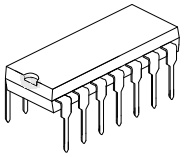
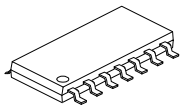
LL204

LINEAR INTEGRATED CIRCUIT

DUAL OUTPUT FLASHER



DIP-14



SOP-14

■ DESCRIPTION

The UTC **LL204** 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 **LL204** can be directly connected to the battery due to extreme low current consumption.

■ FEATURES

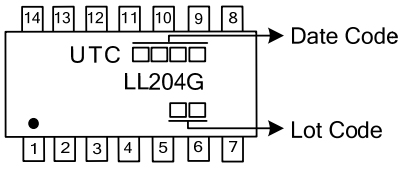
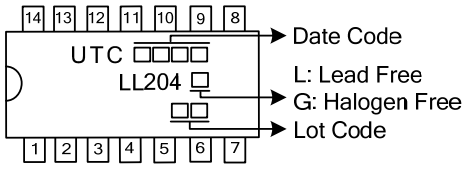
* Temperature and supply voltage compensated flashing frequency
* Frequency doubling indicates lamp fault.
* Two relay driver outputs with high current-carrying capacity and low saturation voltage
* Minimum lamp load for flasher operation: ≥ 1W
* Very low sensitivity to EMI
* Extremely low current consumption<10μA (at switches open)
* Reverse polarity protection
* Three control inputs: left, right and hazard warning

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LL204L-D14-R	LL204G-D14-R	DIP-14	Tube
-	LL204G-S14-R	SOP-14	Tape Reel

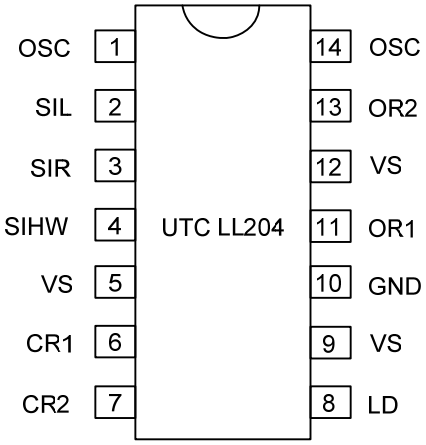
LL204L-D14-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) D14: DIP-14, S14: SOP-14 (3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING

DIP-14	SOP-14
	

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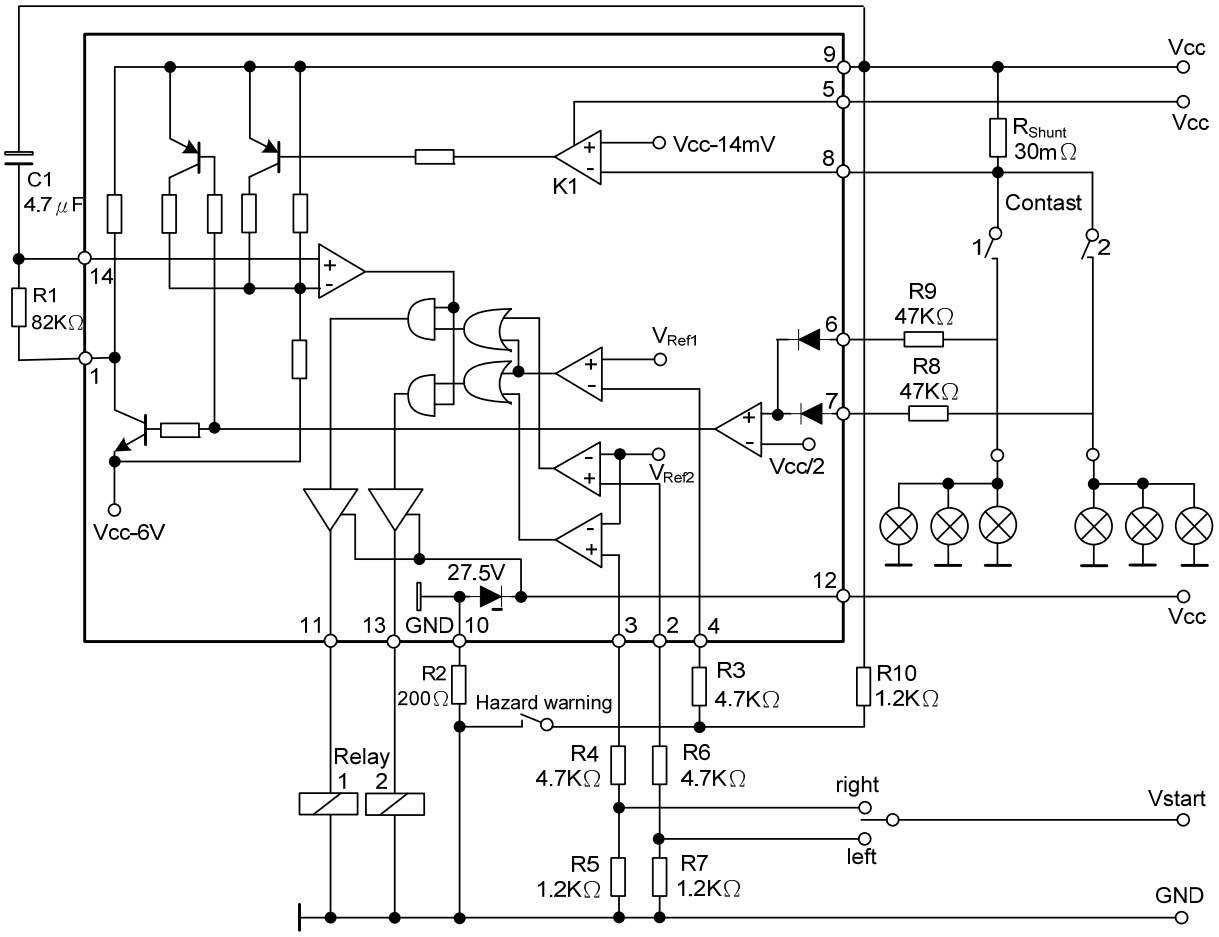
■ PIN CONFIGURATION



■ 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	VS	V_{CC}
6	CR1	Control input relay 1
7	CR2	Control input relay 2
8	LD	Lamp failure detection
9	VS	V_{CC}
10	GND	Ground
11	OR1	Output relay 1
12	VS	V_{CC}
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	+150	°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
Thermal Resistance Junction to Ambient	DIP-14	θ_{JA}	90	°C/W
	SOP-14		120	

■ ELECTRICAL CHARACTERISTICS (V_{CC} = 12V, T_A =25°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_{CC}=8V	V_{OUT}	R_L=82Ω			1.0	V
	V_{CC}=12V					1.2	
Clamping Voltage		V_{12}	T_A= -20°C ~ 85°C	25.0	27.5	30.0	V
Relay output overvoltage detection (relay disabled)		V_{12}	T_A= -20°C ~ 85°C	18	20	22	V
Control signal threshold		V_{CC}	V_{CC}=9V		6		mV
			V_{CC}=13.5V		10		
			V_{CC}=16V		12		
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	μA
Relay coil resistance		R_L					Ω
Start delay		t_{ON}	First bright phase			10	ms
Tolerance of control signal threshold			V_{CC}=9V~16V, Pin 8, T_A= -20°C ~ 85°C	-6		+6	%
Temperature coefficient of control signal Threshold		T_CV_O	V_{CC}=13.5V, Pin 8		10		μV/K

■ TOLERANCES (V_{CC} = 12V, T_A =25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Frequency determining resistor	R_1		6.8		510	kΩ
Frequency determining capacitor	C_1				47	μF
Frequency tolerance	$\triangle f_1$	Normal flashing, basic frequency f_1 excluding the tolerance of R_1 and C_1	-5		+5	%
Bright period	$\triangle f_1$	Basic frequency f_1	47		53	%
	$\triangle f_2$	Control frequency f_2	35		43	
Frequency increase	f_2	Lamp failure	2.15×f_1		2.3×f_1	Hz
Lamp load	P_L		1			W

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