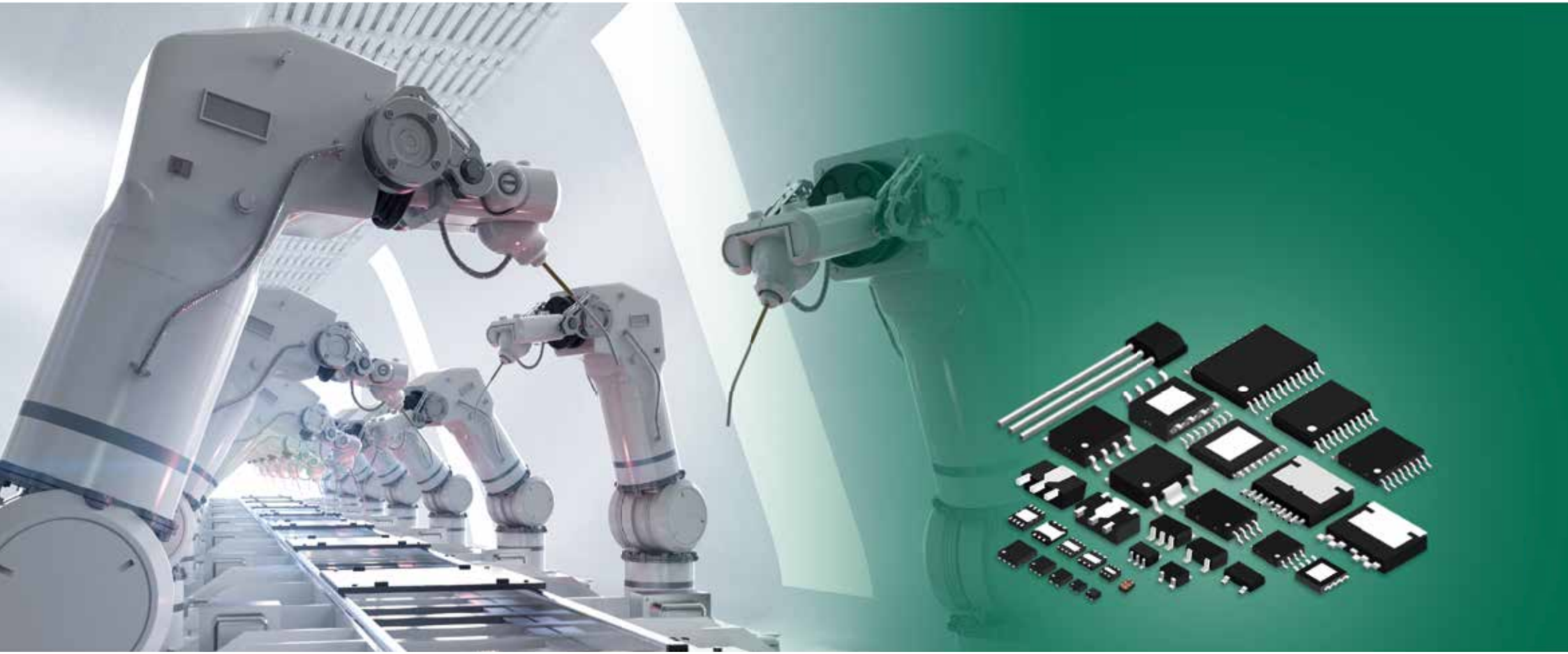
ABLIC
MinebeaMitsumi Group

Product Catalog

Switching Regulators (DC-DC Converters), Boost Charge Pumps, Composite ICs

2023



ABLIC Inc.

Table of Contents

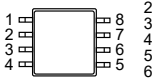
S-8580AA/8580AB/8581AA/8581AB Series

36 V INPUT, 600 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR

Features

- Input voltage: 4.0 V to 36.0 V
- Output voltage (externally set): 2.5 V to 30.0 V (S-8580 Series)
  2.5 V to 12.0 V (S-8581 Series)
- Output current: 600 mA
- FB pin voltage accuracy: ±1.5%
- Efficiency: 91%
- Oscillation frequency: 2.2 MHz typ.
- Overcurrent protection function: 1.2 A typ. (pulse-by-pulse method)
- Thermal shutdown function: 170°C typ. (detection temperature)
- Short-circuit protection function: Hiccup control, Latch control
- 100% duty cycle operation:
- Soft-start function: 5.8 ms typ.
- Under voltage lockout function (UVLO): 3.35 V typ. (detection voltage)
- Input and output capacitors: Ceramic capacitor compat ble
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

HTMSOP-8



1 VIN
2 FB
3 EN
4 NC
5 NC
6 VREG
7 VSS
8 SW

HSNT-8(2030)

1 V N
2 FB
3 EN
4 NC
5 NC
6 VREG
7 VSS
8 SW

HSNT-6(2025)

1 V N
2 FB
3 EN
4 VREG
5 VSS
6 SW

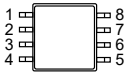
S-8580AC/8580AD/8581AC/8581AD Series

36 V INPUT, 600 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR

Features

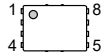
- Input voltage: 4.0 V to 36.0 V
- Output voltage (externally set): 2.5 V to 12.0 V
- Output current: 600 mA
- FB pin voltage accuracy: ±1.5%
- Efficiency: 95%
- Oscillation frequency: 400 kHz typ.
- Overcurrent protection function: 1.2 A typ. (pulse-by-pulse method)
- Thermal shutdown function: 170°C typ. (detection temperature)
- Short-circuit protection function: Hiccup control, Latch control
- 100% duty cycle operation:
- Soft-start function: 5.8 ms typ.
- Under voltage lockout function (UVLO): 3.35 V typ. (detection voltage)
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

HTMSOP-8



1 VIN
2 FB
3 EN
4 NC
5 NC
6 VREG
7 VSS
8 SW

HSNT-8(2030)



1 VIN
2 FB
3 EN
4 NC
5 NC
6 VREG
7 VSS
8 SW

HSNT-6(2025)

1 VIN
2 FB
3 EN
4 VREG
5 VSS
6 SW

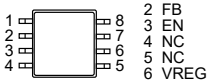
S-8590AA/8590AB/8591AA/8591AB Series

18 V INPUT, 600 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR

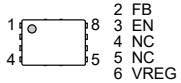
Features

- Input voltage: 4.0 V to 18.0 V
- Output voltage (externally set): 1.0 V to 12.0 V
- Output current: 600 mA
- FB pin voltage accuracy: ±1.5%
- Efficiency: 91%
- Oscillation frequency: 2.2 MHz typ.
- Overcurrent protection function: 1.2 A typ. (pulse-by-pulse method)
- Thermal shutdown function: 170°C typ. (detection temperature)
- Short-circuit protection function: Hiccup control, Latch control
- 100% duty cycle operation:
- Soft-start function: 5.8 ms typ.
- Under voltage lockout function (UVLO): 3.35 V typ. (detection voltage)
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

HTMSOP-8



HSNT-8(2030)



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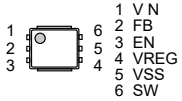


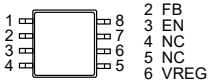
S-8590AC/8590AD/8591AC/8591AD Series

18 V INPUT, 600 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR

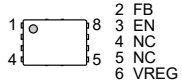
Features

- Input voltage: 4.0 V to 18.0 V
- Output voltage (externally set): 2.5 V to 12.0 V
- Output current: 600 mA
- FB pin voltage accuracy: ±1.5%
- Efficiency: 95%
- Oscillation frequency: 400 kHz typ.
- Overcurrent protection function: 1.2 A typ. (pulse-by-pulse method)
- Thermal shutdown function: 170°C typ. (detection temperature)
- Short-circuit protection function: Hiccup control, Latch control
- 100% duty cycle operation:
- Soft-start function: 5.8 ms typ.
- Under voltage lockout function (UVLO): 3.35 V typ. (detection voltage)
- Input and output capacitors: Ceramic capacitor compat ble
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

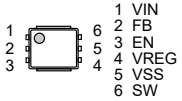
HTMSOP-8



HSNT-8(2030)



HSNT-6(2025)



S-8533 Series

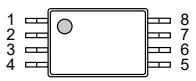
STEP-DOWN, SYNCHRONOUS PWM CONTROL SWITCHING REGULATOR CONTROLLER

Features

- Synchronous rectification system realizing high efficiency (typ. 94%)
- Use at maximum duty ratio = 100% and use of a battery up to maximum life is possible by using P-channel and N-channel power MOS FETs externally.
- Oscillation frequency : 300 kHz typ.
- Input voltage : 2.7 to 16 0 V
- Output voltage : 1.25 V
  1.3 to 6.0 V, selectable in 0.1 V steps
- Output vol age accuracy : ±2.0%
- Soft-start function set by an external capacitor (C_{SS})
- Shutdown function
- Lead-free Sn 100% halogen-free [1]

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

8-Pin TSSOP



1 NC
2 VOUT
3 ON/$\overline{OFF}$
4 CSS
5 VSS
6 NDRV
7 PDRV
8 VIN

S-8520/8521 Series

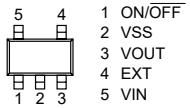
STEP-DOWN, PWM CONTROL or PWM / PFM SWITCHABLE SWITCHING REGULATOR CONTROLLER

Features

- Low current consumption During operation: 60 µA max. (A, B types)
  21 µA max. (C, D types)
  100 µA max. (E, F types)
  During shutdown: 0 5 µA max.
- Input voltage: 2.5 V to 16 V (B, D, F types)
  2.5 V to 10 V (A, C, E types)
- Output voltage: Selectable between 1 5 V and 6 0 V in 0.1 V step
- Duty ratio: 0% to 100% PWM control (S-8520 Series)
  25% to100% PWM / PFM switching control (S-8521 Series)
- External parts are Pch power MOS FET or PNP transistor, coil, diode, and capacitor only (When using PNP transistor, add base resistor and capacitor).
- Oscillation frequency: 180 kHz typ. (A, B types)
  60 kHz typ. (C, D types)
  300 kHz typ. (E, F types)
- Soft-start function: 8 ms. typ. (A, B types)
  12 ms. typ. (C, D types)
  4.5 ms. typ. (E, F types)
- With a shutdown function
- With a built-in overload protection circuit Overload detection time: 4 ms. typ. (A type)
  14 ms. typ. (C type)
  2.6 ms. typ. (E type)
- Lead-free, Sn 100%, halogen-free [1]

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

SOT-23-5



1 ON/$\overline{OFF}$
2 VSS
3 VOUT
4 EXT
5 VIN

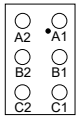
S-85M1A Series (WLP product)

5.6 V INPUT, 200 mA, LOW EMI, SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90 5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5 6 V
- Output voltage: 0.7 V to 2 5 V, in 0.05 V step
  2.6 V to 3 9 V, in 0.1 V step
- Output voltage accuracy: ±1 5% (1 0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1 0 V)
- Switching frequency: 1.0 MHz (at PWM operation)
- High side power MOS FET on-resistance: 360 mΩ
- Low side power MOS FET on-resistance: 250 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 450 mA (at L = 2.2 µH)
- Automatic recovery type short-circuit protection function: Hiccup control
- Discharge shunt function: Unavailable
  (S-85M1A Series B type)
  Available
  (S-85M1A Series C type)
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, halogen-free

WLP-6L



A1 EN
B1 VIN
C1 PVSS
A2 VOUT
B2 VSS
C2 SW

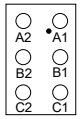
S-85M0A Series (WLP product)

5.6 V INPUT, 50 mA, LOW EMI, SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90.5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5.6 V
- Output voltage: 0.7 V to 2.5 V, in 0 05 V step
  2.6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1.0 V)
- High side power MOS FET on-resistance: 360 mΩ
- Low side power MOS FET on-resistance: 250 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 300 mA (at L = 2.2 µH)
- Automatic recovery type short-circuit protection function: Hiccup control
- Discharge shunt function: Unavailable
  (S-85M0A Series B type)
  Available
  (S-85M0A Series C type)
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free, halogen-free

WLP-6L



A1 EN
B1 V N
C1 PVSS
A2 VOUT
B2 VSS
C2 SW

S-8550 Series

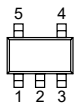
STEP-DOWN, BUILT-IN FET, SYNCHRONOUS RECTIFICATION, PWM CONTROL SWITCHING REGULATORS

Features

- Oscillation frequency: 1.2 MHz
- Input voltage range: 2.0 V to 5 5 V
- Output voltage range: Arbitrarily settable by external output voltage setting resistor
- Output current: 600 mA
- Reference voltage: 0.6 V ±2.0%
- Efficiency: 92%
- Soft-start function: 1 ms typ.
- Shutdown function: Shutdown current consumption : 1.0 µA max.
- Built-in current limit circuit
- Pch power MOS FET on-resistance: 0.4 Ω typ.
- Nch power MOS FET on-resistance: 0.3 Ω typ.
- Constant continuous mode operation (no light load mode)
- Lead-free, Sn 100%, halogen-free [1]

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

SOT-23-5



1 VIN
2 VSS
3 ON/$\overline{OFF}$
4 FB
5 CONT

SNT-8A

1 FB
2 NC
3 VSS
4 ON/$\overline{OFF}$
5 V N
6 PVSS
7 NC
8 CONT

S-85V1A Series

5.5 V INPUT, 200 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 10 µA QUIESCENT CURRENT

Features

- Current consumption: 10 µA quiescent current
- Efficiency: 93%
- Fast transient response: COT control
- Input voltage: 2 2 V to 5.5 V
- Output voltage: 0.7 V to 2.5 V, in 0.05 V step
  2 6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1 0 V)
- Switching frequency: 1 0 MHz (at PWM operation)
- High side power MOS FET on-resistance: 450 mΩ
- Low side power MOS FET on-resistance: 350 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature
- Overcurrent protection function: 450 mA (at L = 2.2 µH)
- Automatic recovery type short-circuit protection function: Hiccup control
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SNT-6A

1 VOUT
2 VSS
3 SW
4 PVSS
5 VIN
6 EN

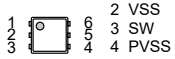
S-85S1A Series

5.5 V INPUT, 200 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90.5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5.5 V
- Output voltage: 0.7 V to 2.5 V, in 0.05 V step
  2.6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1.0 V)
- Switching frequency: 1.0 MHz (at PWM operation)
- High side power MOS FET on-resistance: 420 mΩ
- Low side power MOS FET on-resistance: 320 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 450 mA (at L = 2.2 µH)
- Automatic recovery type short-circuit protection function: Hiccup control
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SNT-6A



1 VOUT
2 VSS
3 SW
4 PVSS
5 VIN
6 EN

S-85S1P Series

SUPPLY VOLTAGE DIVIDED OUTPUT, 5.5 V INPUT, 200 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

DC-DC converter block

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90.5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5.5 V
- Output voltage: 0.7 V to 2.5 V, in 0.05 V step
  2.6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1.0 V)
- Switching frequency: 1.0 MHz (at PWM operation)
- High side power MOS FET on-resistance: 420 mΩ
- Low side power MOS FET on-resistance: 320 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 450 mA (at L = 2.2 µH)
- Automatic recovery type short-circuit protec ion function: Hiccup control
- Input and output capacitors: Ceramic capacitor compatible

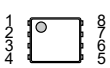
Supply voltage divider block

- Low current consumption: 280 nA typ.
- Input voltage: 1.5 V to 5.5 V
- Output voltage: V_{IN}/2 (S-85S1PCxx)
  V_{IN}/3 (S-85S1PDxx)

Overall

- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SNT-8A



1 PMOUT
2 VOUT
3 VSS
4 SW
5 PVSS
6 VIN
7 EN
8 PMEN

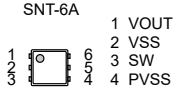
S-85S0A Series

5.5 V INPUT, 50 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90.5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5.5 V
- Output voltage: 0.7 V to 2.5 V, in 0.05 V step
  2.6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1.0 V)
- High side power MOS FET on-resistance: 420 mΩ
- Low side power MOS FET on-resistance: 320 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 300 mA (at L = 2.2 µH)
- Automa ic recovery type short-circuit protection function: Hiccup control
- Input and output capacitors: Ceramic capacitor compatible
- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SNT-6A



S-85S0P Series

SUPPLY VOLTAGE DIVIDED OUTPUT, 5.5 V INPUT, 50 mA SYNCHRONOUS STEP-DOWN SWITCHING REGULATOR WITH 260 nA QUIESCENT CURRENT

Features

DC-DC converter block

- Ultra low current consumption: 260 nA quiescent current
- Efficiency (when under 100 µA load): 90.5%
- Fast transient response: COT control
- Input voltage: 2.2 V to 5.5 V
- Output voltage: 0.7 V to 2.5 V, in 0.05 V step
  2.6 V to 3.9 V, in 0.1 V step
- Output voltage accuracy: ±1.5% (1.0 V ≤ V_{OUT} ≤ 3.9 V)
  ±15 mV (0.7 V ≤ V_{OUT} < 1.0 V)
- High side power MOS FET on-resistance: 420 mΩ
- Low side power MOS FET on-resistance: 320 mΩ
- Soft-start function: 1 ms typ.
- Under voltage lockout function (UVLO): 1.8 V typ. (detection voltage)
- Thermal shutdown function: 135°C typ. (detection temperature)
- Overcurrent protection function: 300 mA (at L = 2.2 µH)
- Automa ic recovery type short-circuit protection function: Hiccup control
- Input and output capacitors: Ceramic capacitor compatible

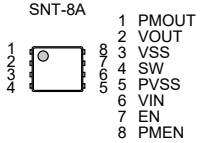
Supply voltage divider block

- Low current consumption: 280 nA typ.
- Input voltage: 1.5 V to 5.5 V
- Output voltage: V_{IN}/2 (S-85S0PCxx)
  V_{IN}/3 (S-85S0PDxx)

Overall

- Operation temperature range: Ta = –40°C to +85°C
- Lead-free (Sn 100%), halogen-free

SNT-8A



S-8355/56/57/58 Series

STEP-UP, SUPER-SMALL PACKAGE, 600 kHz, PWM CONTROL or PWM/PFM SWITCHABLE SWITCHING REGULATOR CONTROLLER

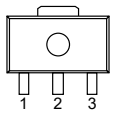
Features

- Low voltage operation : Startup at 0.9 V min. (I_{OUT} = 1 mA) guaranteed
- Low current consumption : During operation 25.9 µA (3.3 V, 100 kHz, typ.)
  During shutdown 0.5 µA (max.)
- Duty ratio : Built-in PWM/PFM switching control circuit (S-8356/58 Series)
  15 to 83% (100 kHz models)
  15 to 78% (250 kHz, 300 kHz, and 600 kHz models)
- External parts : Coil, diode, capacitor, and transistor
- Output voltage : Selectable in 0.1 V steps between 1.5 and 6.5 V (for V_{DD} / V_{OUT} separate types)
  Selectable in 0.1 V steps between 2.0 and 6.5 V (for other than V_{DD} / V_{OUT} separate types)
- Output voltage accuracy : ±2.4%
- Oscillation frequency : 100 kHz, 250 kHz, 300 kHz, 600 kHz selectable

- Soft start function : 6 ms (100 kHz, typ.)
- Shutdown function
- Lead-free, Sn 100%, halogen-free*1

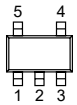
***1.** Refer to "■ **Product Name Structure**" for details.

SOT-89-3



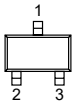
	S-8357/58 B, F, H
1	VSS
2	VOUT
3	EXT

SOT-23-5



	S-8357/58 B, F, H, N	S-8357/58 E, G, J, P	S-8355/56 K, L, M, Q
1	ON/$\overline{OFF}$	VOUT	VOUT
2	VOUT	VDD	VDD
3	NC	NC	ON/$\overline{OFF}$
4	VSS	VSS	VSS
5	EXT	EXT	EXT

SOT-23-3



	S-8357/58 B, F, H
1	VOUT
2	VSS
3	EXT

S-8351/8352 Series

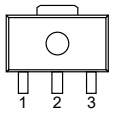
STEP-UP, BUILT-IN / EXTERNAL FET PFM CONTROL SWITCHING REGULATOR / SWITCHING REGULATOR CONTROLLER

Features

- Low voltage operation : Startup at 0.9 V min. (I_{OUT} = 1 mA) guaranteed
- Low current consumption : During operation 23.2 µA (V_{OUT} = 3.3 V, typ.)
  During shutdown 0.5 µA (max.)
- Duty ratio : 50 % / 75 % built-in auto-switching-type PFM control circuit (A, B, and D type)
  75 % built-in fixed-type PFM control circuit (C type)
- External parts : Coil, capacitor, and diode
- Output voltage : Selectable in 0.1 V steps between 2.0 V to 6.5 V (A, B, and C type)
  Selectable in 0.1 V steps between 1.5 V to 6.5 V (D type)
- Output voltage accuracy : ±2.4%
- Shutdown function (A type)
- V_{DD} / V_{OUT} separate type (D type)
- External transistor type available (S-8352 Series)
- Lead-free, Sn 100%, halogen-free*1

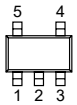
***1.** Refer to "■ **Product Name Structure**" for details.

SOT-89-3



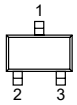
	S-8351C	S-8352C
1	VSS	VSS
2	VOUT	VOUT
3	CONT	EXT

SOT-23-5



	S-8351A	S-8352A	S-8351D	S-8352D
1	ON/$\overline{OFF}$	ON/$\overline{OFF}$	VOUT	VOUT
2	VOUT	VOUT	VDD	VDD
3	NC	NC	NC	NC
4	VSS	VSS	VSS	VSS
5	CONT	EXT	CONT	EXT

SOT-23-3



	S-8351B/C	S-8352B/C
1	VOUT	VOUT
2	VSS	VSS
3	CONT	EXT

S-8353/8354 Series

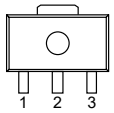
STEP-UP, PWM CONTROL or PWM / PFM SWITCHABLE BUILT-IN TRANSISTOR SWITCHING REGULATOR

Features

- Low voltage operation: Startup at 0.9 V min. (I_{OUT} = 1 mA) guaranteed
- Low current consumption : During operation 18.7 µA (3.3 V, 50 kHz, typ.)
  During shutdown: 0.5 µA (max.)
- Duty ratio : Built-in PWM / PFM switching control circuit (S-8354 Series)
  15 % to 83 % (30 kHz and 50 kHz models)
  15 % to 78 % (250 kHz models)
- External parts : Coil, capacitor, and diode
- Output voltage : Selectable in 0.1 V steps between 1.5 V and 6.5 V (for V_{DD} / V_{OUT} separate types)
  Selectable in 0.1 V steps between 2.0 V and 6.5 V (for other than V_{DD} / V_{OUT} separate types)
- Output voltage accuracy : ±2.4%
- Oscilla ion frequency : 30 kHz, 50 kHz, and 250 kHz selectable
- Soft start function : 6 ms (50 kHz, typ.)
- Lead-free, Sn 100%, halogen-free*1

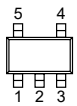
***1.** Refer to "■ **Product Name Structure**" for details.

SOT-89-3



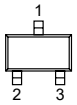
	S-835xA, H
1	VSS
2	VOUT
3	CONT

SOT-23-5



	S-835xA, H	S-835xD, J
1	ON/$\overline{OFF}$	VOUT
2	VOUT	VDD
3	NC	NC
4	VSS	VSS
5	CONT	CONT

SOT-23-3



	S-835xA, C, H
1	VOUT
2	VSS
3	CONT

S-8333 Series

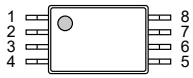
STEP-UP, FOR LCD BIAS SUPPLY, 1-CHANNEL, PWM CONTROL SWITCHING REGULATOR CONTROLLER

Features

- Low voltage operation: 1.8 V to 6.0 V
- Oscillation frequency: 280 kHz to 1.08 MHz (selectable by external resistor)
- Maximum duty: Settable up to 88.5% by external resistor
  47 to 88.5% (oscillation frequency; 500 kHz or more)
  47 to 80% (oscillation frequency; less than 500 kHz)
- Reference voltage: 1.0 V ±1.5%
- Range of operation temperature: –40 to +85 C
- UVLO (under-voltage lockout) function:
  Detection voltage can be selected from between 1.5 V and 2.3 V in 0.1 V step.
  Hysteresis width can be selected from between 0.1 V and 0.3 V in 0.1 V step.
- Timer latch short-circuit protection circuit:
  Delay time can be set using an external capacitor.
- Soft-start function: Soft-start time can be selected in three steps, 10 ms, 15 ms, and 20 ms.
  Both reference voltage control and maximum duty control methods are applied
- Phase compensation external setting:
  Control is possible via the resistor connected between the CC and GND pins and capacitor
- Lead-free, Sn 100%, halogen-free*1

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

8-Pin TSSOP



1	CC
2	FB
3	CSP
4	VIN
5	EXT
6	VSS
7	ROSC
8	RDuty

SNT-8A

1	CC
2	FB
3	CSP
4	VIN
5	EXT
6	VSS
7	ROSC
8	RDuty

S-8337/8338 Series

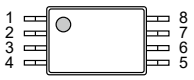
STEP-UP, 1.2 MHz HIGH-FREQUENCY, PWM CONTROL SWITCHING REGULATOR CONTROLLER

Features

- Low voltage operation: 1.8 V to 6.0 V
- Oscillation frequency: 286 kHz to 1.133 MHz (selectable by external resistor)
- Maximum duty: 47 to 88.5% (selectable by external resistor) (S-8337 Series)
  Fixed to 88% typ. (S-8338 Series)
- Reference voltage: 1.0 V±1.5%
- UVLO (under-voltage lockout) function:
  Detection voltage can be selected from between 1.5 V and 2.3 V in 0.1 V steps.
  Hysteresis width can be selected from between 0.1 V and 0.3 V in 0.1 V steps.
- Timer latch short-circuit protection circuit:
  Delay time can be set using an external capacitor.
- Soft-start function: Soft-start time can be selected in three steps, 10 ms, 15 ms, and 20 ms.
- Phase compensation external setting:
  Adjus able by connecting resistor and capacitor in series o GND.
- Shutdown function: S-8338 Series shutdown current consumption: 1 0 µA max.
- Lead-free, Sn 100%, halogen-free*1

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

8-Pin TSSOP



	S-8337	S-8338
1	CC	CC
2	FB	FB
3	CSP	CSP
4	VIN	VIN
5	EXT	EXT
6	VSS	VSS
7	ROSC	ROSC
8	RDuty	ON/$\overline{OFF}$

S-8365/8366 Series

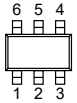
STEP-UP, SUPER-SMALL PACKAGE, 1.2 MHz PWM CONTROL or PWM/PFM SWITCHABLE SWITCHING REGULATOR CONTROLLER

Features

- Low operation voltage : Start at 1.1 V (1 mA) guaranteed (in the product without UVLO function)
- Input voltage range : 1.8 V to 5.5 V
- Oscillation frequency : 1.2 MHz, 600 kHz
- Reference voltage : 0.6 V±2.0%
- Soft start function : 7 ms typ.
- Low current consumption : 70 µA typ. at switching off
- Duty ratio : Built-in PWM / PFM switching control circuit (S-8366 Series)
  28% to 85% (1.2 MHz product)
  28% to 90% (600 kHz product)
- Shutdown function : Current consumption 1.0 µA max. at shutdown
- External parts : Inductor, diode, capacitor, transistor
- Timer latch short-circuit protection circuit : Selectable with / without short-circuit protection circuit for each product
  Settable delay time by external capacitor
  (in the product with short-circuit protection)
- UVLO (under-voltage lockout) function : Selectable with / without UVLO for each product
- Lead-free, Sn 100%, halogen-free [1]

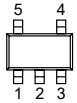
***1.** Refer to "■ **Product Name Structure**" for details.

SOT-23-6



	With Short-Circuit Protection
1	VDD
2	CSP
3	FB
4	ON/$\overline{OFF}$
5	VSS
6	EXT

SOT-23-5



	Without Short-Circuit Protection
1	ON/$\overline{OFF}$
2	VSS
3	EXT
4	VDD
5	FB

SNT-6A

	With Short-Circuit Protection	Without Short-Circuit Protection
1	EXT	EXT
2	VSS	VSS
3	ON/$\overline{OFF}$	ON/$\overline{OFF}$
4	FB	FB
5	CSP	NC
6	VDD	VDD

S-8363 Series

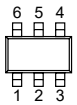
STEP-UP, SUPER-SMALL PACKAGE, 1.2 MHz PWM / PFM SWITCHABLE SWITCHING REGULATOR

Features

- Low operation voltage : Start-up from 0.9 V (I_{OUT} = 1 mA) guaranteed
- Oscillation frequency : 1.2 MHz
- Input voltage range : 0.9 V to 4.5 V
- Output current : 300 mA (V_{IN} = 1 8 V, V_{OUT} = 3.3 V)
- Reference voltage : 0.6 V±2.5%
- Efficiency : 85%
- Soft start function : 1.2 ms typ.
- Low current consumption : During switching-off, 95 µA typ.
- Duty ratio : PWM / PFM switching control
  max.88%
- Power-off function : Current consumption during power-off 3 0 µA max.
- Current limit circuit : limits the peak value of inductor current
- Nch power MOS FET ON resistance : 0.25 Ω typ.
- Start-up function : Operation with fixed duty pulse under the V_{OUT} voltage of 1.4 V or less
- Lead-free, Sn 100%, halogen-free [1]

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

SOT-23-6



1	ON/$\overline{OFF}$
2	VOUT
3	VIN
4	CONT
5	VSS
6	FB

SNT-6A

1	FB
2	VSS
3	CONT
4	VIN
5	VOUT
6	ON/$\overline{OFF}$

S-8821 Series

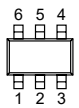
VOLTAGE REGULATION
BOOST CHARGE PUMP DC-DC CONVERTER

Features

- PFM control CMOS boost charge pump
- Power supply voltage: 1.6 to 5.0 V
- Output voltage: 2.5 to 5.5 V, selectable in 0.1 V steps.
- Output voltage accuracy: ±2 % max.
- Built-in soft start circuit: 1.0 ms typ.
- Output current 25 mA (V_{IN}=($V_{OUT(S)}$ × 0.80) V)
- Oscillation frequency: 1.0 MHz typ.
- ON/OFF function: During standby: 1 µA max.
- Lead-free, Sn 100%, halogen-free*1

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

SOT-23-6W



1 VIN
2 C+
3 C-
4 ON/$\overline{OFF}$
5 GND
6 VOUT

SNT-8A

1 C+
2 V N
3 NC
4 VOUT
5 ON/$\overline{OFF}$
6 GND
7 NC
8 C-

S-8424A Series

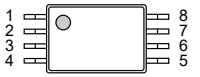
BATTERY BACKUP SWITCHING IC

Features

- Low power consumption
  Normal operation: 15 µA Max. (V_{IN} = 6 V)
  Backup: 2.1 µA Max.
- Voltage regulator
  Output voltage tolerance : ±2 %
  Output voltage: Independently selectable in 0.1 V steps in the range of 2.3 V to 5.4 V
- Three built-in voltage detectors (CS, $\overline{PREEND}$, $\overline{RESET}$)
  Detection voltage precision: ±2 %
  Detection voltage: Selectable in 0.1 V steps in the range of 2.4 V to 5.3 V (CS voltage detector)
  Selectable in 0.1 V steps in the range of 1.7 V to 3.4 V ($\overline{PREEND}$, $\overline{RESET}$ voltage detector)
- Switching circuit for primary power supply and backup power supply configurable on one chip
- Efficient use of backup power supply possible
- Special sequence
  Backup voltage is not output when the primary power supply voltage does not reach the initial voltage at which the switch unit operates.
- Lead-free, Sn 100%, halogen-free *1

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

8-Pin TSSOP



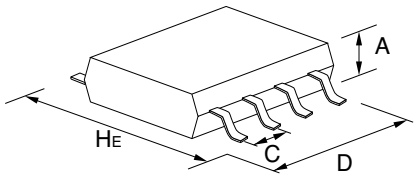
1 $\overline{VSS}$
2 $\overline{PREEND}$
3 VBAT
4 $\overline{CS}$
5 $\overline{RESET}$
6 VOUT
7 V N
8 VRO

Package List

Package Type	Pin Count	Package Name	Package Size (mm)			Pitch (mm)
			HE	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)
			HE	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-6A	2.46	1.96	0.5	0.5
	6	HSNT-6(1212)	1.2	1.2	0.4	0.4
	6	HSNT-6D (HSNT-6(1618))	1.8	1.6	0.4	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

Remark Please contact our sales representatives regarding WLP package products.



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Released in March 2023

ABLIC Inc. i a group company of MinebeaMit umi Inc.

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C1009EJ-03H2303