

Over Voltage and Over Current Protector

Description

SA8200 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 2.5A.

SA8200 also has internal over temperature protect (OTP) function and it can monitor chip temperature to protect the device.

The device is packaged in advanced full-Green Packaging.

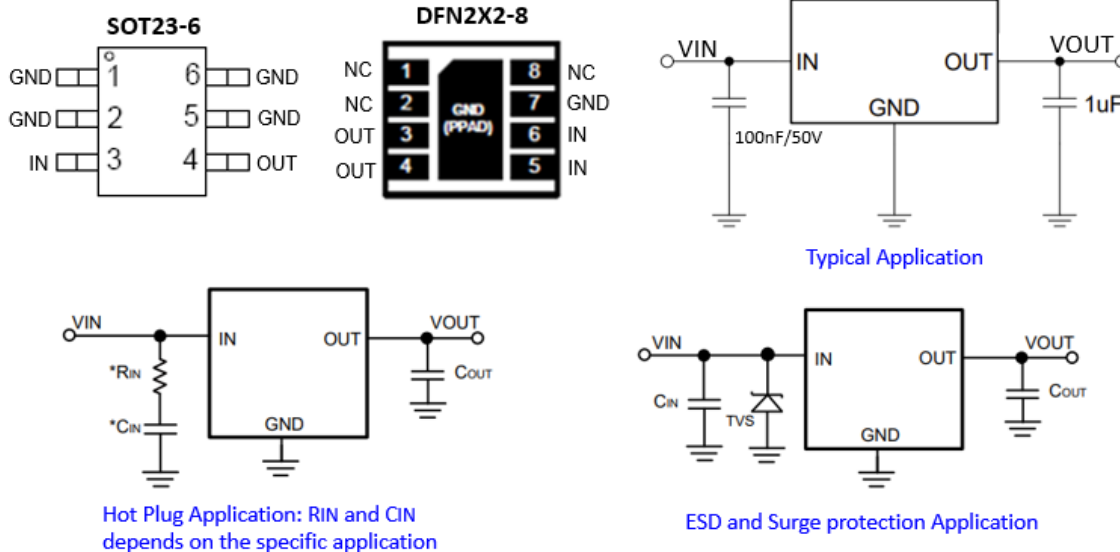
Features

- Typical Ron: 130mΩ@1.5A
- VIN Operating Range: 2.5 to 36V
- Internal Overvoltage Lockout: 6.1V
- Internal Overcurrent Lockout: 2.5A
- OVP Response time: 50ns (typ.)
- Output Discharge
- Startup Debounce Time: 8ms
- Output Power on time: 8ms
- Internal OTSD Protection
- SOT23-6, DFN2X2-8 Package

Applications

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

SA8200 Package & Simplified Schematic

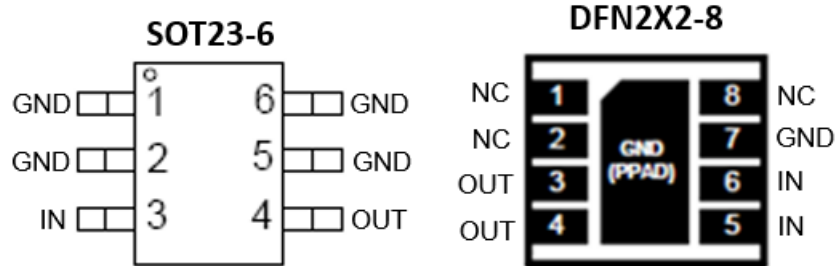


Device Information

Part No.	Package	Quality	Operation Temp.
SA8200	SOT23-6	3000	-40~85 °C
SA8200D	DFN2X2-8	3000	-40~85 °C

Over Voltage and Over Current Protector

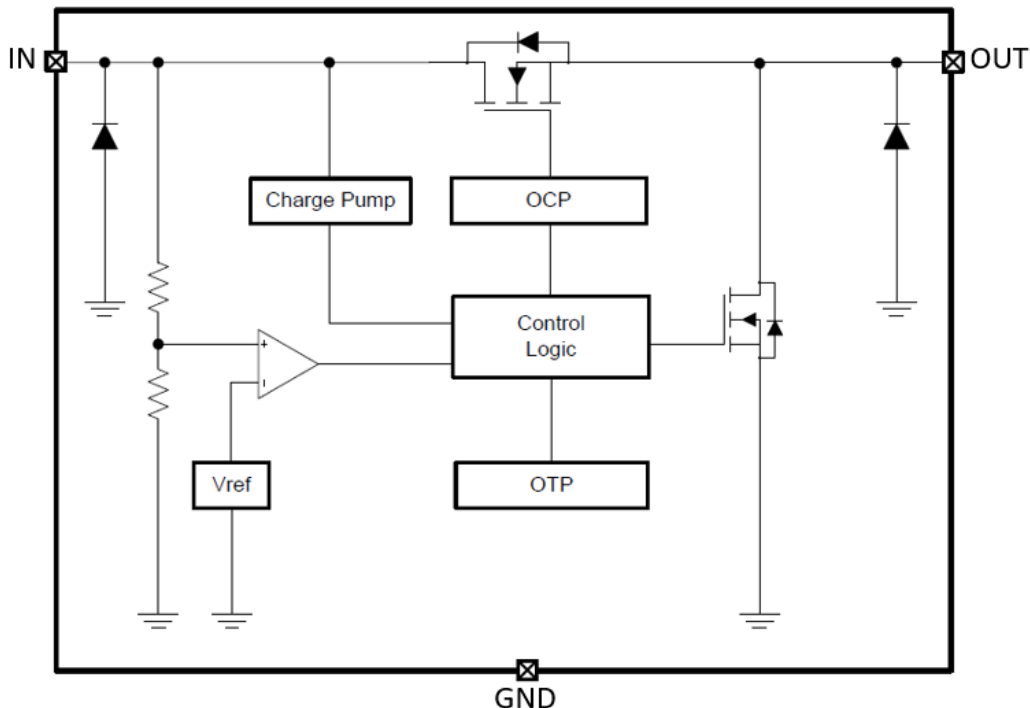
Pin Descriptions



NAME	SOT23-6	DFN2X2-8	TYPE	DESCRIPTION
GND	1,2,5,6	7	P	Power ground
IN	3	5,6	P	Input pin, connect to AC adaptor or VBUS. A 0.1uF 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.
OUT	4	3,4	O	Output pin, Connect to load.
NC		1,2,8	NC	No Connection

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

Function Block Diagram



Over Voltage and Over Current Protector

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		$^{\circ}\text{C/W}$
Thermal resistance	DFN2X2-8 θ_{JA}	160		$^{\circ}\text{C/W}$
ESD(HBM)		2.0		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		50		ns
OVP recovery time	T_{ON_OVP}	VIN = 10 -> 5V to output ON		8		ms
Input Over-Current-Protection (OCP)						
OCP threshold	I_{OCP}		2.0			A
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

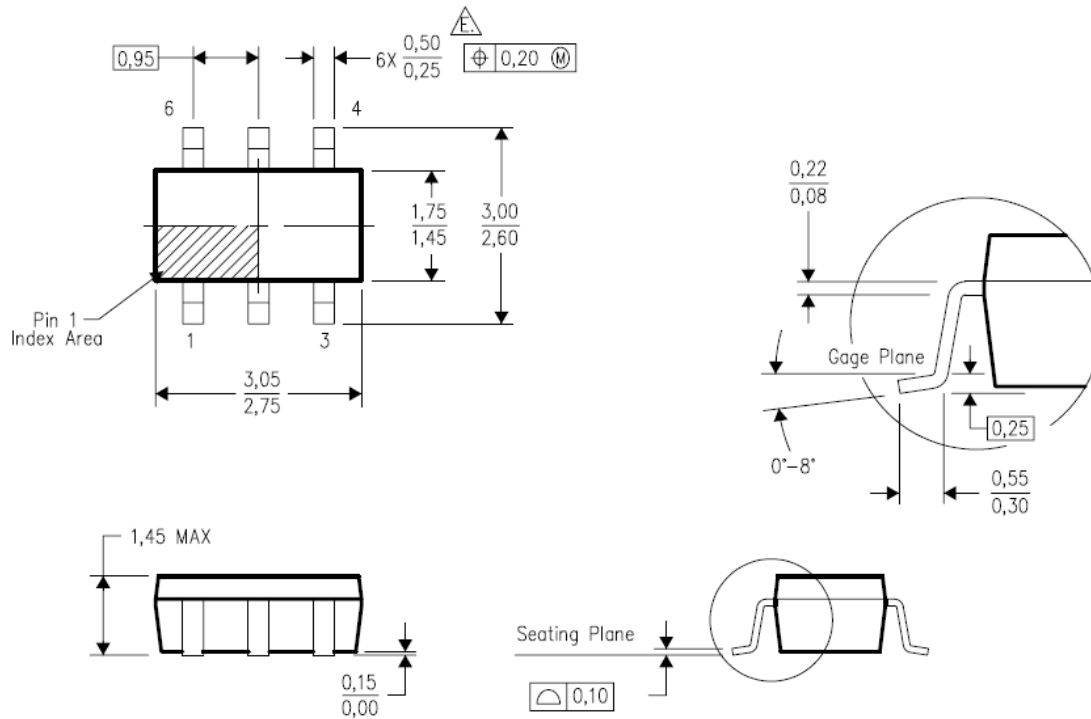
To limit the voltage drop on the input supply caused by transient inrush current when the switch turns on into a discharged load capacitor or short-circuit, a capacitor 1μF or larger must be placed between the VIN and GND pins.

Output Capacitor

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

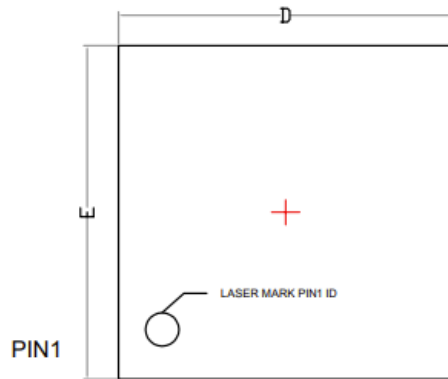
Over Voltage and Over Current Protector

Package
SOT23-6

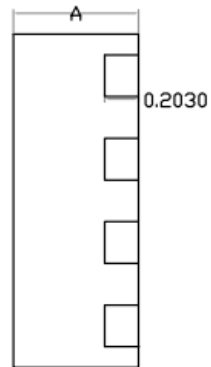


Over Voltage and Over Current Protector

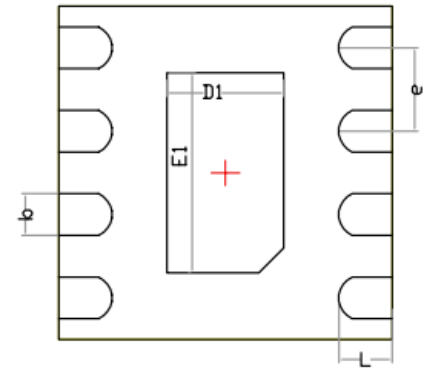
DFN2X2-8



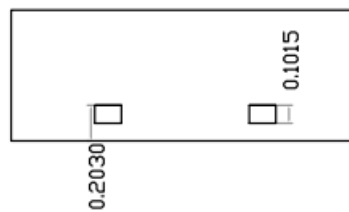
TOP VIEW



SIDE VIEW



BOTTOM VIEW



SIDE VIEW

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.20	0.25	0.30
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D1	0.60	0.70	0.80
E1	1.10	1.20	1.30
e	0.500 REF.		
L	0.27	0.32	0.37

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