RNA51951A, B

Voltage Detecting, System Resetting IC Series

R03DS0003EJ0400
Rev.4.00
Jul 03, 2012

Description

RNA51951A,B are semiconductor integrated circuits designed for detecting supply voltage and resetting all types of logic circuits such as CPUs.

They include a built-in delay circuit to provide a retardation time (200 μs Typ).

They fined extensive applications, including battery checking circuit, level detecting circuit and waveform shaping circuit.

Features

- Few external parts
- Low threshold operating voltage (Supply voltage to keep low-state at low supply voltage): 0.6 V (Typ) at RL = 22 kΩ
- Wide supply voltage range: 2 V to 17 V
- Wide application range
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)	Surface Treatment
RNA51951AFPH0	SOP-8 pin	PRSP0008DE-C	FP	H (2,500 pcs / Reel)	0 (Ni/Pd/Au)
RNA51951APT0	DIP-8 pin	PRDP0008AF-B	P	T (1,000 pcs / Box)	0 (Ni/Pd/Au)
RNA51951AUPH1	UPAK	PLZZ0004CA-A	UP	H (1,000 pcs / Reel)	1 (Sn-Bi)
RNA51951BFPH0	SOP-8 pin	PRSP0008DE-C	FP	H (2,500 pcs / Reel)	0 (Ni/Pd/Au)
RNA51951BPT0	DIP-8 pin	PRDP0008AF-B	P	T (1,000 pcs / Box)	0 (Ni/Pd/Au)
RNA51951BUPH1	UPAK	PLZZ0004CA-A	UP	H (1,000 pcs / Reel)	1 (Sn-Bi)

Application

- Reset circuit of Pch, Nch, CMOS, microcomputer, CPU and MCU, Reset of logic circuit, Battery check circuit, switching circuit back-up voltage, level detecting circuit, waveform shaping circuit, delay waveform generating circuit, DC/DC converter, over voltage protection circuit

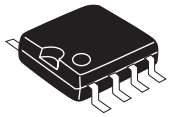
Recommended Operating Condition

- Supply voltage range: 2 V to 17 V

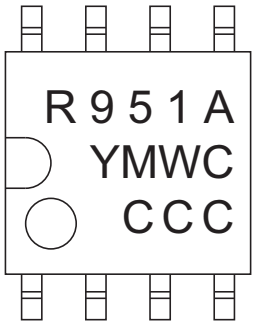
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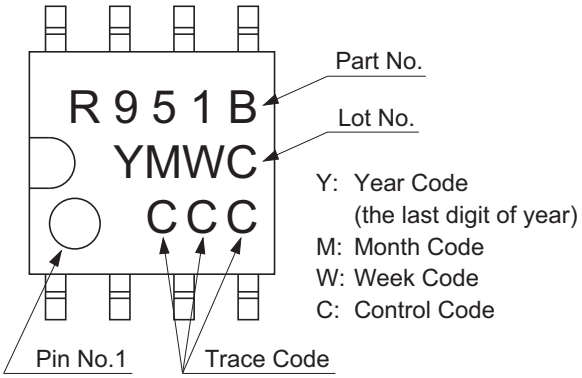
Outline and Article Indication

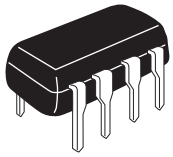
- RNA51951A, B



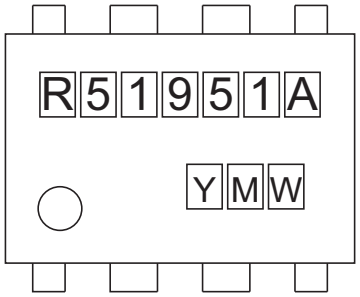
SOP-8

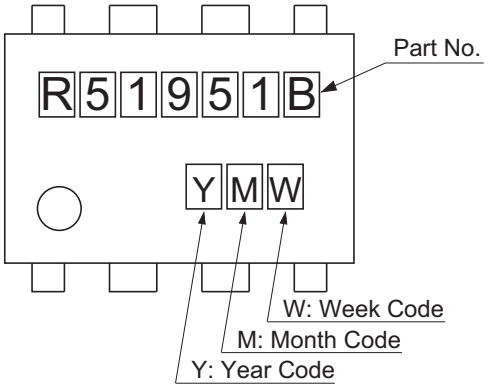


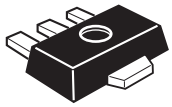




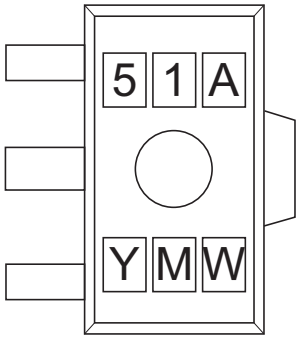
DIP-8

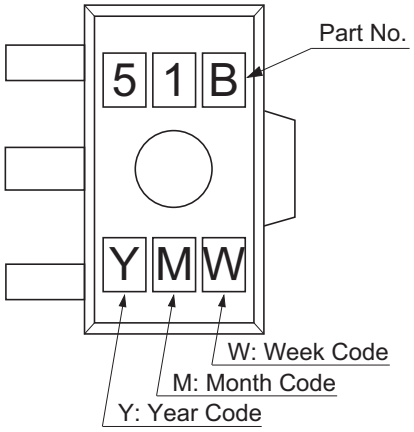






UPAK

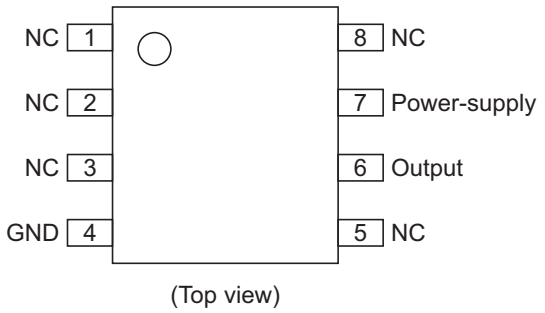




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Pin Arrangement

RNA51951A, B

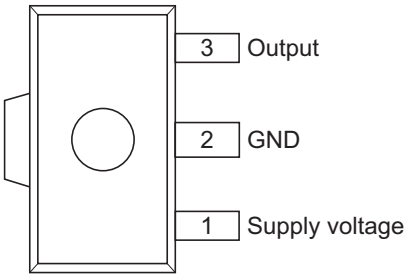


(Top view)

NC: No Connection

Outline: PRSP0008DE-C (SOP-8)
PRDP0008AF-B (DIP-8)

RNA51951A, B

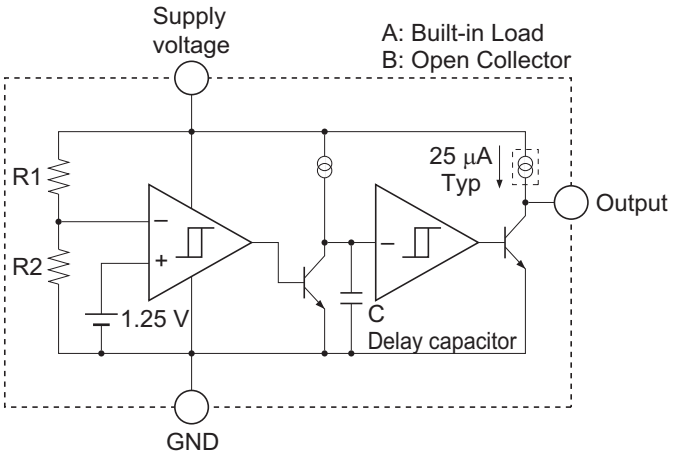


(Top view)

Outline: PLZZ0004CA-A (UPAK)

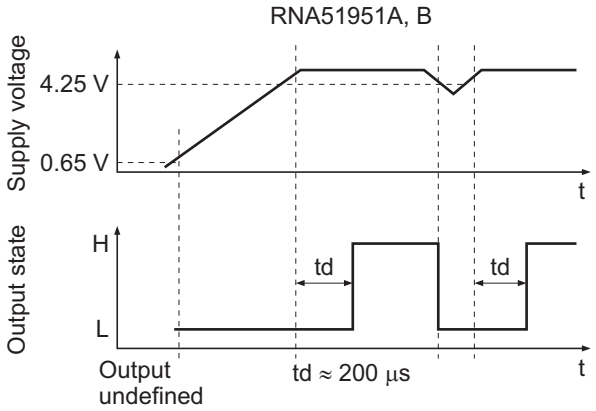
Block Diagram

RNA51951A, B



Operating Waveform

RNA51951A, B



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Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions	
Supply voltage	V_{CC}	18	V		
Output sink current	Isink	6	mA		
Output voltage	V_O	V_{CC}	V	Type A (output with constant current load)	
		18		Type B (open collector output)	
Power dissipation	Pd	400	mW	8-pin SOP (PRSP0008DE-C)	
		570		8-pin DIP (PRDP0008AF-B)	
		640 *[1]		UPAK (PLZZ0004CA-A)	
Thermal derating	Kθ	4.4	mW/°C	8-pin SOP (PRSP0008DE-C)	Refer to the thermal derating curve.
		8.3		8-pin DIP (PRDP0008AF-B)	
		6.4		UPAK (PLZZ0004CA-A)	
Operating temperature	Topr	–40 to +85	°C		
Storage temperature	Tstg	–55 to +125	°C		

Note: 1. 15 mm × 25 mm × 0.7 mmt alumina ceramic board, Ta ≤ 25°C. If Ta > 25°C, derate by 6.4 mW/°C.

Electrical Characteristics

(Ta = 25°C, unless otherwise noted)

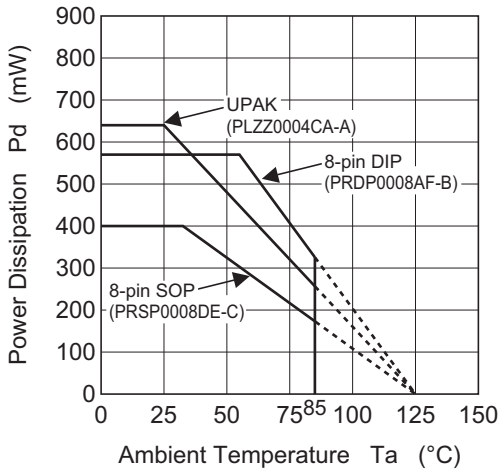
- "L" reset type

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Detecting voltage	V_S	4.05	4.25	4.45	V	
Hysteresis voltage	ΔV_S	30	50	80	mV	
Detecting voltage temperature coefficient	$V_S/\Delta T$	—	0.01	—	%/°C	
Circuit current	I_{CC}	—	450	680	μA	Type A, V_{CC} = 5V
		—	420	630		Type B, V_{CC} = 5V
Delay time	t_{pd}	80	200	500	μs	
Output saturation voltage	Vsat	—	0.2	0.4	V	V_{CC} = 4V, Isink = 4mA
Threshold operating voltage	V_{OPL}	—	0.67	0.8	V	R_L = 2.2kΩ, Vsat ≤ 0.4V
		—	0.55	0.7		R_L = 100kΩ, Vsat ≤ 0.4V
Output leakage current	I_{OH}	—	—	30	nA	Type B
Output load current	I_{OC}	–40	–25	–17	μA	Type A, V_{CC} = 5V, V_O = 1/2 × V_{CC}
Output high voltage	V_{OH}	V_{CC}–0.2	V_{CC}–0.06	—	V	Type A

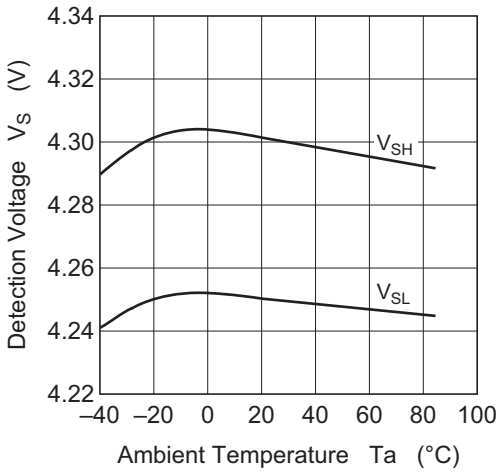
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Typical Characteristics

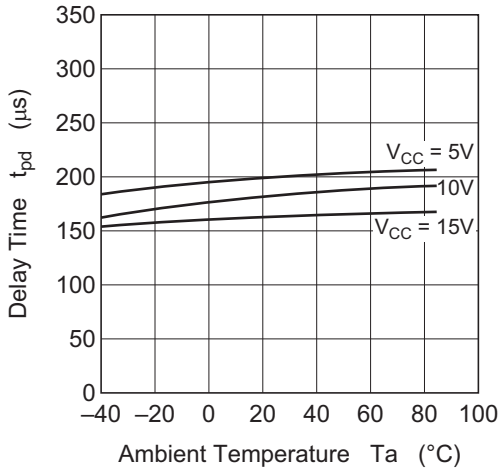
Thermal Derating



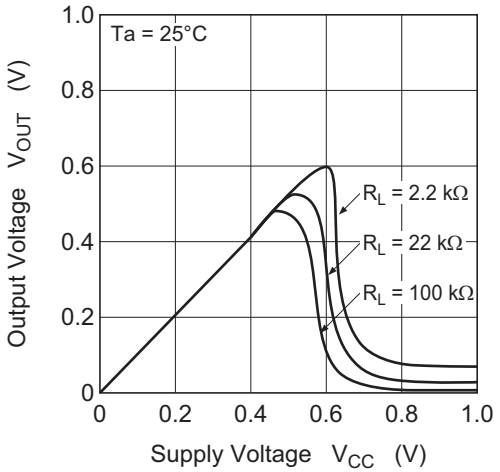
Detection Voltage vs. Ambient Temperature



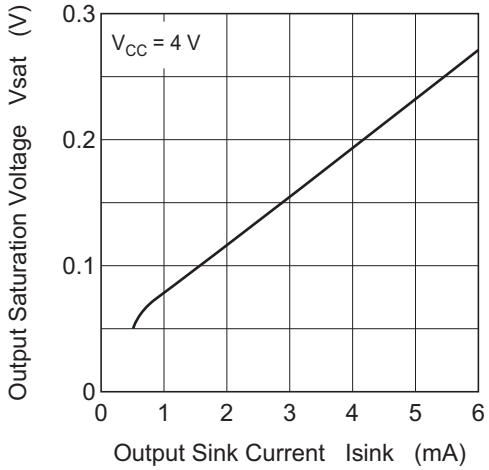
Delay Time vs. Ambient Temperature



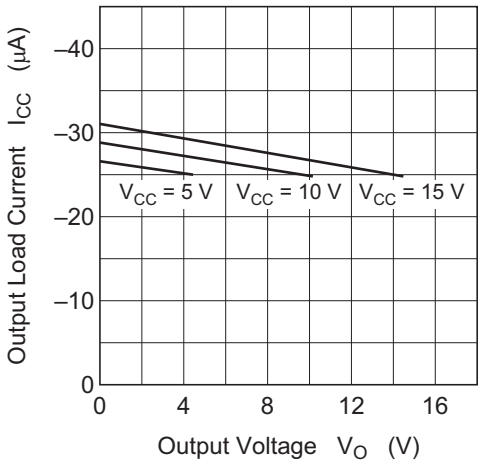
Threshold Operating Voltage



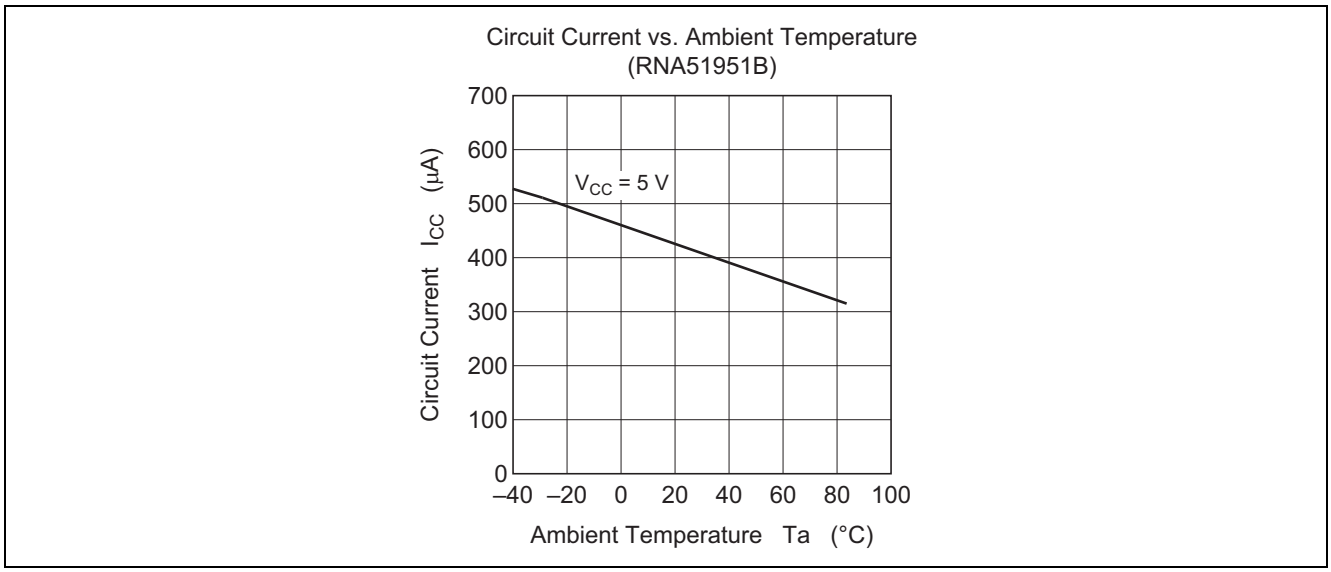
Output Saturation Voltage vs. Output Sink Current



Output Load Current vs. Output Voltage (RNA51951A)



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Example of Application Circuit

Reset Circuit of RNA51951

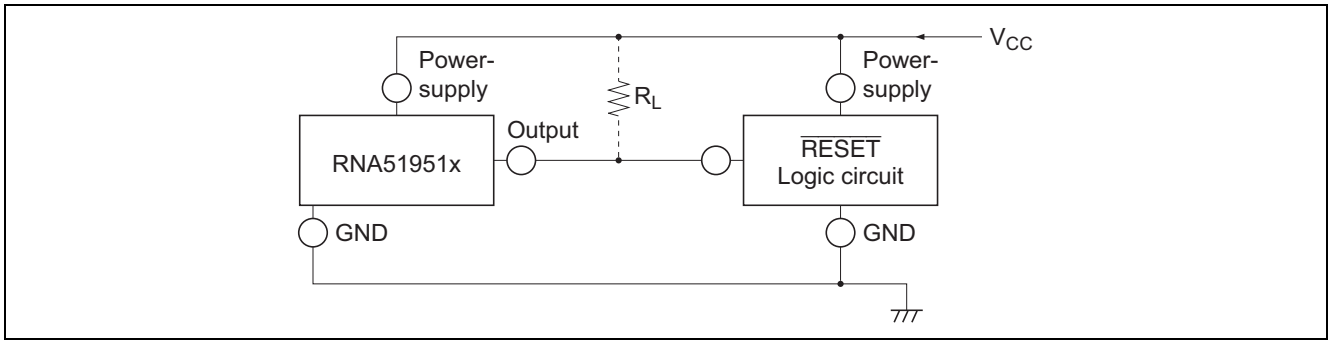


Figure 1 Reset Circuit of RNA51951

Notes: 1. Delay time must be longer than 200 μs, RNA51953, RNA51957, and RNA51958 are used.
2. If the RNA5195xx and the logic circuit share a common power source, type A (built-in load type) can be used whether a pull-up resistor is included in the logic circuit or not.
3. The logic circuit preferably should not have a pull-down resistor, but if one is present, add load resistor R_L to overcome the pull-down resistor.
4. When a negative supply voltage is used, the supply voltage side of RNA5195xx and the GND side are connected to negative supply voltage respectively.

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Notice for use

About the Power Supply Line

1. About bypass capacitor
   Because the ripple and the spike of the high frequency noise and the low frequency are superimposed to the power supply line, it is necessary to remove these.
   Therefore, please install C_1 and C_2 for the low frequency and for the high frequency between the power supply line and the GND line as shown in following figure 2.

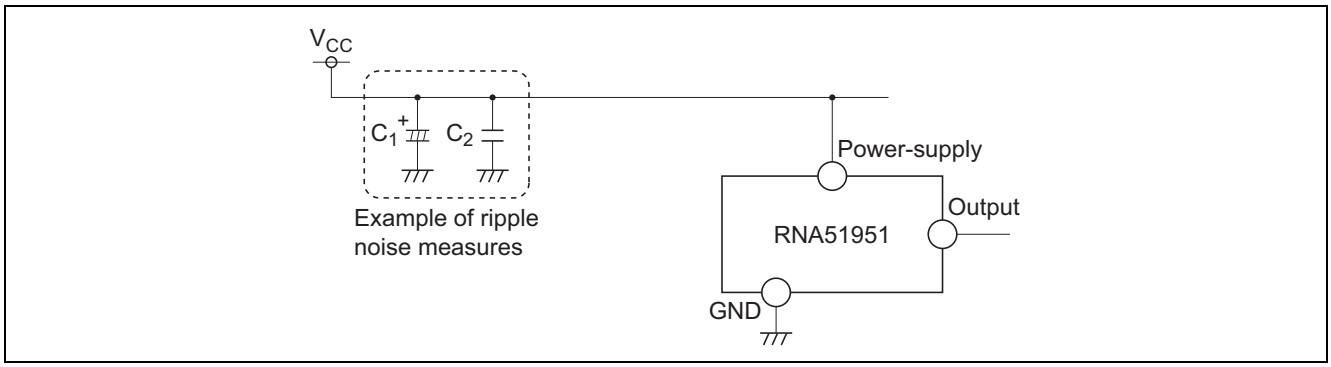


Figure 2 Example of Ripple Noise Measures

Setting of Output Load Resistance (RNA51951B)

High level output voltage can be set without depending on the power-supply voltage because the output terminal is an open collector type. However, please guard the following notes.

1. Please set it in value (2 V to 17 V) within the range of the power-supply voltage recommendation.
   Moreover, please never impress the voltage of maximum ratings 18 V or more even momentarily either.
2. Please set output load resistance (pull-up resistance) R_L so that the output current (output inflow current I_L) at L level may become 4 mA or less. Moreover, please never exceed absolute maximum rating (6 mA).

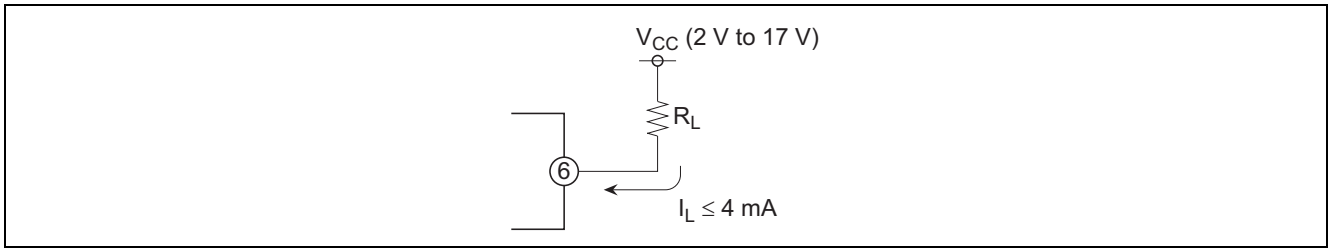


Figure 3 Output Load Resistance R_L

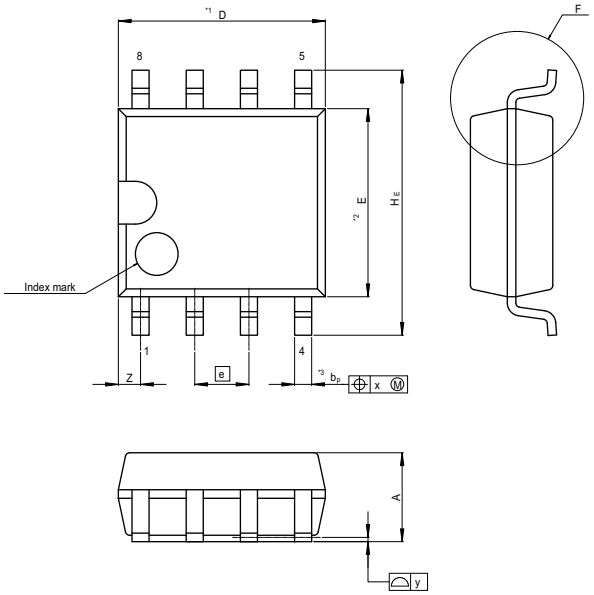
Others

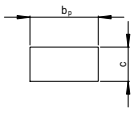
1. Notes when IC is handled are published in our reliability handbook, and please refer it.
   The reliability handbook can be downloaded from our homepage (following URL).
   http://www.renesas.com/products/common_info/reliability/index.jsp
2. Additionally, please inquire of our company when there is an uncertain point on use.

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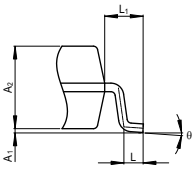
Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP8-4.4x4.85-1.27	PRSP0008DE-C	—	0.1g





Terminal cross section
(Ni/Pd/Au plating)

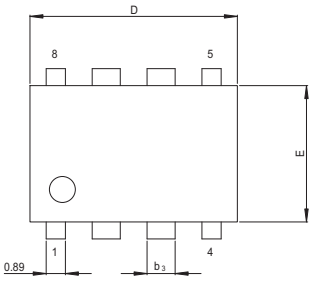


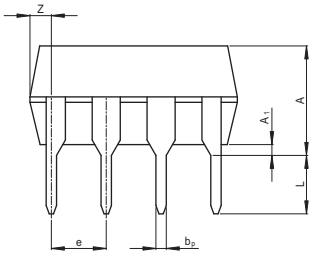
Detail F

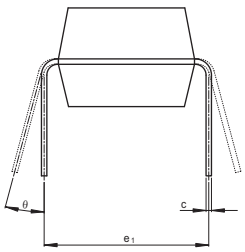
NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	4.65	4.85	5.05
E	4.2	4.4	4.6
A_2	—	1.85	—
A_1	0.00	0.1	0.20
A	—	—	2.03
b_p	0.34	0.4	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	5.7	6.2	6.5
e	1.12	1.27	1.42
x	—	—	0.12
y	—	—	0.10
Z	—	—	0.75
L	0.25	0.45	0.65
L_1	—	0.90	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP8-6.3x9.6-2.54	PRDP0008AF-B	DP-8FV	0.54g







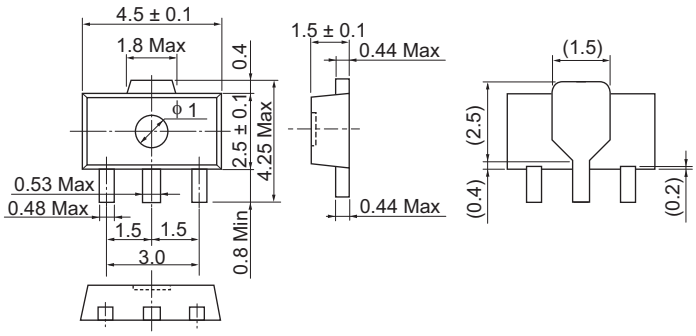
(Ni/Pd/Au plating)

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	7.62	—
D	—	9.60	10.6
E	—	6.30	7.4
A	—	—	5.06
A_1	0.5	—	—
b_p	0.40	0.48	0.56
b_3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.27
L	2.54	—	—

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Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
UPAK	SC-62	PLZZ0004CA-A	UPAK / UPAKV	0.050g

Unit: mm



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