

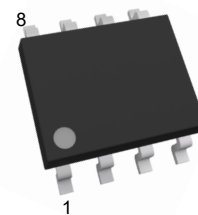
Low-Power rail-to-rail Operational Amplifier

Description

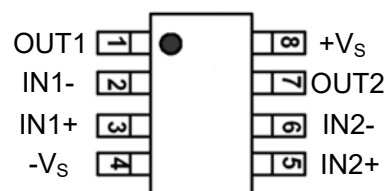
LMV358 (dual channel) is a rail-to-rail input, output voltage feedback, low power consumption operational amplifier. It has wide input common mode voltage and output swing. The minimum working voltage can be up to 2.1V, and the maximum working voltage is recommended to be 5.5V. Used as power amplifier in all kinds of pocket or portable stereo radio recorders.

LMV358 has the following characteristics: Can provide 1MHz gain bandwidth product. It has an extremely low input bias current (about 10pA level) and can be used for integration, photo diode amplifiers and piezoelectric sensors. The Rail to Rail input and output buffers are also used for specific IC designs in single power systems. Applications of this series of amplifiers include safety monitoring, portable devices, batteries and power supplies, supply control, signal processing and interfaces in low power sensor systems.

SOP-8



Pin Assignment



Features

- Low power dissipation
- Rail to rail input and output, typical 0.8mv Vos
- Stable unit gain
- Gain bandwidth product 1.1MHz
- Low input bias current: 10pA Level, <1nA
- Low Power consumption
- 2.1V ~ 5.5V working voltage
- Low operating current: 45uA each channel

Pin Function

Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	OUT1	The output of the first operational amplifier	5	IN2+	The non-inverting input of the second operational amplifier
2	IN1-	The inverting input of the first operational amplifier	6	IN2-	The inverting input of the second operational amplifier
3	IN1+	The non-inverting input of the first operational amplifier	7	OUT2	The output of the second operational amplifier
4	-Vs	Negative power input	8	+Vs	Positive power input

Absolute Maximum Ratings (at T_A = 25°C) ^{Note1}

Parameter	Symbol	Value	Unit
Supply Voltage(+V _S →-V _S)	V _{CC}	7.5	V
Common-mode Input Voltage	V _{ICR}	-V _S -0.5~+V _S +0.5	V
Junction Temperature	T _J	150	°C
Operating Temperature Range	T _{OPR}	-40~85	°C
Storage Temperature Range	T _{STG}	-50~150	°C
Lead Temperature (Soldering, 10 sec)	T _L	260	°C

Note1: Exceeding the above limits may damage to the chip. The reliability of the device will also be affected if the device works under the limit conditions. Electrostatic discharge can also cause damage to chips, so it is suggested to take some preventive measures for integrated circuits. Failure to follow proper handling and installation can also cause damage. Precision LMV358 and other devices are more vulnerable to damage than ordinary devices in the case of tiny electrostatic, and small parameter changes may make the whole circuit performance substandard.

Electrical Characteristics

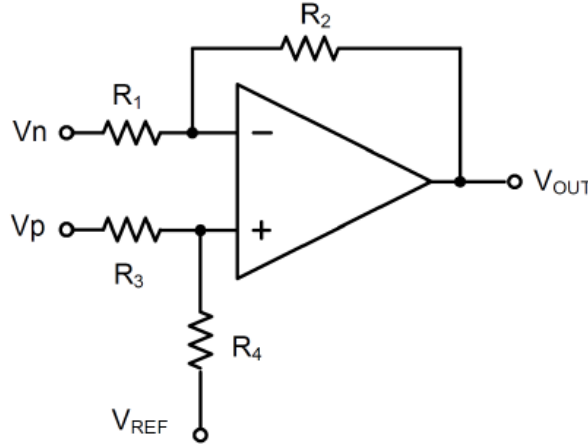
$R_L=100K\Omega$ Connected to $V_S/2$ and $V_{OUT}=V_S/2$, $T_A=25^{\circ}C$, unless otherwise noted

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Input offset voltage	V_{OS}		--	± 0.8	± 5	mV
Input offset current	I_{OS}		--	10	--	pA
Low input bias current	I_B		--	10	--	pA
Common-mode input voltage rang	V_{CM}	$V_S=5.5V$	--	-0.1-5.6	--	V
Input offset voltage drift	$\Delta V_{OS}/\Delta T$		--	2.7	--	$\mu V/^{\circ}C$
Open-loop gain	A_{OL}	$V_O=0.1V\sim 4.9V$, $R_L=5k\Omega$	70	80	--	dB
		$V_O=0.035V\sim 4.96V$, $R_L=100k\Omega$	80	84	--	dB
Common mode rejection	CMRR	$V_S=5.5, V_{CM}=0.1\sim 4V$	62	70	--	dB
		$V_S=5.5, V_{CM}=0.1\sim 5.6V$	56	68	--	dB
Power supply rejection	PSRR	$V_S=2.5V\sim 5.5V, V_{CM}=(-V_S)+0.5V$	60	80	--	dB
Working voltage range	V_W		2.1	--	5.5	V
Quiescent current	I_Q	$I_{OUT}=0$	--	45	75	μA
Gain bandwidth product	GBP	$C_L=100pF$	--	1.1	--	MHz
Slew rate	SR	$G=1$, 2V Output Step	--	0.5	--	V/ μs
Equivalent input noise Voltage	e_n	$f=1KHz$	--	27	--	$nV/\sqrt{Hz}$
		$f=10KHz$	--	20	--	
Output current	I_{OUT}		18	30	--	mA
Output voltage swing	V_{OH}	$R_L=100K\Omega$	--	0.008	--	V
	V_{OL}	$R_L=10K\Omega$	--	0.08	--	V

Typical Application Circuit

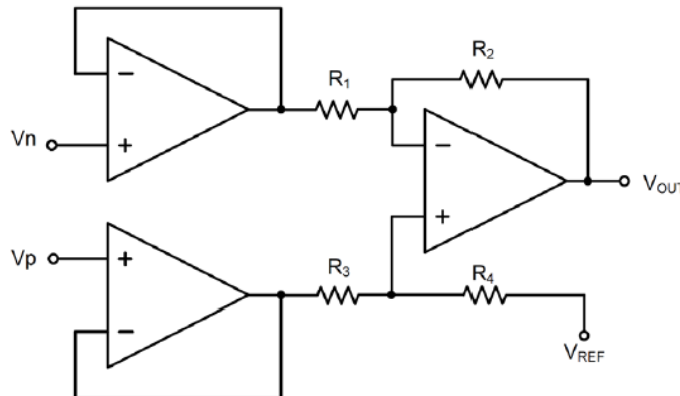
1.differential amplifier

As shown in the figure, if the resistance is equal, ($R_4 / R_3 = R_2 / R_1$), then the output $V_{OUT} = (V_p - V_n) \times R_2 / R_1 + V_{REF}$



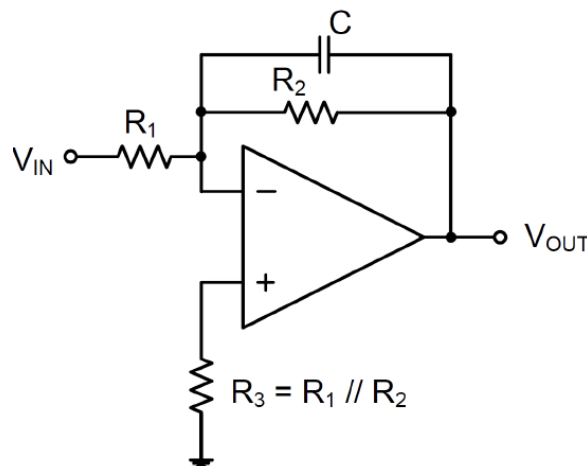
2.instrumentation amplifier

The circuit in the figure above performs the same function, but the input is high impedance.

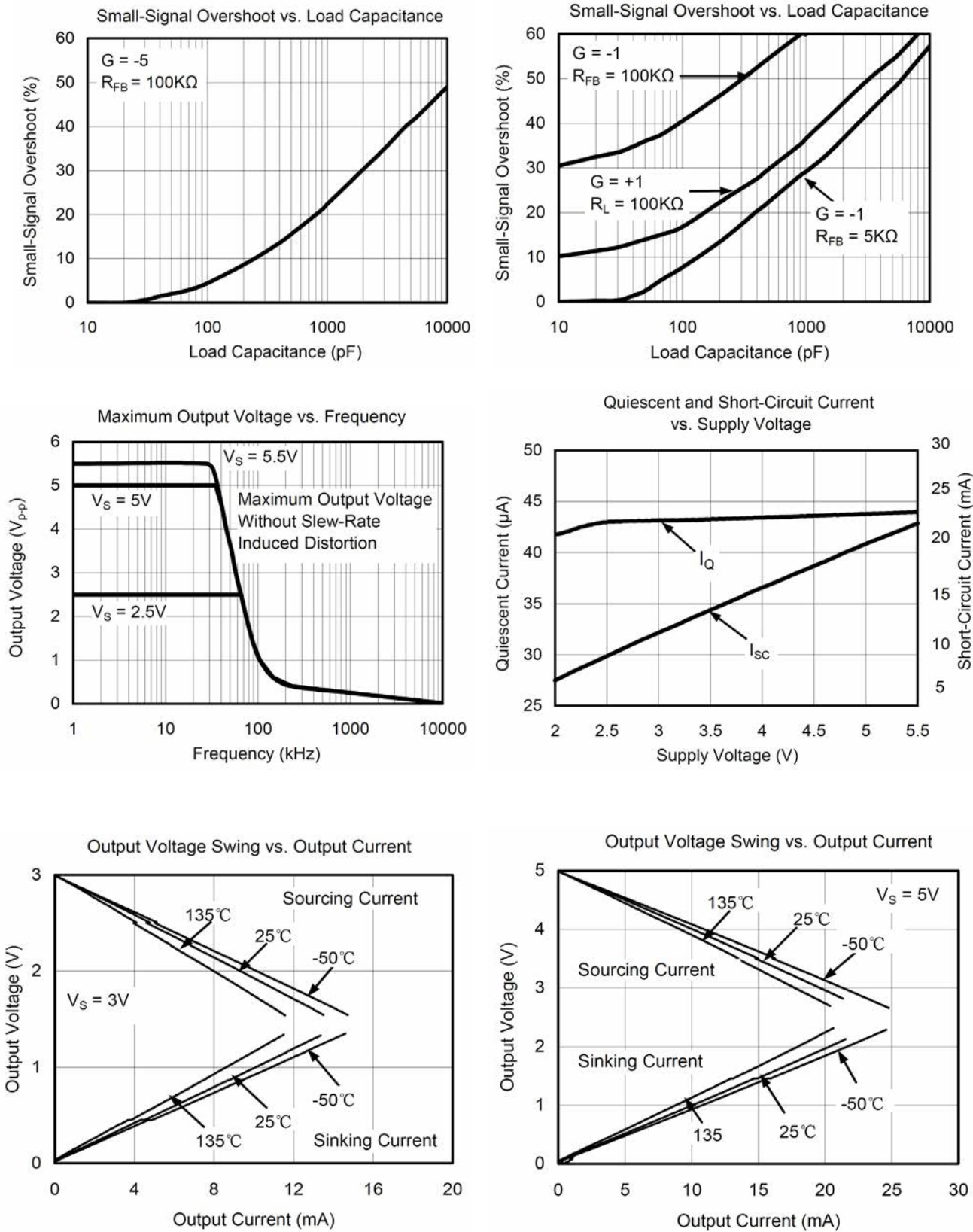


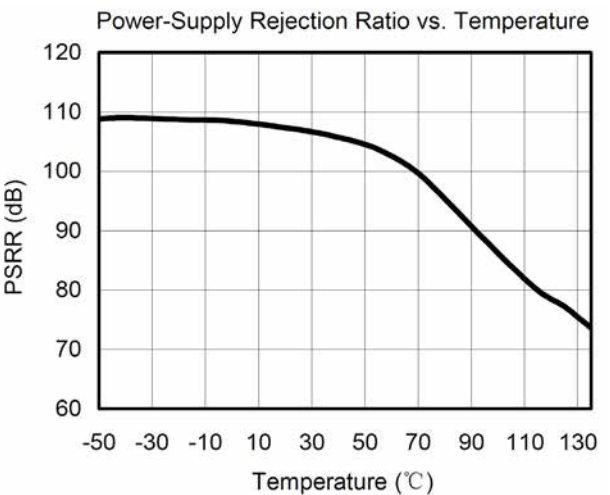
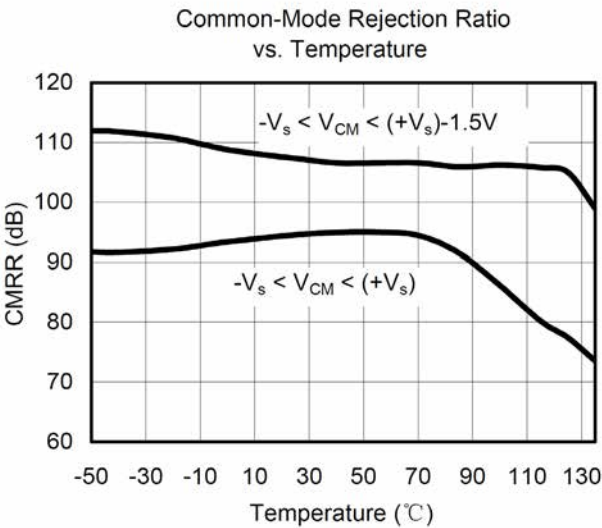
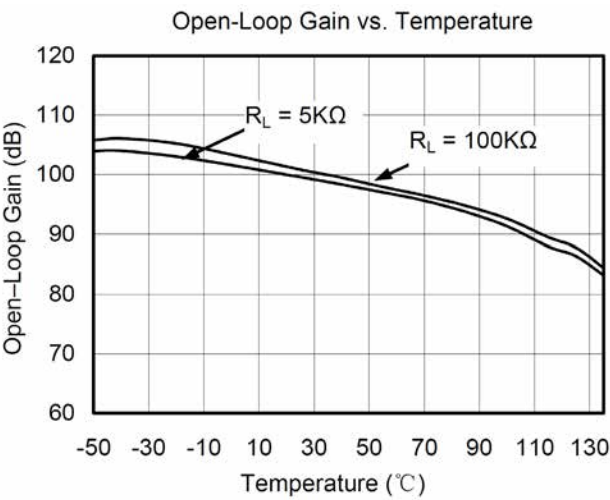
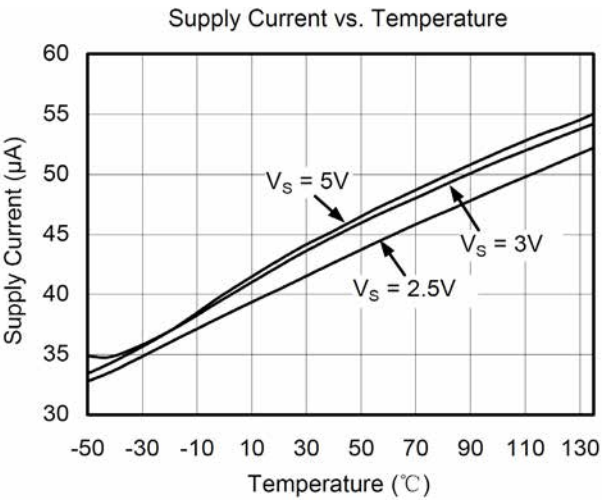
3.Low pass active filtering

The low-pass filter circuit shown here has a $(-R_2 / R_1)$ DC gain and -3db at a frequency of $1/2 \pi R_2 C$ corner. Make sure the filter is within the amplifier's bandwidth. Large feedback resistors are easily accompanied by parasitic capacitance at high speed, resulting in adverse effects such as oscillation. Keep the resistance value as low as possible and consider the appropriate output load.



Typical characteristic curve

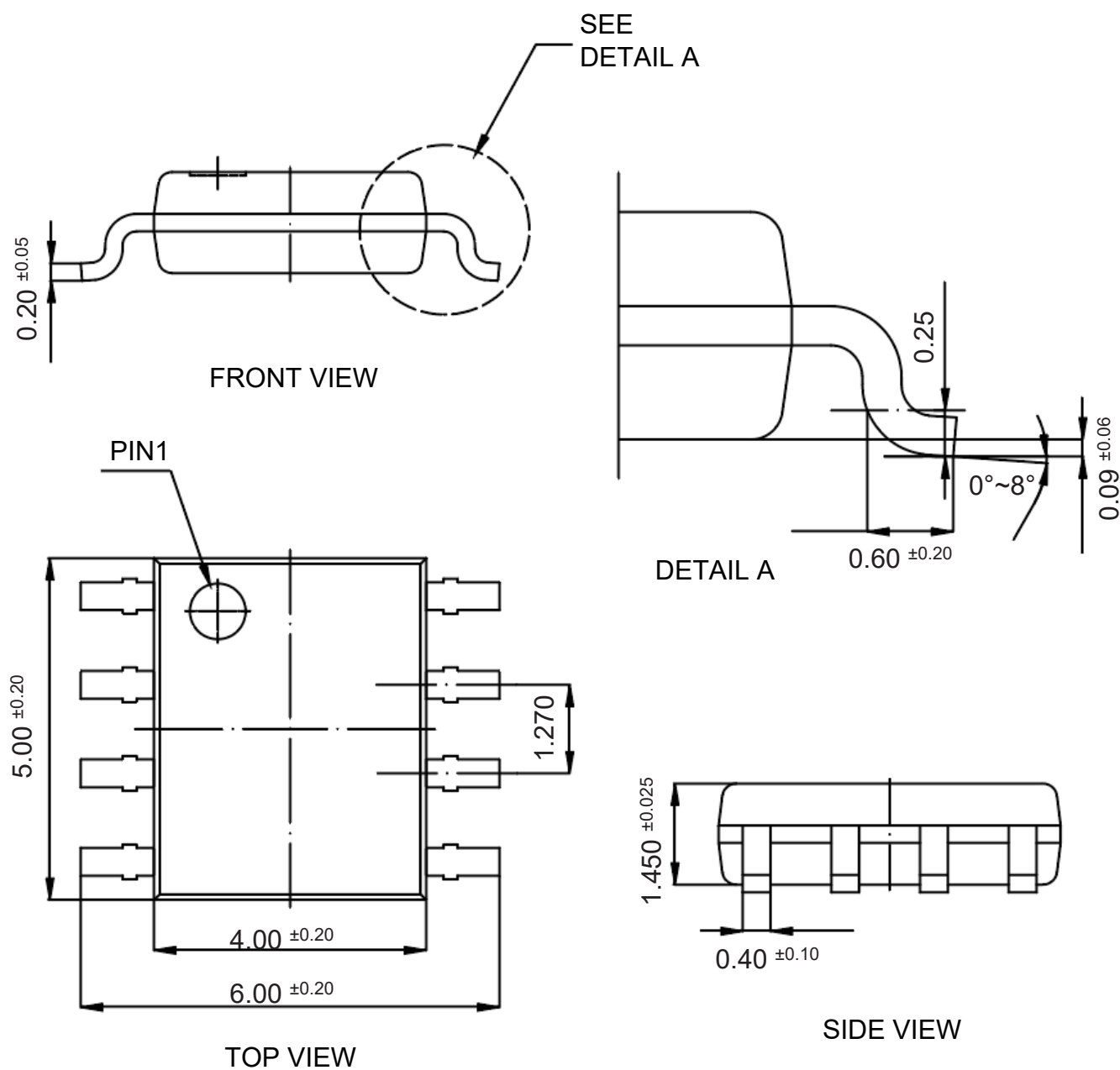




Package Outline

SOP-8

Dimensions in mm



Ordering Information

Device	Package	Shipping
LMV358	SOP-8	4,000PCS/Reel&13inches

Contact Information

TANI website: <http://www.tanisemi.com> Email: tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations.

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