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April 1st, 2010
Renesas Electronics Corporation

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

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M51943A,B/M51944A,B

Voltage Detecting, System Resetting IC Series

REJ03D0773-0400

Rev.4.00

Sep 18, 2007

Description

M51943A,B/M51944A,B are semiconductor integrated circuits designed for detecting supply voltage and resetting all types of logic circuits such as CPUs.

They find 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 $R_L = 22\text{ k}\Omega$
- Wide supply voltage range: 2 V to 17 V
- Wide application range

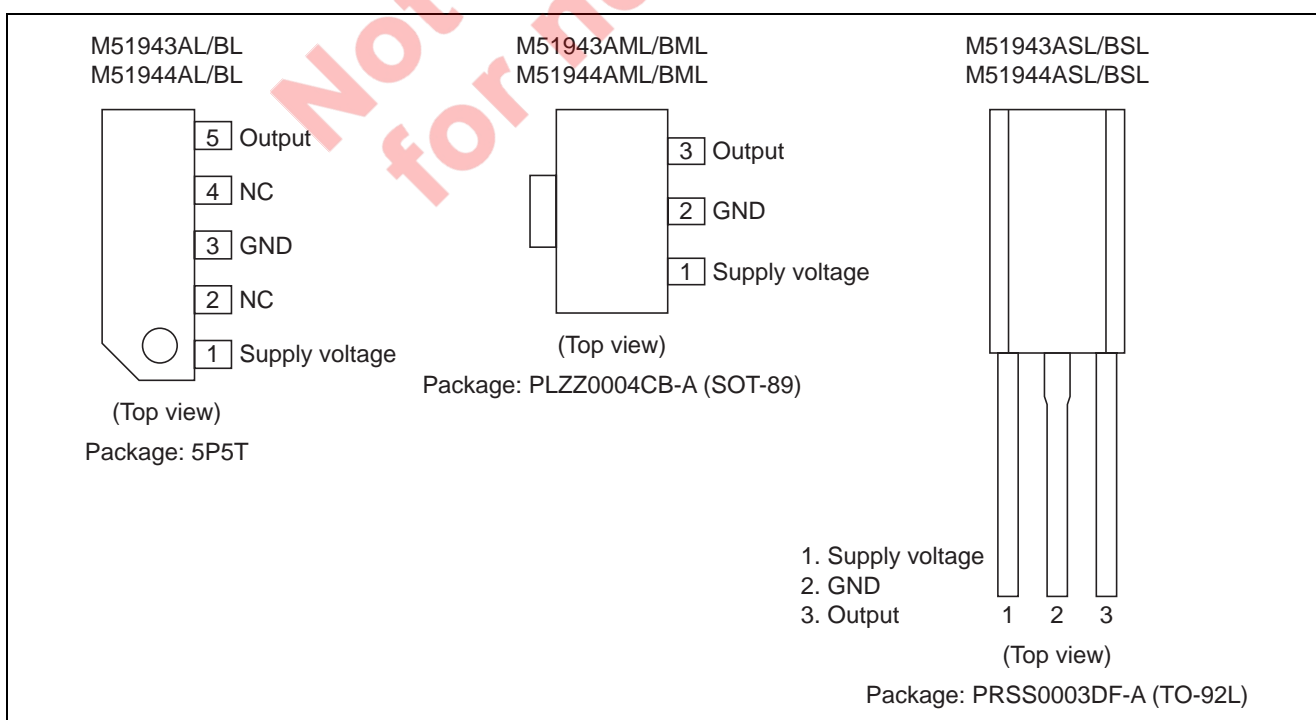
Application

- 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

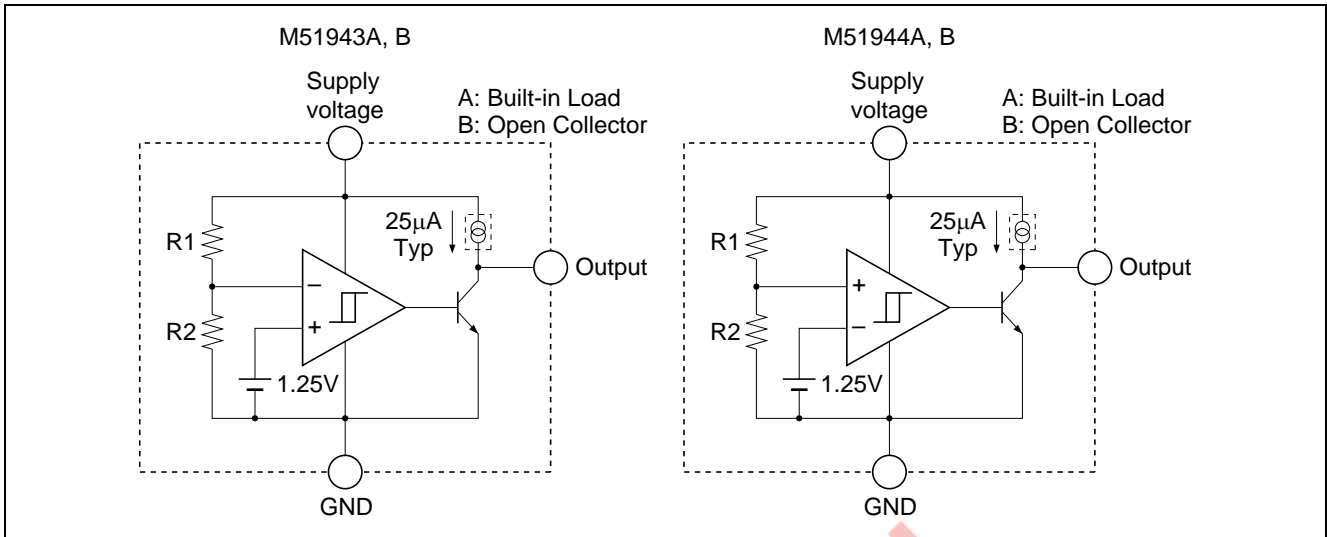
Recommended Operating Condition

- Supply voltage range: 2 V to 17 V

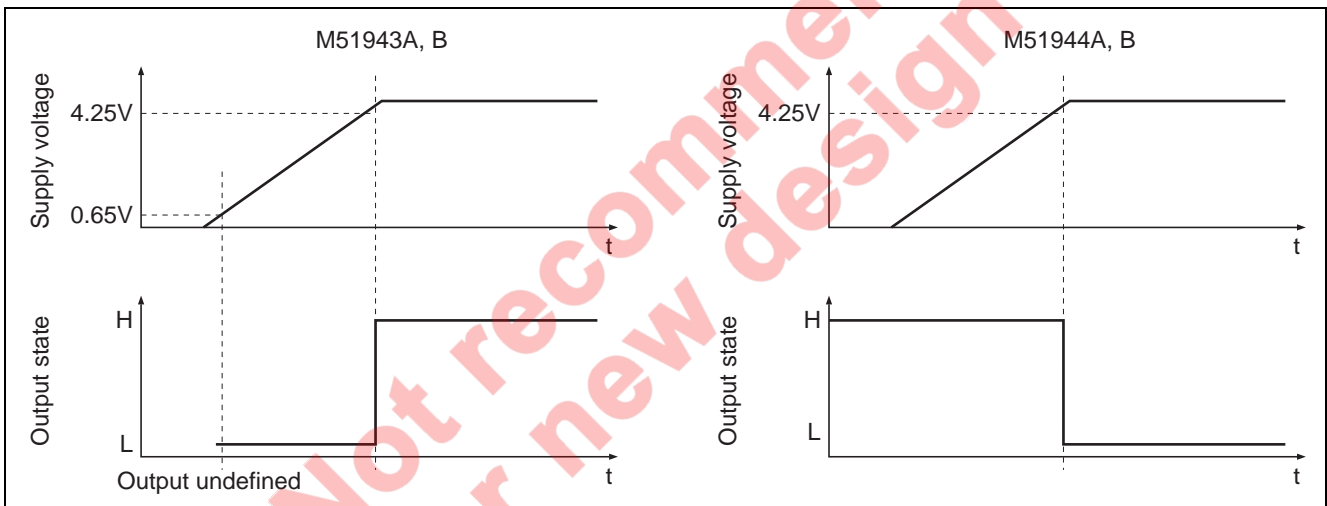
Pin Arrangement



Block Diagram



Operating Waveform



Absolute Maximum Ratings

(Ta = 25°C, unless otherwise noted)

Item	Symbol	Ratings	Unit	Conditions	
Supply voltage	V _{CC}	18	V		
Output sink current	I _{sink}	6	mA		
Output voltage	V _O	V _{CC}	V	Type A (output with constant current load)	
		18		Type B (open collector output)	
Power dissipation	P _d	450	mW	5-pin SIP	
		700		3-pin SIP	
		500		3-pin SOP	
Thermal derating	K _θ	4.5	mW/°C	Ta ≥ 25°C	5-pin SIP
		7			3-pin SIP
		5			3-pin SOP
Operating temperature	T _{opr}	-30 to +85	°C		
Storage temperature	T _{stg}	-40 to +125	°C		

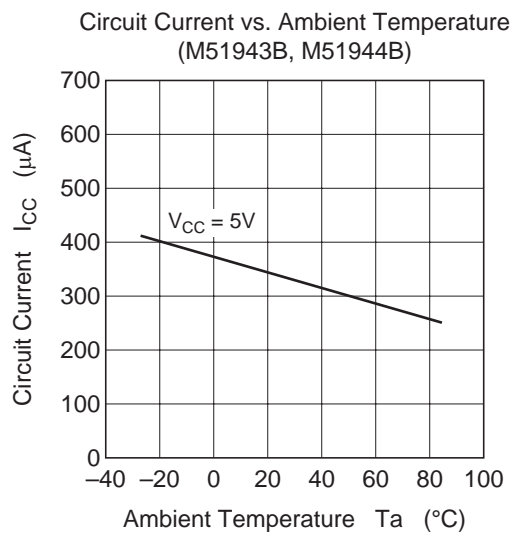
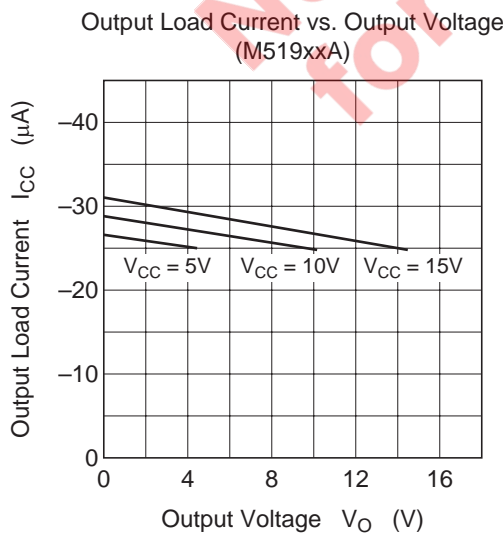
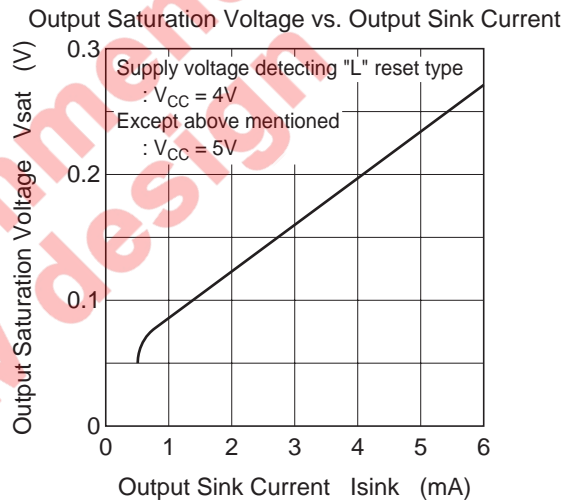
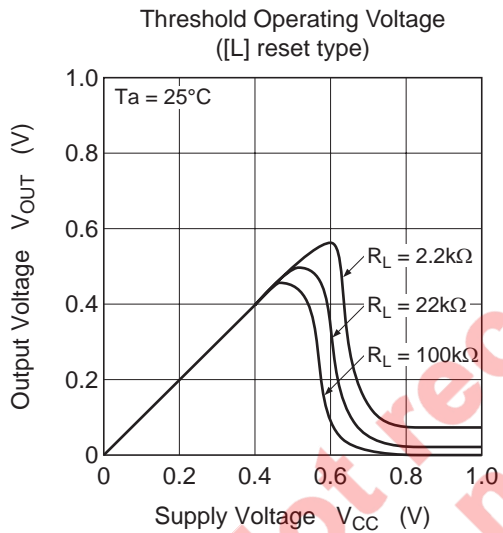
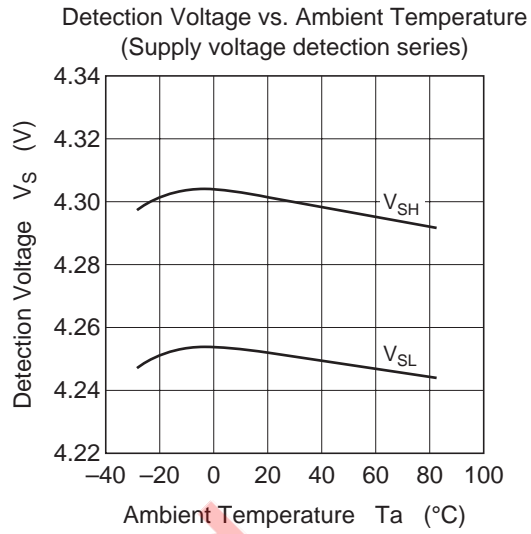
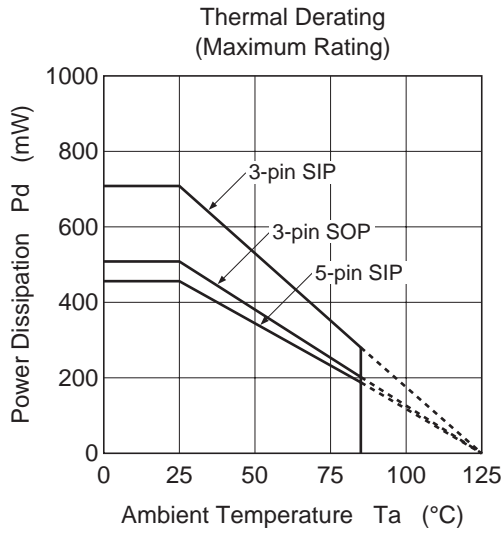
Electrical Characteristics

(Ta = 25°C, unless otherwise noted)

- “L” reset type M51943A, M51943B
- “H” reset type M51944A, M51944B

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 /ΔT	—	0.01	—	%/°C		
Circuit current	I _{CC}	—	370	560	μA	Type A, V _{CC} = 5V	
		—	340	510		Type B, V _{CC} = 5V	
Output saturation voltage	V _{sat}	—	0.2	0.4	V	L reset type, V _{CC} = 4V, I _{sink} = 4mA	
		—	0.2	0.4		H reset type, V _{CC} = 5V, I _{sink} = 4mA	
Threshold operating voltage	V _{OPL}	—	0.67	0.8	V	L reset type minimum supply voltage for IC operation	R _L = 2.2kΩ, V _{sat} ≤ 0.4V
		—	0.55	0.7			R _L = 100kΩ, V _{sat} ≤ 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	
Propagation delay time	t _{PHL}	—	6	—	μs	Response time when V _{CC} changes H → L	
	t _{PLH}	—	3	—		Response time when V _{CC} changes L → H	

Typical Characteristics



Example of Application Circuit

Reset Circuit of M5194xx Series

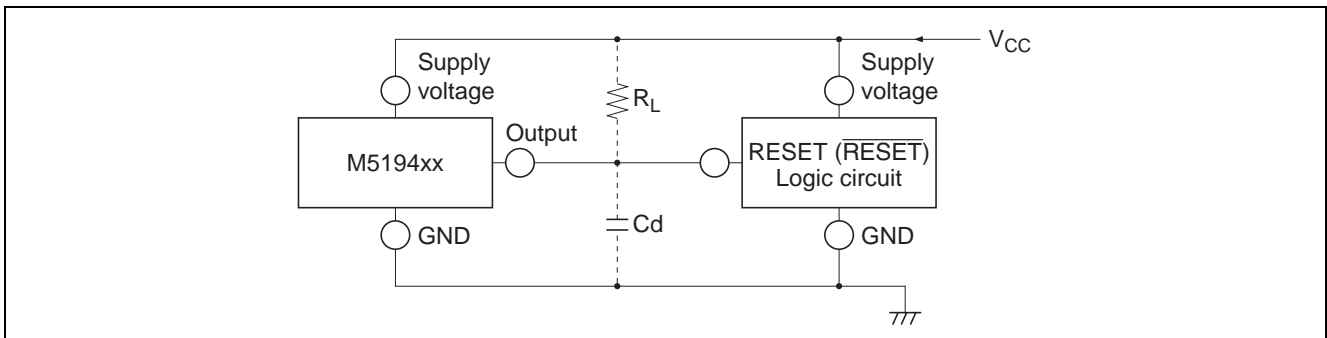


Figure 1 Reset Circuit of M5194xx Series

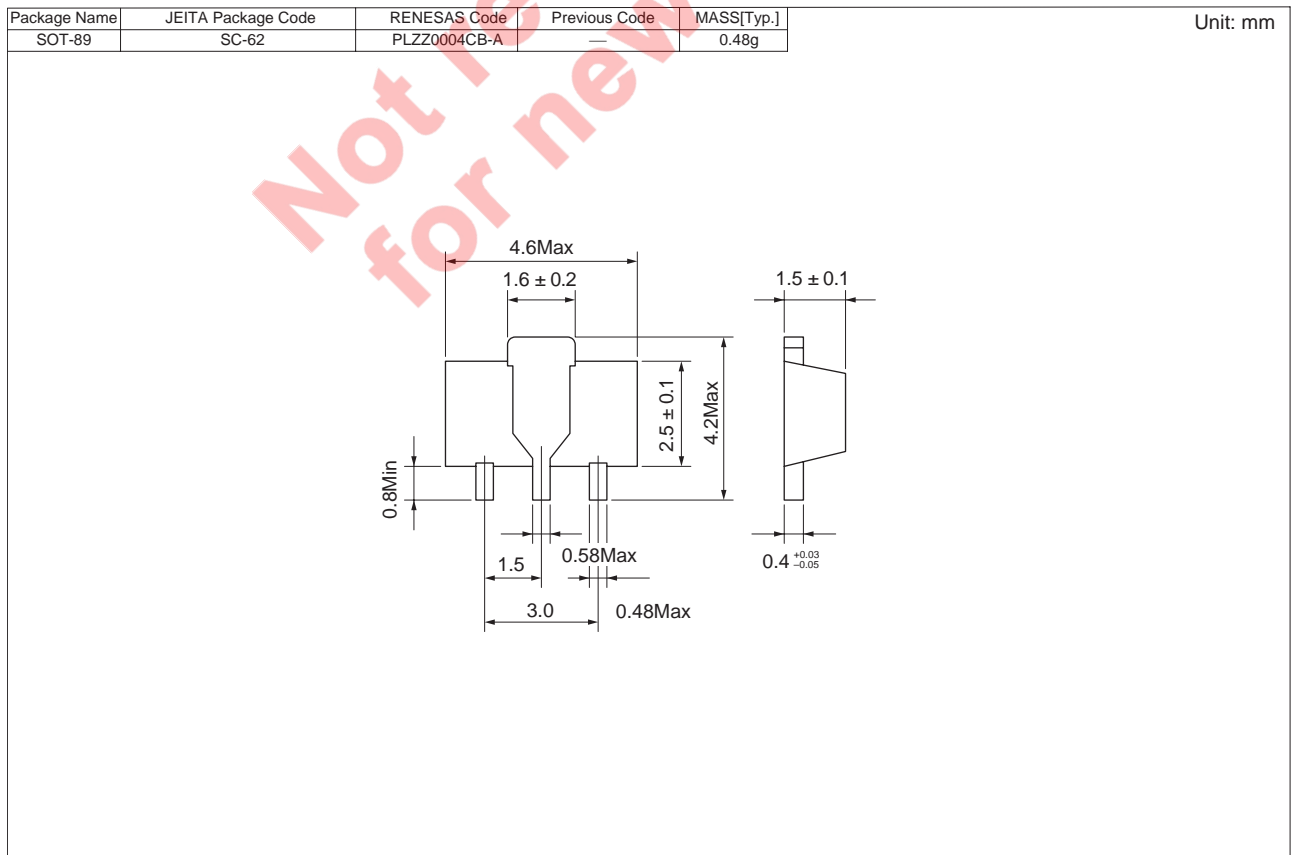
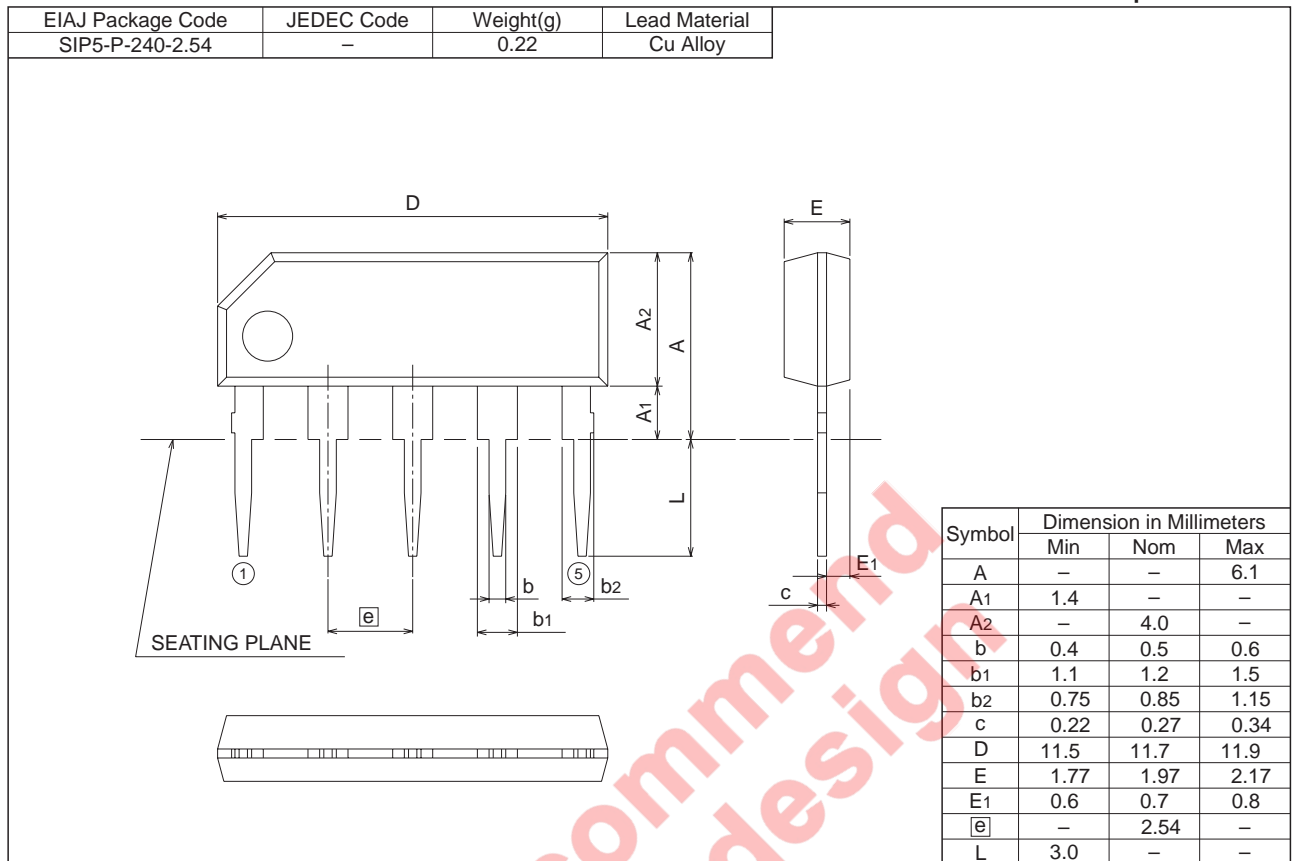
- Notes:
1. When the detecting supply voltage is 4.25 V, M51943 and M51944 are used. When the voltage is anything except 4.25 V, M51945 and M51946 are used.
 2. If the M5194xx and the logic circuit share a common power source, type A (built-in load type) can be used whether a pull-up resistor is included 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. It is better to use the M5195xx series to cause a delay, but if the delay is caused by the M5194xx series, the delay capacitor C_d is applied between the output and GND.
 5. When the reset terminal in the logic circuit is of the low reset type, M51943 and M51945 are used and when the terminal is of the high reset type, M51944 and M51946 are used.
 6. When a negative supply voltage is used, the supply voltage side of M5194xx and the GND side are connected to GND and the negative supply voltage respectively.

Not recommended for new design

Package Dimensions

5P5T

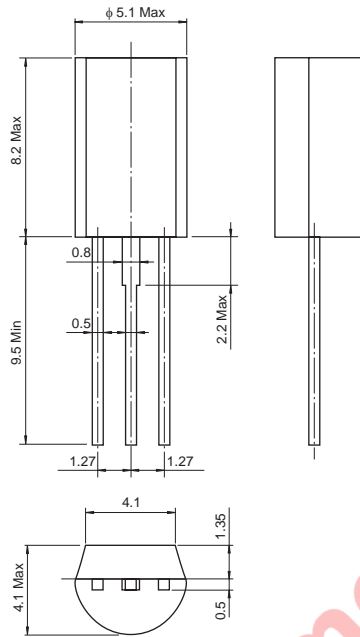
Plastic 5pin 240mil SIP



M51943A,B/M51944A,B

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
—	PRSS0003DF-A	TO-92L	0.34g

Unit: mm



Not recommend
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