■ Introduction

The AL898 is a half-bridge motor driver used for driving reversible motors, which can drive one DC motor, a stepper motor, or other loads.

The AL898 operates on a motor power supply voltage from 4V to 24V, With 3A current limit.

The AL898 is controlled by two input pins. The two logic level inputs determine the output mode: forward, reverse, coast, or brake. Very low standby circuit current can be achieved when the two inputs are both at a low level.

The AL898 is available with SOP-8 package.

■ APPLICATIONS

- Smart Meter
- Smart Lock
- Smart Water/Gas Meter
- Toys

■ Features

- Wide Power Range: 4V to 24V
- Above 3A peak current ability
- Low MOSFET On Resistance: Rhs=0.4Ω, Rls=0.2Ω
- Forward, Reverse, Coast, or Brake Output Modes
- Suitable for wide range MCU control logic
- Input logic hysteresis
- Thermal Shutdown

■ Order Information

Part No.	Package	Tape/Reel	Mark*
AL898	SOP-8	4000/Reel	AL898/YYWW
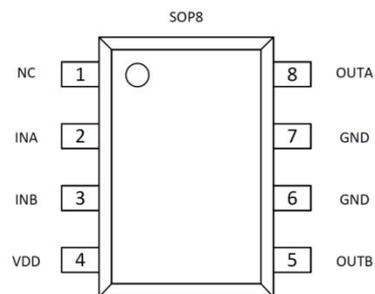
■ Simplified Block Diagram
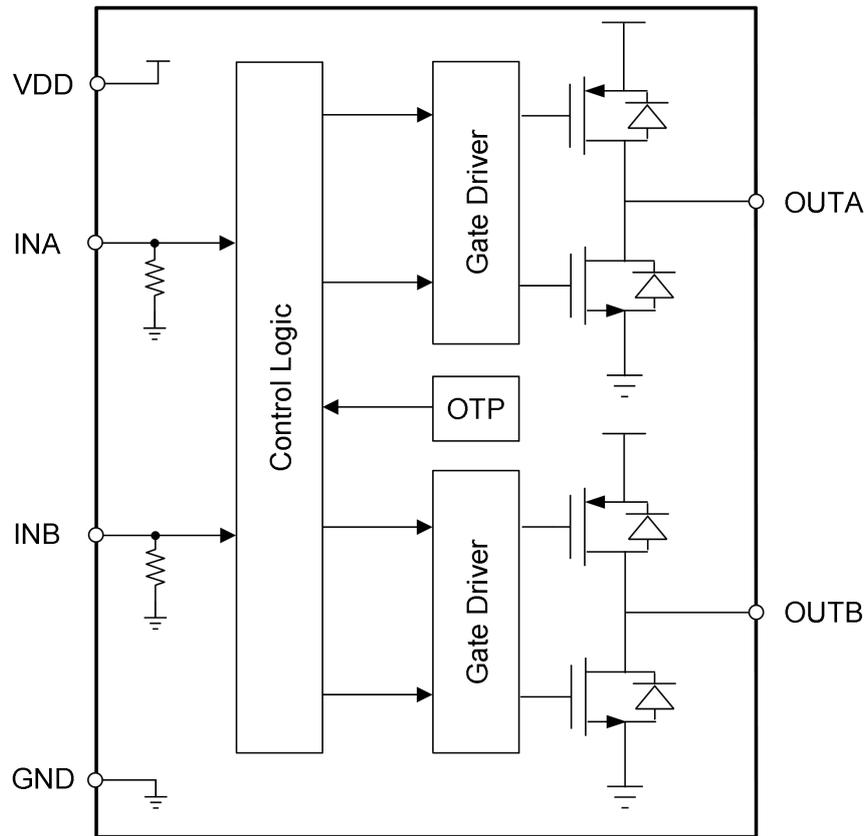
■ Pin Description

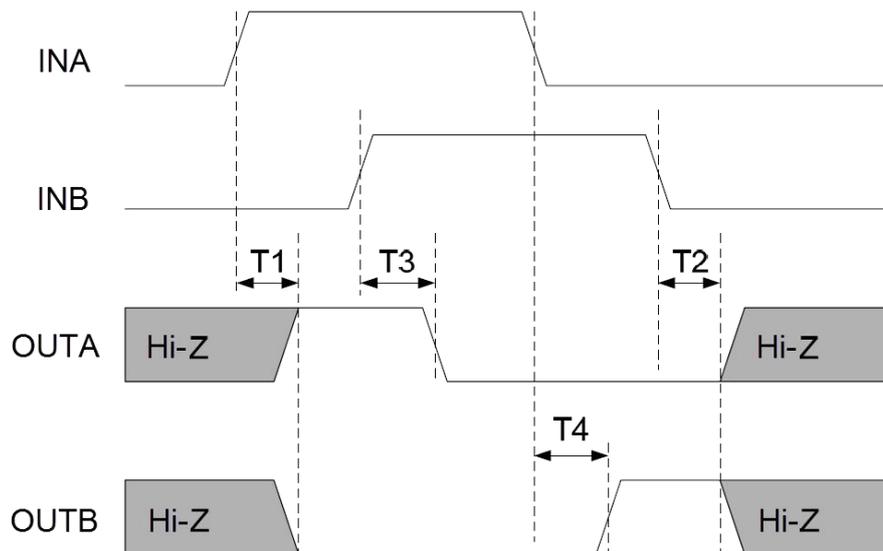| SOP-8	Symbol	Description
1	NC	NC
2	INA	Logic input, with a large internal pull-down resistor.
3	INB	Logic input, with a large internal pull-down resistor.
4	VDD	Supply voltage. A decouple capacitor is required to prevent large voltage spikes.
5	OUTB	Output, Connect this pin to the motor winding.
6 , 7	GND	Thermal PAD is also GND.
8	OUTA	Output, Connect this pin to the motor winding.

■ Absolute Maximum Ratings

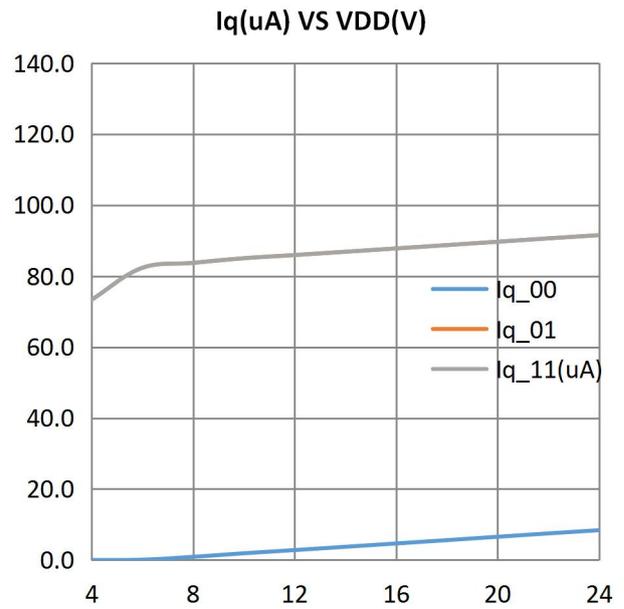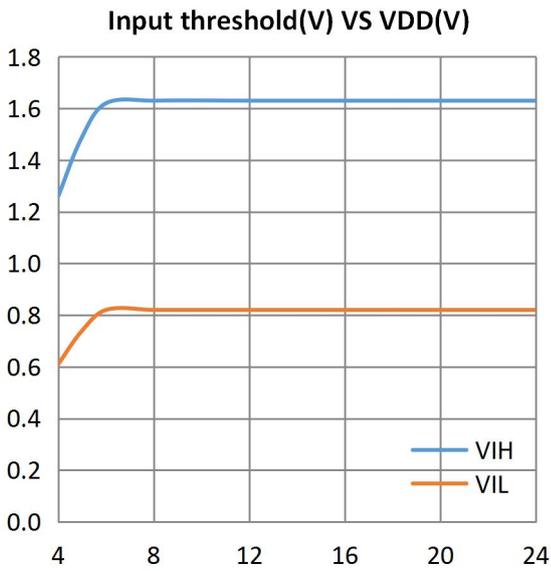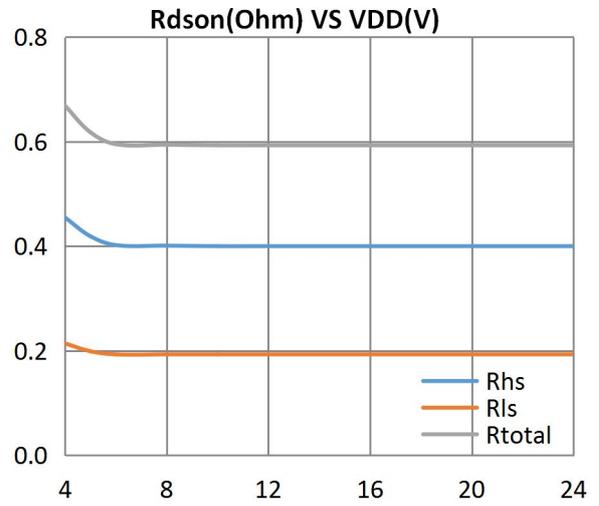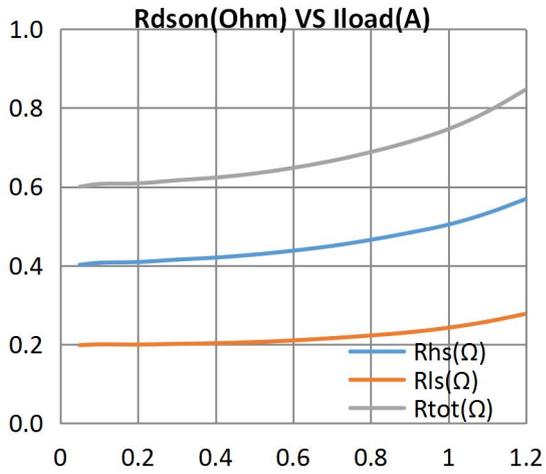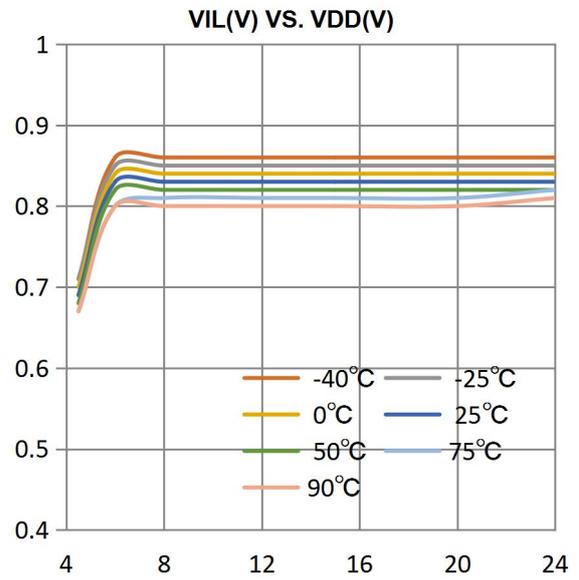| Symbol	Parameter	Value		Unit
V_{VDD}	VDD Supply Voltage Range	-0.4 ~ +25		V
V_{OUTX}	Output Pins Voltage Range	-0.4 ~ +25		V
V_{INX}	Input Pins Voltage Range	GND-0.4 ~ 5.5		V
T_J	Maximum Junction Temperature	150		℃
T_{STG}	Storage Temperature Range	-55~160		℃
θ_{JA}	Package Thermal Resistance (Ambient to Junction)	SOP-8	160	℃/W
$V_{ESD\,(HBM)}$	Electrostatic Discharge Voltage (HBM)	4000		V

■ Electrical Characteristics

Test conditions: TA = 25°C, VDD=12V, unless otherwise noted.

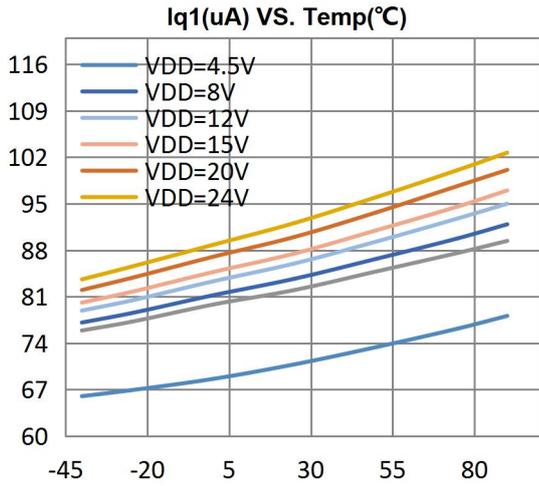| Parameters	Symbol	Condition	Min	Typ.	Max	Units
Operating supply voltage	VDD		4		24	V
Standby mode supply current	Iq0	INA=INB=0V		3		µA
Operating supply current	Iq1			85		µA
UVLO threshold rising				4.0	4.4	V
UVLO hysteresis				0.15		V
Input high voltage	VIH		1.7			V
Input low voltage	VIL				0.8	V
Input high current	IIH	VIN=3.3V		3.5		µA
Input pull-down resistance	RIN			1.2		MΩ
HS switch on resistance	Rhs	ILOAD=300mA	0.4	0.45	0.6	Ω
LS switch on resistance	Rls	ILOAD=300mA	0.2	0.25	0.4	Ω
Output enable time	T1			1000		ns
Delay time	T3	INx high to OUTx high		200		ns
	T4	INx low to OUTx low		300		ns
Dead time				200		ns
Thermal shutdown threshold				155		°C
Thermal shutdown hysteresis				25		°C
current limit				3		A

■ Typical Characteristics

Test conditions: VDD=12V, TA=25℃, Iload=0mA, unless otherwise noted.

Iq1(uA) VS. Temp(℃)

- VDD=4.5V
- VDD=8V
- VDD=12V
- VDD=15V
- VDD=20V
- VDD=24V

Rds vs Temp@vdd

- Rds

VIH(V) VS. VDD(V)

- -40℃
- -25℃
- 0℃
- 25℃
- 50℃
- 75℃
- 90℃

VIL(V) VS. VDD(V)

- -40℃
- -25℃
- 0℃
- 25℃
- 50℃
- 75℃
- 90℃
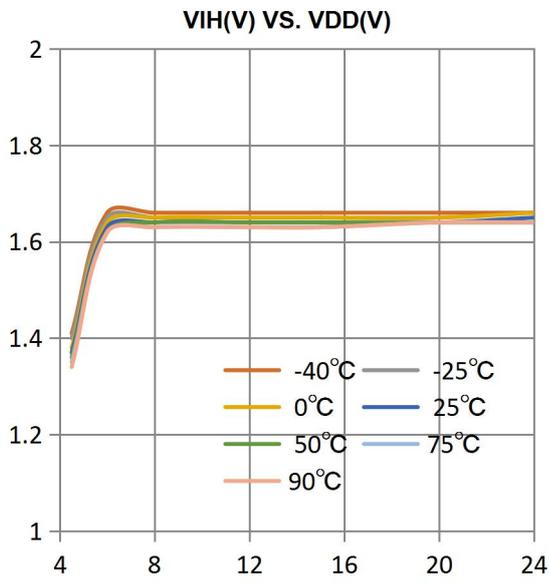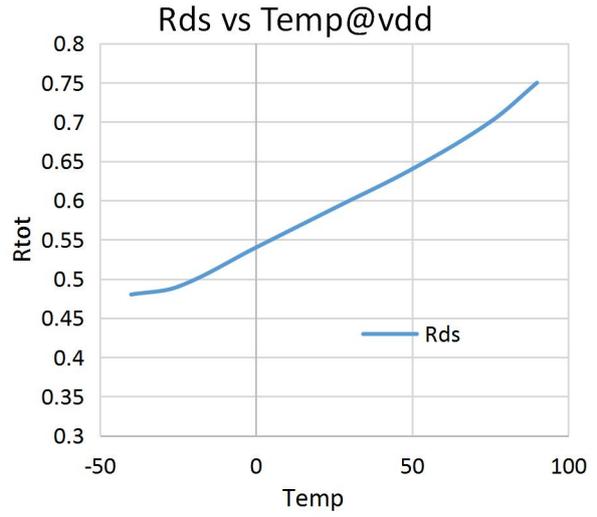
■ Typical Application
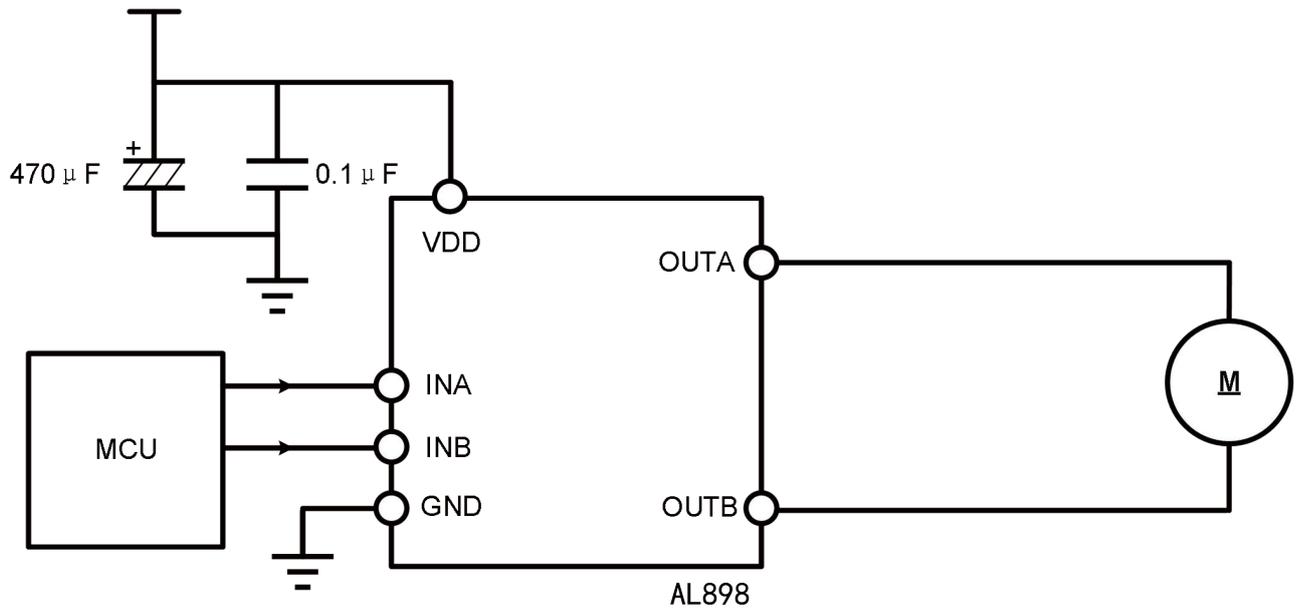
Please make sure that the input pins INA and INB remain low during power-up and power-down.

■ Detailed Description

Overview

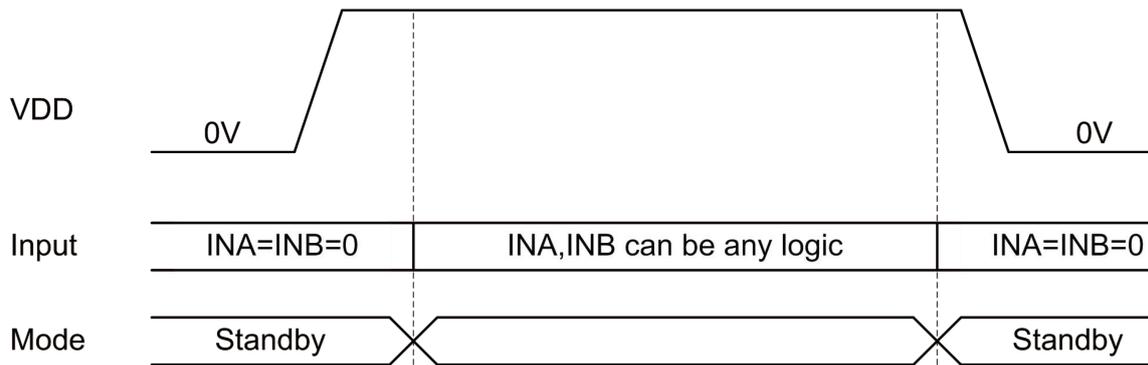The AL898 is an H-bridge driver that can drive a DC motor or other devices such as solenoid valves. Outputs can be controlled via the AL898's PWM interfaces (INA and INB). These devices integrate the necessary driver FETs and FET control circuits, thereby greatly reducing the number of components in a motor driver system. In addition, the AL898 adds protection functions that go beyond conventional discrete implementations: overcurrent protection and thermal shutdown.

RPM Adjustment

PWM (Pulse Width Modulation) technology achieves precise control of motor speed by adjusting the duty cycle of the pulse signal. This technique regulates the average value of the motor input voltage and thus controls the motor speed by changing the duty cycle of the PWM signal, i.e., the ratio of the pulse width to the pulse period. Specifically, the larger the duty cycle of the PWM signal, the higher the average value of the motor input voltage and the faster the motor speed; on the contrary, the smaller the duty cycle, the slower the motor speed.

Motor Control

The AL898 is controlled via PWM input connectors (INA and INB connectors). Each output is controlled by the corresponding input pin.

| INA	INB	OUTA	OUTB	Functions (DC motors)
L	L	Hi-Z	Hi-Z	Inertia or parking
L	H	L	H	Reverse
H	L	H	L	Forward
H	H	L	L	Braking

OCP

There is an analog current limit circuit on each field effect transistor that limits the current through the field effect transistor by eliminating gate drive. If the analog current limit analog current limit lasts longer than t_{DEG}, all field effect transistors in the H-bridge are disabled. Operation is automatically resumed after t_{RETRY}. Overcurrent of the field effect transistors is detected by both the high voltage side and the low voltage side FETs. overcurrent can be caused by a short circuit between the OUTA pin and the OUTB pin or by grounding the OUTB pin.
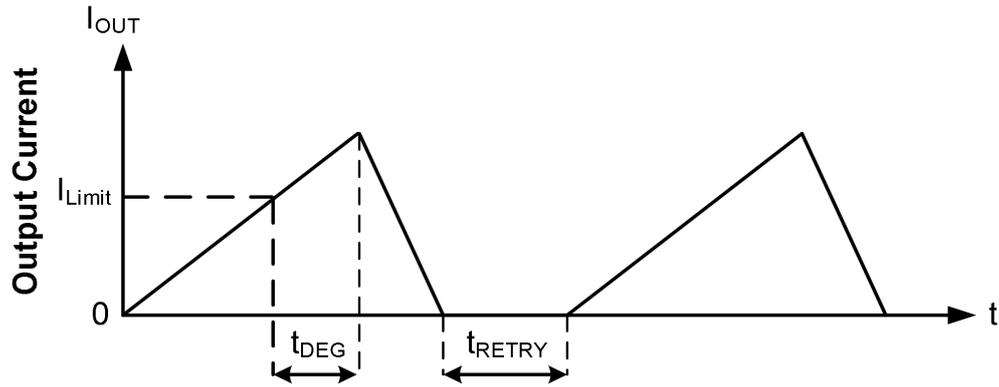
OTP

If the chip temperature exceeds 155°C, all field effect tubes in the H-bridge are disabled. Operation is automatically resumed when the chip temperature drops below 130°C.

■ Package Outline

SOP-8
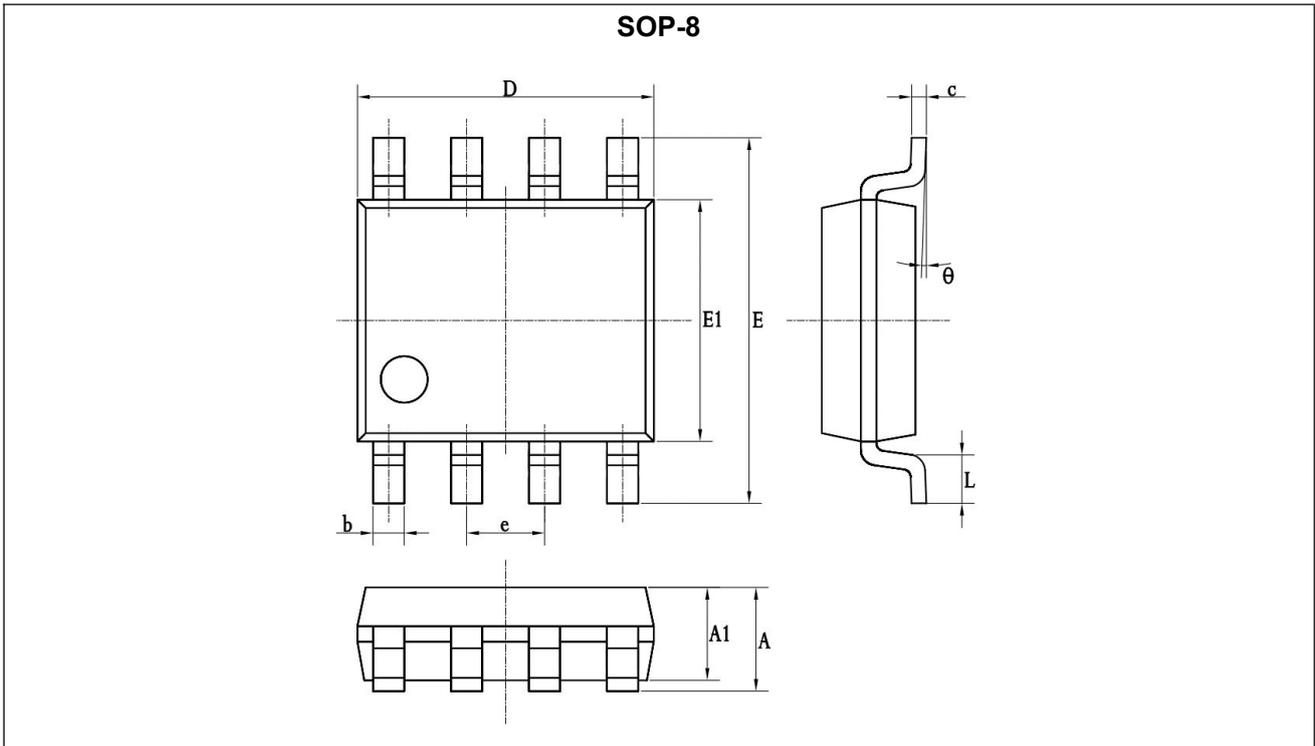
Symbol	Millimeters					
	Min.	Typ.	Max.			
A	-	-	1.75			
A1	1.25	-	1.55			
b	0.33	-	0.51			
c	0.17	-	0.26			
D	4.70	-	5.10			
E	5.80	-	6.20			
E1	3.70	-	4.10			
e	-	1.27	-			
L	0.50	-	0.80			
θ	0°	-	8°			