



## UC1010

Preliminary

LINEAR INTEGRATED CIRCUIT

### IGNITION GATE DRIVER IC

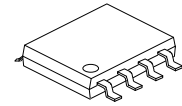
#### DESCRIPTION

The UTC **UC1010** is designed to directly drive an ignition IGBT and control the current and spark event of the coil. The coil current is controlled via the input pin.

When the input of the UTC **UC1010** is driven high, the output is enabled, the IGBT will be turned on and start charging the coil. The UTC **UC1010** will sink a current (IIN) into the input pin based on programmed current on the RA line.

#### FEATURES

- \* Signal Line Input Buffer
- \* Ground shift tolerance  $\pm 1.5$  V
- \* Input spike filter
- \* Programmable maximum dwell time
- \* Programmable Input Pull down current
- \* Operation from Ignition or Battery line
- \* Control IGBT current limiting through Vsense pin
- \* Soft Shutdown following Max Dwell Time out



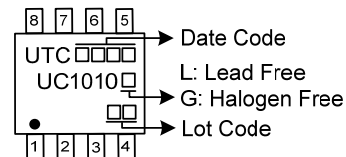
SOP-8

#### ORDERING INFORMATION

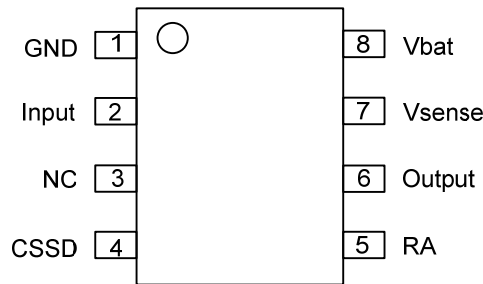
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UC1010L-S08-R	UC1010G-S08-R	SOP-8	Tape Reel

<p>UC1010G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



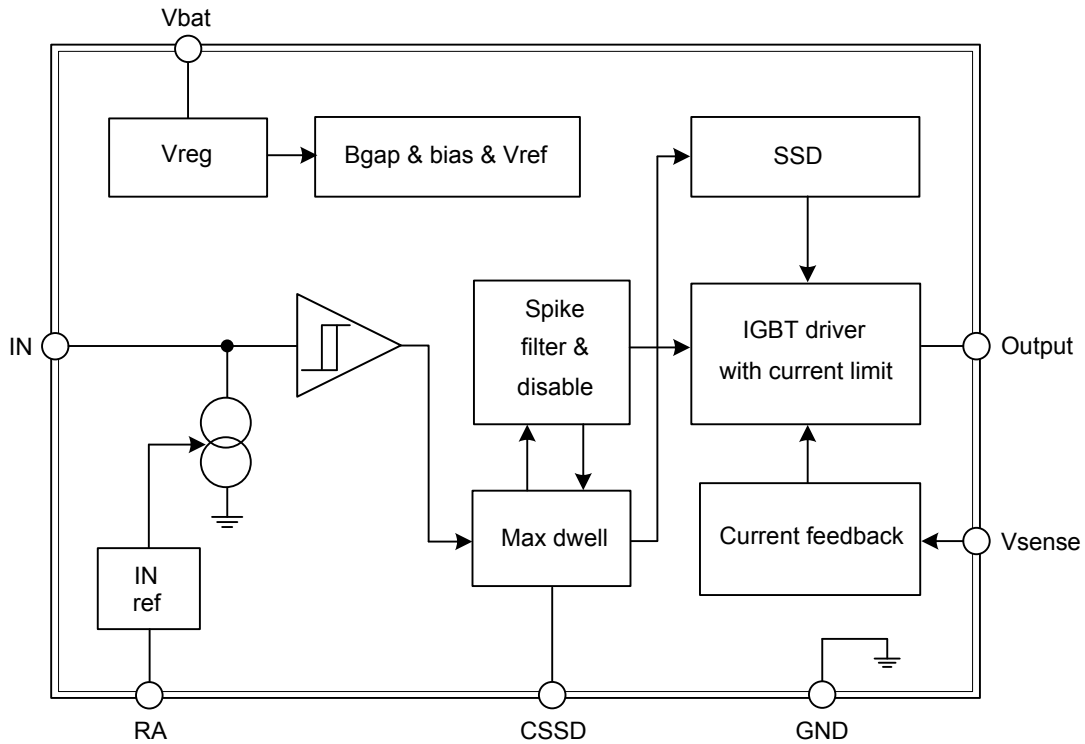
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	GND	Ground reference of the control IC
2	Input	Signal input
3	NC	No connection
4	CSSD	Maximum dwell time and soft-shut-down current output (to external capacitor)
5	RA	Input reference current output (to external resistor)
6	Output	Gate drive to the IGBT
7	Vsense	Sense input used for Ilim function
8	Vbat	Supply voltage

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Voltage at $V_{bat}$ pin (excl. EMC transients)	$V_{bat}$	28	V
Voltage at Input pin with external $R_{in}$	$V_{IN}$	16	V
Voltage at RA & $C_{SSD}$ and Output pins	$V_{RA}, V_{CSSD}$	5	V
Voltage at Gate Output	$V_{OUTPUT}$	6.5	V
Voltage on Vsense pin	$V_{SENSE}$	0 ~ 400	mV
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	625	mW
Junction Temperature	$T_J$	-40 ~ +150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-40 ~ +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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Collector (Coil) Operating Current	$I_{C\_TYP}$		12		A
Coil Primary Inductance	$L_P$		1.5		mH
Coil Primary Resistance ( $25^\circ\text{C}$ )	$R_P$		0.4		$\Omega$
Load Resistance (for Delay Time Measurements)	$R_{LOAD}$		2		$\Omega$

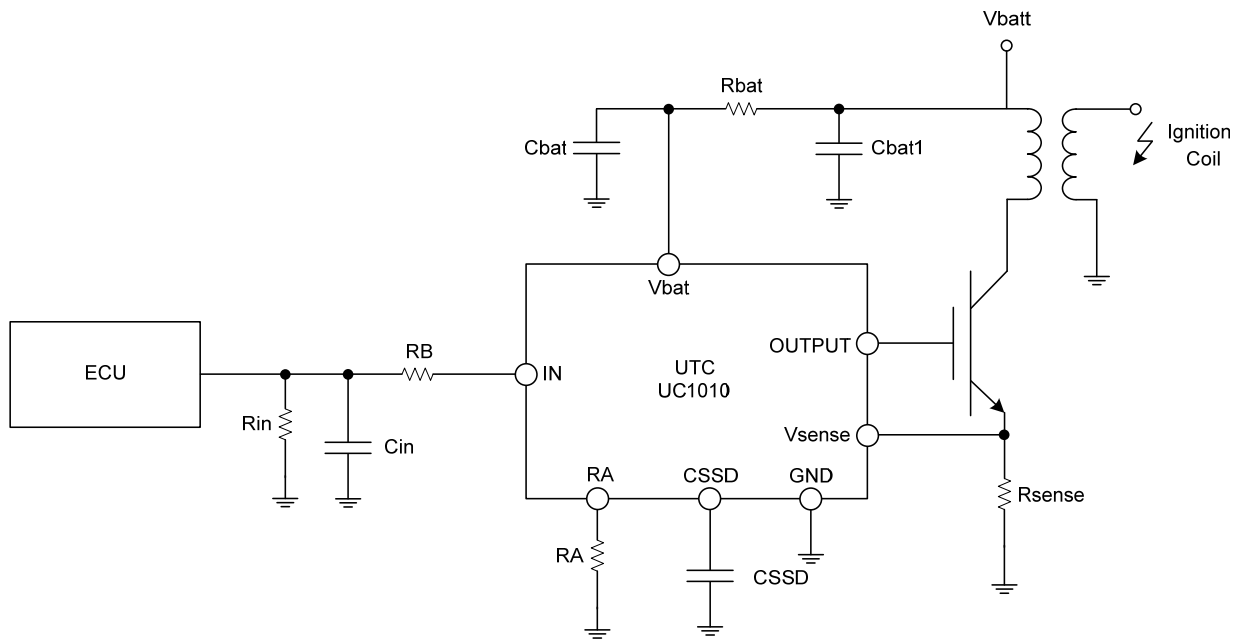
■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	200	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ( $V_{BAT}=6\sim 28V$ ,  $T_J=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>POWER SUPPLY CONDITIONS</b>						
Operating Voltage	Vbat1	Coil Switching Function	4		28	V
Operating Voltage	Vbat2	All Functions	6		28	V
Supply Current	Ibat	Vbat =28V, RA open, Input =5V			5	mA
Vbattery Clamp	Vclamp	Ibatt =10mA	35		50	V
<b>SENSE PIN CONDITIONS</b>						
Sense Voltage at Current Limit	Vlimit	Vbat>8V	180		220	mV
		6V<Vbat<8V	165			mV
Input Spike Filter	Tspike	Delay on Rising and Falling Edge of Input		13		$\mu s$
Turn On Delay Time	TD1	Time from Input =4.0V to $V_{OUT}=4.0V$		15		$\mu s$
Turn Off Delay Time	TD2	Time from Input=0.5V to $V_C-GND=1.0V$		15		$\mu s$
<b>INPUT CONTROL CONDITIONS</b>						
Input Low Voltage	$V_{INL}$		1.2			V
Input High Voltage	$V_{INH}$				2.2	V
Input Voltage Hysteresis	$V_{INHYS}$			0.25		V
Input Current	$I_{IN}$		0.5		15	mA
<b>Gate Output Voltage Max</b>						
Vgate Max	Vgmax	16K $\Omega$ Pull-down Resistor Vbat=28V	4.2	5.0	6.0	V
Vgate Low	Vglow	(0mA<Igate<0.4mA @ $T_A=25^\circ C$ )	0		0.2	V
<b>DIAGNOSTIC FUNCTIONS AND PROTECTION</b>						
Resistor for Input Reference Current	RA		5.2		200	k $\Omega$
Minimum Dwell Time Capacitor	$C_{SSDMIN}$			5.0		nF
Maximum Dwell Time	$T_{DMAX}$	( $C_{SSD}=20nF$ )	30		80	ms
Soft-Shut-Down Slew Rate	$I_{SLEW}$	( $I_C: 80\sim 20\%I_{CLIM}$ )		1.5		A/ms
CSSD Pin Current for TDMAX	$I_{CSSD1}$		0.8	1.25	1.5	$\mu A$

■ TYPICAL APPLICATION CIRCUIT



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