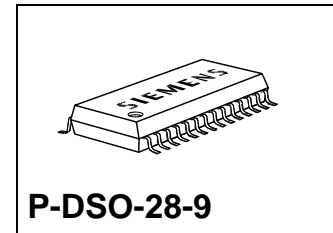
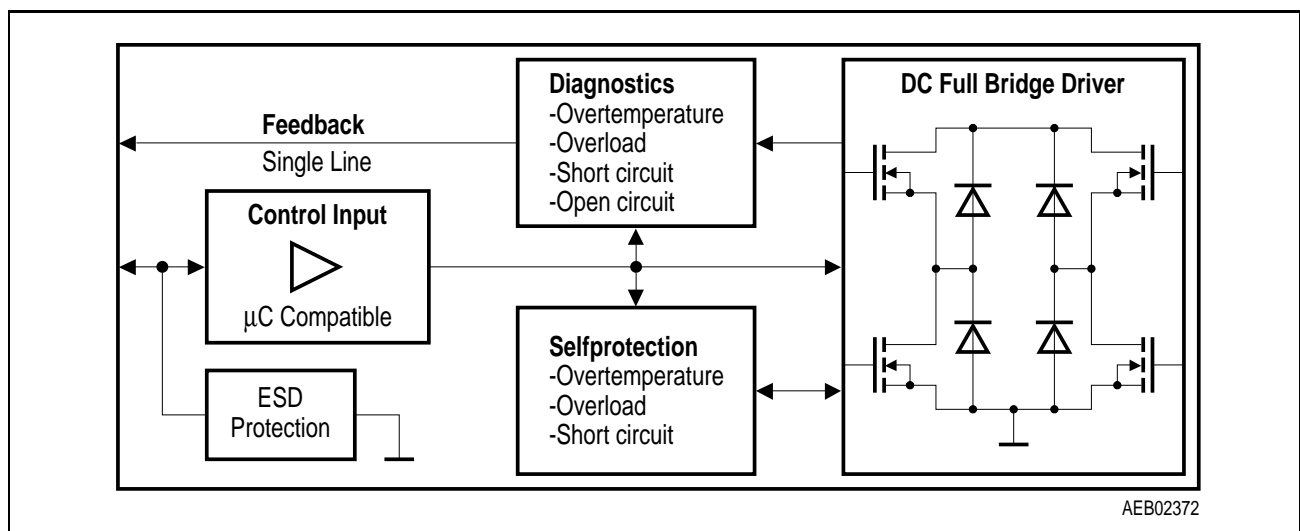


### Features

- Free configurable as bridge or quad-switch
- Optimized for DC motor management applications
- Ultra low  $R_{DS(ON)}$  @ 25 °C :  
High-side switch: typ. 165 mΩ  
Low-side switch: typ. 55 mΩ
- Very high peak current capability
- Very low quiescent current
- Space- and thermal optimized power P-DSO-Package
- Operates up to 40 V
- Load/GND-short-circuit-protected
- Status flag diagnosis
- Overtemperature shut down with hysteresis
- Short-circuit detection and diagnosis
- Open-load detection and diagnosis
- C-MOS compatible inputs
- Internal clamp diodes
- Isolated sources for external current sensing
- Over- and under-voltage detection with hysteresis



### Block Diagram



| Type    | Ordering Code | Package    |
|---------|---------------|------------|
| BTS 770 | Q67007-A9254  | P-DSO-28-9 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | $V_{UVOFF}$  | 36   | V    |

## Absolute Maximum Ratings

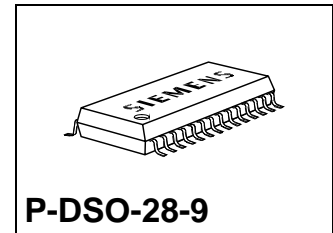
| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 43   | V    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

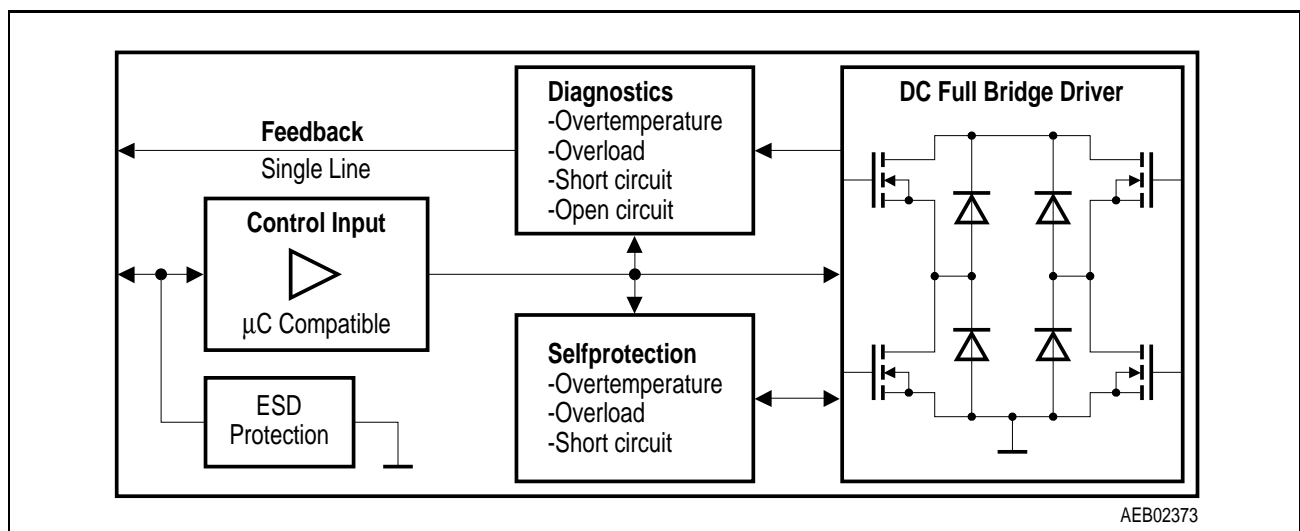
| Parameter                     | Symbol      | Limit Values |      |      | Unit | Remarks               |
|-------------------------------|-------------|--------------|------|------|------|-----------------------|
|                               |             | min.         | typ. | max. |      |                       |
| Quiescent current             | $I_S$       | -            | -    | 35   | μA   | $V_S = 13.2\text{ V}$ |
| $R_{DSO}$ ; Bridge in Path    | $R_{DSOP}$  | -            | 200  | 500  | mΩ   | -                     |
| $R_{DSON}$ ; High-Side-Switch | $R_{DSONH}$ | -            | 165  | 220  | mΩ   | $T_j = 25\text{ °C}$  |
| $R_{DSON}$ ; Low-Side-Switch  | $R_{DSONL}$ | -            | 45   | 65   | mΩ   | $T_j = 25\text{ °C}$  |
| Short circuit output current  | $I_{SCP}$   | 5.5          | -    | 9    | A    | $T_j = 85\text{ °C}$  |
| Open load detection current   | $I_{OCD}$   | 10           | -    | 200  | mA   | -                     |
| Pull-down resistance          | $R_{O1,2}$  | 4            | -    | 30   | kΩ   | -                     |
| Undervolt. switch ON voltage  | $V_{UVON}$  | -            | -    | 7    | V    | $V_S$ increasing      |
| Undervolt. switch OFF voltage | $V_{UVOFF}$ | 3.5          | -    | -    | V    | $V_S$ decreasing      |

### Features

- Free configurable as bridge or quad-switch
- Optimized for DC motor management applications
- Ultra low  $R_{\text{DS(on)}}$  @ 25 °C :  
High-side switch: typ. 85 mΩ  
Low-side switch: typ. 40 mΩ
- Very high peak current capability
- Very low quiescent current
- Space- and thermal optimized power P-DSO-Package
- Operates up to 40 V
- Load/GND-short-circuit-protected
- Status flag diagnosis
- Overtemperature shut down with hysteresis
- Short-circuit detection and diagnosis
- Open-load detection and diagnosis
- C-MOS compatible inputs
- Internal clamp diodes
- Isolated sources for external current sensing
- Over- and under-voltage detection with hysteresis



### Block Diagram



| Type    | Ordering Code | Package    |
|---------|---------------|------------|
| BTS 771 | Q67007-A9274  | P-DSO-28-9 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | $V_{UVOFF}$  | 36   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 43   | V    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

| Parameter                     | Symbol      | Limit Values |      |      | Unit | Remarks               |
|-------------------------------|-------------|--------------|------|------|------|-----------------------|
|                               |             | min.         | typ. | max. |      |                       |
| Quiescent current             | $I_S$       | -            | -    | 35   | μA   | $V_S = 13.2\text{ V}$ |
| $R_{DSON}$ ; Bridge in Path   | $R_{DSONP}$ | -            | -    | 300  | mΩ   | -                     |
| $R_{DSON}$ ; High-Side-Switch | $R_{DSONH}$ | -            | 85   | 110  | mΩ   | $T_j = 25\text{ °C}$  |
| $R_{DSON}$ ; Low-Side-Switch  | $R_{DSONL}$ | -            | 40   | 55   | mΩ   | $T_j = 25\text{ °C}$  |
| Short circuit output current  | $I_{SCP}$   | 7            | -    | 18   | A    | $T_j = 85\text{ °C}$  |
| Open load detection current   | $I_{OCD}$   | 20           | -    | 400  | mA   | -                     |
| Pull-down resistance          | $R_{O1,2}$  | 4            | -    | 30   | kΩ   | -                     |
| Undervolt. switch ON voltage  | $V_{UVON}$  | -            | -    | 7    | V    | $V_S$ increasing      |
| Undervolt. switch OFF voltage | $V_{UVOFF}$ | 3.5          | -    | -    | V    | $V_S$ decreasing      |

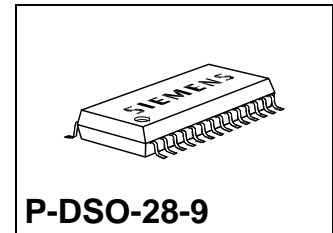
## TRILITHIC™

BTS 774

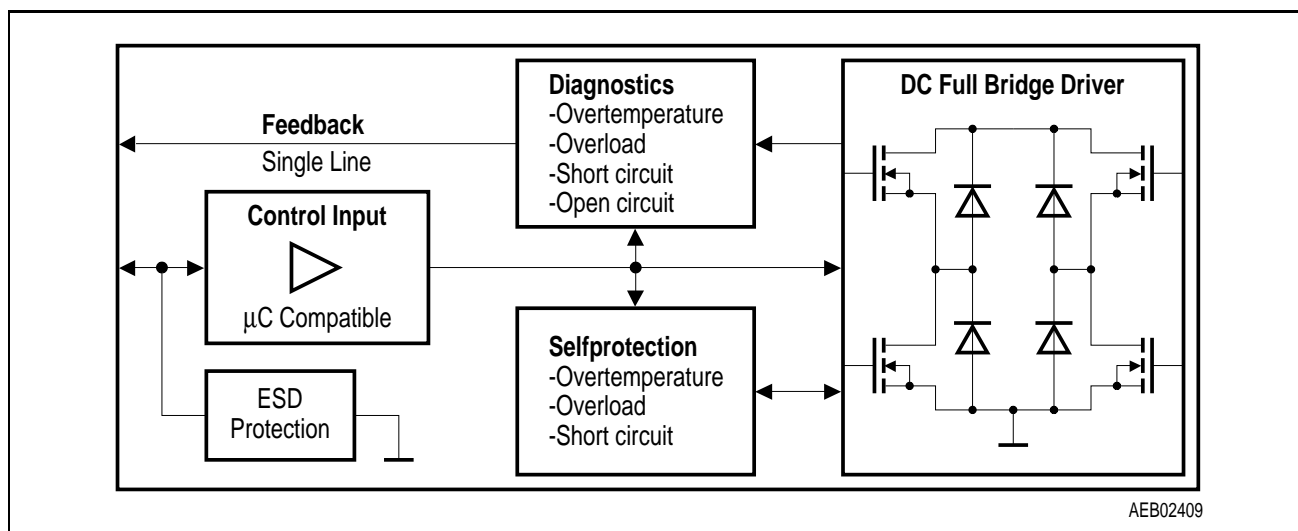
### Preliminary Data

#### Features

- Free configurable as bridge or quad-switch
- Optimized for DC motor management applications
- Ultra low  $R_{\text{DS(on)}}$  @ 25 °C :  
High-side switch: typ. 165 mΩ  
Low-side switch: typ. 55 mΩ
- Very high peak current capability
- Very low quiescent current
- Space- and thermal optimized power P-DSO-Package
- Operates up to 40 V
- **FULL**-short-circuit-protected
- Status flag diagnosis
- Overtemperature shut down with hysteresis
- Short-circuit detection and diagnosis
- Open-load detection and diagnosis
- C-MOS compatible inputs
- Internal clamp diodes
- Isolated sources for external current sensing
- Over- and under-voltage detection with hysteresis



#### Block Diagram



| Type    | Ordering Code | Package    |
|---------|---------------|------------|
| BTS 774 | on request    | P-DSO-28-9 |

■ SMD = Surface Mounted Device

### Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | $V_{UVOFF}$  | 36   | V    |

### Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 43   | V    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

### Electrical Characteristics

| Parameter                           | Symbol      | Limit Values |      |      | Unit | Remarks          |
|-------------------------------------|-------------|--------------|------|------|------|------------------|
|                                     |             | min.         | typ. | max. |      |                  |
| Quiescent current                   | $I_S$       | -            | -    | 50   | μA   | $V_S = 13.2$ V   |
| $R_{DSON}$ ; Path in Bridge Config. | $R_{DSONP}$ | -            | 200  | 500  | mΩ   | -                |
| $R_{DSON}$ ; High-Side-Switch       | $R_{DSONH}$ | -            | 165  | 220  | mΩ   | $T_j = 25$ °C    |
| $R_{DSON}$ ; Low-Side-Switch        | $R_{DSONL}$ | -            | 45   | 60   | mΩ   | $T_j = 25$ °C    |
| Short circuit output current        | $I_{SCP}$   | 5.5          | -    | 9    | A    | $T_j = 85$ °C    |
| Pull-down resistance                | $R_{O1,2}$  | 4            | -    | 30   | kΩ   | -                |
| Undervolt. switch ON voltage        | $V_{UVON}$  | -            | -    | 7    | V    | $V_S$ increasing |
| Undervolt. switch OFF voltage       | $V_{UVOFF}$ | 3.5          | -    | -    | V    | $V_S$ decreasing |

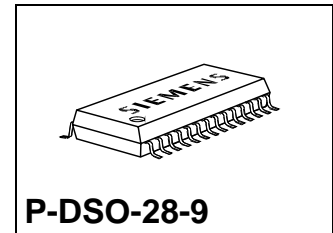
## TRILITHIC™

BTS 775

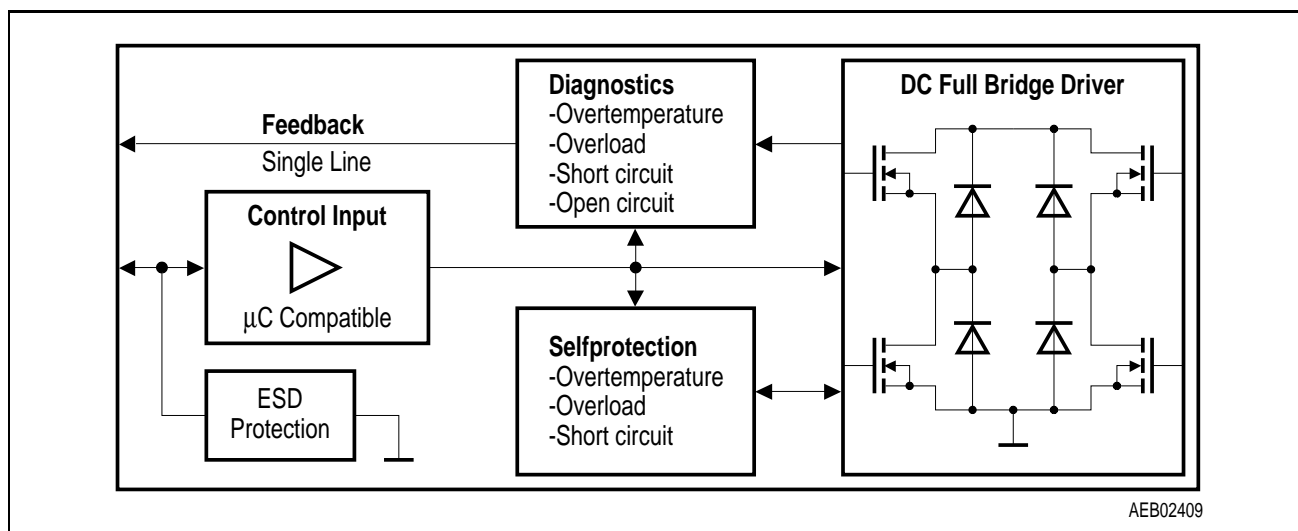
### Preliminary Data

#### Features

- Free configurable as bridge or quad-switch
- Optimized for DC motor management applications
- Ultra low  $R_{DS(ON)}$  @ 25 °C :  
High-side switch: typ. 85 mΩ  
Low-side switch: typ. 45 mΩ
- Very high peak current capability
- Very low quiescent current
- Space- and thermal optimized power P-DSO-Package
- Operates up to 40 V
- **FULL**-short-circuit-protected
- Status flag diagnosis
- Overtemperature shut down with hysteresis
- Short-circuit detection and diagnosis
- Open-load detection and diagnosis
- C-MOS compatible inputs
- Internal clamp diodes
- Isolated sources for external current sensing
- Over- and under-voltage detection with hysteresis



#### Block Diagram



| Type    | Ordering Code | Package    |
|---------|---------------|------------|
| BTS 775 | on request    | P-DSO-28-9 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | $V_{UVOFF}$  | 36   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 43   | V    |
| Output current       | $I_Q$  |              |      | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

| Parameter                                  | Symbol             | Limit Values |      |      | Unit             | Remarks                           |
|--|--------------------|--------------|------|------|------------------|-----------------------------------|
|  |                    | min.         | typ. | max. |                  |                                   |
| Quiescent current                          | $I_S$              | -            | -    | 50   | $\mu\text{A}$    | $V_S = 13.2 \text{ V}$            |
| $R_{\text{DSON}}$ ; Path in Bridge Config. | $R_{\text{DSONP}}$ | -            | -    | 320  | $\text{m}\Omega$ | -                                 |
| $R_{\text{DSON}}$ ; High-Side-Switch       | $R_{\text{DSONH}}$ | -            | 85   | 110  | $\text{m}\Omega$ | $T_j = 25 \text{ }^\circ\text{C}$ |
| $R_{\text{DSON}}$ ; Low-Side-Switch        | $R_{\text{DSONL}}$ | -            | 45   | 60   | $\text{m}\Omega$ | $T_j = 25 \text{ }^\circ\text{C}$ |
| Short circuit output current               | $I_{\text{SCP}}$   | 7            | -    | 18   | A                | $T_j = 85 \text{ }^\circ\text{C}$ |
| Pull-down resistance                       | $R_{\text{O}1,2}$  | 4            | -    | 30   | $\Omega$         | -                                 |
| Undervolt. switch ON voltage               | $V_{\text{UVON}}$  | -            | -    | 7    | V                | $V_S$ increasing                  |
| Undervolt. switch OFF voltage              | $V_{\text{UVOFF}}$ | 3.5          | -    | -    | V                | $V_S$ decreasing                  |



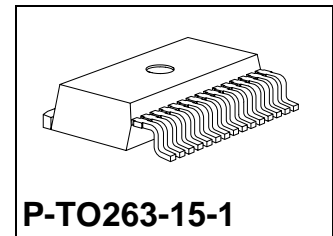
## TRILITHIC™

**BTS 780**

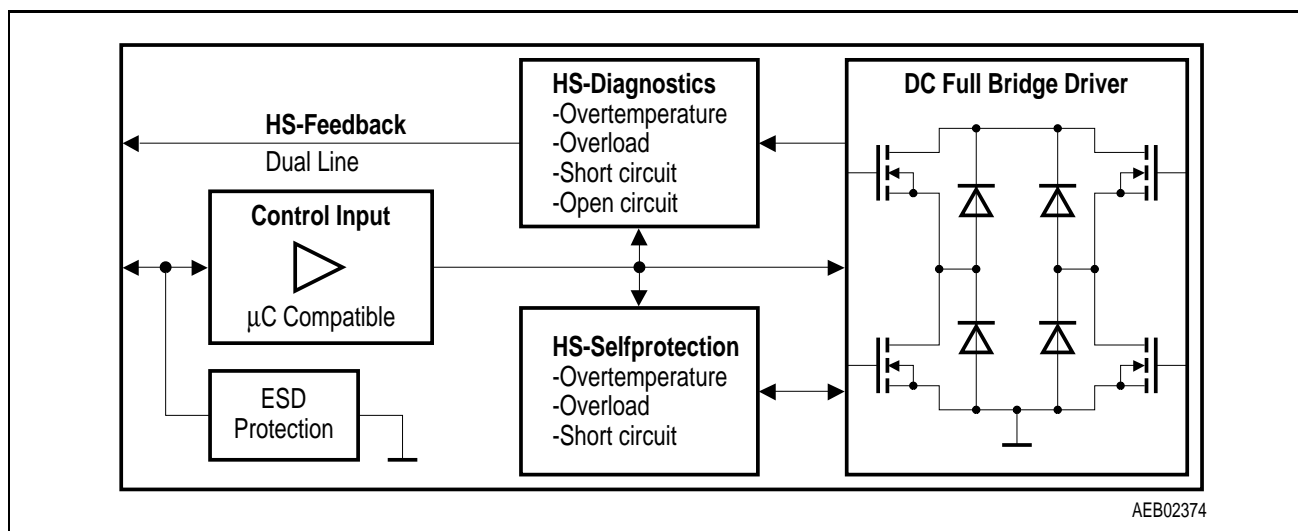
### Target Data

### Features

- Free configurable as bridge or quad-switch
- Optimized for DC motor management applications
- Ultra low  $R_{DS(ON)}$  @ 25 °C :  
High-side switch: typ. 35 mΩ  
Low-side switch: typ. 15 mΩ
- Very high peak current capability
- Very low quiescent current
- Space- and thermal optimized power SMD-Package
- Load/GND-short-circuit-protected
- Operates up to 40 V
- 2-Bit status flag diagnosis
- Overtemperature shut down with hysteresis
- Short-circuit detection and diagnosis
- Open-load detection and diagnosis
- C-MOS compatible inputs
- Internal clamp diodes
- Isolated sources for external current sensing
- Over- and under-voltage detection with hysteresis



### Block Diagram



| Type    | Ordering Code | Package      |
|---------|---------------|--------------|
| BTS 780 | on request    | P-TO263-15-1 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | $V_{UVOFF}$  | 36   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 43   | V    |
| Output current       | $I_Q$  | - 30         | 30   | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

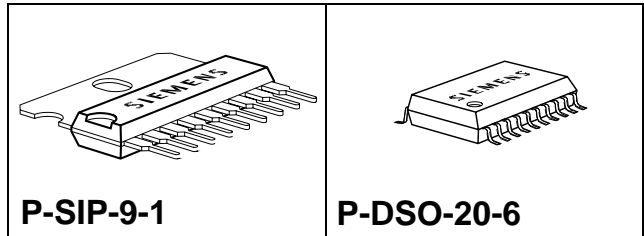
| Parameter                     | Symbol      | Limit Values |      |      | Unit | Remarks                             |
|-------------------------------|-------------|--------------|------|------|------|-------------------------------------|
|                               |             | min.         | typ. | max. |      |                                     |
| Quiescent current             | $I_S$       | -            | -    | 50   | μA   | $V_S = 13.2\text{ V}$               |
| $R_{DSON}$ ; High-Side-Switch | $R_{DSONH}$ | -            | 35   | 75   | mΩ   | -                                   |
| $R_{DSON}$ ; Low-Side-Switch  | $R_{DSONL}$ | -            | 15   | 35   | mΩ   | -                                   |
| Short circuit output current  | $I_{SCP}$   | 28           | -    | 54   | A    | $25\text{ °C} < T_j < 85\text{ °C}$ |
| Pull-down resistance          | $R_{O1,2}$  | 4            | -    | 30   | kΩ   | -                                   |
| Undervolt. switch ON voltage  | $V_{UVON}$  | -            | -    | 7    | V    | $V_S$ increasing                    |
| Undervolt. switch OFF voltage | $V_{UVOFF}$ | 3.5          | -    | -    | V    | $V_S$ decreasing                    |

## Dual Power Operational Amplifier

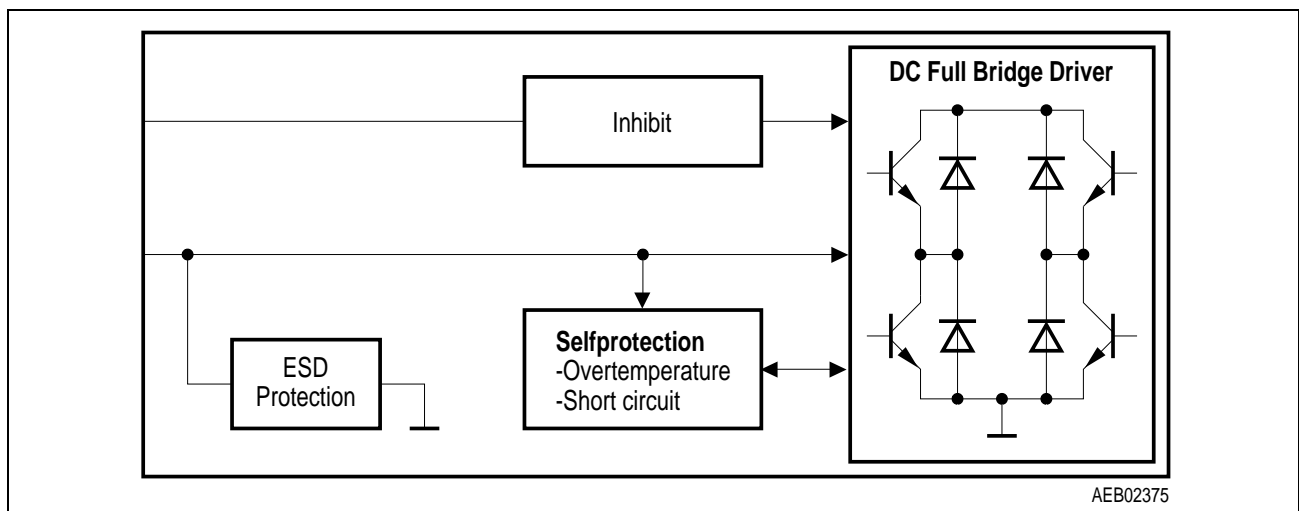
TCA 2465

### Features

- 2 A dual power operational amplifier
- Wide operating range from 6 to 40 V
- Over temperature protection
- Short circuit protection to +  $V_S$  and GND
- Free wheeling diodes
- Inhibit enables tristate outputs



### Block Diagram



| Type                     | Ordering Code | Package    |
|--------------------------|---------------|------------|
| TCA 2465                 | Q67000-A8109  | P-SIP-9-1  |
| TCA 2465 G <sup>1)</sup> | Q67006-A8334  | P-DSO-20-6 |

<sup>1)</sup> Maximum Output Current  $I_Q = 1.4$  A

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | –            | 42   | V    |
| Output current       | $I_Q$  | – 2.5        | 2.5  | A    |
| Junction temperature | $T_j$  | – 40         | 150  | °C   |

## Electrical Characteristics

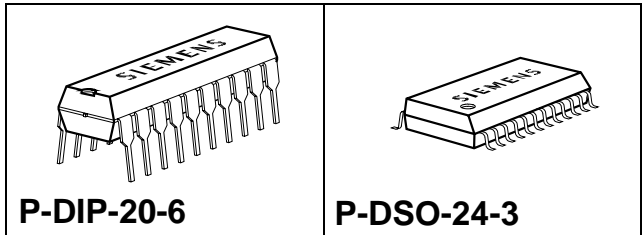
| Parameter               | Symbol     | Limit Values |      |      | Unit | Remarks                |
|-------------------------|------------|--------------|------|------|------|------------------------|
|                         |            | min.         | typ. | max. |      |                        |
| Saturation voltage      | $V_{Qsat}$ | –            | –    | 3.2  | V    | in path                |
| High slew rate          | $SR$       | –            | 2    | –    | V/μs | –                      |
| Fully protected outputs | –          | –            | –    | –    | –    | DC short-circuit proof |

## 2-Phase Stepper-Motor Driver

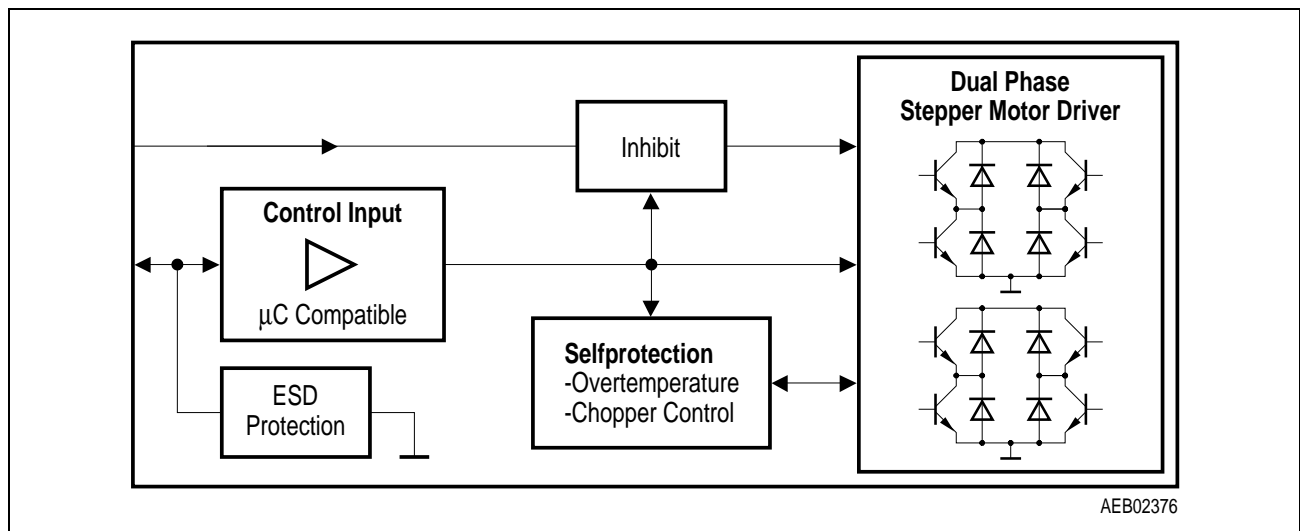
TCA 3727

### Features

- $2 \times 0.75$  A dual phase stepper motor driver full, half, quarter, mini, quasi-sine step
- Integrated driver, control logic and current control
- Wide operating range from 5 to 50 V
- Wide temperature range
- Over temperature protection
- Inhibit
- Low standby-current
- Free wheeling diodes



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TCA 3727   | Q67000-A8302  | P-DIP-20-6 |
| TCA 3727 G | Q67006-A8335  | P-DSO-24-3 |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 50   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values |              | Unit |
|----------------------|--------|--------------|--------------|------|
|                      |        | min.         | max.         |      |
| Supply voltage       | $V_S$  | –            | 52           | V    |
| Output current       | $I_Q$  | –            | $2 \times 1$ | A    |
| Junction temperature | $T_j$  | – 40         | 150          | °C   |

**Electrical Characteristics**

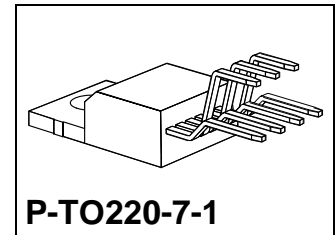
| Parameter                | Symbol             | Limit Values |      |      | Unit | Remarks     |
|--------------------------|--------------------|--------------|------|------|------|-------------|
|                          |                    | min.         | typ. | max. |      |             |
| Quiescent current        | $I_S$              | –            | 0.2  | 0.5  | mA   | –           |
| Saturation voltage       | $V_{Qsat}$         | –            | 1.4  | 1.9  | V    | total       |
| Logic supply voltage     | $V_L$              | –            | 4.5  | 6.5  | V    | –           |
| Standby output threshold | $V_{inh}$<br>(L→H) | –            | 3    | 4    | V    | $V_L = 5 V$ |
| Standby output threshold | $V_{inh}$<br>(H→L) | –            | 2.3  | 2.9  | V    | $V_L = 5 V$ |
| Hysteresis               | $V_{inhhy}$        | –            | 0.7  | 1.1  | V    | $V_L = 5 V$ |

## 2-A DC Motor Driver

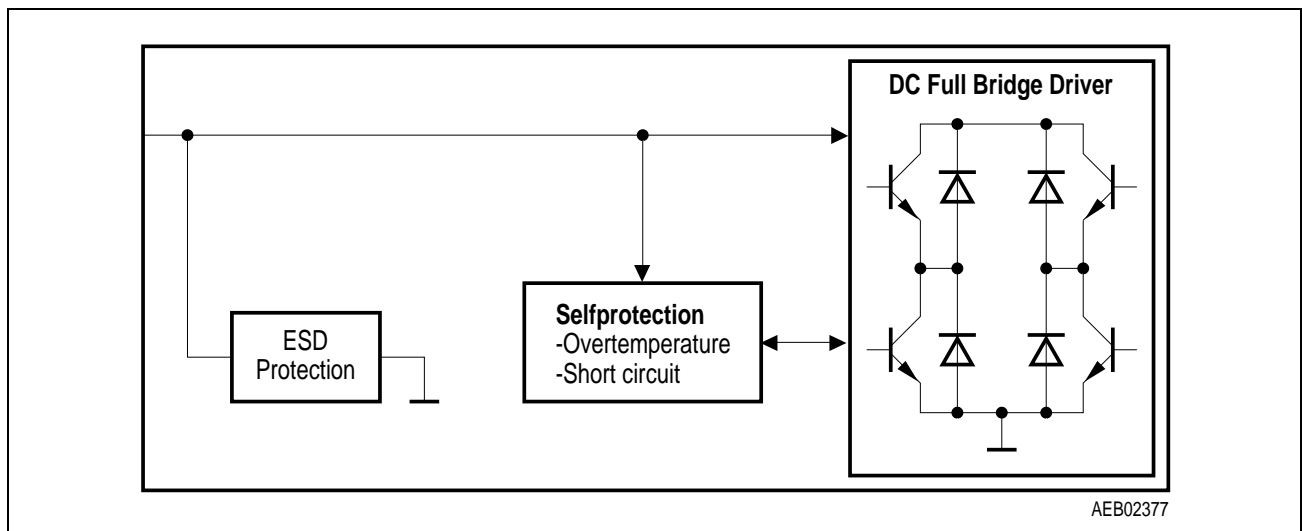
TLE 4202 B

### Features

- 2 A full bridge driver
- Wide operating range from 3.5 to 17 V
- Wide temperature range
- Over temperature protection
- Short circuit protection to GND
- Free wheeling diodes
- Low saturation voltage



### Block Diagram



| Type       | Ordering Code | Package     |
|------------|---------------|-------------|
| TLE 4202 B | Q67000-A8225  | P-TO220-7-1 |

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 3.5          | 17   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | –            | 40   | V    |
| Output current       | $I_Q$  | –            | 2.5  | A    |
| Junction temperature | $T_j$  | – 40         | 150  | °C   |

The two power comparators can switch magnets, motors or other loads either by being separated from each other or being combined to a full-bridge circuit.

The IC contains two amplifiers featuring a typical open-loop voltage gain of 80 dB at 500 Hz.

**Electrical Characteristics**

| Parameter             | Symbol     | Limit Values |      |      | Unit | Remarks     |
|-----------------------|------------|--------------|------|------|------|-------------|
|                       |            | min.         | typ. | max. |      |             |
| Quiescent current     | $I_S$      | –            | 15   | 25   | mA   | –           |
| Saturation voltage    | $V_{Qsat}$ | –            | –    | 2.5  | V    | total       |
| Short circuit current | ISC        | –            | 1.25 | 1.6  | A    | $V_Q = 0 V$ |
| Switch-ON delay       | $t_{ON}$   | –            | 3    | –    | μs   | –           |
| Switch-OFF delay      | $t_{OFF}$  | –            | 1.5  | –    | μs   | –           |

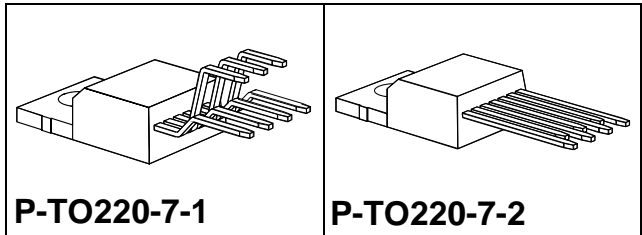


## 4-A DC Motor Driver

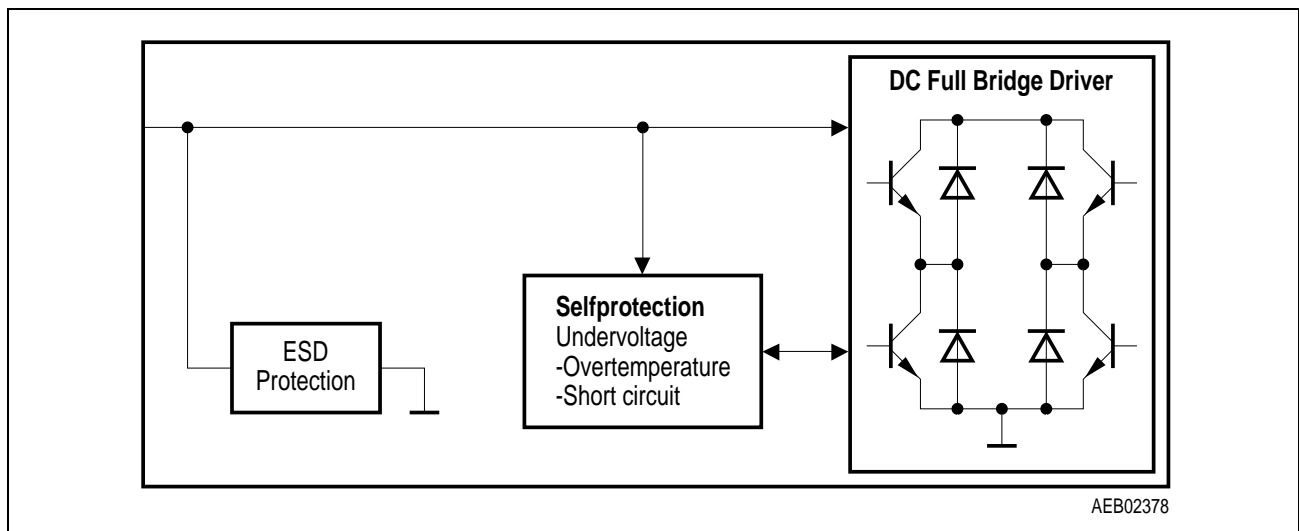
TLE 4203

### Features

- 4 A full bridge driver
- Final push-pull stage free of cross-over currents
- Wide temperature range
- Over temperature protection
- Short circuit protection to +  $V_S$  and GND
- Free wheeling diodes
- Undervoltage protection



### Block Diagram



| Type       | Ordering Code | Package     |
|------------|---------------|-------------|
| TLE 4203   | Q67000-A8121  | P-TO220-7-1 |
| TLE 4203 S | Q67000-A9101  | P-TO220-7-2 |

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 20   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | –            | 45   | V    |
| Output current       | $I_Q$  | –            | 4    | A    |
| Junction temperature | $T_j$  | – 40         | 150  | °C   |

The TLE 4203 is a versatile double power driver of up to 4 A output current which is particularly suitable as a driver for DC motors in reversible operation. The push-pull power output stage operates in the switching mode and can be combined to a full-bridge configuration.

## Electrical Characteristics

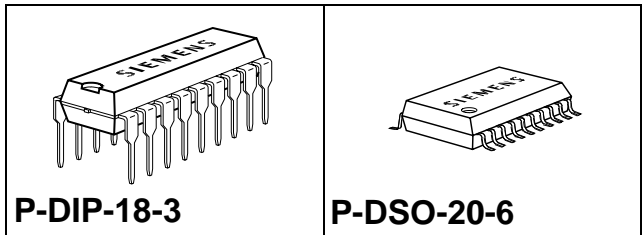
| Parameter             | Symbol     | Limit Values |      |      | Unit | Remarks |
|-----------------------|------------|--------------|------|------|------|---------|
|                       |            | min.         | typ. | max. |      |         |
| Quiescent current     | $I_S$      | –            | 20   | 25   | mA   | –       |
| Saturation voltage    | $V_{Qsat}$ | –            | –    | 2.5  | V    | total   |
| Short circuit current | $I_{SC}$   | –            | 3    | 3.8  | A    | –       |

## 1-A DC Motor Driver

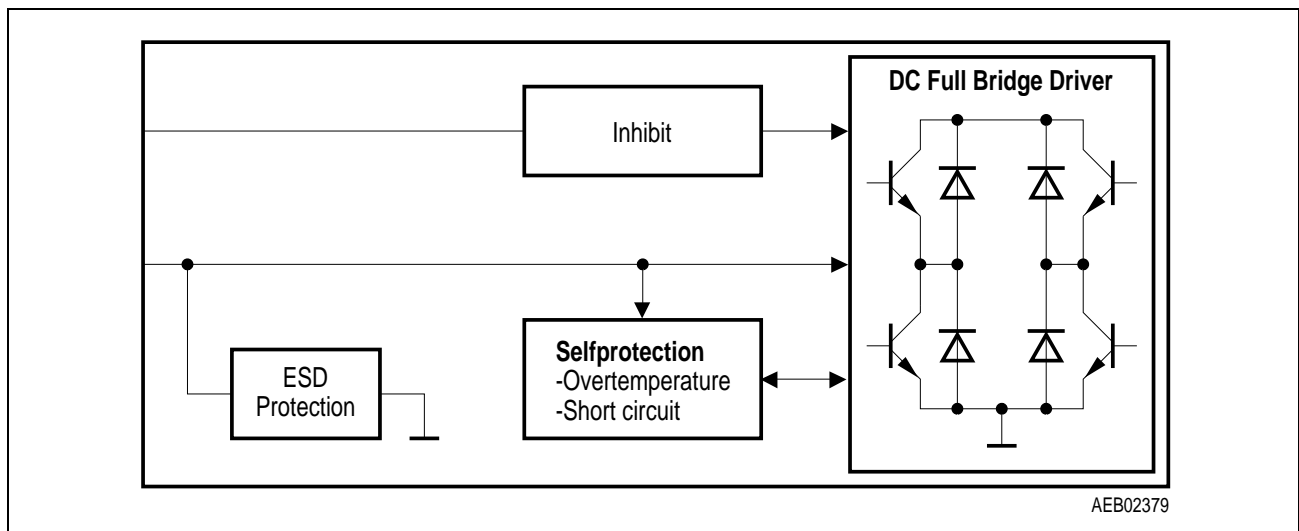
TLE 4205

### Features

- 1 A full bridge driver
- Wide operating range from 6 to 32 V
- Over temperature protection
- Short circuit protection to GND
- Free wheeling diodes
- Inhibit
- ESD protected inputs



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4205   | Q67000-A9025  | P-DIP-18-3 |
| TLE 4205 G | Q67006-A9114  | P-DSO-20-6 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 32   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | –            | 45   | V    |
| Output current       | $I_Q$  | – 1          | 1    | A    |
| Junction temperature | $T_j$  | – 40         | 150  | °C   |

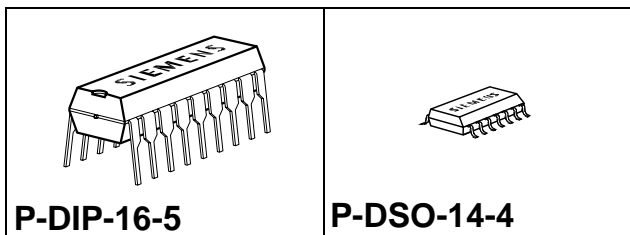
The circuit contains two power comparators that can be combined to a full-bridge circuit. The TLE 4205 is particularly suitable as a driver for DC motors in reversible operation.

## Electrical Characteristics

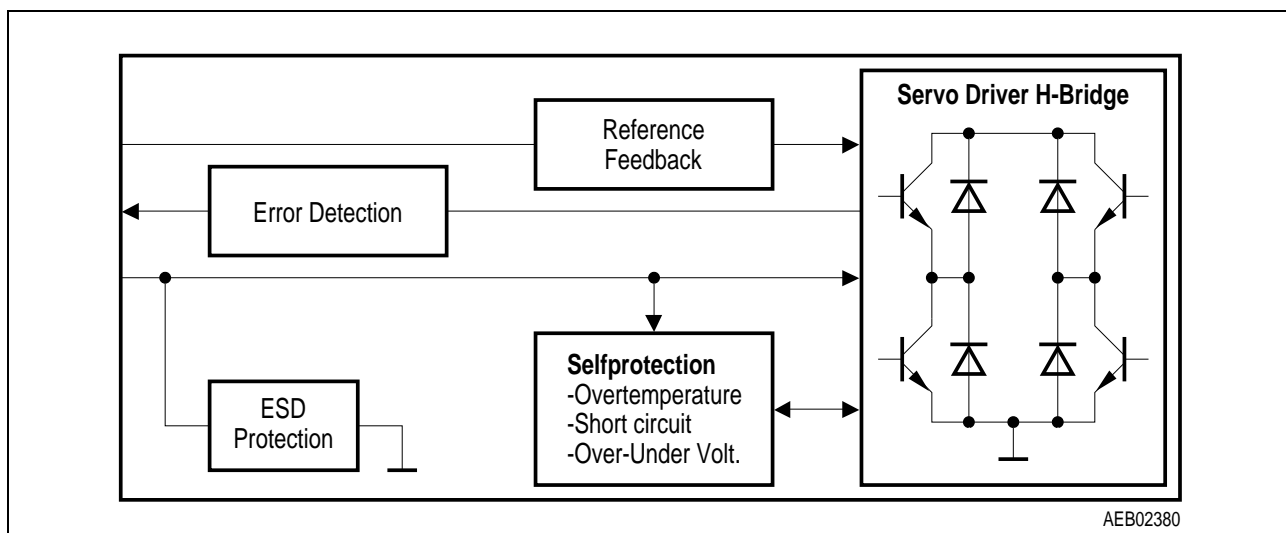
| Parameter          | Symbol     | Limit Values |      |         | Unit | Remarks |
|--------------------|------------|--------------|------|---------|------|---------|
|                    |            | min.         | typ. | max.    |      |         |
| Quiescent current  | $I_S$      | –            | 10   | 100     | μA   | inhibit |
| Saturation voltage | $V_{Qsat}$ | –            | –    | 1.9     | V    | total   |
| Inhibit voltage    | $V_g$      | – 15         | –    | + $V_S$ | V    | –       |
| Switch-ON delay    | $t_{ON}$   | –            | 10   | 20      | μs   | –       |
| Switch-OFF delay   | $t_{OFF}$  | –            | 10   | 20      | μs   | –       |

### Features

- 0.8 A servo motor driver
- Very low stand by current consumption
- Low saturation voltage
- Full short circuit protected outputs
- Overtemperature protection with diagnosis
- Over- and under-voltage lockout
- Error flag diagnosis
- Enhanced power P-DSO package



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4206   | Q67000-A9303  | P-DIP-16-5 |
| TLE 4206 G | Q67006-A9299  | P-DSO-14-4 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter            | Symbol   | Limit Values |      | Unit |
|----------------------|----------|--------------|------|------|
|                      |          | min.         | max. |      |
| Supply voltage       | $V_S$    | 7            | 18   | V    |
| Logic input voltages | $V_{IN}$ | - 2          | 18   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 45   | V    |
| Output current       | $I_Q$  | - 1          | 1    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

The circuit contains one power full bridges for servo driver optimized control inputs. The TLE 4206 G is particularly suitable as a driver for DC motors in reversible operation.

## Electrical Characteristics

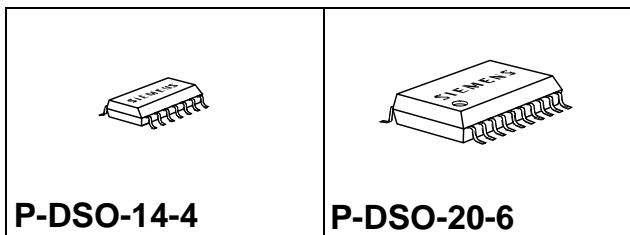
| Parameter              | Symbol      | Limit Values |      |      | Unit | Remarks     |
|------------------------|-------------|--------------|------|------|------|-------------|
|                        |             | min.         | typ. | max. |      |             |
| Quiescent current      | $I_S$       | -            | 20   | 50   | μA   | inhibit     |
| Saturation voltage     | $V_{Qsat}$  | -            | 1.2  | 1.7  | V    | total 0.4 A |
| 0 V Switch OFF voltage | $V_{0VOFF}$ | -            | 20.2 | 24   | V    | -           |
| 0 V Switch ON voltage  | $V_{0VON}$  | 18           | 19.5 | -    | V    | -           |

## 1-A Dual-HBD (Dual-Half-Bridge Driver)

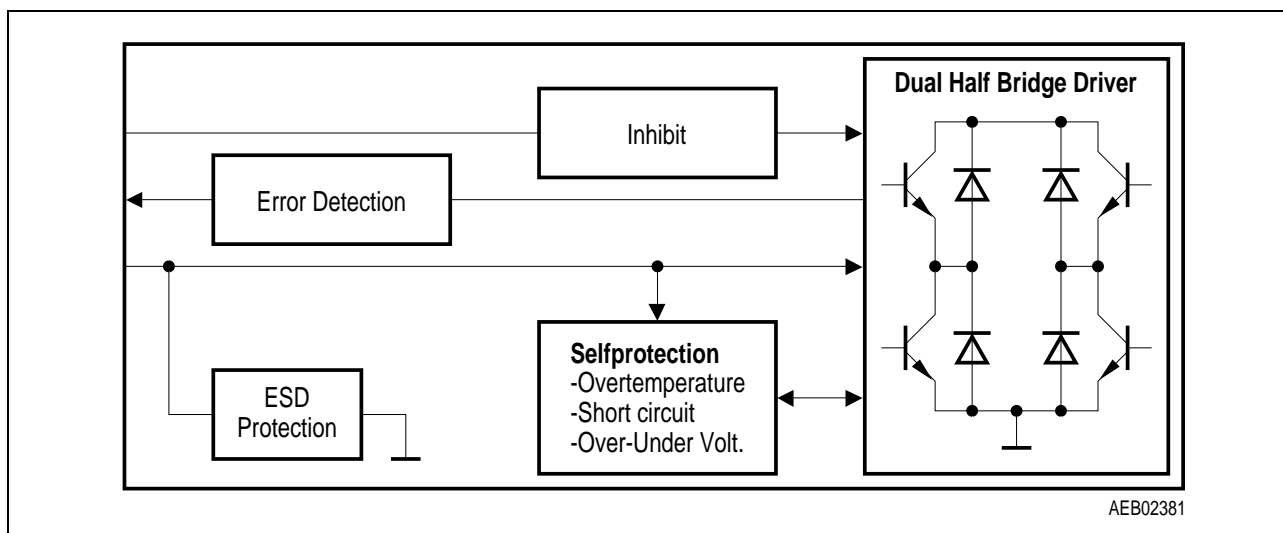
TLE 4207

### Features

- 0.8 A dual half bridge driver
- Very low stand by current consumption
- Very low saturation voltage
- Full short circuit protected outputs
- Overtemperature protection with diagnosis
- Over- and under-voltage lockout
- Error flag diagnosis
- Enhanced power P-DSO package



### Block Diagram



| Type        | Ordering Code | Package    |
|-------------|---------------|------------|
| TLE 4207 G  | Q67006-A9275  | P-DSO-14-4 |
| TLE 4207 GL | on request    | P-DSO-20-6 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter            | Symbol   | Limit Values |      | Unit |
|----------------------|----------|--------------|------|------|
|                      |          | min.         | max. |      |
| Supply voltage       | $V_S$    | 7            | 18   | V    |
| Logic input voltages | $V_{IN}$ | - 2          | 18   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 45   | V    |
| Output current       | $I_Q$  | - 1          | 1    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

The circuit contains two power half bridges which can be combined to a full-bridge circuit. The TLE 4207G is particularly suitable as a driver for DC motors in reversible operation.

## Electrical Characteristics

| Parameter              | Symbol      | Limit Values |      |      | Unit | Remarks     |
|------------------------|-------------|--------------|------|------|------|-------------|
|                        |             | min.         | typ. | max. |      |             |
| Quiescent current      | $I_S$       | -            | 20   | 50   | μA   | inhibit     |
| Saturation voltage     | $V_{Qsat}$  | -            | 1.2  | 1.7  | V    | total 0.4 A |
| 0 V Switch OFF voltage | $V_{0VOFF}$ | -            | 20.2 | 24   | V    | -           |
| 0 V Switch ON voltage  | $V_{0VON}$  | 18           | 19.5 | -    | V    | -           |

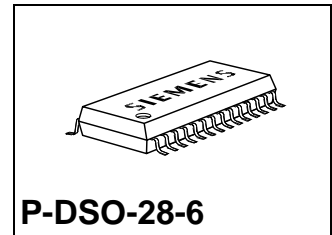


## 1-A Quad-HBD (Quad-Half-Bridge Driver)

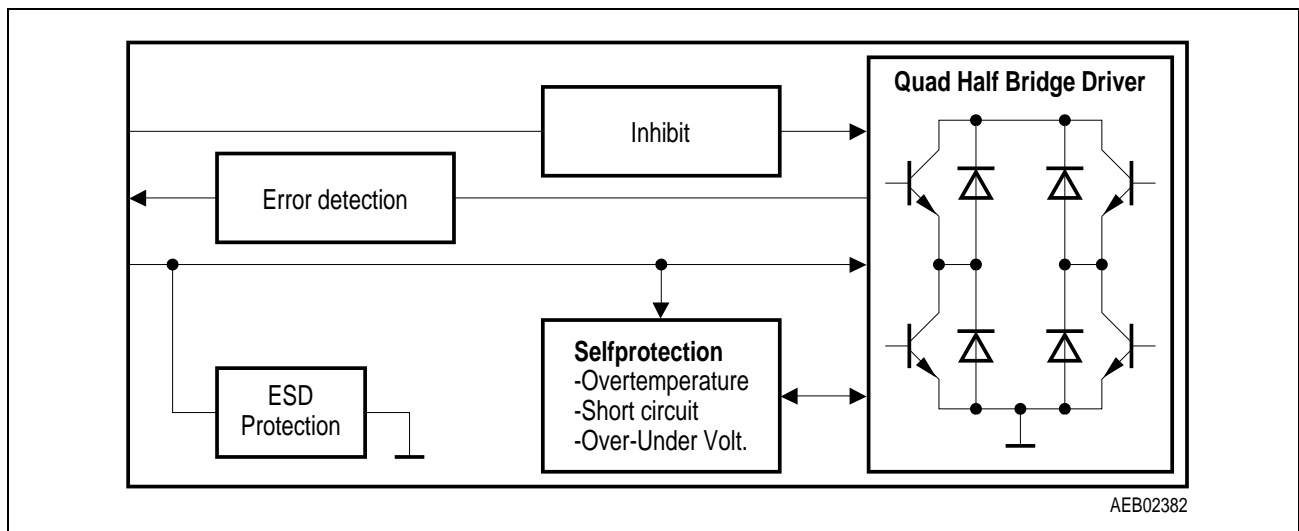
TLE 4208

### Features

- 0.8 A quad half bridge driver
- Very low stand by current consumption
- Very low saturation voltage
- Full short circuit protected outputs
- Overtemperature protection with diagnosis
- Over- and under-voltage lockout
- Error flag diagnosis
- Enhanced power P-DSO package



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4208 G | on request    | P-DSO-28-6 |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter            | Symbol   | Limit Values |      | Unit |
|----------------------|----------|--------------|------|------|
|                      |          | min.         | max. |      |
| Supply voltage       | $V_S$    | 7            | 18   | V    |
| Logic input voltages | $V_{IN}$ | - 2          | 18   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 45   | V    |
| Output current       | $I_Q$  | - 1          | 1    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

The circuit contains four power half bridges which can be combined to two full-bridge circuits.

The TLE 4208 G is particularly suitable as a driver for DC motors in reversible operation.

**Electrical Characteristics**

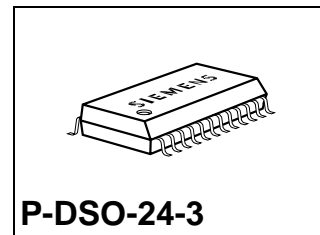
| Parameter          | Symbol      | Limit Values |      |      | Unit    | Remarks     |
|--------------------|-------------|--------------|------|------|---------|-------------|
|                    |             | min.         | typ. | max. |         |             |
| Quiescent current  | $I_S$       | -            | 20   | 50   | $\mu$ A | inhibit     |
| Saturation voltage | $V_{Qsat}$  | -            | 1.2  | 1.7  | V       | total 0.4 A |
| Switch-ON delay    | $V_{OVON}$  | 18           | 19.5 | -    | V       | -           |
| Switch-OFF delay   | $V_{OVOFF}$ | -            | 20.2 | 24   | V       | -           |

## 2-Phase Stepper-Motor Driver

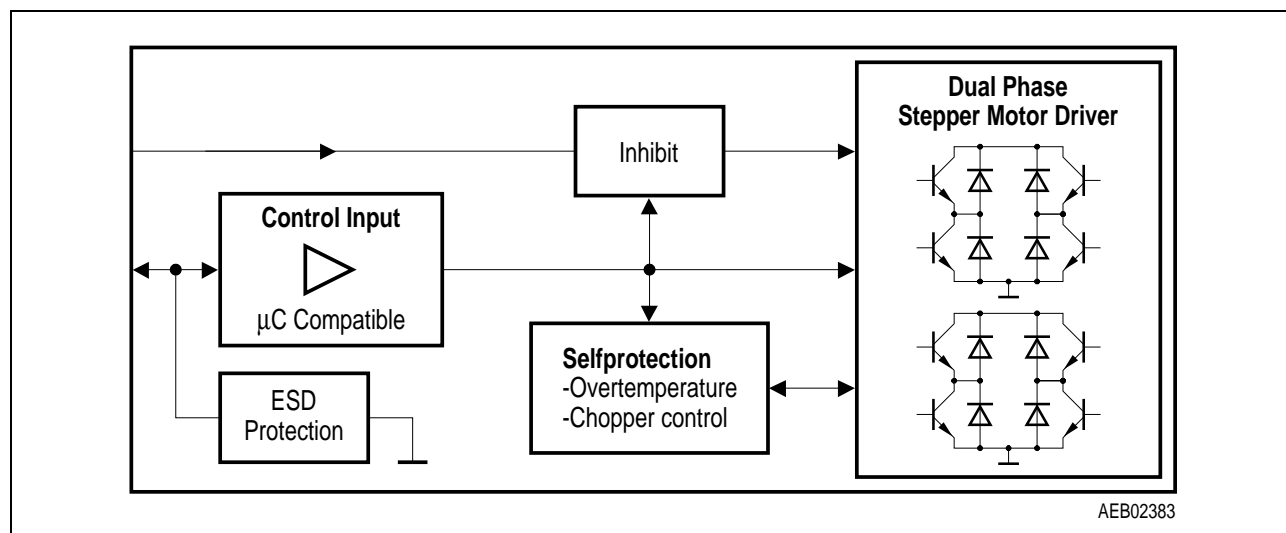
TLE 4726

### Features

- $2 \times 0.75$  A dual phase stepper motor driver full, half, quarter, mini, quasi-sine step
- Integrated driver, control logic and current control
- Wide operating range from 5 to 50 V
- Wide temperature range
- Over temperature protection
- Inhibit
- Low standby-current
- Free wheeling diodes



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4726 G | Q67006-A9297  | P-DSO-24-3 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 50   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |                | Unit |
|----------------------|--------|--------------|----------------|------|
|                      |        | min.         | max.           |      |
| Supply voltage       | $V_S$  | –            | 52             | V    |
| Output current       | $I_Q$  | –            | $2 \times 0.8$ | A    |
| Junction temperature | $T_j$  | – 40         | 150            | °C   |

## Electrical Characteristics

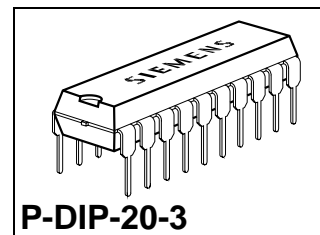
| Parameter                | Symbol             | Limit Values |      |      | Unit | Remarks     |
|--------------------------|--------------------|--------------|------|------|------|-------------|
|                          |                    | min.         | typ. | max. |      |             |
| Quiescent current        | $I_S$              | –            | 0.2  | 0.5  | mA   | –           |
| Saturation voltage       | $V_{Qsat}$         | –            | 1.4  | 1.9  | V    | total       |
| Logic supply voltage     | $V_L$              | –            | 4.5  | 6.5  | V    | –           |
| Standby output threshold | $V_{inh}$<br>(L→H) | –            | 3    | 4    | V    | $V_L = 5 V$ |
| Standby output threshold | $V_{inh}$<br>(H→L) | –            | 2.3  | 2.9  | V    | $V_L = 5 V$ |
| Hysteresis               | $V_{inhhy}$        | –            | 0.7  | 1.1  | V    | $V_L = 5 V$ |

## 2-Phase Stepper-Motor Driver

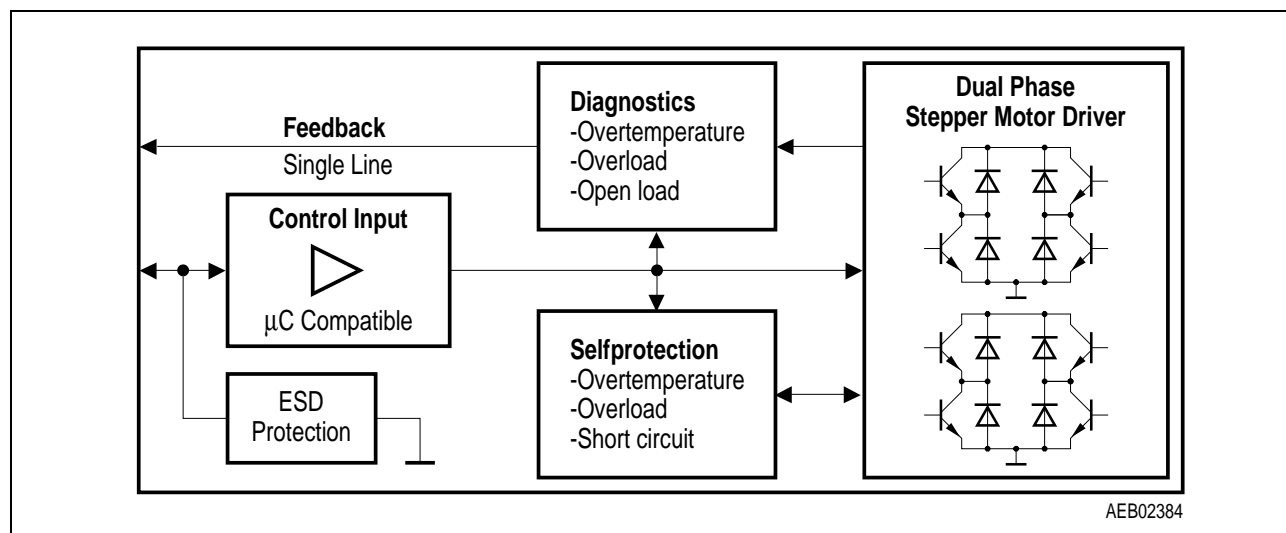
TLE 4727

### Features

- $2 \times 0.7$  A dual phase stepper motor driver
- Wide temperature range
- Short circuit protection to  $+V_S$  and GND
- Over temperature protection
- 5 V TTL logic supply
- Current control
- Free wheeling diodes
- Low saturation voltage



### Block Diagram



| Type     | Ordering Code | Package    |
|----------|---------------|------------|
| TLE 4727 | Q67000-A9099  | P-DIP-20-3 |

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 16   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values   |              | Unit |
|----------------------|--------|----------------|--------------|------|
|                      |        | min.           | max.         |      |
| Supply voltage       | $V_S$  | - 0.3          | 45           | V    |
| Output current       | $I_Q$  | $2 \times - 1$ | $2 \times 1$ | A    |
| Junction temperature | $T_j$  | - 40           | 150          | °C   |

The TLE 4727 is a bipolar monolithic IC for driving bipolar stepper motors, DC motors and other inductive loads that operate on constant current. The control logic and power output stages for two bipolar windings are integrated on a single chip. The direction and value of current are programmable for each phase via separate control inputs. The two output stages in full bridge configuration include fast integrated free-wheeling diodes and are free of crossover current.

## Electrical Characteristics

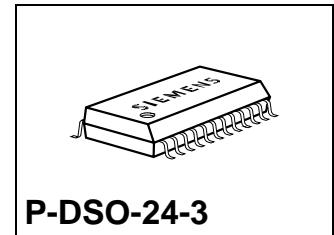
| Parameter              | Symbol     | Limit Values |      |      | Unit | Remarks         |
|------------------------|------------|--------------|------|------|------|-----------------|
|                        |            | min.         | typ. | max. |      |                 |
| Quiescent current      | $I_S$      | -            | 30   | 50   | mA   | -               |
| Saturation voltage     | $V_{Qsat}$ | -            | 1.5  | 1.7  | V    | total           |
| Logic supply voltage   | $V_L$      | -            | 4.5  | 6    | V    | -               |
| Error output           | $V_{Err}$  | -            | -    | 25   | V    | operating range |
|                        | $I_{Err}$  | -            | -    | 1    | mA   | operating range |
| Logic input hysteresis | $V_{lhy}$  | -            | 50   | -    | mV   | -               |

## 2-Phase Stepper-Motor Driver

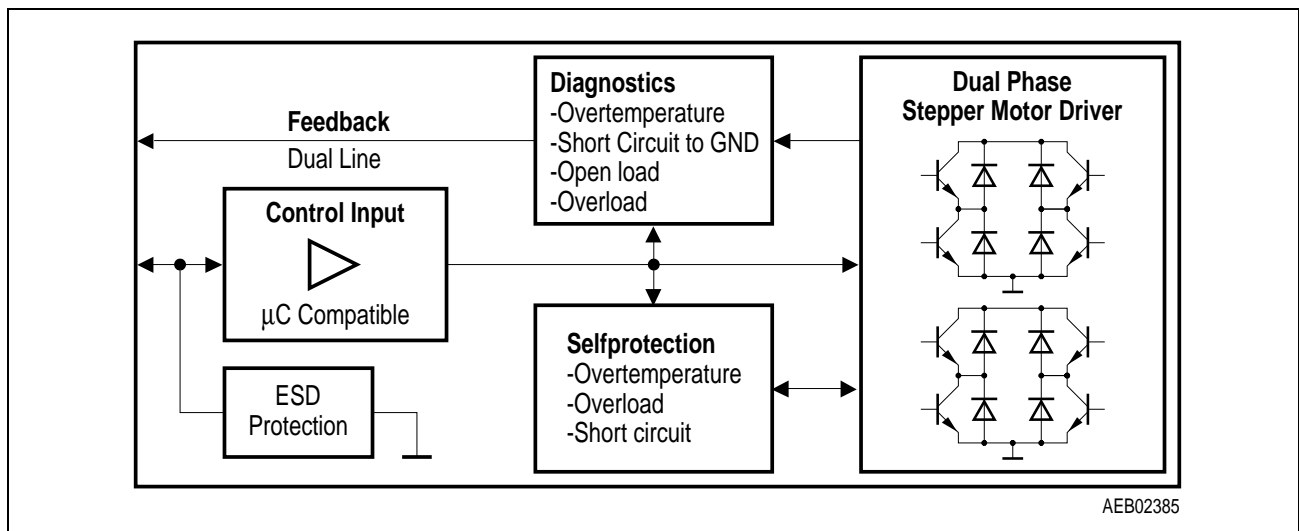
TLE 4728

### Features

- $2 \times 0.7$  A dual phase stepper motor driver
- Wide temperature range
- Short circuit protection to +  $V_S$  and GND
- Over temperature protection
- Output stages free of cross over current
- Free wheeling diodes
- Low saturation voltage



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4728 G | Q67006-A9077  | P-DSO-24-3 |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 16   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values   |              | Unit |
|----------------------|--------|----------------|--------------|------|
|                      |        | min.           | max.         |      |
| Supply voltage       | $V_S$  | - 0.3          | 45           | V    |
| Output current       | $I_Q$  | $2 \times - 1$ | $2 \times 1$ | A    |
| Junction temperature | $T_j$  | - 40           | 150          | °C   |

The TLE 4728 is a bipolar monolithic IC for driving bipolar stepper motors, DC motors and other inductive loads that operate on constant current. The control logic and power output stages for two bipolar windings are integrated on a single chip.

The direction and value of current are programmable for each phase via separate control inputs. The two output stages in full bridge configuration include fast integrated free-wheeling diodes and are free of crossover current.

**Electrical Characteristics**

| Parameter              | Symbol     | Limit Values |      |      | Unit | Remarks         |
|------------------------|------------|--------------|------|------|------|-----------------|
|                        |            | min.         | typ. | max. |      |                 |
| Quiescent current      | $I_S$      | -            | 30   | 50   | mA   | -               |
| Saturation voltage     | $V_{Qsat}$ | -            | 1.5  | 1.7  | V    | total           |
| Logic supply voltage   | $V_{lxx}$  | - 5          | -    | 6    | V    | operating range |
| Error output           | $V_{Err}$  | -            | -    | 25   | V    | operating range |
|                        | $I_{Err}$  | -            | -    | 1    | mA   | operating range |
| Logic input hysteresis | $V_{lhy}$  | -            | 50   | -    | mV   | -               |

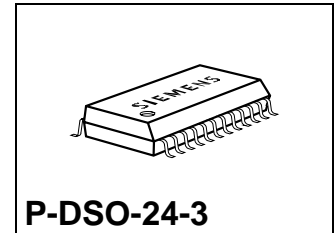


## 2-Phase Stepper-Motor Driver

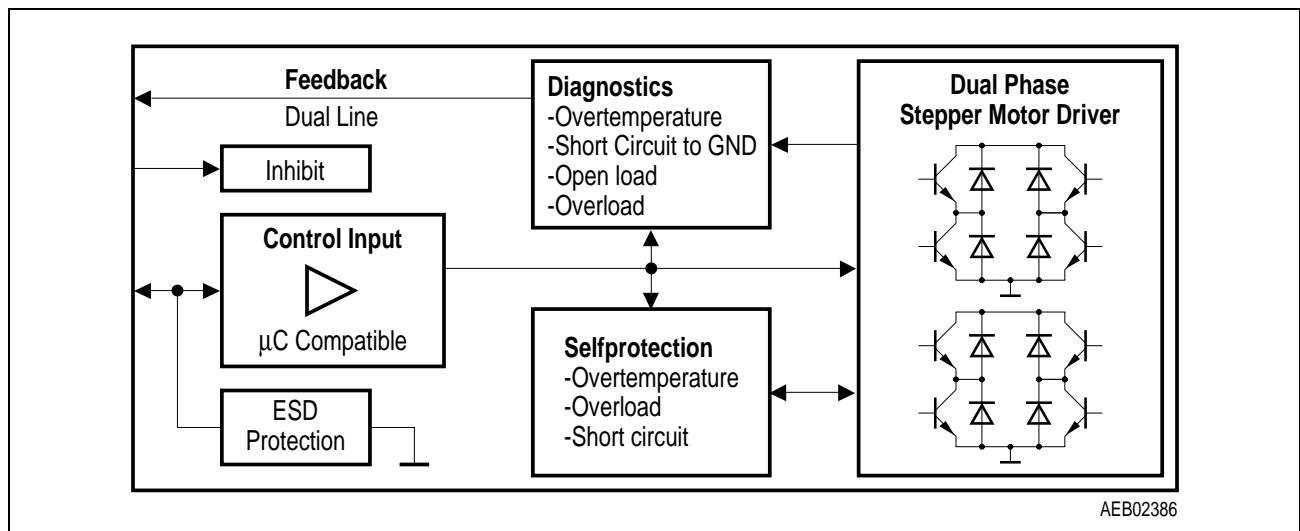
TLE 4729

### Features

- $2 \times 0.7$  A dual phase integrated stepper motor driver with control logic and current control
- Low quiescent current in INHIBIT mode
- Wide temperature range
- Short circuit protection to  $+V_S$  and GND
- Over temperature protection
- Output stages free of cross over current
- Free wheeling diodes
- Low saturation voltage



### Block Diagram



| Type       | Ordering Code | Package    |
|------------|---------------|------------|
| TLE 4729 G | on request    | P-DSO-24-3 |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 5            | 16   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values   |              | Unit |
|----------------------|--------|----------------|--------------|------|
|                      |        | min.           | max.         |      |
| Supply voltage       | $V_S$  | - 0.3          | 45           | V    |
| Output current       | $I_Q$  | $2 \times - 1$ | $2 \times 1$ | A    |
| Junction temperature | $T_j$  | - 40           | 150          | °C   |

The TLE 4729 is a bipolar monolithic IC for driving bipolar stepper motors, DC motors and other inductive loads that operate on constant current. The control logic and power output stages for two bipolar windings are integrated on a single chip.

The direction and value of current are programmable for each phase via separate control inputs. The two output stages in full bridge configuration include fast integrated free-wheeling diodes and are free of crossover current.

**Electrical Characteristics**

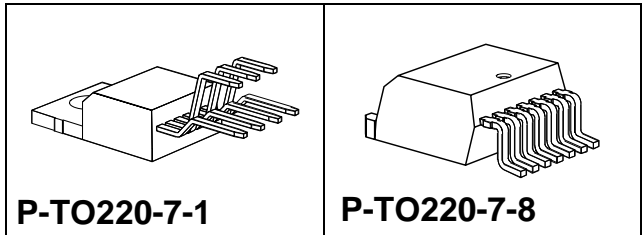
| Parameter              | Symbol     | Limit Values |      |      | Unit | Remarks         |
|------------------------|------------|--------------|------|------|------|-----------------|
|                        |            | min.         | typ. | max. |      |                 |
| Quiescent current      | $I_S$      | -            | 30   | 50   | mA   | -               |
| Saturation voltage     | $V_{Qsat}$ | -            | 1.5  | 1.7  | V    | total           |
| Logic supply voltage   | $V_{lxx}$  | - 5          | -    | 6    | V    | operating range |
| Error output           | $V_{Err}$  | -            | -    | 25   | V    | operating range |
|                        | $I_{Err}$  | -            | -    | 1    | mA   | operating range |
| Logic input hysteresis | $V_{lhy}$  | -            | 50   | -    | mV   | -               |

## 3-A DC Motor Driver

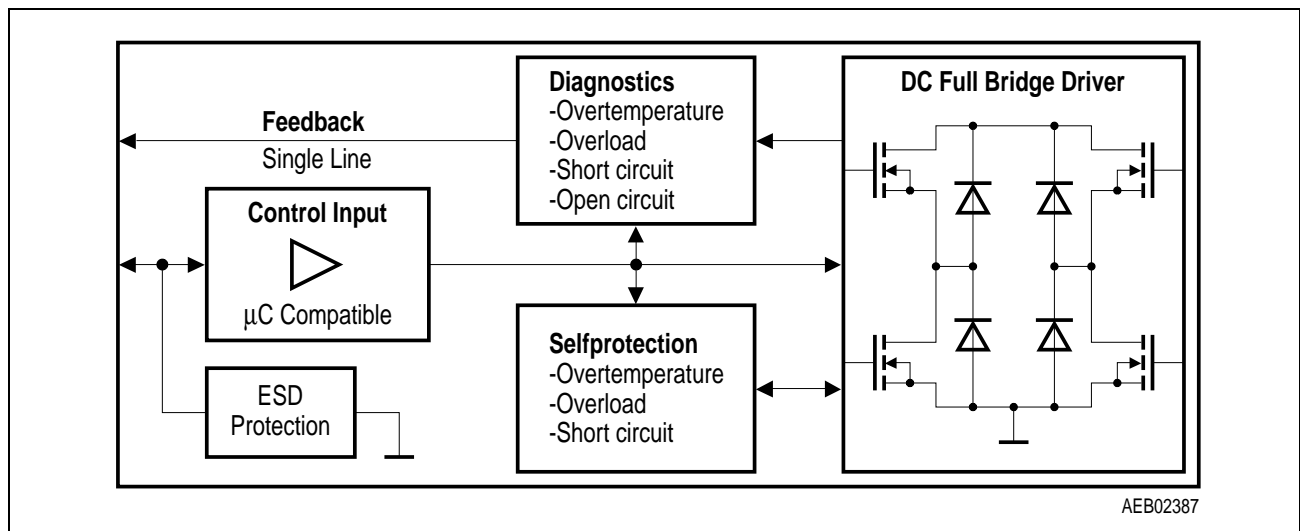
TLE 5203

### Features

- 3 A full H-bridge driver
- Wide operating range from 6 to 40 V
- Over temperature protection
- Overload detection
- Open load detection
- Short circuit protection to +  $V_S$  and GND
- Free wheeling diodes
- I/O error diagnostic
- Low  $R_{DS(on)}$



### Block Diagram



| Type       | Ordering Code | Package     |
|------------|---------------|-------------|
| TLE 5203   | Q67000-A9096  | P-TO220-7-1 |
| TLE 5203 G | Q67006-A9242  | P-TO220-7-8 |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 40   | V    |
| Output current       | $I_Q$  | - 4          | 4    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

This motor bridge is optimized for driving DC motors in reversible operation. The internal protective circuitry in particular ensures that no cross over currents can occur.

**Electrical Characteristics**

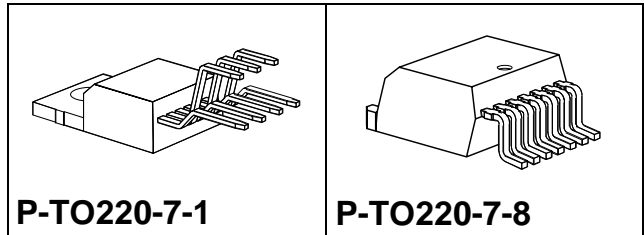
| Parameter                    | Symbol     | Limit Values |      |      | Unit       | Remarks |
|------------------------------|------------|--------------|------|------|------------|---------|
|                              |            | min.         | typ. | max. |            |         |
| Quiescent current            | $I_S$      | -            | -    | 10   | mA         | -       |
| $R_{DSON}$                   | -          | -            | 0.6  | 1.2  | $\Omega$   | total   |
| Logic input voltage          | $V_{11,2}$ | - 0.3        | -    | 7    | V          | -       |
| Diagnostic output voltage    | $V_{EF}$   | - 0.3        | -    | 7    | V          | -       |
| Pull up/pull down resistance | $R$        | 5            | -    | 25   | k $\Omega$ | -       |
| Turn-ON delay                | td1        | -            | -    | 10   | $\mu$ s    | -       |
| Turn-OFF delay               | td2        | -            | -    | 10   | $\mu$ s    | -       |

## 3-A DC Motor Driver

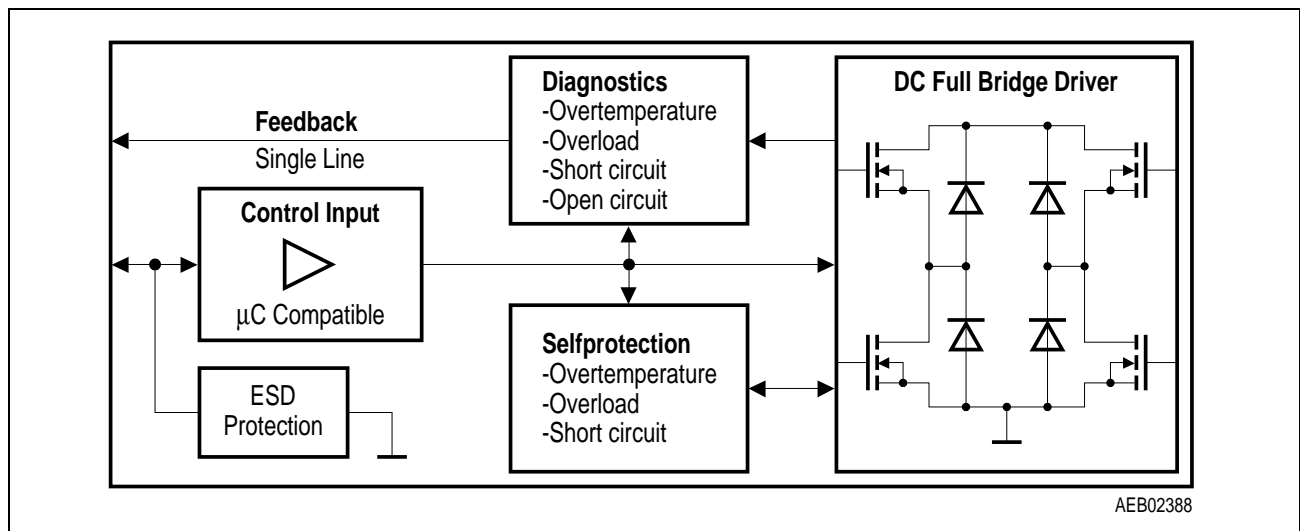
TLE 5204

### Features

- 3 A full H-bridge driver
- Wide operating range from 6 to 40 V
- Break Low **and** break High
- Over temperature protection
- Overload detection
- Open load detection
- Short circuit protection to +  $V_S$  and GND
- Free wheeling diodes
- I/O error diagnostic
- LOW  $R_{DS(ON)}$



### Block Diagram



| Type       | Ordering Code | Package     |
|------------|---------------|-------------|
| TLE 5204   | Q67000-A9177  | P-TO220-7-1 |
| TLE 5204 G | Q67006-A9234  | P-TO220-7-8 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 40   | V    |
| Output current       | $I_Q$  | - 4          | 4    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

This motor bridge is optimized for driving DC motors in reversible operation. The internal protective circuitry in particular ensures that no cross over currents can occur.

## Electrical Characteristics

| Parameter                    | Symbol     | Limit Values |      |      | Unit       | Remarks |
|------------------------------|------------|--------------|------|------|------------|---------|
|                              |            | min.         | typ. | max. |            |         |
| Quiescent current            | $I_S$      | -            | -    | 10   | mA         | -       |
| $R_{DSON}$                   | -          | -            | 0.6  | 1.2  | $\Omega$   | total   |
| Logic input voltage          | $V_{11,2}$ | - 0.3        | -    | 7    | V          | -       |
| Diagnostic output voltage    | $V_{EF}$   | - 0.3        | -    | 7    | V          | -       |
| Pull up/pull down resistance | $R$        | 5            | -    | 25   | k $\Omega$ | -       |
| Turn-ON delay                | td1        | -            | -    | 10   | $\mu$ s    | -       |
| Turn-OFF delay               | td2        | -            | -    | 10   | $\mu$ s    | -       |

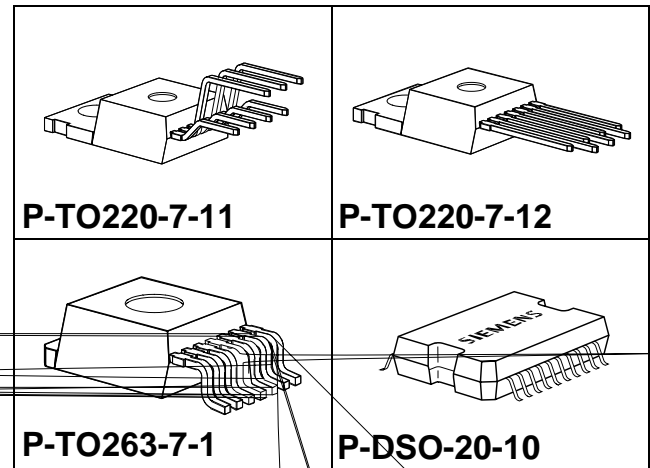
## 5-A H-Bridge for DC-Motor Applications

TLE 5205-2

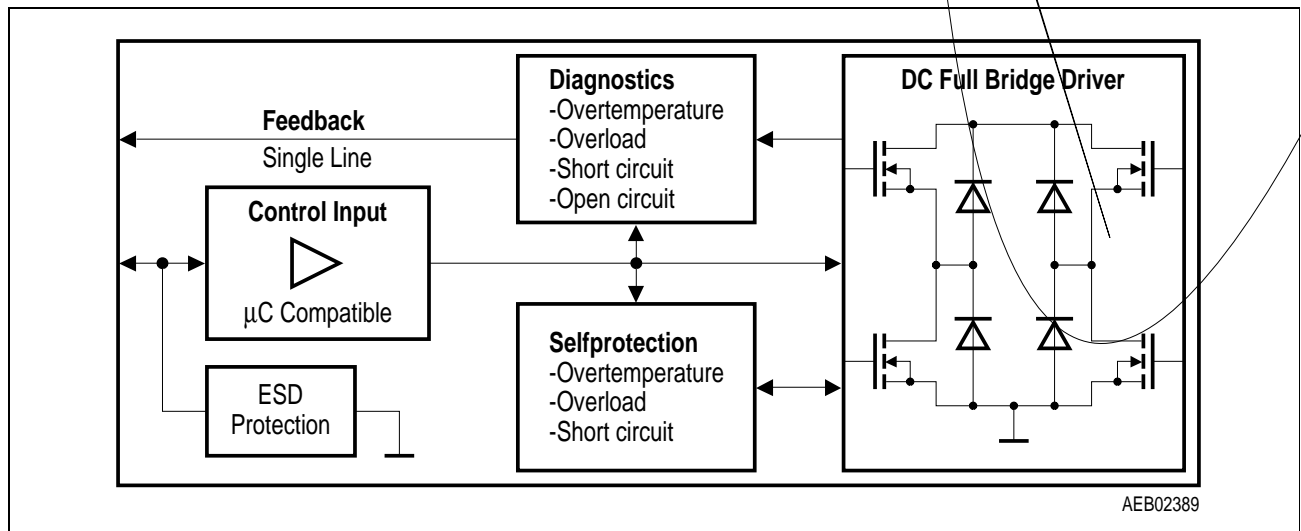
### Preliminary Data

#### Features

- 5.0 A full H-bridge driver
- Wide operating range from 6 to 40 V
- Over temperature protection
- Overload detection
- Open load detection
- Open load diagnosis
- Full short circuit protection
- Integrated free wheeling diodes
- I/O error diagnostic
- Low  $R_{\text{DS(on)}}$  typ. 200 m $\Omega$  @ 25 °C



### Block Diagram



| Type         | Ordering Code | Package      |
|--------------|---------------|--------------|
| TLE 5205-2   | Q67000-A9283  | P-TO220-7-11 |
| TLE 5205-2S  | Q67000-A9324  | P-TO220-7-12 |
| TLE 5205-2G  | Q67006-A9325  | P-TO263-7-1  |
| TLE 5205-2GP | Q67006-A9237  | P-DSO-20-10  |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 40   | V    |
| Output current       | $I_Q$  | - 6          | 6    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

This motor bridge is optimized for driving DC motors in reversible operation. The internal protective circuitry in particular ensures that no cross over currents can occur.

## Electrical Characteristics

| Parameter                 | Symbol     | Limit Values |      |      | Unit          | Remarks                        |
|---------------------------|------------|--------------|------|------|---------------|--------------------------------|
|                           |            | min.         | typ. | max. |               |                                |
| Quiescent current         | $I_S$      | -            | -    | 10   | mA            | -                              |
| $R_{DSON}$                | -          | -            | -    | 1.3  | $\Omega$      | total<br>$T_j = 150\text{ °C}$ |
| Logic input voltage       | $V_{11,2}$ | - 0.3        | -    | 7    | V             | -                              |
| Diagnostic output voltage | $V_{EF}$   | - 0.3        | -    | 7    | V             | -                              |
| Turn-ON delay             | td1        | -            | -    | 20   | $\mu\text{s}$ | -                              |
| Turn-OFF delay            | td2        | -            | -    | 20   | $\mu\text{s}$ | -                              |



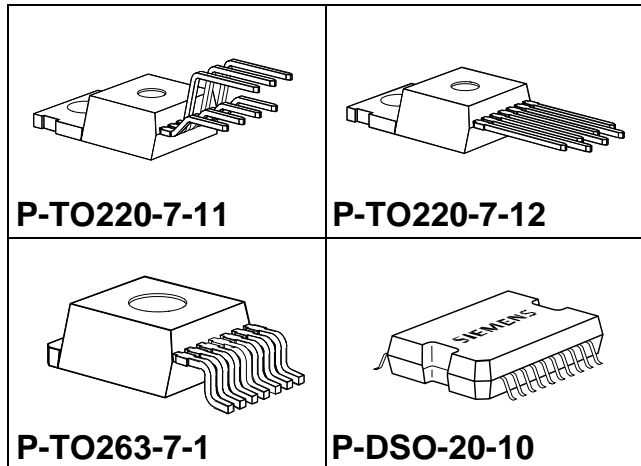
## 5-A H-Bridge for DC-Motor Applications

TLE 5206-2

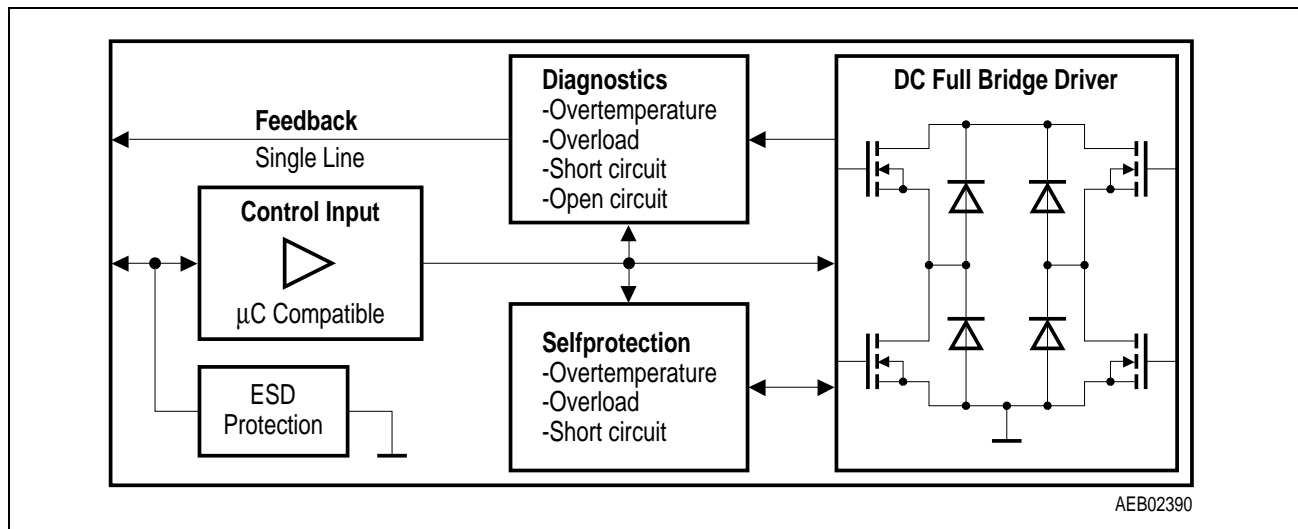
### Preliminary Data

#### Features

- 5.0 A full H-bridge driver
- Wide operating range from 6 to 40 V
- Break Low **and** break High
- Over temperature protection
- Overload detection
- Full short circuit protection
- Integrated free wheeling diodes
- I/O error diagnostic
- Low  $R_{DS(ON)}$  typ. 200 m $\Omega$  @ 25 °C



### Block Diagram



| Type         | Ordering Code | Package      |
|--------------|---------------|--------------|
| TLE 5206-2   | Q67000-A9290  | P-TO220-7-11 |
| TLE 5206-2S  | Q67000-A9326  | P-TO220-7-12 |
| TLE 5206-2G  | Q67006-A9323  | P-TO263-7-1  |
| TLE 5206-2GP | Q67006-A9239  | P-DSO-20-10  |

■ SMD = Surface Mounted Device

**Operating Range**

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

**Absolute Maximum Ratings**

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 40   | V    |
| Output current       | $I_Q$  | - 6          | 6    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

This motor bridge is optimized for driving DC motors in reversible operation. The internal protective circuitry in particular ensures that no cross over currents can occur.

**Electrical Characteristics**

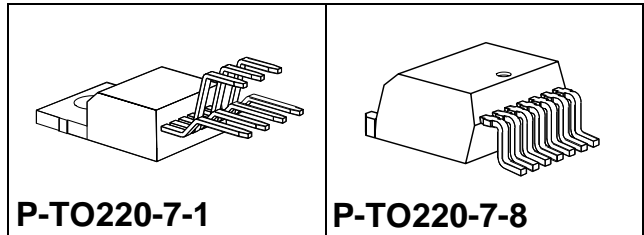
| Parameter                 | Symbol     | Limit Values |      |      | Unit          | Remarks                        |
|---------------------------|------------|--------------|------|------|---------------|--------------------------------|
|                           |            | min.         | typ. | max. |               |                                |
| Quiescent current         | $I_S$      | -            | -    | 10   | mA            | -                              |
| $R_{DSON}$                | -          | -            | -    | 1.3  | $\Omega$      | total<br>$T_j = 150\text{ °C}$ |
| Logic input voltage       | $V_{11,2}$ | - 0.3        | -    | 7    | V             | -                              |
| Diagnostic output voltage | $V_{EF}$   | - 0.3        | -    | 7    | V             | -                              |
| Turn-ON delay             | td1        | -            | -    | 20   | $\mu\text{s}$ | -                              |
| Turn-OFF delay            | td2        | -            | -    | 20   | $\mu\text{s}$ | -                              |

## 6-A DC Motor Driver with Inhibit

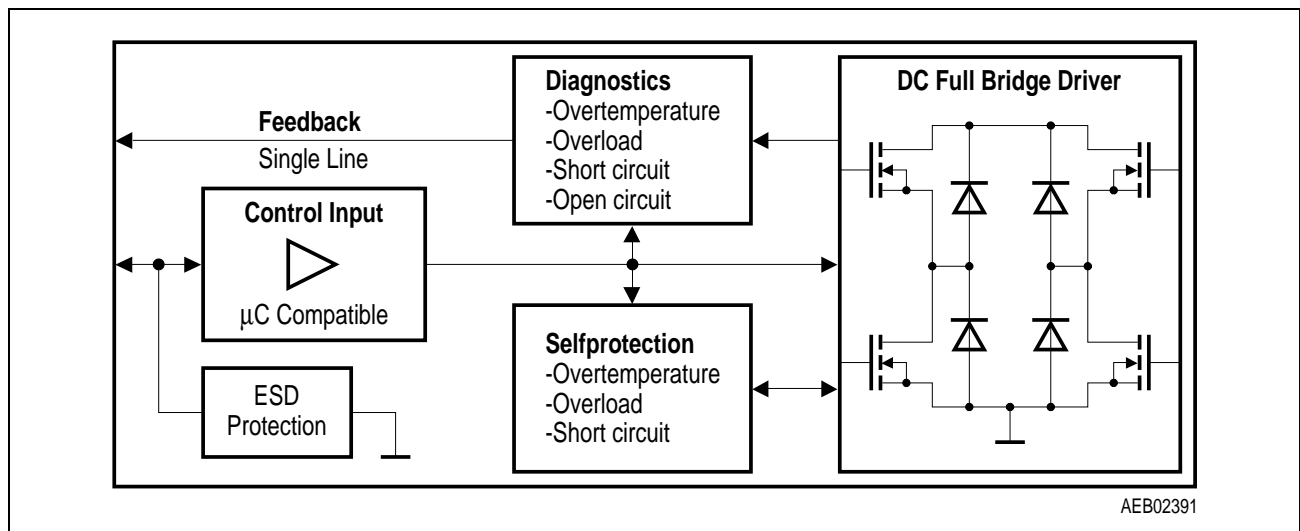
TLE 5207

### Features

- 6 A full bridge driver
- Wide operating range from 6 to 40 V
- Over temperature protection
- Low quiescent current
- Overload detection
- Short circuit protection to +  $V_S$  and GND
- Free wheeling diodes
- I/O error diagnostic
- Low  $R_{DS(ON)}$



### Block Diagram



| Type       | Ordering Code | Package     |
|------------|---------------|-------------|
| TLE 5207   | Q67000-A9295  | P-TO220-7-1 |
| TLE 5207 G | Q67006-A9296  | P-TO220-7-8 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 40   | V    |
| Output current       | $I_Q$  | - 6          | 6    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

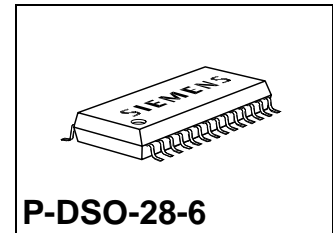
| Parameter                    | Symbol    | Limit Values |      |      | Unit       | Remarks                       |
|------------------------------|-----------|--------------|------|------|------------|-------------------------------|
|                              |           | min.         | typ. | max. |            |                               |
| Quiescent current            | $I_S$     | -            | -    | 100  | $\mu$ A    | $V_S = 12$ V<br>stand by mode |
| $R_{DSON}$                   | -         | -            | 0.6  | 1.2  | $\Omega$   | total                         |
| Logic input voltage          | $V_{1,2}$ | - 0.3        | -    | 6    | V          | $V_S = 0-40$ V                |
| Diagnostic output voltage    | $V_{EF}$  | - 0.3        | -    | 40   | V          | -                             |
| Pull up/pull down resistance | $R$       | 5            | -    | 25   | k $\Omega$ | -                             |
| Turn-ON delay                | td1       | -            | -    | 20   | $\mu$ s    | -                             |
| Turn-OFF delay               | td2       | -            | -    | 20   | $\mu$ s    | -                             |

## Hex-Half-Bridge / Double Six-Driver

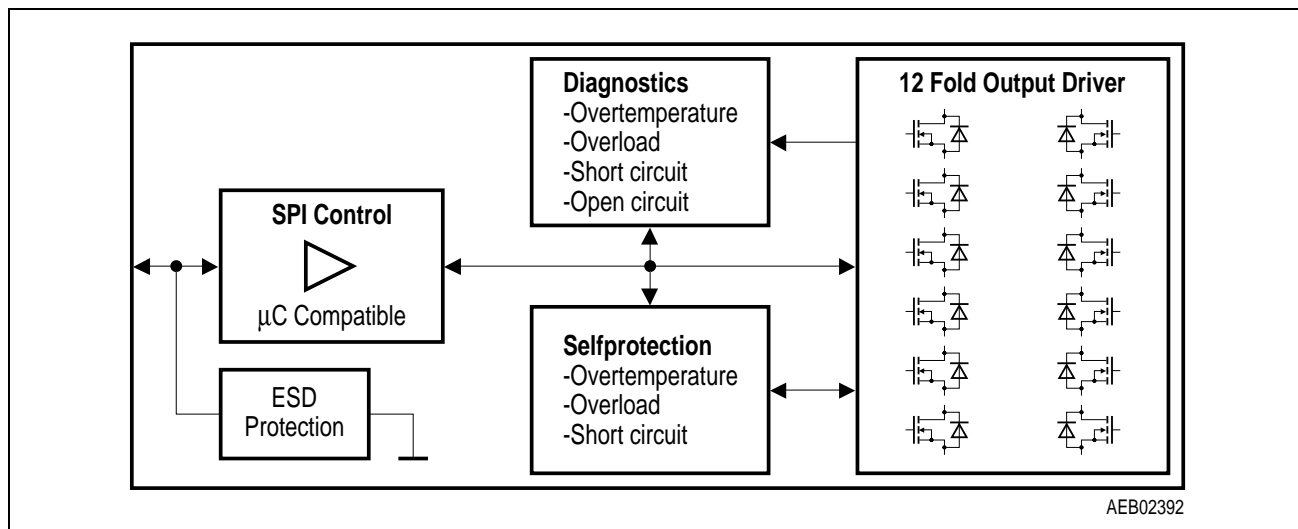
TLE 5208-6

### Features

- Multifunctional 6 fold 1.0 A half bridge driver for motors, inductive loads and lamps
- $R_{\text{DS(on)}}$  typ. 1.0  $\Omega$  @ 25 °C
- Individual configurable with 16 bit SPI
- Full diagnostic with 16 bit SPI
- Wide operating range from 6 to 32 V
- Over temperature protection with prewarning
- Very low quiescent current
- Overload detection (maskable)
- Open load and under load detection
- Over- and under voltage lockout
- Full short circuit protected
- Free wheeling diodes



### Block Diagram



| Type         | Ordering Code | Package    |
|--------------|---------------|------------|
| TLE 5208-6 G | Q67007-A9282  | P-DSO-28-6 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values  |      | Unit |
|----------------|--------|---------------|------|------|
|                |        | min.          | max. |      |
| Supply voltage | $V_S$  | $V_{UV\ OFF}$ | 40   | V    |

## Absolute Maximum Ratings

| Parameter  | Symbol | Limit Values |      | Unit |
|--|--------|--------------|------|------|
|  |        | min.         | max. |      |
| Supply voltage                                   | $V_S$  | - 0.3        | 40   | V    |
| Output current<br>(overload detection activ)     | $I_Q$  | - 2          | 2    | A    |
| Output current<br>(overload detection not activ) | $I_Q$  | - 5          | 5    | A    |
| Junction temperature                             | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

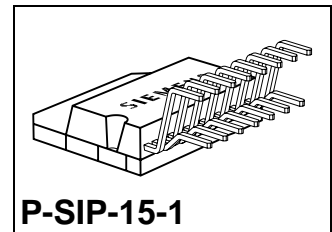
| Parameter                | Symbol       | Limit Values |      |      | Unit | Remarks                |
|--------------------------|--------------|--------------|------|------|------|------------------------|
|                          |              | min.         | typ. | max. |      |                        |
| Quiescent current        | $I_S$        | -            | -    | 50   | µA   | stand-by mode          |
| $R_{DSON}$               |              | -            | 1.0  | 2.5  | Ω    | -                      |
| SPI clock frequency      | $f_{CLK}$    | -            | -    | 2.0  | MHz  | -                      |
| Setup delay time         | $t_{set\ d}$ | -            | -    | 300  | µs   | stand-by to activ      |
| Output delay time source | -            | -            | 5    | 20   | µs   | -                      |
| Output delay time sink   | -            | -            | 7    | 30   | µs   | -                      |
| Thermal prewarning       | -            | 120          | 145  | 170  | °C   | -                      |
| Thermal shutdown         | -            | 150          | 175  | 200  | °C   | -                      |
| Thermal switch on        | -            | 120          | -    | 170  | °C   | after thermal shutdown |

## High Performance Smart Power Stepper Motor Driver with Diagnostic Interface

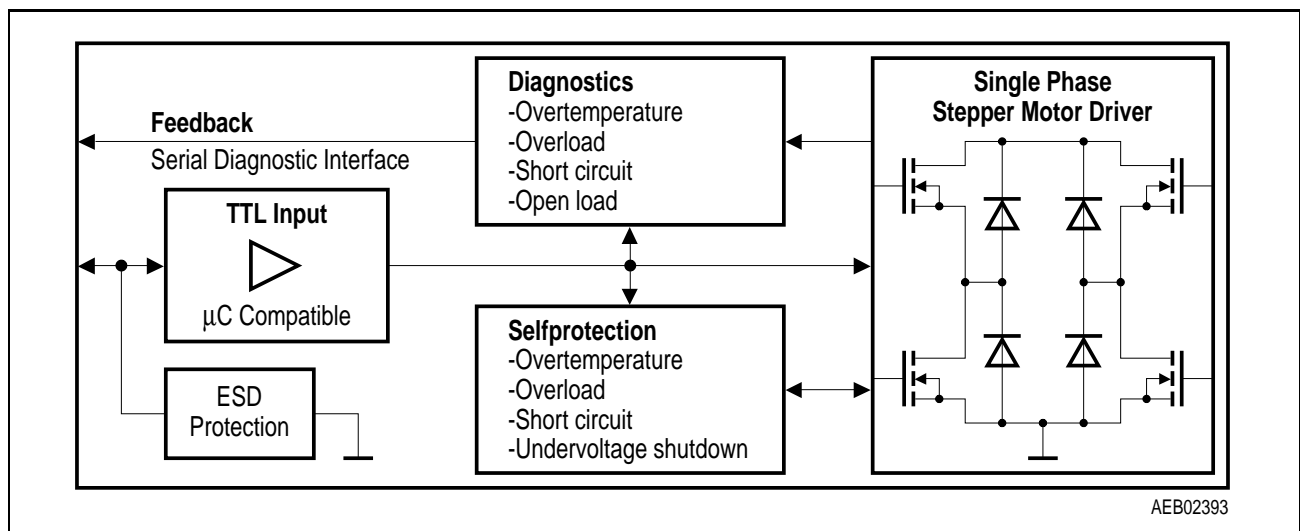
TLE 5250

### Features

- 1 × 2.5 A single phase stepper motor driver
- Fast nominal/actual comparator for micro stepper mode
- Short circuit protection to +  $V_S$  and GND
- Over temperature protection
- Undervoltage shutdown
- Dynamic current control
- Free wheeling diodes
- Serial 16-Bit diagnostic interface



### Block Diagram



| Type     | Ordering Code | Package    |
|----------|---------------|------------|
| TLE 5250 | Q67000-A9103  | P-SIP-15-1 |

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 40   | V    |

## Absolute Maximum Ratings

| Parameter            | Symbol | Limit Values |      | Unit |
|----------------------|--------|--------------|------|------|
|                      |        | min.         | max. |      |
| Supply voltage       | $V_S$  | - 0.3        | 45   | V    |
| Output current       | $I_Q$  | 0            | 3    | A    |
| Junction temperature | $T_j$  | - 40         | 150  | °C   |

The TLE 5250 has TTL-compatible logic inputs, includes a H-bridge with integrated fast free-wheeling diodes plus dynamic limiting of the motor current by chopper mode. The nominal current can be set continuously by a control voltage. Microstep mode can be produced by applying a sinoidal control voltage.

Two TLE 5250 with a minimum of external circuitry and a single supply voltage form a complete system that can be driven direct by a  $\mu$ C for two-phase bipolar stepping motors with output current of up to 2.5 A per phase.

## Electrical Characteristics

| Parameter          | Symbol | Limit Values |      |      | Unit     | Remarks         |
|--------------------|--------|--------------|------|------|----------|-----------------|
|                    |        | min.         | typ. | max. |          |                 |
| Supply current     | $I_S$  | -            | -    | 11   | mA       | -               |
| $R_{DSON}$         | -      | -            | 0.35 | 0.6  | $\Omega$ | total           |
| Logic input        | $V_I$  | - 0.3        | -    | 5.5  | V        | operating range |
| Output current     | $I_Q$  | - 2.5        | -    | 2.5  | A        | operating range |
| RC/Sync, frequency | $f$    | -            | 20   | 100  | kHz      | -               |



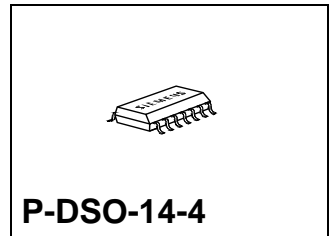
## Triple-Half-Bridge Driver

TLE 6208-3

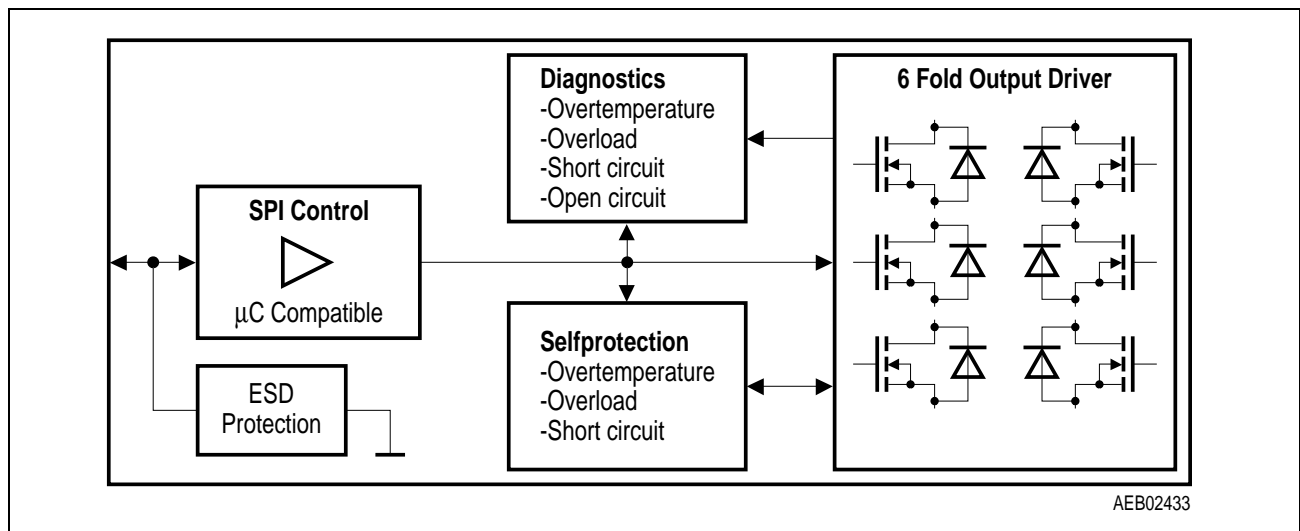
### Target Data

### Features

- Multifunctional 3 fold 1.0 A half bridge driver for motors, inductive loads and lamps
- $R_{\text{DS(on)}}$  typ.  $0.8 \Omega @ 25 \text{ }^\circ\text{C}$
- Individual configurable with 16 bit SPI
- Full diagnostic with 16 bit SPI
- Wide operating range from 6 to 32 V
- Over temperature protection with prewarning
- Very low quiescent current
- Overload detection (maskable)
- Open load and under load detection
- Over- and under voltage lockout
- Full short circuit protected
- Free wheeling diodes



### Block Diagram



| Type         | Ordering Code | Package    |
|--------------|---------------|------------|
| TLE 6208-3 G | on request    | P-DSO-14-4 |

■ SMD = Surface Mounted Device

## Operating Range

| Parameter      | Symbol | Limit Values |      | Unit |
|----------------|--------|--------------|------|------|
|                |        | min.         | max. |      |
| Supply voltage | $V_S$  | 6            | 32   | V    |

## Absolute Maximum Ratings

| Parameter  | Symbol | Limit Values |      | Unit |
|--|--------|--------------|------|------|
|  |        | min.         | max. |      |
| Supply voltage                                   | $V_S$  | - 0.3        | 40   | V    |
| Output current<br>(overload detection activ)     | $I_Q$  | - 2          | 2    | A    |
| Output current<br>(overload detection not activ) | $I_Q$  | - 5          | 5    | A    |
| Junction temperature                             | $T_j$  | - 40         | 150  | °C   |

## Electrical Characteristics

| Parameter                | Symbol | Limit Values |      |      | Unit | Remarks           |
|--------------------------|--------|--------------|------|------|------|-------------------|
|                          |        | min.         | typ. | max. |      |                   |
| Quiescent current        | $I_S$  | -            | -    | 50   | µA   | stand-by mode     |
| $R_{DSON}$               | -      | -            | 0.8  | 2.5  | Ω    | -                 |
| SPI clock frequency      | -      | -            | -    | 2    | MHz  | -                 |
| Setup delay time         | -      | -            | -    | 300  | µs   | stand-by to activ |
| Output delay time source | -      | -            | 5    | 20   | µs   | -                 |
| Output delay time sink   | -      | -            | 7    | 30   | µs   | -                 |
| Thermal prewarning       | -      | 120          | 145  | 170  | °C   | -                 |
| Thermal shutdown         | -      | 150          | 175  | 200  | °C   | -                 |