

1. Description

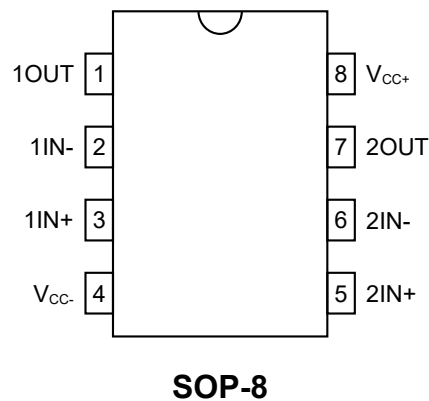
UMW TL072 is a dual operational amplifier with high-speed J-FET input, which consists of high voltage J-FET and bipolar transistor. It has high conversion rate, low input bias current and offset current, and low temperature coefficient of offset voltage. The working range is 0°C-70°C.

UMW TL072 is available in SOP8 packages.

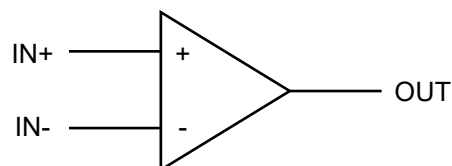
2. Features

- Lower power consumption
- Wide common- mode and differential - mode input voltage range
- Low input bias current and offset current
- Output short - circuit current protection
- High input impedance
- High conversion rate
- High gain bandwidth product, up to 4MHz

3. Pinning Information

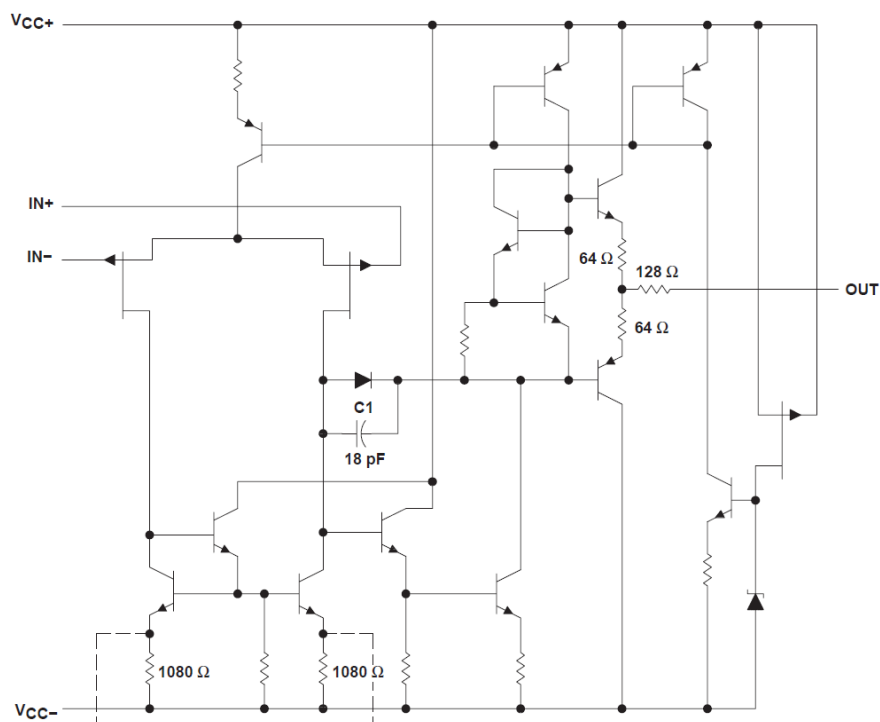


4. Symbol (each operational amplifier)





5. Internal Block Diagram (Each Operational Amplifier)



6. Limit Parameter

Parameter		Value	Value	Units
Power Supply Voltage		V_{CC}	± 18	V
Input Voltage		V_I	± 15	V
Differential Mode Input Power		V_{ID}	± 30	V
Working Temperature	UMW TL072C	T_{OPER}	0 to 70	°C
	UMW TL072I		-40 to 105	°C
Storage Temperature		T_{STG}	-65 to 150	°C



7. Electrical Characteristics

$V_{CC}=\pm 15$, $T_{amp}=25^{\circ}\text{C}$ shall be specified separately.

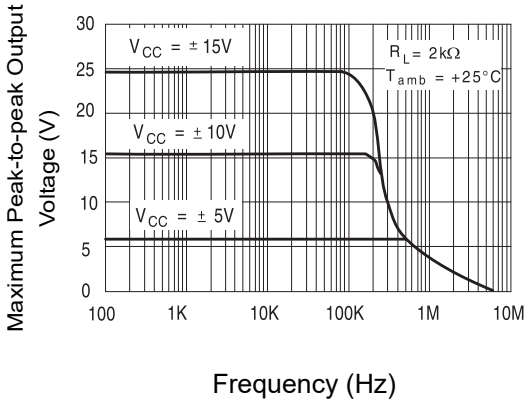
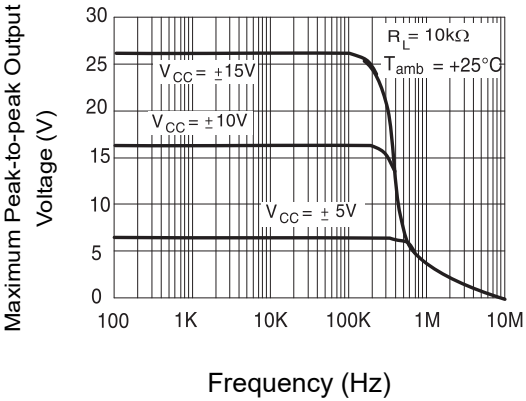
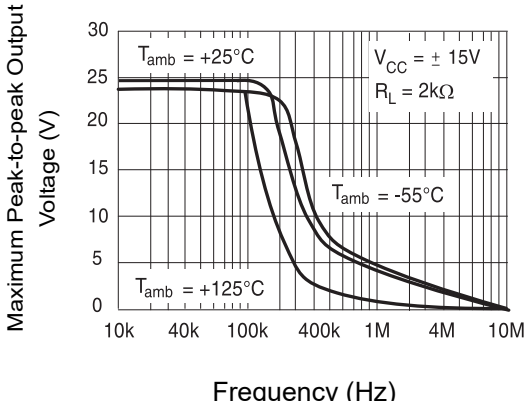
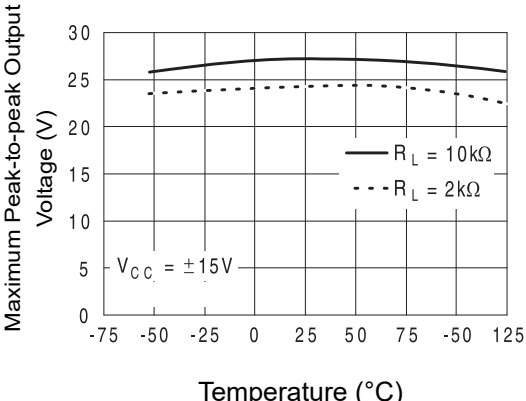
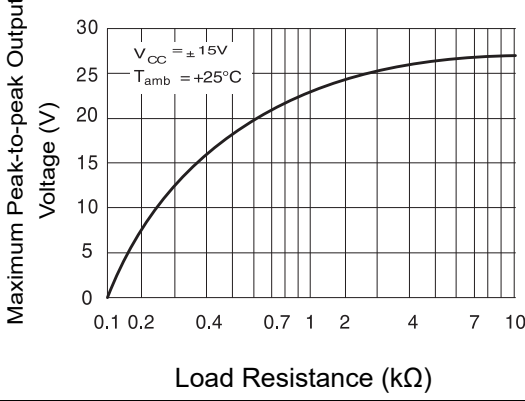
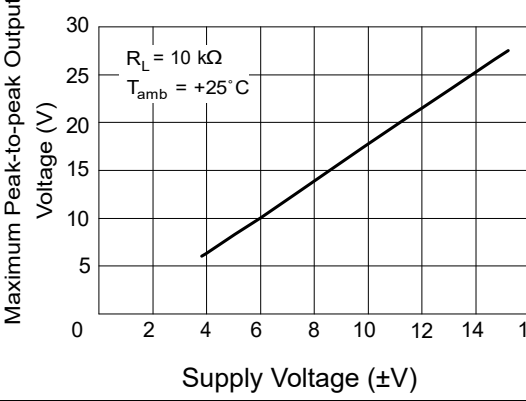
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Offset Voltage	V_{IO}	$V_O=0\text{V}$		3	10	mV
Input Offset Current	I_{IO}	$V_O=0\text{V}$		5	100	pA
Output Bias Current	I_{IB}	$V_O=0\text{V}$		20	200	pA
Input Common Mode Voltage	V_{ICM}		± 11	-12~15		V
Peak Output Voltage	V_{OM}	$R_L=10\text{k}\Omega$	12	13.5		V
		$R_L\geq 2\text{k}\Omega$	10	12		V
Large Signal Voltage Gain	A_{VD}	$R_L\geq 2\text{k}\Omega$, $V_O=\pm 10\text{V}$	25	200		V/mV
Common Mode Rejection Ratio	CMRR		70	86		dB
Power Supply Rejection Ratio	SVR	$V_{CC}=\pm 15\text{V}$ to $\pm 9\text{V}$, $V_O=0\text{V}$	70	86		dB
Static Current-per Channel	I_{CC}			1.4	2.8	mA
Conversion Rate	SR	$V_I=10\text{V}$	8	10		V/ μs
Risetime	t_r			0.1		μs
Input Impedance	R_i			10^{12}		Ω
Rise time	t_r	$V_{in}=20\text{mV}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, unity gain		0.1		μs
Overshoot	K_{OV}	$V_{in}=20\text{mV}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, unity gain		10		%
Gain bandwidth product	GBP	$V_{in}=10\text{mV}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, $F=100\text{kHz}$	2.5	4		MHz
Input resistance	R_i			10^{12}		Ω
Total harmonic distortion	THD	$F=1\text{kHz}$, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$ $A_V=20\text{dB}$, $V_O=2V_{pp}$				%
Equivalent input noise voltage	e_n	$R_S=100\Omega$, $F=1\text{KHz}$		15		nV/ $\sqrt{\text{Hz}}$
Phase margin				45		degrees
Channel separation	V_{O1}/V_{O2}	$A_V=100$		120		dB

1. The input bias currents are junction leakage currents which approximately double for every 10°C increase in the junction temperature.



General J - FET input dual operational amplifier

8.1 Typical Characteristics

 Maximum Peak-to-peak Output Voltage (V) Frequency (Hz) $V_{CC} = \pm 15V$ $V_{CC} = \pm 10V$ $V_{CC} = \pm 5V$ $R_L = 2k\Omega$ $T_{amb} = +25^\circ C$	 Maximum Peak-to-peak Output Voltage (V) Frequency (Hz) $V_{CC} = \pm 15V$ $V_{CC} = \pm 10V$ $V_{CC} = \pm 5V$ $R_L = 10k\Omega$ $T_{amb} = +25^\circ C$
Figure 1: Maximum peak-to-peak output voltage versus frequency ($R_L = 2k\Omega$)	Figure 2: Maximum peak-to-peak output voltage versus frequency ($R_L = 10k\Omega$)
 Maximum Peak-to-peak Output Voltage (V) Frequency (Hz) $T_{amb} = +25^\circ C$ $T_{amb} = -55^\circ C$ $T_{amb} = +125^\circ C$ $V_{CC} = \pm 15V$ $R_L = 2k\Omega$	 Maximum Peak-to-peak Output Voltage (V) Temperature ($^\circ C$) $R_L = 10k\Omega$ $R_L = 2k\Omega$ $V_{CC} = \pm 15V$
Figure 3: Maximum peak-to-peak output voltage versus frequency	Figure 4: Maximum peak-to-peak output voltage versus free air temperature
 Maximum Peak-to-peak Output Voltage (V) Load Resistance ($k\Omega$) $V_{CC} = \pm 15V$ $T_{amb} = +25^\circ C$	 Maximum Peak-to-peak Output Voltage (V) Supply Voltage ($\pm V$) $R_L = 10k\Omega$ $T_{amb} = +25^\circ C$
Figure 5: Maximum peak-to-peak output voltage versus load resistance	Figure 6: Maximum peak-to-peak output voltage versus supply voltage



8.2 Typical Characteristics

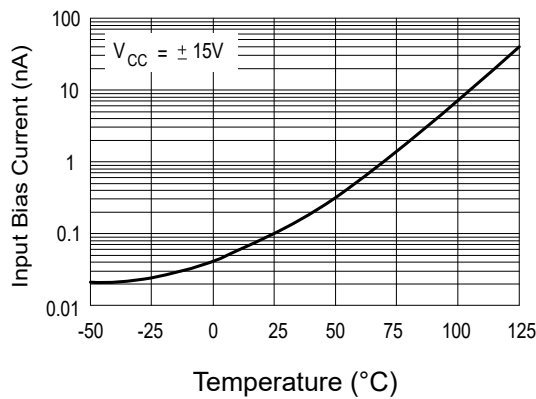


Figure 7: Input bias current versus free air temperature

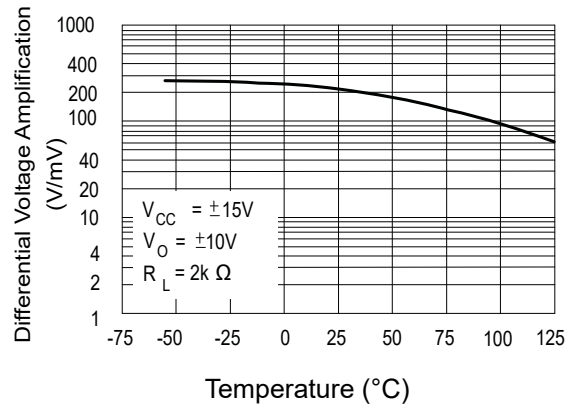


Figure 8: Large signal differential voltage amplification versus free air temp

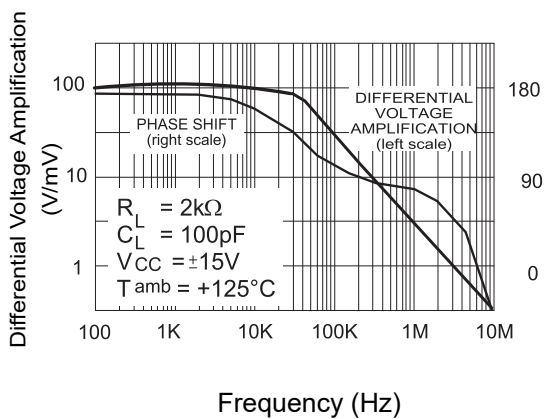


Figure 9: Large signal differential voltage amplification and phase shift versus frequency

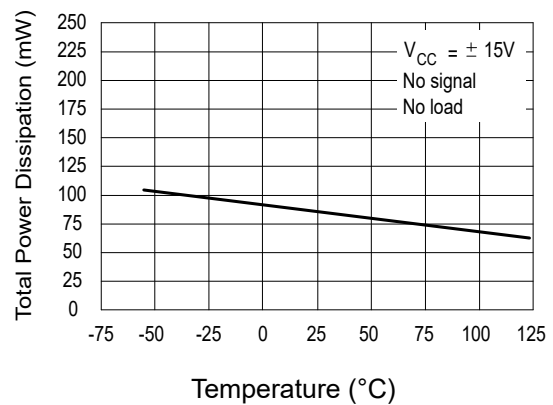


Figure 10: Total power dissipation versus free air temperature

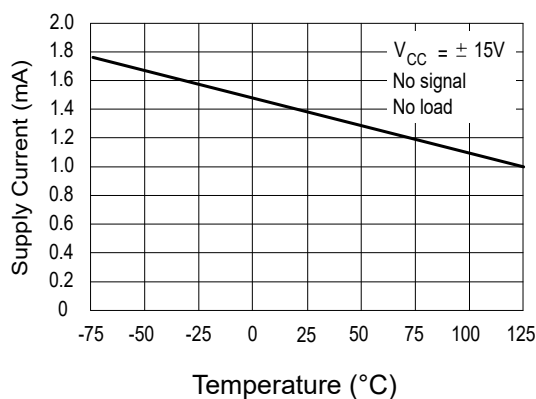


Figure 11: Supply current per amplifier versus free air temperature

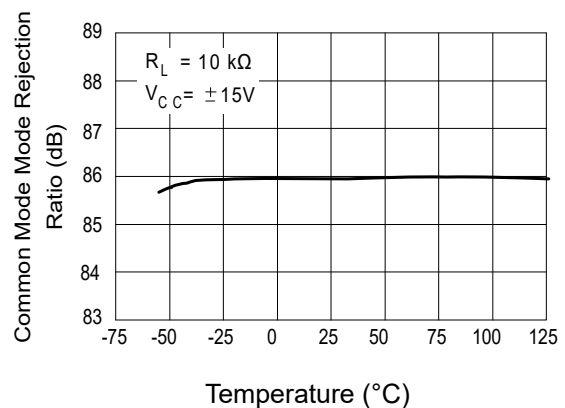
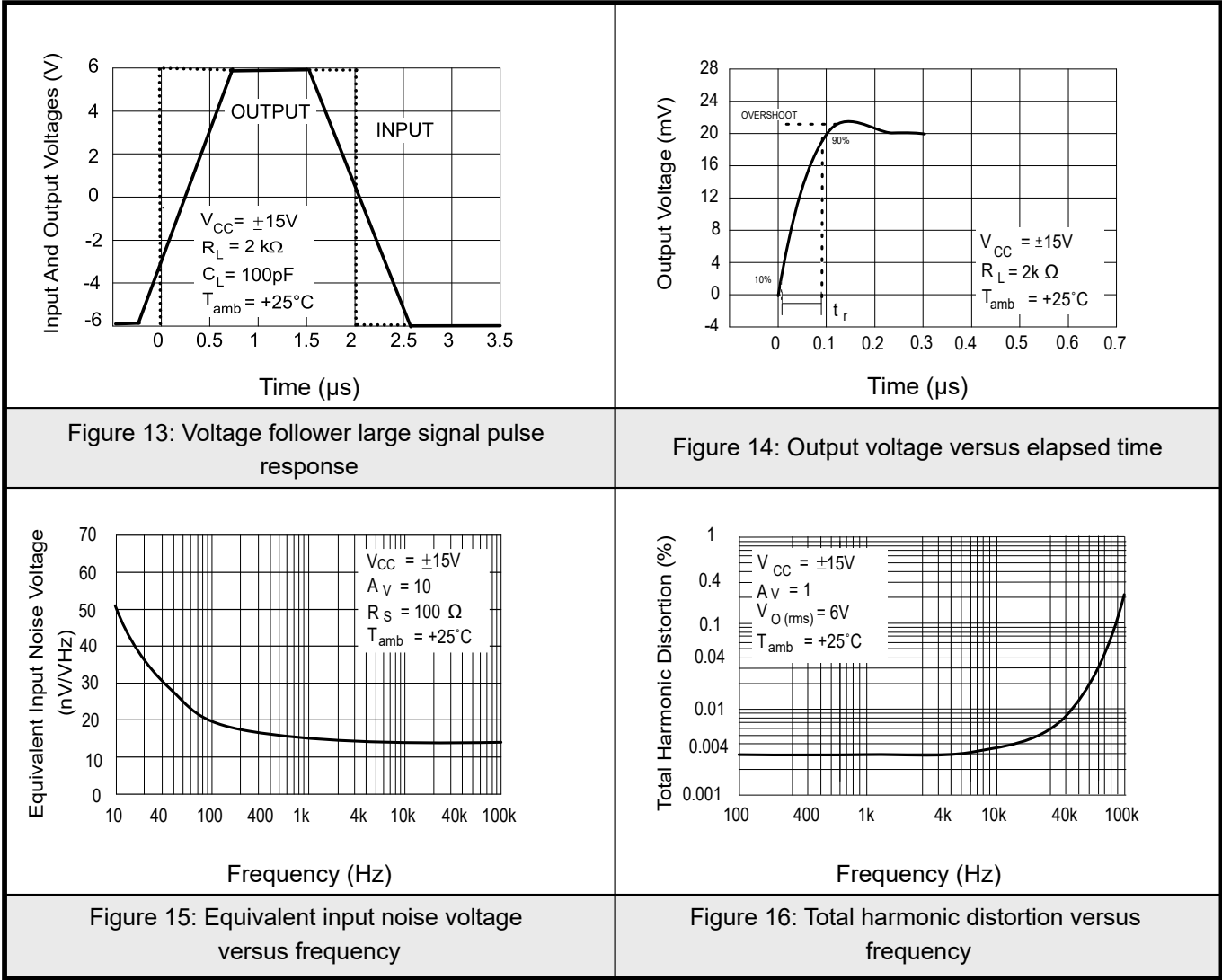


Figure 12: Common mode rejection ratio versus free air temperature



8.3 Typical Characteristics





9. Typical Application Circuit Diagram (Including One Operational Amplifier)

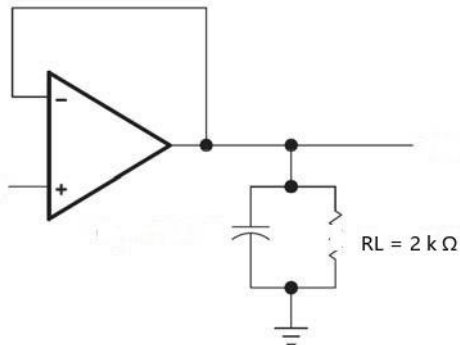


Figure 1: Unity Gain Circuit

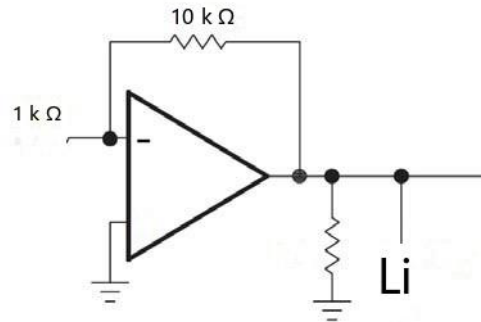


Figure 2: 10 - fold gain circuit

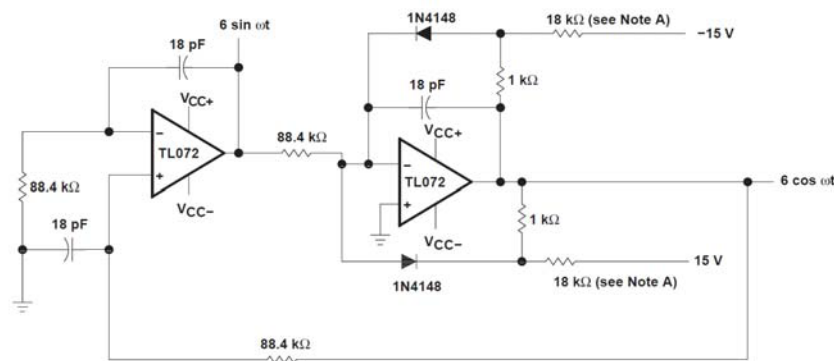


Figure 3: 100KHz oscillator

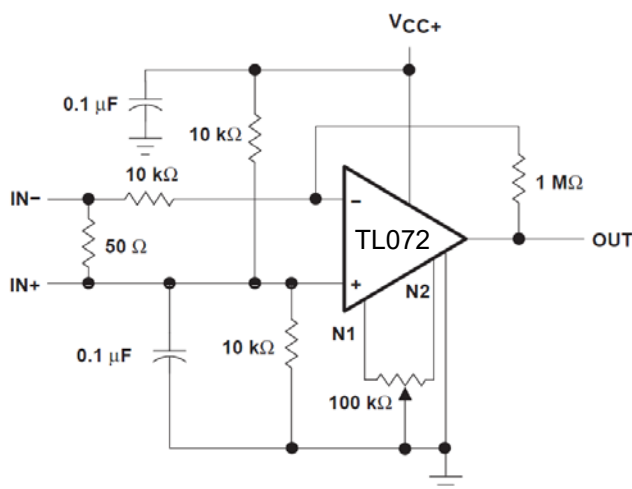


Figure 4: AC amplifier

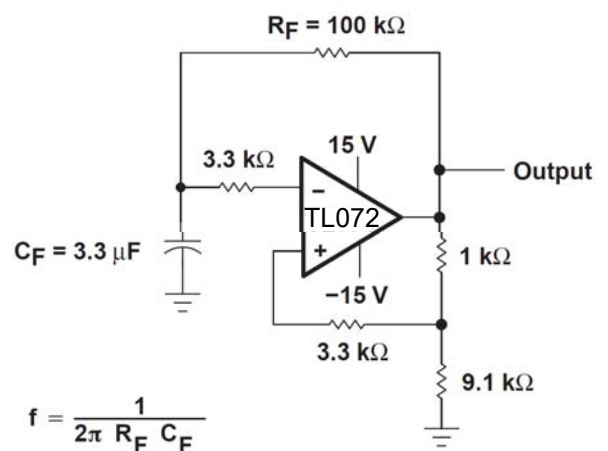
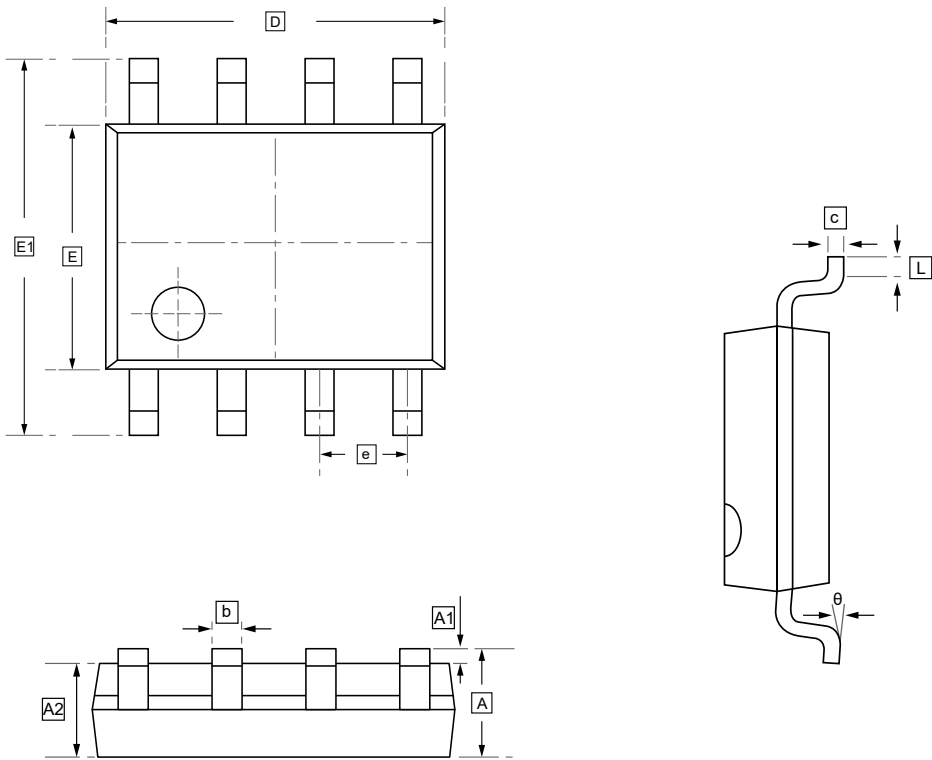


Figure 5: 0.5Hz square wave oscillator



10.SOP-8 Package Outline Dimensions



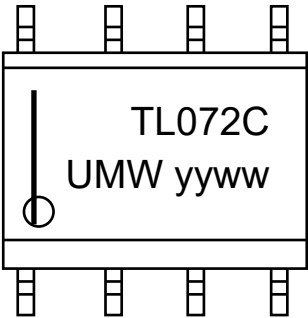
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°



General J - FET input dual operational amplifier

11.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW TL072CDR	TL072C	SOP-8	2500	Tape and reel
UMW TL072IDR	TL072I	SOP-8	2500	Tape and reel



12.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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