}	VIN = 5 -> 10V			500	ns
OVP recovery time	T_{ON_OVP}	VIN = 10 -> 5V to output ON		8		ms
Input Over-Current-Protection (OCP)						
OCP threshold	I_{OCP}	$R_{ILIM}=40.2k$		2.00		A
		$R_{ILIM}=51k$		1.55		A
		$R_{ILIM}=120k$		0.60		A
		$R_{ILIM}=390k$		0.11		A
OCP Active time	T_{OCP}			200		μs
ILIM Voltage	V_{ILIM}			0.8		V
Over-Temperature-Protection (OTP)						
OTP threshold	T_{OTP}			165		$^{\circ}C$
OTP threshold hysteresis	T_{OTP_HYS}			40		$^{\circ}C$

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Functional Description

The OVP switch with overvoltage protection feature a low 120mΩ (typical) on-resistance (RON) internal FET and protect low-voltage systems against voltage faults up to 36VDC. If the input voltage (VIN) exceeds 6.1V, or input current exceeds 2.5A, the internal FET is quickly turned off to prevent damage to the protected downstream components.

The internal FET turns off when the junction temperature exceeds +165°C (TYP.). The device exits thermal shutdown after the junction temperature cools by 40°C (TYP.).

Input Capacitor

To limit the voltage drop on the input supply caused by transient inrush current when the switch turns on into a discharged load capacitor or short-circuit, a capacitor 1μF or larger must be placed between the VIN and GND pins.

Output Capacitor

A 1μF or larger capacitor should be placed between the OUT and GND pins.

Under-voltage Lockout (UVLO)

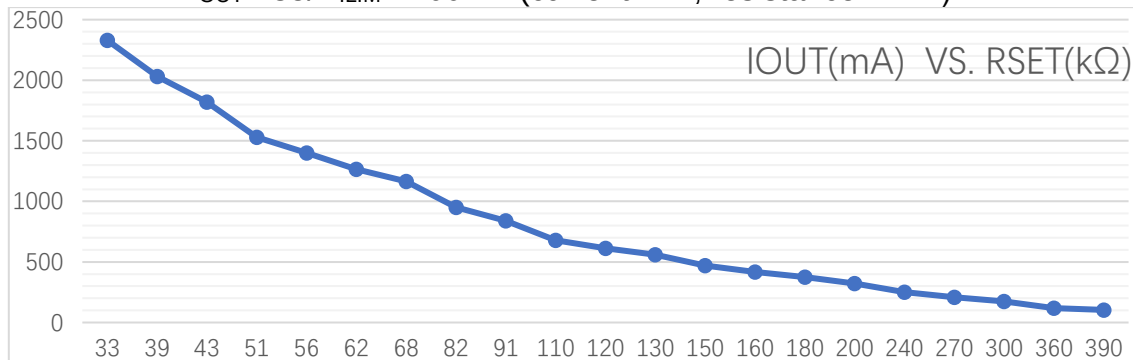
The under-voltage lockout (UVLO) circuit disables the power switch until the input voltage reaches the UVLO turn on threshold. Built-in hysteresis prevents unwanted on and off cycling because of input voltage droop during turn on.

Over Current Protection (OCP)

If the load current rises to the OCP threshold, the device will cut off the output voltage. It takes 8ms after power on for OCP begins to detect. After Power Good, the OCP active time is dozens to hundreds microseconds. SA8204 will latch OUT to OFF status when OCP is trigger and need to re-enable ENB or power up to recovery normal operation.

The OCP threshold is calculated by the equation:

$$I_{OUT} = 85 / R_{ILIM} - 100\text{mA (current in A, resistance in k}\Omega\text{)}$$

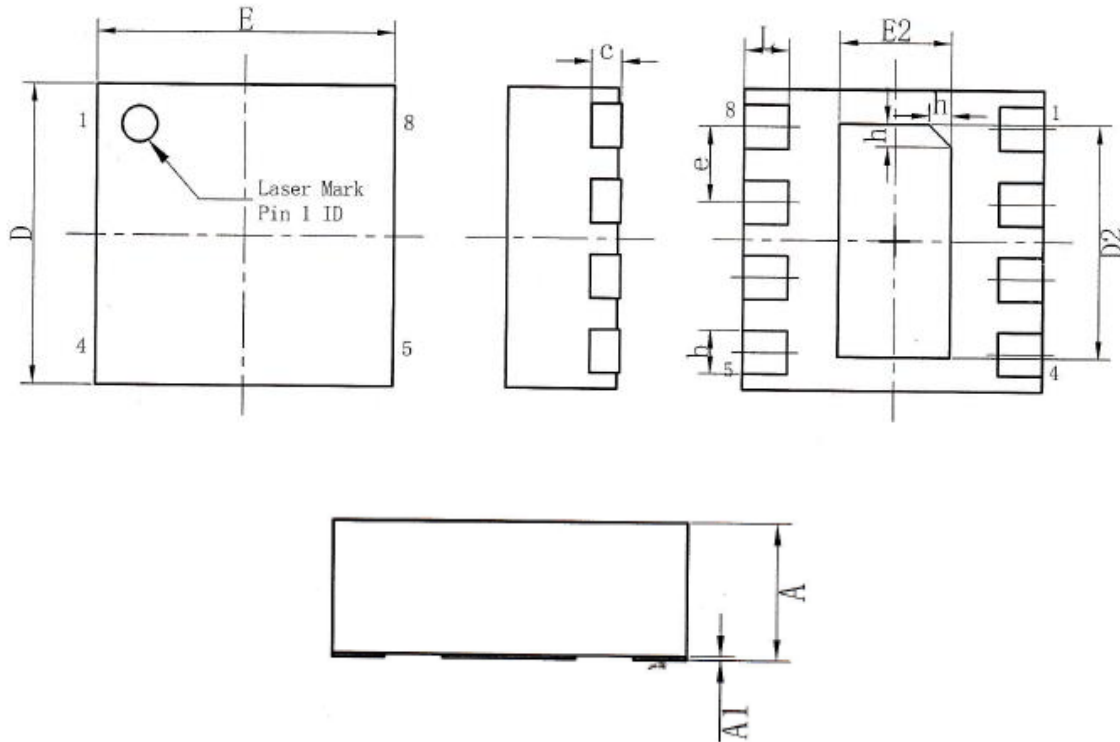


FAULT Condition

FLT_B is open drain output and need to connection a resistor to VBAT. when the input pass FET has been turned off due to input over-voltage or overload current protection, an over-temperature condition, the FLT_B will pull down. FLT_B is high impedance during normal operation.

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Package DFN2X2



标注	尺寸	最小 (mm)	标准 (mm)	最大 (mm)	标注	尺寸	最小 (mm)	标准 (mm)	最大 (mm)
A		0.70	0.75	0.80	e		0.50BSC		
A1		0.00	0.02	0.05	E		1.95	2.00	2.05
b		0.18	0.29	0.30	E2		0.70	0.75	0.80
c		0.20REF			L		0.25	0.30	0.35
D		1.95	2.00	2.05	h		0.10	0.15	0.20
D2		1.50	1.55	1.60	L/F载体尺寸 (mm): 1.00*1.80				

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