

Product Catalog

Amplifiers, Timer ICs, ASSPs

2022



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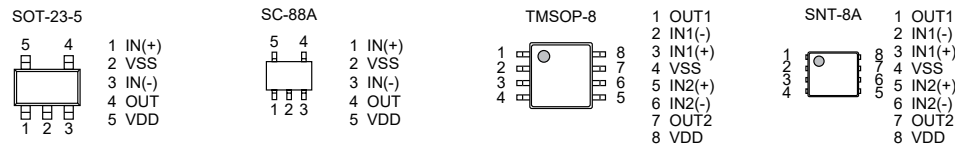
S-89430/89431 Series

1 circuit/2 circuits
0.5 μ A Rail-to-Rail CMOS OPERATIONAL AMPLIFIER

Features

- Lower operating voltage than the conventional general-purpose: $V_{DD} = 0.9\text{ V to }5.5\text{ V}$
- Low current consumption (per circuit): $I_{DD} = 0.5\ \mu\text{A Typ.}$
- Wide I/O voltage range (Rail-to-Rail): $V_{CMR} = V_{SS}\text{ to }V_{DD}$
- Low input offset voltage: $V_{IO} = 10.0\text{ mV Max. (S-89430 Series)}$
 $V_{IO} = 5.0\text{ mV Max. (S-89431 Series)}$
- No external capacitors required for internal phase compensation
- Lead-free, Sn 100%, halogen-free*1

*1. Refer to "■ Product Name Structure" for details.



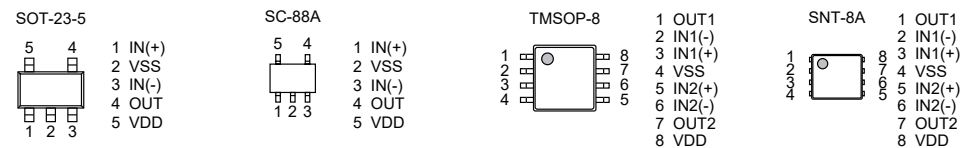
S-89110/89120 Series

1 circuit/2 circuits
CMOS OPERATIONAL AMPLIFIER

Features

- Lower operating voltage than the conventional general-purpose: $V_{DD} = 1.8\text{ V to }5.5\text{ V}$
- Low current consumption (per circuit): $I_{DD} = 50\ \mu\text{A (S-89110 Series)}$
 $I_{DD} = 10\ \mu\text{A (S-89120 Series)}$
- Low input offset voltage: 4.0 mV max.
- No external capacitors required for internal phase compensation
- Output full swing
- Lead-free, Sn 100%, halogen-free*1

*1. Refer to "■ Product Name Structure" for details.



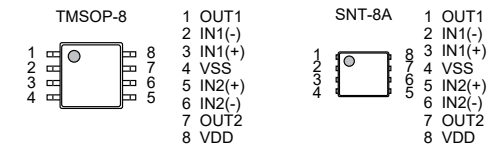
S-89130/89140 Series

2 circuits
CMOS OPERATIONAL AMPLIFIER

Features

- Lower operating voltage : $V_{DD} = 2.7\text{ V to }5.5\text{ V}$
- Low current consumption (per circuit) : $I_{DD} = 1.00\text{ mA typ. (S-89130 Series, }V_{DD} = 5.0\text{ V)}$
 $I_{DD} = 0.27\text{ mA typ. (S-89140 Series, }V_{DD} = 5.0\text{ V)}$
- Low input offset voltage : $V_{IO} = 6.0\text{ mV max. (S-89130 Series)}$
 $V_{IO} = 7.0\text{ mV max. (S-89140 Series)}$
- Operational temperature range : $-40^{\circ}\text{C to }+125^{\circ}\text{C}$
- No external capacitors required for internal phase compensation
- Lead-free (Sn 100%), halogen-free*1

*1. Refer to "■ Product Name Structure" for details.

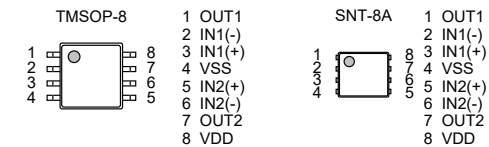


S-89713 Series

2 circuits
LOW INPUT OFFSET VOLTAGE CMOS OPERATIONAL AMPLIFIER

Features

- Low input offset voltage: $V_{IO} = 10\ \mu\text{V max. (Ta = }+25^{\circ}\text{C)}$
- Operation power supply voltage range: $V_{DD} = 2.65\text{ V to }5.50\text{ V}$
- Low current consumption: $I_{DD} = 165\ \mu\text{A typ. (Per circuit, Ta = }+25^{\circ}\text{C)}$
 $I_{DD} = 330\ \mu\text{A typ. (2 circuits, Ta = }+25^{\circ}\text{C)}$
- Internal phase compensation: No external parts required
- Rail-to-Rail input and output
- Operation temperature range: $T_a = -40^{\circ}\text{C to }+85^{\circ}\text{C}$
- Lead-free (Sn 100%), halogen-free

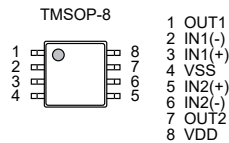


S-89630A

2 circuits 125°C OPERATION,
LOW INPUT OFFSET VOLTAGE CMOS OPERATIONAL AMPLIFIER

Features

- Low input offset voltage: $V_{IO} = +50 \mu\text{V max.}$ ($T_a = -40^\circ\text{C to } +125^\circ\text{C}$)
- Low input offset voltage drift: $\frac{\Delta V_{IO}}{\Delta T_a} = \pm 25 \text{ nV}/^\circ\text{C typ.}$ ($V_{DD} = 30.0 \text{ V, } T_a = -40^\circ\text{C to } +125^\circ\text{C}$)
- Operation power supply voltage range: $V_{DD} = 4.0 \text{ V to } 36.0 \text{ V}$ (Single supply)
 $V_{DD} = \pm 2.0 \text{ V to } \pm 18.0 \text{ V}$ (Dual supply)
- Low current consumption (Per circuit): $I_{DD} = 250 \mu\text{A typ.}$
- Low input noise voltage: $V_{NOISE_pp} = 0.8 \mu\text{Vpp typ.}$ ($f = 0.1 \text{ Hz to } 10 \text{ Hz}$)
- Low input noise voltage density: $V_{NOISE} = 25 \text{ nV}/\sqrt{\text{Hz typ.}}$ ($f = 1 \text{ kHz}$)
- Built-in output current limit circuit: Overcurrent limit when output pin is short-circuited
- Internal phase compensation: No external parts required
- Rail-to-Rail input and output
- Operation temperature range: $T_a = -40^\circ\text{C to } +125^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free



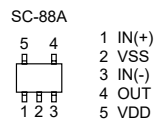
S-89530A/89531A Series

1 circuit
0.7 μA Rail-to-Rail CMOS COMPARATOR

Features

- Can be driven lower voltage than existing general-purpose comparators: $V_{DD} = 0.9 \text{ V to } 5.5 \text{ V}$
- Low current consumption: $I_{DD} = 0.7 \mu\text{A (Typ.)}$
- Rail-to-Rail wide input and output voltage range: $V_{CMR} = V_{SS} \text{ to } V_{DD}$
- Low input offset voltage: 5.0 mV max.
- Lead-free, Sn100%, halogen-free^{*1}

*1. Refer to "■ Product Code List" for details.



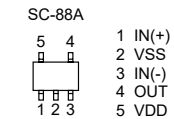
S-89210/89220 Series

1 circuit
CMOS COMPARATOR

Features

- Lower operating voltage than the conventional general-purpose: $V_{DD} = 1.8 \text{ V to } 5.5 \text{ V}$
- Low current consumption: $I_{DD} = 50 \mu\text{A Typ.}$ (S-89210 Series)
 $I_{DD} = 10 \mu\text{A Typ.}$ (S-89220 Series)
- Low input offset voltage: 4.0 mV Max.
- Lead-free, halogen-free^{*1}

*1. Refer to "■ Product Name Structure" for details.



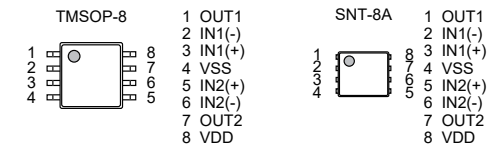
S-89230/89240 Series

2 circuits
CMOS COMPARATOR

Features

- Lower operating voltage than the conventional general-purpose: $V_{DD} = 1.8 \text{ V to } 5.5 \text{ V}$
- Low current consumption (per circuit): $I_{DD} = 23 \mu\text{A Typ.}$ (S-89230 Series)
 $I_{DD} = 5 \mu\text{A Typ.}$ (S-89240 Series)
- Low input offset voltage: 4.0 mV Max.
- Output full swing
- A dual comparator (with 2 circuits)
- Lead-free, Sn 100%, halogen-free^{*1}

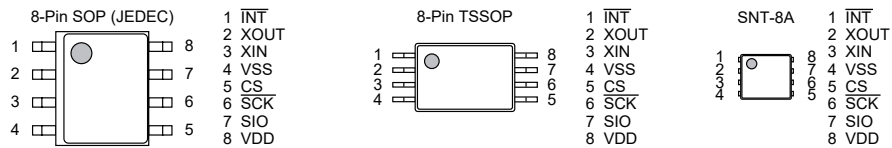
*1. Refer to "■ Product Name Structure" for details.



S-35190A**3-WIRE REAL-TIME CLOCK****Features**

- Low current consumption: 0.25 μ A typ. ($V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in free user register
- 3-wire (MICROWIRE) CPU interface
- Built-in alarm interrupter
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant-voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free, Sn 100%, halogen-free^{*1}

*1. Refer to "■ Product Name Structure" for details.

**S-35391A****2-WIRE REAL-TIME CLOCK****Features**

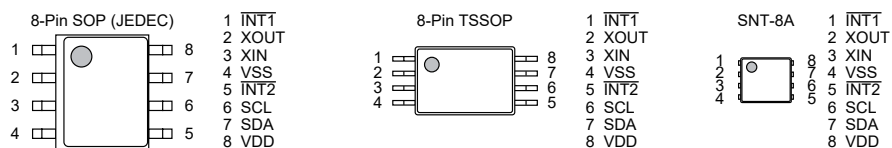
- Low current consumption: 0.25 μ A typ. ($V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in free user register
- 2-wire (I²C-bus) CPU interface
- Built-in alarm interrupter
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free, Sn 100%, halogen-free^{*1}

*1. Refer to "■ Product Name Structure" for details.

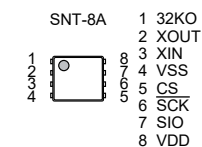
**S-35390A****2-WIRE REAL-TIME CLOCK****Features**

- Low current consumption: 0.25 μ A typ. ($V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in free user register
- 2-wire (I²C-bus) CPU interface
- Built-in alarm interrupter
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free, Sn 100%, halogen-free^{*1}

*1. Refer to "■ Product Name Structure" for details.

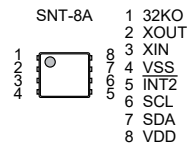
**S-35192A****3-WIRE REAL-TIME CLOCK****Features**

- Low current consumption: 0.45 μ A typ. ($V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Constant output of 32.768 kHz clock pulse (Nch open-drain output)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in free user register
- 3-wire (MICROWIRE) CPU interface
- Built-in alarm function
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free (Sn 100%), halogen-free

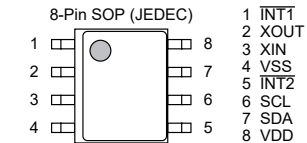


S-35392A**2-WIRE REAL-TIME CLOCK****● Features**

- Low current consumption: 0.45 μA typ. ($V_{\text{DD}} = 3.0 \text{ V}$, $T_a = +25^\circ\text{C}$)
- Constant output of 32.768 kHz clock pulse (Nch open-drain output)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in free user register
- 2-wire (I²C-bus) CPU interface
- Built-in alarm interrupter
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free (Sn 100%), halogen-free

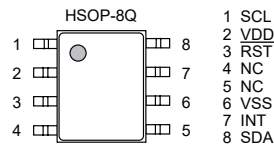
**S-35399A03****2-WIRE REAL-TIME CLOCK****● Features**

- Low current consumption: 0.34 μA typ. ($V_{\text{DD}} = 3.0 \text{ V}$, $T_a = +25^\circ\text{C}$)
- Wide range of operating voltage: 1.3 V to 5.5 V
- Built-in clock correction function
- Built-in 24-bit binary up counter
- Built-in free user register
- 2-wire (I²C-bus) CPU interface
- Built-in alarm interrupter
- Built-in flag generator during detection of low power voltage or at power-on
- Auto calendar up to the year 2099, automatic leap year calculation function
- Built-in constant voltage circuit
- Built-in 32.768 kHz crystal oscillation circuit (built-in C_d , external C_g)
- Lead-free (Sn 100%), halogen-free

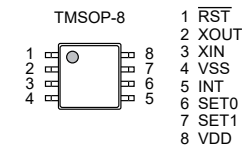


S-35710M**PROGRAMMABLE WAKE-UP TIMER IC
WITH BUILT-IN QUARTZ CRYSTAL****● Features**

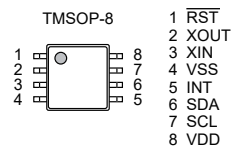
- Built-in 32.768 kHz quartz crystal
- Wake-up function (Alarm interrupt function): Settable on the second time scale from 1 second to 194 days (Approximately half a year)
- Low current consumption: 0.25 μ A typ. ($V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operation voltage: 1.8 V to 5.5 V
- 2-wire (I²C-bus) CPU interface
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

**S-35720 Series****PIN-SELECTABLE WAKE-UP TIMER IC****● Features**

- Wake-up function (Alarm interrupt function): Settable wake-up time (interrupt time) Selectable as the option on the second time scale from 1 second to 194 days (Approximately half a year)
- Low current consumption: 0.2 μ A typ. (Quartz crystal: $C_L = 6.0$ pF, $V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operation voltage: 1.8 V to 5.5 V
- Built-in 32.768 kHz crystal oscillation circuit
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

**S-35710 Series****PROGRAMMABLE WAKE-UP TIMER IC****● Features**

- Wake-up function (Alarm interrupt function): Settable on the second time scale from 1 second to 194 days (Approximately half a year)
- Low current consumption: 0.2 μ A typ. (Quartz crystal: $C_L = 6.0$ pF, $V_{DD} = 3.0$ V, $T_a = +25^\circ\text{C}$)
- Wide range of operation voltage: 1.8 V to 5.5 V
- 2-wire (I²C-bus) CPU interface
- Built-in 32.768 kHz crystal oscillation circuit
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

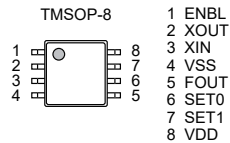


S-35730

PIN-SELECTABLE INTERVAL TIMER IC

● Feature

- Interval signal output function (Clock pulse output function): Selectable interval signal (clock pulse frequency), with an output control pin
- Low current consumption: 4.0 μA typ. (Quartz crystal: $C_L = 6.0 \text{ pF}$, $V_{DD} = 3.0 \text{ V}$, ENBL pin = "H", $T_a = +25^\circ\text{C}$, FOUT pin output = 32.768 kHz)
- Wide range of operation voltage: 1.8 V to 5.5 V
- Built-in 32.768 kHz crystal oscillation circuit
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

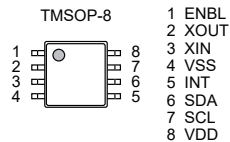


S-35740

PROGRAMMABLE INTERVAL TIMER IC

● Features

- Interval signal output function: (Fixed-cycle interrupt signal output function): Settable interval signal frequency and duty ratio, with an output control pin
- Low current consumption: 0.2 μA typ. (Quartz crystal: $C_L = 6.0 \text{ pF}$, $V_{DD} = 3.0 \text{ V}$, ENBL pin = "H", $T_a = +25^\circ\text{C}$)
- Wide range of operation voltage: 1.8 V to 5.5 V
- 2-wire (I²C-bus) CPU interface
- Built-in 32.768 kHz crystal oscillation circuit
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

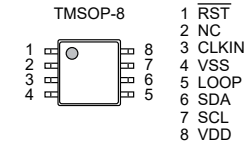


S-35770

COUNTER IC WITH 2-WIRE (I²C-bus) INTERFACE

● Features

- External clock signal count function: Countable from 0 to 16,777,215, with output pin for counter loop flag
- Low current consumption: 0.01 μA typ. ($V_{DD} = 3.0 \text{ V}$, $T_a = +25^\circ\text{C}$, out of communication (CLKIN pin = 0 V))
- Wide range of operation voltage: 1.5 V to 5.5 V
- 2-wire (I²C-bus) CPU interface
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

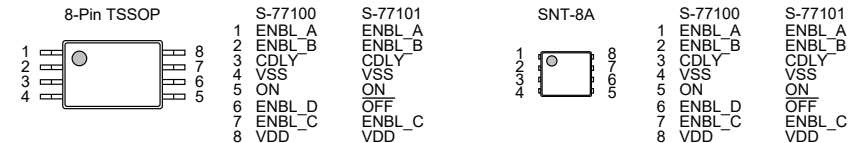


S-77100/77101 Series

POWER SEQUENCER

● Features

- Easy support for sequencing of multiple power supplies.
- Delay time can be set by the external capacitor.
- Sequence operations of 4 channels can be controlled by 1 input signal. (S-77100 Series)
- On-sequence operation and off-sequence operation can be controlled by the separate input signal. (S-77101 Series)
- Enable output can be increased by cascade connection.
- Low current consumption: 3.0 μA typ. (Off period, power-good period, $V_{DD} = 3.3 \text{ V}$, $T_a = +25^\circ\text{C}$)
- Wide range of operation voltage: 2.2 V to 5.5 V
- Operation temperature range: $T_a = -40^\circ\text{C}$ to $+85^\circ\text{C}$
- Output form is selectable: CMOS output, Nch open-drain output
- Output logic is selectable: Active "H", active "L"



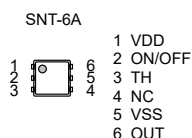
S-8471 Series

WIRELESS POWER
RECEIVER CONTROL IC

● Features

- Current consumption:

During operation:	$I_{SS1} = 30 \mu\text{A typ.}$
During power-off:	$I_{SS2} = 1.0 \mu\text{A max.}$
- Overvoltage detection voltage range: 4.00 V to 5.50 V, selectable in 50 mV step
- Overvoltage detection accuracy: $\pm 2.0\%$
- ON / OFF pin control logic is selectable: Active "H", active "L"
- ON / OFF pin internal resistor connection is selectable: Unavailable, pull-up, pull-down
- Built-in ON / OFF circuit
- Over temperature protection function: Available by connecting a thermistor to the TH pin.
- Operation temperature range: $T_a = -40^\circ\text{C to } +85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free



S-8473 Series

WIRELESS POWER
RECEIVER CONTROL IC WITH CHARGE FUNCTION

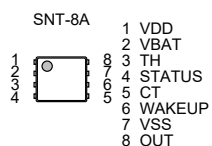
● Features

- Power supply voltage: $V_{DD} = 2.2 \text{ V to } 5.0 \text{ V}$
- Current consumption during charge operation: $I_{SS1} = 250 \mu\text{A typ.}$
- VBAT pin current consumption during power-down: $I_{PDN} = 1.0 \mu\text{A max.}$
- UVLO detection voltage: $V_{UVLO-} = 2.0 \text{ V typ.}$
- Charge function to a small lithium-ion rechargeable battery

Charge current:	$I_{LIM} = 33 \text{ mA typ.}$
Precharge current:	$I_{PRE} = 3.3 \text{ mA typ.}$
Precharge completion voltage:	2.4 V to 3.4 V (50 mV step)
Charge completion voltage:	4.0 V to 4.5 V (50 mV step)
Recharge start voltage:	3.6 V to 4.45 V ^{*1}
Short-circuit detection voltage:	1.5 V to 2.0 V (50 mV step)
Charge timer function:	The charge operation stops after the elapse of 4.0 hours. ($C_{CT} = 4.7 \text{ nF}$) The time is settable by connecting an external capacitor to the CT pin.
- High temperature / low temperature protection function: Available by connecting a thermistor to the TH pin.
- Status display function: Available by connecting an external LED to the STATUS pin.

During charge operation:	Lighting
During charge operation stop:	Lights-out
During error detection:	Blinking
- Operation temperature range: $T_a = -40^\circ\text{C to } +85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

*1. Recharge start voltage = charge completion voltage – charge hysteresis voltage
(The charge hysteresis voltage can be selected from a range of 0.05 V to 0.40 V in 50 mV step.)



S-8474 Series

WIRELESS POWER
TRANSMITTER CONTROL IC

● Features

- Power supply voltage: $V_{DD} = 4.5 \text{ V to } 6.5 \text{ V}$
- Current consumption:

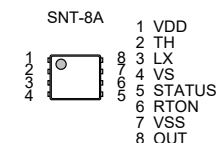
During operation:	$I_{SS1} = 200 \mu\text{A typ.}$
During standby:	$I_{STB} = 3.0 \mu\text{A max.}$
- UVLO detection voltage: $V_{UVLO-} = 4.1 \text{ V typ.}$
- t_{ON} time is settable by connecting an external resistor to the RTON pin.
- Power saving is possible by intermittent operation during standby time of a receiver module.

Active time:	$t_{ACT} = 5.0 \text{ ms typ.}$
Sleep time:	$t_{SLEEP} = 25.0 \text{ ms typ.}$
- TH pin detection voltage is selectable: 0.667 V, 0.577 V, 0.500 V, 0.429 V, 0.370 V
- Built-in reception detection circuit
- Status display function: Available by connecting an external LED to the STATUS pin.

Continuous operation mode:	Lighting
Intermittent operation mode:	Lights-out
High temperature protection mode:	Blinking

 Available by connecting a thermistor to the TH pin.

Operation temperature range:	$T_a = -40^\circ\text{C to } +85^\circ\text{C}$
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- Over temperature protection function:
- Operation temperature range: $T_a = -40^\circ\text{C to } +85^\circ\text{C}$
- Lead-free (Sn 100%), halogen-free

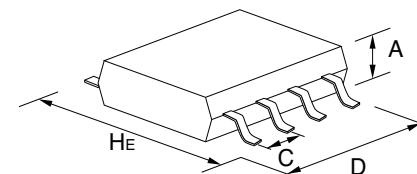


Package List

Package Type	Pin Count	Package Name	Package Size (mm)			Pitch (mm)
			H _E	D	A (max.)	C
Lead insertion type	3	TO-92	7.0	5.2	4.2	2.5/1.27
	3	TO-92S	4.95	4.1	1.62	2.5/1.27
Flat-lead type	3	SOT-89-3	4.0	4.5	1.6	1.5
	5	SOT-89-5	4.5	4.5	1.6	1.5
Gull-wing type	4	SC-82AB	2.1	2.0	1.1	1.3
	5	SC-88A	2.1	2.0	1.1	0.65
	3	SOT-23-3	2.8	2.9	1.3	1.9
	3	SOT-23-3S	2.8	2.9	1.2	1.9
	3	TSOT-23-3S	2.85	2.9	0.8	1.9
	5	SOT-23-5	2.8	2.9	1.3	0.95
	6	SOT-23-6	2.8	2.9	1.35	0.95
	6	SOT-23-6W	2.8	2.9	1.3	0.95
	8	8-Pin SOP (JEDEC)	6.0	5.02	1.75	1.27
	8	8-Pin TSSOP	6.4	3.0	1.1	0.65
	8	8-Pin TSSOP	6.4	3.0	1.1	0.65
	16	16-Pin TSSOP	6.4	5.1	1.1	0.65
	20	20-Pin TSSOP	6.4	6.5	1.2	0.65
	24	24-Pin SSOP	7.6	7.9	1.4	0.65
	8	TMSOP-8	4.0	2.9	0.8	0.65
	8	HTMSOP-8	4.0	2.9	0.8	0.65
	16	HTSSOP-16	6.4	5.12	1.1	0.65
	6	HSOP-6	6.0	5.02	1.75	1.91
	8	HSOP-8A	6.0	5.02	1.68	1.27
	8	HSOP-8A	6.0	5.02	1.65	1.27
	8	HSOP-8Q	6.0	5.02	1.68	1.27
	5	TO-252-5S(A)	6.5	6.5	1.4	1.27
	9	TO-252-9S	6.5	6.5	1.4	0.65

Package Type	Pin Count	Package Name	Package Size (mm)			Pitch (mm)
			H _E	D	A (max.)	C
Non-lead type	6	6-Pin HSON(A)	3.0	2.9	0.9	0.95
	6	SON-6C	2.55	1.56	0.65	0.5
	4	SNT-4A	1.6	1.2	0.5	0.65
	6	SNT-6A SNT-6A(H)	1.8	1.57	0.5	0.5
	8	SNT-8A	2.46	1.97	0.5	0.5
	4	HSNT-4(0808)	0.8	0.8	0.4	0.4
	4	HSNT-4(0808)B	0.8	0.8	0.41	0.4
	4	HSNT-4(1010)	1.0	1.0	0.4	0.65
	4	HSNT-4(1010)B	1.0	1.0	0.41	0.65
	6	HSNT-6(1212)	1.2	1.2	0.4	0.4
	6	HSNT-6A	2.46	1.96	0.5	0.5
	6	HSNT-6(2025)	2.46	1.96	0.5	0.5
	8	HSNT-8(1616)	1.6	1.6	0.4	0.4
	8	HSNT-8(2030)	3.0	2.0	0.5	0.5
	6	DFN-6(1414)A	1.4	1.4	0.6	0.5
	6	DFN-6(1518)A	1.8	1.5	0.33	0.5
	8	DFN-8(1616)A	1.6	1.6	0.6	0.4
	8	DFN-8(2030)	3.0	2.0	0.5	0.5
	8	DFN-8(2030)A	3.0	2.0	0.6	0.5
	8	DFN-8(2030)B	3.0	2.0	0.8	0.5

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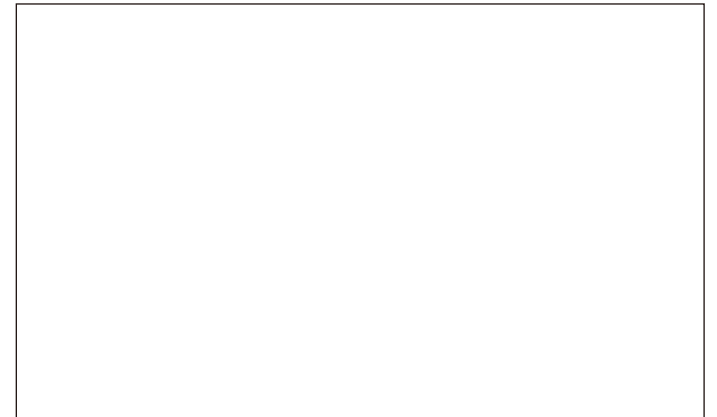
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Released in March 2022

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