

High Power Factor & Accuracy Constant Current LED Driver

Features

- Built-in 600V Power MOSFET
- TM (Transition Mode) Fixed On -Time PFC Control
- Accuracy Constant Current
- Low BOM Cost
- Inductor Size Reduction
- CT Pin Adjust Frequency Range for Optimization
- Over Voltage Protection (OVP)-Auto Recovery
- LED Short Protection (SCP) -Auto Recovery
- Over Load Protection (OLP) -Auto Recovery
- SOP-8 / DIP-8 Package
- Compatible Inductance Ballast
- Incompatible Electronic Ballast

Description

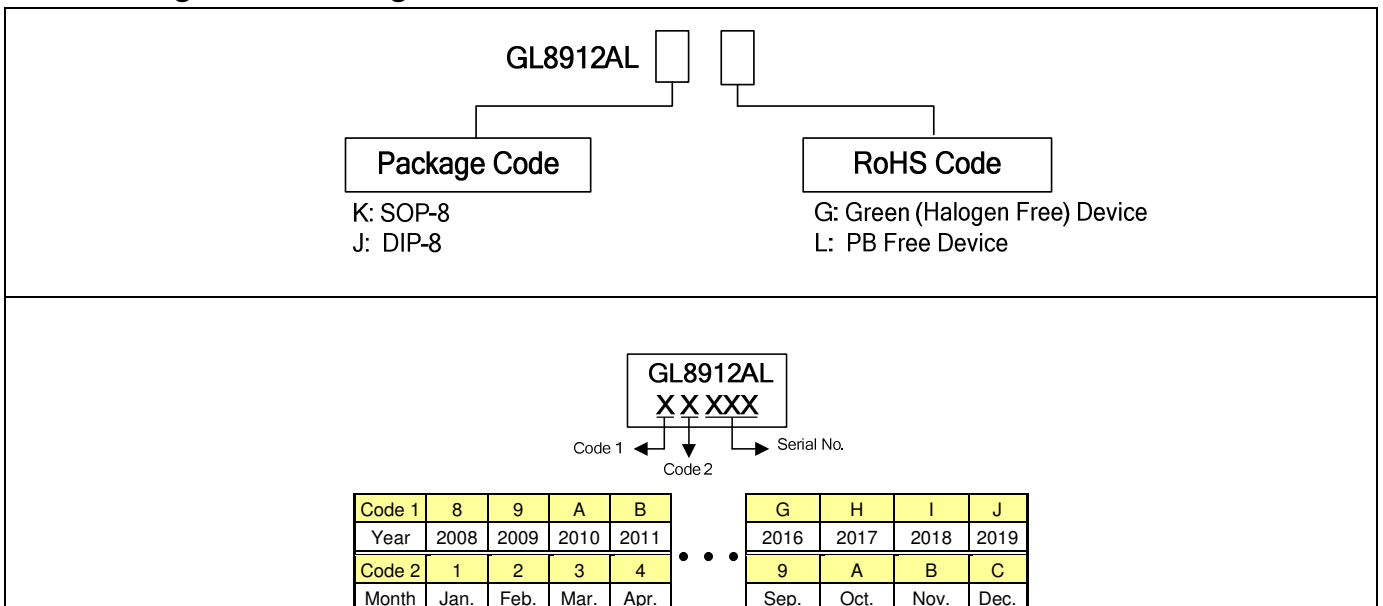
The GL8912AL integrated a 600V power MOSFET and a highly-integrated, low startup current, TM (Transition Mode), fixed on- time PFC control and PWM controller. These functions enable the LED driver to easily meet the accuracy average LED current and high power factor requirements. The integrated functions also include the LED short protection, over voltage protection, over load protection. The COMP pin controls the duty by connected an RC compensation network to ground and forming the closed loop feedback control.

The GL8912AL improves the performance and reduces the cost of the LED driver. It is a 8-pin SOP-8 / DIP-8 package.

Application

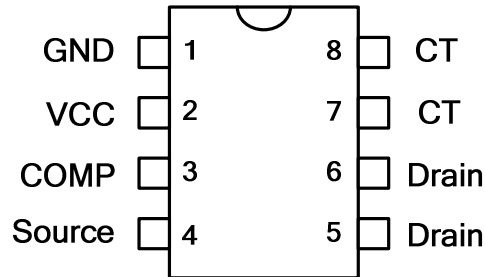
- GU10 /E14 LED Bulb
- Others LED Lighting Applications

Ordering and Marking Information



greenergy OPTO Inc. reserves the right to make changes to improve reliability or manufacture ability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Pin Configuration



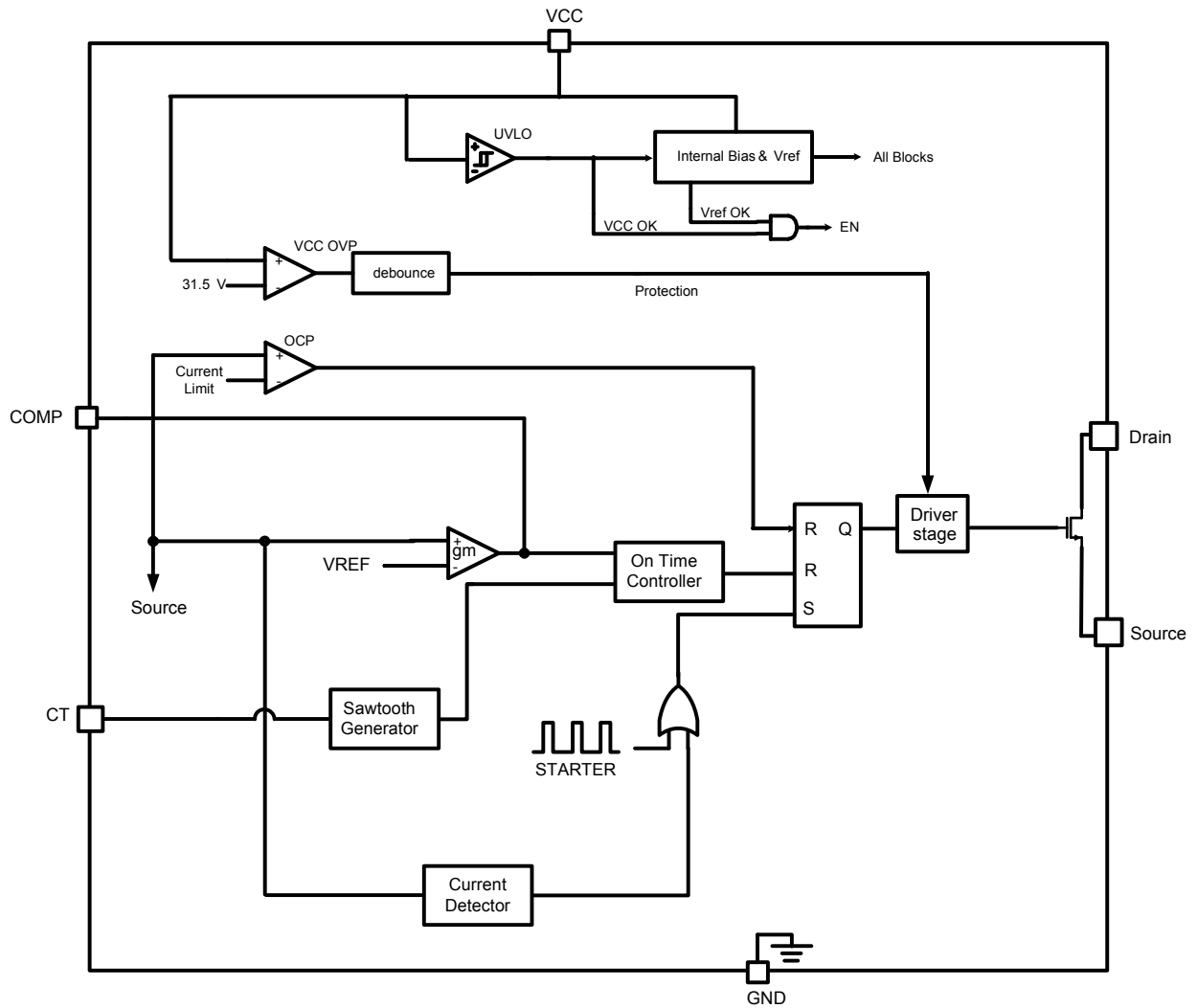
Pin Description

Pin No.	Name	Function
1	GND	Ground Pin
2	VCC	Power Supply Pin
3	COMP	Feedback Compensation Network
4	Source	MOSFET Source Pin
5	Drain	Drain of Internal HV MOS
6	Drain	Drain of Internal HV MOS
7	CT	The CT pin is connected to the current source to charge the external capacitor and compare the COMP voltage to terminate the power switch.
8	CT	The CT pin is connected to the current source to charge the external capacitor and compare the COMP voltage to terminate the power switch.

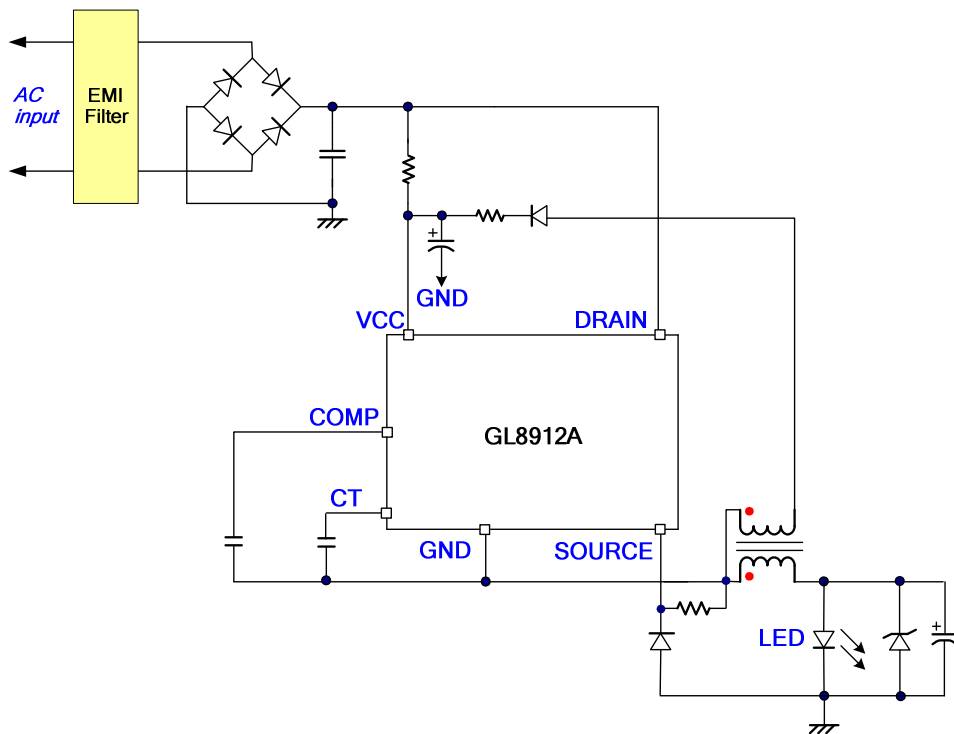
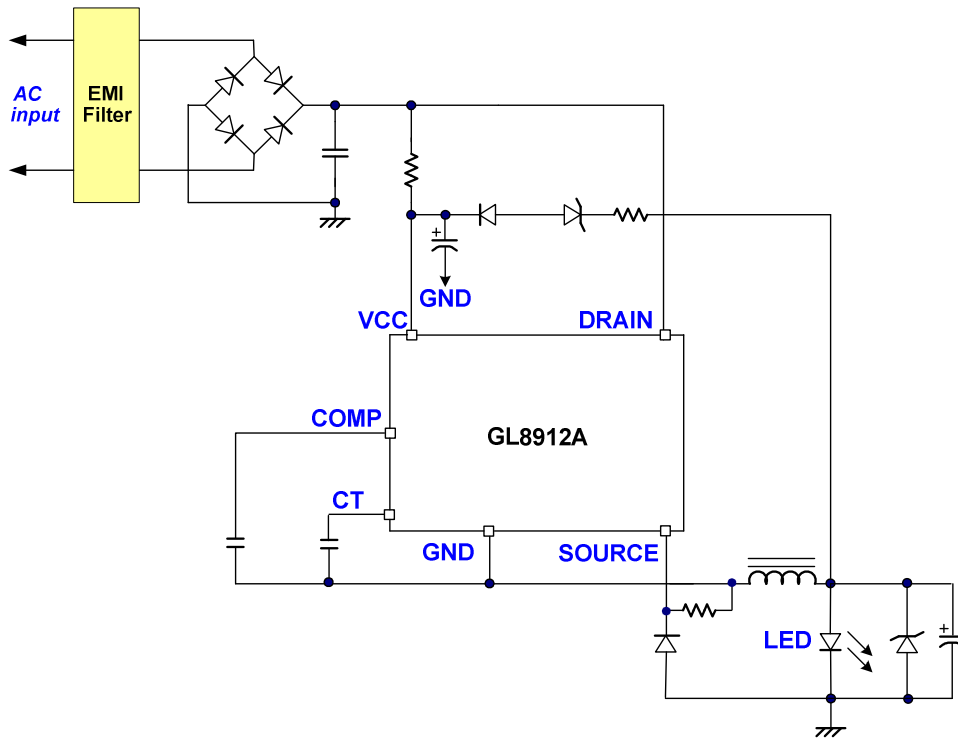
Absolute Maximum Ratings

Drain Voltage	-----	-0.3V ~ 600V
Supply Voltage VCC	-----	30V
CT, COMP	-----	-0.3V ~ 7V
Junction Temperature	-----	150°C
Operating Ambient Temperature	-----	-20°C ~ 85°C
Storage Temperature Range	-----	-65°C ~ 150 °C
Lead Temperature (All Pb free packages, soldering, 10 sec)	-----	260°C
ESD Voltage Protection, Human Body Model	-----	2KV
ESD Voltage Protection, Machine Model	-----	200V

Function Block



Application Circuit





Electrical Characteristics (VCC = 15.0V & TA = +25°C, unless otherwise specified.)

Parameter	Min.	Typ.	Max.	Unit
SUPPLY VOLTAGE				
Startup Current (VCC=UVLO on - 1V)		15		uA
Operating Current , Vcomp = 2.5V		1		mA
Operating Current , Protection Tripped (OVP, SCP,)		1.6		mA
UVLO(off)	5.5	6.5	7.5	V
UVLO(on)	14	15	16	V
OVP Level on VCC Pin	29.5	31.5	33.5	V
OVP De-Bounce Time		40		us
VOLTAGE FEEDBACK				
Feedback Reference Voltage	0.195	0.200	0.205	V
Tran-Conductance		300		uS
Output Sink Current		300		uA
Output Source Current		60		uA
CURRENT SENSING				
Input Over Voltage Protection	1.8	2.0	2.2	V
Open Loop Voltage, CS Pin Open		5		V
Leading-Edge Blanking Time		450		nS
Delay to Output		130	220	nS
CT OUTPUT SECTION				
CT Pin Current	130	150	170	uA
MOSFET SECTION				
BVdss Vgs=0	600			V
Rds (on)		3		Ω

Application Information

Start-up Current

The typical start-up current is around 10uA. Very low start-up current allows the PWM controller to increase the value of start-up resistor and then reduce the power dissipation on it.

UVLO (Under Voltage Lockout)

A hysteresis UVLO comparator is implemented in GL8912AL, then the turn-on and turn-off thresholds level are fixed at 15V and 6.5V respectively. This hysteresis shown in Fig.1 ensures that the start-up capacitor will be adequate to supply the chip during start-up. For quickly startup the LED driver, the start-up resistor should be matched with the startup capacitor. Due to the low UVLO on level, so the turn-on delay time will also never greater than the general PWM IC.

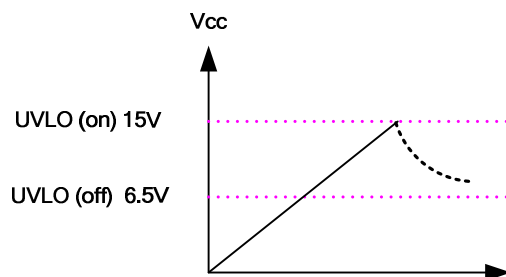


Fig.1

LEB (Leading-Edge Blanking)

Each time the power MOSFET is switched on, a turn-on spike will inevitably occur at the sense resistor. To avoid fault trigger, a 450ns leading-edge blanking time is built in. Conventional RC filtering can therefore be omitted. During this blanking period, the current-limit comparator is disabled and can not switch off the gate driver.

OVP (Over Voltage Protection) on VCC

To prevent the LED driver from being damaged, the GL8912AL is implemented an OVP function on VCC. When the VCC voltage is higher than the OVP

threshold voltage 31.5V, the output gate driver circuit will be shut down immediately to stop the switching of power MOSFET. The VCC pin OVP function is an auto recovery type protection. If the OVP condition happens, the pulses will be stopped and never recovery unless the VCC pin voltage is down to the UVLO off level. The GL8912AL is working in an auto-recovery mode as shown in Fig.2.

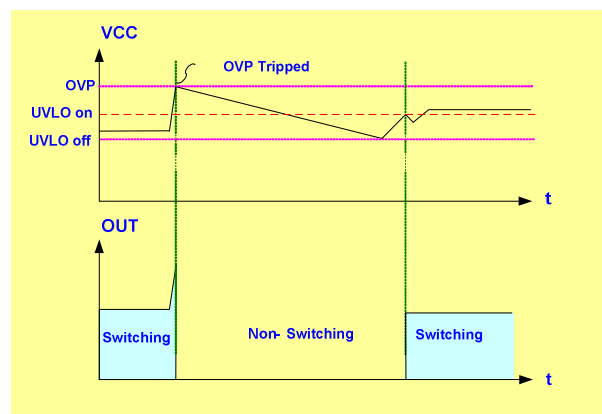
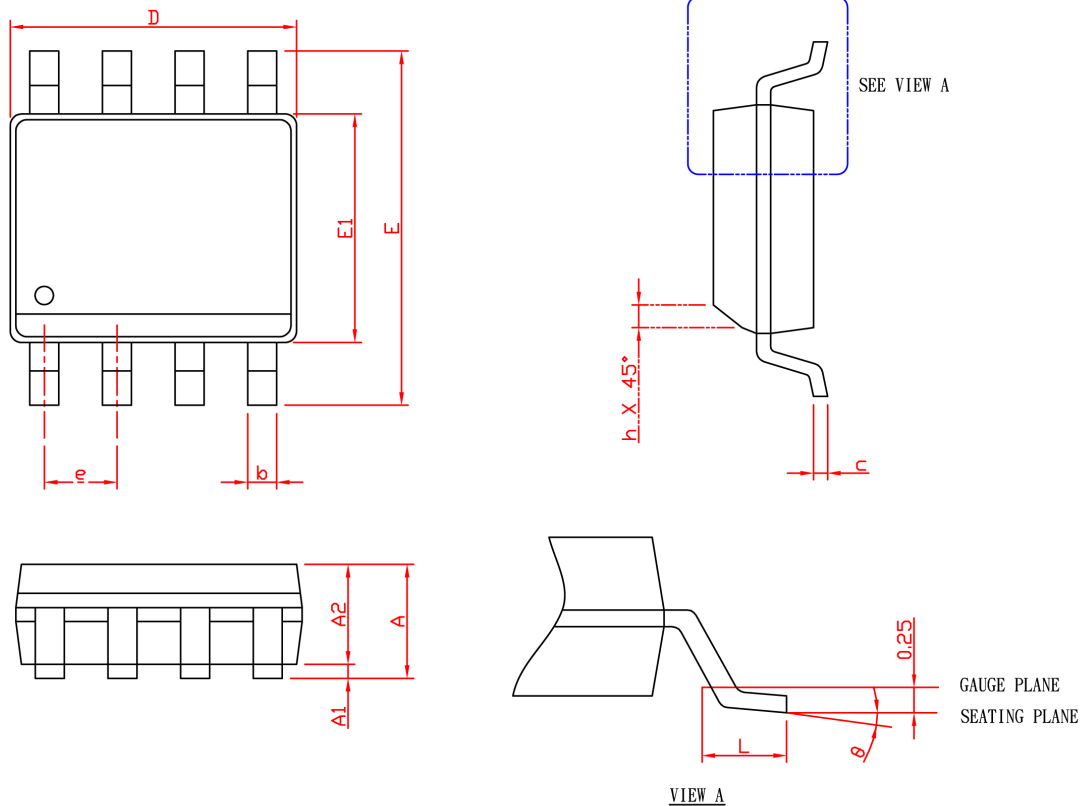


Fig. 2

Gate Clamp

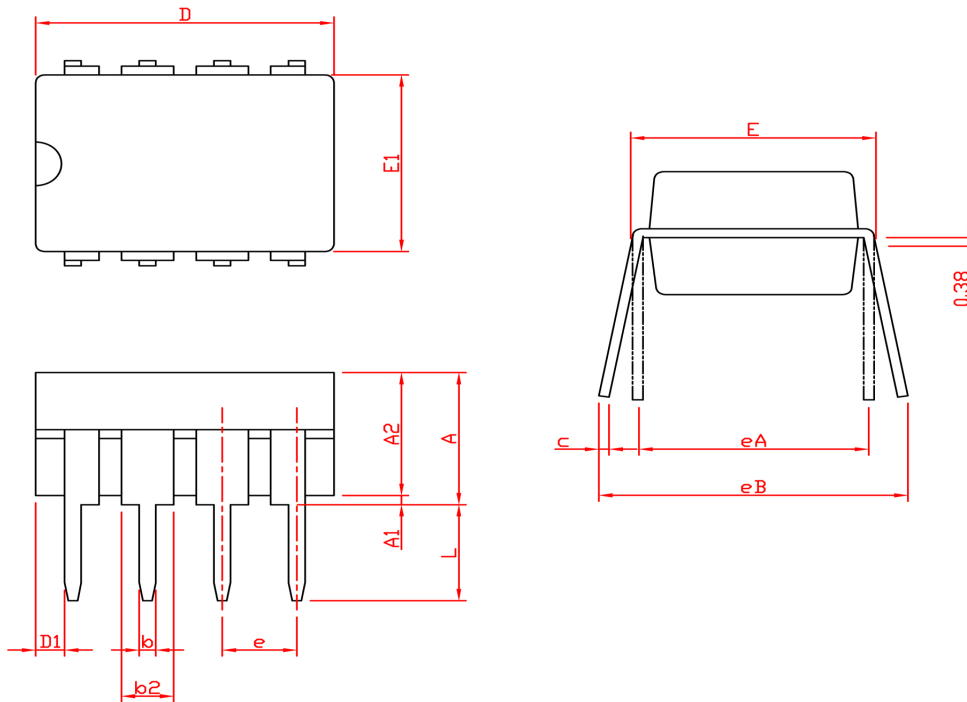
Driver is clamped to 15V by an internal clamping circuit. Those damages usually come from undesired over-voltage gate signals. Under the conditions listed below, the gate output will turn off immediately to protect the power circuit.

Package Information
SOP-8


SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

Note: 1. Followed from JEDEC MS-012 AA.

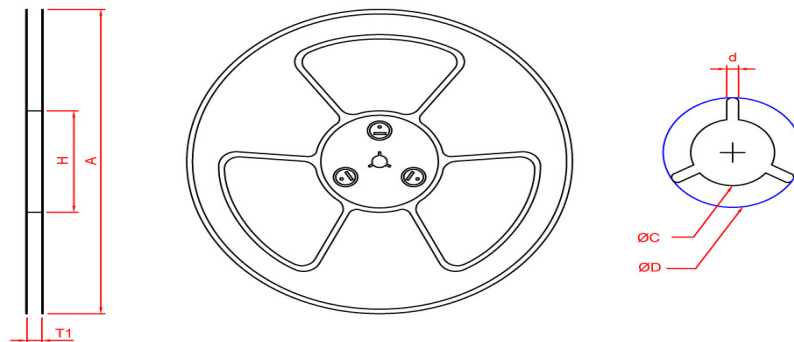
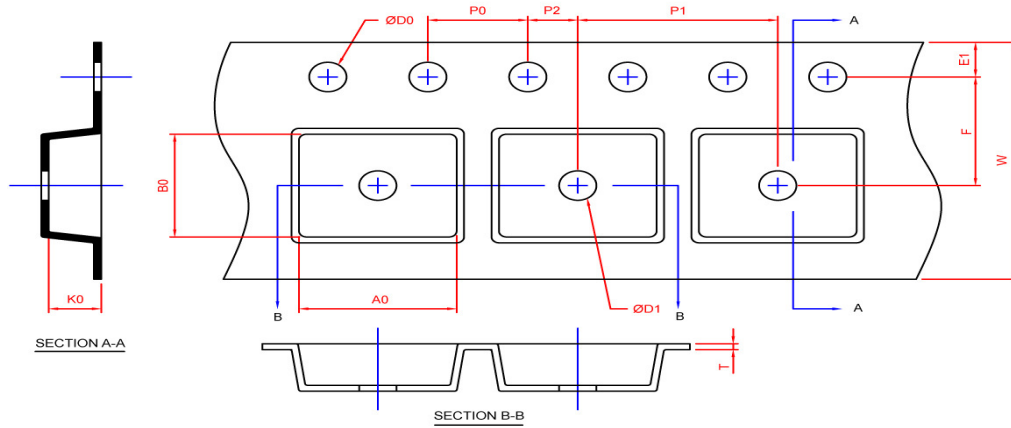
- Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
- Dimension "E1" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

Package Information
DIP-8


SYMBOL	DIP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	4.95	0.115	0.195
b	0.36	0.56	0.014	0.022
b2	1.14	1.78	0.045	0.070
c	0.20	0.35	0.008	0.014
D	9.01	10.16	0.355	0.400
D1	0.13		0.005	
E	7.62	8.26	0.300	0.325
E1	6.10	7.11	0.240	0.280
e	2.54 BSC		0.100 BSC	
eA	7.62 BSC		0.300 BSC	
eB		10.92		0.430
L	2.92	3.81	0.115	0.150

Note: 1. Followed from JEDEC MS-001 BA.

2. Dimension D, D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 10 mil.

Carrier Tape & Reel Dimensions
SOP-8


Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0±2.0	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.05
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0±0.10	8.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40±0.20	5.20±0.20	2.10±0.20

(mm)

Devices Per Unit

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP-8	12	-	2500

Taping direction information

SOP-8

