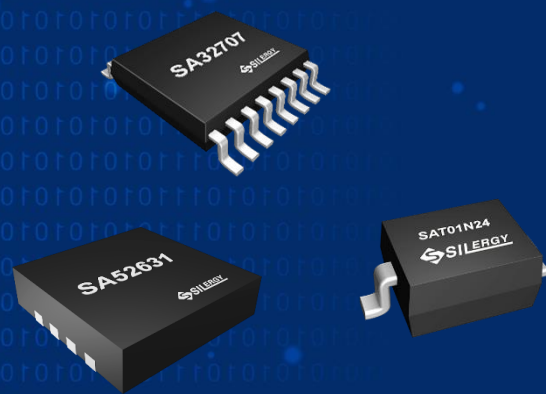


# ***Automotive Solutions***

**Q1 2024  
AEC-Q100 QUALIFIED**



## Typical Applications

### Info/T-BOX/Gateway

- Backlight LED Driver
- Power Supply
- Audio Amplifier
- Battery Gauge
- Light Sensor
- CAN/SBC
- SerDes
- MOS

### ABS/ESC/SDM/EPS

- Power Supply
- Motor Driver
- Half-bridge/Full-bridge Pre-driver
- MCU (ASIL-B/D)
- CAN
- MOS

### BMS, TRACTION, OBC/DCDC

- SiC MOSFET
- Isolated Driver
- Battery Monitoring
- Isolated Power Supply
- Current Sense Amplifier
- MCU (ASIL-B/D)
- CAN

### ADAS

- Power Supply
- High-side Driver
- Power Management IC
- CAN
- MOS
- SerDes

### USB & Wireless Charging

- Power Supply
- ESD Protection
- Wireless Charging
- MCU
- MOS

### Lighting

- Power Supply
- LED Driver
- MCU
- CAN
- ESD Protection

### Body

- Power Supply
- Half-bridge/Full Bridge Driver
- Half-bridge/Full Bridge Pre-drive
- High-side and Low-side Driver
- Electronic Fuse
- MCU
- CAN

### Sensor

- Tire Pressure Monitoring System (TPMS)
- Pressure Sensor
- Temperature Sensor
- Optical Sensor

## Automotive Qualified

### Silergy and Its Supplier Quality System and Certificates

- ISO9001
- ISO14001
- ISO26262
- ISO27001
- ROHS/HF/REACH
- Responsible Business Alliance (RBA)
- IATF 16949 (suppliers)
- ISO17025 (suppliers)
- ISO45001 (suppliers)
- Sony Green Partner

### Quality Control

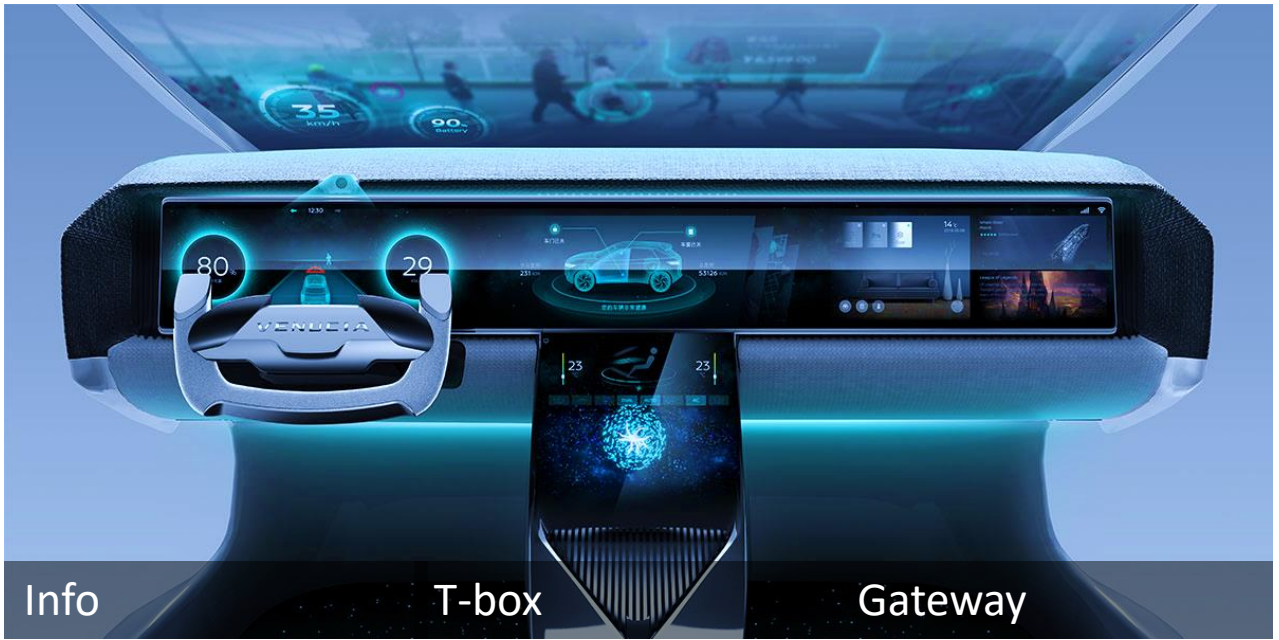
- On-Site Foundry and Assembly Teams
- Daily Short-Term and Long-Term Reliability Monitoring
- Quarterly Supplier Quality Review
- Annual Supplier Audits



|     | Category          | P/N             | Application                  | Feature                                             | Package        | Sampling |
|-----|-------------------|-----------------|------------------------------|-----------------------------------------------------|----------------|----------|
|     | Buck              | SA24401/BFCA    | Info, T-Box, Gateway         | Low I <sub>Q</sub> , 40V, 0.6A Buck                 | SO8E           | ✓        |
|     | Buck              | SA24403FCA      | Info, T-Box, Gateway         | 40V, 3.5A Buck                                      | SO8E           | ✓        |
| NEW | Buck              | SA24406XNQ      | IVI, T-BOX, Gateway          | 36V, 6A Buck                                        | QFN3.5×4-14    | ✓        |
| NEW | Buck              | SA24493TLQ      | IVI, T-BOX, Gateway          | 36V, 3A Buck                                        | QFN2×2-12      | ✓        |
| NEW | Buck              | SA23001ADFD     | Info, T-Box, Gateway         | 5.5V, 1A Buck, with Mode                            | DFN2x2-8       | ✓        |
|     | Buck              | SA23002ADFD     | Info, T-Box, Gateway         | 5.5V, 2A Buck, with Mode                            | DFN2x2-8       | ✓        |
| NEW | Buck              | SA23002B/CDFD   | Info, T-Box, Gateway         | 5.5V, 2A Buck, with PG                              | DFN2x2-8       | ✓        |
|     | Buck              | SA23003ATWD     | Info, T-Box, Gateway         | 5.5V, 3A Buck, with Mode                            | DFN1.4x1.8-6   | ✓        |
| NEW | Buck              | SA23006XHQ      | Info, T-Box, ADAS            | 5.5V, 6A Buck, with PG, Mode, SS                    | QFN2×3-9       | ✓        |
| NEW | Buck              | SA26066WYQ      | Info, T-Box, Gateway         | 7V, 6A Buck                                         | QFN2x3-14      | ✓        |
|     | Buck              | SA33101HSP      | MDC/T-BOX                    | 0.7-5.3V, Buck Controller                           | SSOP18E        | ✓        |
| NEW | Buck              | SA33103QCQ      | MDC/T-BOX                    | VOU <sub>T</sub> :0.7-15V, 60V Sync Buck Controller | QFN4×4-24      | ✓        |
|     | Buck-Boost        | SA22307TVA      | Info, T-Box, Gateway         | 36V, 7A Buck-Boost                                  | QFN5x5-30      | ✓        |
|     | Boost             | SA22115VPA      | Info, T-Box, Gateway         | 16V, 15A Sync-Boost                                 | QFN3x4-15      | ✓        |
|     | LDO               | SA21345AFCA     | Info, T-Box, Body            | 36V, 0.3A LDO                                       | SO8E           | ✓        |
|     | LDO               | SA21345GFAA     | Info, T-Box, Body            | 36V, 0.15A 5V LDO                                   | SO8            | ✓        |
|     | LDO               | SA21340FCA      | Info, T-Box, Body            | 36V, 0.3A LDO, PG                                   | SO8E           | ✓        |
|     | LDO               | SA21340IFCP     | Info, T-Box, Body            | 36V, 0.3A 3.3V LDO, PG                              | SO8E           | ✓        |
| NEW | LDO               | SA21305AUYS     | Automotive BGA SSD           | 3.3V, 1350mA LDO                                    | CSP2.4×2.4 -36 | ✓        |
|     | Protection Switch | SA21816QSQ      | Info, T-Box                  | 18V Protection Switch                               | QFN3x4-20      | ✓        |
| NEW | High side Switch  | SA21803AHTP     | BCM, MDC, Power Distribution | Smart High-Side Power Switch                        | TSOP14E        | ✓        |
|     | Linear Charger    | SA61930QIA      | BUB in T-Box, eCall          | LDO + Linear Charger                                | QFN4x4 16      | ✓        |
|     | Linear Charger    | SA61930BQIA     | BUB in T-Box, eCall          | LDO + Linear Charger                                | QFN4x4 16      | ✓        |
|     | USB Charger       | SA61931QCA      | QC3.0 USB Charger            | QC3.0, DCP, 18W                                     | QFN4x4 24      | ✓        |
|     | PMIC              | SA47302QDQ      | Camera                       | 16V Camera PMIC                                     | QFN3x3-16      | ✓        |
|     | Amplifier         | SA59202DAA      | BUB in T-Box, eCall          | 25V, 12bit Gas Gauge                                | DFN3x3-8       | ✓        |
|     | Amplifier         | SA59101/SA59102 | WPC,OBC,DCDC, EV/HEV         | 26V, Bidirectional Current-sense Amplifier          | SOT363         | ✓        |
|     | ADC               | SA59400FBP      | BMS, Automotive Sensor       | Bidirectional 12bit ADC with Temperature Sensor     | MSOP10         | ✓        |
|     | ADC               | SA59401FBP      | BMS, Automotive Sensor       | Bidirectional 16bit ADC with Temperature Sensor     | MSOP10         | ✓        |
|     | LED Driver        | SA32707HFA      | Lighting                     | 3Ch*150mA Linear Driver                             | TSSOP16E       | ✓        |
|     | LED Driver        | SA32774QJQ      | Lighting                     | 24-channel LED driver for rear light                | QFN7x7-48      | ✓        |
|     | LED Driver        | SA32772LQEQ     | Lighting                     | 12-channel LED driver for rear light                | QFN5x5-32      | ✓        |
|     | Boost/Flyback     | SA32703FAP      | OBC, DCDC, Traction          | 11V 1A Boost/Flyback Controller                     | SO8            | ✓        |
|     | Boost/Flyback     | SA22300FAP      | Lidar,OBC,Traction,BMS       | 36V Boost/Flyback Controller                        | SO8            | ✓        |
|     | Boost/Flyback     | SA22301HOP      | Lidar,OBC,Traction,BMS       | 36V Boost/Flyback Controller                        | SSOP14E        | ✓        |

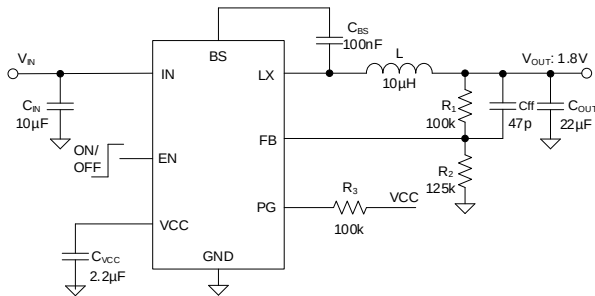
## Selection Guide

|     | Category          | P/N                               | Application                                         | Feature                                                          | Package                         | Sampling |
|-----|-------------------|-----------------------------------|-----------------------------------------------------|------------------------------------------------------------------|---------------------------------|----------|
|     | Motor Driver      | SA52106VAA                        | HVAC, Mirror, BCM                                   | 6x Half-bridge                                                   | QFN5x5-24                       | ✓        |
| NEW | Motor Driver      | SA52106HHP                        | HVAC, Mirror, BCM                                   | 6x Half-bridge                                                   | TSSOP24E                        | ✓        |
|     | Motor Driver      | SA52108HHP                        | HVAC, Mirror, BCM                                   | 8x Half-bridge                                                   | TSSOP24E                        | ✓        |
|     | Motor Driver      | SA52112VAQ                        | HVAC, Mirror, BCM                                   | 12x Half-bridge                                                  | QFN5x5-24                       | ✓        |
|     | Motor Driver      | SA52270FFP                        | Door handle, Door lock, BCM                         | 40V 15A H-bridge                                                 | SOP16                           | ✓        |
|     | Gate Driver       | SA52631DAD                        | WPC, ESP, ABS, BCM                                  | High-side and Low-Side Driver                                    | DFN3x3-8                        | ✓        |
| NEW | Gate Driver       | SA52631FAP                        | WPC, ESP, ABS, BCM                                  | High-side and Low-Side Driver                                    | SOP8                            | ✓        |
|     | ISO DCDC          | SA52731AAT                        | Isolated interface power supply, BMS                | Single 3.3V or 5V Supply                                         | SOT23-5                         | ✓        |
|     | Audio             | SA51023HDA                        | T-Box, Info                                         | High CMRR, Line receiver                                         | TSSOP14                         | ✓        |
|     | Audio             | SA51024HGA                        | T-Box, Info                                         | 10W Class-D AMP                                                  | TSSOP28E                        | ✓        |
|     | Audio             | SA51034HFA                        | T-Box, Info                                         | 8W Class-D AMP                                                   | TSSOP16E                        | ✓        |
|     | Audio             | SA51054HFA                        | T-Box, Info                                         | 22W Class-D AMP                                                  | TSSOP16E                        | ✓        |
|     | Audio             | SA51500HFP                        | T-Box, Info                                         | 8W Class-D Audio Power Amplifier, Load Dump                      | TSSOP16E                        | ✓        |
|     | Audio             | SA51510HFP                        | T-Box, Info                                         | 22W Class-D Audio Power Amplifier, Load Dump                     | TSSOP16E                        | ✓        |
| NEW | Audio             | SA55600HNP                        | Car Audios, Home Audios                             | Mono Audio Digital to Analog Converter                           | TSSOP24                         | ✓        |
|     | Reference         | SA89550AOT                        | BMS,OBC,EV/HEV                                      | 5V Shunt Voltage Reference                                       | SOT-23                          | ✓        |
| NEW | Reference         | SA89550BAOT                       | BMS,OBC,EV/HEV                                      | 4.096V Shunt Voltage Reference                                   | SOT-23                          | ✓        |
|     | Reference         | SA89550CAOT                       | BMS,OBC,EV/HEV                                      | 3.3V Shunt Voltage Reference                                     | SOT-23                          | ✓        |
|     | Reference         | SA89550DAOT                       | BMS,OBC,EV/HEV                                      | 2.5V Shunt Voltage Reference                                     | SOT-23                          | ✓        |
|     | ESD               | SAT01N24AMA                       | ESD Protection                                      | ESD for LIN                                                      | SOD323                          | ✓        |
|     | ESD               | SAT03N24AOA                       | ESD Protection                                      | ESD for CAN                                                      | SOT-23                          | ✓        |
|     | Light Sensor      | SA88010RS22-J00                   | Wiper                                               | Light Sensor-IR                                                  | 2.0x1.5x0.6                     | ✓        |
|     | Light Sensor      | SA88011AS22-J00                   | Body, Cluster, Info                                 | Light Sensor                                                     | 2.0x1.5x0.6                     | ✓        |
|     | BMS AFE           | SA63122GGF                        | BMS                                                 | Stackable 18S Monitor and Passive Cell Balancer with Daisy Chain | TQFP10x10-64E                   | ✓        |
|     | BMS AFE Interface | SA63000HFP                        | BMS, EV/HEV                                         | SPI Interface: 2MHz-6MHz                                         | TSSOP16E                        | ✓        |
| NEW | MCU               | SA32B12QEQ/AQEQ<br>SA32B12GFF/GDF | Roof, Door, Seatbelt, Airbag, BCM, EPB, Lighting    | 1xM4F, 120MHz, Flash 128KB, 2xCAN                                | QFN32 /LQFP7x7-48 /LQFP10x10-64 | ✓        |
|     | MCU               | SA32B14GFF/GDF                    |                                                     | 1xM4F, 120MHz, Flash 256KB, 3xCAN                                | LQFP7x7-48 /LQFP10x10-64        | ✓        |
|     | MCU               | SA32B16GDF/GEF                    | Smart Cockpit, HVAC, T-BOX, OBC, BMS, BCM, Lighting | 1xM4F, 120MHz, Flash 512KB, 3xCAN                                | LQFP10x10-64 /LQFP14x14-100     | ✓        |



Low Quiescent Current 4.25V-40V Input,  
0.6A Output Current Synchronous Step Down Regulator

SA24401/SA24401B



## Features

- Low  $R_{DS(ON)}$  for Internal Switches (Top/Bottom): 225mΩ/150mΩ
- 4.25V to 40V Input Voltage Range
- 0.6A Output Current Capability
- Low Quiescent Current:
  - SA24401: 5µA
  - SA24401B: 1.8µA
- Switching Frequency:
  - SA24401: 500kHz
  - SA24401B: 2.1MHz
- Internal Soft-start Limits the Inrush Current
- Short Circuit Protection
- Thermal Shutdown and Auto Recovery
- Power Good Indicator
- Compact Package: SO8E
- Automotive AEC- Q100 Grade 1 certified

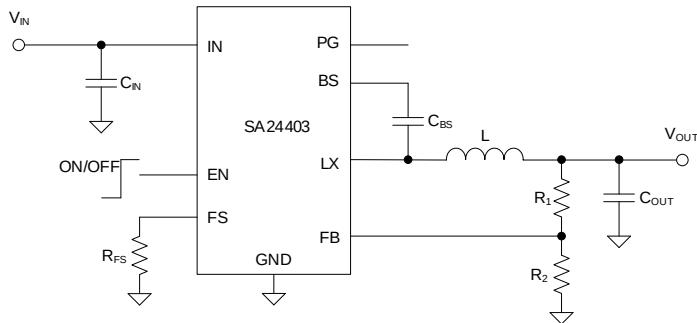
## Applications

- Info, T-box, Gateway, EPS, ETC

## Buck Regulators

### SA24403

### 4.2V-40V Input , 3.5A High Efficiency Fast Response Synchronous Step Down Regulator



## Features

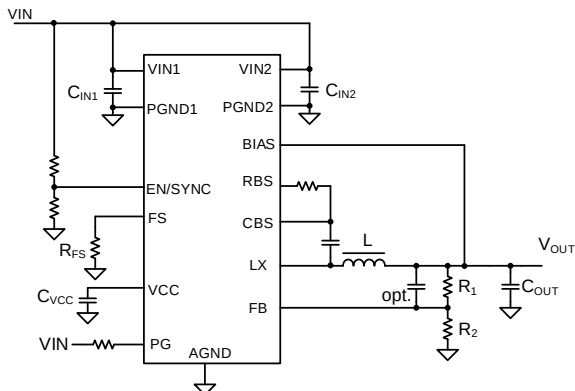
- Low  $R_{DS(ON)}$  for Internal Switches (Top/Bottom): 115/80mΩ
- 4.2-40V Input Voltage Range
- Internal Compensation
- Internal 1ms Soft-start Limits the Inrush Current
- Adjustable Switching Frequency Range: 300kHz to 2.2MHz
- 3.5A Output Current Capability
- $\pm 2\%$  0.6V Reference Over  $-40^{\circ}\text{C} \sim 125^{\circ}\text{C}$
- Cycle-by-cycle Peak Current Limitation
- Short Circuit Protection
- Thermal Shutdown and Auto Recovery
- RoHS Compliant and Halogen Free
- Compact Package: SO8E
- Automotive AEC- Q100 Grade 1 Qualified

## Applications

- Info, T-box, Gateway, EPS, ETC
- OBC, DCDC, ABS, ESC
- Cluster
- Lighting

## 36V Input, 6A Synchronous Step Down Regulator

## SA24406



## Features

- 4 to 36V Input Voltage Range
- 6A Output Current Capability
- Low  $R_{DS(ON)}$  for Internal Switches (Top/Bottom): 41/21 mΩ
- Typical 30uA Quiescent Current and 1uA Shutdown Current
- 300kHz to 2.2MHz Switching Frequency
- Synchronizes to External Clock
- Spread Spectrum function
- Hic-Cup Mode Output Short Circuit Protection
- EN ON/OFF Control with Accurate Threshold
- Cycle-by-Cycle Peak Current Limit
- Power Good Indicator
- $1V \pm 1\%$  Reference Voltage Over  $-40^{\circ}C$  to  $150^{\circ}C$  Temperature Range
- Package: QFN3.5×4-14
- Automotive AEC- Q100 Grade 1 Qualified

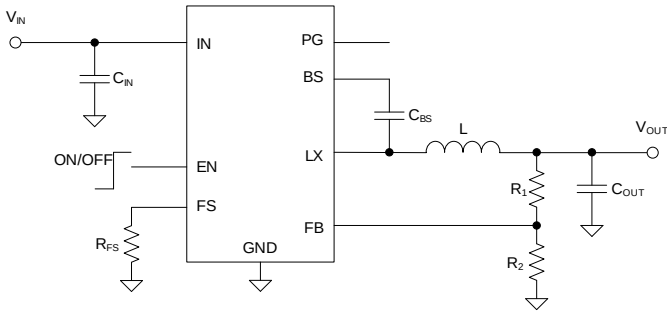
## Applications

- IVI
- T-BOX
- Gateway

## Buck Regulators

### SA24493

### 36V Input, 3A Synchronous Step Down Regulator



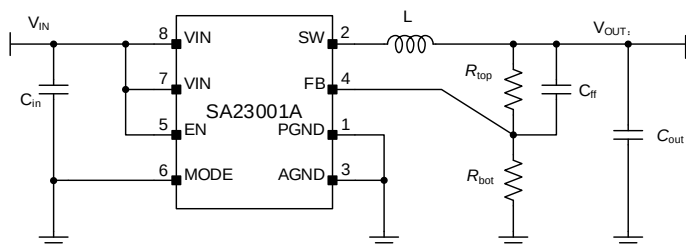
## Features

- 4.15-36V Input Voltage Range
- Low  $R_{DS(ON)}$  for Internal Switches (Top/Bottom): 113/70 m $\Omega$
- Internal Compensation
- Internal 1ms Soft-start Limits the Inrush Current
- Adjustable Switching Frequency Range: 300kHz to 2.2MHz
- 3A Output Current Capability
- $\pm 2\%$  0.6V Reference Over  $-40^{\circ}\text{C} \sim 125^{\circ}\text{C}$
- Cycle-by-Cycle Peak Current Limitation
- Short Circuit Protection
- Spread Spectrum Function
- Thermal Shutdown and Auto Recovery
- RoHS Compliant and Halogen Free
- Compact Package: QFN2 $\times$ 2-12
- AEC-Q100 Qualified

## Applications

- IVI
- T-BOX
- Gateway

## 2.8V-5.5V Input, 1A Single Synchronous Buck Converter



## Features

- 2.8V to 5.5V Input Voltage Range
- Up to 1A Output Current
- External Adjustable Voltage with  $\pm 1.5\%$  Reference Accuracy
- $1\mu\text{A}$  Shutdown Current (Typical)
- Fixed 2.35MHz Switching Frequency Minimizes Required External Components
- Selectable PWM and PFM Operating Modes
- 100% Duty-Cycle Capable
- Cycle-by-Cycle Current-Limit Protection
- Hiccup-Mode Short-Circuit Protection
- Thermal Shutdown
- Package: DFN2 $\times$ 2-8
- Automotive AEC- Q100 Grade 1 certified

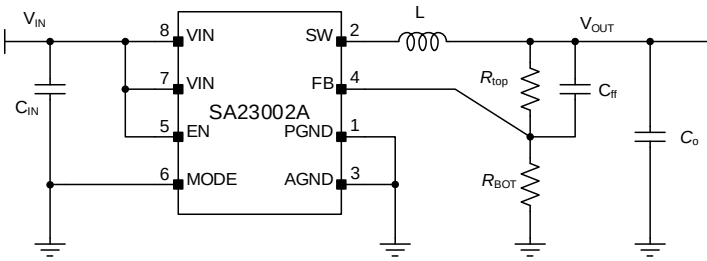
## Applications

- Info, T-box, Gateway, Cluster
- Automotive Display
- ADAS

## Buck Regulators

### SA23002A

2.8V-5.5V Input, 2A Single Synchronous Buck Converter



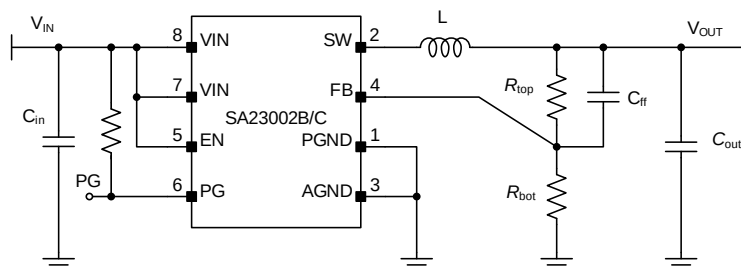
## Features

- 2.8V to 5.5V Input Voltage Range
- Up to 2A Output Current
- External Adjustable Voltage with  $\pm 1.5\%$  Reference Accuracy
- Typical  $1\mu\text{A}$  Shut Down Current
- Fixed 2.35MHz Switching Frequency
- PWM and PFM Operating Selectable
- 100% Duty Cycle for Lowest Dropout
- Cycle by Cycle Current Limit Protection
- Hiccup Mode Short-Circuit Protection (SCP)
- Thermal Shutdown
- Package: DFN2 $\times$ 2-8
- Automotive AEC- Q100 Grade 1 certified

## Applications

- Info, T-box, Gateway, Cluster
- Automotive Display
- ADAS

## 2.8V-5.5V Input, 2A Single Synchronous Buck Converter



## Features

- 2.8V to 5.5V Input Voltage Range
- External Adjustable Voltage with  $\pm 1.5\%$  Reference Accuracy
- Typical  $1\mu\text{A}$  Shut Down Current
- Fixed 2.35MHz Switching Frequency
- Light Load Operating Mode
  - SA23002B is PFM Mode
  - SA23002C is PWM Mode
- Power Good Indicator
- Internal Soft Start
  - SA23002B: typical 0.2ms
  - SA23002C: typical 0.4ms
- 100% Duty Cycle for Lowest Dropout
- Cycle by Cycle Current Limit Protection
- Hiccup Mode Short-Circuit Protection (SCP)
- Thermal Shutdown
- Package: DFN2 $\times$ 2-8
- Automotive AEC- Q100 Grade 1 certified

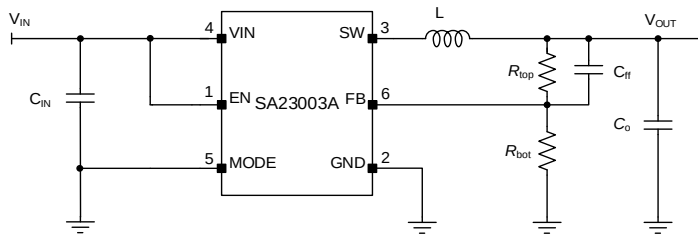
## Applications

- Info, T-box, Gateway, Cluster
- Automotive Display
- ADAS

## Buck Regulators

### SA23003A

### 2.8V-5.5V Input, 3A Single Synchronous Buck Converter



## Features

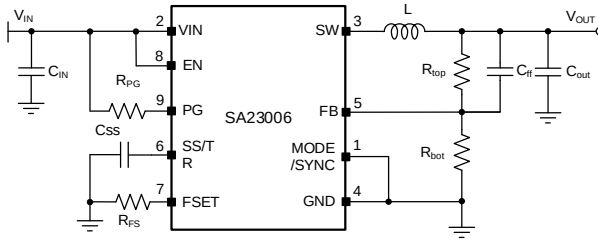
- 2.8V to 5.5V Input Voltage Range
- Up to 3A Output Current
- External Adjustable Voltage with  $\pm 1.5\%$  Reference Accuracy
- $1\mu\text{A}$  Shutdown Current (Typical)
- Fixed 2.35MHz Switching Frequency Minimizes Required External Components
- Selectable PWM or PFM Operating Modes
- 100% Duty-Cycle Capable
- Cycle-by-Cycle Current-Limit Protection
- Hiccup-Mode Overcurrent Protection
- Hiccup-Mode Short-Circuit Protection
- Thermal Shutdown
- Package: DFN1.4 $\times$ 1.8-6
- Automotive AEC-Q100 Grade 1 Certified

## Applications

- Info, T-box, Gateway, Cluster
- Automotive Display
- ADAS

## 2.8V-5.5V Input, 6A Single Synchronous Buck Converter

## SA23006



## Features

- 2.8V to 5.5V Input Voltage Range
- Up to 6A Output Current
- $\pm 1.2\%$  Reference Voltage Accuracy
- $1\mu\text{A}$  Shutdown Current (Typical)
- Adjustable Switching Frequency of 1.8MHz to 3MHz
- PWM or PFM Operating Selectable in Light Load
- Adjustable Soft-Start Time
- 100% Duty-Cycle for Lowest Dropout
- Optional Frequency Jittering Function
- Cycle-by-Cycle Current-Limit Protection
- Hiccup-Mode Short-Circuit Protection
- Power Good Indicator
- Thermal Shutdown
- Package: QFN2 $\times$ 3-9
- Automotive AEC-Q100 Grade 1 Certified

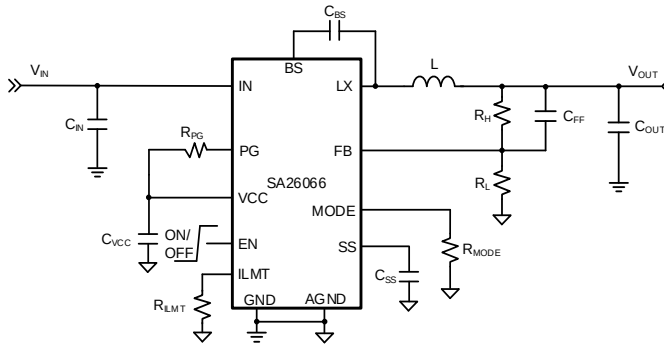
## Applications

- Info, T-box
- Automotive Display
- ADAS

## Buck Regulators

### SA26066

### 7V Input 6A Synchronous Step-Down Regulator



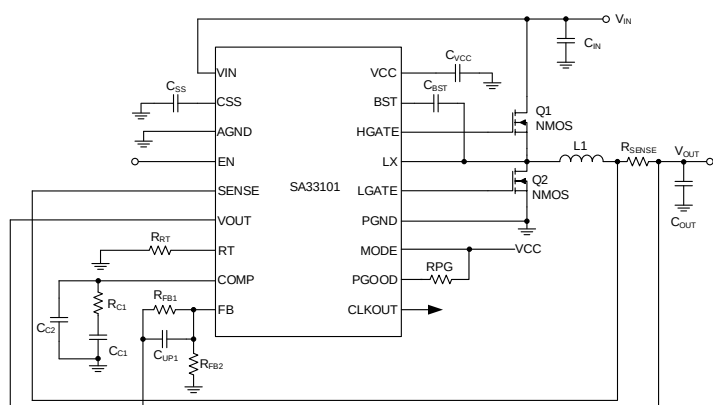
## Features

- 3V to 7V Input Voltage Range
- Up to 6A Output Current
- $\pm 1\%$  Reference Voltage over  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  Junction Temperature Range
- Internal  $22.1\text{m}\Omega$  Power Switch and  $8.1\text{m}\Omega$  Synchronous Rectifier
- Instant-PWM™ Provides Fast Transient Response
- 660kHz, 1100kHz, and 2200 kHz Operating Frequency
- Selectable PFM/FCCM Operation
- Programmable Valley Current Limit
- Cycle-by-Cycle Valley and Peak Current Limit (OCP) and Reverse Current Limit if FCCM is Selected
- Output Overvoltage (OVP), Output Undervoltage (UVP), Overtemperature (OTP)
- Hiccup Mode after 32 Consecutive Cycles of Valley Current-Limit Protection
- Pre-Biased Startup
- Power-Good Indicator
- Compact Package: QFN2x3-14
- Automotive AEC-Q100 Grade 1 Certified

## Applications

- Info, T-box, Gateway, Cluster
- Automotive Display
- ADAS

## 36V Synchronous Buck Controller



## Features

- AEC-Q100-Grade 1 -40°C~125°C
- Wide Input Voltage Ranges from 4.0 V to 36V
- Start-up Input Voltage: 4.5V
- Output Voltage Range from 0.7V to 5.3V
- Fold Back Reference Voltage: 640mV $\pm$ 1%
- Adjustable Switching Frequency: 250kHz to 1MHz
- Spread Frequency Function
- Adjustable Soft-start Time
- Pre-bias Start-up
- Output Voltage Abnormal Detection, Shows on PGOOD Pin, UVD/OVD
- Cycle by Cycle Current Limit Protection
- Thermal Shut down When  $T_j > 160^\circ\text{C}$
- Reliable Protection: SOP/UVD/OVD/OVP/OTP
- Package: SSOP18E

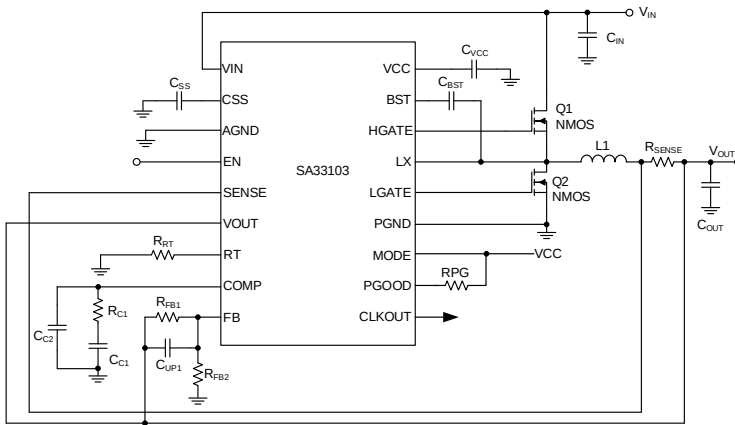
## Applications

- DC/DC Converter
- Power Module
- Automotive Power Supply Unit
- Power Source for Control Units Including EV
- Inverter and Charge Controller

# Buck Controller

## SA33103

## 60V Synchronous Buck Controller



## Features

- Wide Input Voltage Ranges from 4.0 V to 60V
- Start-up Input Voltage: 4.5V
- Output Voltage Range from 0.7V to 15V
- Fold Back Reference Voltage:  $640\text{mV} \pm 1\%$
- Adjustable Switching Frequency: 200kHz to 1MHz
- Spread Frequency Function
- Adjustable Soft-start Time
- Pre-bias Start-up
- Output Voltage Abnormal Detection, Shows on PGOOD Pin, UVD/OVD
- Cycle by Cycle Current Limit Protection
- Thermal Shut down When  $T_j > 160^\circ\text{C}$
- Reliable Protection: SOP/UVD/OVD/OVP/OTP
- Package: QFN4×4-24

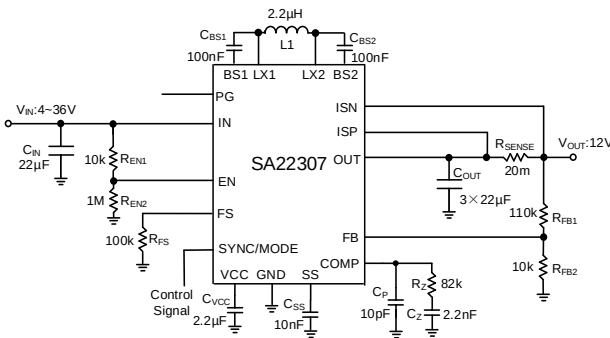
## Applications

- DC/DC Converter
- Power Module
- Automotive Power Supply Unit
- Power Source for Control Units Including EV
- Inverter and Charge Controller



## High Efficiency, 4V-36V Input Single Inductor Synchronous Step Up/Down Regulator

**SA22307**



## Features

- 4V to 36V Input Voltage Range
- 3V to 20V Output Voltage Range
- Low  $R_{DS(ON)}$  for Internal Switches: 35mΩ
- External Soft-start Limits the Inrush Current
- 1µA shutdown current
- 7A Internal Switch Peak Current Capability
- Programmable Frequency 200kHz~600kHz
- 1.0V±2% Reference over -40°C to 125°C
- Light Load Operating Mode Selection: PSM or FCCM
- Power Good Indicator
- Hiccup Mode for Output Short-circuit Protection
- Output Over Current Protection
- Thermal Shutdown with Auto Recovery
- Compact Package: QFN5×5-30
- Automotive AEC- Q100 Grade 1 Qualified

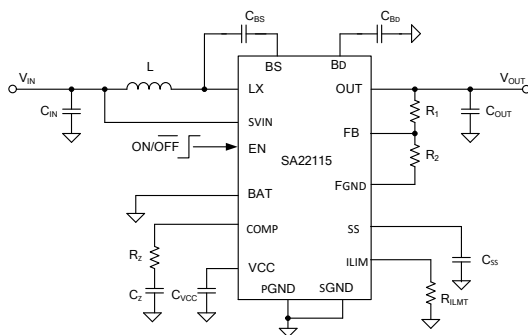
## Applications

- Info, T-Box, Gateway
- ADAS
- Smart Cockpit



### SA22115

### High Efficiency, 15A Synchronous Boost Regulator

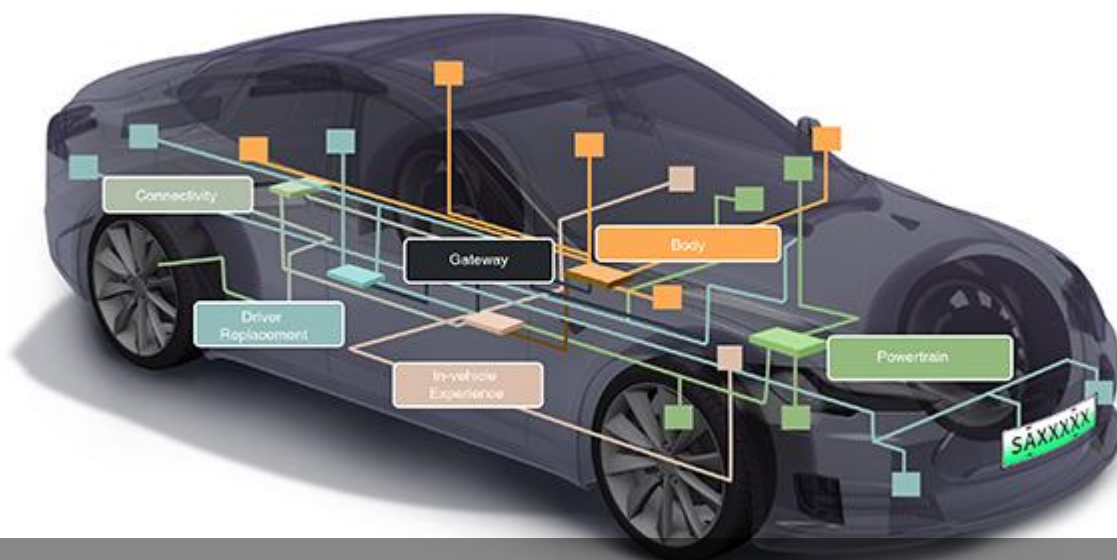


### Features

- Wide Input Range:
  - 2.7V to 16V Start-up Voltage
  - 1.2V to 16V Operation Voltage
- 400kHz Pseudo-constant Frequency
- True Shutdown Function
- Low RDS(ON) Internal Switch
  - Main FET: 10mΩ
  - Rectifier FET: 20mΩ
  - Disconnect FET: 30 mΩ
- External Loop Compensation
- Programmable Peak Current Limit Threshold
- Battery Voltage Monitoring
- Programmable Soft-Start Limits the Inrush Current
- Input Voltage UVLO
- Over Temperature Protection
- Output Over Voltage Protection
- RoHS Compliant and Halogen Free
- Compact Package: QFN3×4-15
- Automotive AEC- Q100 Grade 1 Certified

### Applications

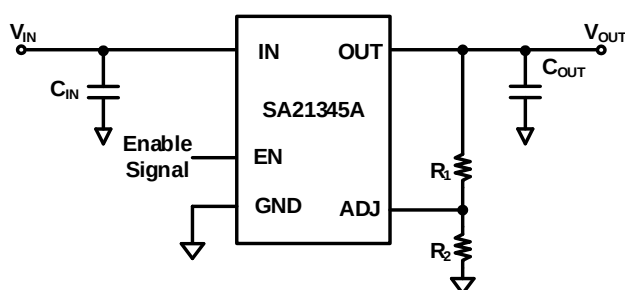
- Backup Battery
- Info, T-box, Gateway



Body

## 36V, 300mA LDO Regulator

## SA21345A



## Features

- Wide Input Voltage Range: 4V to 36V
- Low Dropout Voltage (300mV @ 300mA)
- Ultra-low Quiescent Current
- Extremely Low Shutdown Current
- Stability with Tantalum or Ceramic Capacitors
- Excellent Load and Line Regulation
- 300mA Maximum Load Current
- Enable Control Input
- Over Current Protection
- Thermal Shutdown
- Compact SO8E Package
- Automotive AEC- Q100 Grade 1 Certified

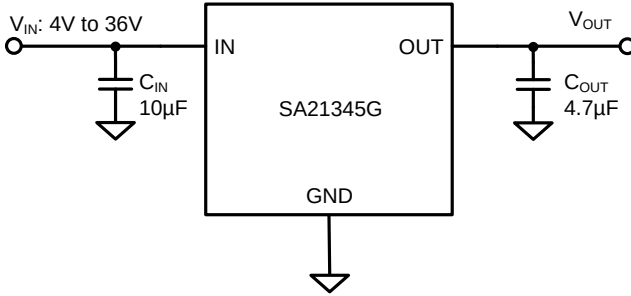
## Applications

- Info, T-box, Gateway
- Body
- ADAS
- Lidar

## LDO

### SA21345G

### 150mA LDO Regulator



### Features

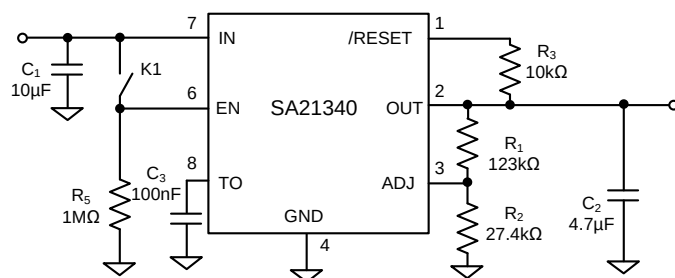
- Wide Input Voltage Range: 4V to 36V
- Low Dropout Voltage (150mV @ 150mA)
- Ultra-low Quiescent Current
- Fixed 5V Output Voltage
- Stability with Tantalum or Ceramic Capacitors
- Excellent Load And Line Regulation
- 150mA Maximum Load Current for SO8
- Over Current Protection
- Thermal Shutdown Protection
- Compact SO8 Package
- RoHS Compliant and Halogen Free
- Automotive AEC- Q100 Grade 1 Certified

### Applications

- Info, T-box, Gateway
- Body
- ADAS
- Lidar

## 300mA, 36V Fast-Response LDO Regulator

## SA21340



## Features

- High-current Capability: 300mA Over Full Temperature Range
- Low-dropout Voltage of 300mV at Full Load 300mA.
- Adjustable Output Voltage
- Low Ground Current
- Over Current Limit Protection
- Output Short Circuit Protection(Hiccup Mode)
- Over Temperature Protection.
- Reset Output with Programmable Timeout Period
- Packages: SO8E
- RoHS Compliant and Halogen Free
- Automotive AEC- Q100 Grade 1 Certified

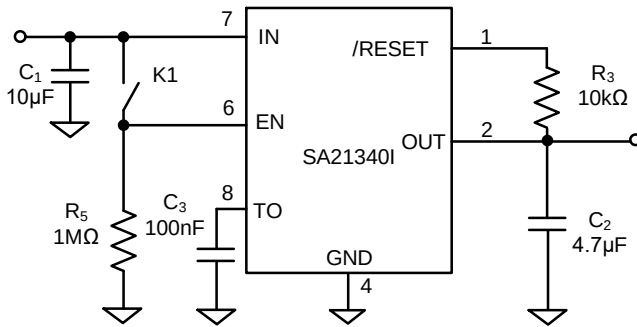
## Applications

- Info, T-box, Gateway
- Body
- ADAS
- Lidar

## LDO

## SA21340I

## 36V 300mA LDO with Programmable Reset



## Features

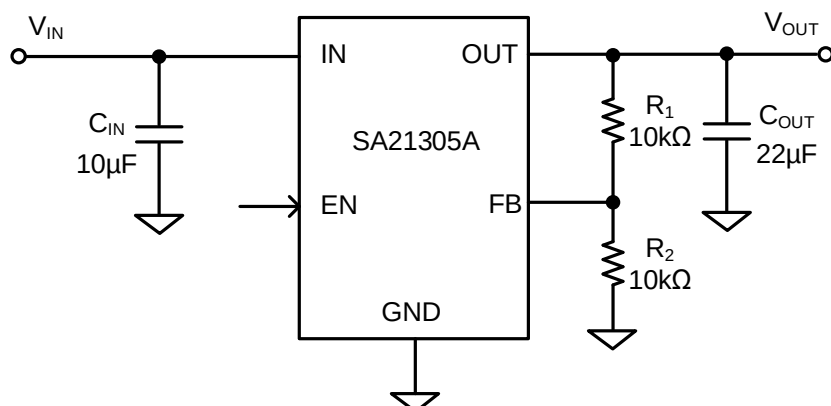
- High-current Capability: 300mA Over Full Temperature Range
- Low-dropout Voltage of 300mV at Full Load 300mA
- Fixed 3.3V Output Voltage
- Low Ground Current
- Over Current Limit Protection
- Output Short Circuit Protection (Hiccup Mode)
- Over Temperature Protection
- Reset Output with Programmable Timeout Period
- Packages: SO8E
- RoHS Compliant and Halogen Free
- Automotive AEC- Q100 Grade 1 Certified

## Applications

- Info, T-box, Gateway
- Body
- ADAS
- Lidar

## 1350mA Low Dropout Regulator

## SA21305A



## Features

- Input Voltage Range: 1.65V to 3.3V
- Output Current up to 1350mA
- PSRR at 1kHz : 55dB(Typ)
- Adjustable Output FB Voltage Accuracy :  $\pm 1\%$  @  $T_A = 25^\circ\text{C}$
- Drop Output Voltage : Max=0.4V
- Packages CSP 2.4mm $\times$ 2.4mm -36
- RoHS Compliant and Halogen Free
- AEC Q100 Grade 2
- $-40^\circ\text{C}$  to  $+105^\circ\text{C}$  Ambient Temperature Range

## Applications

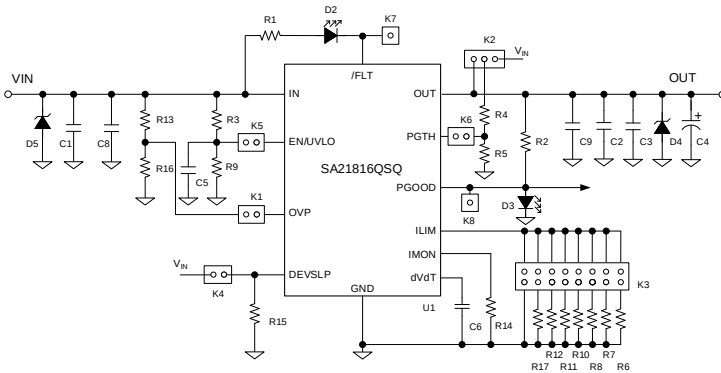
- Automotive BGA SSD

## Protection Switch



### SA21816

### Protection Switch with True Reverse Blocking



### Features

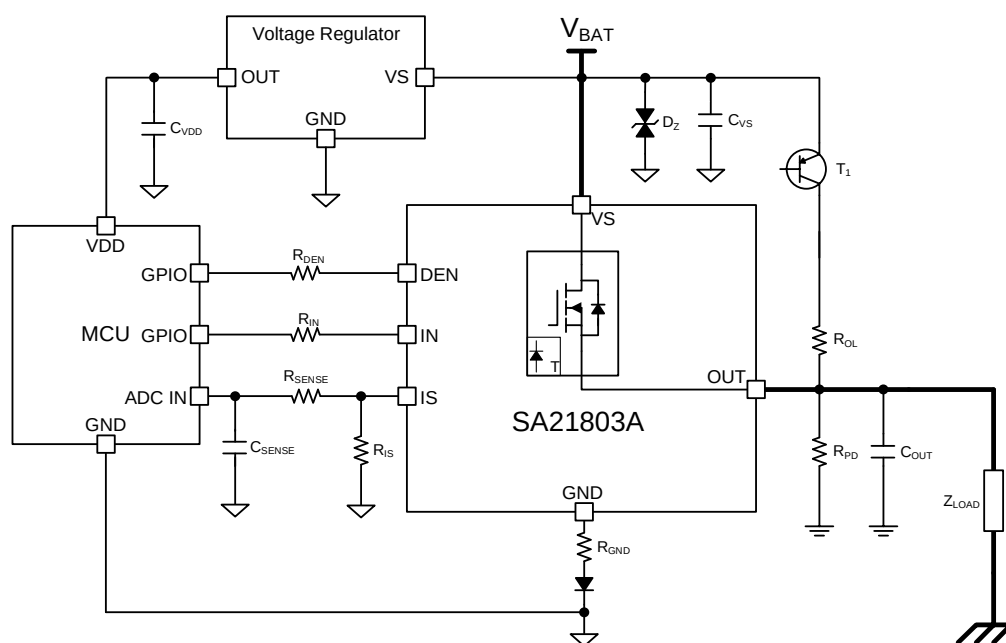
- AEC-Q100 Grade 1 Qualified
- 2.7V to 18V Operating Voltage, 21V (Max)
- Ultra Low  $R_{DS(ON)}$ : 46mΩ RON (Typical)
- 0.6A to 5.3A Adjustable Current Limit
- IMON Current Indicator Output
- 130μA Operating IQ (Typical)
- Reverse Current Blocking
- Programmable dV/dt Control
- Power Good and Fault Outputs
- -40°C to 125°C Junction Temperature Range
- RoHS Compliant and Halogen Free
- Compact package: QFN3×4-20

### Applications

- Info, T-box
- ADAS Cameras and Radar Sensors
- USB Hubs
- Power MUX

## Single Channel, Smart High-Side Power Switch

## SA21803A



## Features

- AEC-Q100/ Q104 Qualified for Automotive Applications
- One Channel Device
- Very Low Shutdown Current
- 3.3V and 5V Compatible Logic Inputs
- Logic Ground Independent from Load Ground
- Very Low Power DMOS Leakage Current in OFF State
- Diagnostic Functions
  - Proportional Load Current Sense
  - Open Load in OFF State
  - Short Circuit to Battery and Ground
  - Over Temperature
  - Stable Diagnostic Signal During Short Circuit
  - Enhanced  $k_{ILIS}$  Dependency with Temperature and Load Current
- Protection Functions
  - Stable Behavior during Under Voltage
  - Reverse Polarity Protection with External Components
  - Secure Load Turn-off during Logic Ground Disconnect with External Components
  - Over Temperature Protection with Latch
  - Overvoltage Protection with External Components
  - Voltage Dependent Current Limitation
  - Enhanced Short Circuit Operation



## Applications

- Suitable for Resistive, Inductive and Capacitive Loads
- Replaces Electromechanical Relays, Fuses and Discrete Circuits
- Most Suitable for Loads with High Inrush Current, Such as Lamps
- Suitable for 12V and 24V Truck and Transportation System

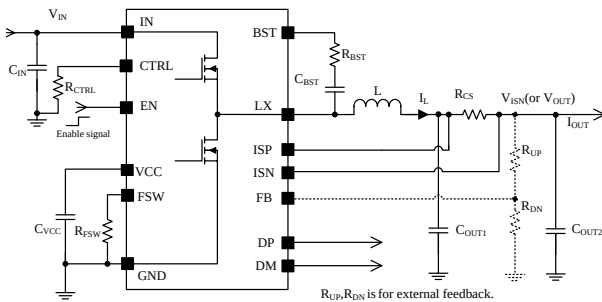
## Battery



BUB in T-box

### SA61931

4.5- 40V Wide Input, 3A High Efficiency  
CV/CC Step-Down Regulator with USB and QC3.0 Handshaking



### Features

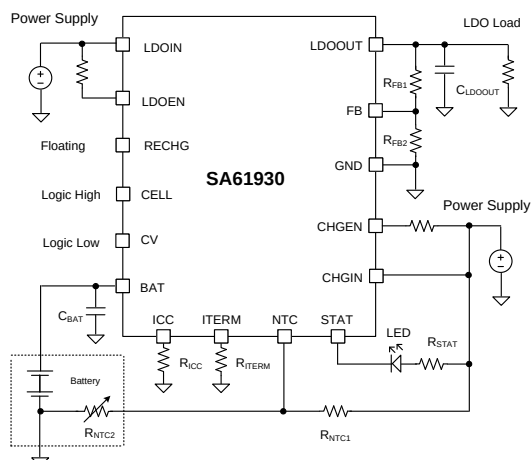
- 4.5-40V Wide Input Voltage Range
- Build in Low  $R_{DS(ON)}$  Power Switches
- 60-400kHz Programmable Switching Frequency
- Cable Voltage Drop Compensation
- Output Constant Current Limit
- Maximum 5V/3A Output Power
- Maximum 9V/2A Output Power
- Maximum 12V/1.5A Output Power
- Integrated Soft-start and Compensation
- Hiccup Mode During Output Short
- Input Voltage UVLO and OVP
- Output Over Voltage Protection
- Thermal Shutdown Protection
- Output Apple-divide Mode, DCP and QC3.0 Handshaking
- QC 3.0 Certificate
- 8kV ESD HBM Protection on DP and DM
- AEC-Q100 Grade1 Automotive Qualified
- Compact Package: QFN4x4-24

### Applications

- Car Charger
- Cigarette Lighter Adapter
- Other CV/CC Applications

## 500mA Linear Regulator and 400mA Linear Charger

# SA61930



## Features

- 4.5V~36V Wide Input Operation Voltage Range
- Integrated a 500mA Linear Regulator with Over Load and Short Circuit Protection
- Integrated a 400mA Linear Charger
- Support 1-cell or 2-cell Li-ion and Li-polymer Batteries
- Support 4.05V, 4.1V and 4.2V Cell Voltage Battery
- $\pm 0.5\%$  Battery Charge Voltage Accuracy
- Programmable Constant Charge Current and Termination Current
- 100mA~400mA Constant Charge Current with  $\pm 10\%$  Accuracy
- 20mA~100mA Termination Current with  $\pm 20\%$  Accuracy
- Thermal Regulation and Thermal Shutdown
- Compact Package: QFN4 $\times$ 4-16
- AEC-Q100 Grade1 Qualified

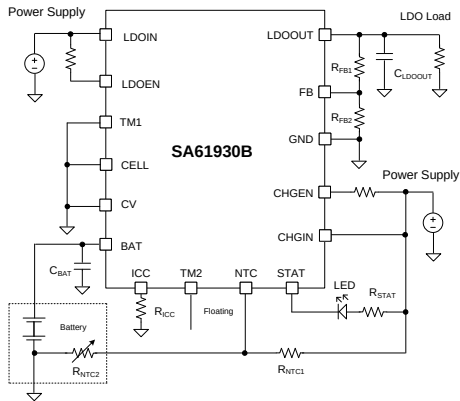
## Applications

- T-box
- Portable Battery-powered Equipment

## Battery

### SA61930B

500mA Linear Regulator and 100mA Linear Charger  
for Automotive Battery Backup System



## Features

- 4.5V-36V Wide Input Operation Voltage Range
- Integrated a 500mA Linear Regulator with Over Load and Short Circuit Protection
- Integrated a 100mA Linear Charger
- Support up to 2-cell Ni-MH Batteries by Linear Charging
- $\pm 0.5\%$  Battery Charge Voltage Accuracy
- Programmable Constant Charge Current
- 20mA~100mA Constant Charge Current with  $\pm 20\%$  Accuracy
- Thermal Regulation and Thermal Shutdown
- Compact Package: QFN4 $\times$ 4-16
- AEC-Q100 Grade1 Qualified

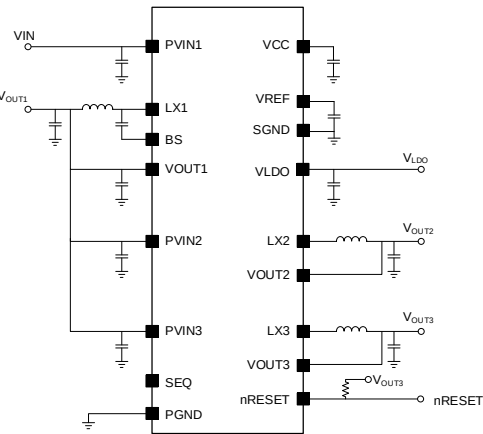
## Applications

- T-box
- Portable Battery-Powered Equipment



# SA47302

## Automotive Camera PMIC



### Features

- AEC-Q100-Grade 1 Qualified
- 2.2MHz Fixed Switching Frequency
- Primary Synchronous Buck Converter1
  - Fixed Output Voltage: 3.3V/3.8V (optional)
  - Maximum Continue Output Current:1.5A
  - Low  $R_{DS(ON)}$  High Side and Low Side Switches:220mΩ/120mΩ
- Secondary Synchronous Buck Converter 2
  - Fixed Output Voltage: 1.1V/1.2V (optional)
  - Maximum Continue Output Current:1.5A
  - Low  $R_{DS(ON)}$  High Side and Low Side Switches:220mΩ/180mΩ
- Secondary Synchronous Buck Converter 3
  - Fixed Output Voltage: 1.8V
  - Maximum Continue Output Current:1A
  - Low  $R_{DS(ON)}$  High Side and Low Side Switches:320mΩ/220mΩ
- Secondary LDO
  - Output Voltage:2.8V/3.3V(optional)
  - Maximum Output Current:300mA
- Spread Spectrum Frequency Modulation
- RoHS Compliant and Halogen Free
- Compact Package: QFN3×3-16

### Applications

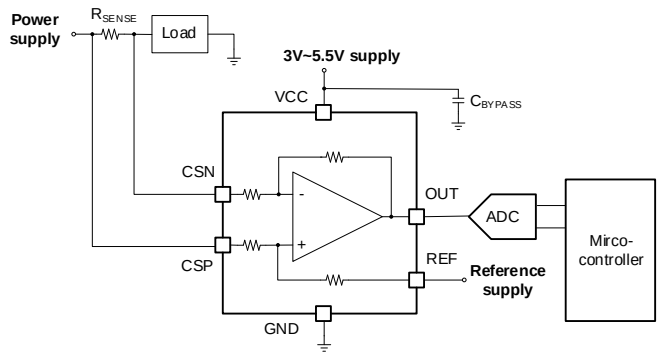
- Automotive Camera Modules

# Current Sense



## High- or Low-Side, Bidirectional, High Accuracy Current-sense Amplifier

SA59101/SA59102

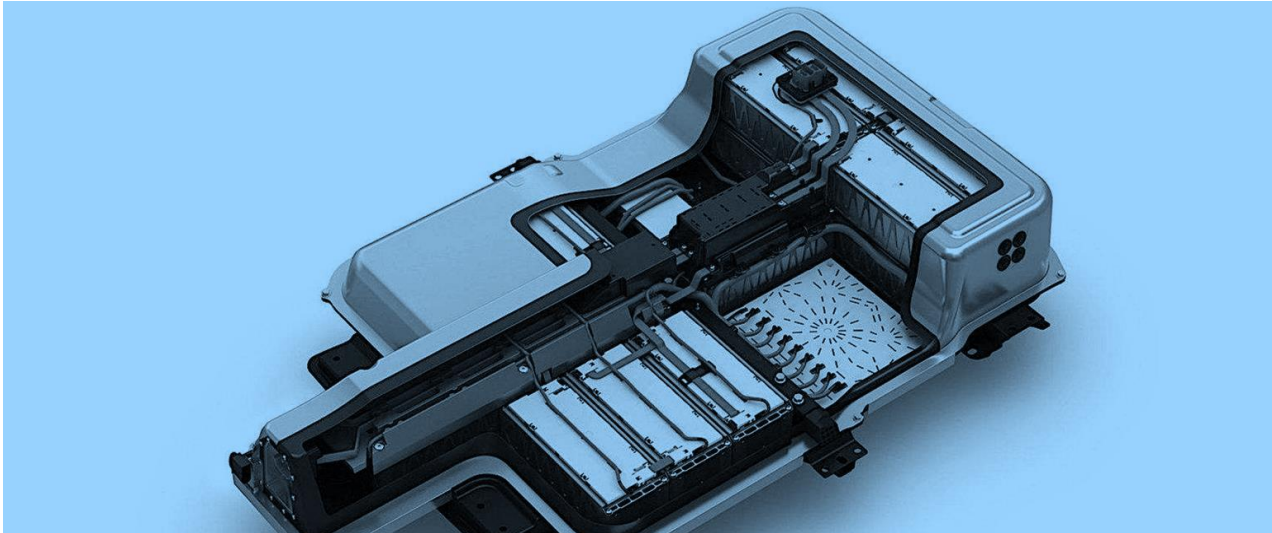


## Features

- Voltage-output, Current-sense Amplifier
- Wide Common Mode Operation Range: -0.3V~26V
- Gain=50V/V(SA59101), Gain=100V/V(SA59102)
- Amplifier's Output Referenced to VREF input
- Shunt Input Voltage Range:
  - SA59101: -40mV to 40mV (VCC=5V, VREF=2.5V)
  - SA59102 :-20mV to 20mV (VCC=5V, VREF=2.5V)
- Low Offset Voltage:
  - SA59101: ±100μV (Maximum)
  - SA59102: ±50μV (Maximum)
- 0.5μV/°C Offset Drift (Maximum)
- ±0.5% Gain Error (Maximum)
- 10ppm/°C Gain Drift (Maximum)
- Quiescent Current: 100μA (Maximum)
- Packages: SOT363

## Applications

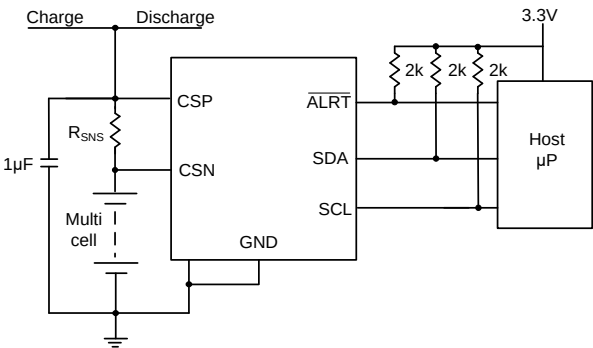
- Body Control Module
- OBC
- DCDC
- Motor Control



# Electric Vehicles Backup Battery Systems

## SA59202

## Multi Cell Battery Gas Gauge



## Features

- High Accuracy Coulomb Counter Measures Accumulated Battery Charge and Discharge
- Operation Voltage Range: 3.6V to 25V
- 12-bit ADC Measures Voltage and Current
- 1% Voltage, Current and Charge Accuracy
  - $\pm 64\text{mV}$  Sense Voltage Range for Current ADC
  - High Side Sense for Current ADC
  - Low Value External Current Sense Resistor
- Low Quiescent Current
- Configurable Alert Output/Charge Complete Input
- I2C Interface
- Compact DFN3×3-8 Package
- AEC-Q100 Qualified for Automotive Applications
  - Temperature Grade 2:  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$

## Applications

- Power Tools
- Portable Equipment
- Electric and Hybrid Electric Vehicles
- Backup Battery Systems

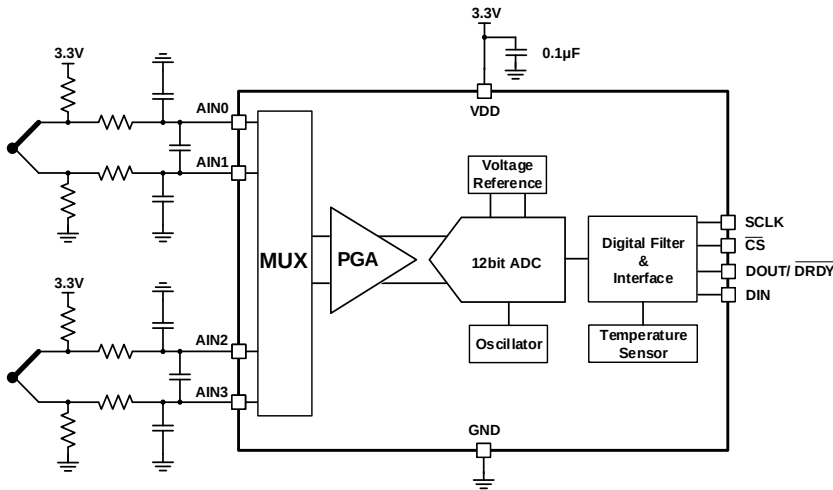
## ADC



BMS

### SA59400

**Bidirectional, Zero-Drift, High-accuracy 12bit ADC with Internal Reference and Temperature Sensor**



### Features

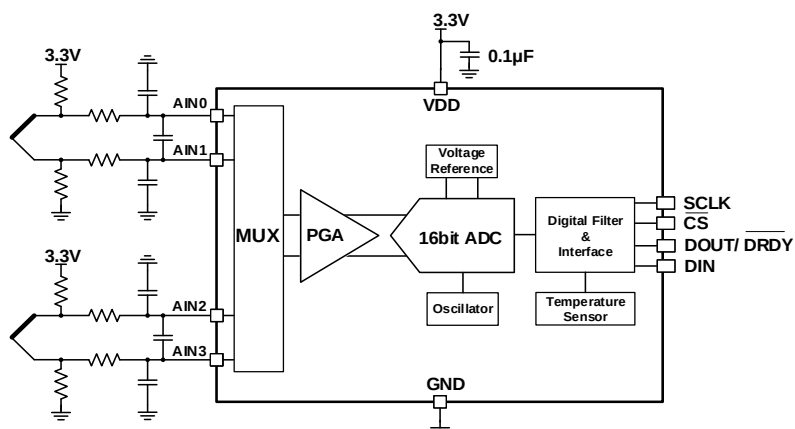
- Wide Supply Range: 2.7V to 5.5V
- Low Current Consumption:
  - Continuous Mode: 350µA
  - Single-Shot Mode: Automatic Power Down
- Programmable Data Rate: 120 SPS to 4630 SPS
- Single-Cycle Settling
- Internal Low-Drift Voltage Reference
- Internal Temperature Sensor:
  - 3°C (Maximum) Error: -40°C to 125°C
- Internal Oscillator
- Internal PGA
- Four Single-Ended or Two Differential Inputs
- MSOP10 Package

### Applications

- BMS
- Automotive Sensor

## Bidirectional, Zero-Drift, High-accuracy 16bit ADC with Internal Reference and Temperature Sensor

SA59401



### Features

- Wide Supply Range: 2.7V to 5.5V
- Low Current Consumption:
  - Continuous Mode: 350µA
  - Single-Shot Mode: Automatic Power Down
- Programmable Data Rate: 8 SPS to 890 SPS
- Single-Cycle Settling
- Internal Low-Drift Voltage Reference
- Internal Temperature Sensor:
  - 3°C (Maximum) Error: -40°C to 125°C
- Internal Oscillator
- Internal PGA
- Two Differential Inputs
- MSOP10 Package

### Applications

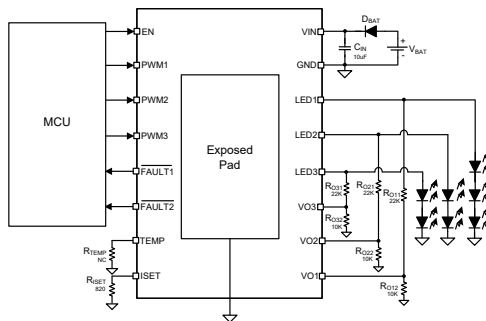
- BMS
- Automotive Sensor

## LED Driver



### Lighting

## SA32707 28V, 0.15A, 3-channel Linear LED Driver with ON OFF Dimming

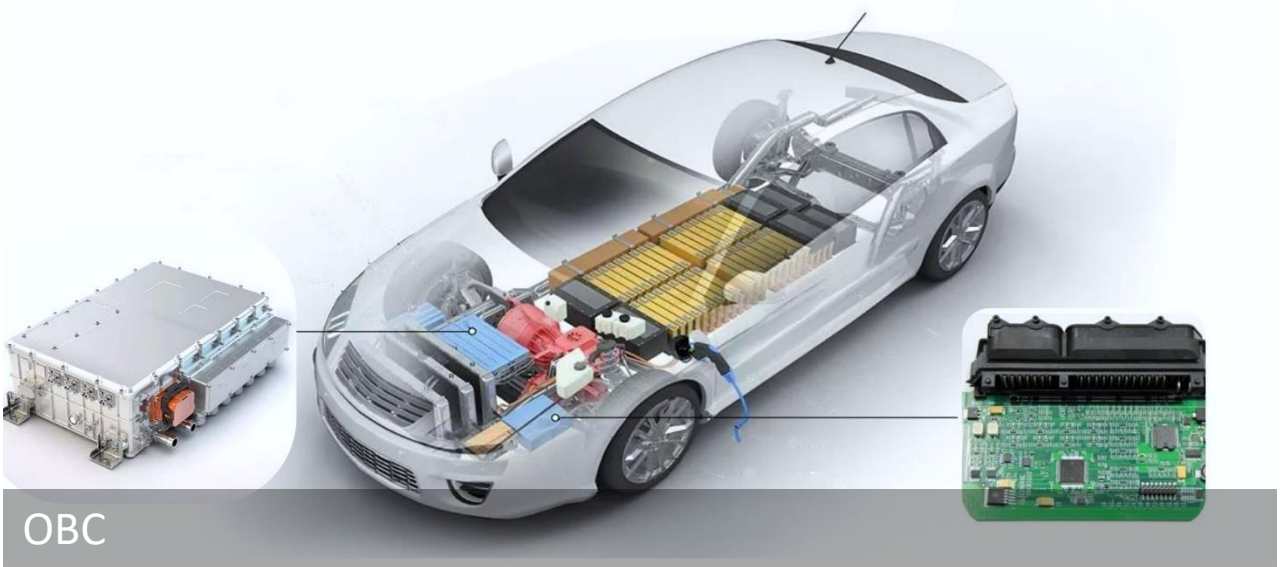


### Features

- Wide Input Voltage Range 5V to 28V
- Current Accuracy for Full Temperature Range:
  - $\pm 2.5\%$  per Device when  $I_{OUTx} > 30\text{mA}$
  - $\pm 1.5\%$  per Channel when  $I_{OUTx} > 30\text{mA}$
- Low Dropout Voltage:
  - Maximum Dropout Voltage:  $400\text{mV}@60\text{mA}$
  - Maximum Dropout Voltage:  $900\text{mV}@150\text{mA}$
- Thermal Foldback Function
- Parallel Outputs for Higher Current Using Multiple ICs or Multiple Channels of A Single IC
- Short LED Detection with Deglitch Timer
- Single LED Short Detection with Deglitch Timer
- Open LED Detection with Deglitch Timer
- Separate Single LED Short Fault Pin and Open/Short Led Fault pin
- Compact Package: TSSOP16E
- AEC-Q100 Qualified with the Following Results:
  - Device Temperature Grade1:  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
  - Device HBM ESD All pins  $\pm 2000\text{V}$
  - Device CDM ESD Other pins  $\pm 500\text{V}$
  - Corner pins (1, 8, 9, and 16)  $\pm 750\text{V}$

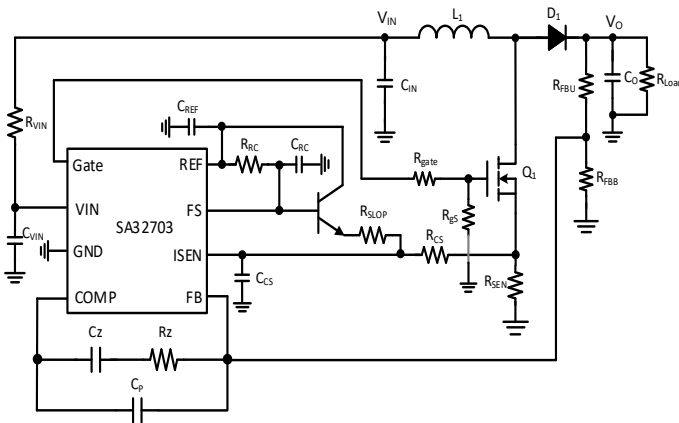
### Applications

- DRL
- Position Light
- Fog Light
- Rear Light
- Turn Light
- Interior light
- OBC Indicator Light



## Boost/Flyback Current Mode Controller

**SA32703**



## Features

- AEC-Q100-Grade 1 -40°C~125°C
- 5.0-11V Input Voltage Range
- $\pm 2\%$  Accuracy for REF and FB Reference
- Typical 150- $\mu$ A Starting Up Current and 800- $\mu$ A Operating Supply Current Exclude MOS Driving Current
- Flexible Frequency and Minimum off Time Set by FS Pin and up to 1 MHz Switching Frequency
- Cycle by Cycle Current Limit(1V) and over Current Limit (1.5V) for ISEN
- Typical 4ms Internal Soft Start and Fault (OCP、OTP、REF\_UVLO、VIN\_UVLO) Soft-start
- Package: SO8

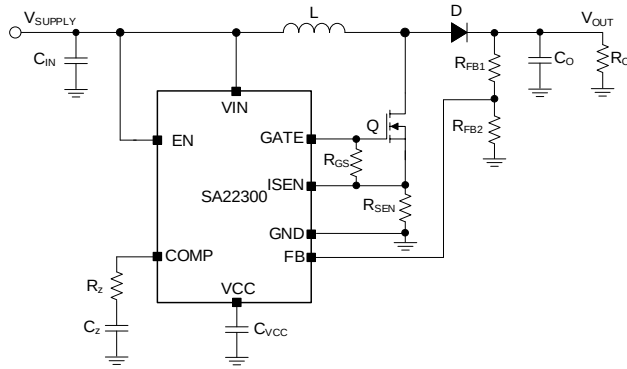
## Applications

- OBC
- DC/DC
- Traction Inverter

## Boost Regulators

### SA22300

### 36V, Boost/Flyback/Sepic Controller



## Features

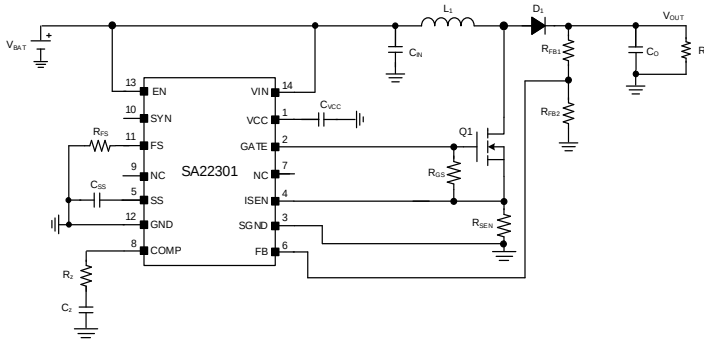
- Wide Input Voltage Range: 3.45V to 36V
- $1.2V \pm 2\%$  Reference Voltage
- Fixed Frequency Operation
- Internal Soft-Start
- Typical  $1.6\mu A$  Shutdown Current
- Cycle-by-Cycle Current Limit Protection
- Hiccup-Mode Overcurrent Protection (OCP)
- Hiccup-Mode Short-Circuit Protection (SCP)
- 1.5A Peak Gate Source Current
- 1.5A Peak Gate Sink Current
- Thermal Shutdown
- Package: SOP8
- Automotive AEC- Q100 Grade 1 Certified

## Applications

- OBC, DCDC, Traction, BMS
- SDM
- LiDAR

## 36V, Boost/Flyback/Sepic Controller

## SA22301



## Features

- Wide Input Voltage Range: 4.75V to 36V
- Flexible Switching Frequency Range From 100kHz to 1000kHz
- 2.5V  $\pm$ 2% Reference Voltage
- Typical 1.4 $\mu$ A Shutdown Current
- External Soft-Start Adjustable by Capacitor
- Cycle-by-Cycle Current Limit Protection
- Hiccup Mode Overcurrent Protection
- 1A Peak Gate Source Current
- 1.3A Peak Gate Sink Current
- Thermal Shutdown
- Package: SSOP14E
- Automotive AEC- Q100 Grade 1 certified

## Applications

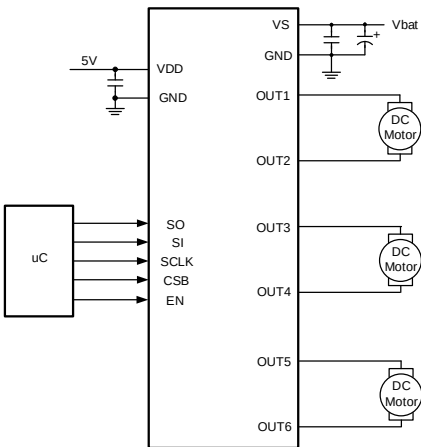
- OBC, DCDC, Traction, BMS
- Smart Cockpit
- LiDAR

# Motor Driver



## SA52106VAA

## Hex Half-H-Bridge Driver with SPI Control



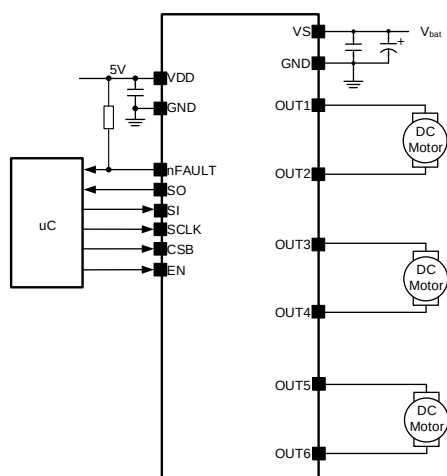
### Features

- Six half-bridge Drivers
- 0.55A Output Current per Channel@13.5V
- Low Power Mode
- Compatible with 5V/3.3V System
- Serial Data Interface, up to 5MHz
- Fault Reporting
- PWM Capable Outputs for Frequency 80Hz, 100Hz and 200Hz with 8-bit Duty cycle resolution
- Internal Over Current Protection, Short Circuit Protection, Under Load Detection, Under Voltage Lockout, Over Voltage Lockout and Thermal shutdown
- AEC-Q100 Qualified
- QFN5x5-24 package

### Applications

- HVAC
- Mirror
- BDC, ZCU

## Six Half-Bridge Driver with SPI Control



## Features

- 6 Half-bridge Outputs
- 4.5V to 32V Operating Voltage
- Up to 1A Output Current for Each Output
- Low-power Sleep Mode
- Compatible with 5V/3.3V System
- Serial Peripheral Interface, up to 5MHz
- Daisy Chain Functionality
- PWM Capable Output for Frequency 80Hz, 100Hz, 200Hz and 2kHz with 8-Bit Duty Cycle Resolution
- Integrated Protection: Overcurrent Protection , Short Circuit Protection, Open Load Detection, Under Voltage Lockout, Over Voltage Protection and Thermal Shutdown
- nFAULT Pin Output
- AEC-Q100 Qualified
- Compact Package:TSSOP24E

## Applications

- Automotive
- LED
- HVAC
- DC Brushed Motors

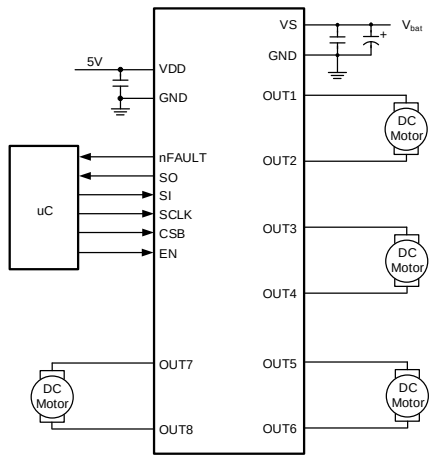
# Motor Driver



Rear Mirror

## SA52108

## Eight Half-H-Bridge Driver with SPI Control



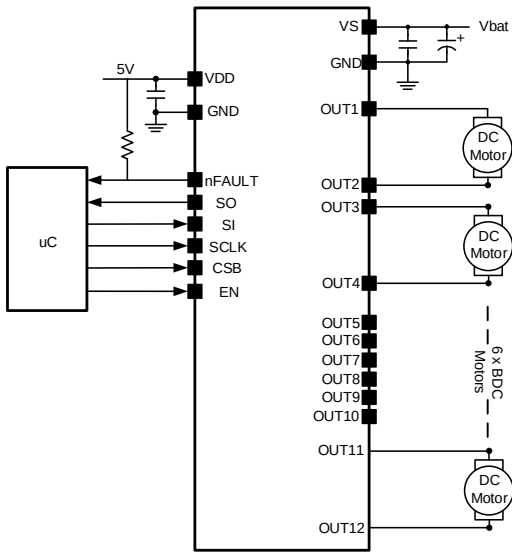
### Features

- 8 Half-bridge Outputs
- 4.5V to 32V Operating Voltage
- Up to 1A Output Current for Each Output
- Low-power Sleep Mode
- Compatible with 5V/3.3V System
- Serial Peripheral Interface, up to 5MHz;
- Daisy Chain Functionality
- PWM Capable Output for Frequency 80Hz,100Hz, 200Hz and 2kHz with 8-bit Duty Cycle Resolution
- Integrated Protection: Overcurrent Protection, Short Circuit Protection, Open Load Detection, Under Voltage Lockout, Over Voltage Protection and Thermal Shutdown
- nFAULT Pin Output
- AEC-Q100 Qualified
- Compact Package: TSSOP24E

### Applications

- HVAC
- Mirror
- BDC, ZCU

## Twelve Half-H-Bridge Driver with SPI Control



## Features

- 12 Half-bridge Outputs
- 4.5V to 32V Operating Voltage
- Up to 1A RMS Output Current for Each Output
- Low-power Sleep Mode
- Compatible with 5V/3.3V System
- Serial Peripheral Interface, up to 5MHz;
- Daisy Chain Functionality
- PWM Capable Output for Frequency 80Hz, 100Hz, 200Hz and 2kHz with 8-bit Duty Cycle Resolution
- Integrated Protection: Overcurrent Protection, Short Circuit Protection, Open Load Detection, Under Voltage Lockout, Over Voltage Protection and Thermal Shutdown
- nFAULT Pin Output
- AEC-Q100 Qualified
- Compact Package: QFN5x5-24

## Applications

- HVAC
- Mirror
- BDC, ZCU

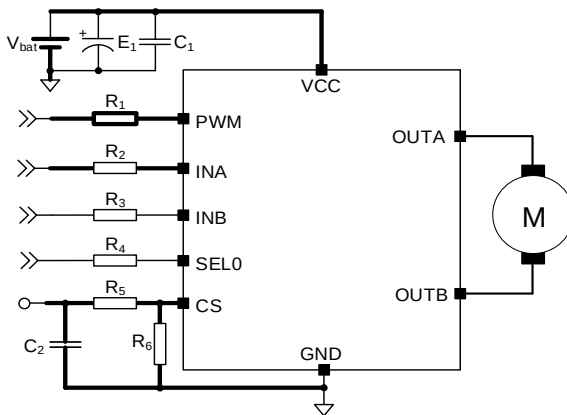
## Motor Driver



Door Handle

### SA52270

### 15A H-bridge Motor Driver for Automotive Applications



### Features

- Output Current: 15 A
- Undervoltage Lockout
- Overvoltage Clamp
- Thermal Shutdown
- Cross-conduction Protection
- Current Limitation
- Protection against Loss of Ground and Loss of VCC
- Output Short Circuit Protections
- Low Power Standby Mode
- PWM Work Mode
- Current Sense Output
- Diagnostic Function
- AEC-Q100 Grade 1 Qualified
- Compact Package: SOP16

### Applications

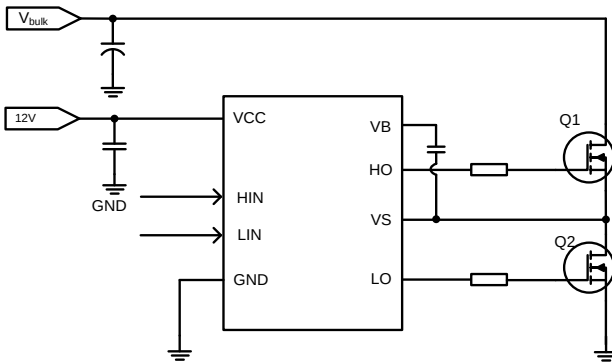
- Door Lock
- Door Handle
- OBC Lock
- BCM



Body Control

## 40V High-side and Low-Side Gate Driver

SA52631DAD/FAP



## Features

- High Voltage Range up to 40 V
- 0.75A Source and 1.25A Sink Current
- VCC Operation Range from 4.4V to 14V
- CMOS/TTL Compatible
- Fast Propagation Delay Time
- Compact Package: DFN3x3-8/SOP8
- AEC-Q100 Qualified

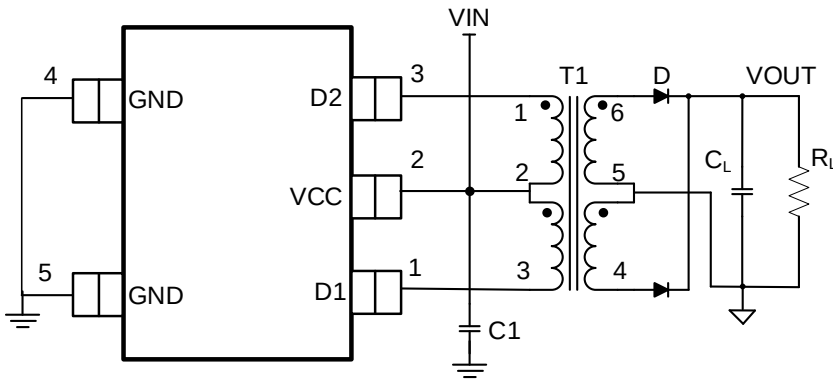
## Applications

- ABS
- ESC
- WPC
- Domain Controller
- Body

## ISO DCDC

## SA52731

## Transformer Driver for Isolated Power Supplies



## Features

- Single 3.3-V or 5-V Supply
- Push-Pull Driver for Small Transformers
- High Primary-side Current Drive: 500mA
- Spread Spectrum Clocking
- Thermal Shutdown
- Soft Start
- AEC-Q100 Grade1 Qualified
- Compact Package: SOT23-5

## Applications

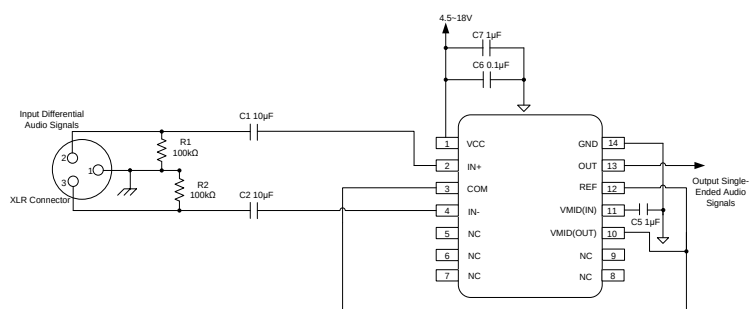
- BMS
- Isolated Interface Power Supply for CAN, RS-485, RS-422, RS-232, SPI, I2C, Low-Power LAN
- Industrial Equipment
- Medical Equipment



Smart Cockpit

## High Common-Mode Rejection Line Receiver

SA51023



## Features

- High Common-mode Rejection: 106dB(Typical)
- High Input Impedance: 1MΩ Differential
- Ultra-low Total Harmonic Distortion + Noise: <0.001%
- Low Quiescent Current: 4.1mA (Typical)
- Short-circuit Protection
- Integrated EMI Filters
- Wide Supply Range: 4.5V to 18V
- Qualified According to AEC-Q100 Grade 1
- -40°C to 125°C Ambient Temperature Range
- Available in Small TSSOP-14 Package

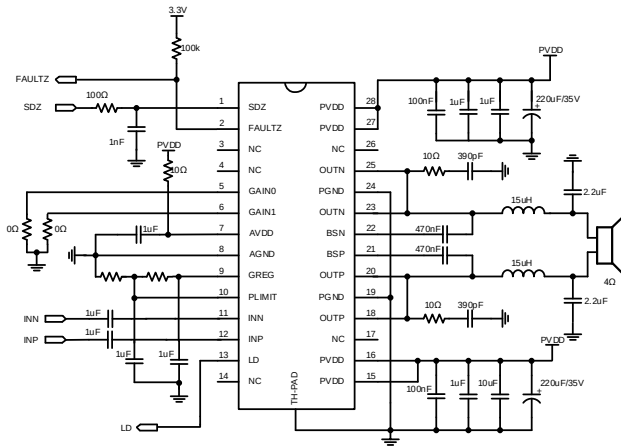
## Applications

- Differential Audio Interfaces
- Audio Input Circuitry
- Line Drivers
- Audio Power Amplifiers
- Audio Analyzers
- High-End Audio and Video (A/V) Receivers

## Audio

# SA51024

## Analog Class-D AUDIO IC For Automotive Application



## Features

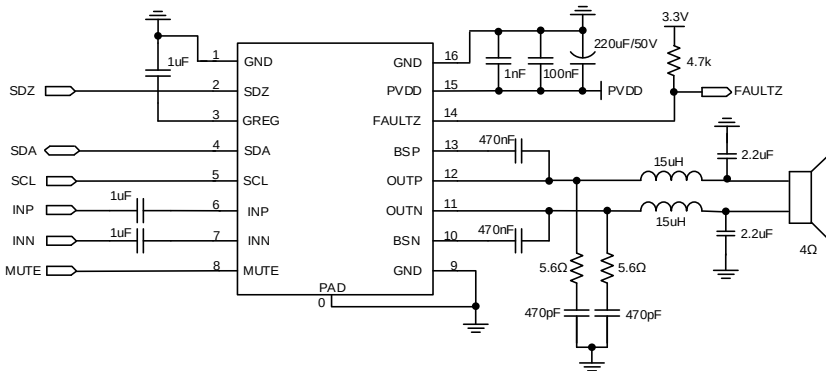
- 10W into a 4Ω Load at <1% THD+N from a 12V Supply
- Qualified for Automotive Applications
- AEC-Q100 Qualified with the Following Results
  - Device Temperature Grade 1: -40°C to 125°C Ambient Operating Temperature Range
  - Device HBM ESD Classification Level H2
  - Device CDM ESD Classification Level C3
- Highly Efficient Class-D Operation Eliminating Need for Heat Sink
- Operates from 5.5V to 18V
- Adjustable Power Limit
- Four Selectable, Fixed-gain Settings
- Load Diagnostic Functions
  - Open and Shorted Output Load
  - Output-to-Ground and Output-to-PVDD Shorts
- Comprehensive Click and Pop Suppression
- Space-saving Surface Mount TSSOP28E Package

## Applications

- Noise Generation for HEV/EV
- Emergency Call Systems (e Call)
- Cluster
- AVAS
- Linear Motor Driver

## Analog Class-D Audio IC For Automotive Application

## SA51034/SA51054



## Features

- SA51034: 8W into a 4Ω Load at <0.1% THD+N from a 12V Supply
- SA51054: 22W into a 4Ω Load at <10% THD+N from a 14.4V Supply
- Qualified for Automotive Applications
- AEC-Q100 Qualified with the Following Results:
  - Device Temperature Grade 1: -40°C to 125°C Ambient Operating Temperature Range
  - Device HBM ESD Classification Level H2
  - Device CDM ESD Classification Level C3
- Highly Efficient Class-D Operation Eliminating Need for Heat Sink
- Operates from 4.5V to 18V
- Thermal and Over-Current Protection
- Load Diagnostic Functions:
  - Open and Shorted Output Load
  - Output-to-Ground and Output-to-PVDD Shorts
- Comprehensive Click and Pop Suppression
- Space-Saving Surface Mount TSSOP16E Package

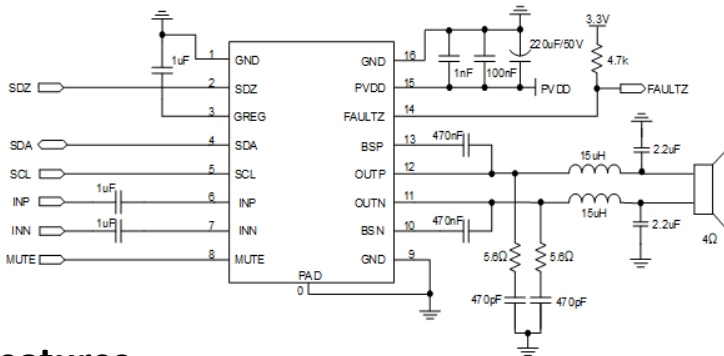
## Applications

- Noise Generation for HEV/EV
- Emergency Call Systems (e Call)
- Cluster
- AVAS
- Linear Motor Driver

## Audio

# SA51500

## Analog Class-D Audio IC For Automotive Application



## Features

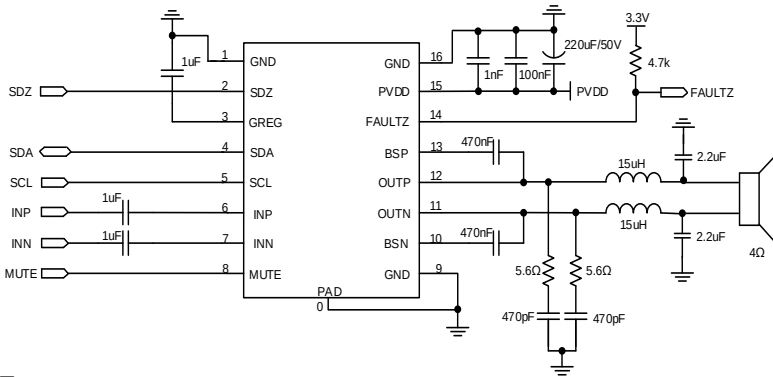
- Wide Voltage Range
  - 4.5V to 28V with Under and Over Voltage Protection
  - 40V Load-dump Protection per ISO-16750-2
- High Output Power Capability
  - 8W4 Ω, 0.1% THD+N at 14.4V
  - 12W4Ω, 1% THD+N at 12V
- Excellent Audio performance
  - 0.03% THD+N at 1W4 Ω 12V
  - 102dB A-weighted SNR
- Comprehensive Protection
  - Under Voltage, Over Voltage, Over Temperature, Over Current, DC Detection Protection with Auto Recovery
  - Selectable Power Limit Function for Speaker Protection
- Load Diagnostic Functions
  - Open and Shorted Output Load
  - Output-to-ground and Output-to-PVDD Shorts and Shorted Output Indicator
- AEC-Q100 Qualified with the Following Results:
  - Device Temperature Grade 1: -40°C to 125°C Ambient Operating Temperature Range
  - Device HBM ESD Classification Level H2
  - Device CDM ESD Classification Level C3
- Differential Single-ended Input
- Spread Spectrum and Programmable Edge Rate to Optimize EMC Performance
- Space-Saving Surface Mount TSSOP16E Package

## Applications

- Emergency Call Systems (e Call)
- Cluster
- AVAS
- Automotive Telematics

## Analog Class-D Audio IC For Automotive Application

# SA51510



## Features

- Wide Voltage Range
  - 4.5V to 28V with Under and Over Voltage Protection
  - 40V Load-dump Protection per ISO-16750-2
- High Output Power Capability
  - 22W4  $\Omega$ , 0.1% THD+N at 14.4V
  - 38W8 $\Omega$ , 1% THD+N at 28V
- Excellent Audio performance
  - 0.03% THD+N at 1W4  $\Omega$  12V
  - 102dB A-weighted SNR
- Comprehensive Protection
  - Under Voltage, Over Voltage, Over Temperature, Over Current, DC Detection Protection with Auto Recovery
  - Selectable Power Limit Function for Speaker Protection
- Load Diagnostic Functions
  - Open and Shorted Output Load
  - Output-to-ground and Output-to-PVDD Shorts and Shorted Output Indicator
- AEC-Q100 Qualified with the Following Results:
  - Device Temperature Grade 1: -40°C to 125°C Ambient Operating Temperature Range
  - Device HBM ESD Classification Level H2
  - Device CDM ESD Classification Level C3
- Differential Single-ended Input
- Spread Spectrum and Programmable Edge Rate to Optimize EMC Performance
- Space-Saving Surface Mount TSSOP16E Package

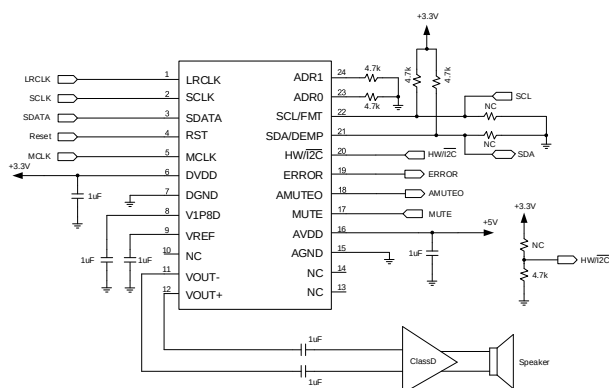
## Applications

- Emergency Call Systems (e Call)
- Cluster
- AVAS
- Automotive Telematics

## Audio

### SA55600

### Mono Audio Digital to Analog Converter

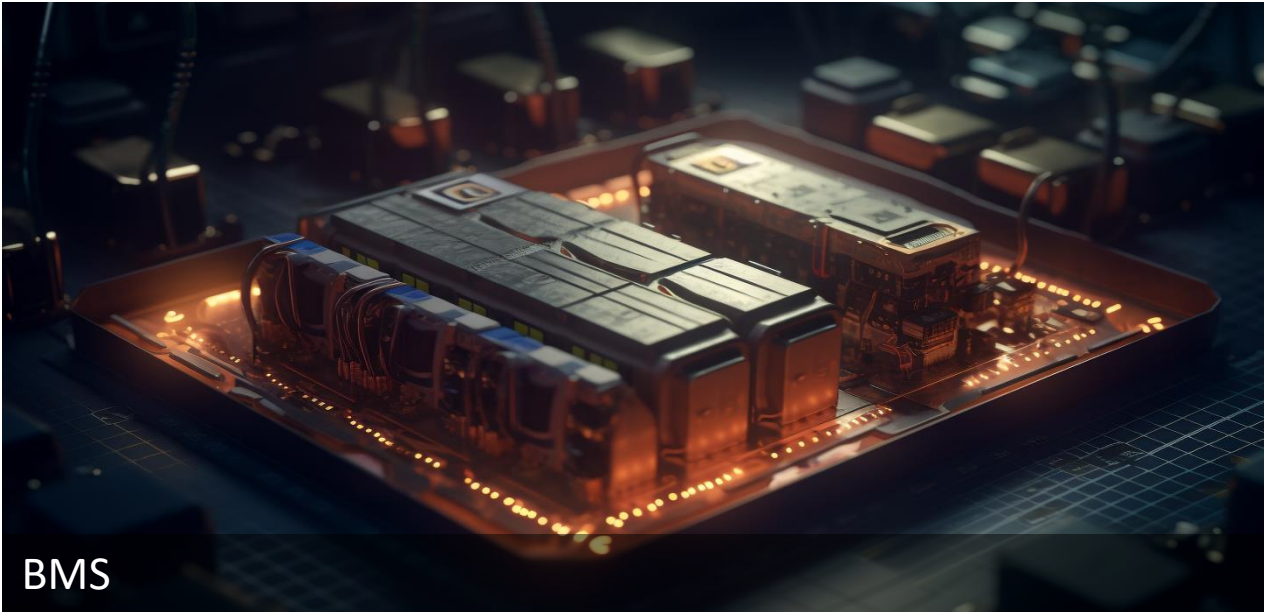


## Features

- Power supply
  - 5 V for Analog and 3.3 V for Digital
- Large Differential Voltage Output
  - 8.6 VPP at 0dBFS(default)
- Excellent Audio performance
  - -90dB THD+N at 0dBFS
  - 115 dB A-weighted SNR
  - 115 dB Dynamic Range SNR
- Low power consumption
  - Power-Save Mode: 6.5uA AVDD quiescent current
  - Play mode: 1.7mA AVDD quiescent current at fs=48kHz MCLK=512\*fs
- Abundant Audio Interface
  - Input Sampling Rates: 8 kHz to 192 kHz
  - I/F Format: I2S, Left-/Right-Justified
  - Input Data Length: 16, 20, 24, 32 Bits
- Flexible Mode Control
  - I2C mode with 4 Slave address
  - Hardware Mode
- Hardware Mode Control
  - Audio I/F Format Select: I2S or Left-Justified
  - Digital De-Emphasis Filter Select: 44.1 kHz or disable
  - Sampling mode is Auto
- Digital Filter
  - Digital De-Emphasis Filter
  - Sharp roll off filter: Passband ripple:  $\pm 0.0018$  dB, stop band Attenuation: -75dB
  - Slow roll off filter: Passband ripple:  $\pm 0.001$  dB, stop band Attenuation: -112 dB
- Analog Filter
  - Analog Low-Pass Filter Included
- Comprehensive Error Detection and Protection
  - Zero Detection
  - Clock Error Detection
  - Supply Under Voltage Detection
  - Analog Mute by Detected Faults
  - Output Current Limit Protection
- AEC-Q100 Grade1 Qualified
- Compact Package: TSSOP24

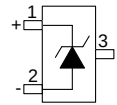
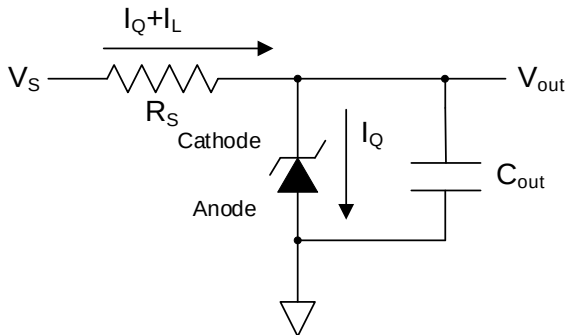
## Applications

- Car Audios
- Home Audios



## Precision Micro-power Shunt Voltage Reference

## SA89550/SA89550B/ SA89550C/SA89550D



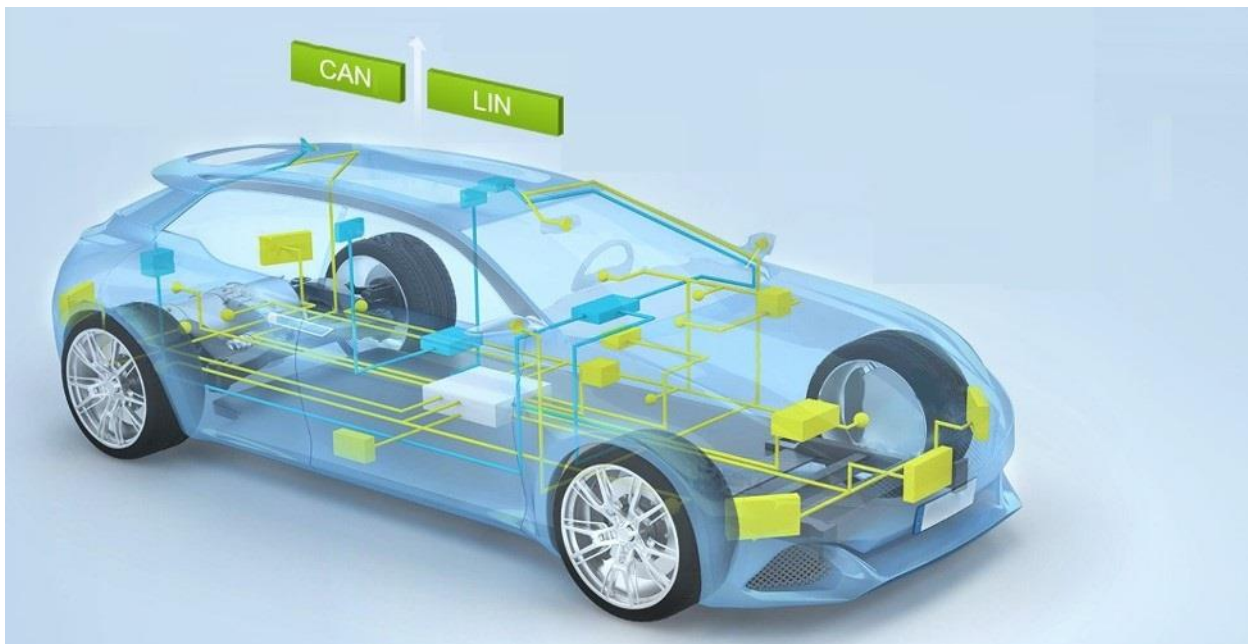
## Features

- No output Capacitor Required
- Tolerates Capacitive Loads
- Fixed Reverse Breakdown Voltage:
  - SA89550: 5V
  - SA89550B: 4.096V
  - SA89550C: 3.3V
  - SA89550D: 2.5V
- Output Voltage Tolerance  $\pm 0.1\%$  (Maximum)
- Low output noise (10Hz to 10kHz) 38 $\mu$ Vrms (Typical)
- Wide Operating Current Range  $I_{RMIN}$  to 15mA
- Industrial Temperature Range  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- Low Temperature Coefficient  $\pm 43$  ppm/ $^{\circ}\text{C}$  (max)
- Small Package: SOT-23
- AEC Q100 Grade 1 Qualified

## Applications

- BMS
- OBC
- EV/HEV

## ESD Protection



### SAT01N24AMA

### LIN Bus TVS Protection

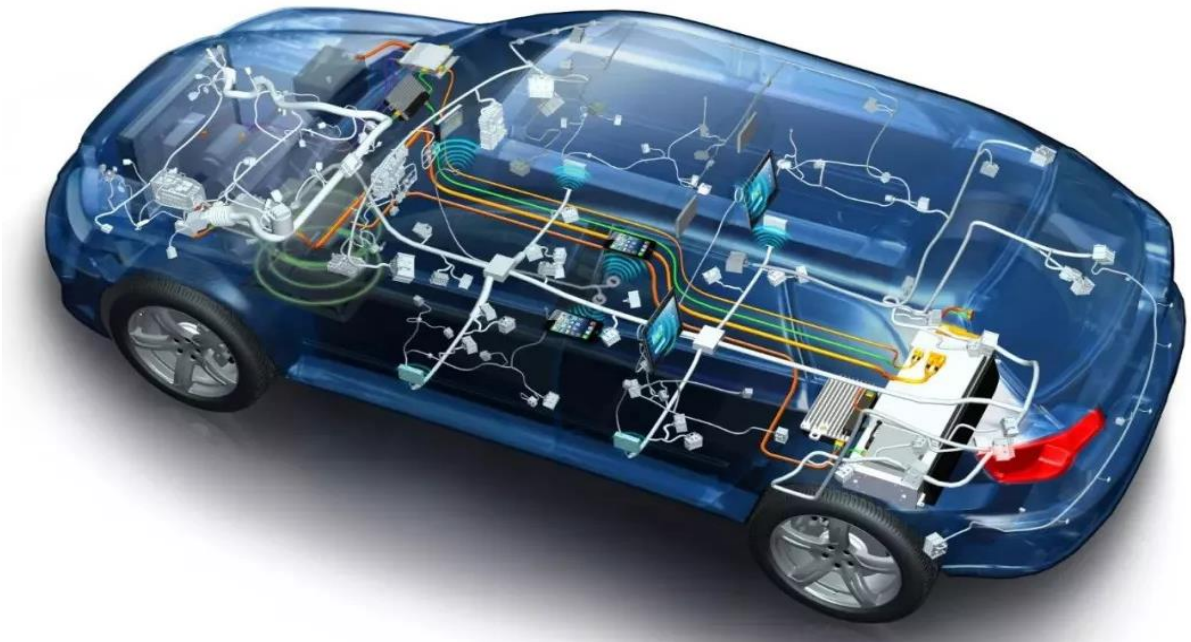


### Features

- Transient protection for high-speed data lines
- IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Air)  $\pm 30\text{kV}$  (Contact)
- IEC 61000-4-5 (Surge) 4A (8/20 $\mu\text{s}$ )
- Protects one automotive LIN-bus line
- Low capacitance: 12pF (Typical)
- Low leakage current: 0.01 $\mu\text{A}$  @ VRWM (Typical)
- Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge
- AEC-Q101 Qualified
- SOD-323 package

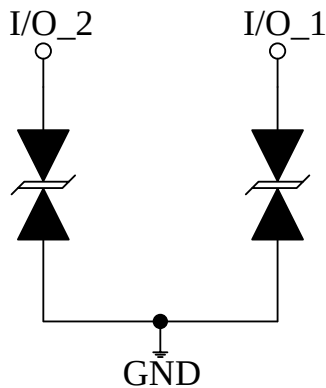
### Applications

- LIN Bus Protection



## CAN Bus TVS Protection

## SAT03N24AOA



## Features

- Transient protection for high-speed data lines
- IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Air)  $\pm 30\text{kV}$  (Contact)
- IEC 61000-4-5 (Surge) 4A (8/20 $\mu\text{s}$ )
- Protects two data, control or CAN bus lines
- Low capacitance: 12pF (Typical)
- Low leakage current: 0.01 $\mu\text{A}$  @ VRWM (Typical)
- Each I/O pin can withstand over 1000 ESD strikes for  $\pm 8\text{kV}$  contact discharge
- AEC-Q101 Qualified
- SOT-23 package

## Applications

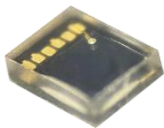
- CAN Bus Protection

## Sensor



### SA88010RS22-J00

### Silicon PIN Infrared Photodiode

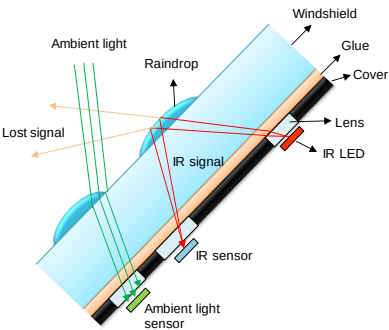


#### Features

- Package type: Optical DFN
- Dimensions: 2.0mmx1.5mmx0.6mm
- Peak sensitivity occurs with 870nm wavelength
- Fast rising and falling speed
- AEC-Q102 Qualified

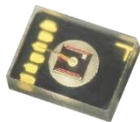
#### Applications

- Wiper



### SA88011AS22-J00

### Ambient Light Sensor

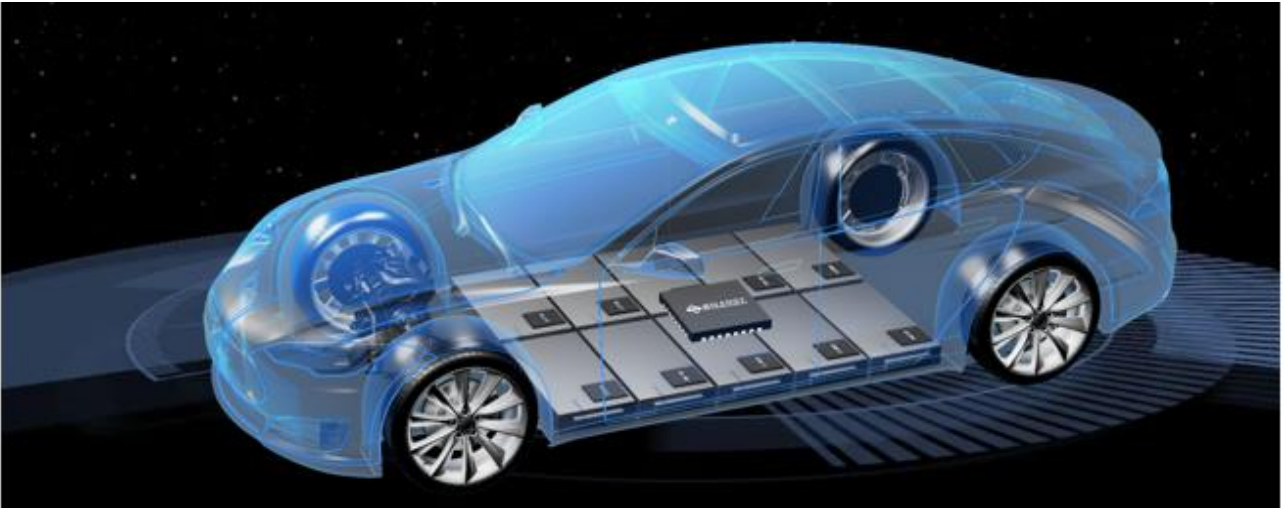


#### Features

- Package Type: Optical DFN
- Dimensions: 2.0mmx1.5mmx0.6mm
- High Sensitivity at Visible Range
- Spectral Response Close to Human Eyes Photopic Curve
- AEC-Q102 Qualified

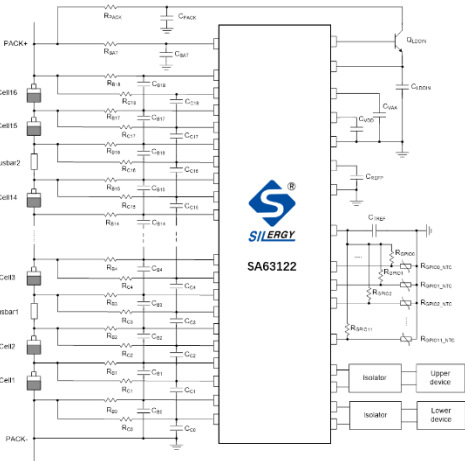
#### Applications

- Body
- Cluster
- Info



# 18S Monitor and Passive Cell Balancer for Automotive Battery Management System

SA63122



## Features

- Operating voltage range from 12V to 80V, 6 to 18 cells
- 16-bit MAIN ADC with programmable measurement slot (typical 157us)
- 18 channels battery cell and bus bar voltage measurement
  - $\pm 1\text{mV}$  accuracy(25°C)
- 12 channels GPIO voltage measurement for voltage ratio value measurement
  - $\pm 0.2\%$  accuracy
- Die temperature measurement  $\pm 5^\circ\text{C}$  accuracy
- Integrated post-ADC configurable digital low-pass filters
- Supports bus bar connection and measurement
- Integrated N FETs for passive cell balance
  - Up to 300mA balancing current per channel
- Smart thermal management (battery, PCB, die)
  - Automatic pause during ADC measurement
  - Adjacent channels on
  - Available during sleep mode
- Build-in independent hardware OVUV/OTUT protection
  - Provide programmable OVUV counter to allow de-bouncing
  - Support flexible OTUT threshold selection for each channel
  - Reversely waking host up in sleep mode
- 3 operation modes
  - Shutdown mode: extremely low quiescent current for wake up
  - Sleep mode: for OVUV, OTUT protection, balance, heartbeat signal through communication line
  - Active mode: for ADC measurement and daisy-chain communication
- Robust daisy-chain communication
- AEC-Q100 Compliance
- Device temperature grade1:  $-40^\circ\text{C}$  to  $+125^\circ\text{C}$
- Package: TQFP 10x10 -64E
- ASIL-D Functional Safety-Compatible

## Applications

- High-Voltage Battery Stacks
- Electric Vehicles and Hybrid Electric Vehicles
- Backup Battery Systems

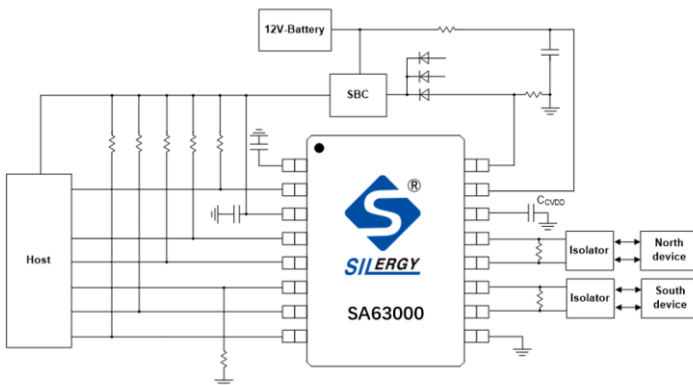


## BMS AFE Interface



### SA63000

### SPI Communication Transceiver for Automotive Battery Management System



### Features

- 12V/5V Operation Voltage
- ASIL-D Functional Safety-Capable
- SPI Interface: 2MHz-6MHz
- 256-Byte TX FIFO and 32-Byte RX FIFO
- Operating Modes
- Sleep Mode: Support reversely wake-up host with 5uA quiescent current
- Active Mode: Support ring architecture communication and asserting to inform host
- AEC-Q100 Compliance
- Device Temperature Grade1: -40°C To +125°C
- Device HBM ESD Classification Level 2
- Device CDM ESD Classification Level C4B
- Package Info: TSSOP16E

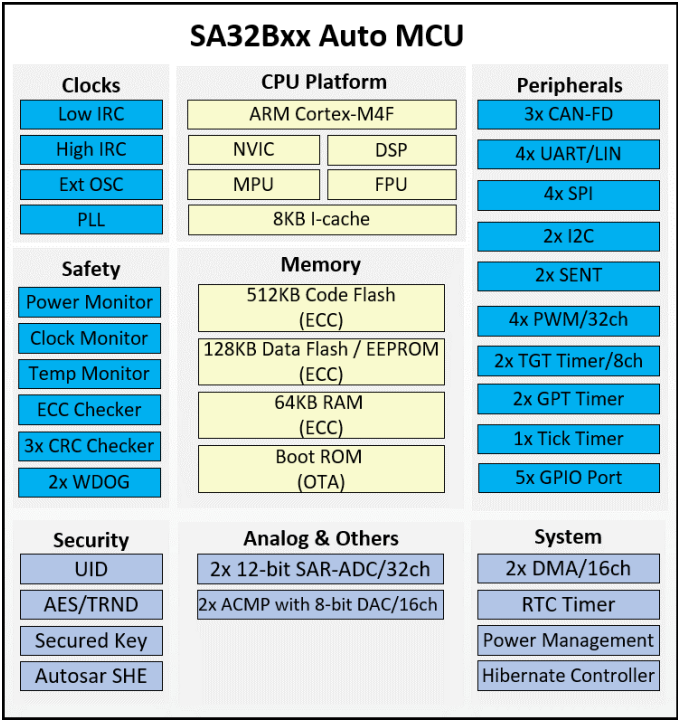
### Applications

- Battery Management Systems (BMS)
- Electric and Hybrid Vehicles (EV/HEV)

SA32 B-series MCUs are ARM Cortex-M4F core based high reliability MCUs for automotive market with rich peripherals and packages. This series meets AEC-Q100 G1 standard and ISO26262 ASIL-B level function safety. With its performance, reliability and function safety design, this series is suited for automotive applications like body control, T-box, OBC, BMS, airbag, HVAC, heat management, etc.

| Part Number | CPU | Frequency (MHz) | C-Flash (KB) | D-Flash (KB) | SRAM (KB) | CAN-FD | UART/LIN | SPI | Package       | Targeted Applications                                                                   |
|-------------|-----|-----------------|--------------|--------------|-----------|--------|----------|-----|---------------|-----------------------------------------------------------------------------------------|
| SA32B12QEQ  | M4F | 120             | 128          | 128          | 64        | 2      | 3        | 1   | QFN32         | Roofs, Windows, Shift, Seatbelt, Airbag, Parking Brake, Lighting, etc.                  |
| SA32B12AQEQ | M4F | 120             | 128          | 128          | 64        | 2      | 3        | 2   | QFN32         |                                                                                         |
| SA32B12GFF  | M4F | 120             | 128          | 128          | 64        | 2      | 3        | 3   | LQFP7x7-48    |                                                                                         |
| SA32B12GDF  | M4F | 120             | 128          | 128          | 64        | 2      | 3        | 3   | LQFP10x10-64  |                                                                                         |
| SA32B14GFF  | M4F | 120             | 256          | 128          | 64        | 3      | 4        | 4   | LQFP7x7-48    |                                                                                         |
| SA32B14GDF  | M4F | 120             | 256          | 128          | 64        | 3      | 4        | 4   | LQFP10x10-64  |                                                                                         |
| SA32B16GDF  | M4F | 120             | 512          | 128          | 64        | 3      | 4        | 4   | LQFP10x10-64  | Wireless Charger, HVAC, T-BOX, OBC, LV BMS, Low-cost BCM, Lighting, Smart Cockpit, etc. |
| SA32B16GEF  | M4F | 120             | 512          | 128          | 64        | 3      | 4        | 4   | LQFP14x14-100 |                                                                                         |
| SA32B18GDF  | M4F | 160             | 1M           | 128          | 320       | 4      | 6        | 6   | LQFP10x10-64  |                                                                                         |
| SA32B18GEF  | M4F | 160             | 1M           | 128          | 320       | 4      | 6        | 6   | LQFP14x14-100 |                                                                                         |
| SA32B18GLF  | M4F | 160             | 1M           | 128          | 320       | 4      | 6        | 6   | LQFP20x20-144 |                                                                                         |
| SA32B20GEF  | M4F | 160             | 2M           | 128          | 320       | 4      | 6        | 6   | LQFP14x14-100 |                                                                                         |
| SA32B20GLF  | M4F | 160             | 2M           | 128          | 320       | 4      | 6        | 6   | LQFP20x20-144 |                                                                                         |

➤ Block Diagram



➤ Application



MCU

➤ SA32B Ecosystem



- Documents
- Introduction
  - Datasheet
  - Reference
  - Application Note



- Application
- T-BOX
  - Rear Lighting
  - LV BMS



- Evaluation Board
- General EVB Suit



- Function Library & Routines
- Driver Interface Library
  - Application Routines



- Programmer
- Multi-programmer



- Simulation Tool
- U-LINK
  - J-LINK



- IDE
- KEIL
  - IAR

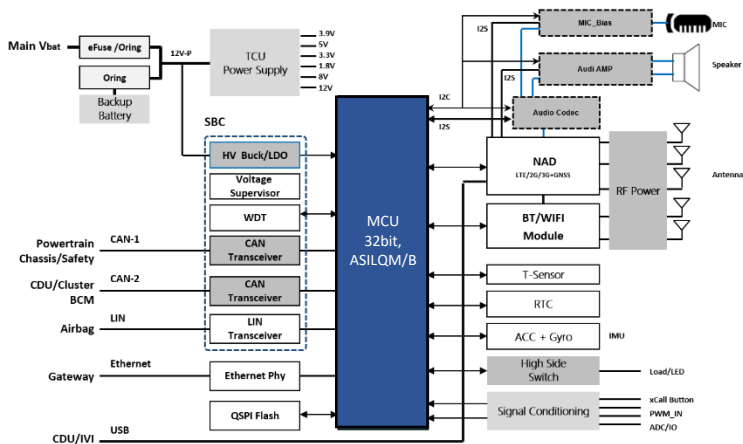


- Technical Support
- Local FAE/AE

➤ SA32B Target Application: T-Box

Key Features

- Big capacity flash 256KB-2MB;
- Support several low power modes, the smallest standby current  $\leq 44\mu A$ ;
- Rich peripherals, included LIN/CAN/SPI/UART/PWM, etc;
- Support high precision analog peripherals, 2x 12-bit SAR ADC, 32channels, sample rate up to 1Mbps/ 2x Analog DAC;
- Multiple Packages, LQFP64/100/144;
- Built-in BootROM for FOTA Upgrade;
- Support AUTOSAR



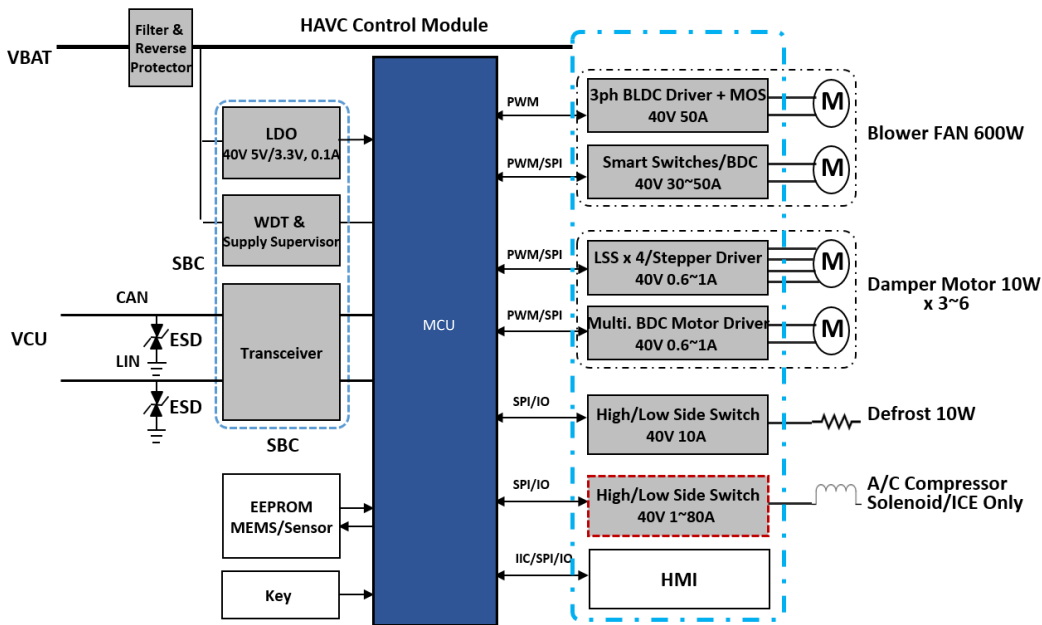
Silergy Solutions

| Product | Function  | Key Features                                | Package     |
|---------|-----------|---------------------------------------------|-------------|
| SA32B16 | MCU       | M4F, 120MHz, 512KB                          | LQFP64/100  |
| SA32B18 | MCU       | M4F, 160MHz, 1MB                            | LQFP100/144 |
| SA32B20 | MCU       | M4F, 160MHz, 2MB                            | LQFP100/144 |
| SA51034 | Audio Amp | 8W Class-D Audio Power Amplifier            | TSSOP16E    |
| SA51500 | Audio Amp | 8W Class-D Audio Power Amplifier, Load dump | TSSOP16E    |

➤ SA32B Target Application: HVAC

Key Features

- Big capacity flash 512KB-2MB;
- Support several low power modes, the smallest standby current  $\leq 44\mu\text{A}$ ;
- Rich peripherals, included LIN/CAN/SPI/UART/PWM, etc;
- Support high precision analog peripherals, 2x 12-bit SAR ADC, 32channels, sample rate up to 1Mbps/ 2x Analog DAC;
- Multiple Packages, LQFP64/100/144;
- Built-in BootROM for FOTA Upgrade;
- Support AUTOSAR



Silergy Solutions

| Product  | Function     | Key Features          | Package     |
|----------|--------------|-----------------------|-------------|
| SA32B16  | MCU          | M4F, 120MHz, 512KB    | LQFP64/100  |
| SA32B18  | MCU          | M4F, 160MHz, 1MB      | LQFP100/144 |
| SA32B20  | MCU          | M4F, 160MHz, 2MB      | LQFP100/144 |
| SA52108  | Motor Driver | 8-half bridge driver  | TSSOP24E    |
| SA52112  | Motor Driver | 12-half bridge driver | QFN5x5-24   |
| SA21345A | LDO          | 36V, 300mA LDO        | SO8E        |

MCU

➤ SA32B Target Application: LV BMS

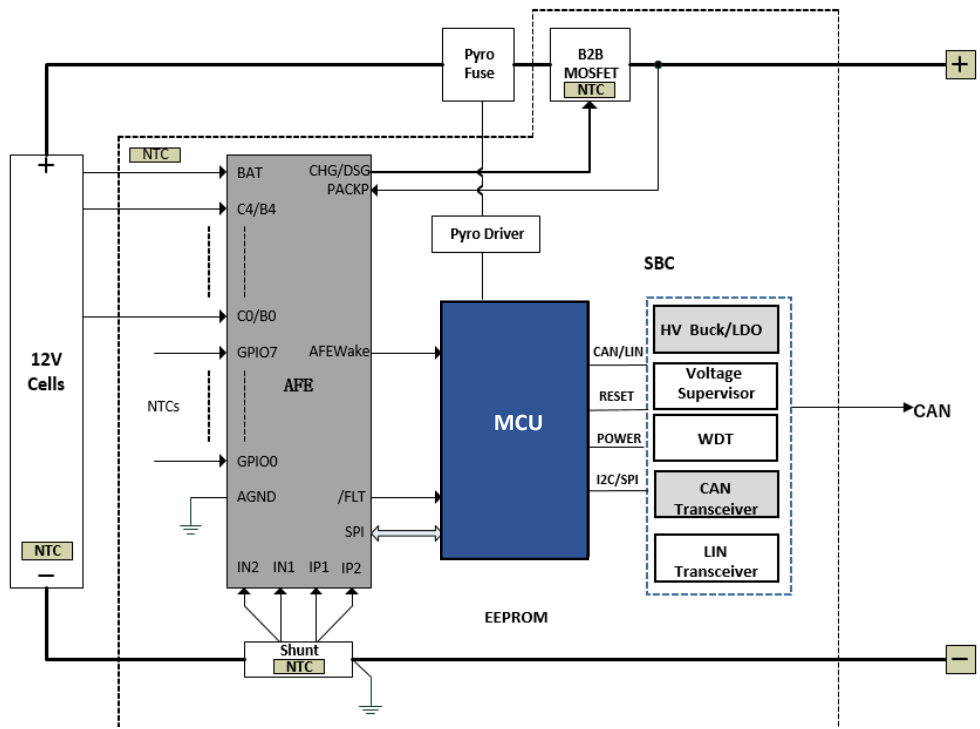
Key Features

SA32B Series

- Big capacity flash 512KB-2MB;
- Support several low power modes, the smallest standby current  $\leq 44\mu\text{A}$ ;
- Rich peripherals, included LIN/CAN/SPI/UART/PWM, etc;
- Support high precision analog peripherals, 2x 12-bit SAR ADC, 32channels, sample rate up to 1Mbps/ 2x Analog DAC;
- Multiple Packages, LQFP64/100/144;
- Built-in BootROM for FOTA Upgrade;
- Support AUTOSAR

AFE and Bridge

- Bridge IC and 18S AFE;
- Support ISO 26262 ASIL-D;
- Support Daisy-Chain communication



Silergy Solutions

| Product | Function | Key Features                                     | Package       |
|---------|----------|--------------------------------------------------|---------------|
| SA32B16 | MCU      | M4F, 120MHz, 512KB                               | LQFP64/100    |
| SA32B18 | MCU      | M4F, 160MHz, 1MB                                 | LQFP100/144   |
| SA32B20 | MCU      | M4F, 160MHz, 2MB                                 | LQFP100/144   |
| SA63122 | AFE      | 18S AFE, ASIL-D, Dasiy-chain Com                 | TQFP10x10-64E |
| SA63000 | Bridge   | SPI Communication Transceiver for Automotive BMS | TSSOP16E      |

## ➤ SA32B Target Application: Rear Lighting

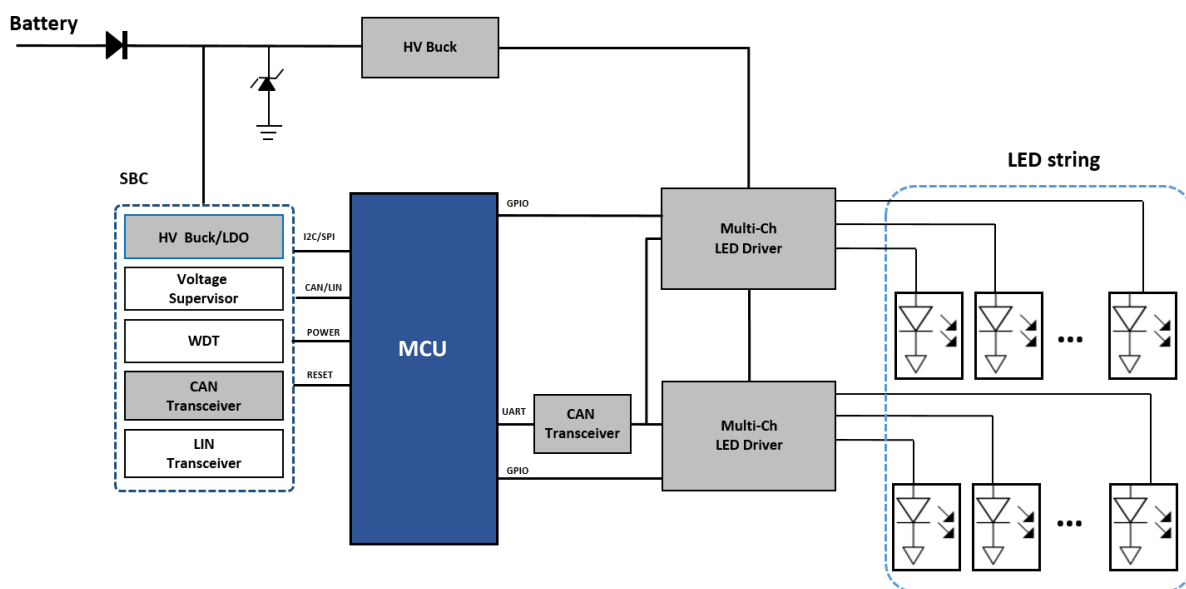
### Key Features

#### SA32B Series

- Big capacity flash 128KB-2MB;
- Support several low power modes, the smallest standby current  $\leq 44\mu\text{A}$ ;
- Rich peripherals, included LIN/CAN/SPI/UART/PWM, etc;
- Support high precision analog peripherals, 2x 12-bit SAR ADC, 32channels, sample rate up to 1Mbps/ 2x Analog DAC;
- Multiple Packages, LQFP64/100/144;
- Built-in BootROM for FOTA Upgrade;
- Support AUTOSAR

#### 12/24-Channel LED driver

- 12/24 Chn, each channel support up to 100mA current;
- Up to 2Mbps UART Over CAN to improve EMI;
- Support Cascade connection by multiple chips.



### Silergy Solutions

| Product  | Function   | Key Features                           | Package    |
|----------|------------|----------------------------------------|------------|
| SA32B14  | MCU        | M4F, 120MHz, 256KB                     | LQEP64/48  |
| SA32B16  | MCU        | M4F, 120MHz, 512KB                     | LQEP64/100 |
| SA32774  | LED Driver | 24 CHN, Max current 100mA for each CHN | QFN7x7-48  |
| SA32772L | LED Driver | 12 CHN, Max current 100mA for each CHN | QFN5x5-32  |

# Contact Us

Silergy Corp. was founded by a group of technology innovators and business leaders with an average 30 years' experience. We design innovative mixed-signal and analog ICs that utilize our industry-leading process technologies. Widely used in automotive, industrial, consumer, computing and communication devices, our products are designed to improve efficiency and to conserve or measure energy use.

Silergy Corp is a Cayman Island company with its operations headquarters in Hangzhou, China. The company stock is traded on Taiwan Stock Exchange (TWSE: 6415).

We are committed to providing industry-leading performance at an affordable solution cost.

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