DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC1458

GENERAL PURPOSE DUAL OPERATIONAL AMPLIFIER

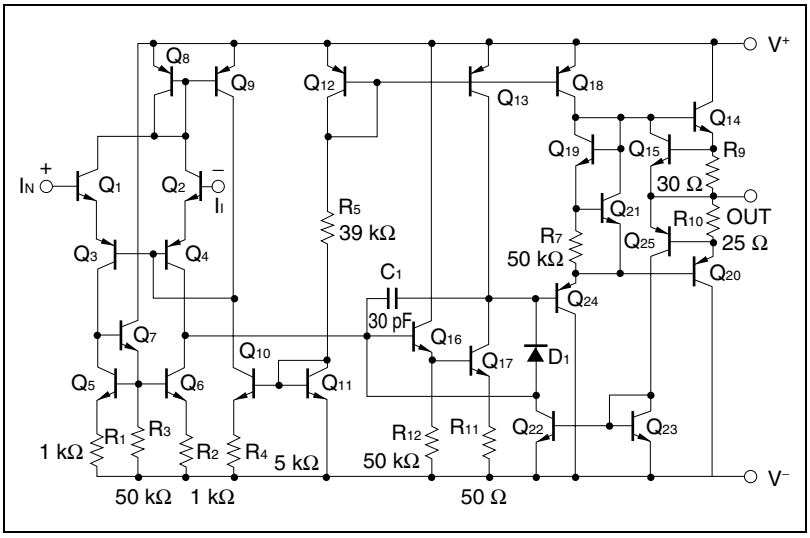
DESCRIPTION

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.

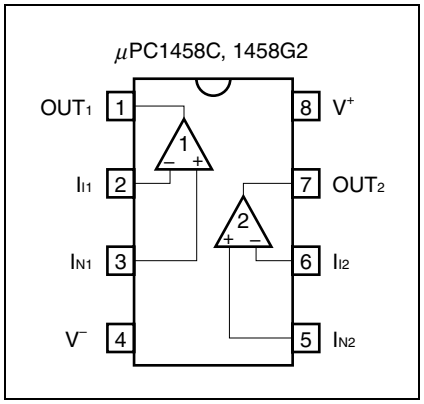
FEATURES

- 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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The mark ★ shows major revised points.

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ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER		SYMBOL	μPC1458	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 Temperature Range		T_{opt}	−20 to +80	°C
Storage Temperature Range		T_{stg}	−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)	$V^{\pm}$	±7.5		±16	V
Supply Voltage (V^- = GND)	V^+	+15		+32	V
Output Current	I_O		±2	±5	mA

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

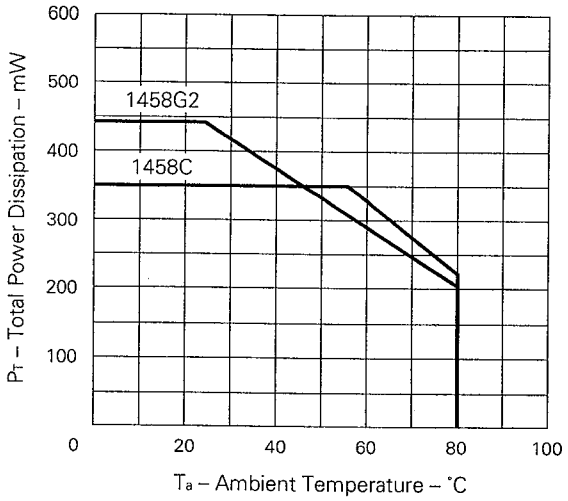
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Input Offset Voltage	V_{IO}		±1.0	±6.0	mV	$R_S \leq 10$ kΩ
Average Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$		±3		μV/°C	$R_S \leq 10$ kΩ
Input Offset Current **(Note 7)**	I_{IO}		±20	±200	nA	
Input Bias Current **(Note 7)**	I_B		80	500	nA	
Input Impedance	R_{in}	0.3	1.0		MΩ	
Large Signal Voltage Gain	A_v	20000	160000			$R_L \geq 2$ kΩ, V_O = ±10 V
★ Supply Current **(Note 8)**	I_{CC}		3.0	5.6	mA	I_O = 0 A
★ Power Consumption	P_d		90	170	mW	I_O = 0 A
Common Mode Rejection Ratio	CMR	70	90		dB	$R_S \leq 10$ kΩ
Supply Voltage Rejection Ratio	SVR		30	150	μV/V	$R_S \leq 10$ kΩ
Output Voltage Swing	V_{om}	±12	+14 −12		V	$R_L \geq 10$ kΩ
Output Voltage Swing	V_{om}	±10	+13 −11		V	$R_L \geq 2$ kΩ
Common Mode Input Voltage Range	V_{ICM}		V^+−0.5 V^-+2		V	
Channel Separation			120		dB	f = 10 Hz, R_L = 2 kΩ

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

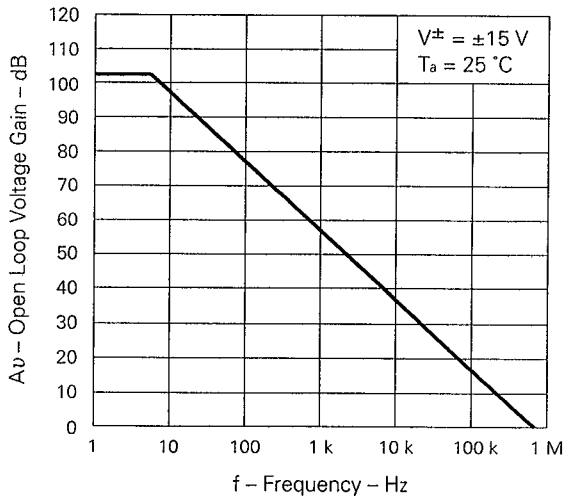
★ **Note 8.** This current flows irrespective of the existence of use.

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

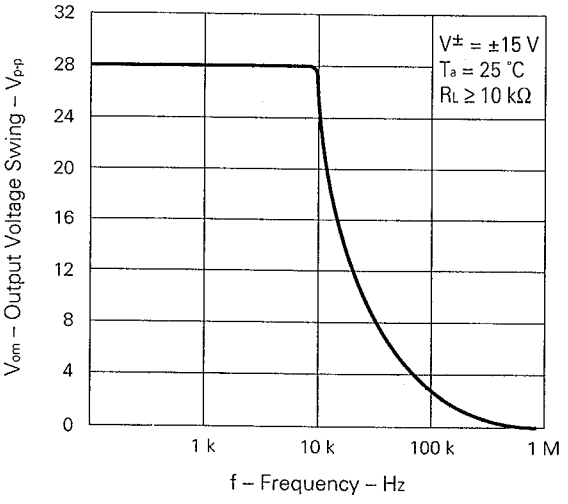
POWER DISSIPATION



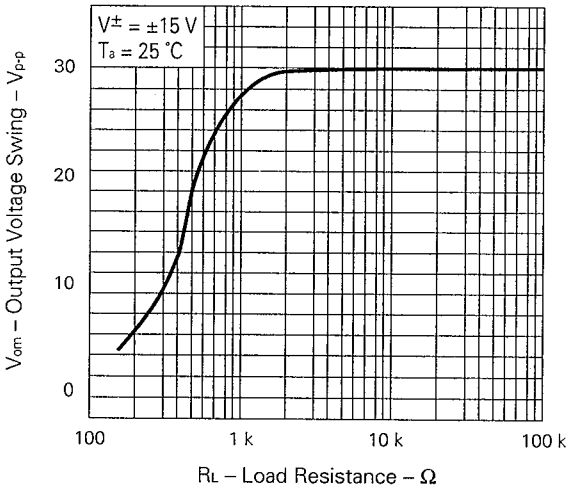
OPEN LOOP FREQUENCY RESPONSE



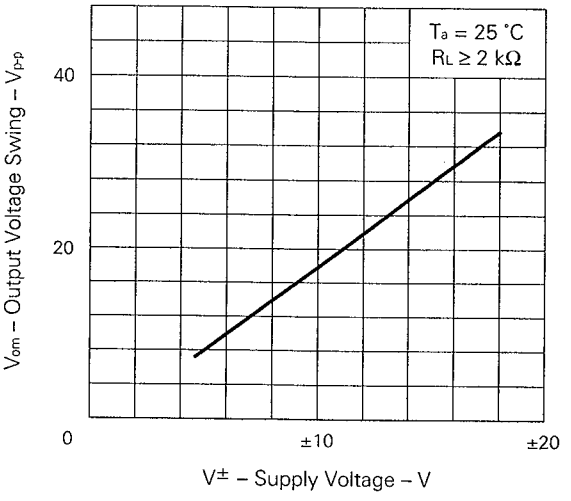
LARGE SIGNAL FREQUENCY RESPONSE



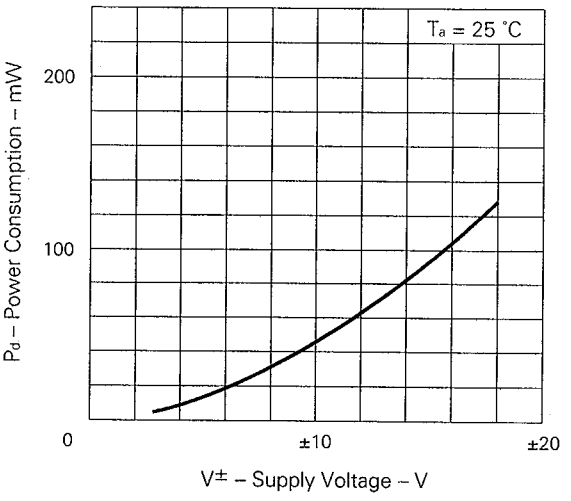
OUTPUT VOLTAGE SWING



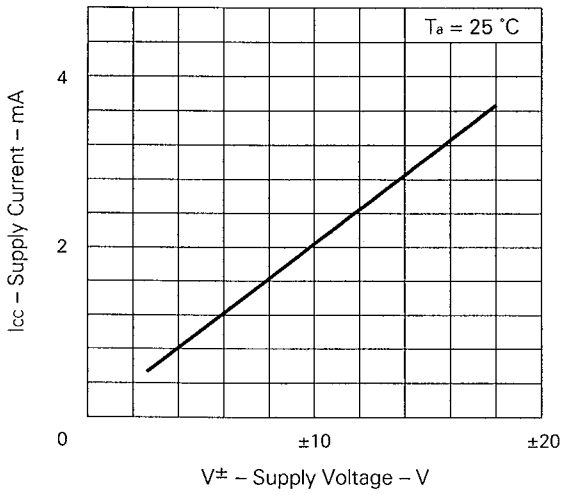
OUTPUT VOLTAGE SWING



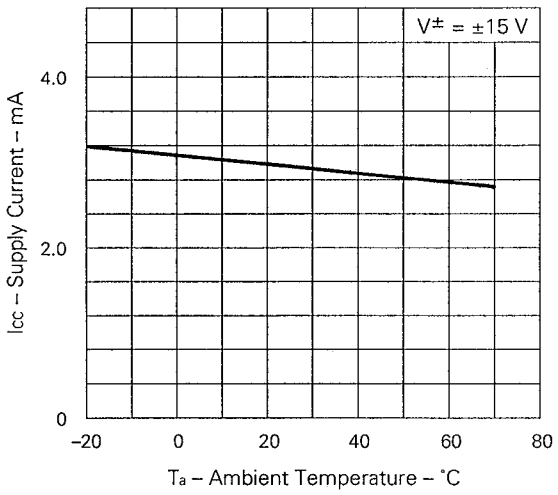
POWER CONSUMPTION



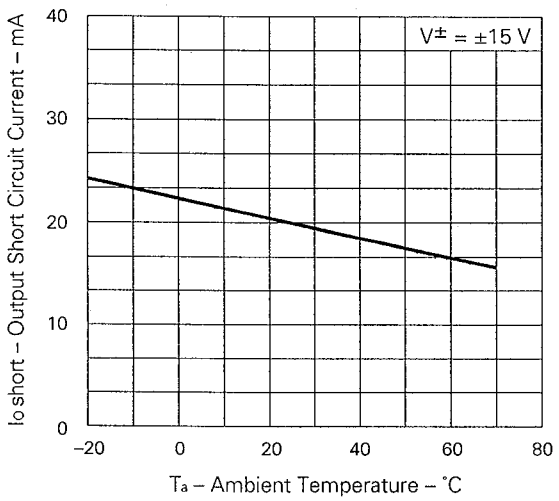
SUPPLY CURRENT



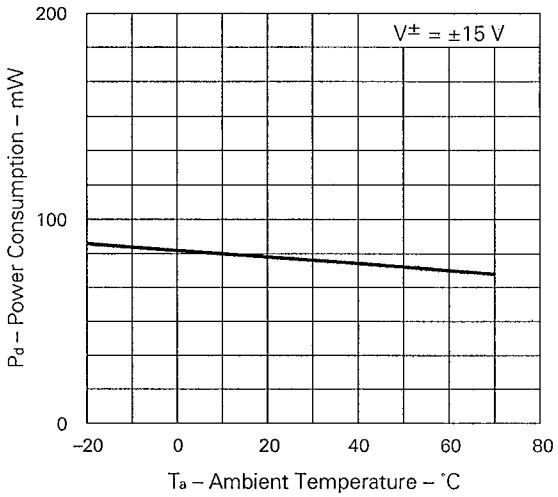
SUPPLY CURRENT



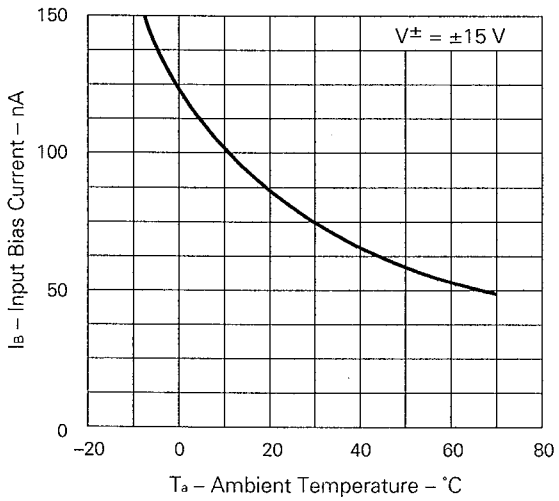
OUTPUT SHORT CIRCUIT CURRENT



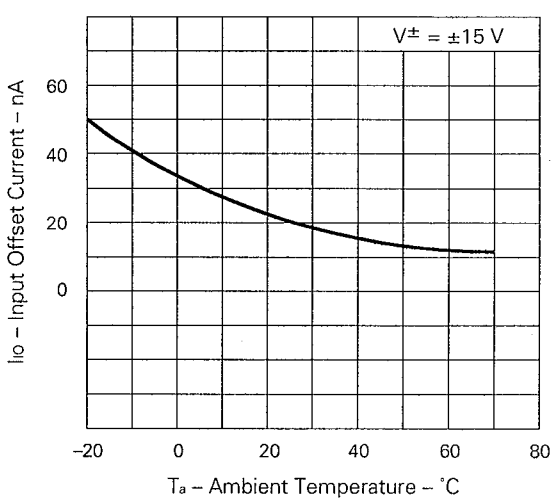
POWER CONSUMPTION



INPUT BIAS CURRENT

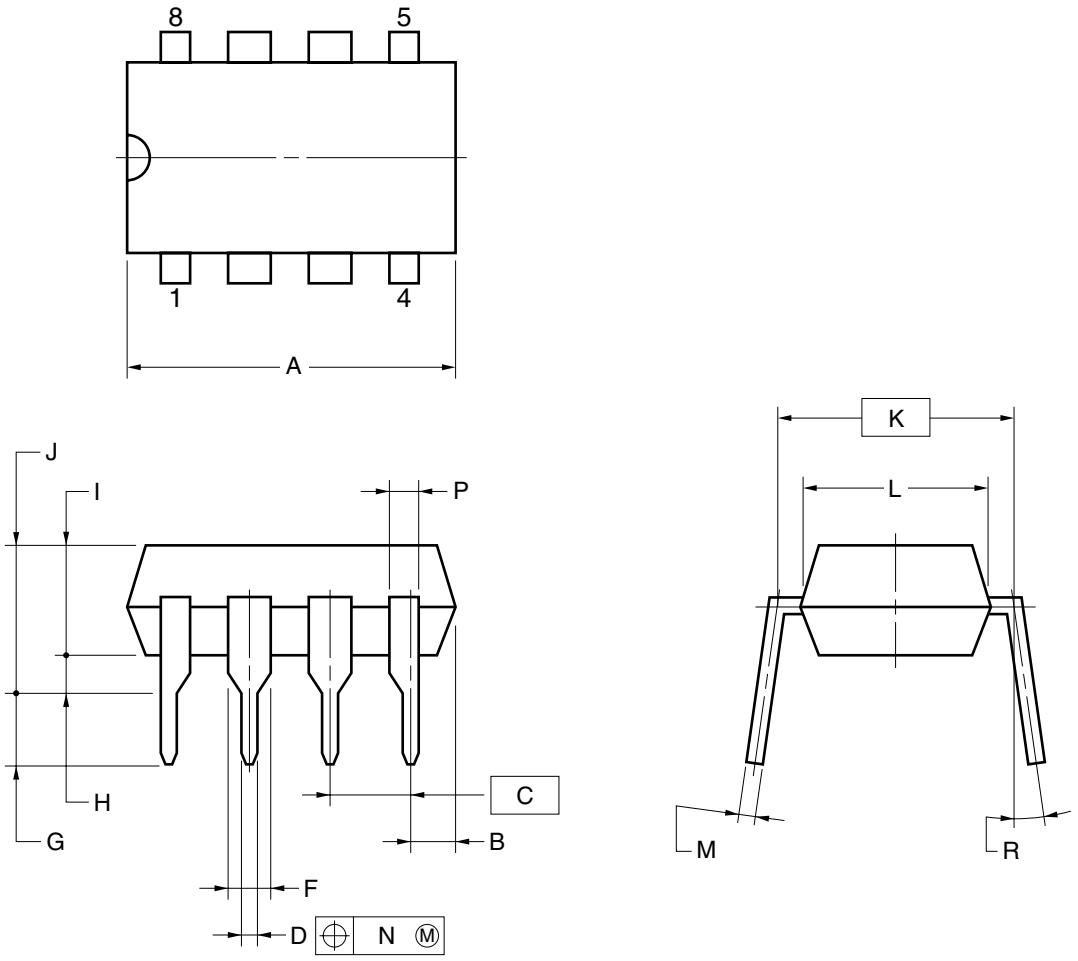


INPUT OFFSET CURRENT



★ **PACKAGE DRAWINGS (Unit: mm)**

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



NOTES

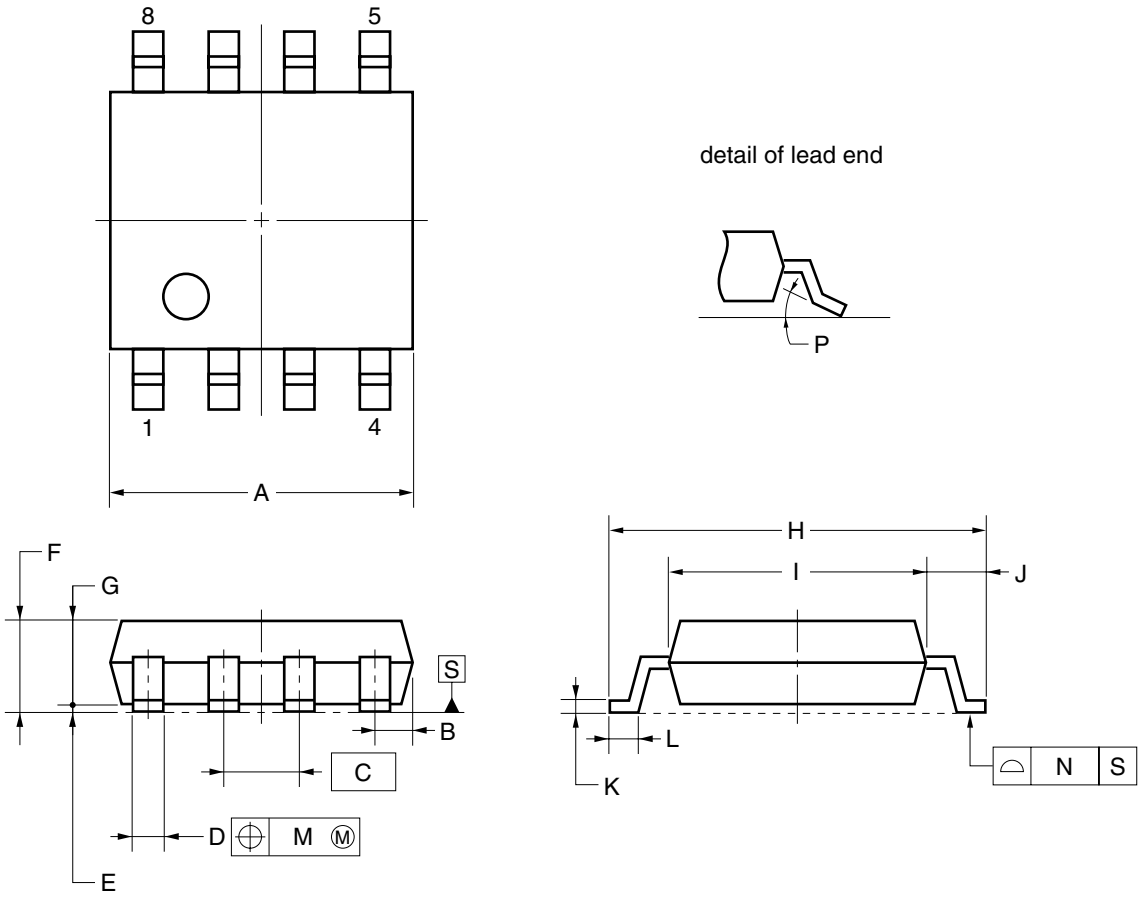
1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

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	$3^{\circ}{}^{+7^{\circ}}_{-3^{\circ}}$

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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