



## L2044

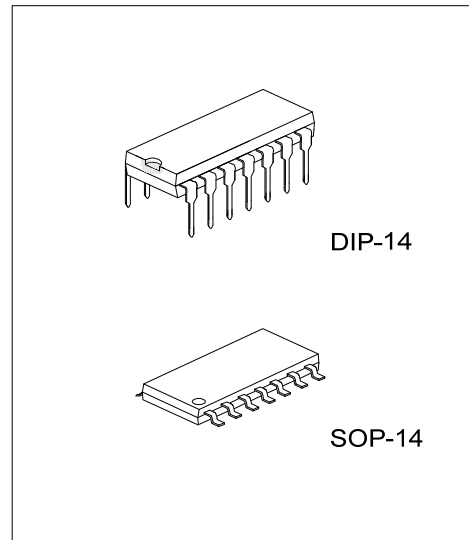
## LINEAR INTEGRATED CIRCUIT

### DUAL OUTPUT FLASHER

#### DESCRIPTION

The UTC **L2044** is a dual output stages flasher designed as a relay driver for flashing light control in automotive applications. Both sides direction indicator input with only a small control current makes switch contacts for small loads possible. Each side of the vehicle is controlled separately.

The construction of the hazard switch could be simplified due to hazard warning input is separate. The flasher will dramatically increase the flash frequency by a typical ratio of 2:1 if lamp fault is detected. The UTC **L2044** can be directly connected to the battery due to extreme low current consumption.



#### FEATURES

- \* Temperature and Supply Voltage Compensated Flashing Frequency
- \* Frequency Doubling Indicates Lamp Fault.
- \* Two Relay Driver Outputs with High Current-carrying Capacity and Low Saturation Voltage
- \* Minimum Lamp Load for Flasher Operation:  $\geq 1W$
- \* Very Low Sensitivity to EMI
- \* Extremely Low Current Consumption  $< 10\mu A$  ( at Switches Open)
- \* Reverse Polarity Protection
- \* Three Control Inputs: Left, Right and Hazard Warning

#### ORDERING INFORMATION

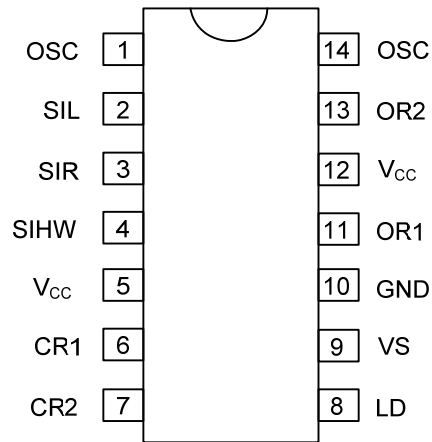
Ordering Number		Package	Packing
Lead Free	Halogen Free		
L2044L-D14-T	L2044G-D14-T	DIP-14	Tube
L2044L-S14-R	L2044G-S14-R	SOP-14	Tape Reel

<p>L2044G-D14-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D14: DIP-14, S14: SOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING

DIP-14	SOP-14
<p>14 13 12 11 10 9 8 → Date Code UTC □□□□ L2044 □ □ □ → Lot Code 1 2 3 4 5 6 7</p> <p>L: Lead Free G: Halogen Free</p>	<p>14 13 12 11 10 9 8 → Date Code UTC □□□□ L2044 □ ● □ □ → Lot Code 1 2 3 4 5 6 7</p> <p>L: Lead Free G: Halogen Free</p>

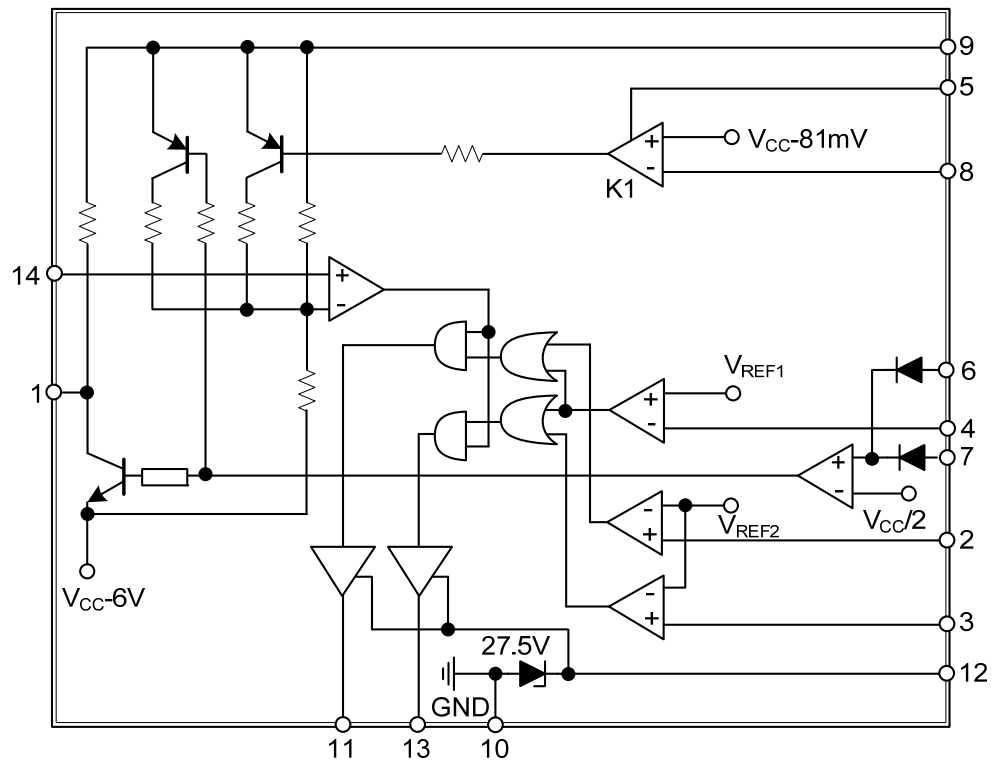
### ■ PIN CONFIGURATION



### ■ PIN DESCRIPTION

PIN No.	PIN NAME	FUNCTION
1	OSC	Oscillator
2	SIL	Start input left
3	SIR	Start input right
4	SIHW	Start input hazard warning
5	V <sub>CC</sub>	V <sub>CC</sub>
6	CR1	Control input relay 1
7	CR2	Control input relay 2
8	LD	Lamp failure detection
9	V <sub>CC</sub>	V <sub>CC</sub>
10	GND	ground
11	OR1	Output relay 1
12	VS	V <sub>CC</sub>
13	OR2	Output relay 2
14	OSC	Oscillator

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage, 1 min, pins 5, 9 and 12	$V_{CC}$	24	V
Junction Temperature	$T_J$	+125	°C
Operating Temperature	$T_{OPR}$	-20 ~ +85	°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.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-14	90	°C/W
	SOP-14	120	

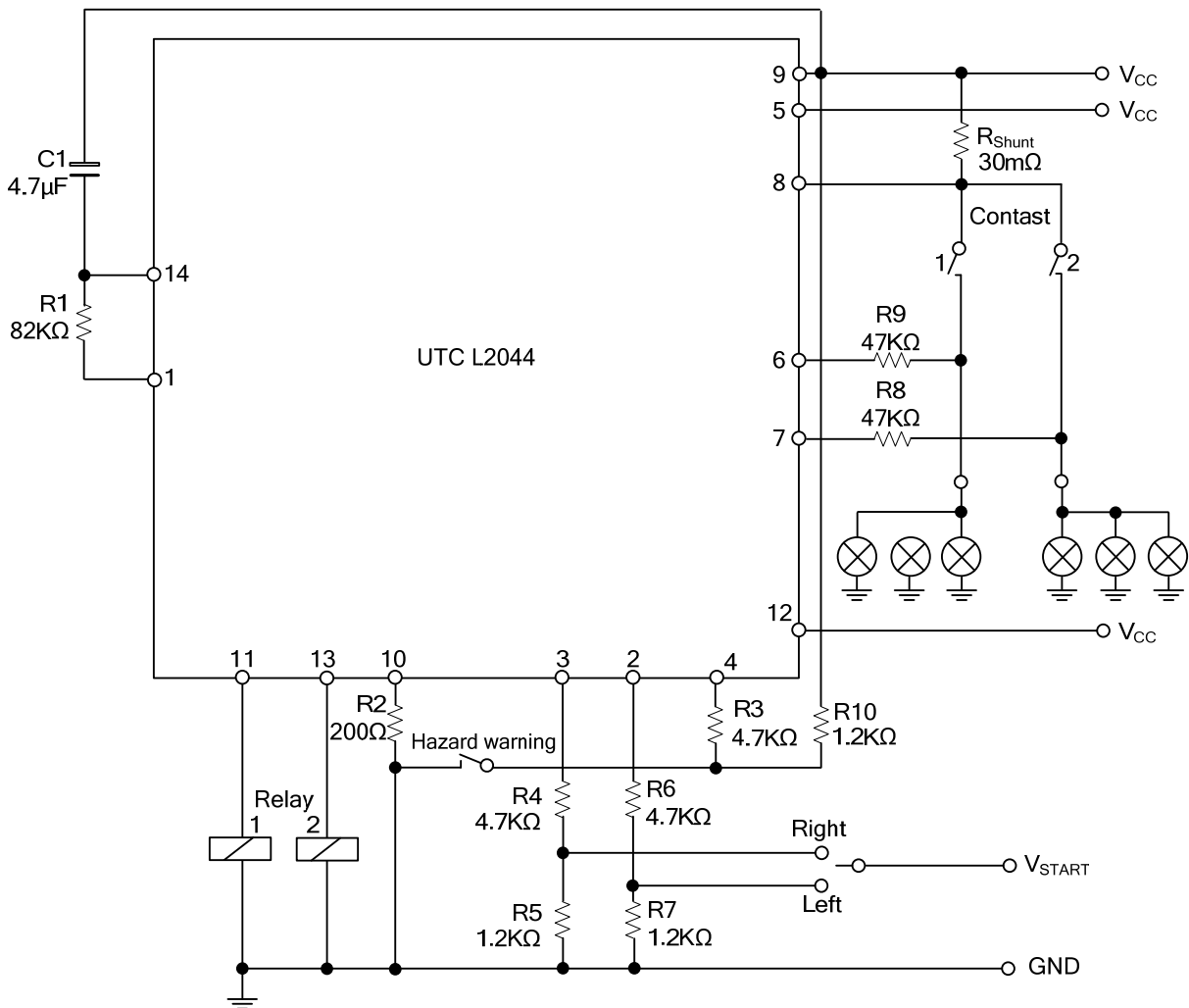
### ■ ELECTRICAL CHARACTERISTICS ( $V_{CC} = 12V$ , $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage Range	$V_{CC}$	Pins 5, 9, 12	8		18	V
Saturation Voltage	$V_{OUT}$	$V_{CC}=8V, R_L=82\Omega$			1.0	V
		$V_{CC}=12V, R_L=82\Omega$			1.2	
Clamping Voltage	$V_{12}$	$T_a = -20^\circ C \sim 85^\circ C$	25.0	27.5	30.0	V
Relay output overvoltage detection (relay disabled)	$V_{12}$	$T_a = -20^\circ C \sim 85^\circ C$	18	20	22	V
Control signal threshold	$V_{CC}$	$V_{CC}=9V$		70.6		mV
		$V_{CC}=13.5V$		85.5		
		$V_{CC}=16V$		93.0		
Output current for relay driver	$I_{OUT}$	Pins 11, 13			300	mA
Relay output reverse current	$I_{OUT}$	Pins 11, 13			0.1	mA
Supply current, switches open	$I_{CC}$	Pins 5, 9, 12			10	$\mu A$
Relay coil resistance	$R_L$					$\Omega$
Start delay	$t_{ON}$	First bright phase			10	ms
Tolerance of control signal threshold		$V_{CC}=9V\sim 16V$ , Pin 8, $T_A = -20^\circ C \sim 85^\circ C$	-6		+6	%
Temperature coefficient of control signal Threshold	$T_{CV0}$	$V_{CC}=13.5V$ , Pin 8		10		$\mu V/K$

### ■ TOLERANCES ( $V_{CC} = 12V$ , $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Frequency determining resistor	$R_1$		6.8		510	k $\Omega$
Frequency determining capacitor	$C_1$				47	$\mu F$
Frequency tolerance	$\Delta f_1$	Normal flashing, basic frequency $f_1$ excluding the tolerance of $R_1$ and $C_1$	-5		+5	%
Bright period	$\Delta f_1$	Basic frequency $f_1$	47		53	%
	$\Delta f_2$	Control frequency $f_2$	37		45	
Frequency increase	$f_2$	Lamp failure	$1.9 \times f_1$		$2.3 \times f_1$	Hz
Lamp load	$P_L$		1			W

## ■ TYPICAL APPLICATION CIRCUIT



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