Dual Operational Amplifiers Integrated Circuit

LM4558A Operational Amplifiers

1 Introduction

The LM4558A consists of two high performance operational amplifiers. The IC features high gain, low equivalent input noise voltage, high input resistance, excellent channel separation, wide range of operating voltage and internal frequency compensation.

It can work with ±18V maximum power supply voltage or single power supply up to 36V.

The LM4558A is available in SOP packages.

2 Features

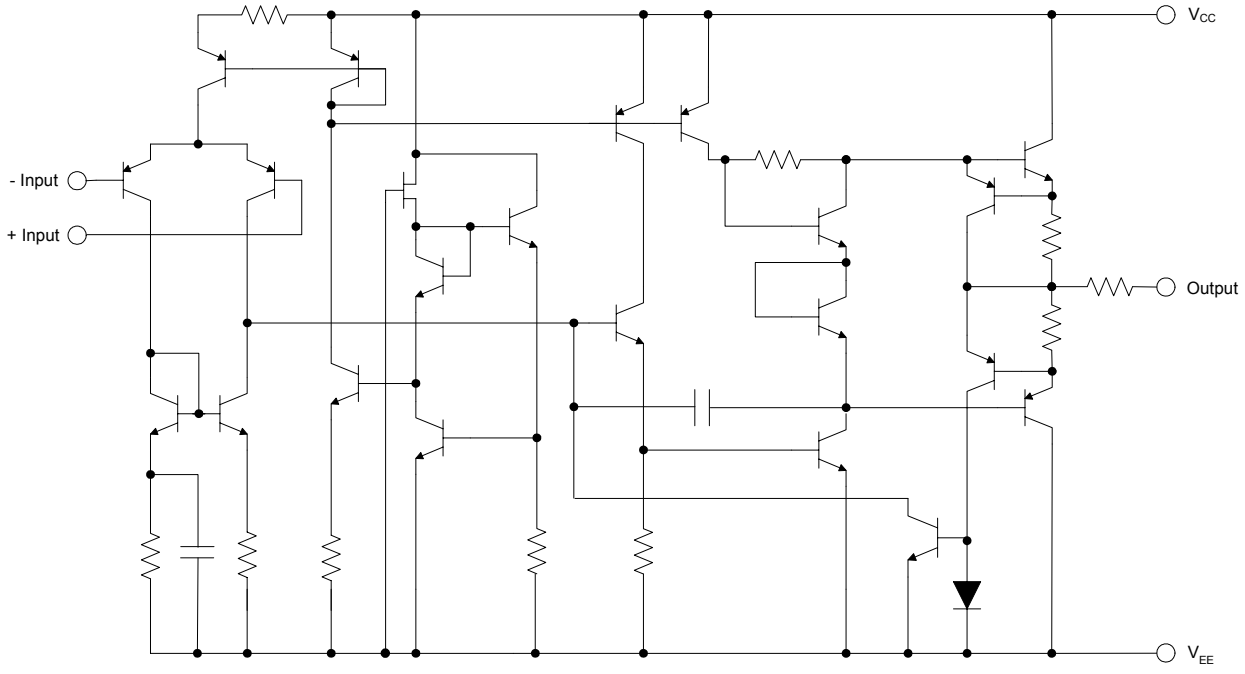
- Internally Frequency Compensated
- Large Signal Voltage Gain: 100dB Typical
- Gain and Phase Match between Amplifiers
- Gain Bandwidth Product (at 10kHz): 5.5MHz
- Pin to Pin Compatible with MC1458

3 Applications

- Audio AC-3 Decoder System
- Audio Amplifier

4 Available Packages

PART NUMBER	PACKAGE
LM4558A	SOP8



Functional Block Diagram of LM4558A (Each Amplifier)

5 Orderable Information

MODEL	DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
LM4558A	LM4558A	SOP8	0 ~ 70°C	RoHS & Green	Level 3 168 HR	Tape and Reel 4000 Units / Reel	Active
Others	-	-	-	-	-	-	Customized

Note:

ECO PLAN: For the RoHS and Green certification standards of this product, please refer to the official report provided by JSCJ.

MSL: Moisture Sensitivity Level. Determined according to JEDEC industry standard classification.

SORT: Specifically defined as follows:

Active: Recommended for new products;

Customized: Products manufactured to meet the specific needs of customers;

Preview: The device has been released and has not been fully mass produced. The sample may or may not be available;

NoRD: It is not recommended to use the device for new design. The device is only produced for the needs of existing customers; Obsolete: The device has been discontinued.

6 Pin Configuration and Marking Information

6.1 Pin Configuration and Function

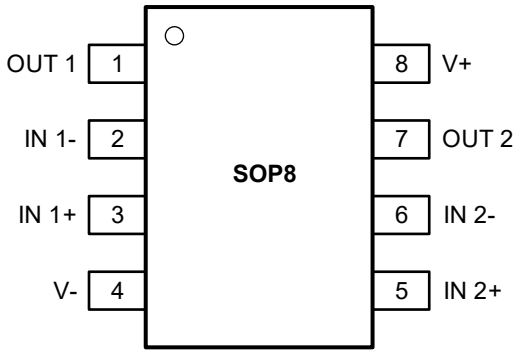
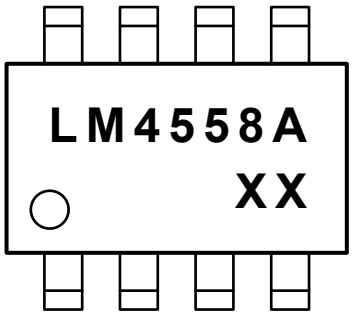


Figure 6-1. LM4558A Pin Map

PIN NAME	LM4558A SOP8	I / O	DESCRIPTION
OUT 1	1	O	Output of the operational amplifier 1.
IN 1-	2	I	Negative input of the operational amplifier 1.
IN 1+	3	I	Positive input of the operational amplifier 1.
V-	4	-	Negative (lowest) supply or ground for single supply.
IN 2+	5	I	Positive input of the operational amplifier 2.
IN 2-	6	I	Negative input of the operational amplifier 2.
OUT 2	7	O	Output of the operational amplifier 2.
V+	8	-	Positive (highest) supply.

6.2 Marking Information



"**LM4558A**": Device number.

"XX": Code, indicates weekly record information.

7 Specifications

7.1 Absolute Maximum Ratings

(over operating ambient temperature range, unless otherwise specified)(1)

CHARACTERISTIC		SYMBOL	VALUE	UNIT
Maximum power supply	Single supply	V_{CC}	36	V
	Dual supplies		±18	
Maximum differential input range		V_{ID}	±30	V
Maximum input range (either input)		V_{IN}	±15	V
Operating Temperature Range		T_{OPR}	0 ~ 70	°C
Storage Temperature Range		T_{STG}	-65 ~150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum rated conditions for extended periods may affect device reliability.

7.2 Thermal Information

THERMAL METRIC(2)	SYMBOL	SOP8	UNIT
Junction-to-ambient thermal resistance	$R_{\Theta JA}$	165.0	°C/W
Junction-to-case thermal resistance	$R_{\Theta JC}$	45.0	°C/W
Reference maximum power dissipation (continuous)	$P_{D\ Ref}$	0.61	W

(2) T_A = 25°C, measured on evaluation board with 1oz. copper traces of minimum pad size, all device outputs were active.

7 Specifications

7.3 Electrical Characteristics

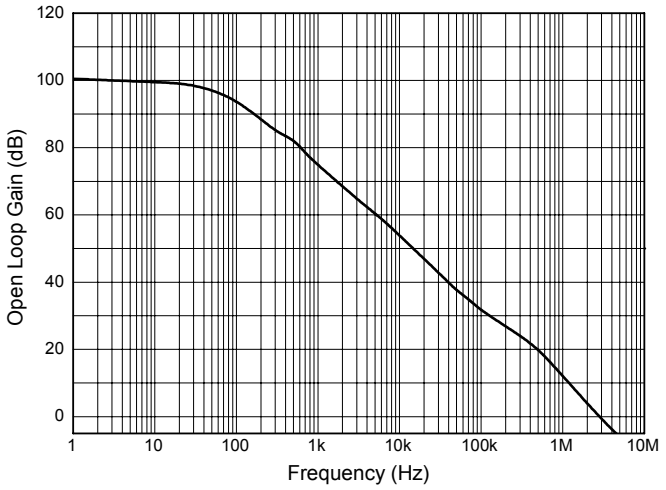
V_{CC} = +15V, V_{EE} = -15V, T_A = 25°C, unless otherwise specified.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	-	-	1	5	mV
Input Offset Current	I_{IO}	V_{CM} = 0V	-	10	200	nA
Input Bias Current	I_{IB}	V_{CM} = 0V	-	70	500	nA
Large Signal Voltage Gain	A_{VD}	R_L = 2kΩ, V_O = ±10V	85	100	-	dB
Supply Voltage Rejection Ratio	SVR	R_S ≤ 10kΩ	77	100	-	dB
Supply Current	I_{CC}	All Amplifiers, no load	-	2.5	4.5	mA
Input Common Mode Voltage Range	V_{ICM}	-	±12	-	-	V
Common Mode Rejection Ratio	CMRR	R_S ≤ 10kΩ	70	95	-	dB
Output Voltage Swing	V_O	R_L ≥ 10kΩ	±12	±14	-	V
		R_L ≥ 2kΩ	±10	±13	-	
Slew Rate	SR	V_I = ±10V, R_L = 2kΩ, C_L = 100pF, unity gain	-	1.8	-	V/μs
Rise Time	T_R	V_I = ±20mV, R_L = 2kΩ, C_L = 100pF, unity gain	-	0.3	-	μs
Overshoot	K_{OV}	V_I = ±20mV, R_L = 2kΩ, C_L = 100pF, unity gain	-	15	-	%
Input Resistance	R_I	-	-	0.5	-	MΩ
Output Resistance	R_O	-	-	45	-	Ω
Unity Gain Bandwidth	B	Gain = 0dB	-	2.8	-	MHz
Gain Bandwidth Product	GBWP	V_I = ±10mV, R_L = 2kΩ, C_L = 100pF, f = 10kHz	-	5.5	-	MHz
Total Harmonic Distortion Plus Noise	THD+N	f = 1kHz, A_V = 6dB, R_L = 10kΩ, V_O = 1V_{RMS}	-	0.002	-	%
Equivalent Input Noise Voltage Density	e_N	R_S = 100Ω, f = 1kHz	-	10	-	$\frac{nV}{\sqrt{Hz}}$

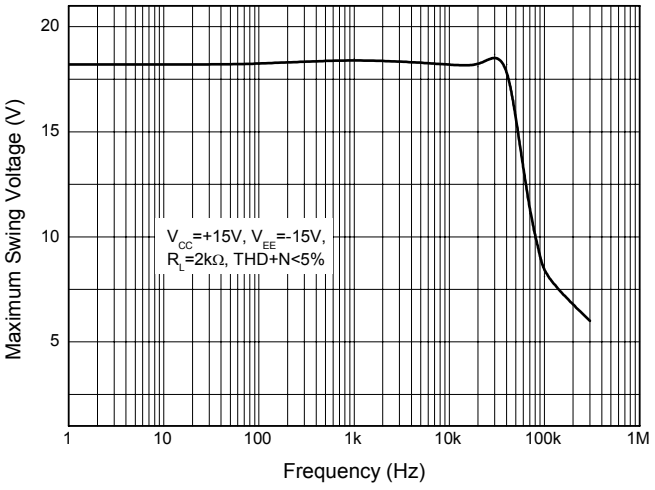
7 Specifications

7.4 Typical Characteristics

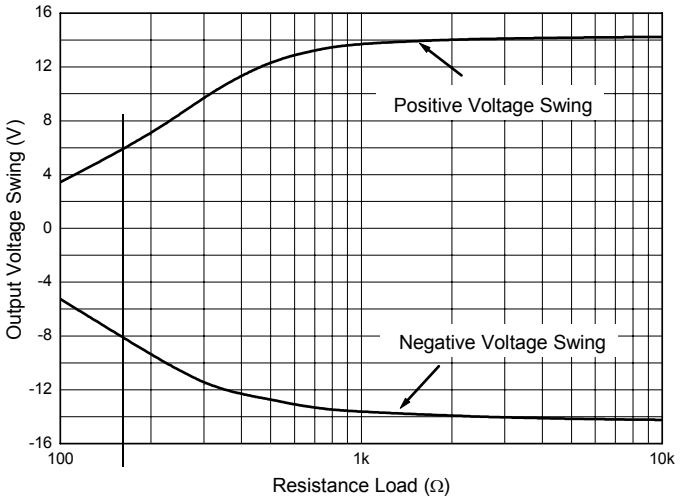
Open Loop Voltage Gain vs. Frequency



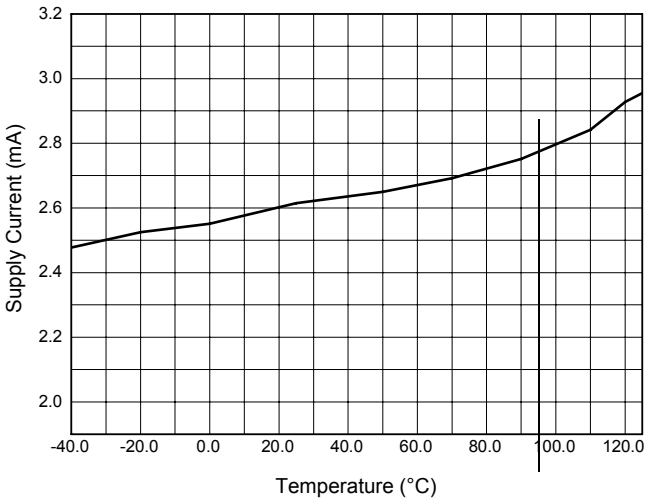
Maximum Output Voltage Swing vs. Frequency



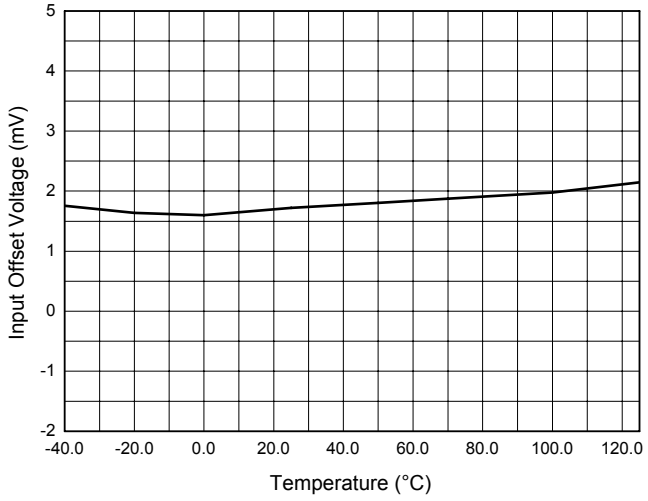
Maximum Output Voltage Swing vs. Load Resistance



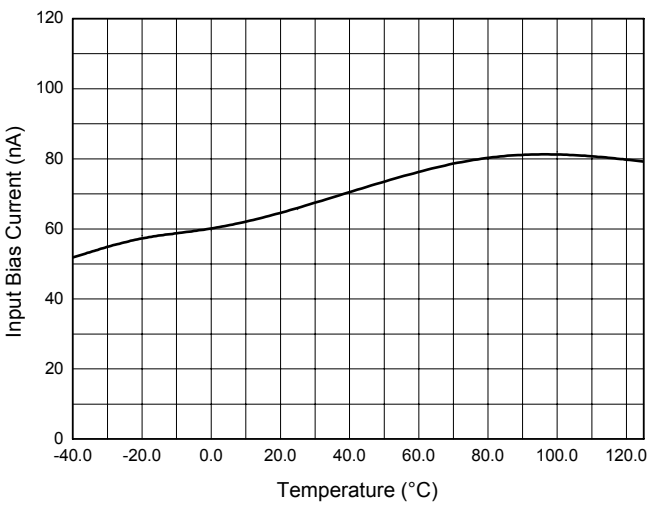
Supply Current vs. Temperature



Input Offset Voltage vs. Temperature



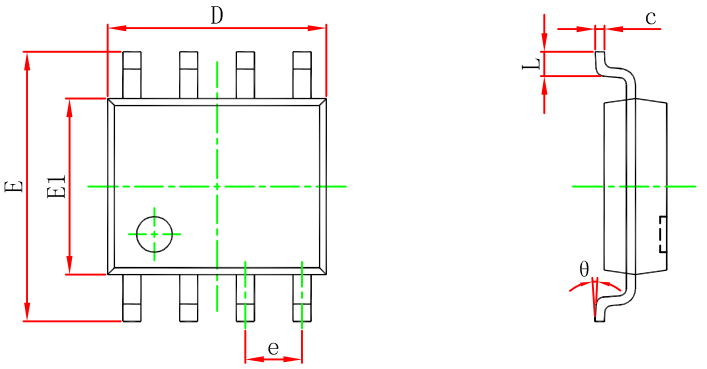
Input Bias Current vs. Temperature



8 Mechanical Information

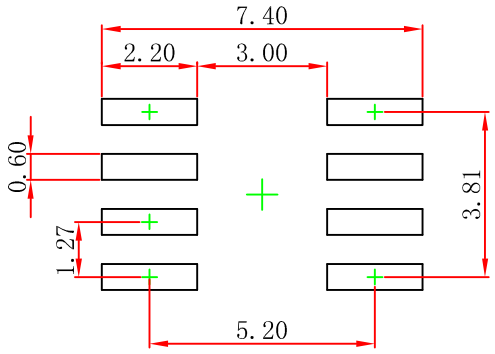
8.1 SOP8 Mechanical Information

Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	1.370	1.670	0.054	0.066
A1	0.070	0.250	0.003	0.010
A2	1.350	1.550	0.053	0.061
b	0.300	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270（BSC）		0.050（BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

SOP8 Suggest Pad Layout



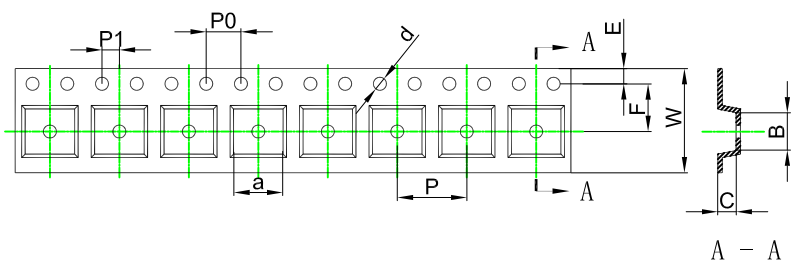
NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm.
3. The pad layout is for reference purposes only.

9 Packaging Information

9.1 SOP8 Tape and Reel Information

Embossed Carrier Tape



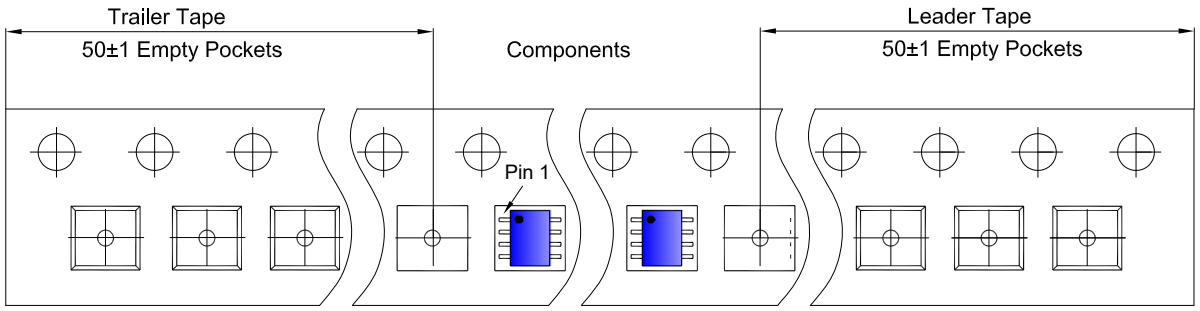
Packaging Description:

SOP8 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

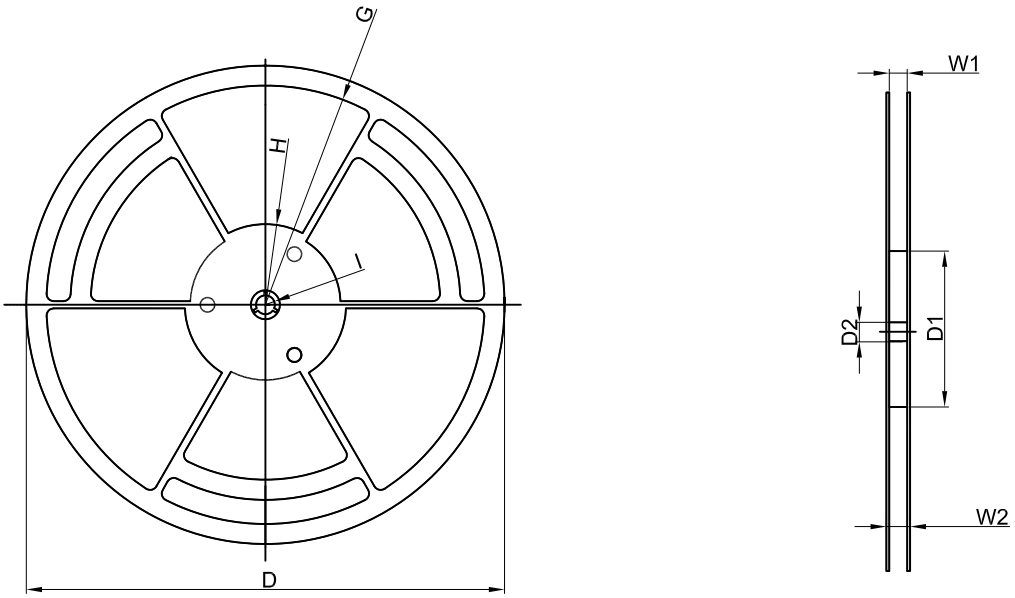
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP8	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

Tape Leader and Trailer



Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R151.00	R56.00	R6.50	12.40	17.60

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
4,000 pcs	13 inch	8,000 pcs	360×360×65	64,000 pcs	565×380×390	

10 Notes and Revision History

10.1 Associated Product Family and Others

To view other products of the same type or IC products of other types, click the official website of JSCJ -- https: ***www.jscj-elec.com*** for more details.

10.2 Notes

Electrostatic Discharge Caution

This IC may be damaged by ESD. Relevant personnel shall comply with correct installation and use specifications to avoid ESD damage to the IC. If appropriate measures are not taken to prevent ESD damage, the hazards caused by ESD include but are not limited to degradation of integrated circuit performance or complete damage of integrated circuit. For some precision integrated circuits, a very small parameter change may cause the whole device to be inconsistent with its published specifications.

10.3 Revision History

July 2025: released LM4558A rev - 1.0.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

The information in this data sheet is intended to describe the operation and characteristics of our products. JSCJ has the right to make any modification, enhancement, improvement, correction or other changes to any content in this data sheet, including but not limited to specification parameters, circuit design and application information, without prior notice.

Any person who purchases or uses JSCJ products for design shall: 1. Select products suitable for circuit application and design; 2. Design, verify and test the rationality of circuit design; 3. Procedures to ensure that the design complies with relevant laws and regulations and the requirements of such laws and regulations. JSCJ makes no warranty or representation as to the accuracy or completeness of the information contained in this data sheet and assumes no responsibility for the application or use of any of the products described in this data sheet.

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