

**FEATURES**

- Over-voltage protection (OVP) for 3.3V, 5V and 12V
- Under-voltage sense (UVS) and protection (UVP) for 3.3V, 5V
- Open drain output for PGO and FPO pins
- 300mS power good delay
- 75mS turn on delay for 3.3V and 5V
- 2.8mS PSON control to FPO turn-off delay
- 38mS /38mS PSON control De-bounce
- 350uS width noise deglitches
- 2mS UVP De-bounce time
- 1mS UVS De-bounce time
- No lockup during the fast AC power on/off
- Brownout protection function for 3.3V and 5V
- Wide supply voltage range from 4V to 15V

**DESCRIPTION**

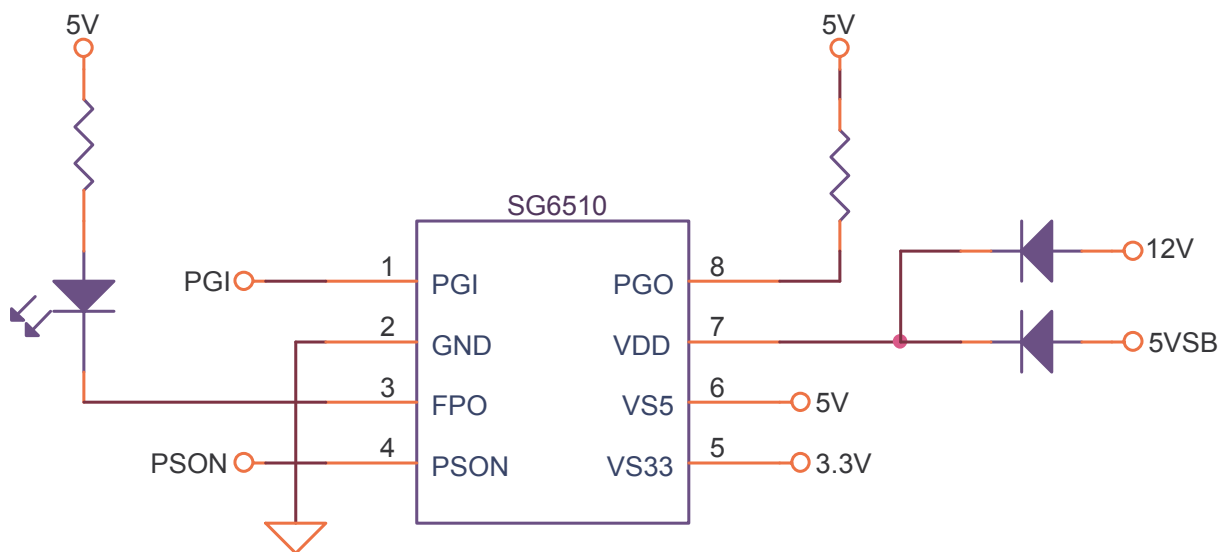
SG6510 is designed to provide the voltage supervisor function, remote on/off PSON function, power good (PGO) indicator function, and fault protection (FPO) function for switching power systems.

For supervisor function, it provides the over voltage protection (OVP) monitoring for 3.3V, 5V and 12V (12V

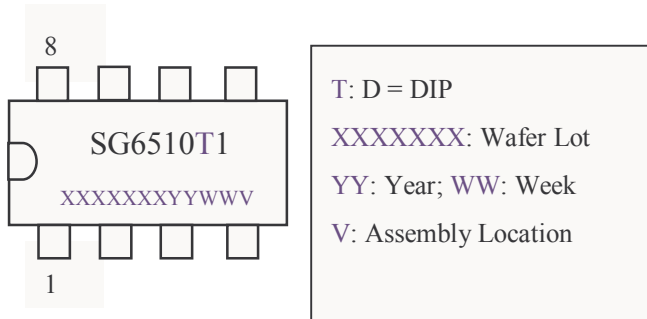
via VDD pin); under voltage sense (UVS) monitoring for 3.3V and 5V; and under voltage protection (UVP) monitoring for 3.3V and 5V. When 3.3V or 5V voltage is decreasing to 2.8V and 4.2V respectively, the under voltage sense (UVS) function will be enabled to reset the PGO signal from high to low. If 3.3V or 5V voltage is further decreasing to 2.5V and 3.6V respectively, FPO will be set to high to turn off the PWM controller IC. To achieve better immunity for lighting surge glitch and to prevent accidental power shut down during dynamic loading condition, the de-bounce time for UVP and UVS is 2mS/1mS respectively. The deglitch time for OVP is 75uS for better noise immunity. During AC sag or brownout situation, the UVP functions still can be enabled to protect power supply in case of output short circuit.

The power supply is turned on after 38mS de-bounce time when PSON signal is set from high to low. To turn off power supply, PSON signal is set from low to high and the de-bounce time is 38mS. The PGI circuitry provides a sufficient power-down warning signal for PGO. When PGI input is lower than the internal 1.2V reference voltage, after 350uS de-bounce time, the PGO signal is pulled low.

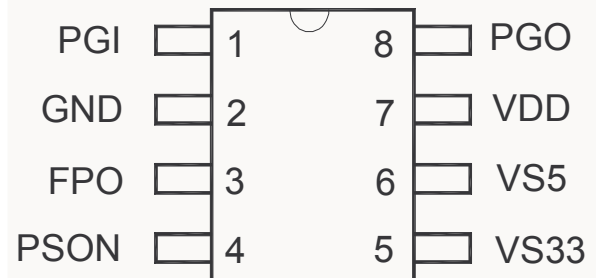
**TYPICAL APPLICATION**



**MARKING INFORMATION**



**PIN CONFIGURATION**



**ORDERING INFORMATION**

Part Number	Package Type
SG6510D1	8 pins DIP Plastic

**PIN DESCRIPTIONS**

Pin No.	Pin Name	Type	Description
1	PGI	Analog input	Power good input. For ATX SMPS, it detects main AC voltage under-voltage and/or failure.
2	GND	Supply	Ground.
3	FPO	Logic output	Fault protection output (invert). Output signal to control the PWM IC. For example it controls the PWM IC of primary side through an opto-coupler. When FPO is low, the main SMPS is operational.
4	PSON	Logic input	Remote On/Off logic input from CPU or main-board. Turn on/off the PWM output after 38mS / 38mS delay.
5	VS33	Analog input	3.3 V over/under-voltage control sense input.
6	VS5	Analog input	5 V over/under-voltage control sense input.
7	VDD	Supply	Supply voltage. 4V ~ 15V. For ATX SMPS, it is connected to 5V-standby and 12V through diodes respectively.
8	PGO	Logic output	Power good logic output, 0 or 1(open-drain). Power good=1 means that the power is good for operation. The power good delay is 300mS.

**FUNCTION TABLE**

PGI	PERSON	UV Sense (3.3V or 5V)	UV Protection (3.3V or 5V)	OV Protection	FPO	PGO
PGI<1.2V	L	No	No	No	L	L
PGI<1.2V	L	Yes	No	No	L	L
PGI<1.2V	L	No	Yes	No	L	L
PGI<1.2V	L	No	No	Yes	H	L
PGI<1.2V	L	Yes	Yes	No	L	L
PGI<1.2V	L	Yes	No	Yes	H	L
PGI<1.2V	L	No	Yes	Yes	H	L
PGI<1.2V	L	Yes	Yes	Yes	H	L
PGI>1.2V	L	No	No	No	L	H
PGI>1.2V	L	Yes	No	No	L	L
PGI>1.2V	L	No	Yes	No	H	L
PGI>1.2V	L	No	No	Yes	H	L
PGI>1.2V	L	Yes	Yes	No	H	L
PGI>1.2V	L	Yes	No	Yes	H	L
PGI>1.2V	L	No	Yes	Yes	H	L
PGI>1.2V	L	Yes	Yes	Yes	H	L
X	H	X	X	X	H	L

x = don't care

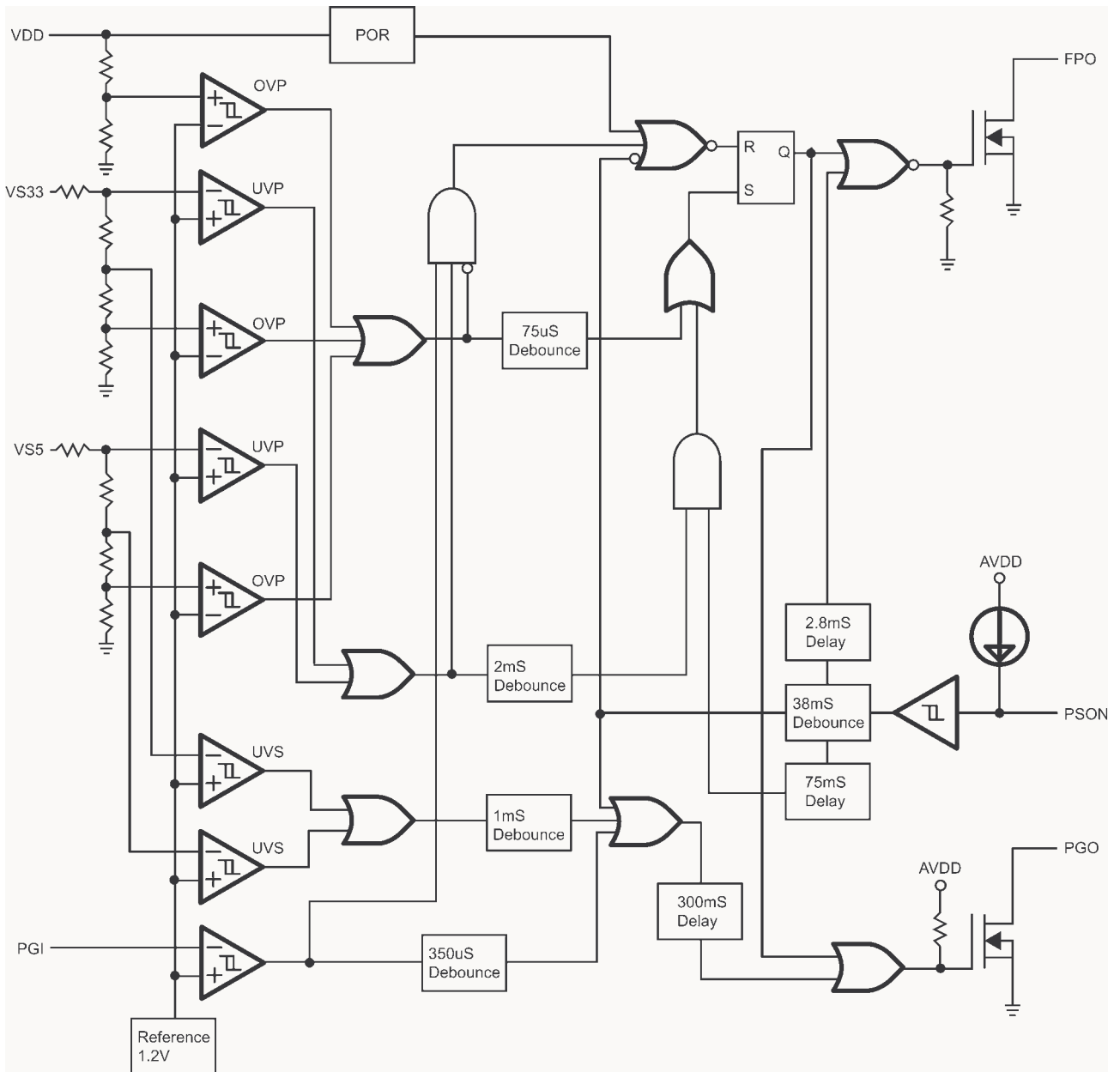
FPO = L means: fault IS NOT latched

FPO = H means: fault IS latched

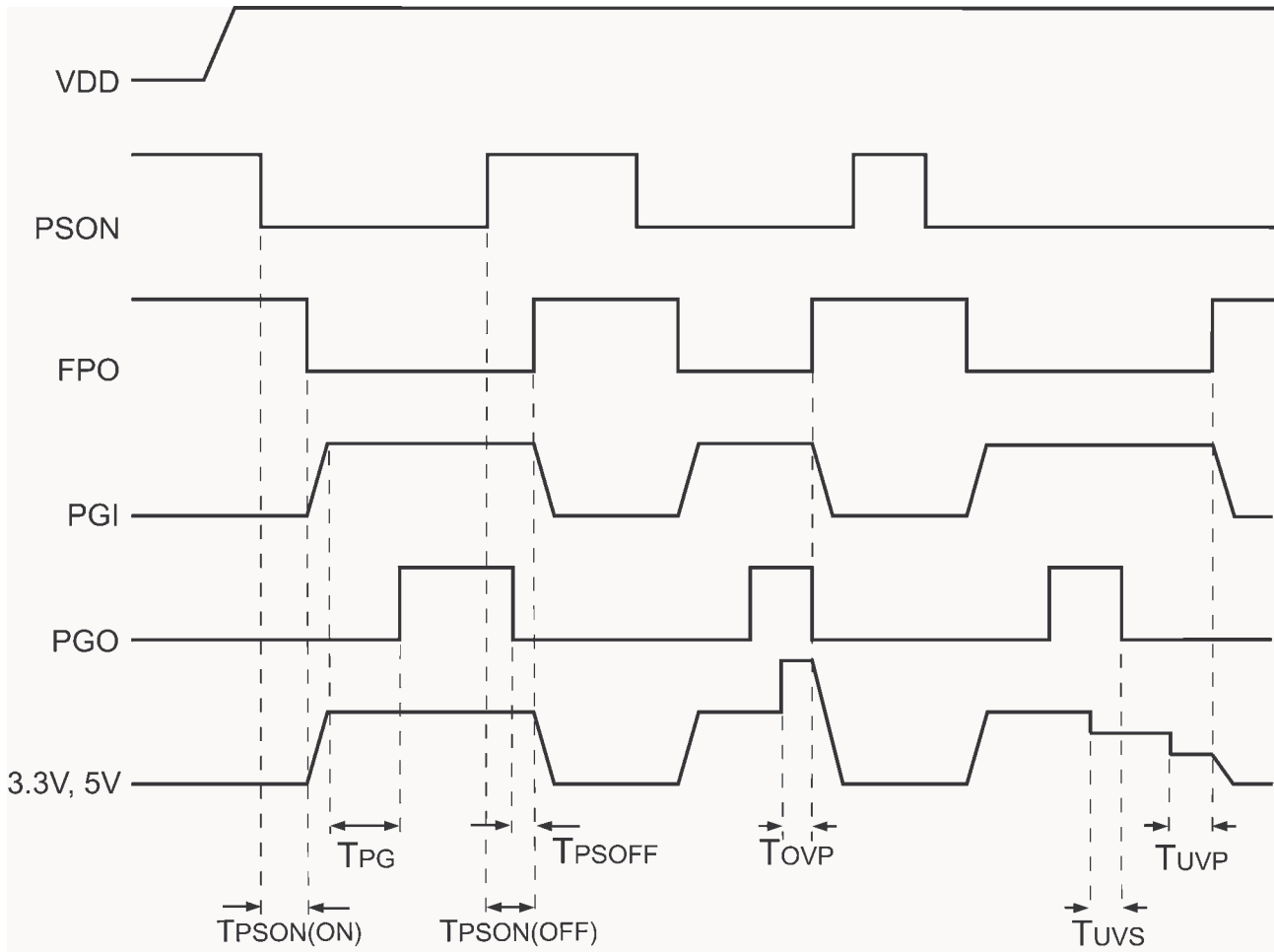
PGO = L means: fault

PGO = H means: No fault

**BLOCK DIAGRAM**



**TIMING DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Min.	Max.	Unit
V <sub>DD</sub>	DC Supply Voltage	-0.3	16	V
V <sub>i</sub>	Input Voltage	PERSON, VS33, VS5, PGI	8	V
V <sub>OUT</sub>	Output Voltage	FPO	16	V
		PGO	8	
T <sub>A</sub>	Operating Free Air Temperature Range	-40	85	°C
T <sub>STG</sub>	Storage Temperature Range	-55	150	°C
	Soldering Temperature		260	°C
	ESD Capability, HBM model		2	KV

Note: Stresses above those listed may cause permanent damage to the device.

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min.	Max.	Unit
V <sub>DD</sub>	DC Supply Voltage	4	15	V
V <sub>IL</sub>	Input Voltage	PERSON, VS33, VS5, PGI	7	V
V <sub>OUT</sub>	Output Voltage	FPO	15	V
		PGO	7	
I <sub>OSINK</sub>	Output Sink Current	FPO	20	mA
		PGO	10	
T <sub>R</sub>	Supply Voltage Rising Time	See Note	1	mS
T <sub>A</sub>	Operating Free Air Temperature Range	-30	85	°C

Note: VDD rising and falling slew rate must be less than 14V/mS.

**ELECTRICAL CHARACTERISTICS (VDD=12V, TA=25°C)**
**Over-voltage Protection**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>OVP</sub>	Over-voltage Protection VS33		3.7	3.9	4.1	V
	Over-voltage Protection VS5		5.7	6.1	6.5	
	Over-voltage Protection VDD		13.2	13.8	14.4	
I <sub>LKG</sub>	Leakage Current (FPO)	V(FPO) = 5V			5	uA
V <sub>OL</sub>	Low Level Output Voltage (FPO)	I <sub>sink</sub> 20mA			0.7	V
T <sub>OVP</sub>	Timing OVP to Protection		33	75	110	uS

**Under-voltage and PGI, PGO**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>PGI</sub>	Input Threshold Voltage PGI		1.15	1.2	1.25	V
V <sub>UVS</sub>	Under-voltage Sense VS33		2.6	2.8	3.0	V
	Under-voltage Sense VS5		4.0	4.2	4.4	
V <sub>UVP</sub>	Under-voltage Protection VS33		2.3	2.5	2.7	V
	Under-voltage Protection VS5		3.4	3.6	3.8	
T <sub>UVS</sub>	Timing UVS to Sense (PG)		0.6	1	1.5	mS
T <sub>UVP</sub>	Timing UVP to Protection (FPO)		1.3	2	3	mS
I <sub>LKG</sub>	Leakage Current (PGO)	PGO = 5V			5	uA
V <sub>OL</sub>	Low Level Output Voltage (PGO)	VDD = 12V Isink 10mA			0.7	V
	Under-voltage Enable Delay Time		49	75	114	
T <sub>PG</sub>	Timing PG Delay	PGI to PGO	200	300	450	mS
	Noise Deglitch Time	PGI to PGO	200	350	450	

**PSON Control**

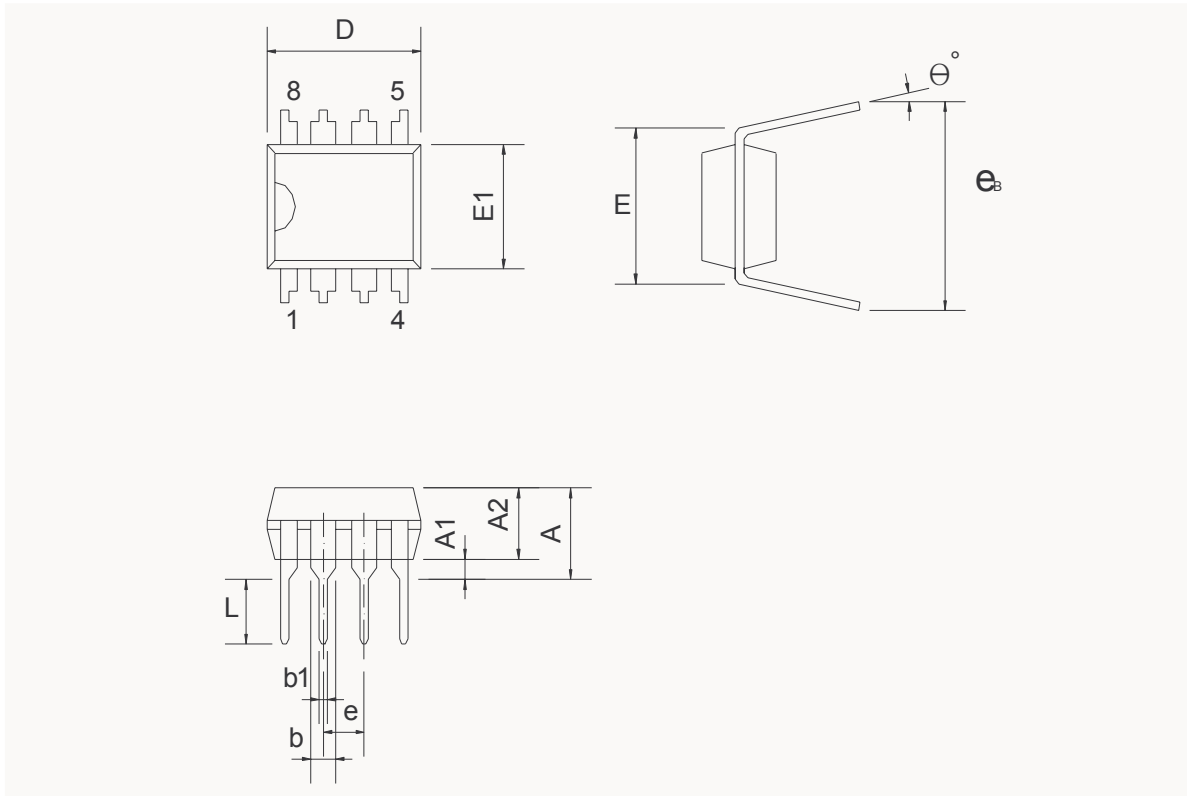
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>PSON</sub>	Input Pull-up Current	PSON = 0V	100	160	220	uA
V <sub>IH</sub>	High-level Input Voltage		2.4	1.85		V
V <sub>IL</sub>	Low-level Input Voltage			1.35	1.2	V
T <sub>PSON</sub>	Timing PSON to On/Off					mS
	On		24	38	57	
	Off		24	38	57	
T <sub>PSOFF</sub>	Timing PG Low to Power Off		1.6	2.8	4.5	mS

**Total Device**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>DD</sub>	Supply Current	PSON = 5V /VDD = 5V		0.7	1.5	mA

**PACKAGE INFORMATION**

**8 PINS – PLASTIC DIP (D)**

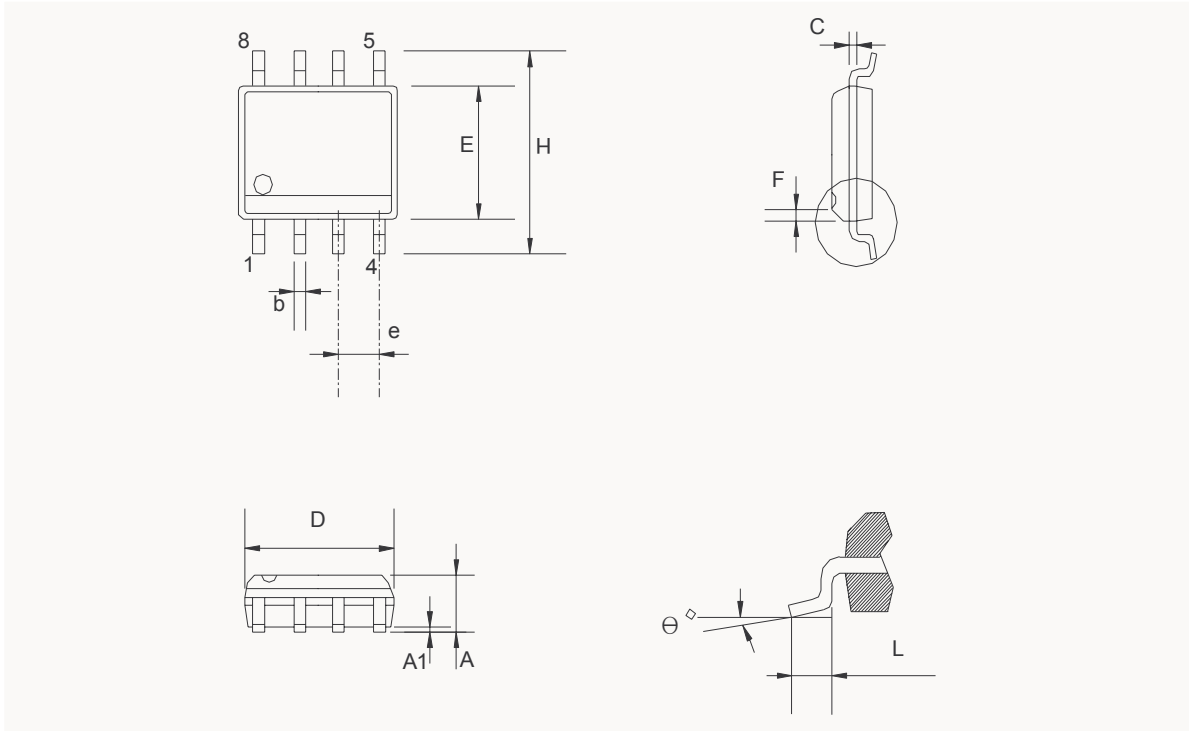


**Dimension**

Symbol	Millimeter			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.334			0.210
A1	0.381			0.015		
A2	3.175	3.302	3.429	0.125	0.130	0.135
b		1.524			0.060	
b1		0.457			0.018	
D	9.017	9.271	10.160	0.355	0.365	0.400
E		7.620			0.300	
E1	6.223	6.350	6.477	0.245	0.250	0.255
e		2.540			0.100	
L	2.921	3.302	3.810	0.115	0.130	0.150
e <sub>B</sub>	8.509	9.017	9.525	0.335	0.355	0.375
θ°	0°	7°	15°	0°	7°	15°



8 PINS – PLASTIC SMD (S)



Dimension

Symbol	Millimeter			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.346		1.752	0.053		0.069
A1	0.101		0.254	0.004		0.010
b		0.406			0.016	
c		0.203			0.008	
D	4.648		4.978	0.183		0.196
E	0.381		3.987	0.150		0.157
e		1.270			0.050	
F		0.381X45°			0.015X45°	
H	5.791		6.197	0.228		0.244
L	0.406		1.270	0.016		0.050
$\theta^\circ$	0°		8°	0°		8°

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