



# AMC34063A

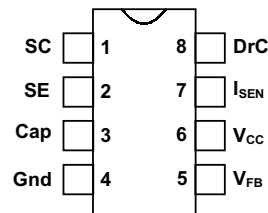
## DC - DC CONVERTER CONTROL CIRCUITS

DESCRIPTION	FEATURES
<p>The AMC34063A is designed for the applications which require DC - DC converters. It can be operated in a wide input range from 3.0V to 40V and has the controlled duty cycle oscillator, driver and high current output switch. Also, With the internal temperature compensation circuit, the AMC34063A provides an internally trimmed precision 2% reference voltage of 1.25V. These features make the AMC34063A suitable for step-up, step-down and voltage-inverting applications.</p>	<ul style="list-style-type: none"> <li>■ <b>Wide Input Operating Range: 3.0V to 40V</b></li> <li>■ <b>Output Switch Current up to 1.5A</b></li> <li>■ <b>100KHz operational Frequency</b></li> <li>■ <b>Low Standby Current</b></li> <li>□ <b>Internally trimmed 2% 1.25V Reference Voltage</b></li> <li>□ Adjustable Output Voltage</li> <li>□ Available in 8 Pin Plastic DIP and 8 Pin S.O Packages</li> <li>□ Direct pin-to-pin replacement for industrial product MC34063A.</li> </ul>

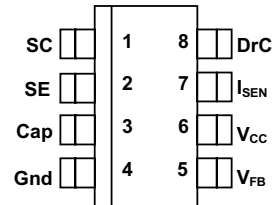
### APPLICATIONS

- Chargers
- Adaptors
- Mother Board
- Scanner

### PACKAGE PIN OUT



**M PACKAGE  
(TOP VIEW)**

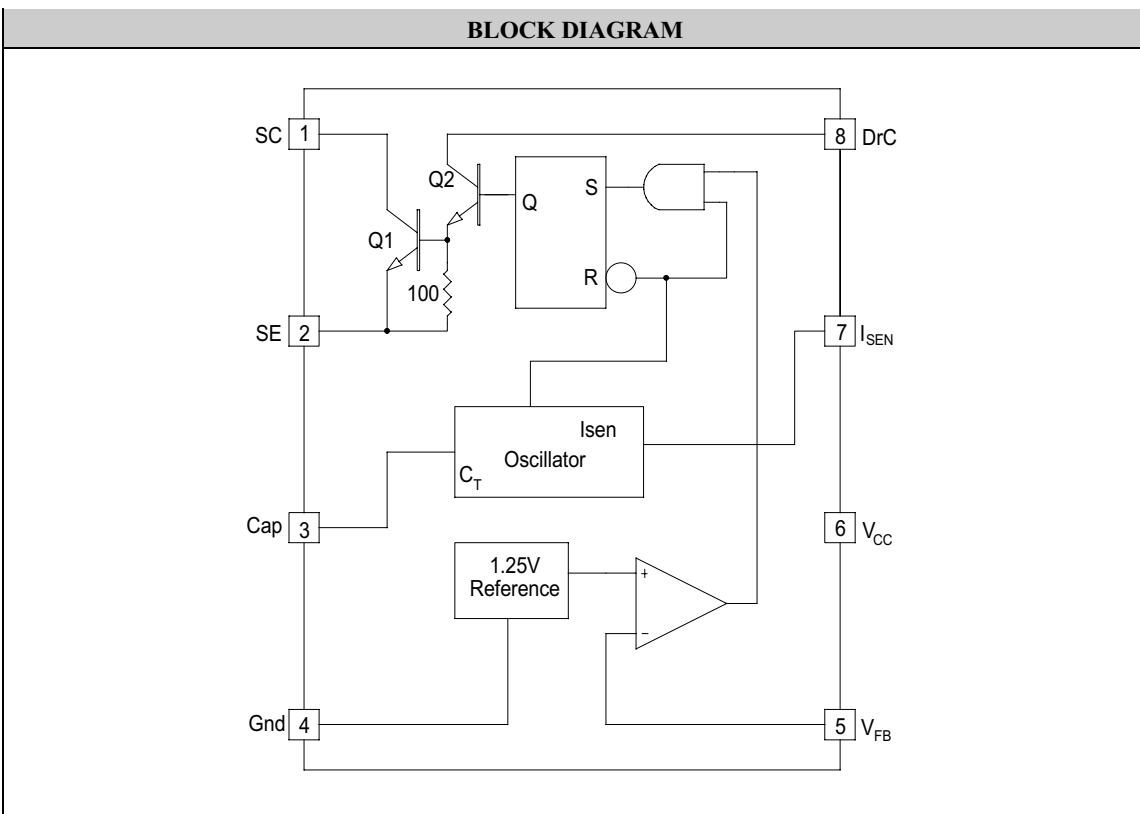


**DM PACKAGE  
(TOP VIEW)**

ORDER INFORMATION			
$T_A$ (°C)	<b>M</b>	Plastic DIP 8-pin	<b>DM</b>
<b>0 to 70</b>		<b>AMC34063AM</b>	Plastic SO-8 8-pin <b>AMC34063ADM</b>
Note: All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC34063ADMT).			

ABSOLUTE MAXIMUM RATINGS	
Power Supply Voltage ( $V_{CC}$ ) .....	40V
Operating Junction temperature	
Plastic (M, DM Package) .....	150°C
Storage Temperature Range .....	-65°C to 150°C
Lead temperature (Soldering, 10 seconds) .....	300°C
Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.	

THERMAL DATA	
M PACKAGE:	
Thermal Resistance-Junction to Ambient, $\theta_{JA}$	95°C/W
DM PACKAGE:	
Thermal Resistance-Junction to Ambient, $\theta_{JA}$	165°C/W



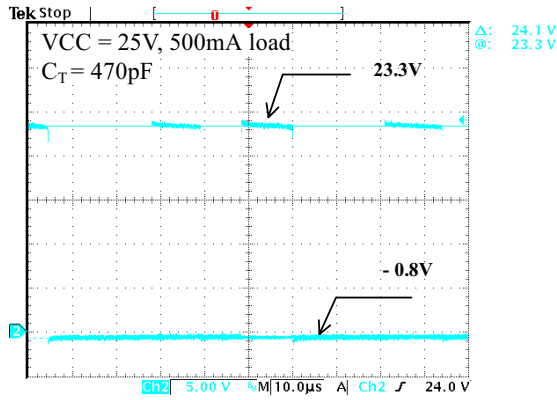
Pin Assignment Descriptions	
Pin 1 : SC - Switch Collector	Pin 8 : DrC - Driver Collector
Pin 2 : SE - Switch Emitter	Pin 7 : I <sub>SEN</sub> - I Peak Sense
Pin 3 : Cap - Oscillator Timing Capacitor	Pin 6 : V <sub>CC</sub> - Power Supply
Pin 4 : Gnd - Ground	Pin 5 : V <sub>FB</sub> - Comparator inverting input

RECOMMENDED OPERATING CONDITIONS					
Parameter	Symbol	Recommended Operating			Units
		Min.	Typ.	Max.	
Comparator Input Voltage	$V_{FB}$	-0.3 to + 40			V
Switch Collector Voltage	$V_{C(\text{switch})}$			40	V
Switch Emitter Voltage ( $V_{\text{Pin1}}=40\text{V}$ )	$V_{E(\text{switch})}$			40	V
Switch Collector to Emitter Voltage	$V_{CE(\text{switch})}$			40	V
Driver Collector Voltage	$V_{C(\text{driver})}$			40	V
Driver Collector Current (Note 1)	$I_{C(\text{driver})}$			100	mA
Switch Current	$I_{SW}$			1.5	A
Timing Capacitor (connected to Cap pin)	$C_T$		1		nF
Operating Ambient Temperature Range	$T_A$	0 to +70			$^{\circ}\text{C}$

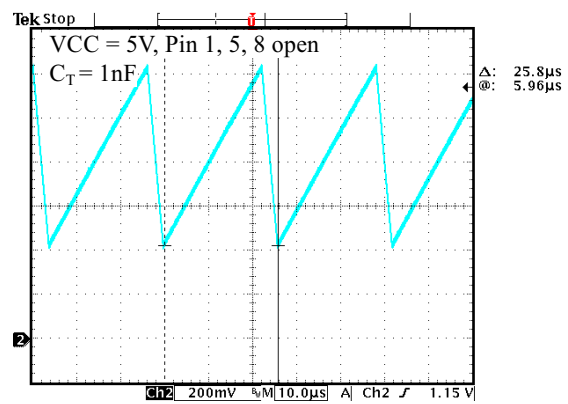
**Note 1:** Maximum package power dissipation limits must be observed.

ELECTRICAL CHARACTERISTICS						
$V_{CC}=5.0\text{ V}$ , $T_A=0^{\circ}\text{C}$ to $70^{\circ}\text{C}$ , unless otherwise specified.						
Parameter	Symbol	Test Conditions	AMC34063A			Units
			Min.	Typ.	Max.	
<b>OSCILLATOR</b>						
Frequency	$f_{osc}$	$V_{\text{Pin5}} = 0\text{ V}$ , $C_T = 1.0\text{ nF}$ , $T_A = 25^{\circ}\text{C}$	24	33	42	KHz
Charge Current	$I_{chg}$	$V_{CC} = 5.0\text{ V}$ to $40\text{ V}$ , $T_A = 25^{\circ}\text{C}$	24	35	42	$\mu\text{A}$
Discharge Current	$I_{dischg}$	$V_{CC} = 5.0\text{ V}$ to $40\text{ V}$ , $T_A = 25^{\circ}\text{C}$	140	220	260	$\mu\text{A}$
Discharge to Charge Current Ratio	$I_{dischg}/I_{chg}$	Pin 7 to $V_{CC}$ , $T_A = 25^{\circ}\text{C}$	5.2	6.5	7.5	-
Current Limit Sense Voltage	$V_{sense}$	$I_{chg} = I_{dischg}$ , $T_A = 25^{\circ}\text{C}$	250	300	350	mV
<b>OUTPUT SWITCH</b>						
Saturation Voltage, Darlington Connection	$V_{CE(\text{sat})}$	$I_{SW} = 1.0\text{ A}$ , Pins 1, 8 connected	-	1.0	1.3	V
Saturation Voltage	$V_{CE(\text{sat})}$	$I_{SW} = 1.0\text{ A}$ , $R_{\text{pin8}} = 82\ \Omega$ to $V_{CC}$ , Forced $\beta = 20$	-	0.45	0.7	V
DC Current Gain	$h_{FE}$	$I_{SW} = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ , $T_A = 25^{\circ}\text{C}$	50	75	-	-
Collector Off – State Current	$I_{C(\text{off})}$	$V_{CE} = 40\text{ V}$	-	0.01	100	$\mu\text{A}$
<b>COMPARATOR</b>						
Threshold Voltage	$V_{th}$	$T_A = 25^{\circ}\text{C}$	1.225	1.25	1.275	V
		$T_A = 0^{\circ}\text{C}$ to $70^{\circ}\text{C}$	1.21	-	1.29	
Threshold Voltage Line Regulation	$\text{Reg}_{\text{line}}$	$V_{CC} = 3.0\text{ V}$ to $40\text{ V}$	-	1.4	5.0	mV
Input Bias Current	$I_{IB}$	$V_{FB} = 0\text{ V}$	-	-20	-400	nA
<b>TOTAL DEVICE</b>						
Supply current	$I_{CC}$	$V_{CC} = 5.0\text{ V}$ to $40\text{ V}$ , $C_T = 1.0\text{ nF}$ , Pin 7 = $V_{CC}$ , $V_{FB} > V_{th}$ , Pin 2 = Gnd, remaining pins open	-	-	4.0	mA

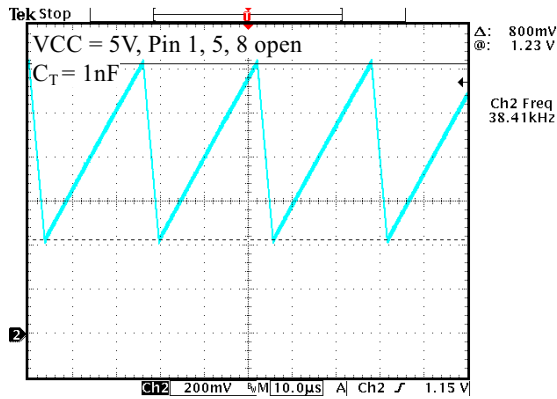
**CHARACTERIZATION CURVES**



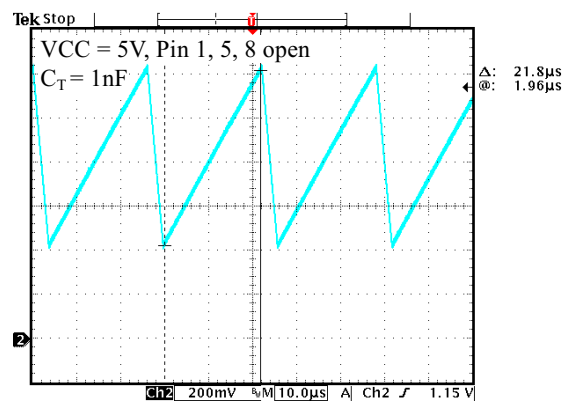
**SE pin (PIN#2) waveform**  
**on 5V step down converter**



**Cap pin (PIN#3) waveform**

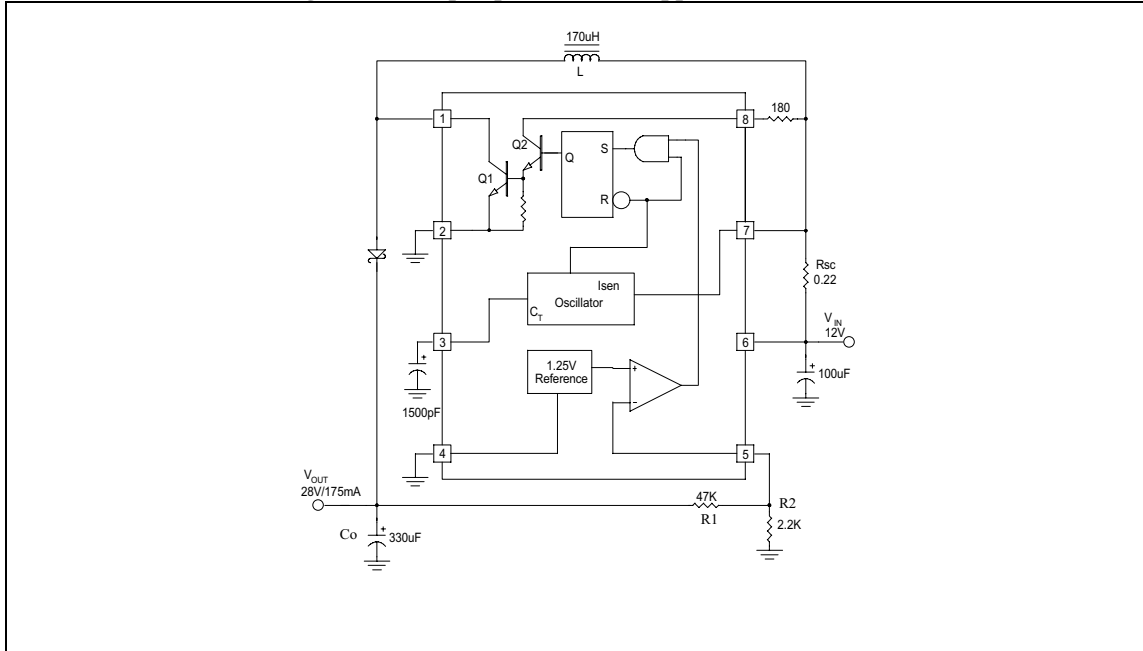


**Cap pin (PIN#3) waveform**

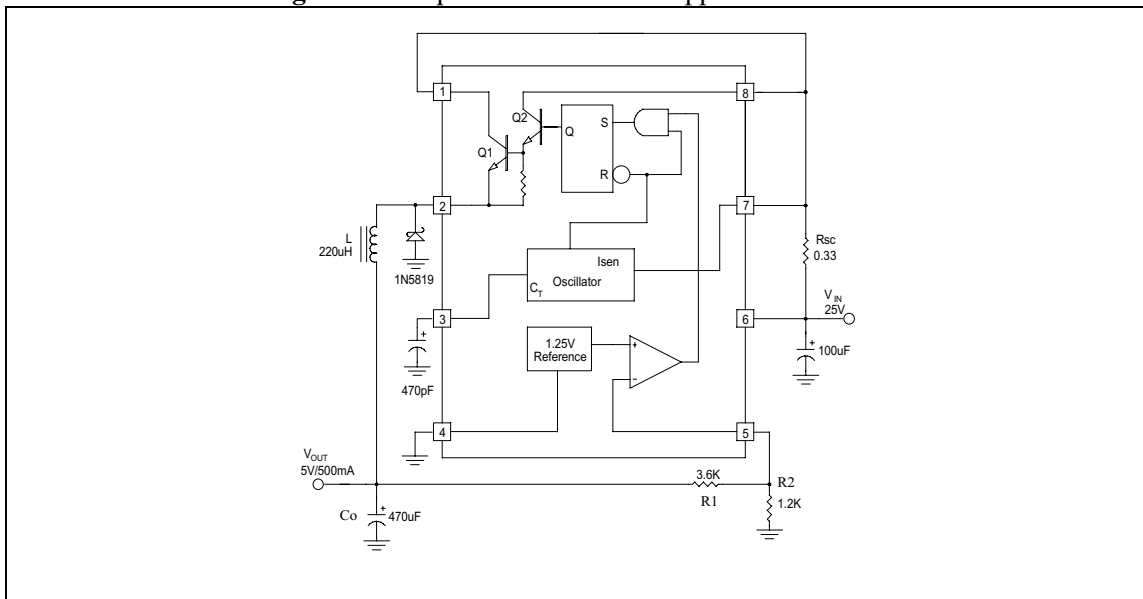


**Cap pin (PIN#3) waveform**

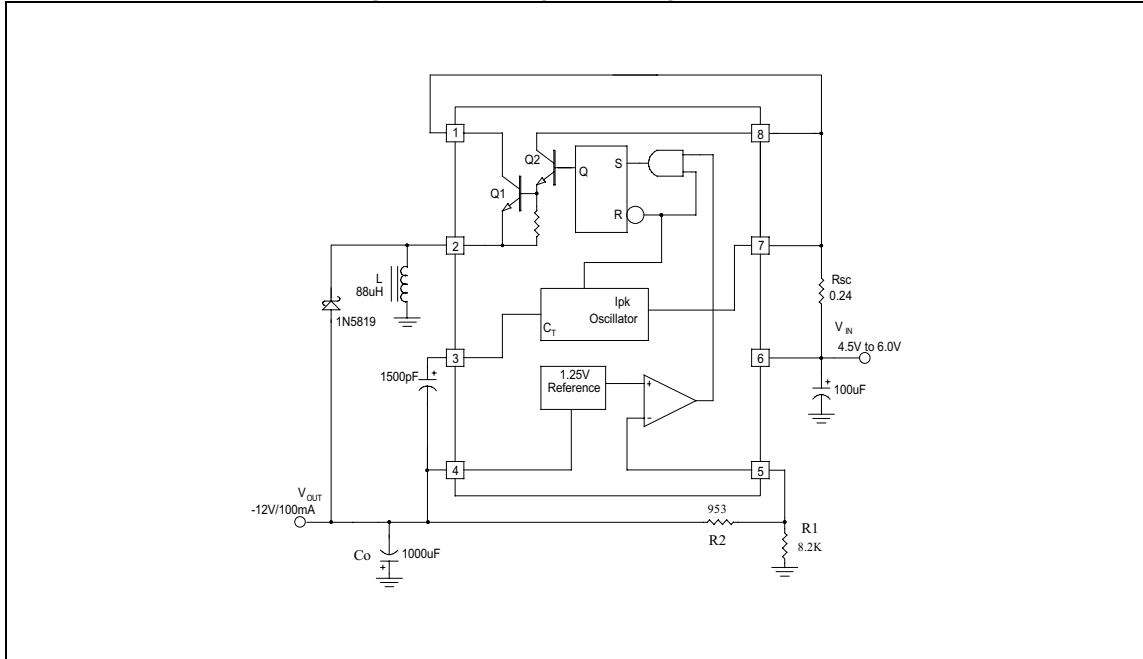
**Figure 1 – Step-Up Converter Application Circuits**



**Figure 2 – Step-Down Converter Application Circuit**



**Figure 3 – Voltage Inverting Converters**



Note: For step-up, step-down or voltage inverting applications requiring peak current greater than 1.5A, external boost current circuitry by NPN or PNP transistors can be used.

**Typical Design Reference Table:**

Calculation	Step-Down	Step-Up	Voltage-Inverting
$t_{on}/t_{off}$	$\frac{V_{out} + V_F}{V_{in(min)} - V_{sat} - V_{out}}$	$\frac{V_{out} + V_F - V_{in(min)}}{V_{in(min)} - V_{sat}}$	$\frac{ V_{out}  + V_F}{V_{in} - V_{sat}}$
$t_{on} + t_{off}$	$\frac{1}{f}$	$\frac{1}{f}$	$\frac{1}{f}$
$t_{off}$	$\frac{t_{on} + t_{off}}{t_{on}/t_{off} + 1}$	$\frac{t_{on} + t_{off}}{t_{on}/t_{off} + 1}$	$\frac{t_{on} + t_{off}}{t_{on}/t_{off} + 1}$
$t_{on}$	$(t_{on} + t_{off}) - t_{off}$	$(t_{on} + t_{off}) - t_{off}$	$(t_{on} + t_{off}) - t_{off}$
$C_T$	$4.0 \times 10^{-5} t_{on}$	$4.0 \times 10^{-5} t_{on}$	$4.0 \times 10^{-5} t_{on}$
$I_{pk( switch )}$	$2I_{out(max)}$	$2I_{out(max)} (t_{on}/t_{off} + 1)$	$2I_{out(max)} (t_{on}/t_{off} + 1)$
$R_{SC}$	$0.3/I_{pk( switch )}$	$0.3/I_{pk( switch )}$	$0.3/I_{pk( switch )}$
$L_{(min)}$	$\left( \frac{V_{in(min)} - V_{sat} - V_{out}}{I_{pk( switch )}} \right) t_{on(max)}$	$\left( \frac{V_{in(min)} - V_{sat}}{I_{pk( switch )}} \right) t_{on(max)}$	$\left( \frac{V_{in(min)} - V_{sat}}{I_{pk( switch )}} \right) t_{on(max)}$
$C_O$	$\frac{I_{pk( switch )} (t_{on} + t_{off})}{8V_{ripple(pp)}}$	$9 \frac{I_{out} t_{on}}{V_{ripple(pp)}}$	$9 \frac{I_{out} t_{on}}{V_{ripple(pp)}}$

$V_F$ : Forward Voltage drop of the output rectifier

$V_{sat}$ : Saturation voltage of the output switch.

**The following power supply characteristics must be chosen:**

$V_{in}$  - Nominal input voltage

$V_{out}$  - Desired output voltage,  $|V_{out}| = 1.25(1 + R1/R2)$

$I_{out}$  - Desired output current.

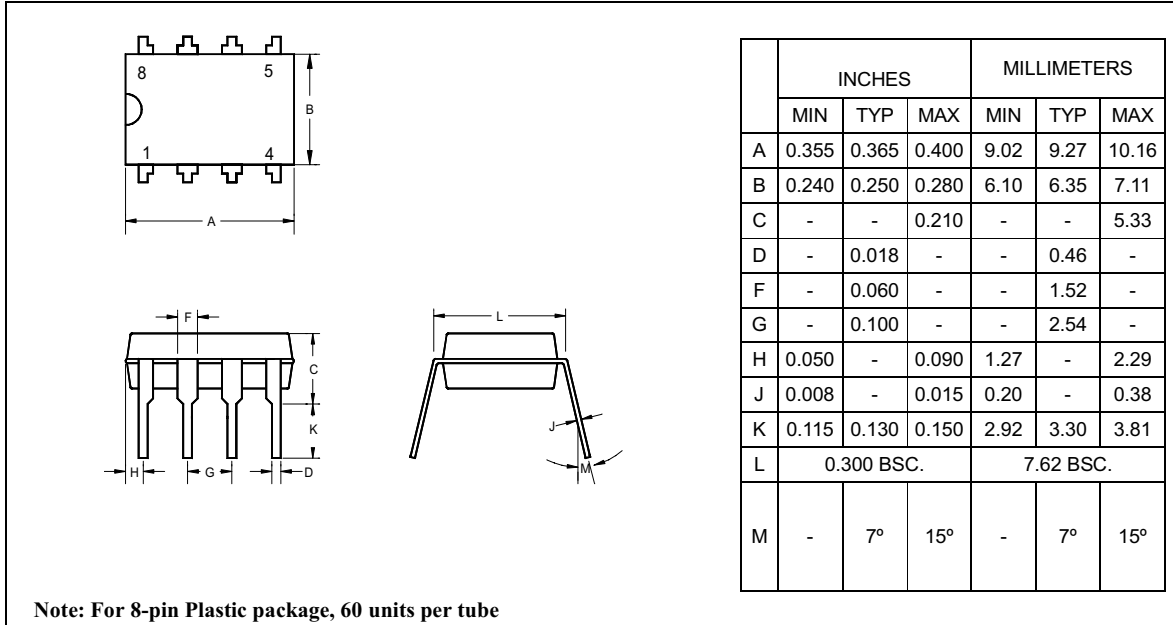
$f_{min}$  - Minimum desired output switching frequency at the selected values of  $V_{in}$  and  $I_O$

$V_{ripple(pp)}$  - Desired peak - to - peak output ripple voltage.

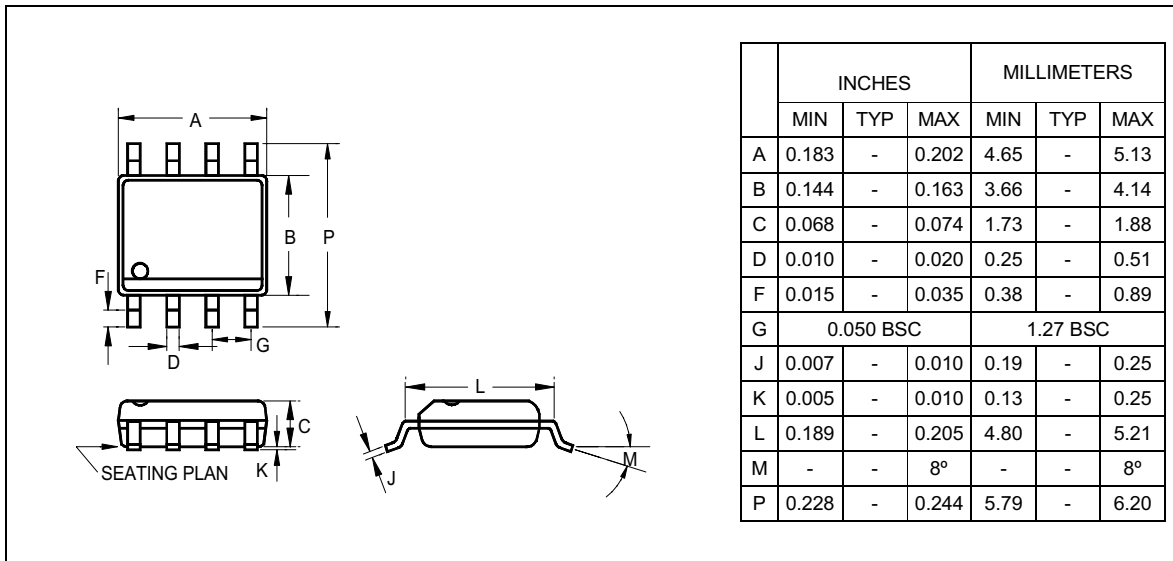
**Application concerns:**

To get the best regulation performance, Low ESR capacitors at  $V_{out}$  are suggested.

**8-Pin Plastic DIP**



**8-Pin Plastic S.O.I.C.**





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