



## MC34262

Preliminary

CMOS IC

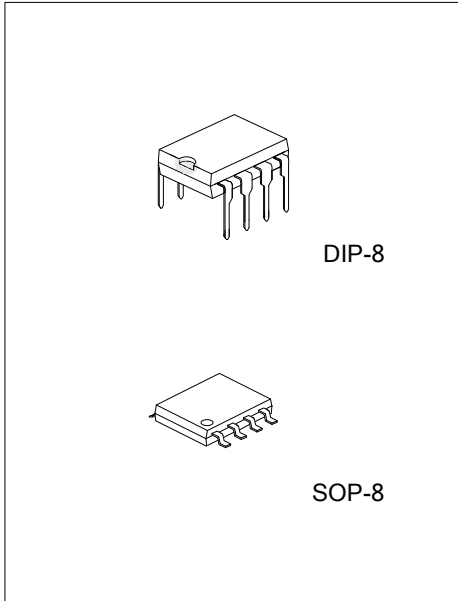
### POWER FACTOR CONTROLLERS

#### DESCRIPTION

The UTC **MC34262** is an active power factor controller that functions as a boost preconverter in electronic ballast and in off-line power converter applications.

These integrated circuits feature an internal startup timer for stand-alone applications, one quadrant multiplier for near unity power factor, zero current detector to ensure critical conduction operation, transconductance error amplifier, quick start circuit for enhanced startup, trimmed internal bandgap reference, current sensing comparator, and a totem pole output ideally suited for driving a power MOSFET.

The multi-protection function of UTC **MC34262** can greatly enhance the system reliability and safety. The UTC **MC34262** features output over voltage protection, input UVLO with hysteresis, cycle-by-cycle current limiting, multiplier output clamp that limits maximum peak switch current, and a drive output high state clamp for MOSFET gate protection. These devices are available in dual-in-line and surface mount plastic packages.



#### FEATURES

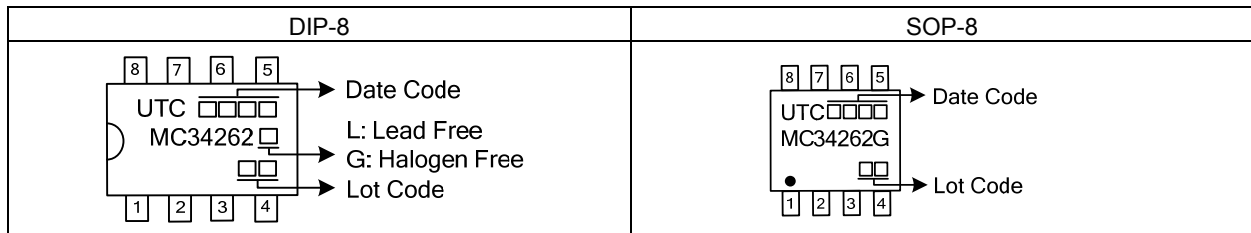
- \* Output over voltage protection
- \* Internal Startup Timer
- \* One Quadrant Multiplier
- \* Zero Current Detector
- \* Trimmed 2% Internal Bandgap Reference
- \* Totem Pole Output with High State Clamp
- \* Undervoltage Lockout (UVLO) with 5.0V of Hysteresis
- \* Low Startup and Operating Current
- \* Supersedes Functionality of SG3561, TDA4817 and UTC **MC34262**

#### ORDERING INFORMATION

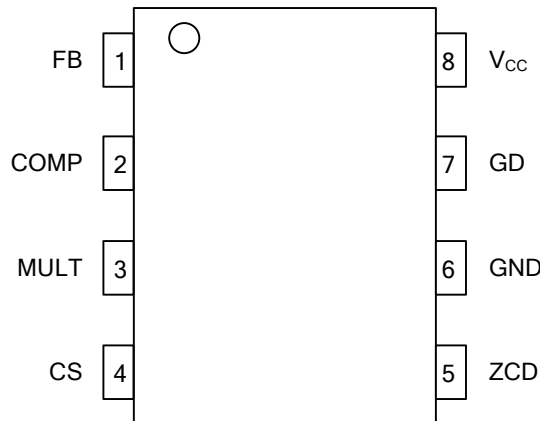
Ordering Number		Package	Packing
Lead Free	Halogen Free		
MC34262L-D08-T	MC34262G-D08-T	DIP-8	Tube
-	MC34262G-S08-R	SOP-8	Tape Reel

<p>MC34262L-D08-T</p>	<p>(1) T: Tube, R: Tape Reel  (2) D08: DIP-8, S08: SOP-8  (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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### MARKING



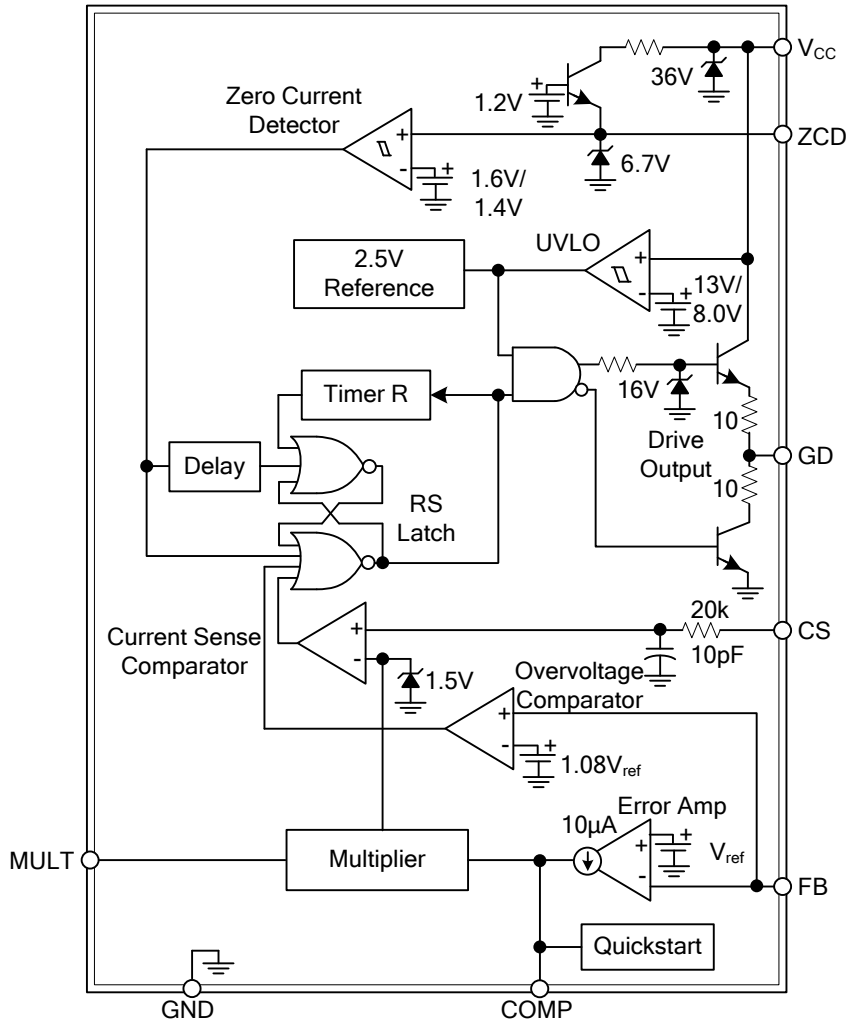
### PIN CONFIGURATION



### PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	FB	Inverting input of the error amplifier. The information on the out voltage of the boost converter is fed into the pin through a resistor divider.
2	COMP	Out of the error amplifier. This pin is connected to ground via a compensation capacitor to achieve stability of the voltage control loop.
3	MULT	Input to the multiplier. This pin is connected to the line voltage after the bridge rectified diodes via a resistor divider to provide sinusoidal reference voltage to the current loop.
4	CS	Input to the CS comparator. The MOSFET current is sensed by a resistor, the resulting voltage is applied to this pin and compared with an internal sinusoidal-shaped reference generated by the multiplier to determine the MOSFET's turn off.
5	ZCD	Zero Current Detector input. This pin is connected to the auxiliary winding via a resistor to sense the inductor current zero crossing point by monitoring the auxiliary winding voltage falls below 1.4V. When activated, a new switching cycle starts.
6	GND	Ground pin.
7	GD	Gate driver out. The totem pole output stage is able to driver power MOSFET, The high-level voltage of the pin is clamped at about 16V.
8	VCC	Supply voltage of driver and control circuits.

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT	
Total Power Supply And Zener Current		$(I_{CC}+I_Z)$	30	mA	
Output Current, Source Or Sink		$I_O$	500	mA	
Current Sense, Multiplier, And Voltage Feedback Inputs		$V_{IN}$	-1.0~+10	V	
Zero Current Detect Input	High State Forward Current	$I_{IN}$	50	mA	
	Low State Reverse Current		-10		
Power Dissipation And Thermal Characteristics	N Suffix, Plastic Package	Maximum Power Dissipation ( $T_A=70^\circ\text{C}$ )	$P_D$	800	mW
		Thermal Resistance, Junction-to-Air	$R_{\theta JA}$	100	$^\circ\text{C/W}$
	D Suffix, Plastic Package	Maximum Power Dissipation ( $T_A=70^\circ\text{C}$ )	$P_D$	450	mW
		Thermal Resistance, Junction-to-Air	$R_{\theta JA}$	178	$^\circ\text{C/W}$
Operating Junction Temperature		$T_J$	+150	$^\circ\text{C}$	
Operating Ambient Temperature		$T_A$	0~+85	$^\circ\text{C}$	
Storage Temperature		$T_{STG}$	-65~+150	$^\circ\text{C}$	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ ELECTRICAL CHARACTERISTICS

( $V_{CC}=12\text{V}$ , for min/max values  $T_A$  is the operating ambient temperature range that applies unless otherwise noted.)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>ERROR AMPLIFIER</b>							
Voltage Feedback Input Threshold		$V_{FB}$	$T_A=25^\circ\text{C}$	2.465		2.535	V
			$T_A=T_{low}\sim T_{high}$ , $V_{CC}=12\text{V}\sim 28\text{V}$	2.44		2.54	
Line Regulation		$\text{Reg}_{line}$	$V_{CC}=12\text{V}\sim 28\text{V}$ , $T_A=25^\circ\text{C}$			10	mV
Input Bias Current		$I_{IB}$	$V_{FB}=0\text{V}$			-0.5	$\mu\text{A}$
Transconductance		$g_m$	$T_A=25^\circ\text{C}$	80		130	$\mu\text{mho}$
Output Current	Source	$I_O$	$V_{FB}=2.3\text{V}$		10		$\mu\text{A}$
	Sink		$V_{FB}=2.7\text{V}$		10		$\mu\text{A}$
Output Voltage Swing	High State	$V_{OH(EA)}$	$V_{FB}=2.3\text{V}$	5.8			V
	Low State	$V_{OL(EA)}$	$V_{FB}=2.7\text{V}$			2.4	V
<b>OVERVOLTAGE COMPARATOR</b>							
Voltage Feedback Input Threshold		$V_{FB(OV)}$		1.065 $V_{FB}$		1.095 $V_{FB}$	V
<b>MULTIPLIER</b>							
Input Bias Current, MULT		$I_{MULT}$	$V_{FB}=0\text{V}$			-0.5	$\mu\text{A}$
Input Threshold, COMP		$V_{TH(M)}$		1.05 $V_{OL(EA)}$			V
Dynamic Input Voltage Range	Multiplier Input	$V_{MULT}$		0~2.5			V
	Compensation	$V_{COMP}$		$V_{TH(M)}\sim$ $(V_{TH(M)}+1.0)$			V
Multiplier Gain		K	$V_{MULT}=0.5\text{V}$ , $V_{COMP}=V_{TH(M)}+1.0\text{V}$	0.43		0.87	1/V
<b>ZERO CURRENT DETECTOR</b>							
Input Threshold Voltage		$V_{TH}$	$V_{IN}$ Increasing	1.33		1.87	V
Hysteresis		$V_{HYS}$	$V_{IN}$ Decreasing	100		300	mV
Input Clamp Voltage	High State	$V_{ZCDH}$	$I_{DET}=+3.0\text{mA}$	6.1			V
	Low State	$V_{ZCDL}$	$I_{DET}=-3.0\text{mA}$	0.3		1.0	

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>CURRENT SENSE COMPARATOR</b>							
Input Bias Current	$I_{IB}$	$V_{CS}=0V$			-1.0	$\mu A$	
Input Offset Voltage	$V_{CSoffset}$	$V_{COMP}=1.1V, V_{MULT}=0V$			25	mV	
Maximum Current Sense Input Threshold (Note 1)	$V_{TH(MAX)}$		1.3		1.8	V	
Delay to Output	$T_{PHL(IN/OUT)}$				400	ns	
<b>DRIVE OUTPUT</b>							
Output Voltage	Low State	$V_{OL}$	$V_{CC}=12V$	$I_{sink}=20mA$		0.8	V
				$I_{sink}=200mA$		3.3	
	High State	$V_{OH}$		$I_{source}=20mA$	9.8		
				$I_{source}=200mA$	7.8		
Output Voltage	High State	$V_{O(max)}$	$V_{CC}=30V$	$I_{source}=20mA,$ $C_L=15pF$	14	18	V
Output Voltage Rise Time	$T_R$	$C_L=1.0nF$			120	ns	
Output Voltage Fall Time	$T_F$	$C_L=1.0nF$			120	ns	
Output Voltage with UVLO Activated	$V_{O(UVLO)}$	$V_{CC}=7.0V, I_{sink}=1.0mA$			0.5	V	
<b>RESTART TIMER</b>							
Restart Time Delay	$T_{Dly}$		200			$\mu s$	
<b>SUPPLY VOLTAGE SECTION</b>							
$V_{CC}$ Under Voltage Lockout Exit	$UVLO_{off}$	$V_{CC}$ increasing	11.5		14.5	V	
$V_{CC}$ Under Voltage Lockout Enter	$UVLO_{on}$	$V_{CC}$ decreasing	7.0		9.0	V	
Hysteresis	$V_{Hys}$		3.8		6.2	V	
$V_{CC}$ Supply Zener Voltage	$V_Z$		30			V	
<b>SUPPLY CURRENT SECTION</b>							
Stand by mode Current	$I_{stand\_by}$	$V_{CC}=7.0V$			0.4	mA	
Quiescent Current	$I_Q$	Output no switching			12	mA	
Dynamic Operating Current	$I_{CC}$	50kHz, $C_L=1.0nF$			20	mA	

■ TYPICAL APPLICATION CIRCUIT

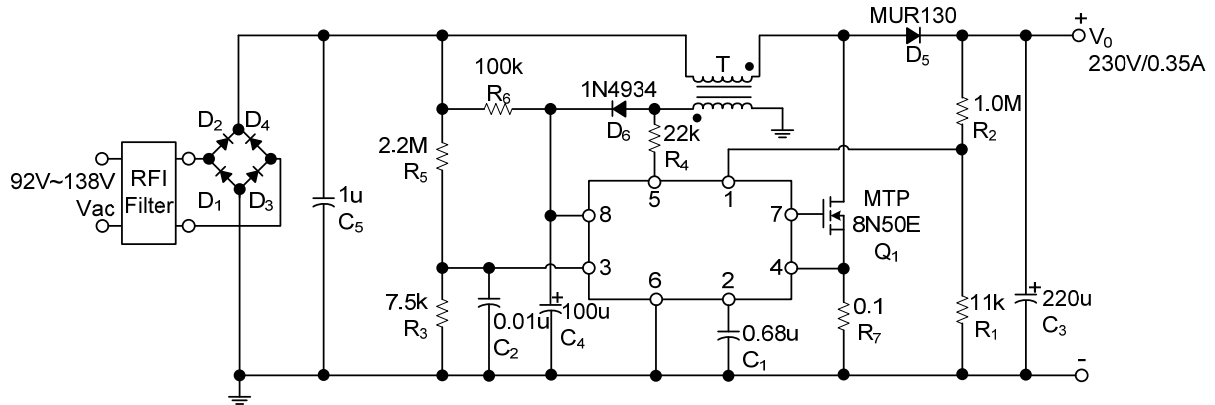


Figure 1. 80W Power Factor Controller

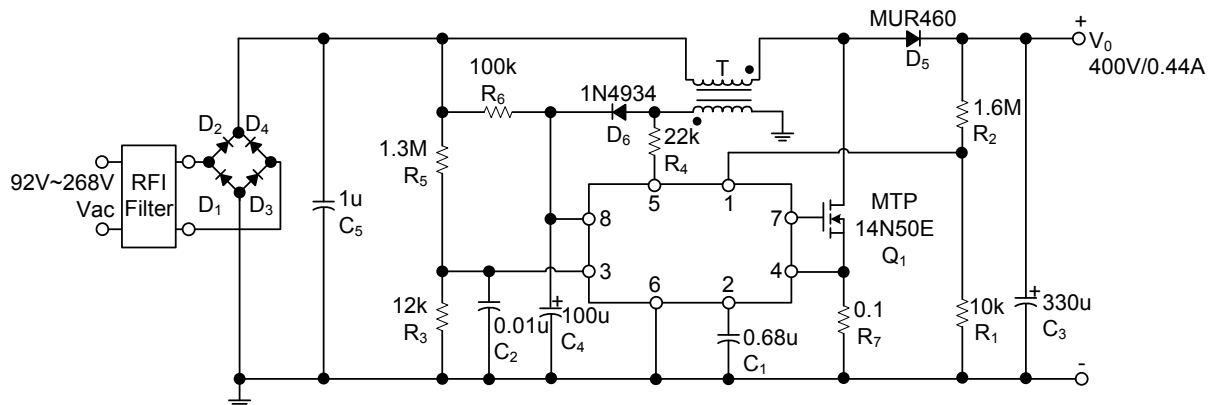


Figure 2. 175W Power Factor Controller

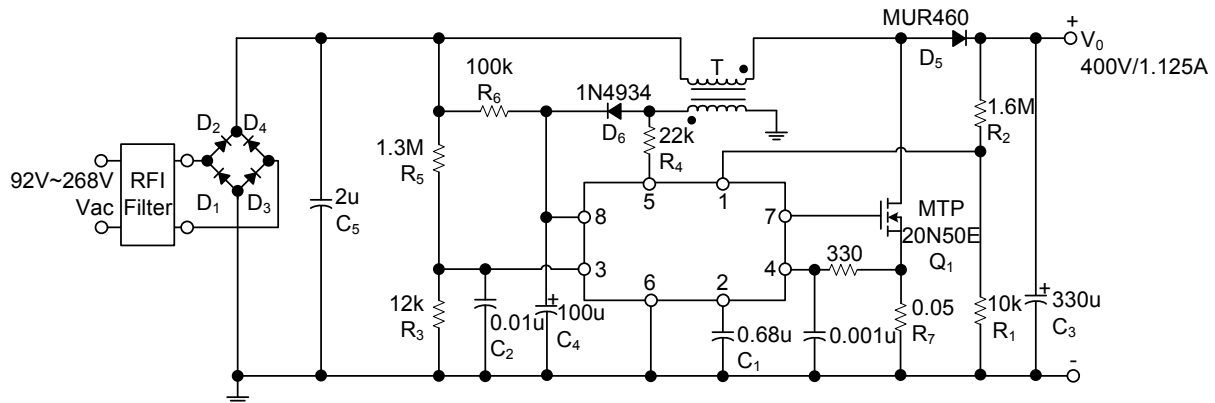


Figure 3. 450W Power Factor Controller

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