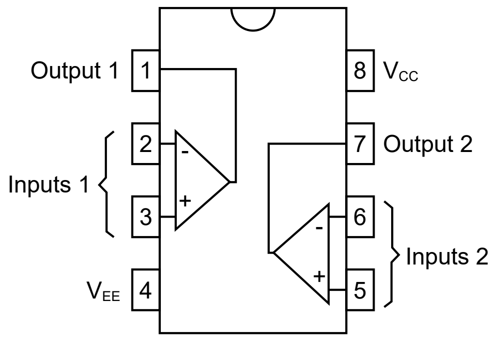
1.Description

This type of J-FET input operational amplifier is specially designed for low-power applications, which are characterized by high input impedance, low input bias current and low input offset current. Advanced design technology ensures higher conversion rate, gain bandwidth product and output swing. Commercial and vehicle equipment can be packaged in plastic dipline SOP.

2.Features

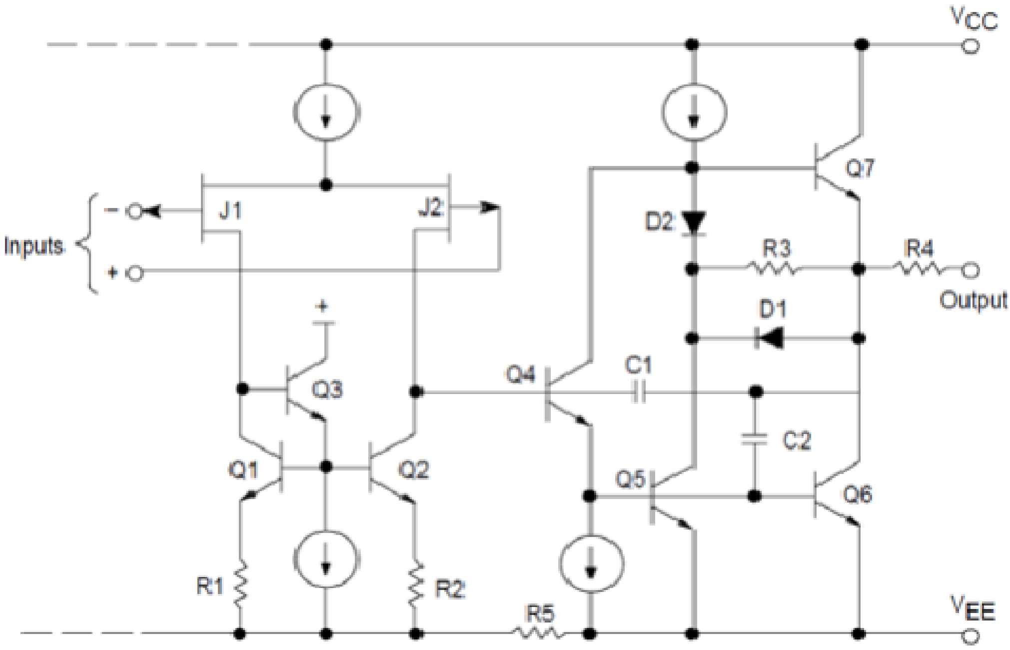
- Low power supply current: 200uA/Amplifier
- Low input bias current: 5.0pA
- High gain bandwidth: 2.0MHz
- High conversion rate: 6.0V/uS
- High input impedance: $10^{12}\Omega$
- Large output voltage swing: ±15V
- Output short circuit protection

3.Pinning Information



SOP-8

4.Representative Schematic Diagram (Each Amplifier)



5.Maximum Rating

Parameter		Value	Value	Units
Power supply (from V_{CC} to V_{EE})		V_{CC}	±18	V
Input differential voltage range (Note 1)		V_{IDR}	±30	V
Input voltage range (Note 1 and Note2)		V_{IR}	±15	V
Output Short Circuit Duration (Note 3)		tsc	need to be decided or settled	sec
Operating junction temperature range		T_J	125	°C
Storage temperature range		T_{STG}	-60 to 150	°C
Operating free air temperature range	TL062I	T_{OPER}	-40 to 105	°C
	TL062C		0 to 70	°C

Note:

1. The differential voltage is located at the noninverting input terminal with respect to the inverting input terminal.
2. The magnitude of the input voltage must not exceed the amplitude of the supply voltage of 15 volts,whichever is smaller.
3. Power consumption must be considered to ensure that the maximum junction temperature is not exceeded.

6.1 Electrical Characteristics (TL062C)

V_{CC}=20V, Tamp=25°C shall be specified separately

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Input offset voltage	V_{IO}	R_S=50Ω, V_O=0V	T_A=25°C		3	15	mV
			T_A=0°C to 70°C			20	mV
Average temperature coefficient of offset voltage	$\Delta V_{IO}/\Delta T$	R_S=50Ω, V_O=0V			10		μV/°C
Input offset current	I_{IO}	V_{CM}=0V, V_O=0V	T_A=25°C		5	200	pA
			T_A=0°C to 70°C			5	nA
Input bias current	I_{IB}	V_{CM}=0V, V_O=0V	T_A=25°C		30	200	pA
			T_A=0°C to 70°C			10	nA
Input common- mode voltage range	V_{ICM}		T_A=25°C	±11.5	-12~15		V
Large signal voltage gain	A_{VOL}	R_L=10kΩ, V_O=±10V0	T_A=25°C	3	6		V/mV
			T_A=0°C to 70°C	3			V/mV
Output voltage amplitude	V_{OM}	R_L=10kΩ	T_A=25°C	±10	±13.5		V
			T_A=0°C to 70°C	±10			V
Common mode rejection ratio	CMR	R_S=50Ω,V_{CM}=V_{ICR} min,V_O=0V,T_A=25°C		70	84		dB
	PSR	R_S=50Ω, V_{CM}=0V, V_O=0V, T_A=25°C		70	86		dB
Supply current (per independent opamp)	I_D	No load, V_O=0V, T_A=25°C			200	250	μA
Total power consumption (per independent operational amplifier)	P_D	No load, V_O=0V, T_A=25°C			6	7.5	mW

6.2 Electrical Characteristics (TL062I)

V_{CC}=20V, Tamp=25°C shall be specified separately

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Input offset voltage	V_{IO}	R_S=50Ω, V_O=0V	T_A=25°C		3	6	mV
			T_A=0°C to 70°C			9	mV
Average temperature coefficient of offset voltage	$\Delta V_{IO}/\Delta T$	R_S=50Ω, V_O=0V			10		μV/°C
Input offset current	I_{IO}	V_{CM}=0V, V_O=0V	T_A=25°C		5	100	pA
			T_A=0°C to 70°C			10	nA
Input bias current	I_{IB}	V_{CM}=0V, V_O=0V	T_A=25°C		30	200	pA
			T_A=0°C to 70°C			20	nA
Input common- mode voltage range	V_{ICM}		T_A=25°C	±11.5	-12~15		V
Large signal voltage gain	A_{VOL}	R_L=10kΩ, V_O=±10V0	T_A=25°C	4	6		V/mV
			T_A=0°C to 70°C	4			V/mV
Output voltage amplitude	V_{OM}	R_L=10kΩ	T_A=25°C	±10	±13.5		
			T_A=0°C to 70°C	±10			
Common mode rejection ratio	CMR	R_S=50Ω,V_{CM}=V_{ICR} min,V_O=0V,T_A=25°C		80	86		dB
	PSR	R_S=50Ω, V_{CM}=0V, V_O=0V, T_A=25°C		80	95		dB
Supply current (per independent opamp)	I_D	No load, V_O=0V, T_A=25°C			200	250	μA
Total power consumption (per independent operational amplifier)	P_D	No load, V_O=0V, T_A=25°C			6	7.5	mW

6.3 AC Electrical Characteristics

V_{CC}=15V, V_{EE}=-15V, T_A=+25°C unless otherwise specified.

Parameter		Symbol	Conditions	Min	Typ	Max	Units
Conversion rate		SR	V_{IN}=-10V to+10V, R_L=10KΩ C_L=100pF, A_V=+1.0	2	6		V/uS
Rise time		T_r	V_{IN}=20mV, R_L=10KΩ C_L=100pF, A_V=+1.0		0.1		uS
Setting time	To within 10mV	t_s	V_{CC}=+15V, V_{EE}=-15V, A_V=+1.0 R_L=10kΩ, V_O=0V to +10V step		1.5		uS
	To within 1.0mV				2.2		uS
Gain bandwidth product		GBW	f=200KHz		2		MHz
Equivalent input noise		e_n	R_S=100Ω, f=1.0KHz		47		nV/ sqrt(Hz)
Input resistance		R_i			10^{12}		Ω
Channel separation		CS	f=10KHz		120		dB
Deviation value		OS	V_{IN}=20mV, R_L=10KΩ C_L=100pF, A_V=+1.0		10		%

7.1 Typical Characterisitics

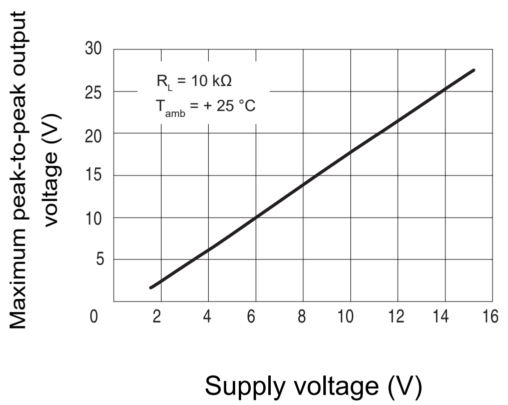


Figure 1: Maximum peak-to-peak output voltage versus supply voltage

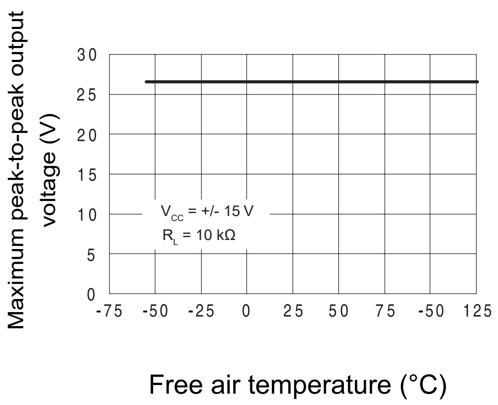


Figure 2: Maximum peak-to-peak output voltage versus free air temperature

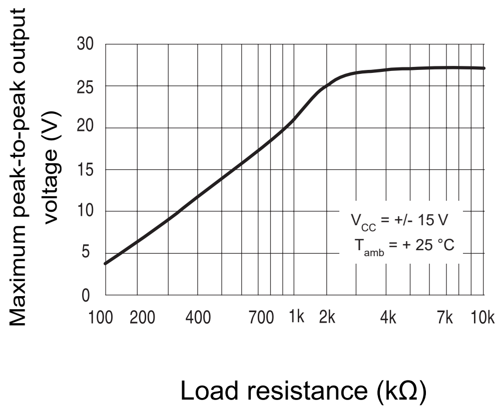


Figure 3: Maximum peak-to-peak output voltage versus load resistance

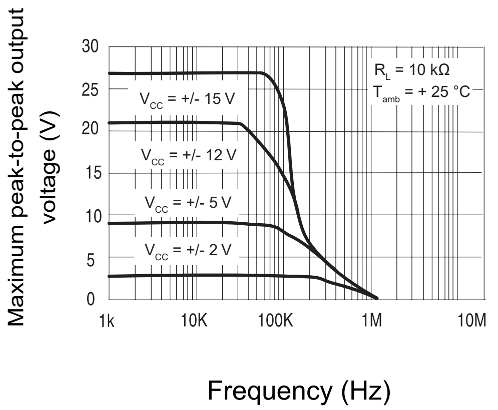


Figure 4: Maximum peak-to-peak output voltage versus frequency

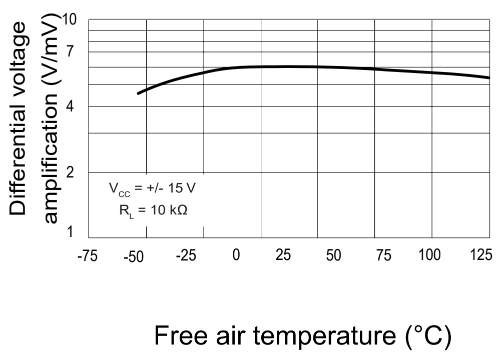


Figure 5: Differential voltage amplification versus free air temperature

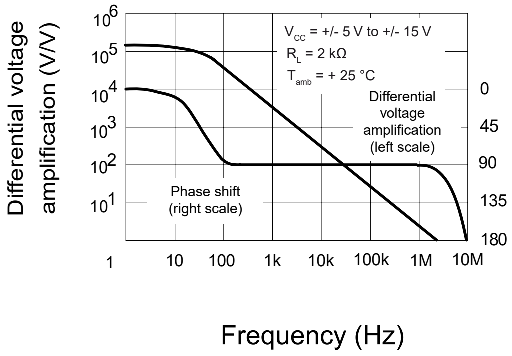


Figure 6: Large signal differential voltage amplification and phase shift versus frequency

7.2 Typical Characterisitics

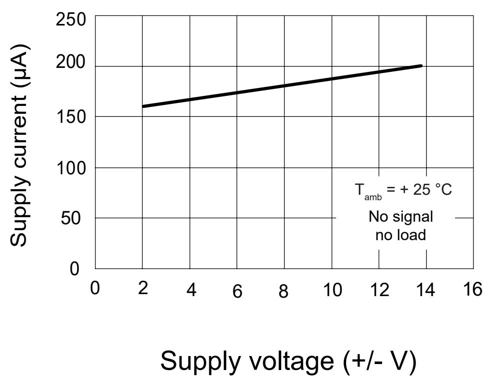


Figure 7: Supply current per amplifier versus supply voltage

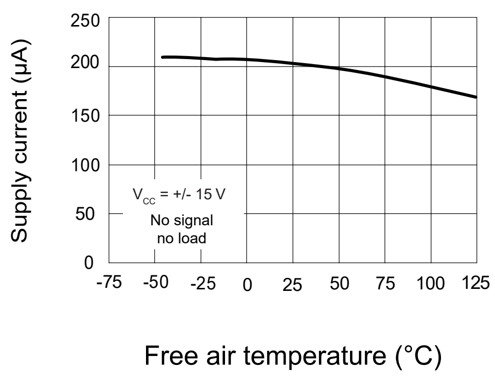


Figure 8: Supply current per amplifier versus free air temperature

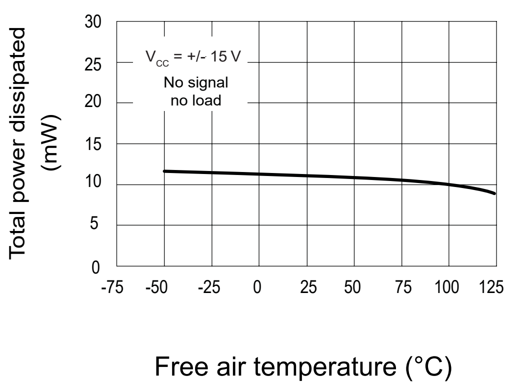


Figure 9: Total power dissipated versus free air temperature

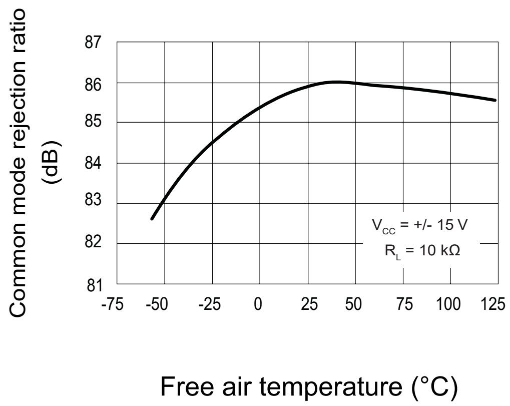


Figure 10: Common-mode rejection ratio versus free air temperature

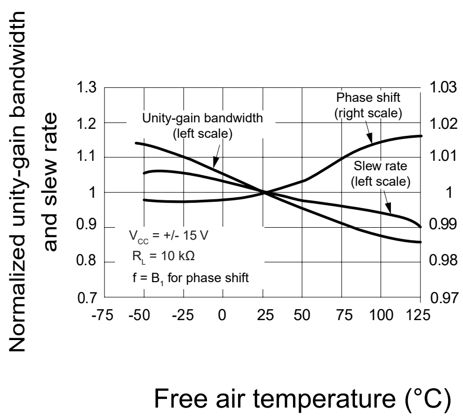


Figure 11: Normalized unity gain bandwidth slew rate and phase shift versus temperature

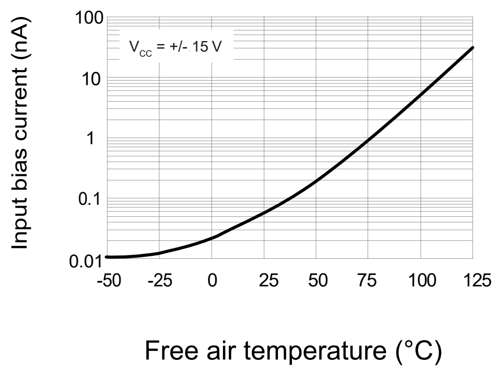


Figure 12: Input bias current versus free air temperature

7.3 Typical Characterisitics

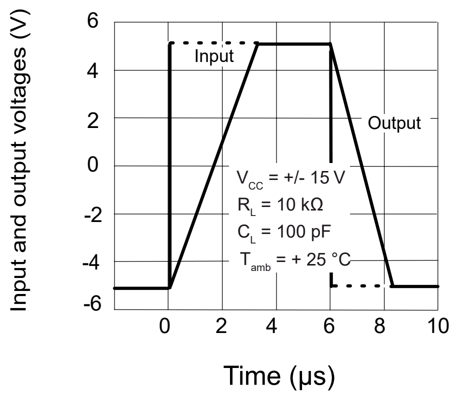


Figure 13: Voltage follower large signal pulse response

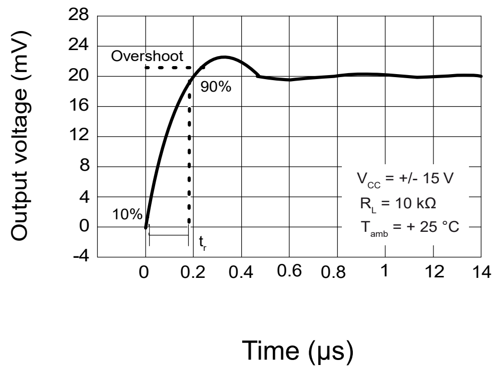


Figure 14: Output voltage versus elapsed time

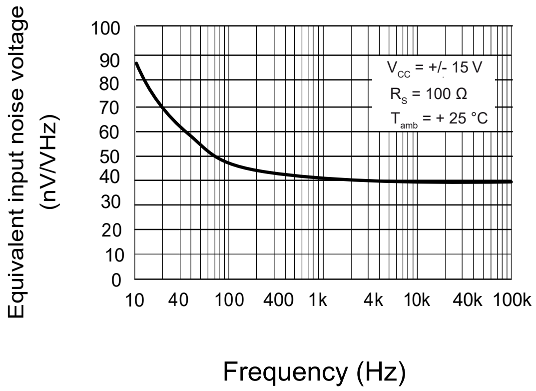


Figure 15: Equivalent input noise voltage versus frequency

Figure 19. AC Amplifier

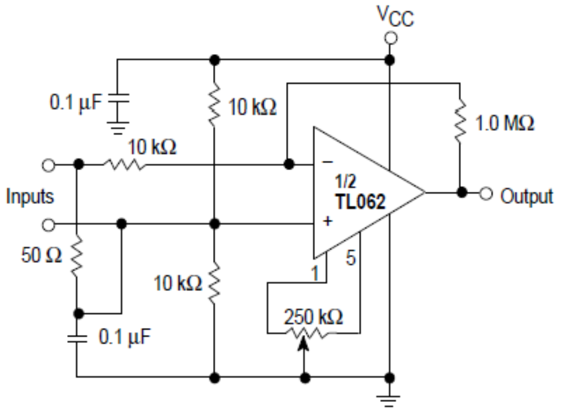


Figure 20. High-Q Notch Filter

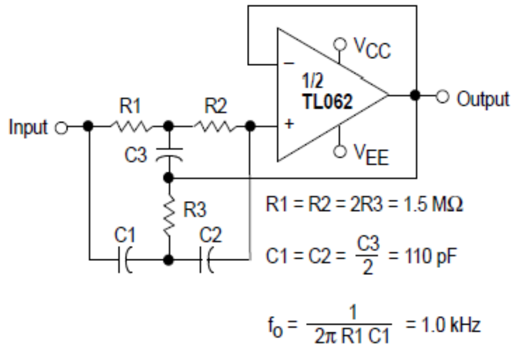
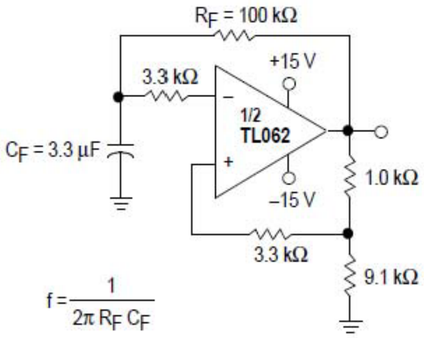
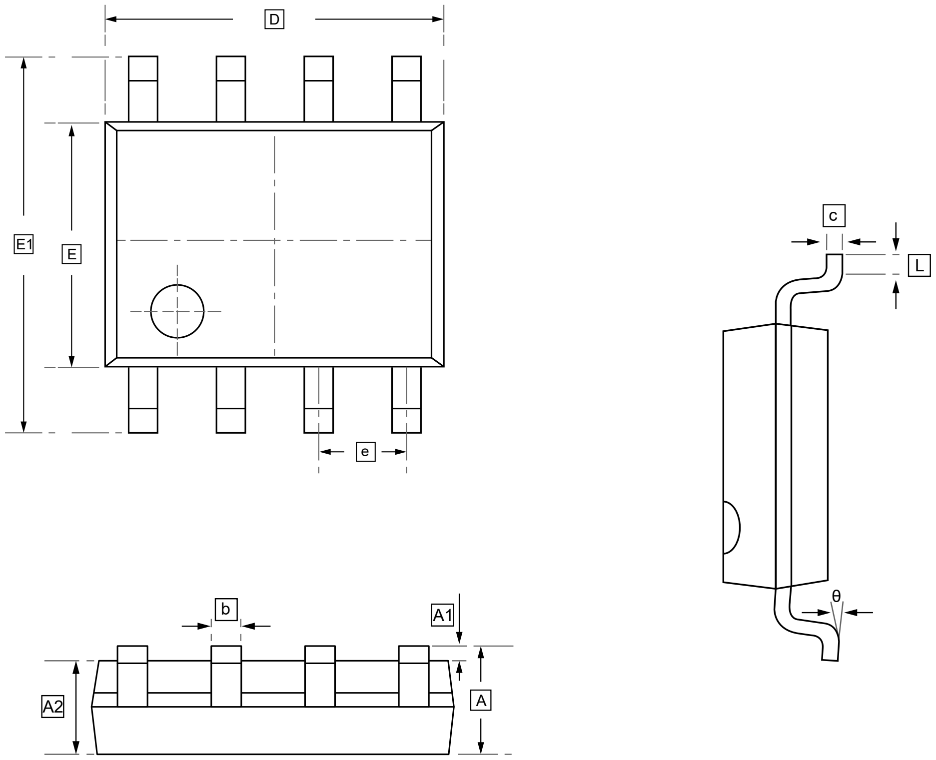


Figure 21. 0.5 Hz Square-Wave Oscillator



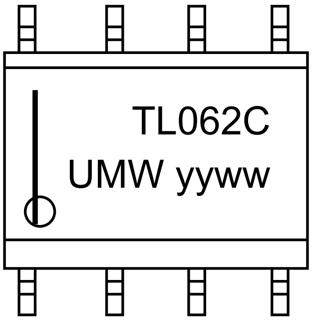
8.SOP-8 Package Outline Dimensions



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°

9.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW TL062CDR	TL062C	SOP-8	2500	Tape and reel
UMW TL062IDR	TL062I	SOP-8	2500	Tape and reel

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