低功耗J-FET 输入运算放大器

特性

- 低电源电流：200uA/Amplifier
- 低输入偏置电流：5.0pA
- 高增益带宽：2.0MHz
- 高转换率：6.0V/uS
- 高输入阻抗：1012Ω
- 大输出电压摆幅：±14V
- 输出短路保护

应用

- 平板电脑
- 白色家电
- 个人电子产品
- 计算机

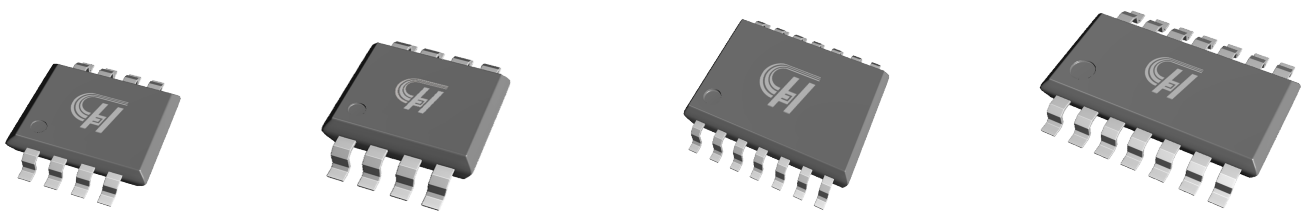
概述

这类 J-FET 输入运算放大器专为低功耗应用而设计，它们的特点是高输入阻抗，低输入偏置电流和低输入失调电流。

先进的设计技术保证了更高的转换速率, 增益带宽积和输出摆幅。商业和车辆设备可用塑料SOP贴片封装它的工作温度范围从0'C 到 70’C。

HCR062C 双通道运算放大器，

HCR064C 四通道运算放大器。



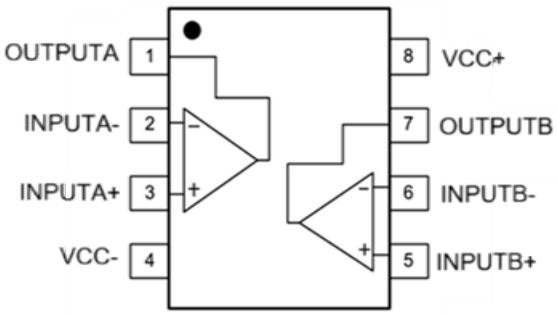
MSOP-8　SOIC-8/SOP-8　TSSOP-14　SOIC-14/SOP-14

图一 .HCR062C/HCR064C的封装外观图片

低功耗J-FET 输入运算放大器

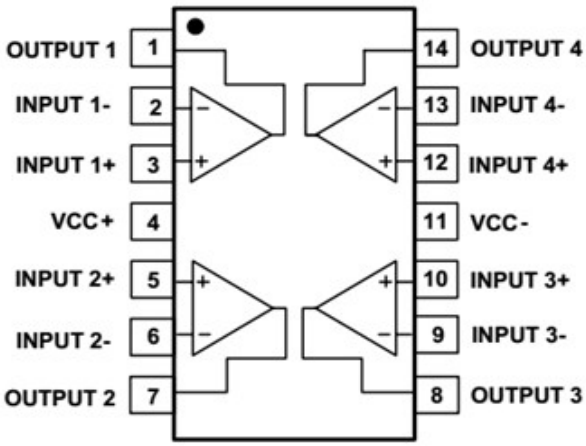
管脚排列图

HCR062C 管脚图片



封装:MSOP-8/SOIC-8(SOP8)

HCR064C管脚图片



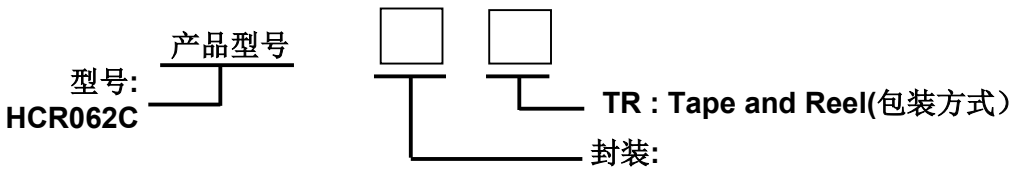
封装：TSSOP-14/SOIC-14(SOP-14)

图二 .HCR062C/HCR064C的管脚排列图

管脚功能描述

名称	功能描述
INPUTA+/B+, OUTPUT1+/2+/3+/4+	Non-inverting Inputs
INPUTA-/B-, OUTPUT1-/2-/3-/4-	Inverting Inputs
VCC+	Positive Power Supply
VCC-	Negative Power Supply
OUTPUTA/B, OUTPUT1/2/3/4	Outputs

产品订购信息：

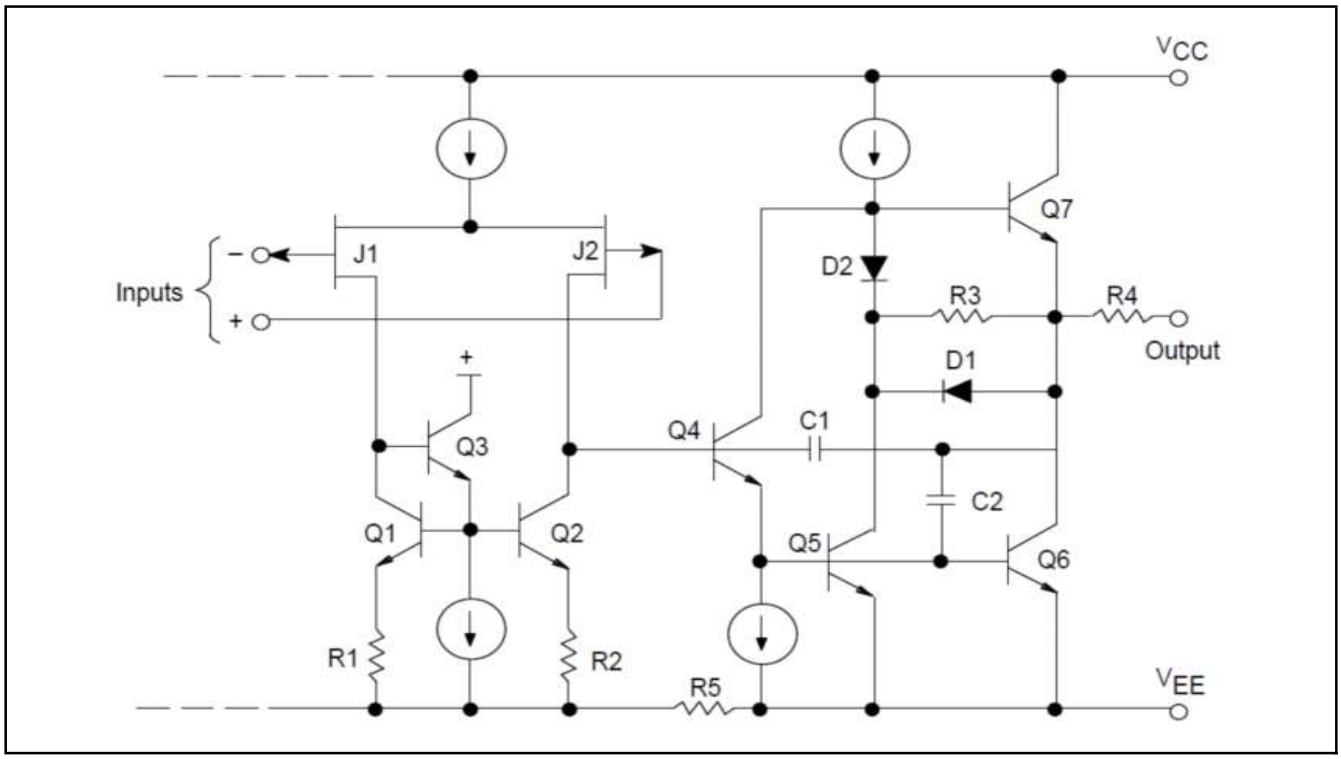


订单信息

采购订单	丝印：[a]	温度范围	封装	包装数量
HCR062CMS8TR	T062CXXYY	-40'C to +85'C	MSOP-8	3000个/盘
HCR062CM8TR	HCR062CXXYY	-40'C to +85'C	SOIC-8 (SOPO-8)	2500个/盘
HCR064CTSP14TR	HCR064CXXYY	-40'C to +85'C	TSSOP-14	2500个/盘
HCR064CM14TR	HCR064CXXYY	-40'C to +85'C	SOIC-14 (SOP-14)	2500个/盘

注 a. 这 "T062C&HCR062C/HCR064C" 是产品型号，而"XX"是周代码和“YY"是序列号.

方框示意图(每个放大器）



图三．方框示意图(每个放大器）

最大额定值 (1)

产品参数	符号	参数值	单位
电源（从VCC到VEE)	VS	+36	V
输入差分电压范围（注2)	VIDR	±30	V
输入电压范围（注2和注3)	VIR	±15	V
输出短路持续时间（注4）	tSC	待定	sec
工作结温	TJ	+125	'C
工作温度	TA	-40 to +85	'C
存储温度范围	TSTG	-60 to +150	'C
引脚温度（焊接10s)	TLEAD	260	'C

注：1. 极限参数是指无论在任何条件下都不能超过的极限值。万一超过此极限值，将有可能造成产品劣化等物理性损伤；同时在接近极限参数下，不能保证芯片可以正常工作。

2、差分电压相对于反相输入端子位于同相输入端.

3、输入电压的大小绝不能超过供电电压 15 伏的幅度，以较小者为准。

4、必须考虑功耗，以确保不超过最大结温。

低功耗J-FET 输入运算放大器

电特性（Vcc=±15V，Tamp=25°C 特殊情况另外说明）

参数	符号	测试条件		最小	典型	最大	单位
输入失调电压	VOS	RS=50Ω, VO=0V	Ta=25'C	-	3.0	15	mV
			Ta=0'C to +70'C	-	-	20	
偏移电压的平均温度系数	ΔVOS/ΔTA	RS=50Ω, VO=0V		-	10	-	uV/'C
输入失调电流	IOS	VCM =0V, VO=0V	Ta=25'C	-	0.5	200	pA
			Ta=0'C to +70'C	-	-	2	nA
输入偏置电流	IB	VCM =0V, VO=0V	Ta=25'C	-	3	200	pA
			Ta=0'C to +70'C	-	-	10	nA
输入共模电压范围	VCMR	Ta=25'C		-	+14.5	+11	V
				-11	-12	-	
大信号电压增益	AVOL	RL=10KΩ, Vo=±10Vo	Ta=25'C	3.0	58	-	V/mV
			Ta=0'C to +70'C	3.0	-	-	
输出电压幅度	Vo+	RL=10KΩ, VID=10Vo	Ta=25'C	+10	+14	-	V
	Vo-			-	-14	-10	
	Vo+		Ta=0'C to +70'C	+10	-	-	
	Vo-			-	-	-10	
共模抑制比	CMRR	RS=50Ω, VCM=VICR min, VO=0V, Ta=25'C		70	85	-	dB
共模抑制比	PSSR	RS=50Ω, VCM=0V, VO=0V, Ta=25'C		70	86	-	dB
电源电流（每个独立运放）	ID	空载， VO=0V, Ta=25'C		-	200	250	uA
总功耗（每个独立运放）	PD	空载， VO=0V, Ta=25'C		-	6.0	7.5	mW
转换速率	SR	Vin=-10V to +10V, RL=10KΩ, CL=100pF, AV=+1.0		2.0	5.0	-	V/us
上升时间	Tr	Vin=20mV, RL=10KΩ, CL=1--pF, AV=+1.0		-	0.1	-	uS
偏离值	OS	Vin=20mV, RL=10KΩ, CL=1--pF, AV=+1.0		-	10	-	%
建立时间	ts	VCC=+15V, VEE=-15V, AV=+1.0, RL=10KΩ, VO=0V to +10V step	to within 10mV	-	1.5	-	uS
			to within 1mV	-	2.2	-	
增益带宽积	GBW	f=200KHz		-	2.0	-	MHz
等效输入噪声	en	RS=100Ω, f=1.0KHz		-	47	-	nV/ √ Hz
输入电阻	Ri	-		-	10^{12}	-	Ω
信道分离	CS	f=10KHz		-	120	-	dB

特性曲线图

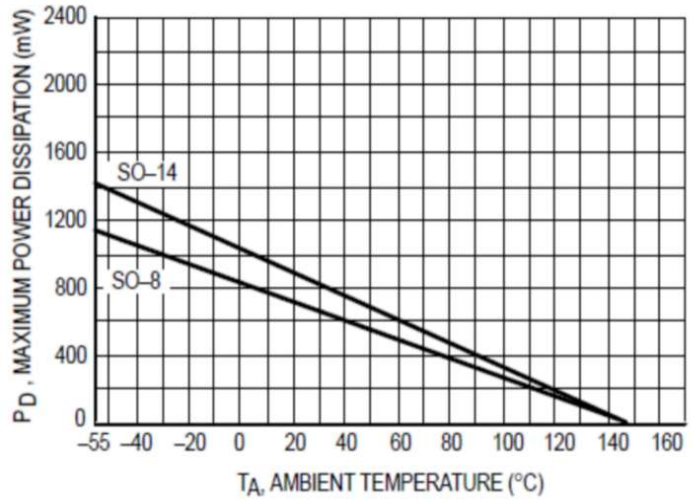


Fig 4. maximum Power Dissipation vs Temperature for package Variations

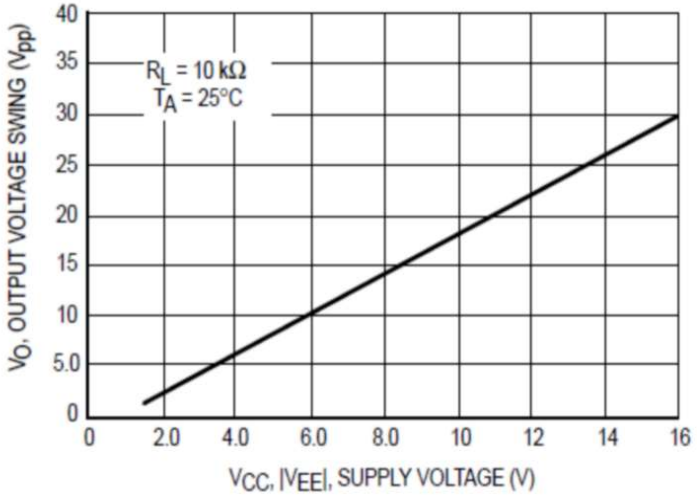


Fig 5. Output Voltage Swing vs Supply Voltage

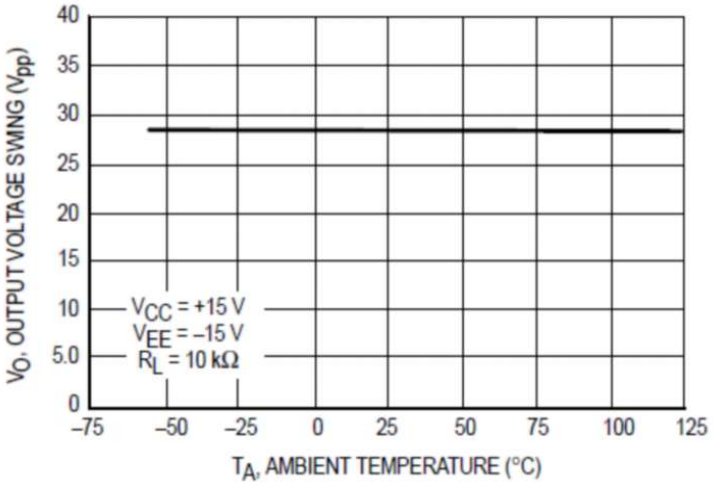


Fig 6. Output Voltage Swing vs Temperature

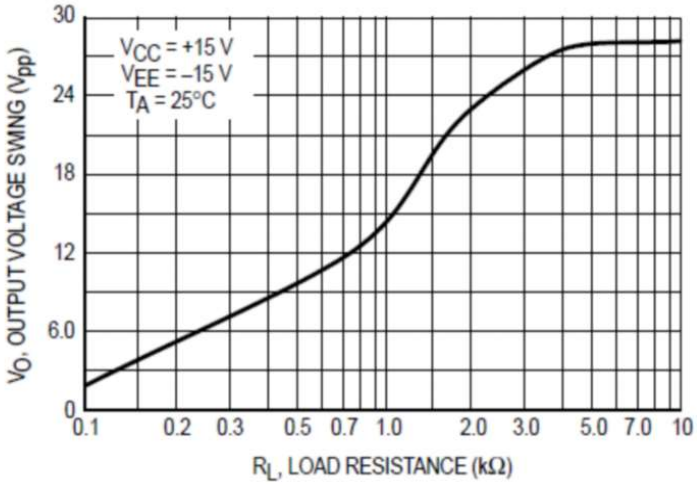


Fig 7. Output Voltage Swing vs Load Resistance

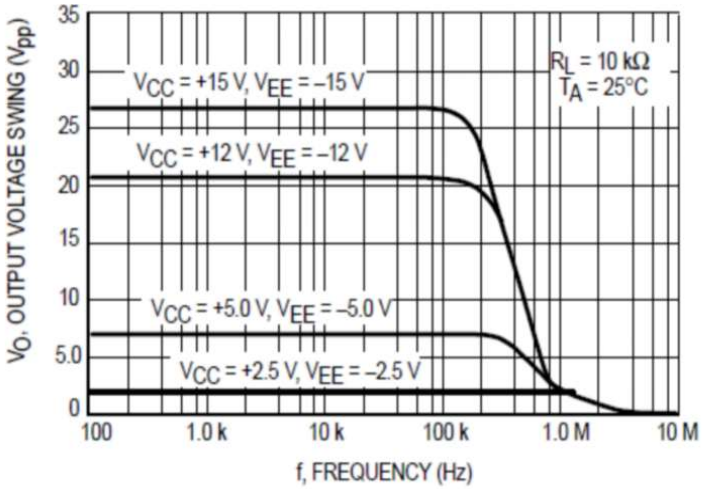


Fig 8. Output Voltage Swing vs Frequency

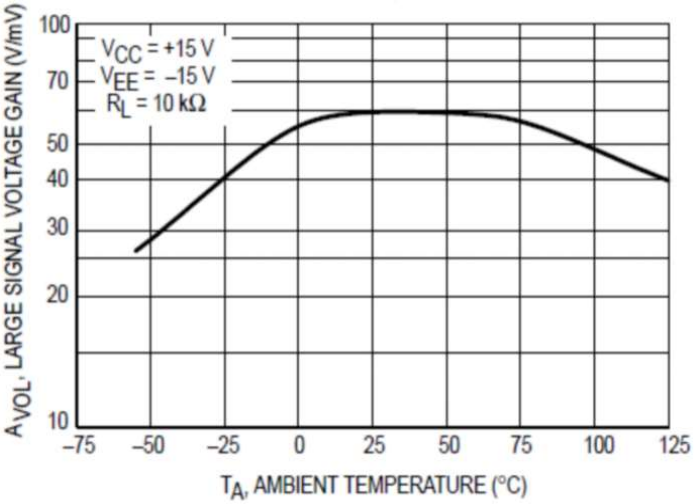


Fig 9. Large Signal Voltage Gain vs Temperature

特性曲线图(延续)

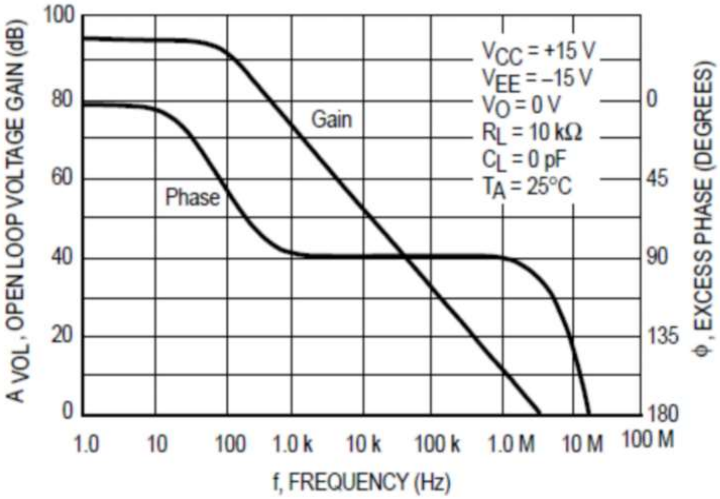


Fig 10. Open Loop Voltage Gain and Phase vs Frequency

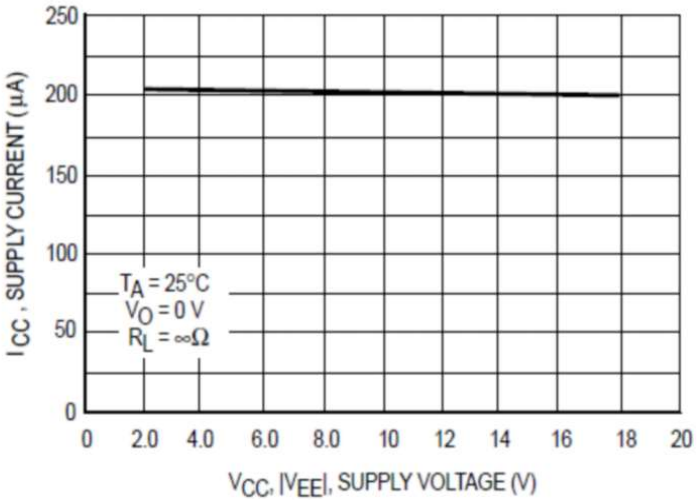


Fig 11. Supply Current per Amplifier vs Supply Voltage

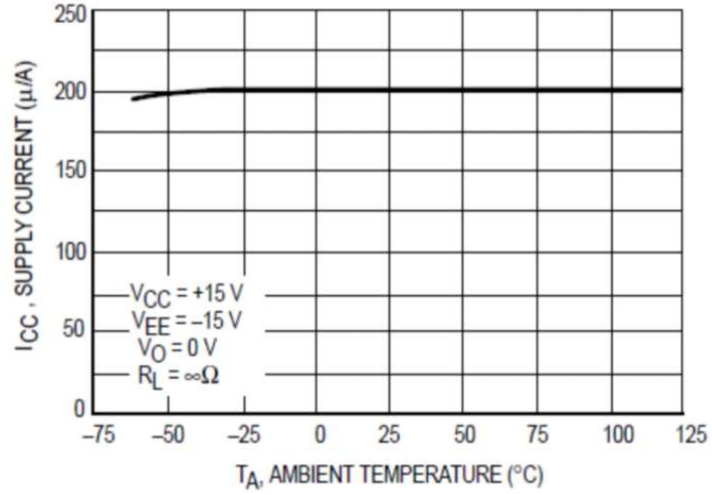


Fig 12. Supply Current per Amplifier vs Temperature

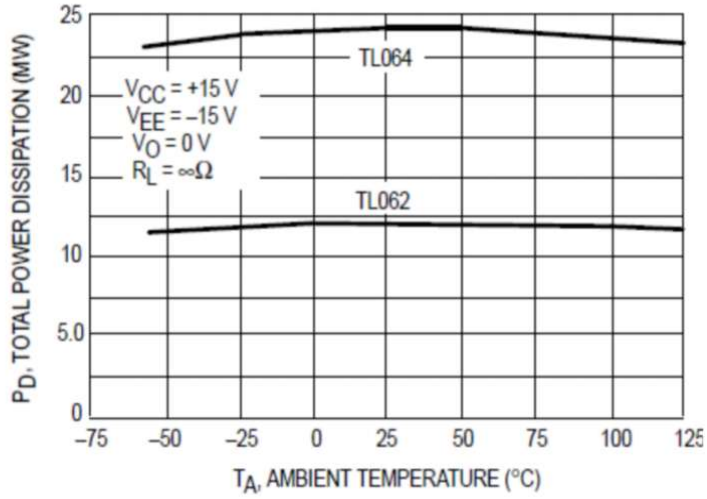


Fig 13. Total Power Dissipation vs Temperature

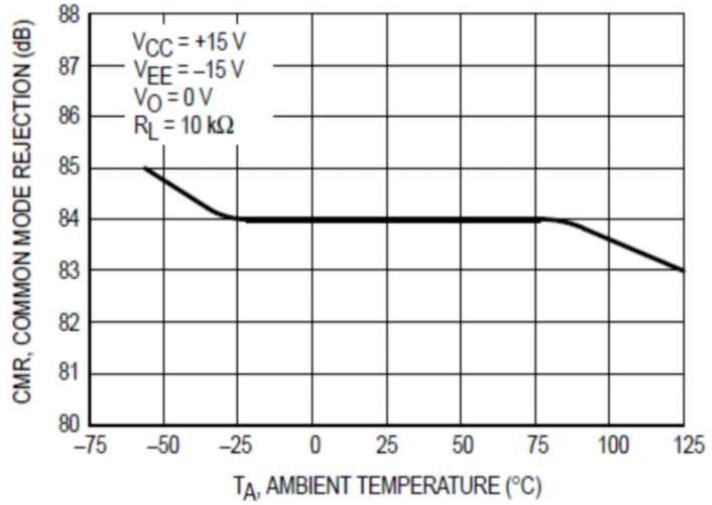


Fig 14. Common Mode Rejection vs Temperature

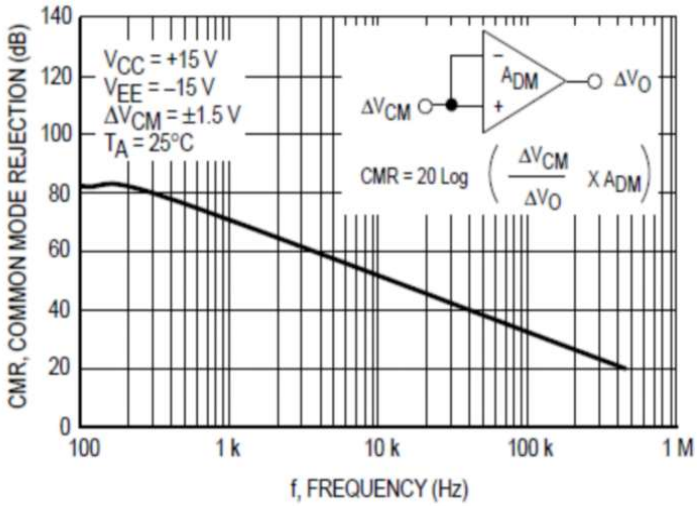


Fig 15. Common Mode Rejection vs Frequency

特性曲线图(延续)

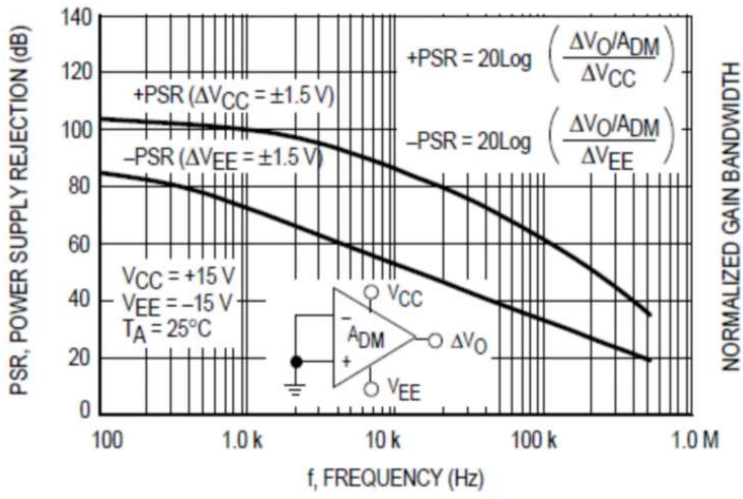


Fig 16. Power Supply Rejection vs Frequency

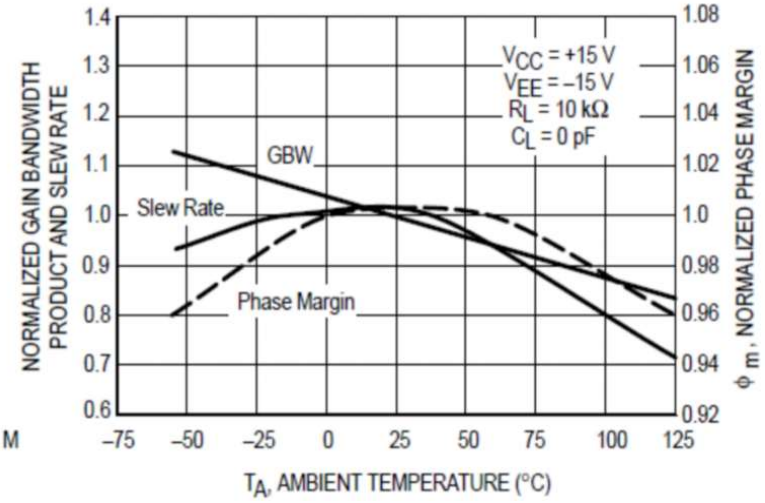


Fig 17. Normalized Gain Bandwidth Product, Slew Rate and Ohase Margin vs Temperature

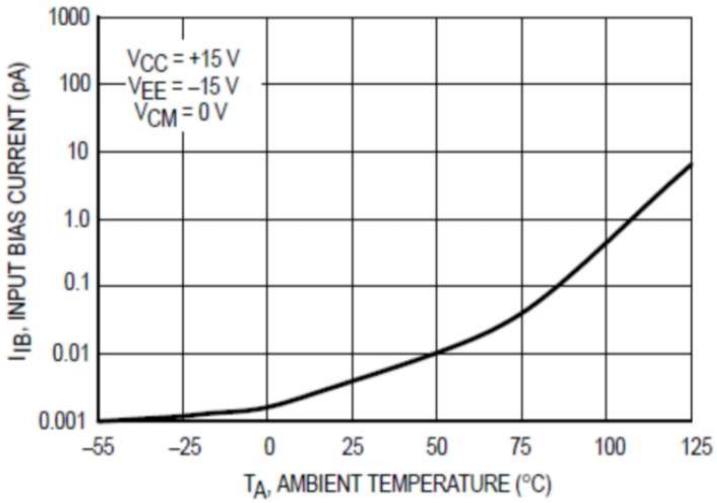


Fig 18. Input Bias Current vs Temperature

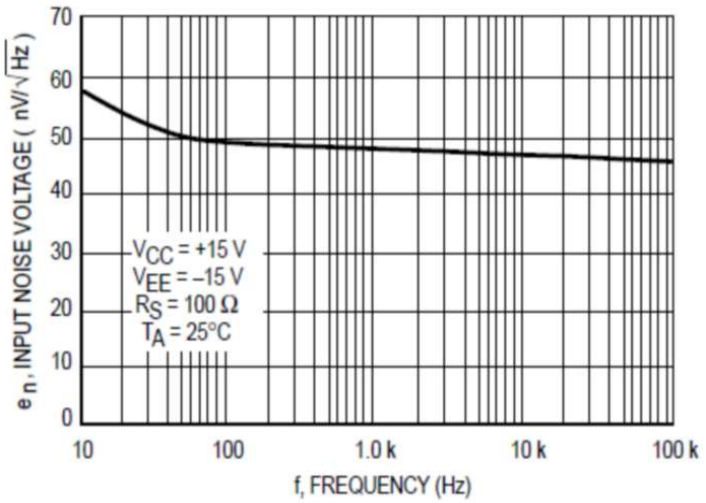


Fig 19. Input Noise Voltage vs Frequency

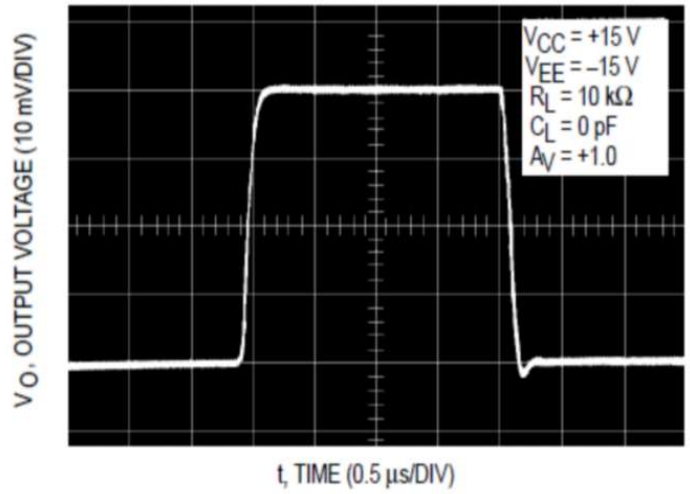


Fig 20. Small Signal Response

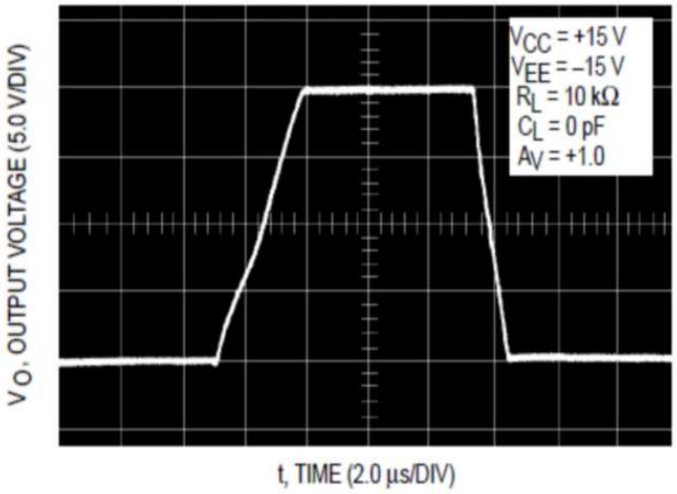


Fig 21. Large Signal Response

低功耗J-FET 输入运算放大器

应用原理图

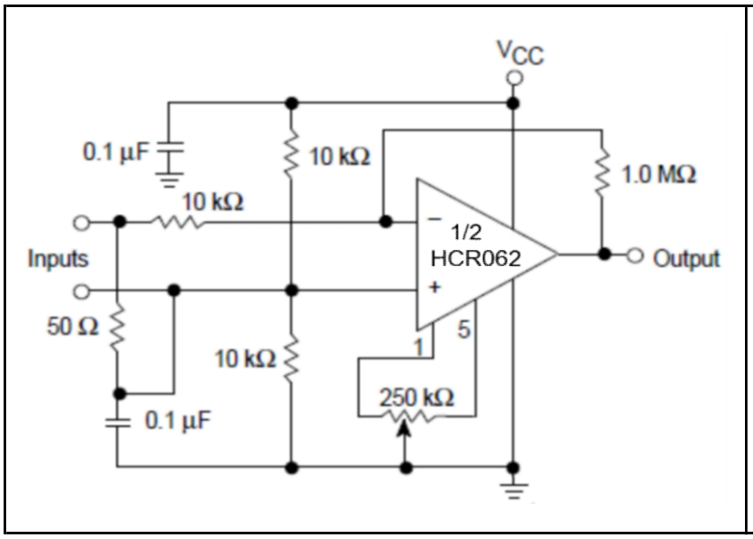


Fig 22. AC Amplifier

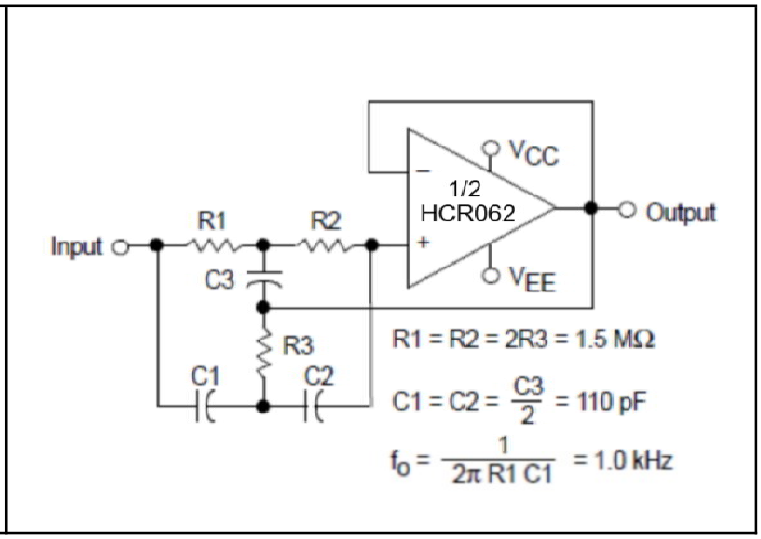


Fig 23. High-Q Notch Filter

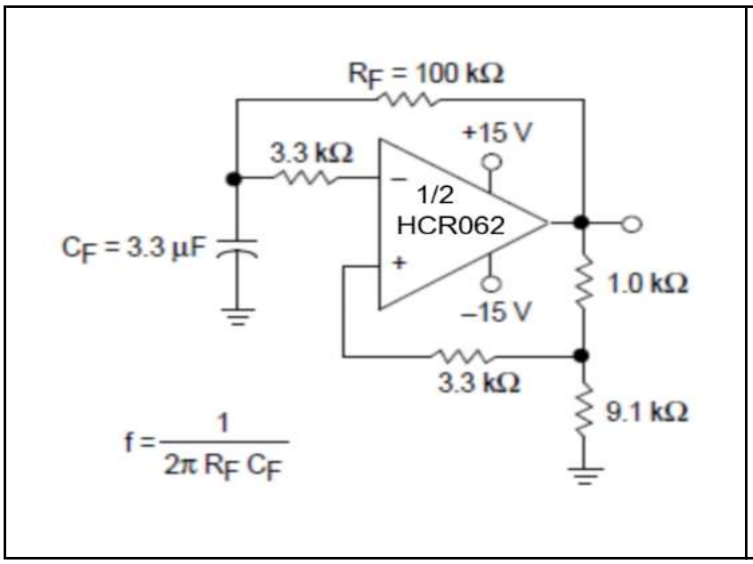


Fig 24. 0.5Hz Square-Wave Oscillator

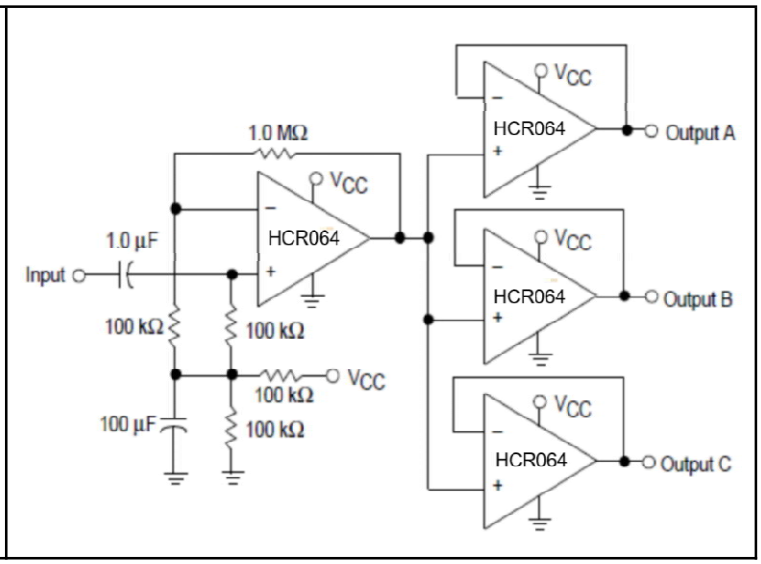


Fig 25. Audio Distribution Amplifier

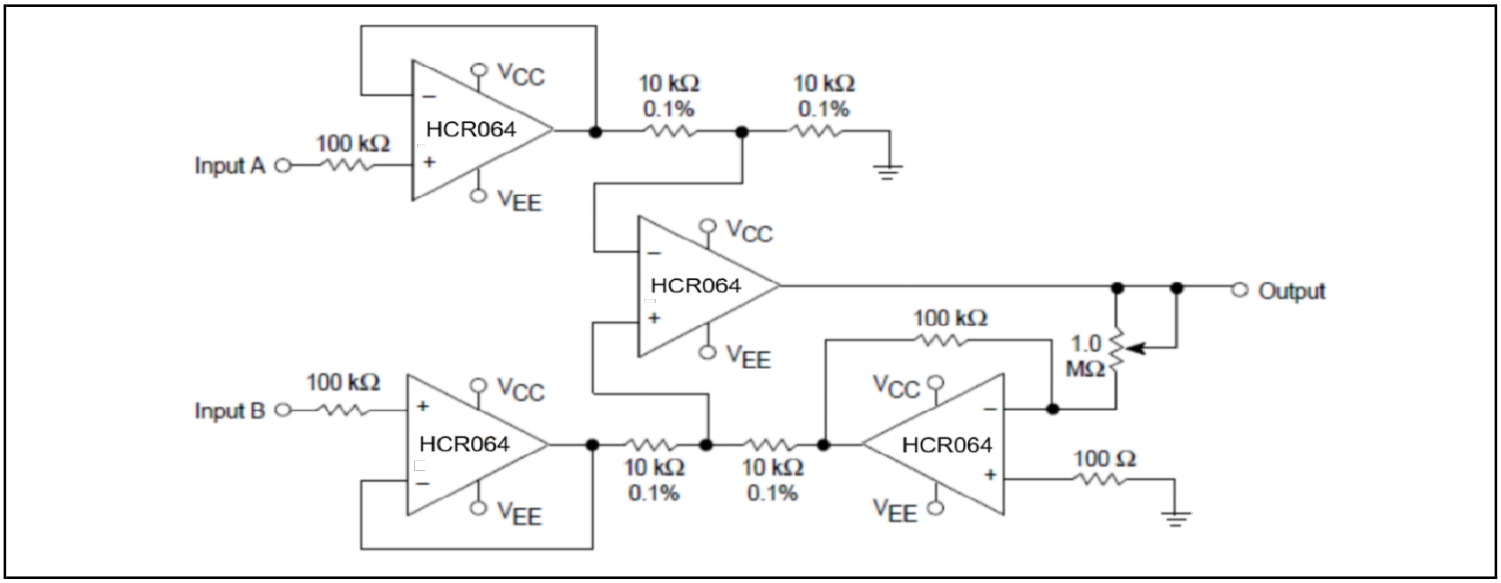
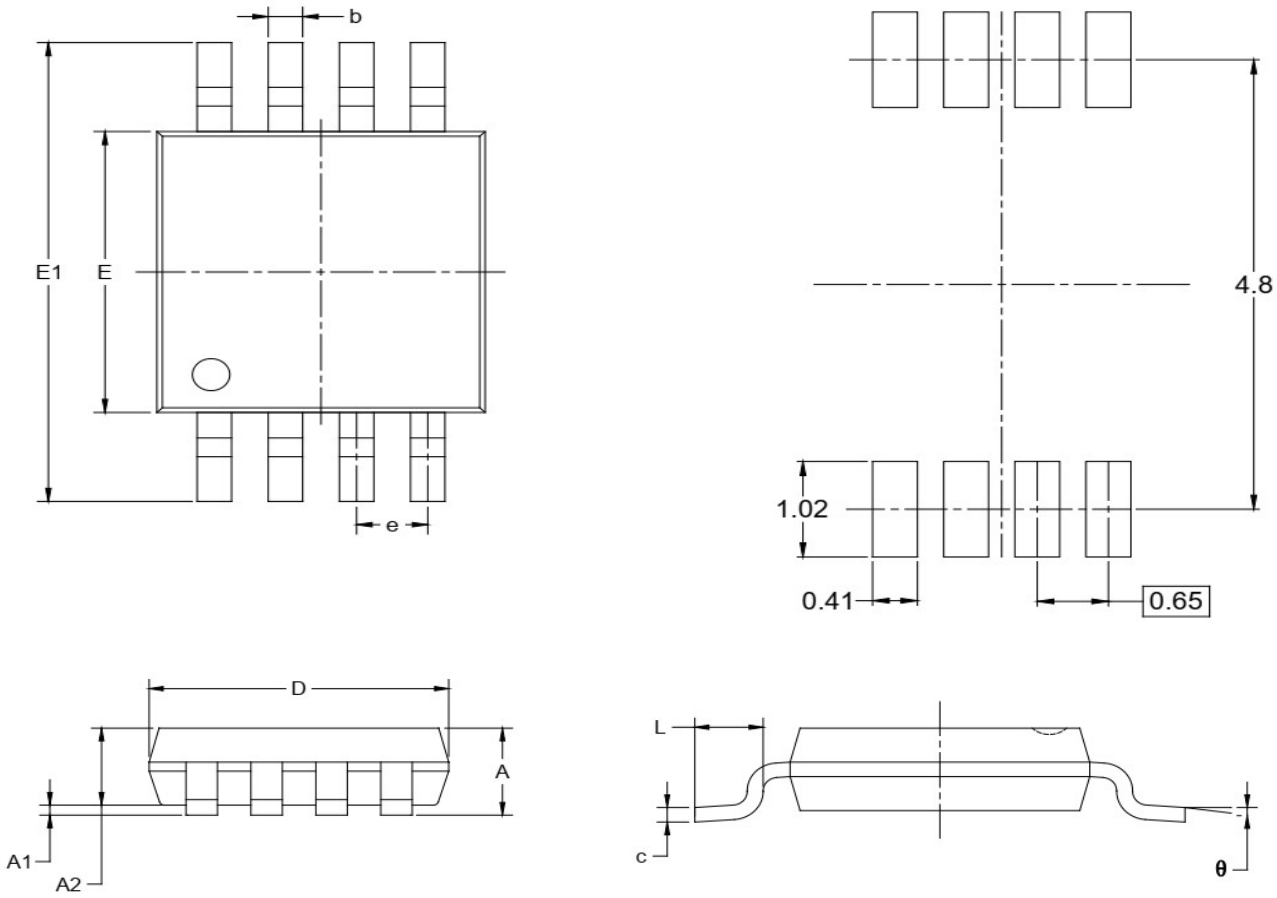


Fig 26. Instrumentation Amplifier

封装外型尺寸

MS8：MSOP-8封装

Unit: mm (inch)



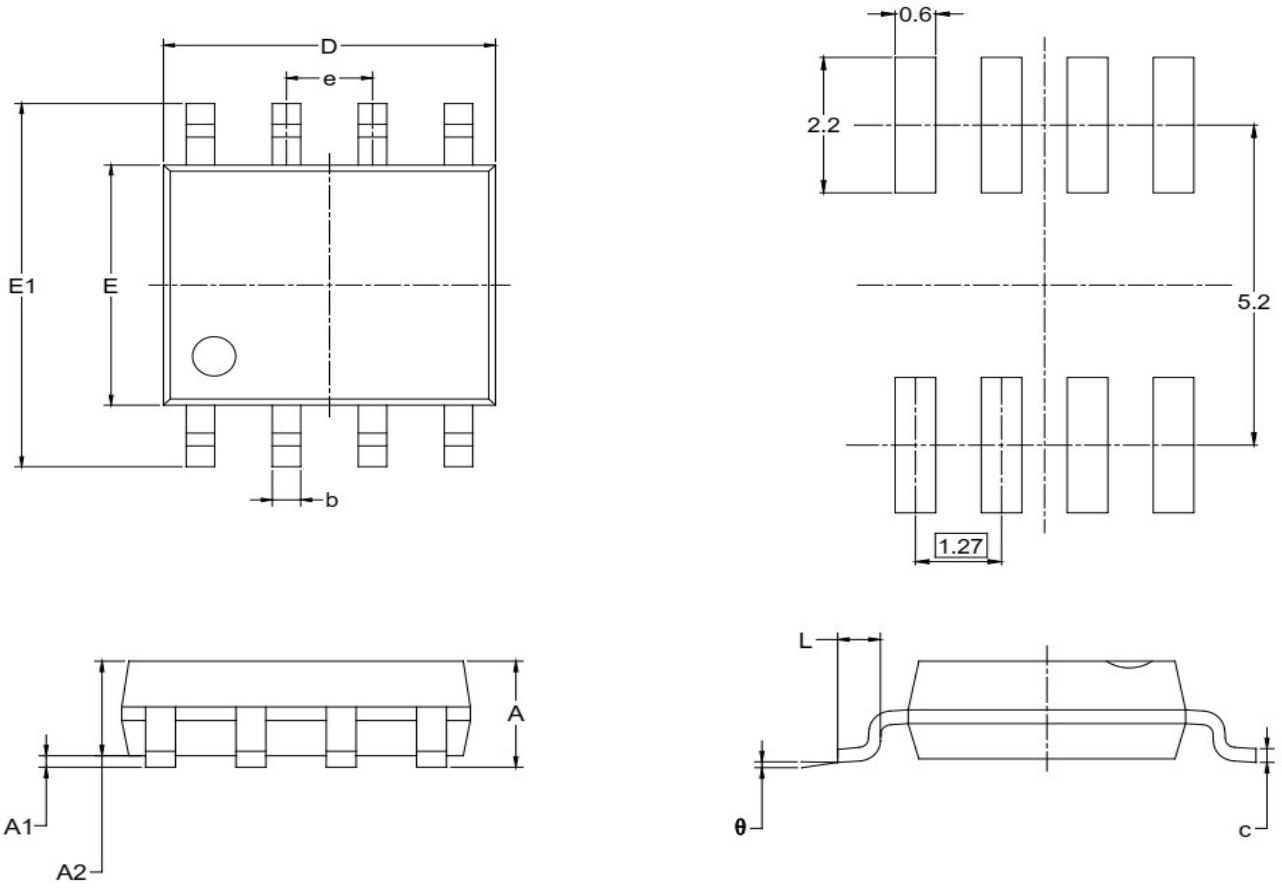
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

封装外型尺寸(延续)

M8 : SOIC-8/SOP-8 封装

Unit: mm (inch)



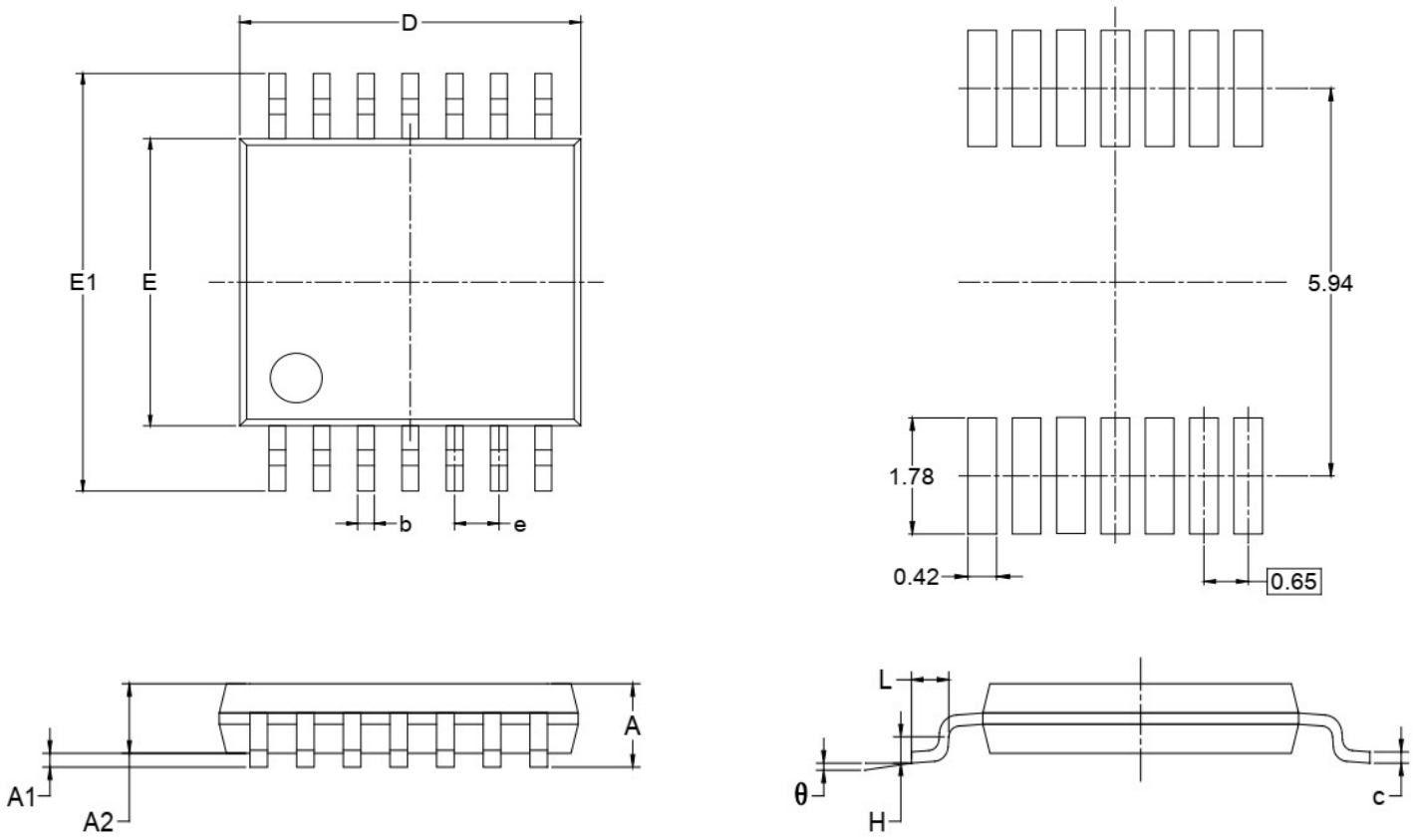
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

封装外型尺寸(延续)

TSP14 ： TSSOP-14 封装

Unit: mm (inch)



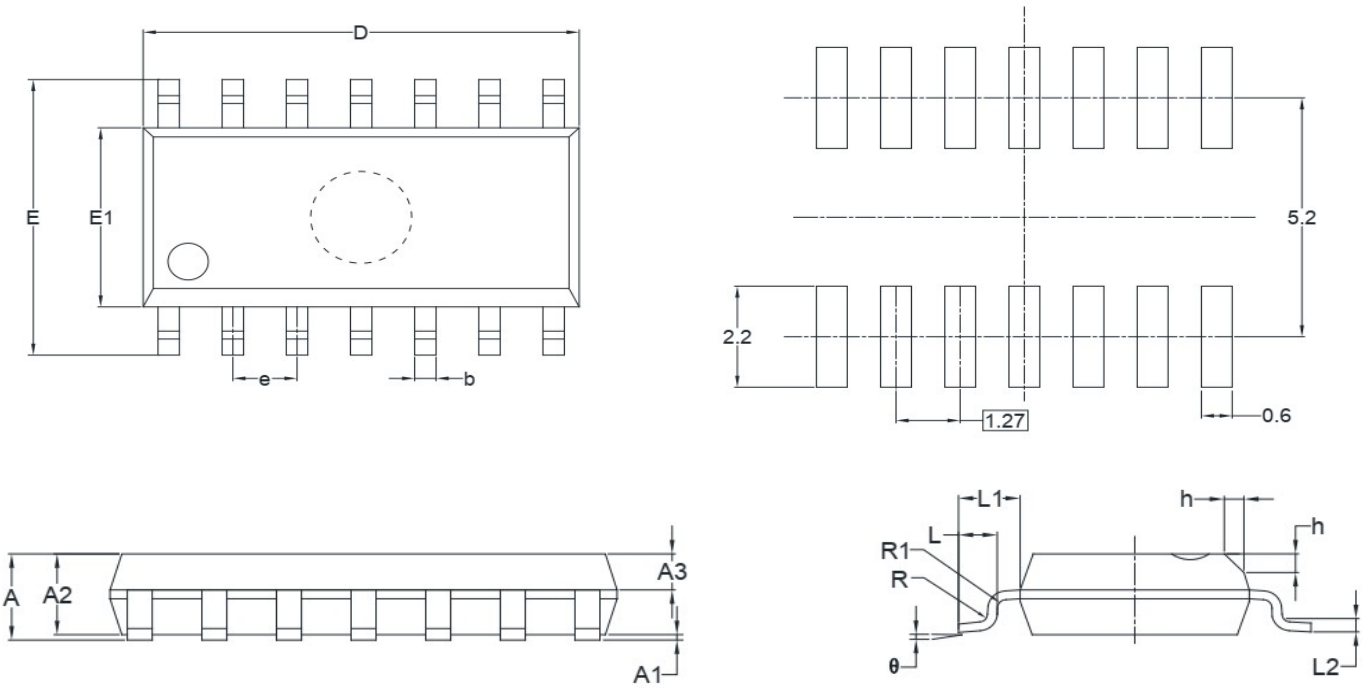
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.02	0.028
H	0.25 TYP		0.01 TYP	
θ	1°	7°	1°	7°

NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

封装外型尺寸(延续)

M14 ： SOIC-14/SOP-14 封装

Unit: mm (inch)

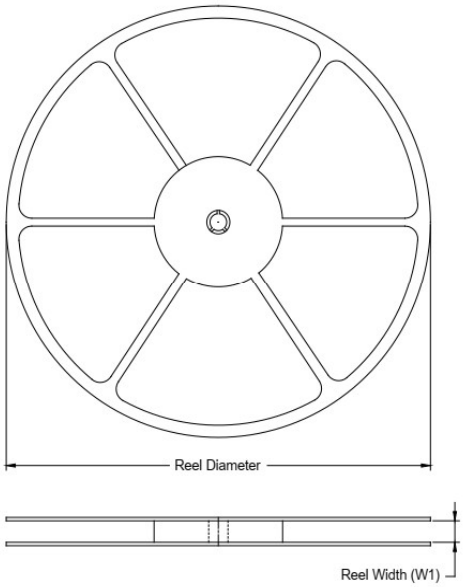


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.01 BSC	
R	0.07		0.003	
R1	0.07		0.003	
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

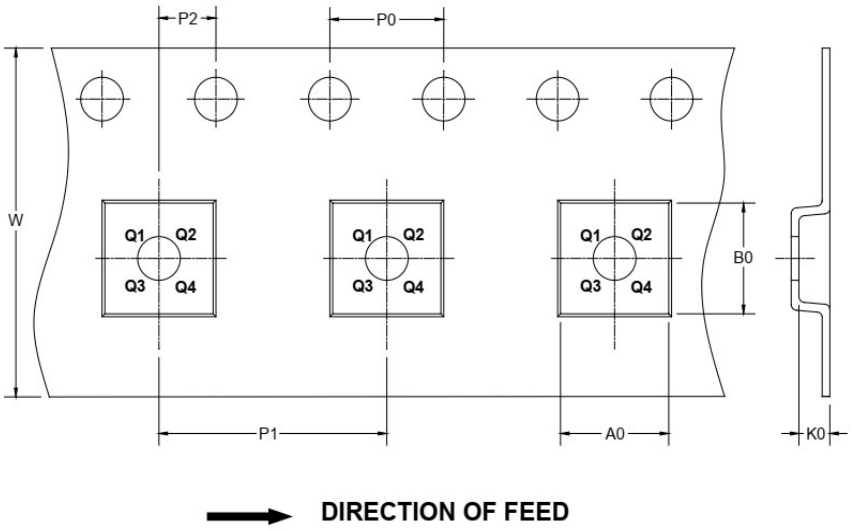
NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

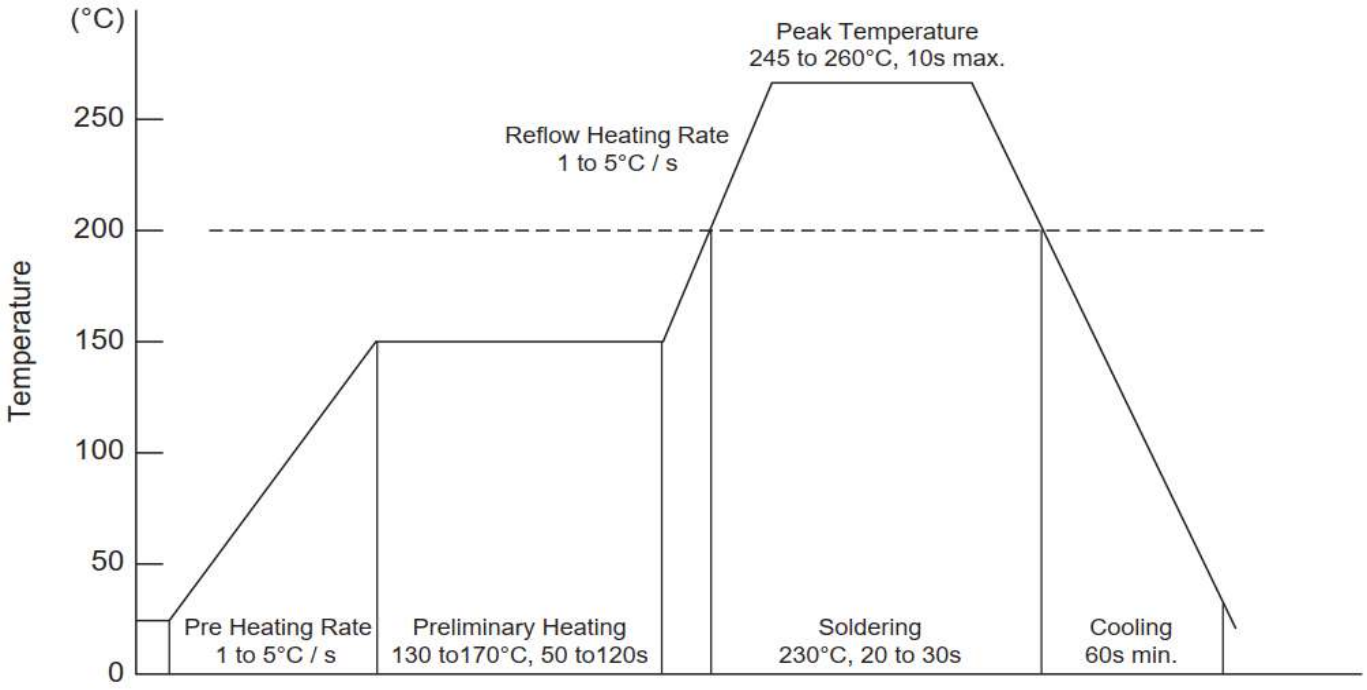
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-8	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1
MSOP-8	13"	12.4	5.20	3.30	1.50	4.0	8.0	2.0	12.0	Q1
TSSOP-14	13"	12.4	6.95	5.60	1.20	4.0	8.0	2.0	12.0	Q1
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1

Conditins of Soldering and Storage

* Recommended condition of reflow soldering



Recommended peak temperature is over 245'C, if peak temperature is below 245'C, you may adjust the following parameters:

* Time length of peak temperature (longer)
* Time length of soldering (longer)
* Thickness of solder paste (thicker)

* Conditions of hand soldering
  * Temperature : 300'C
  * Time : 3s max
  * Times : one time

* Storage conditions
  * Temperature

    5 to 40'C
  * Humidity

    30 to 80% RH
  * Recommended period

    One year after manufacturing