To our customers,

Old Company Name in Catalogs and Other Documents

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

April 1st, 2010
Renesas Electronics Corporation

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

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RENESAS

BIPOLAR ANALOG INTEGRATED CIRCUIT
µPC4556

HIGH PERFORMANCE DUAL DECOMPENSATED OPERATIONAL AMPLIFIER

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DESCRIPTION

The µPC4556 is a dual operational amplifier which features further advanced A.C. performance than that of the µPC4558. Decompensation characteristic guarantees 20MHz gain-bandwidth product higher than 20 dB. Also featured are low input noise and high output drive capability making this device the optimum choice for audio application.

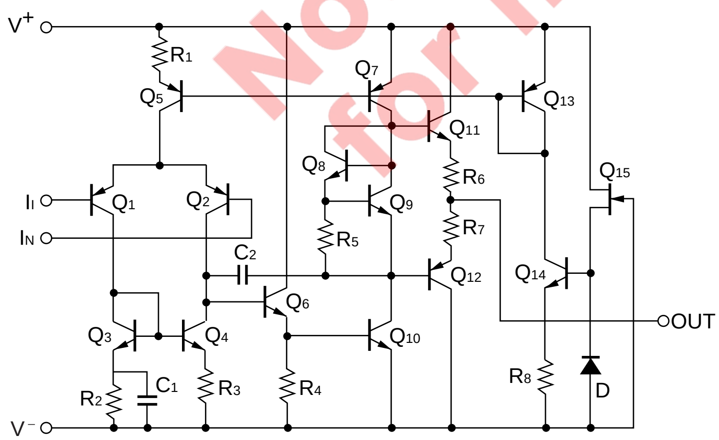
FEATURES

- Gain bandwidth products: 20 MHz ($A_v \geq 20$ dB)
- High slew rate: 5 V/µs
- Low input noise voltage: 6 $\mu V_{p\text{-}p}$
- Internal frequency compensation ($A_v \geq 20$ dB)

ORDERING INFORMATION

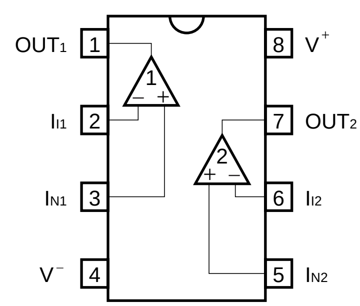
Part Number	Package
µPC4556C	8-pin plastic DIP (7.62 mm (300))
µPC4556G2	8-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT



PIN CONFIGURATION (Top View)

µPC4556C, 4556G2



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Date Published March 2004 N CP(K)
Printed in Japan

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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	700	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 1. Reverse connection of supply voltage can cause destruction.

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.

3. 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.

4. Thermal derating factor is –7.0 mV/°C when operating ambient temperature is higher than 25°C.

5. Thermal derating factor is –4.4 mV/°C when operating ambient temperature is higher than 25°C.

6. 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	$V^{\pm}$	±4		±16	V

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ELECTRICAL CHARACTERISTICS (T_A = 25°C, $V^{\pm}$ = ±15 V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 10$ kΩ		±0.5	±6	mV
Input Offset Current Note 7	I_{IO}			±5	±200	nA
Input Bias Current Note 7	I_B			180	500	nA
Large Signal Voltage Gain	A_V	$R_L \geq 2$ kΩ , V_O = ±10 V	20000	100000		
★ Power Consumption	P_d	I_O = 0 A		90	170	mW
Common Mode Rejection Ratio	CMR	$R_S \leq 10$ kΩ	70	90		dB
Supply Voltage Rejection Ratio	SVR	$R_S \leq 10$ kΩ		30	150	μV/V
Output Voltage Swing	V_{om}	$R_L \geq 2$ kΩ	±12	±14		V
		I_O = ±25 mA	±10	±11.5		V
Common Mode Input Voltage Range	V_{ICM}		±12	±14		V
Slew Rate	SR	$A_V \geq 10$ (20 dB)		5		V/μs
Input Equivalent Noise Voltage	V_n	R_S = 1 kΩ, f = 1 Hz to 1 kHz		6		μV_{p-p}
Channel Separation		f = 1 kHz		105		dB

Notes 7. Input bias currents flow out from IC. Because each currents are base current of PNP-transistor on input stage.

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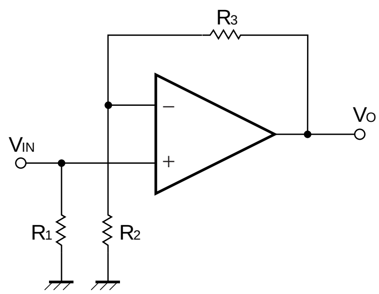
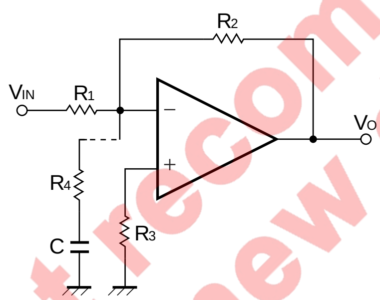
TYPICAL APPLICATION CIRCUIT

Noninverting Amplifier



$R_3 \geq 9 \cdot R_2$
$R_1 = R_2$

Inverting Amplifier



R_4, C are necessary when $R_2 < 10 \cdot R_1$

$$R_4 \leq \frac{1}{9} R_2$$

$$C \geq \frac{R_2/R_4}{2 \cdot \pi \cdot R_4 \cdot 5\ \text{MHz}}$$

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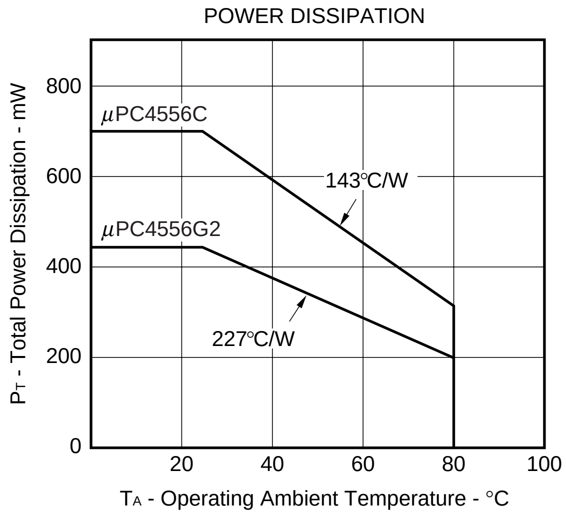
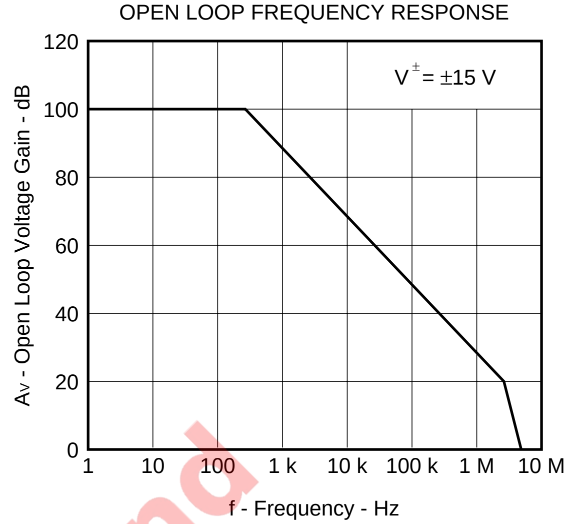
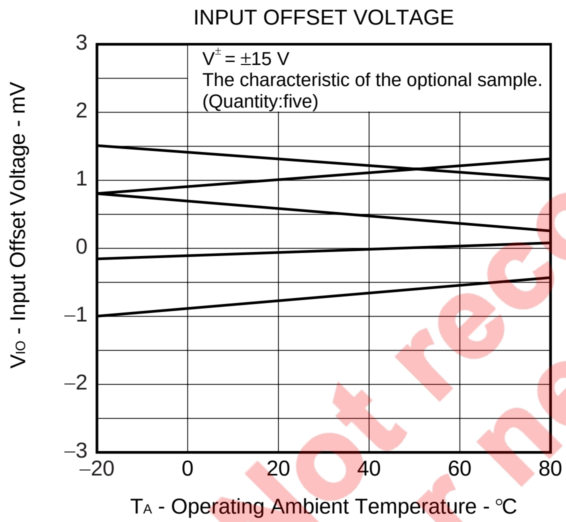
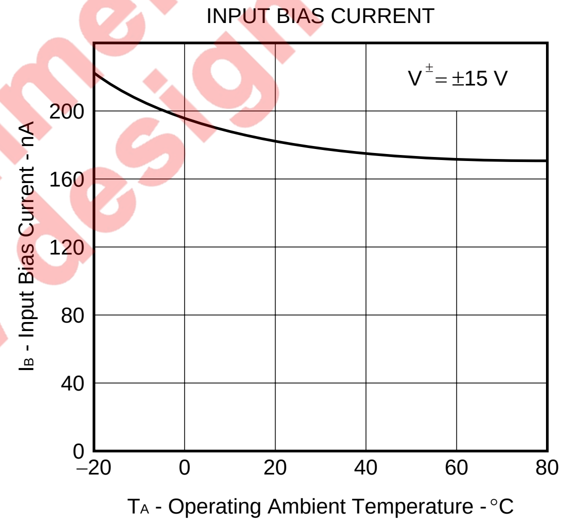
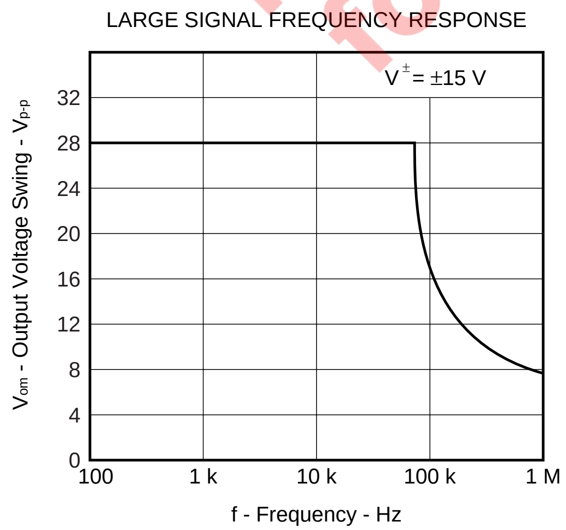
TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C, TYP.)

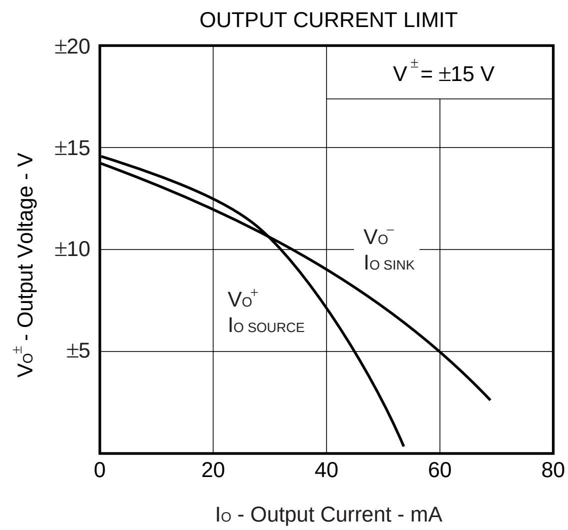












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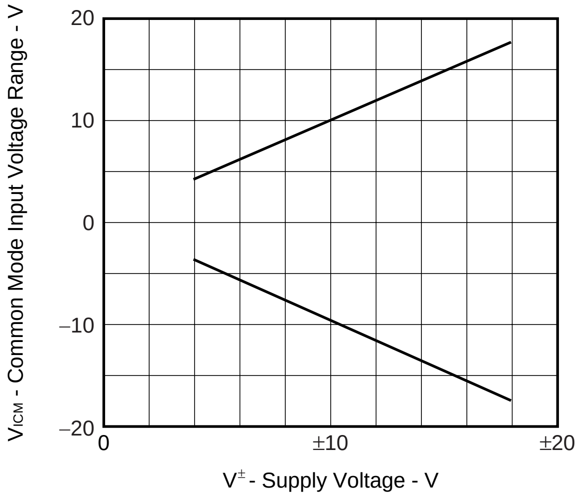
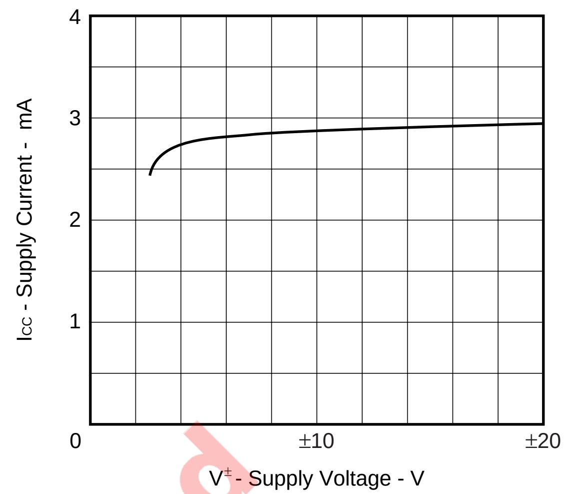
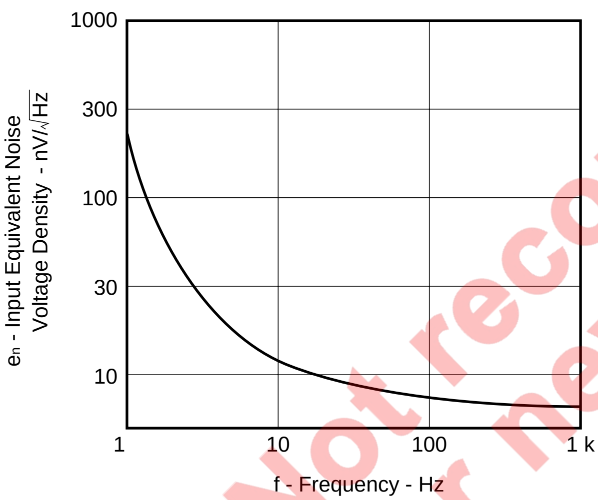
OUTPUT VOLTAGE SWING



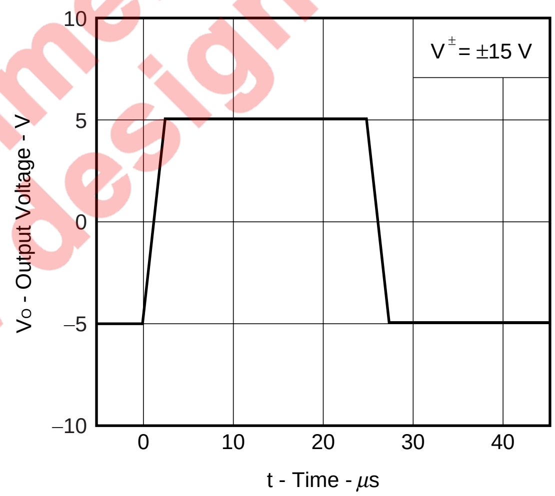
SUPPLY CURRENT



INPUT EQUIVALENT NOISE VOLTAGE DENSITY



VOLTAGE FOLLOWER PULSE RESPONSE



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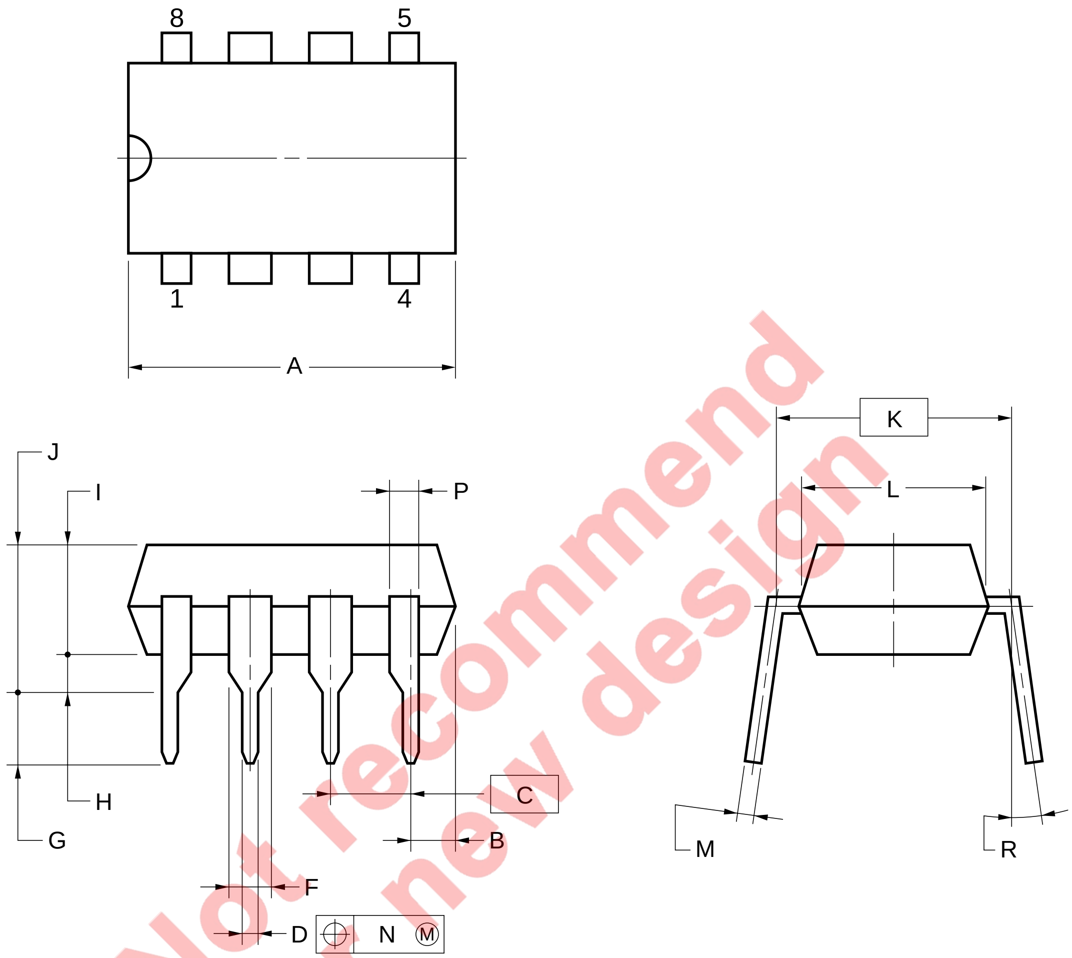
PACKAGE DRAWINGS (Unit : mm)

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



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NOTES

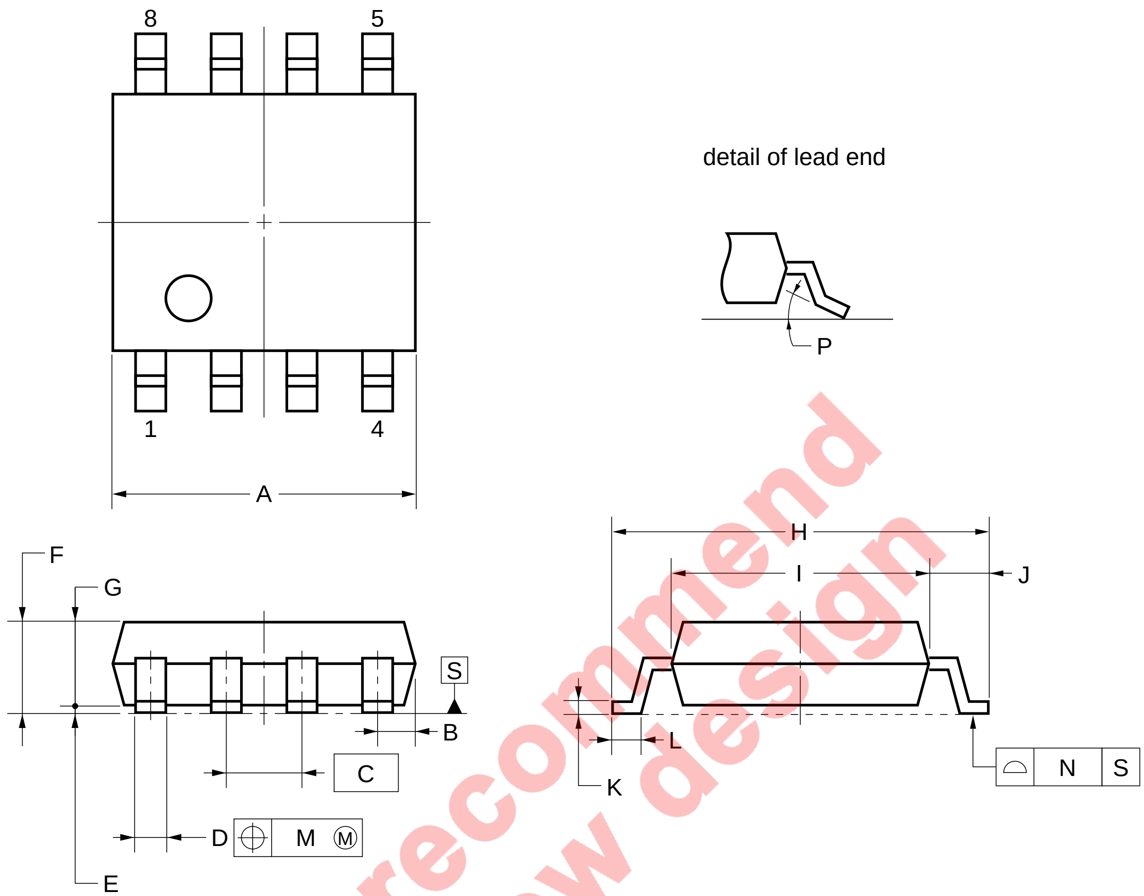
1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

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))



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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

The μPC4556 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)

Type of Surface Mount Device

μPC4556G2: 8-pin plastic SOP (5.72 mm (225))

Process	Conditions	Symbol
Infrared Ray Reflow	Peak temperature: 235°C or below (Package surface temperature), Reflow time: 30 seconds or less (at 210°C or higher), Maximum number of reflow processes: 3 time.	IR35-00-3
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: 3 time.	VP15-00-3
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

μPC4556C: 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.

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