



93334

LINEAR INTEGRATED CIRCUIT

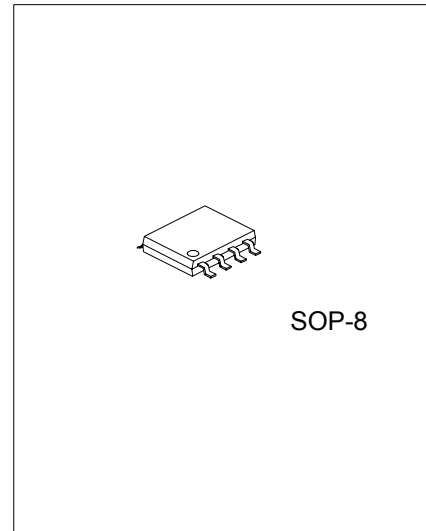
HIGH ENERGY IGNITION CIRCUIT

DESCRIPTION

This device is designed to use the signal from a retractor 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



*Pb-free plating product number: 93334L

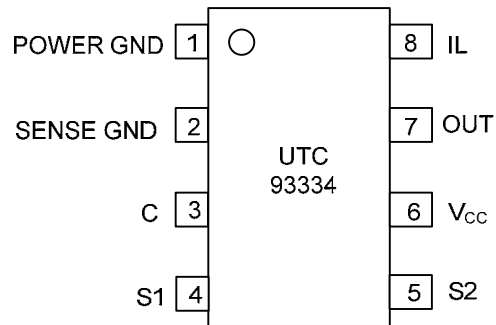
ORDERING INFORMATION

Ordering 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

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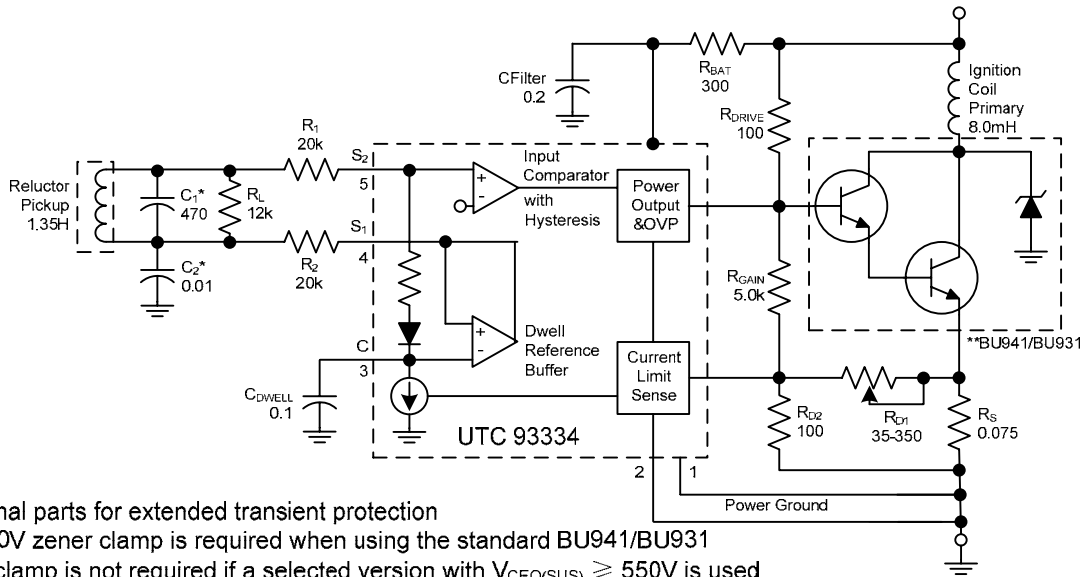
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■ PIN CONFIGURATION



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■ BLOCK DIAGRAM AND TYPICAL APPLICATION



* Optional parts for extended transient protection
 ** A 350V zener clamp is required when using the standard BU941/BU931
 This clamp is not required if a selected version with $V_{CEQ(SUS)} \geq 550V$ is used

Figure 1

Component Values

Pickup	Series resistance = $800\Omega \pm 10\%$ @ 25 , inductance= $1.35H$ @ $1.0kHz$ @ $15Vrms$
Coil	Leakage $L=0.6mH$, primary $R=0.43\Omega \pm 5\%$ @ 25 , primary $L=7.5mH \sim 8.5mH$ @ $5.0A$
RL	Load resistor for pickup= $12K\Omega \pm 20\%$
R1, R2	Input buffer resistors provide additional transient protection to the already clamped inputs= $20k\Omega \pm 20\%$
C1, C2	For reduction of high frequency noise and spark transients induced in pick-up and leads; optional and non-critical
RBAT	Provides load dump protection (but small enough to allow operation at $V_{BAT}=4.0V$) = $300\Omega \pm 20\%$
CFilter	Transient filter on V_{CC} , non-critical
CDWELL	Stores reference, circuit designed for $0.1\mu F \pm 20\%$
RGAIN	R_{GAIN}/R_{D1} sets the DC gain of the current regulator = $5.0k\Omega \pm 20\%$
RD2	R_{D2}/R_{D1} set up voltage feedback from R_S
RS	Sense resistor (P_{DAG} in thick film techniques) = $0.075\Omega \pm 30\%$
RDRIVE	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 = $100\Omega \pm 20\%$, $5.0W$
RD1	Starting with 35Ω assures less than $5.5A$, increasing as required to set $5.5A$ $R_{D1} = (I_{O(PEAK)} R_S - V_{REF}) / ((V_{REF}/R_{D2}) - (1.4/R_{GAIN})) - (\approx 100\Omega)$

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■ ABSOLUTE MAXIMUM RATINGS

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

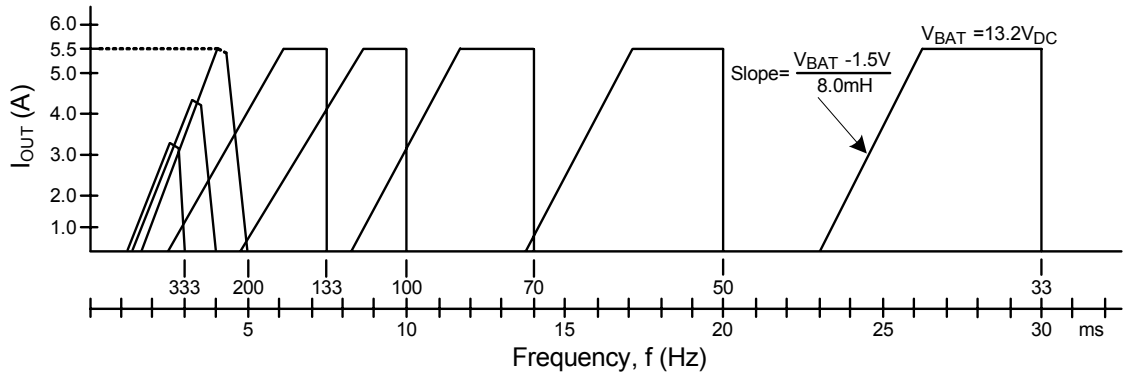
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS ($V_{CC} = 13.2V_{DC}$, 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 V_{DC}
		Turn-off		90		
Input Threshold Hysteresis	V_{HYS}		75			mV V_{DC}
Input Threshold (Active Operation)	V_{THR}	Turn-on		1.8		V_{DC}
		Turn-off		1.5		
Total Circuit Lag from t_s (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) ($R_{DRIVE} = 100\Omega$)	$V_{CE(SAT)}$	$V_{BAT} = 10V_{DC}$		120		mV V_{DC}
		$V_{BAT} = 30V_{DC}$		280		
		$V_{BAT} = 50V_{DC}$		540		
Current Limit Reference, Pin 8	V_{REF}			120	160	mV V_{DC}

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■ IGNITION COIL CURRENT VS. FREQUENCY / PERIOD



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