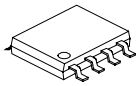
HIGH ENERGY IGNITION CIRCUIT



SOP-8

*Pb-free plating product number: 93334L

■ DESCRIPTION

This device is designed to use the signal from a reluctor type ignition pickup to produce a well controlled output from a power darlington output transistor.

■ FEATURES

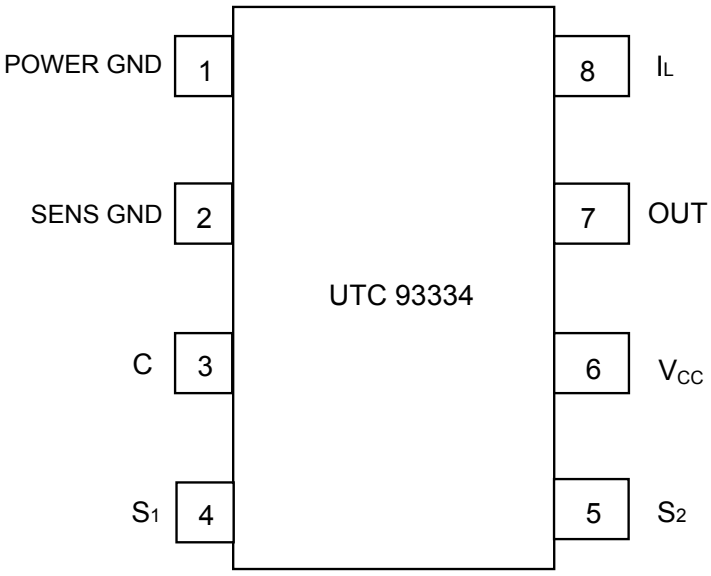
* Very Low Peripheral Component Count
* No Critical System Resistors
* Wide Supply Voltage Operating Range (4.0V ~ 24V)
* Overvoltage Shutdown (30V)
* Dwell Automatically Adjusts to Produce Optimum Stored Energy without Waste
* Externally Adjustable Peak Current
* Transient Protected Inputs and Outputs

■ ORDERING INFORMATION

Order Number		Package	Packing
Normal	Lead Free Plating		
93334-S08-R	93334L-S08-R	SOP-8	Tape Reel
93334-S08-T	93334L-S08-T	SOP-8	Tube

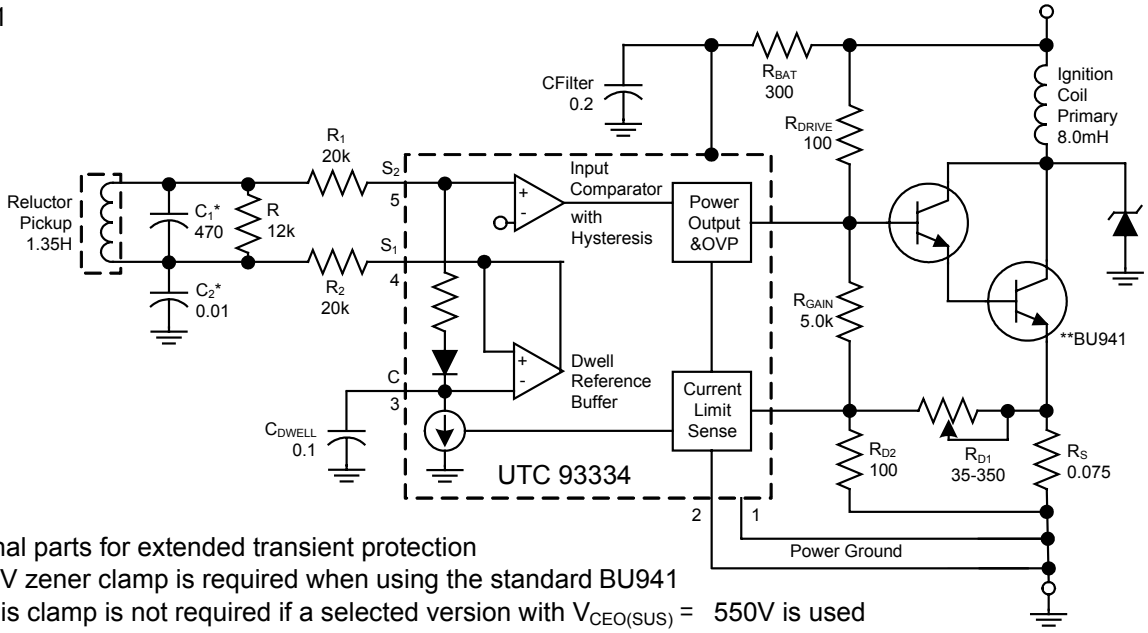
93334L-S08-R (1)Packing Type (2)Package Type (3)Lead Plating	(1) R: Tape Reel, T: Tube (2) S08: SOP-8 (3) L: Lead Free Plating, Blank: Pb/Sn

■ PIN CONFIGURATION



■ BLOCK DIAGRAM AND TYPICAL APPLICATION

Figure 1



* Optional parts for extended transient protection

** A350V zener clamp is required when using the standard BU941
This clamp is not required if a selected version with $V_{CEO(SUS)}$ = 550V is used

Component Values

Pickup	Series resistance = 800Ω±10% @ 25°C, inductance= 1.35H @ 1.0kHz @ 15Vrms
Coil	Leakage L=0.6mH, primary R=0.43Ω±5% @ 25°C, primary L=7.5mH ~ 8.5mH @ 5.0A
R_L	Load resistor for pickup=10Ω±20%
R_A, R_B	Input buffer resistors provide additional transient protection to the already clamped inputs=20k±20%
C_1, C_2	For reduction of high frequency noise and spark transients induced in pick-up and leads; optional and non-critical
R_{BAT}	Provides load dump protection (but small enough to allow operation at V_{BAT} =4.0V) =300Ω±20%
CFilter	Transient filter on V_{CC}, non-critical
C_{DWELL}	Stores reference, circuit designed for 0.1μF±20%
R_{GAIN}	R_{GAIN}/R_{D1} sets the DC gain of the current regulator =5.0k±20%
R_{D2}	R_{D2}/R_{D1} set up voltage feedback from R_S
R_S	Sense resistor ($P_D A_G$ in thick film techniques) =0.075Ω±30%
R_{DRIVE}	Low enough to supply drive to the output Darlington, high enough to keep $V_{CE(SAT)}$ of the I_C below Darlington turn-on during load dump = 100Ω±20%, 5.0W
R_{D1}	Starting with 35Ω assures less than 5.5A, increasing as required to set 5.5A $R_{D1}=(I_{O(PEAK)} R_S - V_{REF})/((V_{REF}/R_{D2})-(1.4/R_{GAIN}))-(\approx 100\Omega)$

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Power Supply Voltage-Steady State Transient 300ms or less	V_{CC}	24	V
		90	
Output Sink Current-Steady State Transient 300ms of less	$I_{OUT(SINK)}$	300	mA
		1.0	A
Power Dissipation	P_D	1.05	W
Derate above 25°C		12	mW/°C
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-20~+85	°C
Storage Temperature	T_{STG}	-40 ~ 150	°C

Note 1. 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.

2. The device is guaranteed to meet performance specification within 0℃~+70℃ operating temperature range and assured by design from -20℃~+85℃.

■ ELECTRICAL CHARACTERISTICS (V_{CC} = 13.2V_{DC}, circuit of Figure 3, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Internal Supply Voltage, Pin 6	V_{CC}	V_{BAT} =4.0V_{DC}		3.5		V_{DC}
		V_{BAT} =8.0V_{DC}		7.2		
		V_{BAT} =12.0V_{DC}		10.4		
		V_{BAT} =14.0V_{DC}		11.8		
Ignition Coil Current Peak, Cranking RPM 2.0Hz ~ 27Hz	I_{PEAK}	V_{BAT} =4.0V_{DC}	3.0	3.4		A_{PEAK}
		V_{BAT} =6.0V_{DC}	4.0	5.2		
		V_{BAT} =8.0V_{DC}	4.6	5.3		
		V_{BAT} =10.0V_{DC}	5.1	5.4		
Ignition Coil Current Peak, Normal RPM	I_{PEAK}	F=33Hz	5.1	5.5		A_{PEAK}
		F=133Hz	5.1	5.5		
		F=200Hz	4.2	5.4		
		F=267Hz	3.4	4.4		
		F=333Hz	2.7	3.4		
Ignition Coil On-Time, Normal RPM Range	T_{ON}	F=33Hz		7.5	14.0	ms
		F=133Hz		5.0	5.9	
		F=200Hz		4.0	4.6	
		F=267Hz		3.0	3.6	
		F=333Hz		2.3	2.8	
Shutdown Voltage	V_{BAT}		25	30	35	V_{DC}
Input Threshold (Static Test)	V_{THR}	Turn-on		360		mV_{DC}
		Turn-off		90		
Input Threshold Hysteresis	V_{HYS}		75			mV_{DC}
Input Threshold (Active Operation)	V_{THR}	Turn-on		1.8		V_{DC}
		Turn-off		1.5		
Total Circuit Lag from ts (Figure 1) until Ignition Coil Current Falls to 10%				60	120	μs
Ignition Coil Current Fall Time (90% ~ 10%)				4.0		μs
Saturation Voltage IC Output (Pin 7) (R_{DRIVE} = 100Ω)	$V_{CE(SAT)}$	V_{BAT} =10V_{DC}		120		mV_{DC}
		V_{BAT} =30V_{DC}		280		
		V_{BAT} =50V_{DC}		540		
Current Limit Reference, Pin 8	V_{REF}		120	160	190	mV_{DC}

■ LGNITION COIL CURRENT VERSUS FREQUENCY / PERIOD