

BIPOLAR ANALOG INTEGRATED CIRCUIT

μ PC4558

HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER

DESCRIPTION

The μ PC4558 is a dual type operational amplifier having internal phase compensating circuits, its electrical characteristics features higher speed, broader bandwidth, and lower noise compared with such conventional general purpose operational amplifier as μ PC741.

Therefore, application to active filters, audio amplifiers, VCO, etc. can be realized with simple circuit composition.

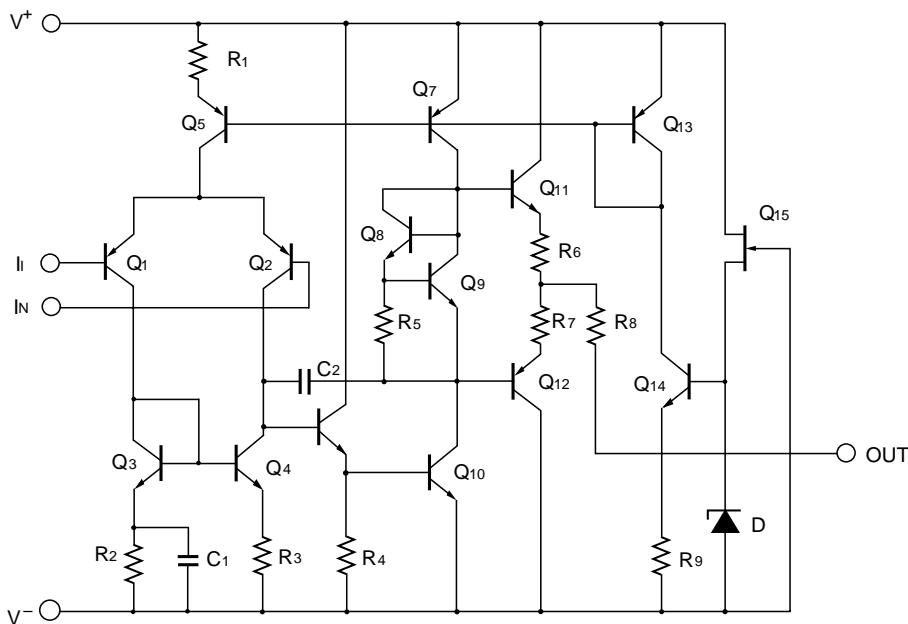
FEATURES

- Internal frequency compensation
- Low noise
- Output short circuit protection

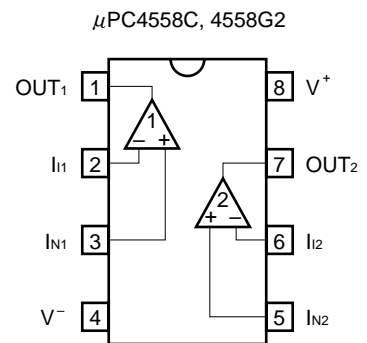
ORDERING INFORMATION

Part Number	Package
μ PC4558C	8-pin plastic DIP (7.62 mm (300))
μ PC4558G2	8-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT (1/2 Circuit)



PIN CONFIGURATION (Top View)



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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter		Symbol	Ratings	Unit
Voltage between V ⁺ and V ⁻ ^{Note 1}		V ⁺ - V ⁻	-0.3 to +36	V
Differential Input Voltage		V _{ID}	±30	V
Input Voltage ^{Note 2}		V _I	V ⁻ -0.3 to V ⁺ +0.3	V
Output Voltage ^{Note 3}		V _O	V ⁻ -0.3 to V ⁺ +0.3	V
Power Dissipation	C Package ^{Note 4}	P _T	350	mW
	G2 Package ^{Note 5}		440	mW
Output Short Circuit Duration ^{Note 6}			Indefinite	sec
Operating Ambient Temperature		T _A	-20 to +80	°C
Storage Temperature		T _{stg}	-55 to +125	°C

- Notes**
- Reverse connection of supply voltage can cause destruction.
 - The input voltage should be allowed to input without damage or destruction. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The normal operation will establish when the both inputs are within the Common Mode Input Voltage Range of electrical characteristics.
 - This specification is the voltage which should be allowed to supply to the output terminal from external without damage or destructive. Even during the transition period of supply voltage, power on/off etc., this specification should be kept. The output voltage of normal operation will be the Output Voltage Swing of electrical characteristics.
 - Thermal derating factor is -5.0 mW/°C when operating ambient temperature is higher than 55°C.
 - Thermal derating factor is -4.4 mW/°C when operating ambient temperature is higher than 25°C.
 - Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Note 4 and Note 5.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V [±]	±4		±16	V

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V[±] = ±15 V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Offset Voltage	V _{IO}	R _S ≤ 10 Ω		±0.5	±6.0	mV
Input Offset Current ^{Note}	I _{IO}			±5	±200	nA
Input Bias Current ^{Note}	I _B			60	500	nA
Large Signal Voltage Gain	A _V	R _L ≥ 2 kΩ, V _O = ±10 V	20,000	100,000		
Power Consumption	P _d	I _O = 0 A, Both Amplifiers		90	170	mW
Common Mode Rejection Ratio	CMR	R _S ≤ 10 kΩ	70	90		dB
Source Variation Rejection Ratio	SVR	R _S ≤ 10 kΩ		30	150	μV/V
Output Voltage Swing	V _{om}	R _L ≥ 10 kΩ	±12	±14		V
		R _L ≥ 2 kΩ	±10	±13		V
Common Mode Input Voltage Range	V _{ICM}		±12	±14		V
Slew Rate	SR	A _V = 1		1.0		V/μs
Input Equivalent Noise Voltage	V _n	R _S = 1 kΩ, f = 1 Hz to 1 kHz (Figure1)		6		μV _{p-p}
Channel Separation		f = 1 kHz (Figure2)		105		dB

Note Input bias currents flow out from IC, because each currents are base current of PNP-transistor on input stage.

When using these ICs, pay careful attention to the following points.

1. The total of the internal power dissipation, when the loads of both channels are short-circuited at the same time.
2. The likelihood of interference between the channels, due to the temperature gradient of the chip, when the internal power dissipation of the left and right channels differ greatly in circuits handling low level inputs.

MEASUREMENT CIRCUIT

Figure1 Noise Measurement Circuit

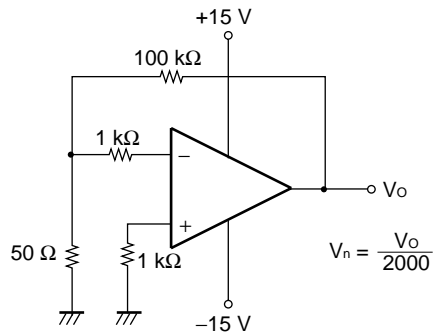
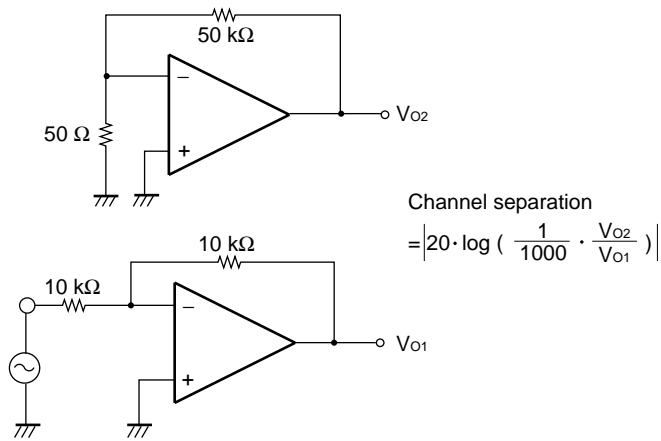
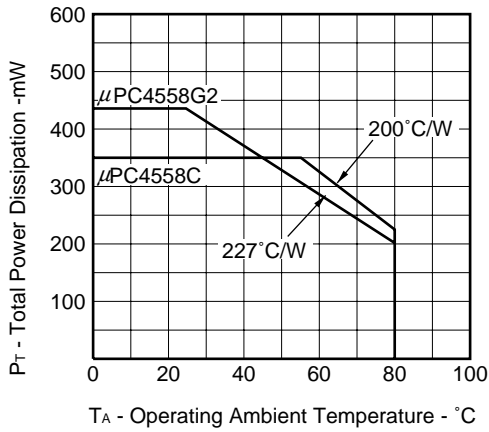


Figure2 Channel Separation Measurement Circuit

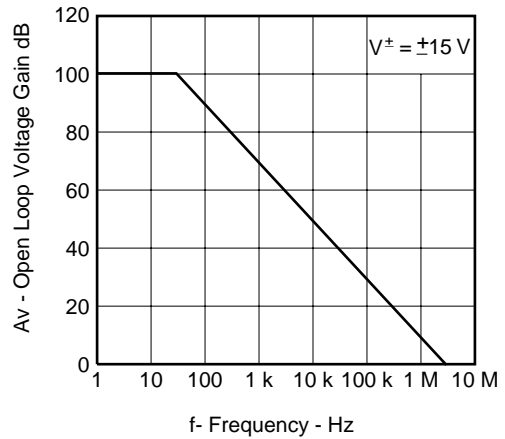


TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$, TYP.)

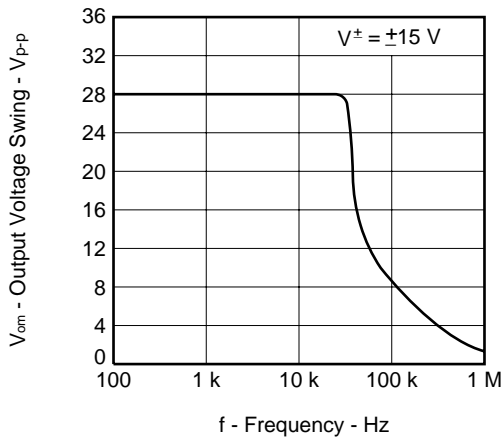
★ POWER DISSIPATION



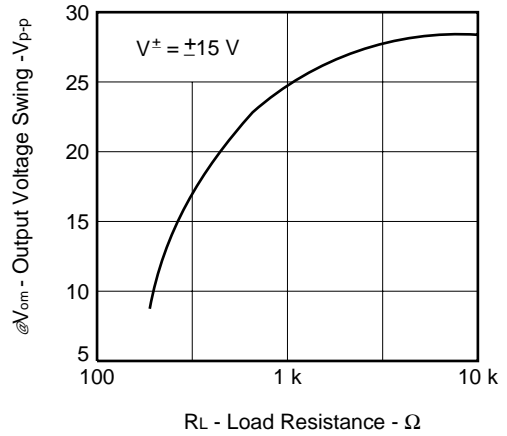
OPEN LOOP FREQUENCY RESPONSE



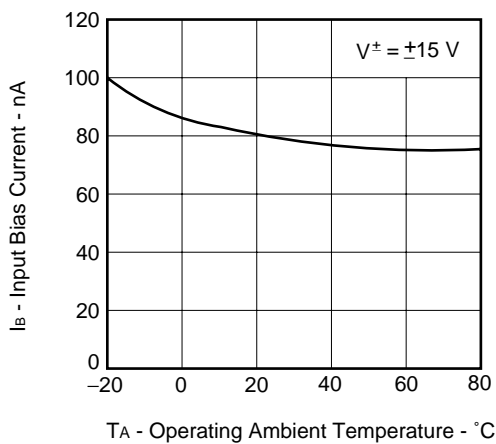
LARGE SIGNAL FREQUENCY RESPONSE



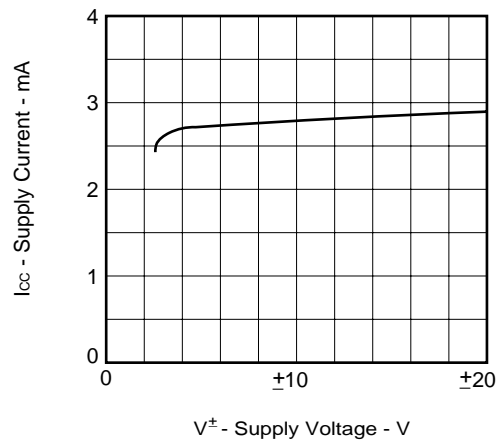
OUTPUT VOLTAGE SWING



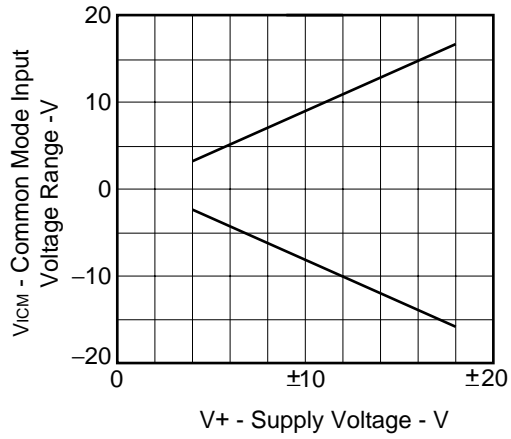
INPUT BIAS CURRENT



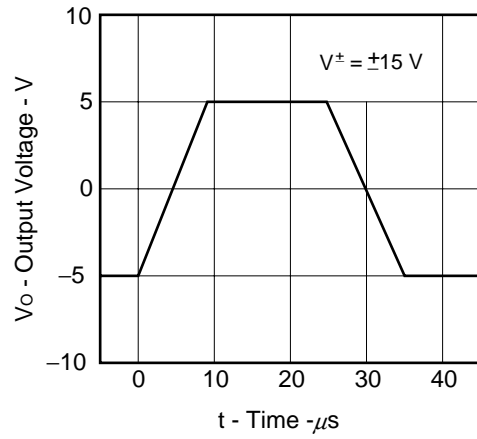
SUPPLY CURRENT



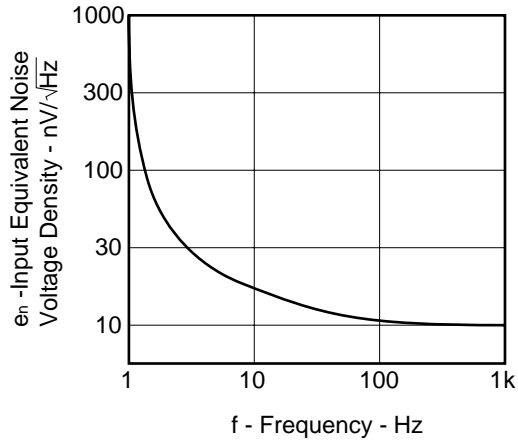
★ COMMON MODE INPUT VOLTAGE RANGE



VOLTAGE FOLLOWER PULSE RESPONSE

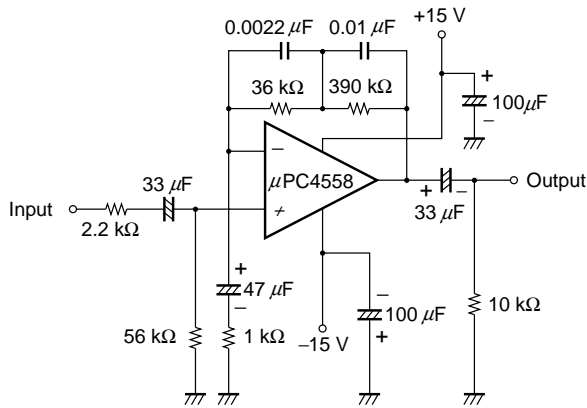


INPUT EQUIVALENT NOISE VOLTAGE DENSITY



APPLICATION CIRCUIT

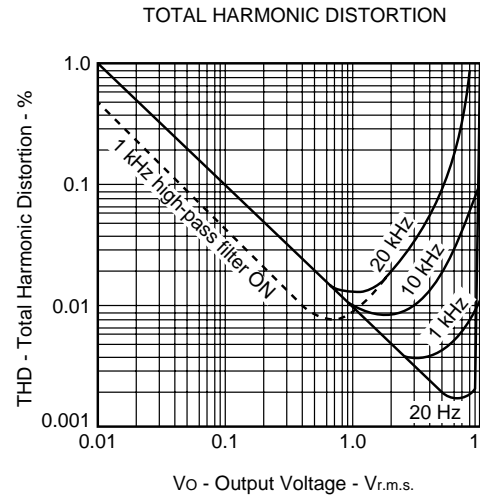
RIAA PREAMP ($A_v = 32.5$ dB)



TYPICAL CHARACTERISTIC

Distortion 0.03% ($V_o = 1V_{r.m.s.}, f = 1$ kHz)

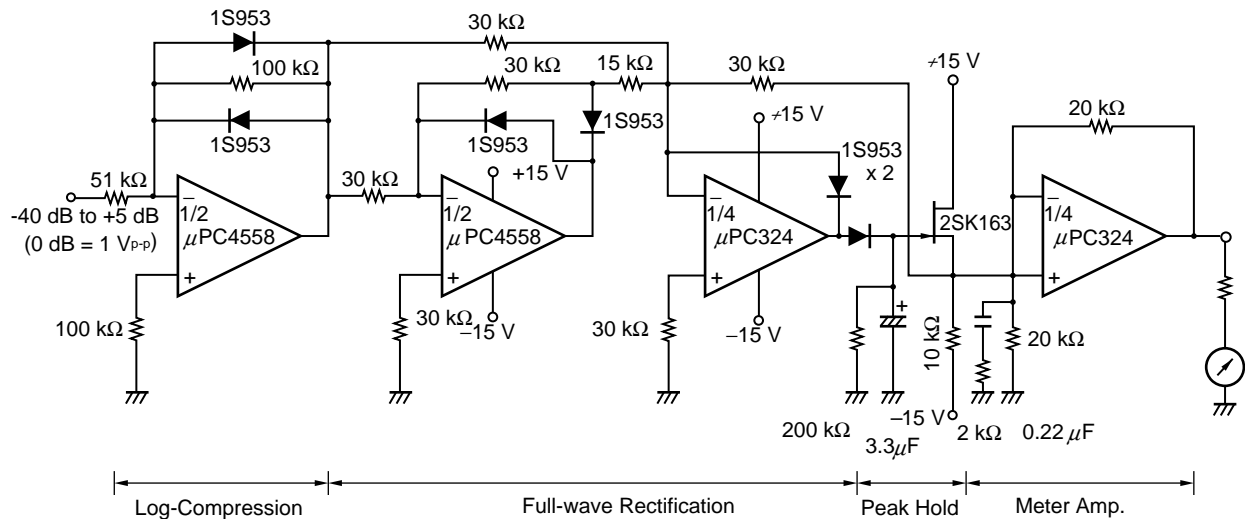
Noise $1.0 \mu V_{r.m.s.}$ (Input Equiv., Input Short Peak DET., Average Indication)



PEAK LEVEL METER

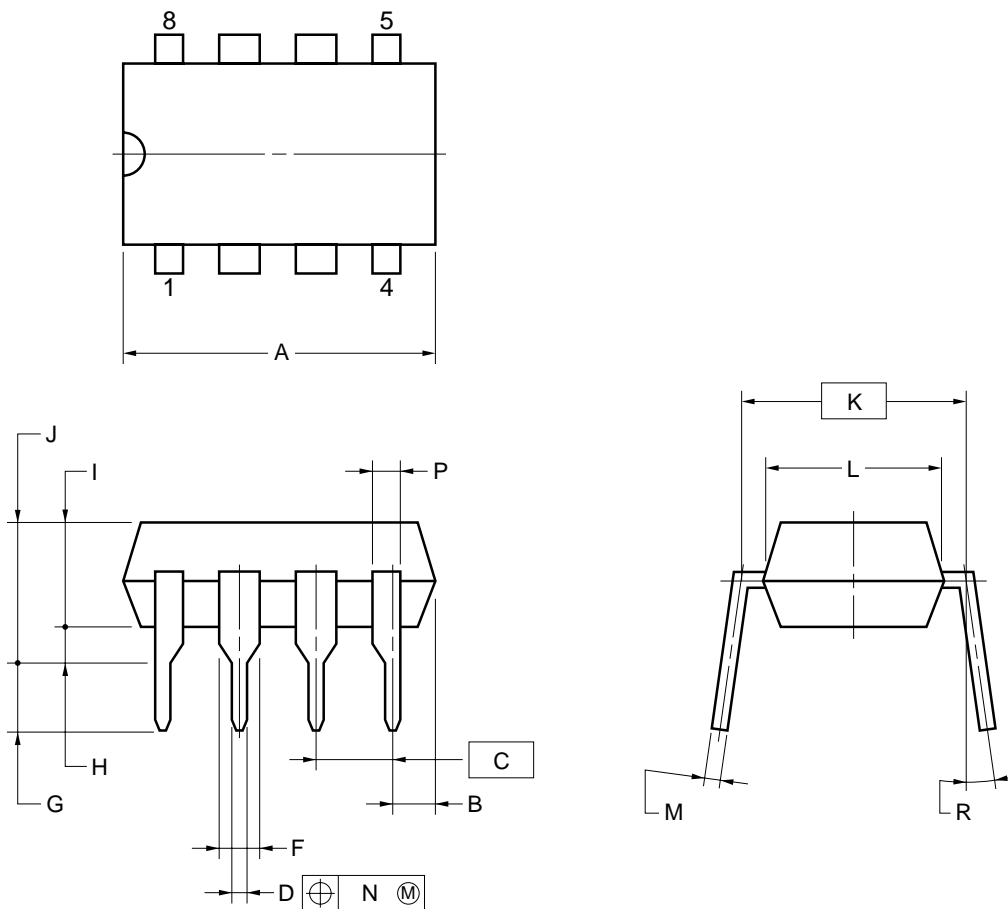
This circuit converts the peak voltage (about ± 10 mV to ± 10 V) of the input signal to a DC voltage (about 0.2 V to 1.3 V) and drives the meter.

Since the output voltage is proportional to the logarithmic value of the peak voltage of the input signal, indication of a much wider dynamic range can be obtained compared to conventional linear indicating methods.



PACKAGE DRAWINGS (Unit : mm)

8-PIN PLASTIC DIP (7.62mm(300))



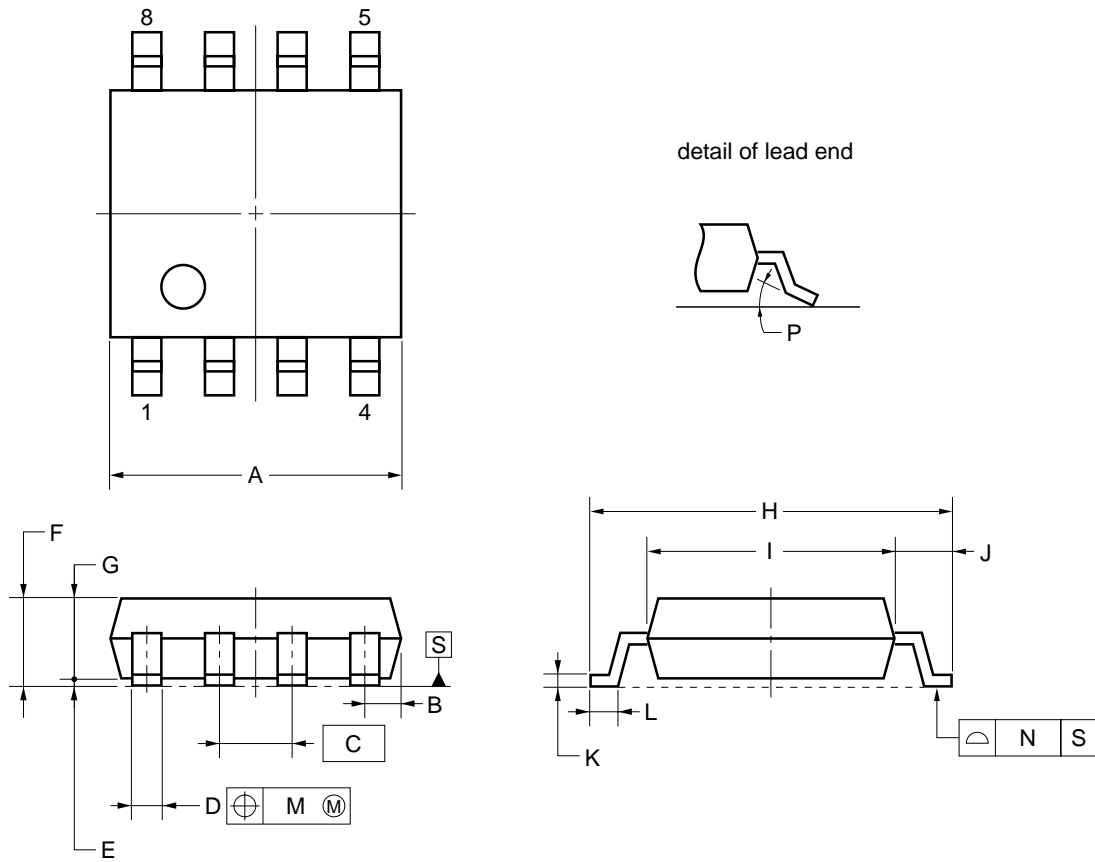
NOTES

1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.
2. Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS
A	10.16 MAX.
B	1.27 MAX.
C	2.54 (T.P.)
D	0.50±0.10
F	1.4 MIN.
G	3.2±0.3
H	0.51 MIN.
I	4.31 MAX.
J	5.08 MAX.
K	7.62 (T.P.)
L	6.4
M	0.25 ^{+0.10} _{-0.05}
N	0.25
P	0.9 MIN.
R	0-15°

P8C-100-300B,C-2

8-PIN PLASTIC SOP (5.72 mm (225))



NOTE

Each lead centerline is located within 0.12 mm of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS
A	5.2 ^{+0.17} / _{-0.20}
B	0.78 MAX.
C	1.27 (T.P.)
D	0.42 ^{+0.08} / _{-0.07}
E	0.1±0.1
F	1.59±0.21
G	1.49
H	6.5±0.3
I	4.4±0.15
J	1.1±0.2
K	0.17 ^{+0.08} / _{-0.07}
L	0.6±0.2
M	0.12
N	0.10
P	3° ^{+7°} / _{-3°}

S8GM-50-225B-6

★ RECOMMENDED SOLDERING CONDITIONS

When soldering this product, it is highly recommended to observe the conditions as shown below. If other soldering processes are used, or if the soldering is performed under different conditions, please make sure to consult with our sales offices.

For more details, refer to our document "SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL" •(C10535E).

Type of Surface Mount Device

μPC4558G2: 8-pin plastic SOP (5.72 mm (225))

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 230°C or below (Package surface temperature), Reflow time: 30 seconds or less (at 210°C or higher), Maximum number of reflow processes: 1 time.	IR30-00-1
Vapor Phase Soldering	Peak temperature: 215°C or below (Package surface temperature), Reflow time: 40 seconds or less (at 200°C or higher), Maximum number of reflow processes: 1 time.	VP15-00-1
Wave Soldering	Solder temperature: 260°C or below, Flow time: 10 seconds or less, Maximum number of flow processes: 1 time, Pre-heating temperature: 120°C or below (Package surface temperature).	WS60-00-1
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (Per each side of the device).	—

Caution Apply only one kind of soldering condition to a device, except for "partial heating method", or the device will be damaged by heat stress.

Type of Through-hole Device

μPC4558C: 8-pin plastic DIP (7.62 mm (300))

Process	Conditions
Wave Soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.
Partial Heating Method	Pin temperature: 300°C or below, Heat time: 3 seconds or less (per each lead).

Caution For through-hole device, the wave soldering process must be applied only to leads, and make sure that the package body does not get jet soldered.

[MEMO]

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