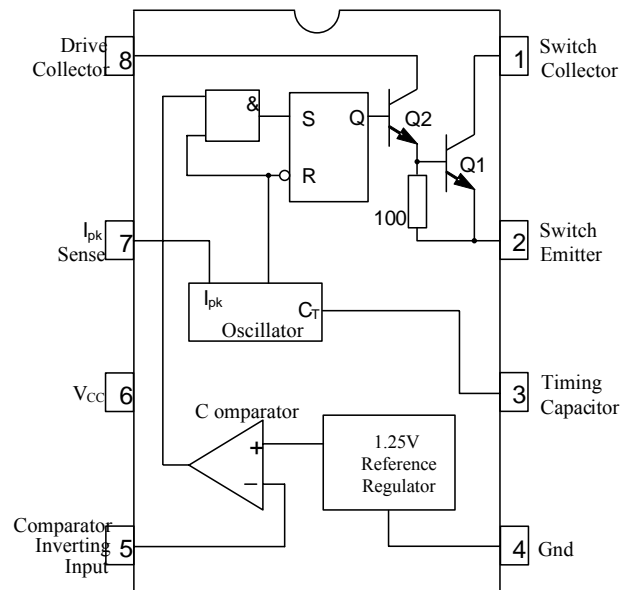


**DC-DC Converter Control Circuits**

**DESCRIPTION**

The IL34063S1 Series is a monolithic control circuit containing the primary functions required for DC-to-DC converters. These devices consist of an internal temperature compensated reference, comparator, controlled duty cycle oscillator with an active current limit circuit, driver and high current output switch. This series is specifically designed for incorporating in Step-Down and Step-Up and Voltage-Inverting applications with a minimum number of external components.

**BLOCK DIAGRAM**



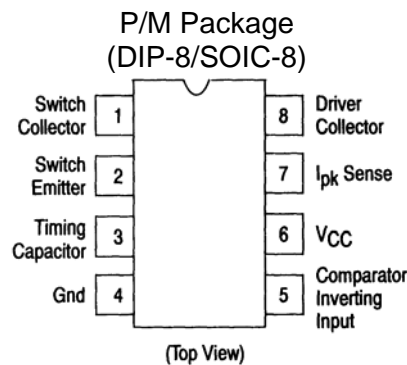
**FEATURES**

- Operation from 4.0 V to 40 V Input
- Low Standby Current
- Current Limiting
- Output Switch Current to 0.8 A
- Output Voltage Adjustable
- Frequency Operation to 32 kHz (CT=1nF)
- Precision 2% Reference

**APPLICATIONS**

- Chargers
- Adaptors
- Mother Board
- Scanner

**PIN CONFIGURATION**



## ORDERING INFORMATION

Device	Temperature Range	Package
IL34063S1N	0° to 70+°C	DIP-8
IL34063S1D	0° to 70+°C	SOIC-8

## PIN DESCRIPTION

Pin Number	Pin Name	Function
1	Switch Collector	Internal switch transistor collector
2	Switch Emitter	Internal switch transistor emitter
3	Timing Capacitor	Timing Capacitor to control the switching frequency
4	Ground	Ground pin for all internal circuits
5	Comparator Inverting Input	Inverting input pin for internal comparator
6	Supply Voltage	Voltage supply
7	IpK Sense	Peak Current Sense Input by monitoring the voltage drop across an external I sense resistor to limit the peak current through the switch
8	Driver Collector	Voltage driver collector

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}$	40	V
Comparator Input Voltage Range	$V_{IR}$	-0.3 to +7	V
Switch Collector Voltage	$V_{C(switch)}$	40	V
Switch Emitter Voltage (Vpin 1 = 40 V)	$V_{E(switch)}$	40	V
Switch Collector to Emitter Voltage	$V_{CE(switch)}$	40	V
Driver Collector Voltage	$I_{C(driver)}$	40	V
Driver Collector Current (Note 1)	$I_{C(driver)}$	15	mA
Switch Current	$I_{SW}$	0,8	A
Power Dissipation and Thermal Characteristics			
N SUFFIX PLASTIC DIP: $T_A = +25^{\circ}C$	$P_D$	1.25	W
Thermal Resistance	$R_{\theta JA}$	100	$^{\circ}C/W$
D SUFFIX SOIC: $T_A = +25^{\circ}C$	$P_D$	625	mW
Thermal Resistance	$R_{\theta JA}$	160	$^{\circ}C/W$
Operating Junction Temperature	$T_J$	+150	$^{\circ}C$
Operating Ambient Temperature Range	$T_A$	0 to +70	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^{\circ}C$

**ELECTRICAL CHARACTERISTICS**

 (V<sub>CC</sub> = 5.0 V, T<sub>A</sub> = 0 to +70°C unless otherwise specified.)

Characteristics	Symbol	Min	Typ	Max	Unit
<b>OSCILLATOR</b>					
Frequency (V <sub>Pin5</sub> = 0 V, C <sub>T</sub> = 1.0 nF, T <sub>A</sub> = 25°C)	f <sub>osc</sub>	24	33	42	kHz
Charge Current (V <sub>CC</sub> = 5.0 V to 40 V, T <sub>A</sub> = 25°C)	I <sub>chg</sub>	24	33	42	μA
Discharge Current (V <sub>CC</sub> = 5.0 V to 40 V, T <sub>A</sub> = 25°C)	I <sub>dischg</sub>	140	200	260	μA
Discharge to Charge Current Ratio (Pin7 to V <sub>CC</sub> , T <sub>A</sub> = 25°C)	I <sub>dischg</sub> /I <sub>chg</sub>	5.2	6.2	7.5	—
Current Limit Sense Voltage (I <sub>chg</sub> = I <sub>dischg</sub> , T <sub>A</sub> = 25°C)	V <sub>lpk(sense)</sub>	250	300	350	mV
<b>OUTPUT SWITCH (Note 2)</b>					
Saturation Voltage, Darlington Connection (Note 3) (I <sub>SW</sub> = 0.5 A, Pins 1, 8 connected)	V <sub>CE(sat)</sub>	—	1.0	1.3	V
Saturation Voltage (I <sub>SW</sub> = 0.5 A, R <sub>Pin8</sub> = 82 Ω to V <sub>CC</sub> . Forced β = 20)	V <sub>CE(sat)</sub>	—	0.45	0.7	V
DC Current Gain (I <sub>SW</sub> = 0.5 A, V <sub>CE</sub> = 5.0 V, T <sub>A</sub> = 25°C)	h <sub>FE</sub>	50	120	—	—
Collector Off-State Current (V <sub>CE</sub> = 40V)	I <sub>C(off)</sub>	—	0.01	100	μA
<b>COMPARATOR</b>					
Threshold Voltage (T <sub>A</sub> = 25°C) (T <sub>A</sub> = T <sub>LOW</sub> to T <sub>HIGH</sub> )	V <sub>th</sub>	1.225 1.21	1.25 —	1.275 1.29	V
<b>Threshold Voltage (T<sub>A</sub> = 25°C) **</b>	<b>V<sub>th</sub></b>	<b>1.2375</b>	<b>1.25</b>	<b>1.2625</b>	<b>V</b>
Threshold Voltage Line Regulation (V <sub>CC</sub> = 3.0 V to 40 V)	Regline	—	1.4	5.0	mV
Input Bias Current (V <sub>in</sub> = 0V)	I <sub>IB</sub>	—	-40	-400	nA
<b>TOTAL DEVICE</b>					
Supply Current (V <sub>CC</sub> = 5.0 V to 40 V, C <sub>T</sub> = 1.0 nF, V <sub>pin7</sub> = V <sub>CC</sub> . V <sub>Pin5</sub> > V <sub>th</sub> , Pin 2 = Gnd, Remaining pins open)	I <sub>CC</sub>	—	2.5	4.0	mA

**NOTES:**

- Maximum package power dissipation limits must be observed.
- Low duty cycle pulse techniques are used during test to maintain Junction temperature as close to ambient temperature as possible
- If the output switch is driven into hard saturation (non Darlington configuration) at low switch currents (< 300 mA) and high driver currents (>30 mA), it may take up to 2.0 μs to come out of saturation. This condition will shorten the off time at frequencies > 30 kHz, and is magnified at high temperatures. This condition does not occur with a Darlington configuration, since the output switch cannot saturate. If a non Darlington configuration is used, the following output drive condition is recommended:

 Forced β of output switch = I<sub>C, output</sub> / (I<sub>C, driver</sub> - 7.0 mA) > 10

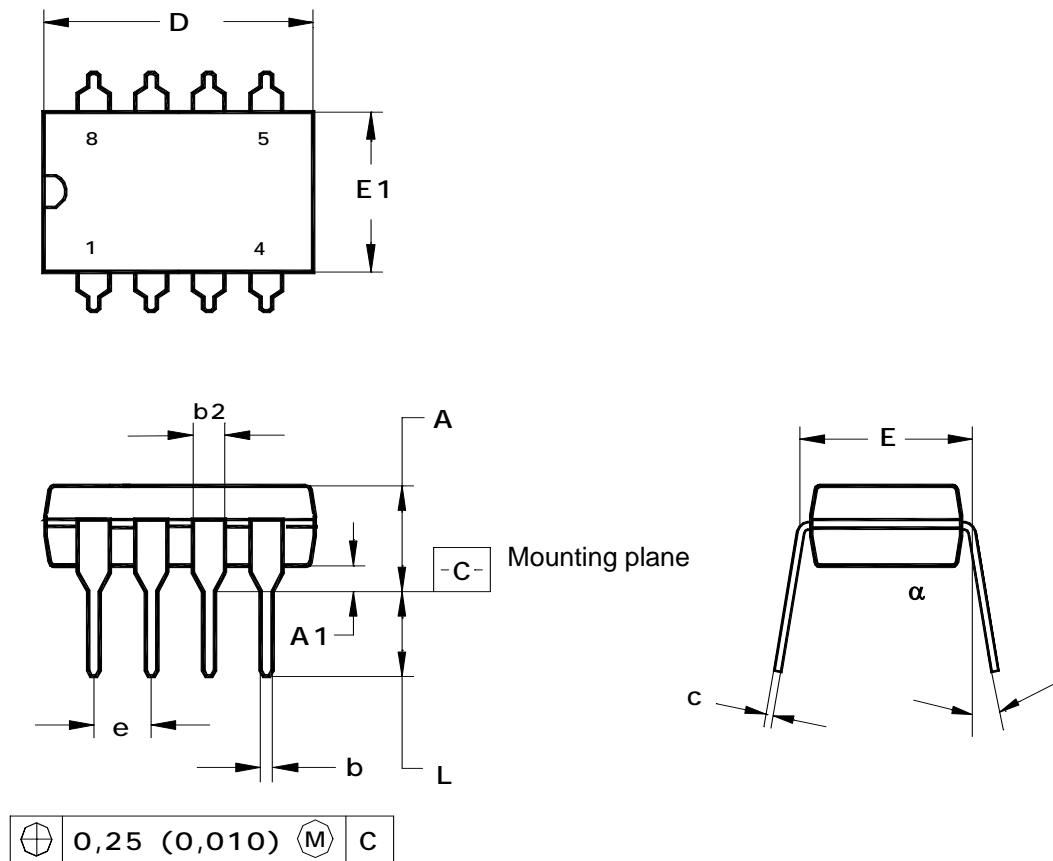
\*The 100 Ω resistor in the emitter of the driver device requires about 7.0 mA before the output switch conducts

**\*\*Possible version for shipment**

**PACKADGE DIMENSIONS**

*N SUFFIX PLASTIC DIP*

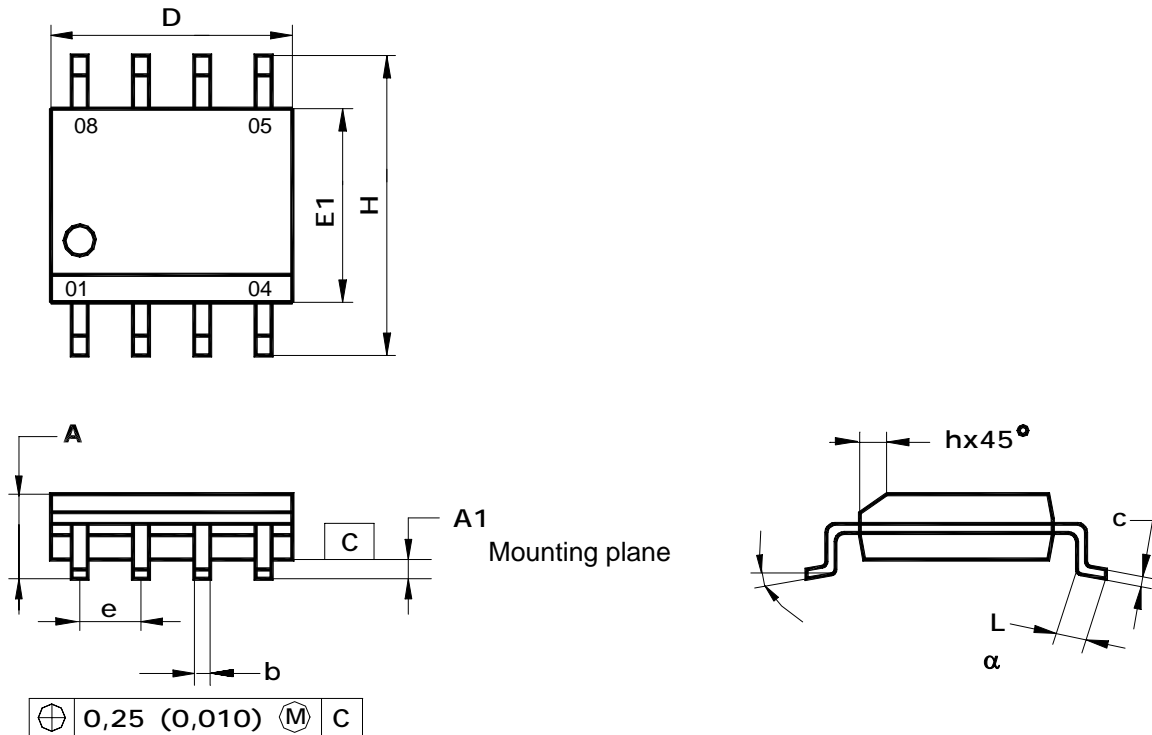
(MS - 001BA)



Note - Dimensions D, E1 do not include the fin value, which should not exceed 0.25 mm (0.010 inch) per side.

	D	E1	A	b	b2	e	$\alpha$	L	E	c	A1
mm											
min	9,02	6,07	—	0,36	1,14		0°	2,93	7,62	0,20	0,38
max	10,16	7,11	5,33	0,56	1,78	2,54	15°	3,81	8,26	0,36	—
inches											
min	0,355	0,240	—	0,014	0,045		0°	0,115	0,300	0,008	0,015
max	0,400	0,280	0,210	0,022	0,070	0,1	15°	0,150	0,325	0,014	—

*D SUFFIX SOIC*  
(MS - 012AA)



Note - Dimensions D, E1 do not include the fin value, which should not exceed 0.25 mm (0.010 inch) per side.

	D	E1	H	b	e	$\alpha$	A	A1	c	L	h
mm											
min	4,80	3,80	5,80	0,33		0°	1,35	0,10	0,19	0,41	0,25
max	5,00	4,00	6,20	0,51	1,27	8°	1,75	0,25	0,25	1,27	0,50
inches											
min	0,1890	0,1497	0,2284	0,013		0°	0,0532	0,0040	0,0075	0,016	0,0099
max	0,1968	0,1574	0,2440	0,020	0,05	8°	0,0688	0,0098	0,0098	0,050	0,0196