M51943A,B/M51944A,B

Voltage Detecting, System Resetting IC Series

REJ03D0773-0200
Rev.2.00
Nov 02, 2005

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 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 R_L = 22 kΩ
- Wide supply voltage range: 2 V to 17 V
- Wide application range

Application

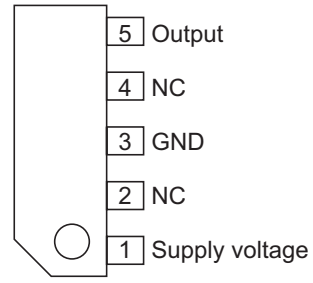
- Reset circuit of Pch, Nch, CMOS, microcomputer, CPU and MCU, Reset of logic circuit, Battery check circuit, switching circuit back-up voltage, level detecting circuit, waveform shaping circuit, delay waveform generating circuit, DC/DC converter, over voltage protection circuit

Recommended Operating Condition

- Supply voltage range: 2 V to 17 V

Pin Arrangement

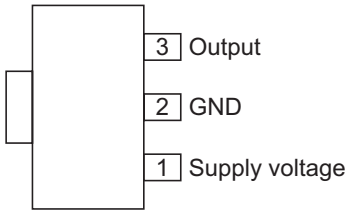
M51943AL/BL
M51944AL/BL



(Top view)

Package: 5P5T

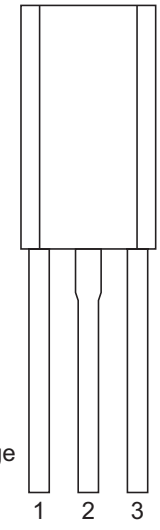
M51943AML/BML
M51944AML/BML



(Top view)

Package: PLZZ0004CB-A (SOT-89)

M51943ASL/BSL
M51944ASL/BSL



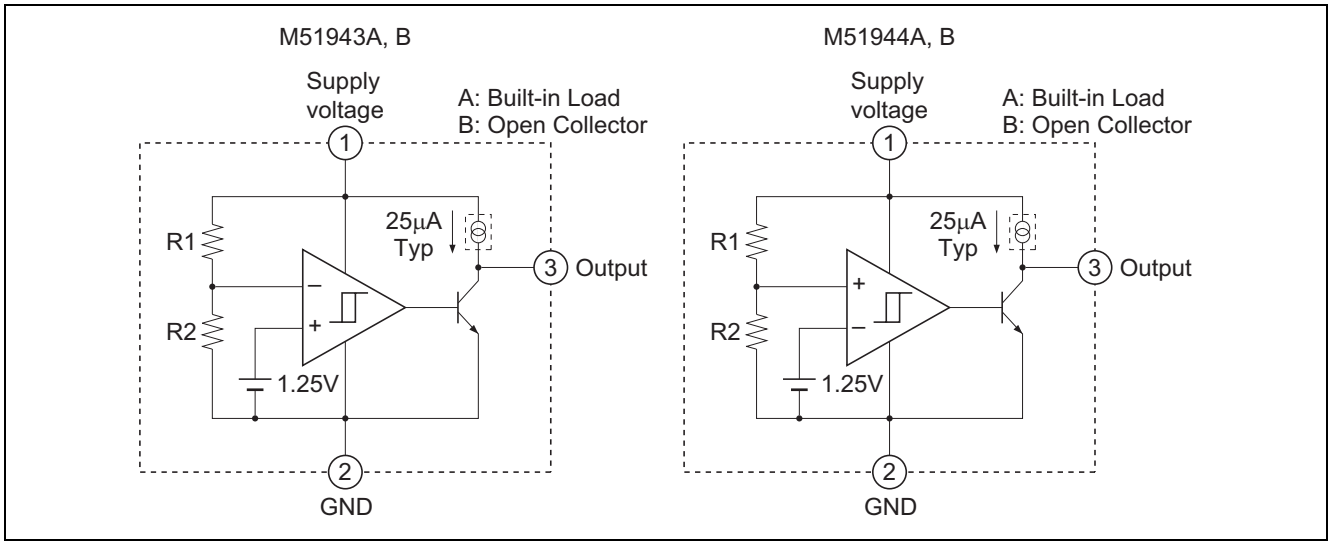
1. Supply voltage
2. GND
3. Output

1 2 3

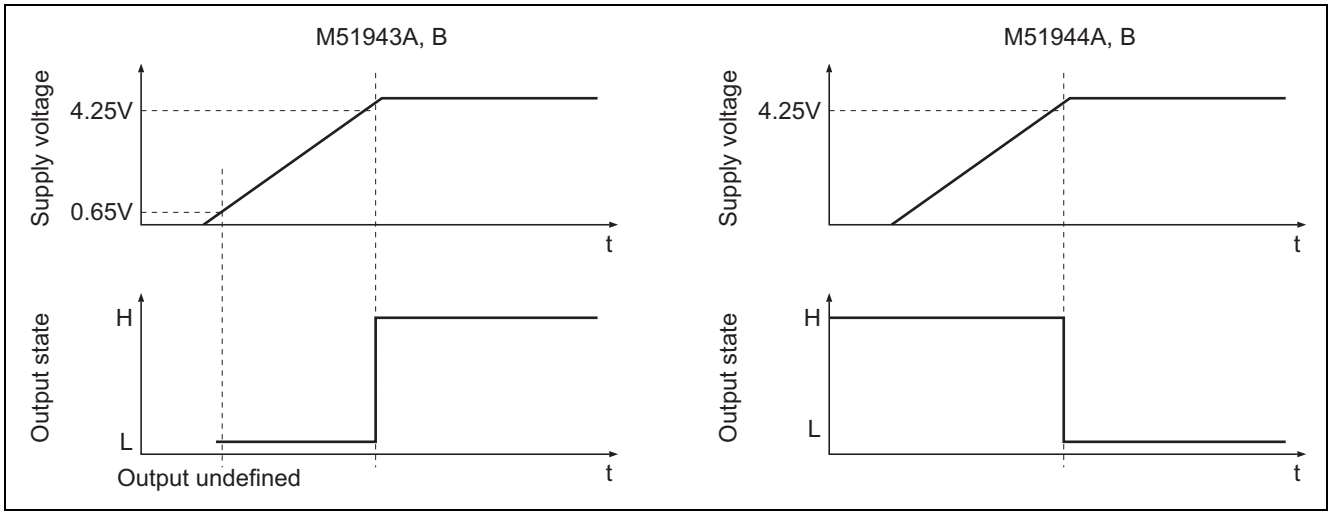
(Top view)

Package: PRSS0003DF-A (TO-92L)

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	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	450	mW	5-pin SIP	
		700		3-pin SIP	
		500		3-pin SOP	
Thermal derating	Kθ	4.5	mW/°C	Ta ≥ 25°C	5-pin SIP
		7			3-pin SIP
		5			3-pin SOP
Operating temperature	Topr	–30 to +85	°C		
Storage temperature	Tstg	–40 to +125	°C		

Electrical Characteristics

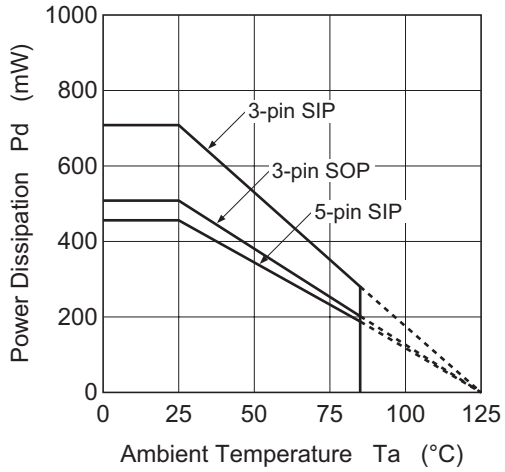
(Ta = 25°C, unless otherwise noted)

- "L" reset type M51943A, M51943B
- "H" reset type M51944A, M51944B

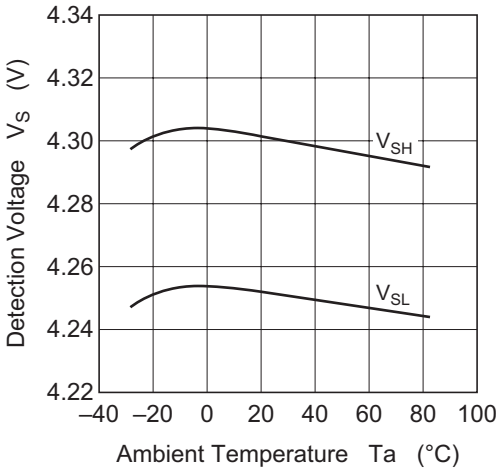
Item	Symbol	Min	Typ	Max	Unit	Test Conditions	
Detecting voltage	V_S	4.05	4.25	4.45	V		
Hysteresis voltage	ΔV_S	30	50	80	mV		
Detecting voltage temperature coefficient	$V_S/\Delta T$	—	0.01	—	%/°C		
Circuit current	I_{CC}	—	370	560	µA	Type A, V_{CC} = 5V	
		—	340	510		Type B, V_{CC} = 5V	
Output saturation voltage	Vsat	—	0.2	0.4	V	L reset type, V_{CC} = 4V, Isink = 4mA	
		—	0.2	0.4		H reset type, V_{CC} = 5V, Isink = 4mA	
Threshold operating voltage	V_{OPL}	—	0.67	0.8	V	L reset type minimum supply voltage for IC operation	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	
		—	—	1	µA	Type B, Ta = –30 to +85°C	
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

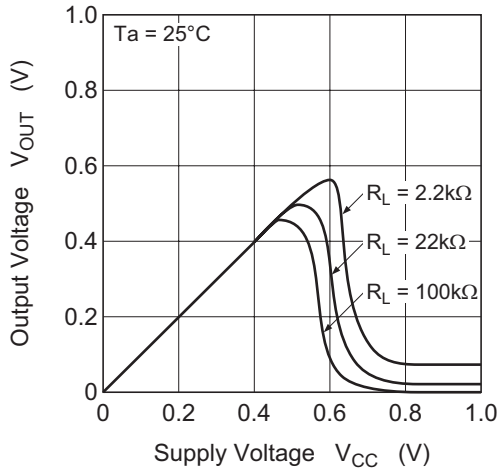
Thermal Derating
(Maximum Rating)



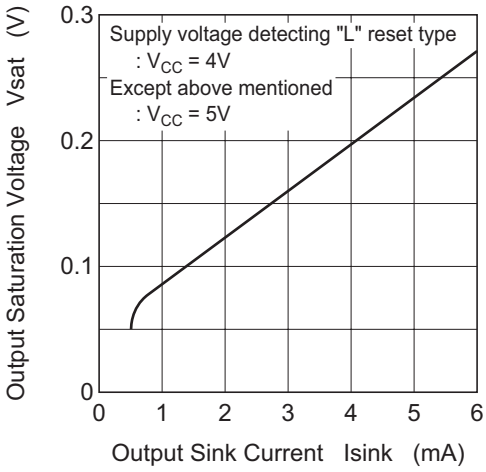
Detection Voltage vs. Ambient Temperature
(Supply voltage detection series)



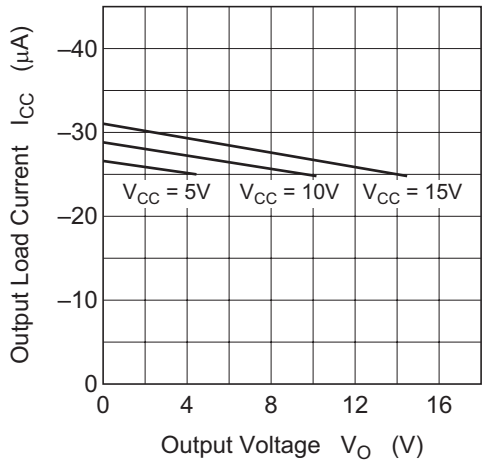
Threshold Operating Voltage
([L] reset type)



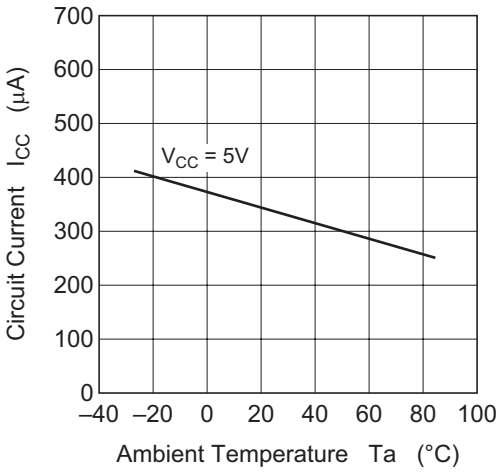
Output Saturation Voltage vs. Output Sink Current



Output Load Current vs. Output Voltage
(M519xxA)



Circuit Current vs. Ambient Temperature
(M51943B, M51944B)



Example of Application Circuit

Reset Circuit of M5194xx Series

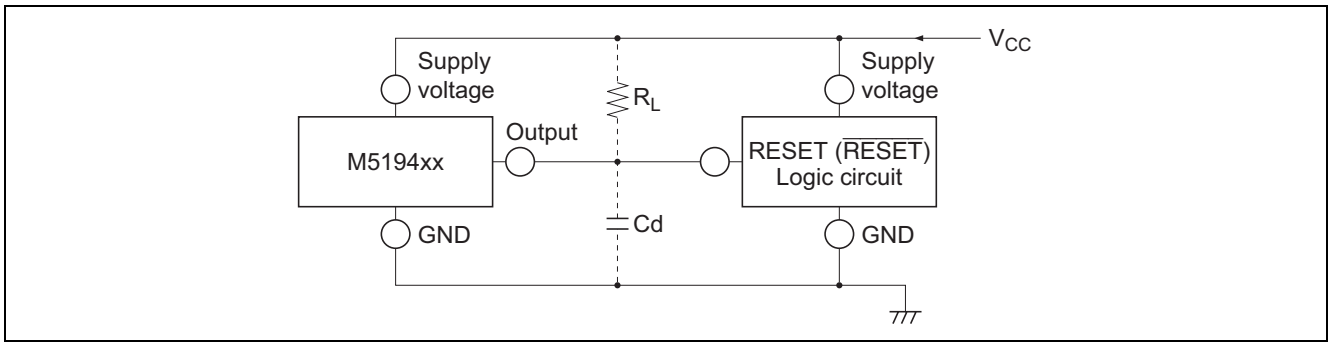


Figure 1 Reset Circuit of M5194xx Series

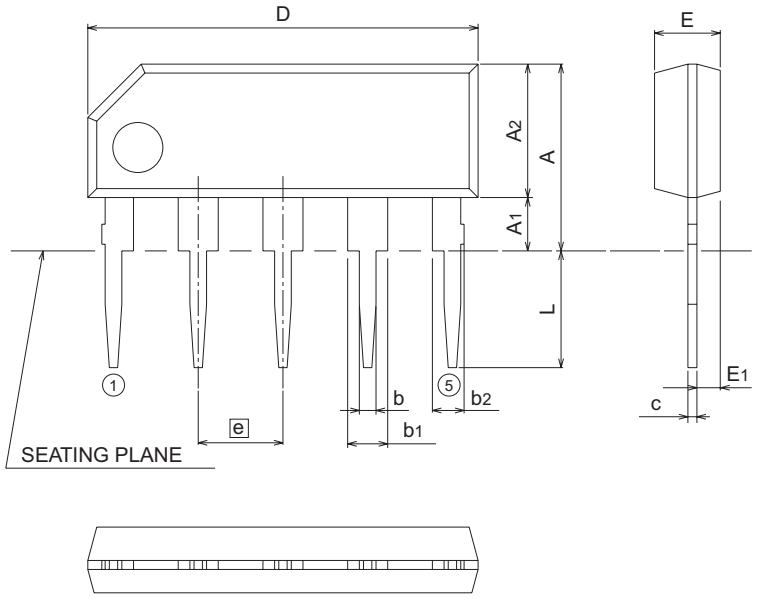
Notes:
1. When the detecting supply voltage is 4.25 V, M51943 and M51944 are used. When the voltage is anything except 4.25 V, M51945 and M51946 are used.
2. If the M5194xx and the logic circuit share a common power source, type A (built-in load type) can be used whether a pull-up resistor is included 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 Cd 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.

Package Dimensions

5P5T

Plastic 5pin 240mil SIP

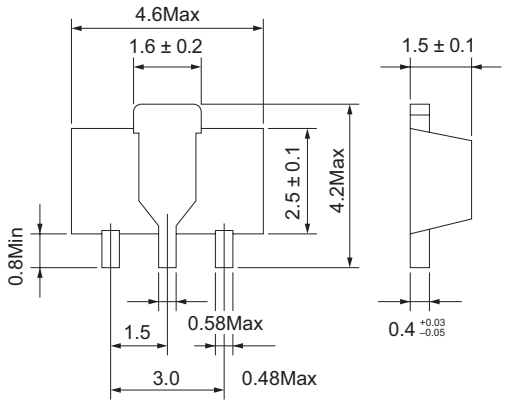
EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SIP5-P-240-2.54	–	0.22	Cu Alloy



Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	6.1
A_1	1.4	–	–
A_2	–	4.0	–
b	0.4	0.5	0.6
b_1	1.1	1.2	1.5
b_2	0.75	0.85	1.15
c	0.22	0.27	0.34
D	11.5	11.7	11.9
E	1.77	1.97	2.17
E_1	0.6	0.7	0.8
e	–	2.54	–
L	3.0	–	–

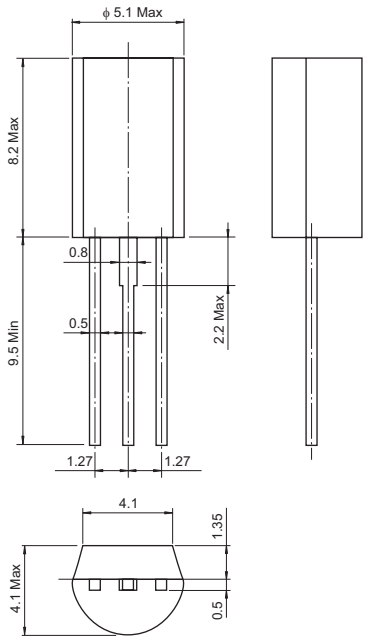
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SC-62	PLZZ0004CB-A	TSOT89	0.48g

Unit: mm



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

Unit: mm



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