- These are Pb−Free and Halide−Free Devices

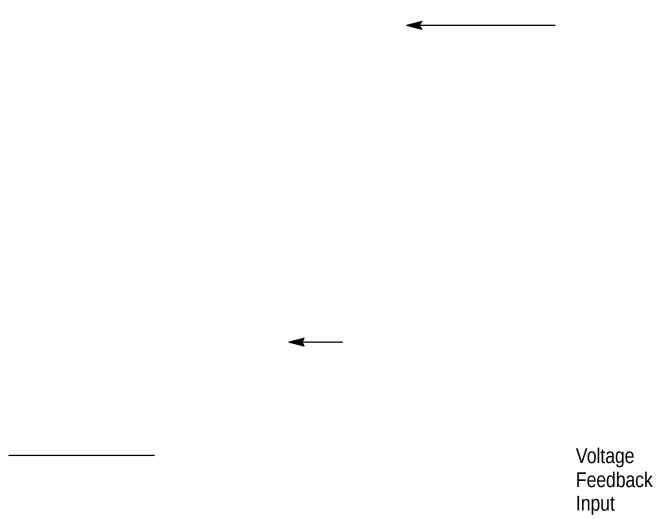


Figure 1. Simplified Block Diagram

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
		–	
		–	
° – – ° – –			° °
			°
		–	°
		–	°

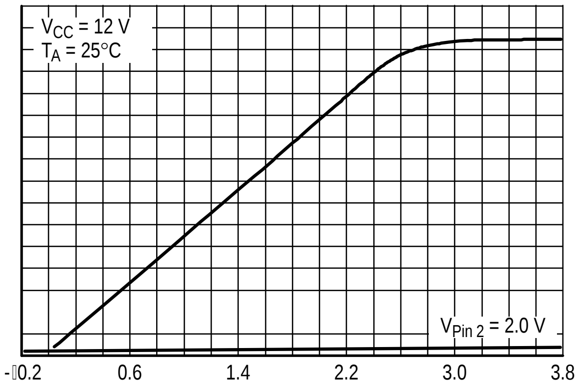
– – – – –

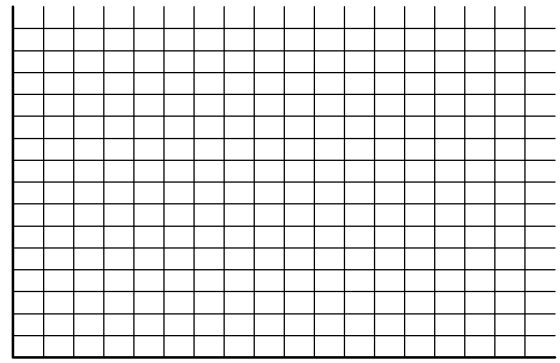
ELECTRICAL CHARACTERISTICS °

Characteristic	Symbol	Min	Typ	Max	Unit
ERROR AMPLIFIER					
°					

[redacted]

–


VCC = 12 V
TA = 25°C
VPin 2 = 2.0 V
-0.2
0.6
1.4
2.2
3.0
3.8



-55

T_A

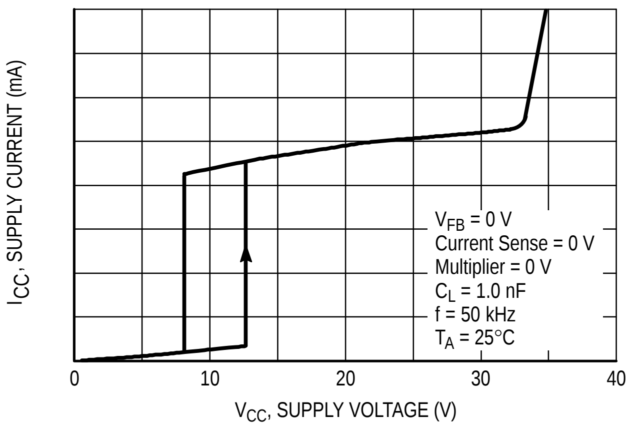


Figure 14. Supply Current versus Supply Voltage

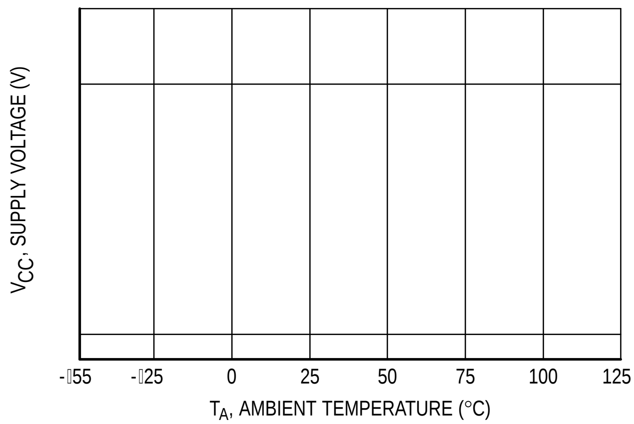


Figure 15. Undervoltage Lockout Thresholds

Operating Description

The MC34262, MC33262 contain many of the building blocks and protection features that are employed in modern high performance current mode power supply controllers. There are, however, two areas where there is a major difference when compared to popular devices such as the UC3842 series. Referring to the block diagrams in Figures 20, 21, and 22 note that a multiplier has been added to the current sense loop and that this device does not contain an oscillator. The reasons for these differences will become apparent in the following discussion. A description of each of the functional blocks is given below.

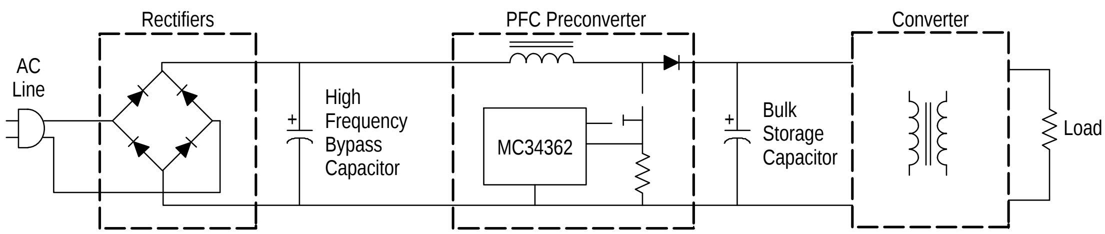


Figure 18. Active Power Factor Correction Preconverter

A significant reduction in line current distortion can be attained by forcing the preconverter to switch as the ac line voltage crosses through zero. The forced switching is achieved by adding a controlled amount of offset to the Multiplier and Current Sense Comparator circuits. The equation shown below accounts for the built−in offsets and is accurate to within ten percent. Let $V_{th(M)}$ = 1.991 V

−

−

Zero Current Detector

The MC34262 operates as a critical conduction current mode controller, whereby output switch conduction is initiated by the Zero Current Detector and terminated when the peak inductor current reaches the threshold level established by the Multiplier output. The Zero Current Detector initiates the next on−time by setting the RS Latch at the instant the inductor current reaches zero. This critical conduction mode of operation has two significant benefits. First, since the MOSFET cannot turn−on until the inductor

A Quickstart circuit has been incorporated to optimize converter startup. During initial startup, compensation capacitor C_1 will be discharged, holding the error amp output below the Multiplier threshold. This will prevent Drive Output switching and delay bootstrapping of capacitor C_4 by diode D_6. If Pin 2 does not reach the multiplier threshold before C_4 discharges below the lower UVLO threshold, the converter will “hiccup” and experience a significant startup delay. The Quickstart circuit is designed to precharge C_1 to 1.7 V, Figure 8. This level is slightly below the Pin 2 Multiplier threshold, allowing immediate Drive Output switching and bootstrap operation when C_4 crosses the upper UVLO threshold.

Drive Output

The MC34262/MC33262 contain a single totem−pole output stage specifically designed for direct drive of power MOSFETs. The Drive Output is capable of up to ±500 mA peak current with a typical rise and fall time of 50 ns with a 1.0 nF load. Additional internal circuitry has been added to keep the Drive Output in a sinking mode whenever the Undervoltage Lockout is active. This characteristic eliminates the need for an external gate pulldown resistor. The totem−pole output has been optimized to minimize cross−conduction current during high speed operation. The addition of two 10 Ω resistors, one in series with the source output transistor and one in series with the sink output transistor, helps to reduce the cross−conduction current and radiated noise by limiting the output rise and fall time. A 16 V clamp has been incorporated into the output stage to limit the high state V_{OH}. This prevents rupture of the MOSFET gate when V_{CC} exceeds 20 V.

APPLICATIONS INFORMATION

The application circuits shown in Figures 20, 21 and 22 reveal that few external components are required for a complete power factor preconverter. Each circuit is a peak detecting current−mode boost converter that operates in critical conduction mode with a fixed on−time and variable off−time. A major benefit of critical conduction operation is that the current loop is inherently stable, thus eliminating the need for ramp compensation. The application in Figure 20 operates over an input voltage range of 90 Vac to 138 Vac and provides an output power of 80 W (230 V at 350 mA) with an associated power factor of approximately 0.998 at nominal line. Figures 21 and 22 are universal input preconverter examples that operate over a continuous input voltage range of 90 Vac to 268 Vac. Figure 21 provides an output power of 175 W (400 V at 440 mA) while Figure 22 provides 450 W (400 V at 1.125 A). Both circuits have an observed worst−case power factor of approximately 0.989. The input current and voltage waveforms of Figure 21 are shown in Figure 23 with operation at 115 Vac and 230 Vac. The data for each of the applications was generated with the test set−up shown in Figure 25.

Table 1. Design Equations

Notes	Calculation	Formula

η

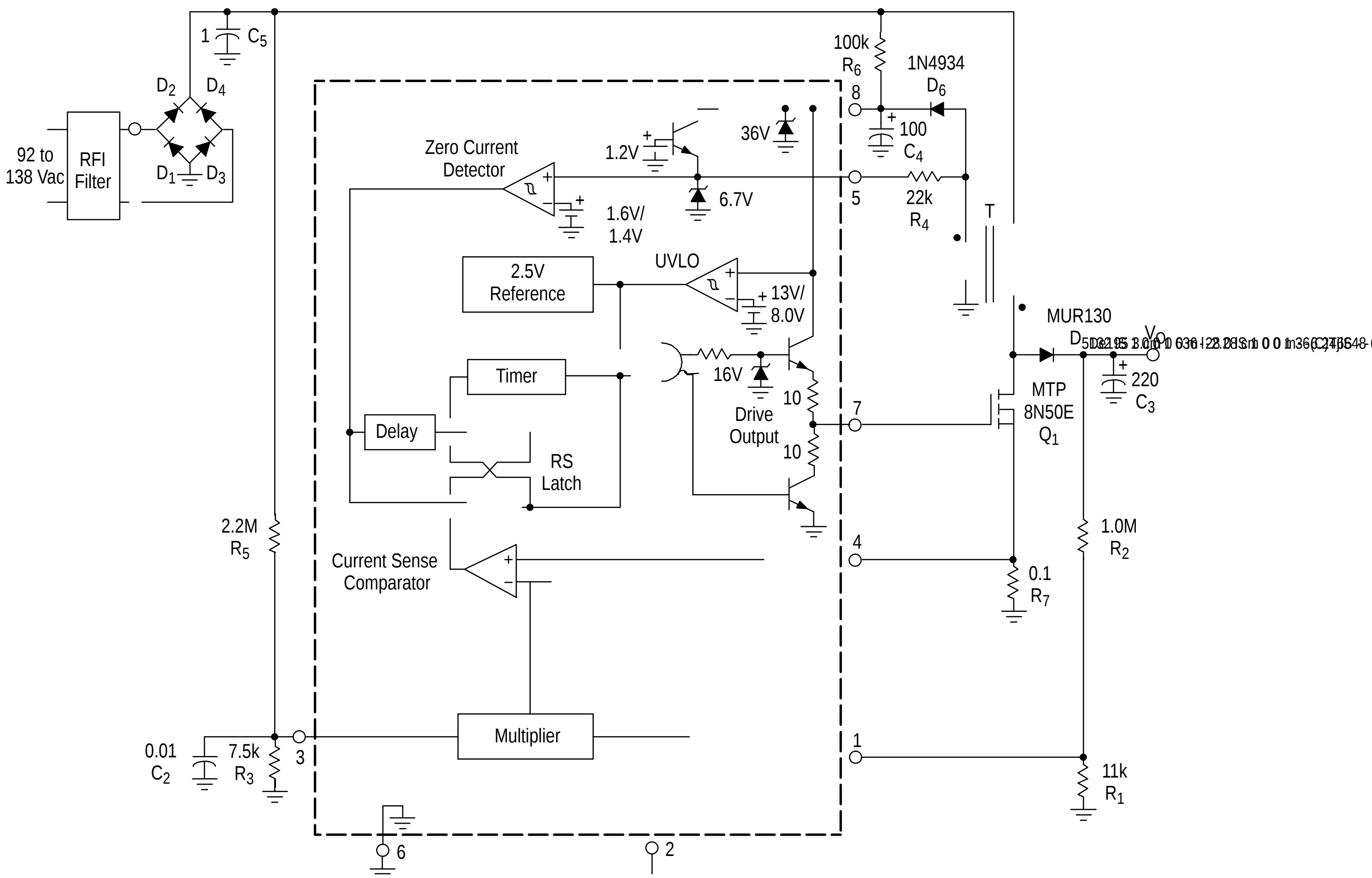
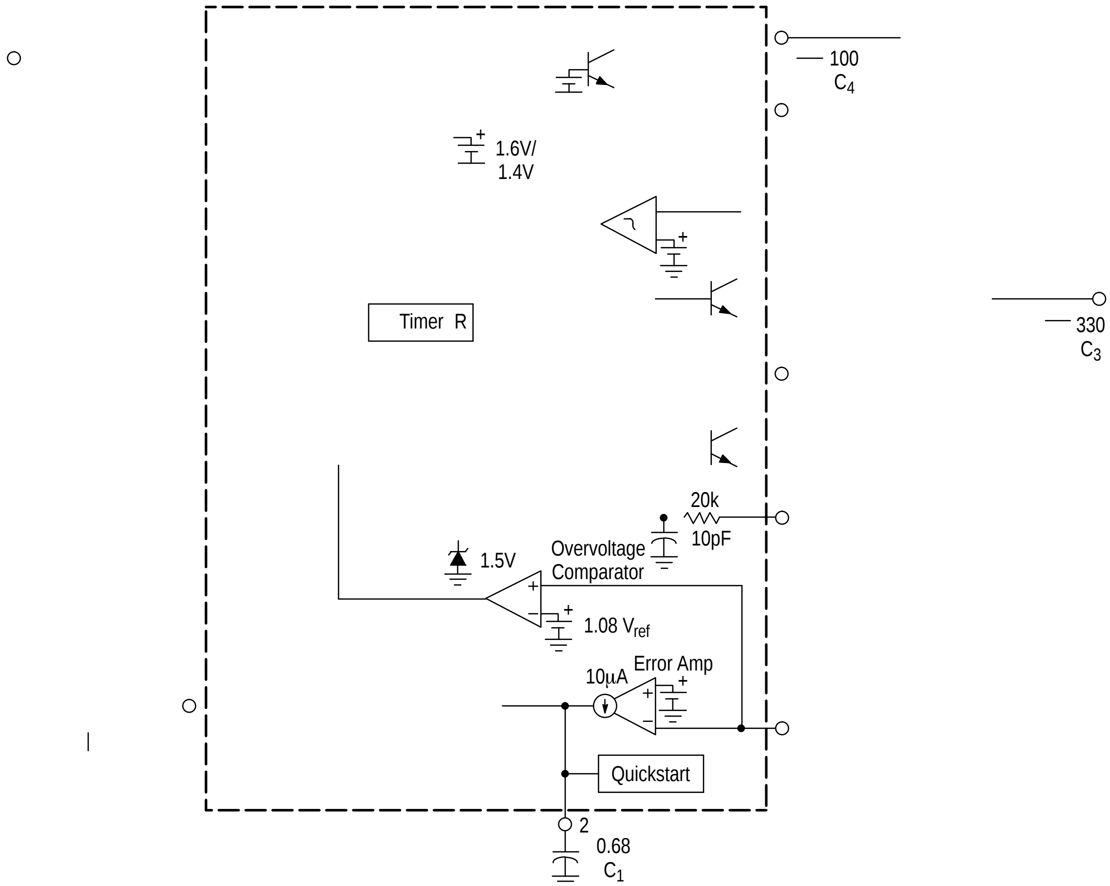


Figure 20. 80 W Power Factor Controller


100
C4
1.6V/
1.4V
Timer R
330
C3
20k
10pF
1.5V
Overvoltage
Comparator
1.08 Vref
10μA
Error Amp
Quickstart
2
0.68
C1

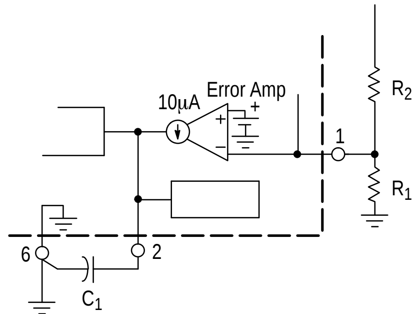


Figure 26. Error Amp Compensation

≈

–

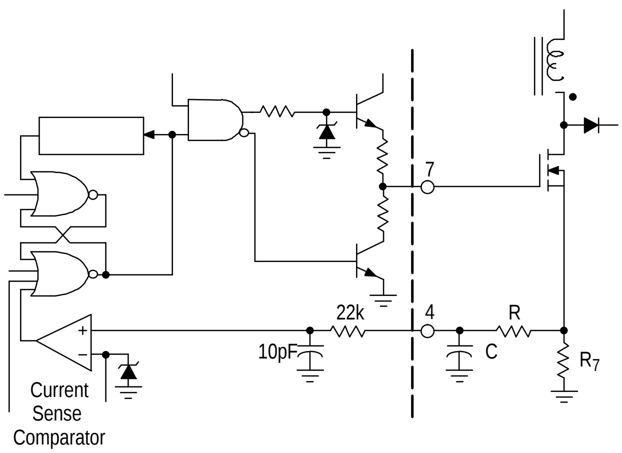


Figure 27. Current Waveform Spike Suppression

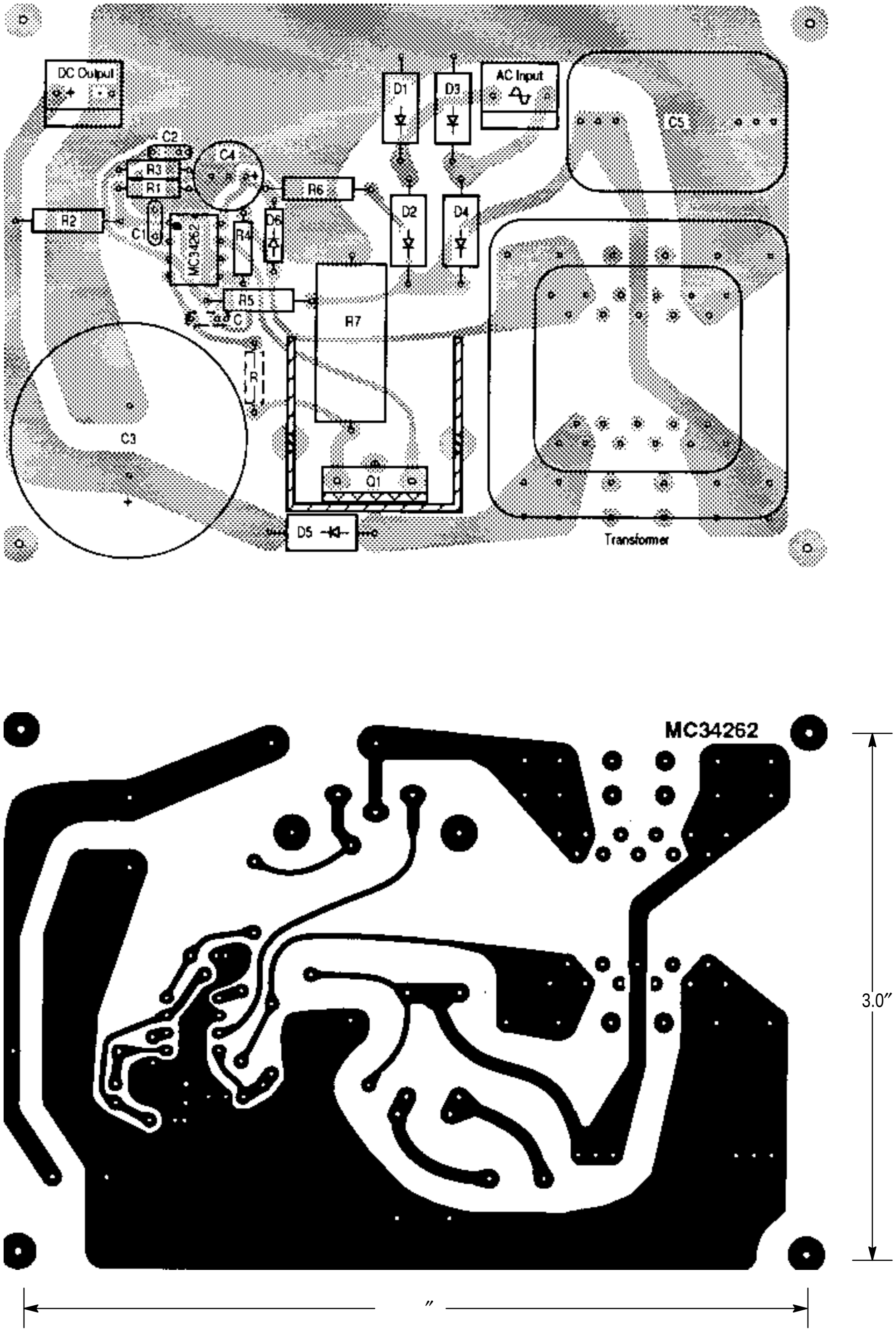


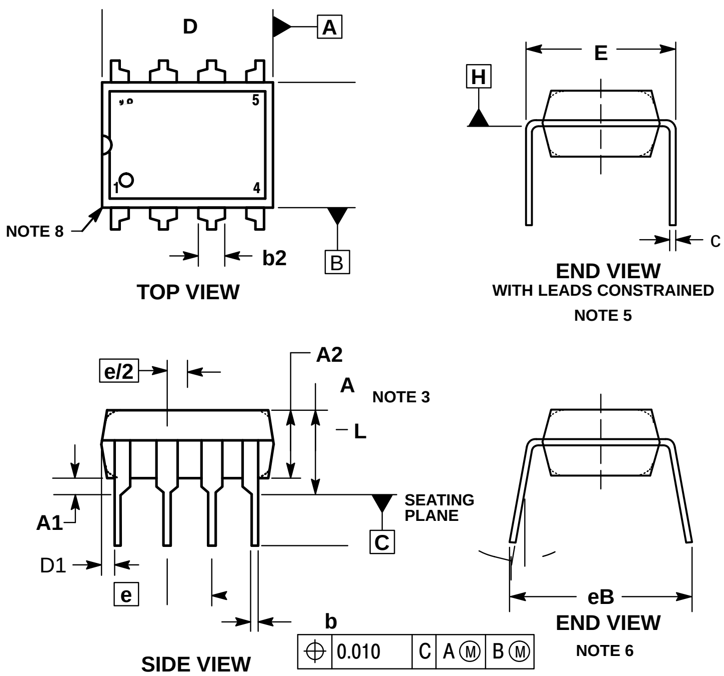
Figure 29. Printed Circuit Board and Component Layout
(Circuits of Figures 20 and 21)

DEVICE ORDERING INFORMATION

Device	Operating Temperature Range	Package	Shipping
		– –	
	° °	– –	
		– –	
		– –	
	– ° °	– –	
		– –	
		– –	

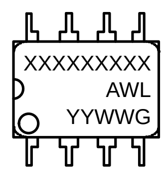
PDIP 8
CASE 626−05
ISSUE P

DATE 22 APR 2015



DIM	INCHES MIN	INCHES MAX		
A	−−−−	0.210		
A1	0.015	−−−−		
A2	0.115	0.195	2.92	4.95
b	0.014	0.022		
C	0.008	0.014		
D	0.355	0.400		
D1	0.005	−−−−		
E	0.300	0.325		
e	0.100 BSC			
L	0.115	0.150	2.92	3.81

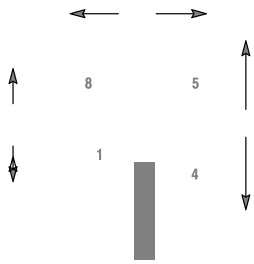
GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
G = Pb−Free Package

SOIC 8 NB
CASE 751−07
ISSUE AK

DATE 16 FEB 2011



SEATING
PLANE