

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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### GENERAL PURPOSE DUAL OPERATIONAL AMPLIFIER

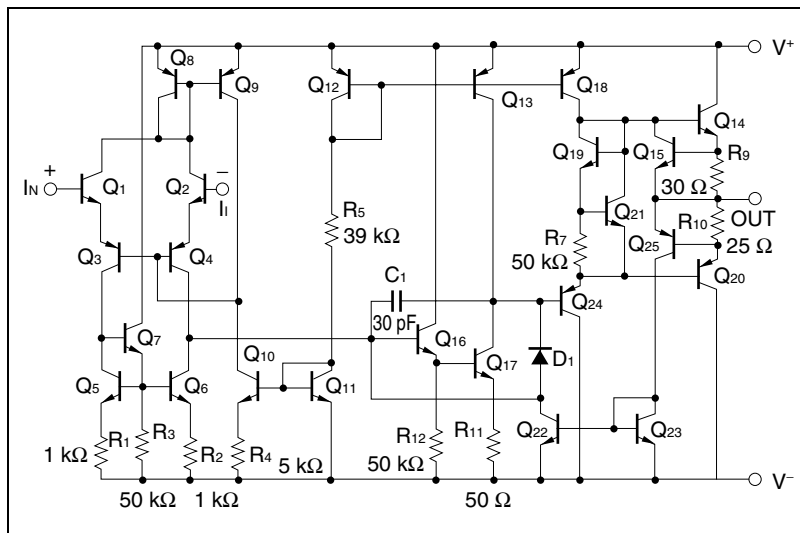
#### DESCRIPTION

The μPC1458 is a dual general purpose operational amplifier having internal frequency compensating circuits. It is intended for a wide range of analog applications. High common mode voltage range and no latch up tendencies make this amplifier ideal for use as a voltage follower.

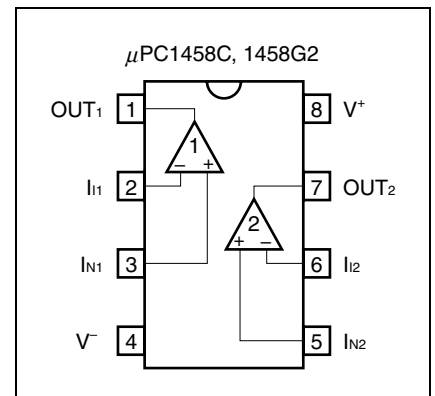
#### FEATURES

- Internally frequency-compensated
- Short circuit protection

#### EQUIVALENT CIRCUIT (1/2 Circuit)



#### CONNECTION DIAGRAM (Top View)



#### ★ ORDERING INFORMATION

PART NUMBER	PACKAGE	QUALITY GRADE
μPC1458C	8-pin plastic DIP (7.62 mm (300))	Standard
μPC1458G2	8-pin plastic SOP (5.72 mm (225))	Standard

Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No: C11531E) published by NEC Electronics Corporation to know the specification of the quality grade on the device and its recommended applications.

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**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

PARAMETER		SYMBOL	μPC1458	UNIT
Voltage between V <sup>+</sup> and V <sup>-</sup> (Note 1)		V <sup>+</sup> - V <sup>-</sup>	-0.3 to +36	V
Differential Input Voltage		V <sub>ID</sub>	±30	V
Input Voltage (Note 2)		V <sub>I</sub>	V <sup>-</sup> -0.3 to V <sup>+</sup> +0.3	V
Output Voltage (Note 3)		V <sub>O</sub>	V <sup>-</sup> -0.3 to V <sup>+</sup> +0.3	V
Power Dissipation	C Package (Note 4)	P <sub>T</sub>	350	mW
	G2 Package (Note 5)		440	mW
Output Short Circuit Duration (Note 6)			Indefinite	sec
Operating Temperature Range		T <sub>opt</sub>	-20 to +80	°C
Storage Temperature Range		T <sub>stg</sub>	-55 to +125	°C

**Note 1.** Reverse connection of supply voltage can cause destruction.

**Note 2.** 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.

**Note 3.** This specification is the voltage which should be allowed to supply to the output terminal from external without damage or destruction. 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.

**Note 4.** Thermal derating factor is -5.0 mW/°C when ambient temperature is higher than 55 °C.

**Note 5.** Thermal derating factor is -4.4 mW/°C when ambient temperature is higher than 25 °C.

**Note 6.** Pay careful attention to the total power dissipation not to exceed the absolute maximum ratings, Notes 4 and 5.

**RECOMMENDED OPERATING CONDITIONS**

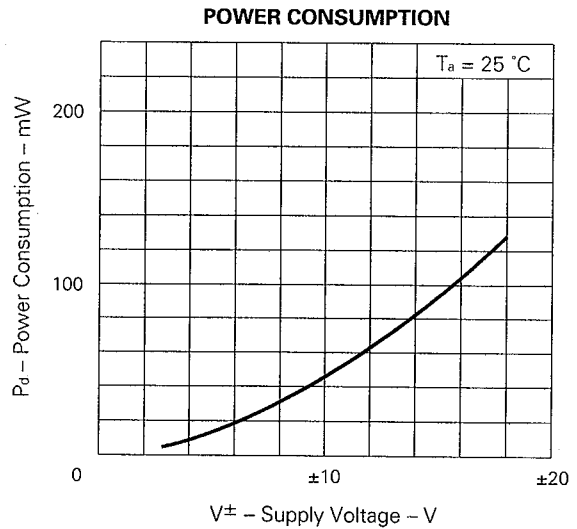
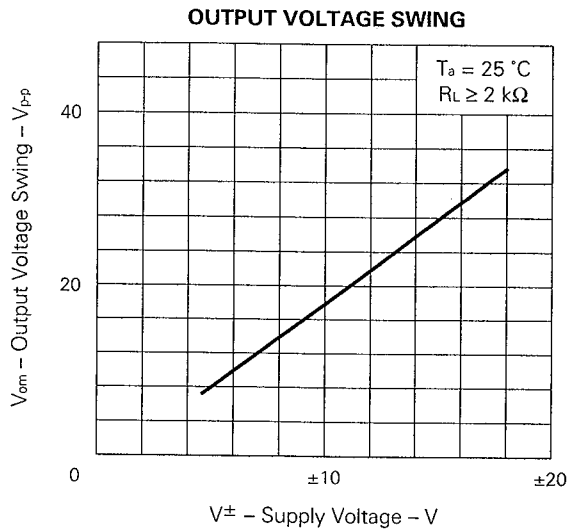
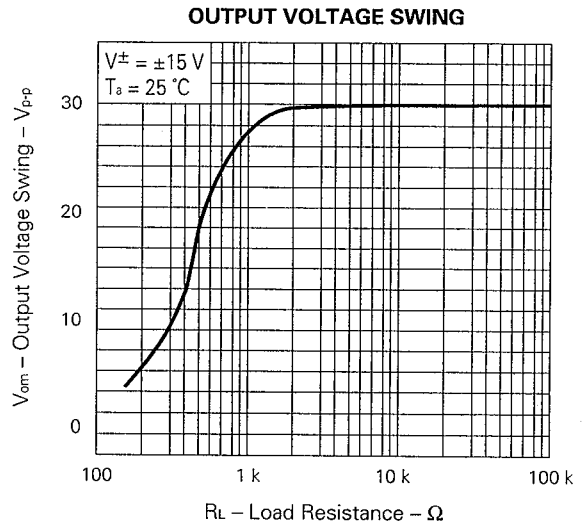
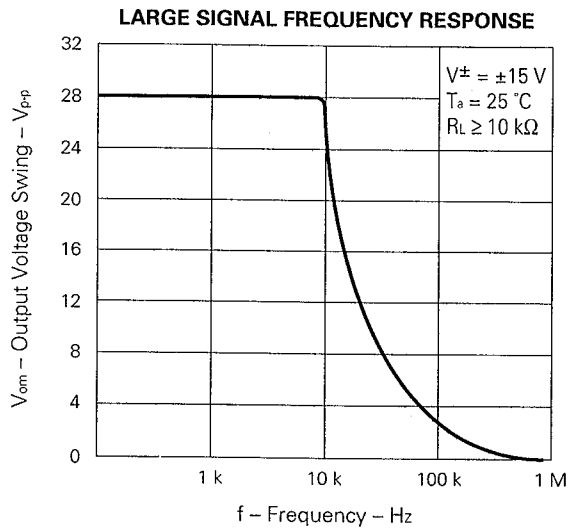
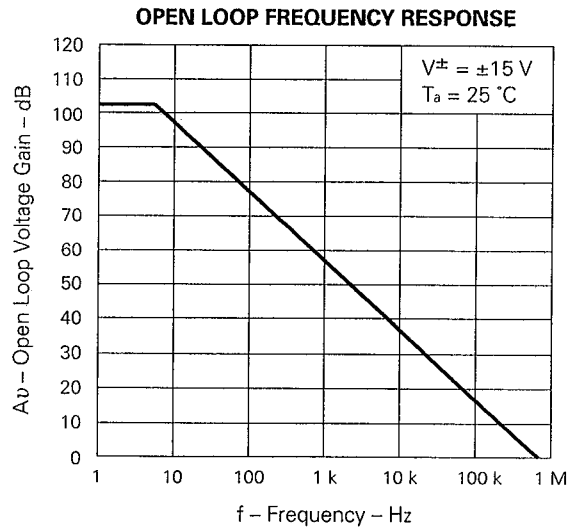
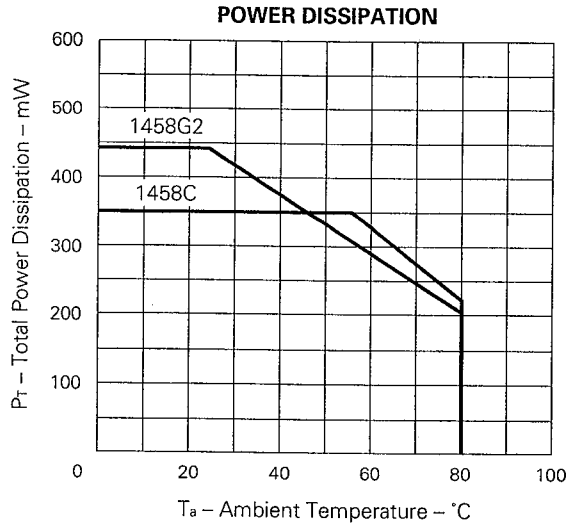
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage (Split)	V <sup>±</sup>	±7.5		±16	V
Supply Voltage (V <sup>-</sup> = GND)	V <sup>+</sup>	+15		+32	V
Output Current	I <sub>o</sub>		±2	±5	mA

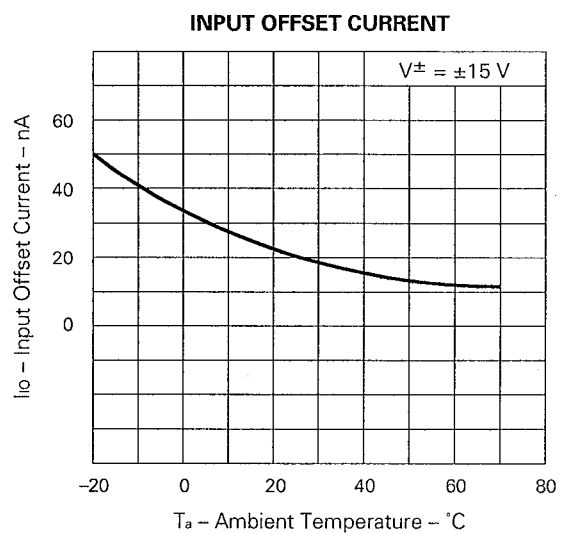
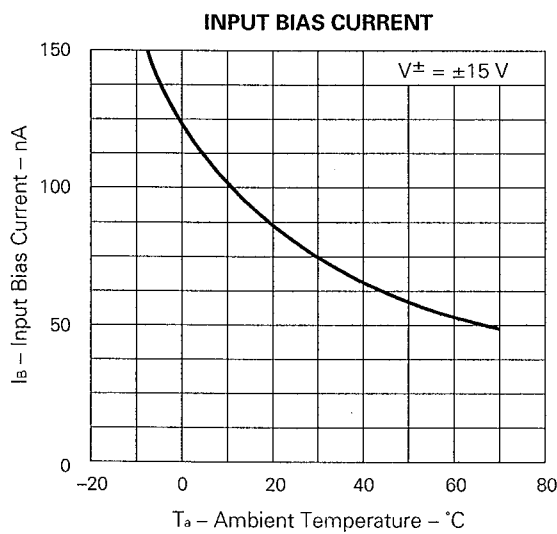
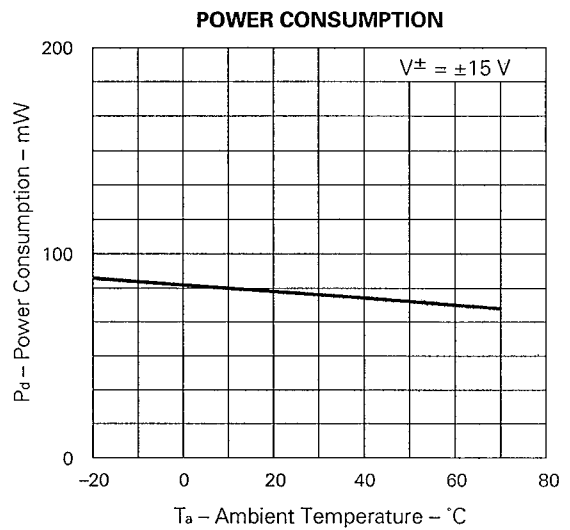
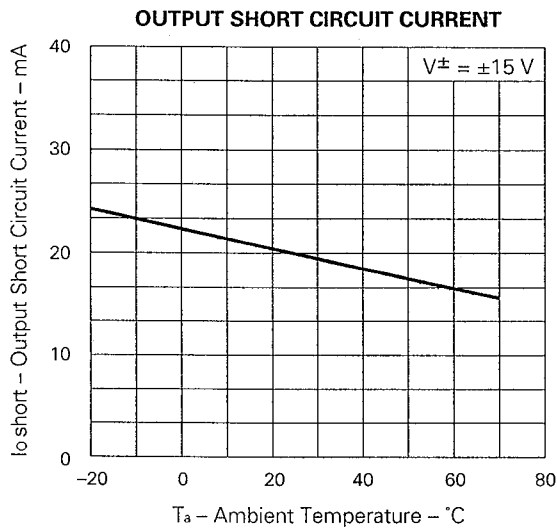
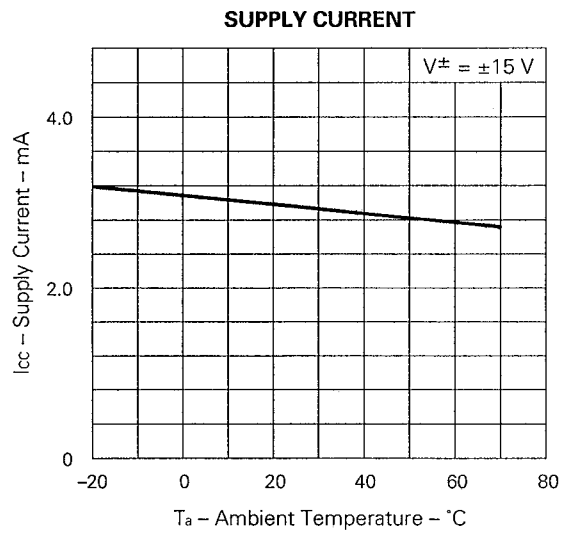
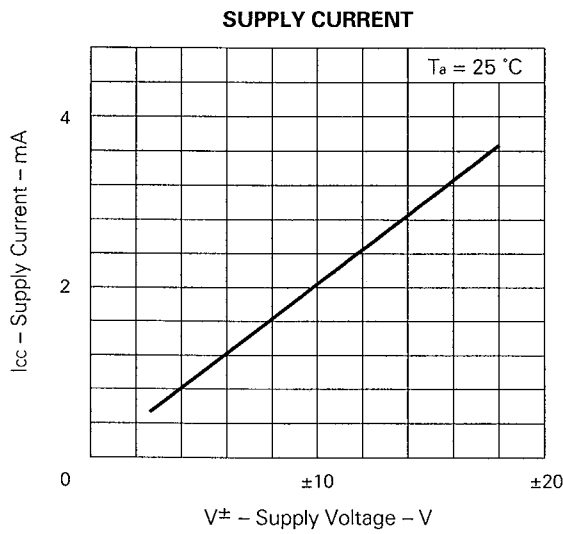
**ELECTRICAL CHARACTERISTICS ( $V^{\pm} = \pm 15V$ ,  $T_a = 25^{\circ}C$ )**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Input Offset Voltage	$V_{io}$		$\pm 1.0$	$\pm 6.0$	mV	$R_S \leq 10\text{ k}\Omega$
Average Input Offset Voltage Drift	$\Delta V_{io}/\Delta T$		$\pm 3$		$\mu V/^{\circ}C$	$R_S \leq 10\text{ k}\Omega$
Input Offset Current (Note 7)	$I_{io}$		$\pm 20$	$\pm 200$	nA	
Input Bias Current (Note 7)	$I_b$		80	500	nA	
Input Impedance	$R_{in}$	0.3	1.0		M $\Omega$	
Large Signal Voltage Gain	$A_v$	20000	160000			$R_L \geq 2\text{ k}\Omega$ , $V_o = \pm 10\text{ V}$
Supply Current	$I_{cc}$		3.0	5.6	mA	$I_o = 0\text{ A}$ , Both Amplifiers
Power Consumption	$P_d$		90	170	mW	$I_o = 0\text{ A}$ , Both Amplifiers
Common Mode Rejection Ratio	CMR	70	90		dB	$R_S \leq 10\text{ k}\Omega$
Supply Voltage Rejection Ratio	SVR		30	150	$\mu V/V$	$R_S \leq 10\text{ k}\Omega$
Output Voltage Swing	$V_{om}$	$\pm 12$	+14 -12		V	$R_L \geq 10\text{ k}\Omega$
Output Voltage Swing	$V_{om}$	$\pm 10$	+13 -11		V	$R_L \geq 2\text{ k}\Omega$
Common Mode Input Voltage Range	$V_{icm}$		$V^+ - 0.5$ $V^- + 2$		V	
Channel Separation			120		dB	$f = 10\text{ Hz}$ , $R_L = 2\text{ k}\Omega$

**Note 7.** Input bias currents flow into IC. Because each currents are base current of NPN-transistor on input stage.

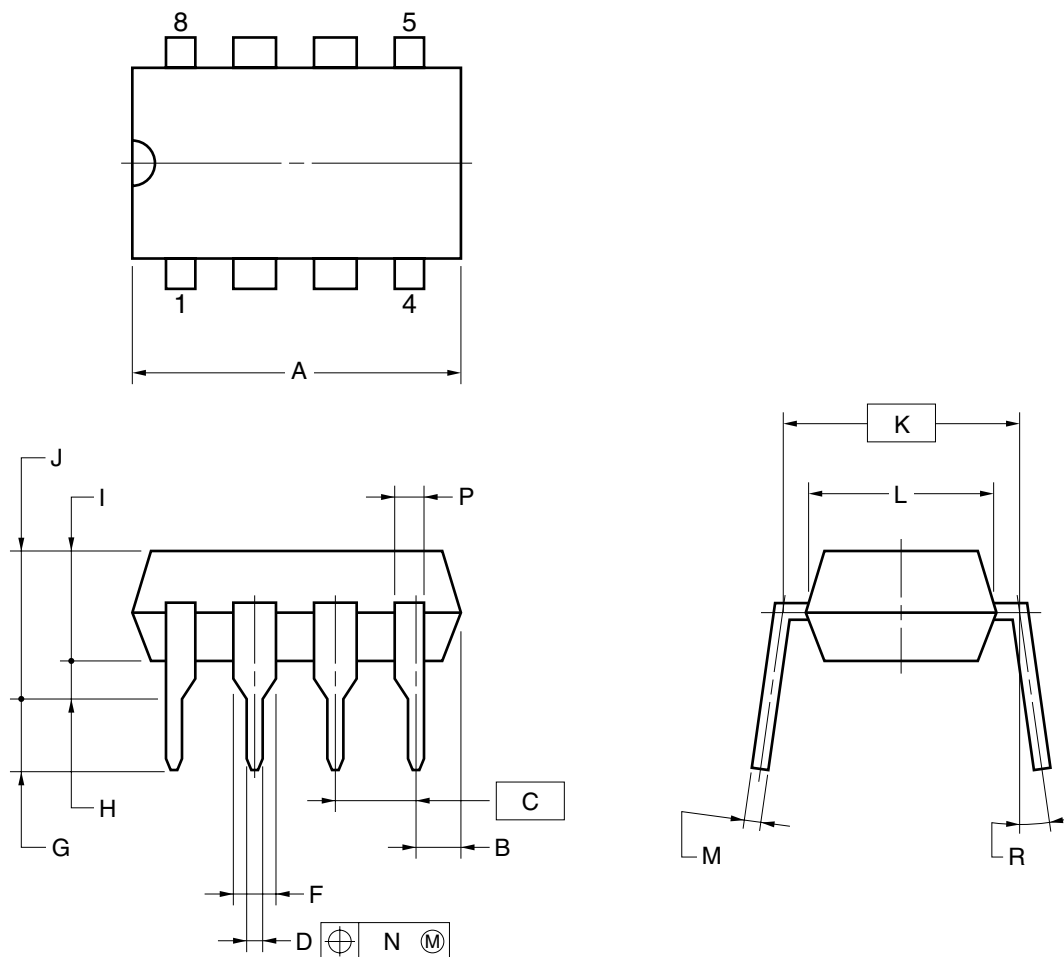
TYPICAL PERFORMANCE CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ , TYP.)





★ PACKAGE DRAWINGS (Unit: mm)

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



**NOTES**

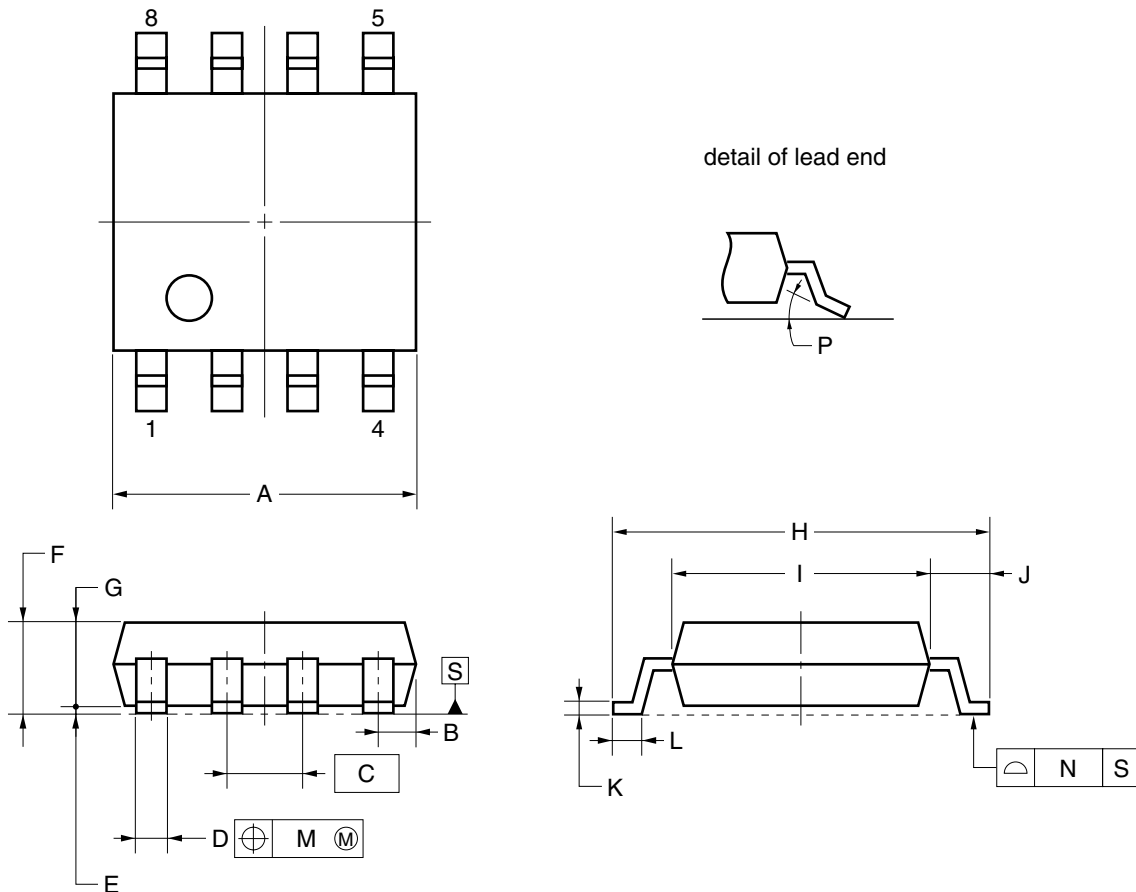
1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.
2. Item "K" to center of leads when formed parallel.

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 <sup>+0.10</sup> <sub>-0.05</sub>
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 <sup>+0.17</sup> / <sub>-0.20</sub>
B	0.78 MAX.
C	1.27 (T.P.)
D	0.42 <sup>+0.08</sup> / <sub>-0.07</sub>
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 <sup>+0.08</sup> / <sub>-0.07</sub>
L	0.6±0.2
M	0.12
N	0.10
P	3° <sup>+7°</sup> / <sub>-3°</sub>

S8GM-50-225B-6

★ RECOMMENDED SOLDERING CONDITIONS

The μPC1458 should be soldered and mounted under the following recommended conditions.

For soldering methods and conditions other than those recommended below, contact an NEC Electronics sales representative.

For technical information, see the following website.

Semiconductor Device Mount Manual (<http://www.necel.com/pkg/en/mount/index.html>)

TYPES OF SURFACE MOUNT DEVICE

μPC1458G2: 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.

TYPES OF THROUGH HOLE DEVICE

μPC1458C: 8-pin plastic DIP (7.62 mm (300))

Soldering method	Soldering conditions	Recommended condition symbol
Wave soldering	Solder temperature: 260°C or below, Flow time: 10 seconds or below	

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