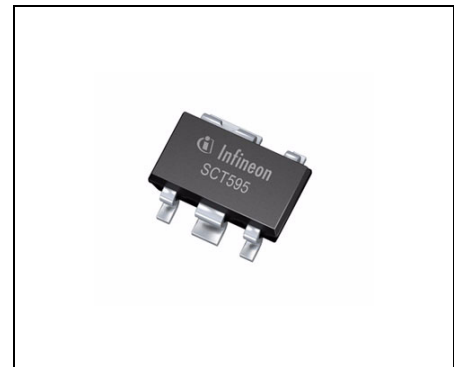




Features

- Four versions: 2.6 V, 3.0 V, 3.3 V, 5.0 V
- Output voltage tolerance $\leq \pm 4\%$
- Very low drop voltage
- Output current: 30 mA
- Power fail output
- Low quiescent current consumption
- Wide operation range: up to 45 V
- Wide temperature range: $-40\text{ }^{\circ}\text{C} \leq T_j \leq 150\text{ }^{\circ}\text{C}$
- Output protected against short circuit
- Overtemperature protection
- Reverse polarity proof
- Very small SMD-Package PG-SCT595-5
- Green Product (RoHS compliant)
- AEC Qualified



PG-SCT595-5

Functional Description

The **TLE 4295 G** is a monolithic integrated low-drop voltage regulator in the very small SMD package PG-SCT595-5. It is designed to supply e.g. microprocessor systems under the severe conditions of automotive applications. Therefore the device is equipped with additional protection functions against overload, short circuit and reverse polarity. At overtemperature the regulator is automatically turned off by the integrated thermal protection circuit.

Input voltages up to 40 V are regulated to $V_{Q,nom} = 2.6\text{ V}$ (V26 version) 3.0 V (V30 version) 3.3 V (V33 version) or 5.0 V (V50 version). The output is able to drive a load of more than 30 mA while it regulates the output voltage within a 4% accuracy.

The power fail output (open collector) is switched to low in case of undervoltage overload or saturation of the output transistor.

| Type | Package | Marking |
|---------------|-------------|---------|
| TLE 4295 GV26 | PG-SCT595-5 | D4 |
| TLE 4295 GV30 | PG-SCT595-5 | D3 |
| TLE 4295 GV33 | PG-SCT595-5 | D2 |
| TLE 4295 GV50 | PG-SCT595-5 | D1 |

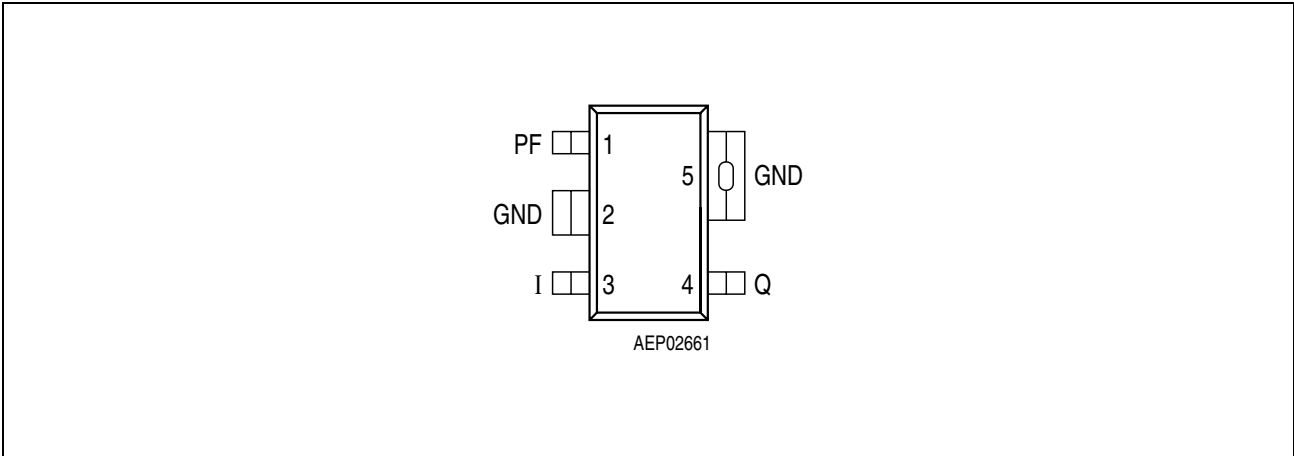


Figure 1 Pin Configuration (top view)

Table 1 Pin Definitions and Functions

| Pin No. | Symbol | Function |
|---------|--------|--|
| 1 | PF | Power Fail ; L for under-voltage |
| 2 | GND | Ground ; connected to pin 5 |
| 3 | I | Input voltage |
| 4 | Q | Output voltage ; must be blocked by a capacitor $C_Q \geq 2.2 \mu\text{F}$, $\text{ESR} \leq 5 \Omega$ to GND (Tantalum capacitor recommended as output capacitor) |
| 5 | GND | Ground ; connected to pin 2 |

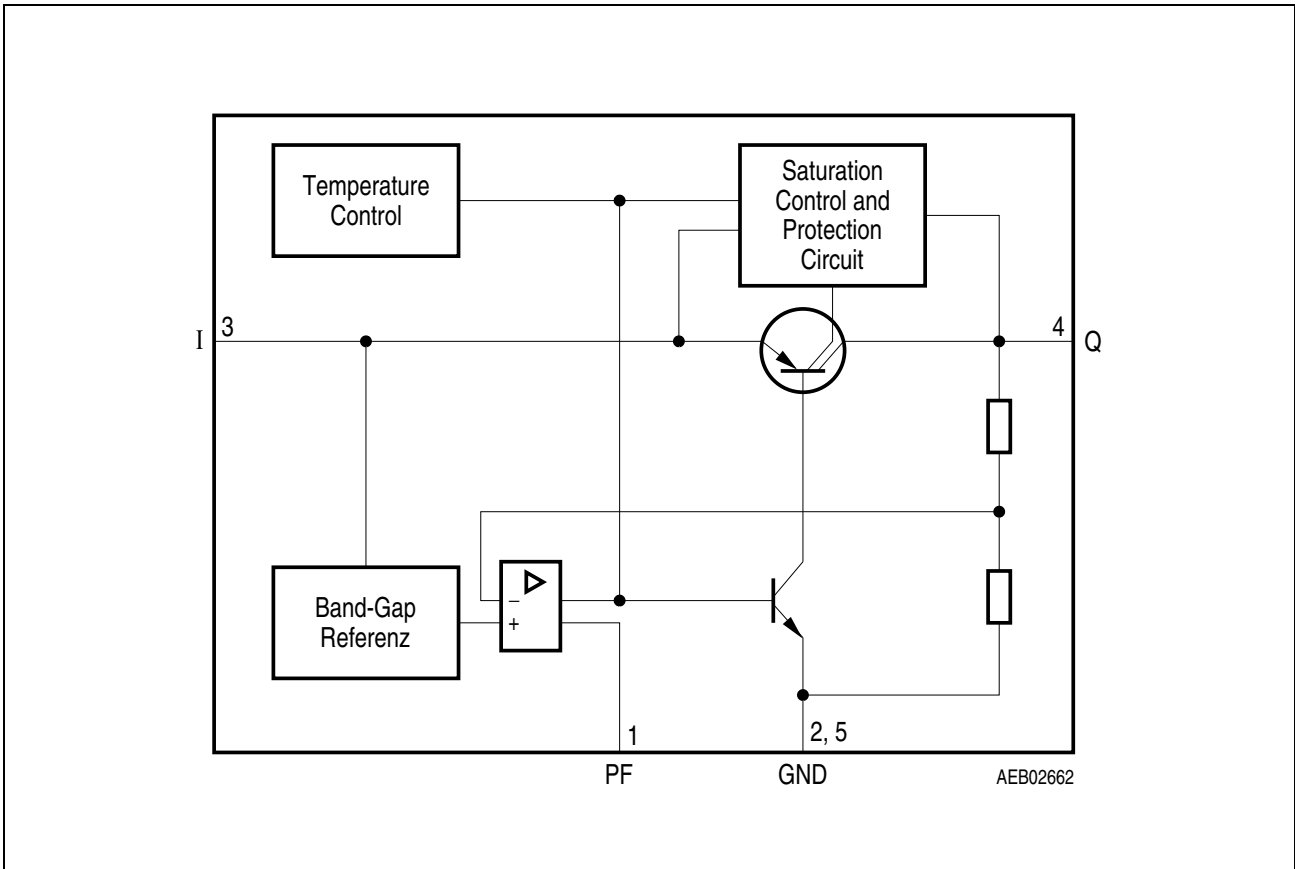


Figure 2 **Block Diagram**

Table 2 Absolute Maximum Ratings
 $-40\text{ °C} < T_j < 150\text{ °C}$

| Parameter | Symbol | Limit Values | | Unit | Remarks |
|--------------------------------|---------------|--------------|------|--------------------|--|
| | | Min. | Max. | | |
| Input | | | | | |
| Voltage | V_I | -42 | 45 | V | – |
| Current | I_I | – | – | mA | internally limited |
| Output | | | | | |
| Voltage | V_Q | -6 | 30 | V | – |
| Current | I_Q | – | – | mA | internally limited |
| Power Fail | | | | | |
| Voltage | V_{PF} | -0.3 | 45 | V | – |
| Current | I_{PF} | -500 | * | μA | * internally limited |
| Temperatures | | | | | |
| Junction temperature | T_j | -40 | 150 | $^{\circ}\text{C}$ | – |
| Storage temperature | T_{stg} | -50 | 150 | $^{\circ}\text{C}$ | – |
| Thermal Resistances | | | | | |
| Junction pin | $R_{thj-pin}$ | – | 30 | K/W | measured to pin 5 |
| Junction ambient ¹⁾ | R_{thja} | – | 179 | K/W | zero airflow zero heat sink area |

1) Worst case regarding peak temperature.

Note: Maximum ratings are absolute ratings; exceeding any one of these values may cause irreversible damage to the integrated circuit.

Table 3 Operating Range

| Parameter | Symbol | Limit Values | | Unit | Remarks |
|----------------------|--------|----------------------------|------|--------------------|--------------------|
| | | Min. | Max. | | |
| Input voltage | V_I | $V_{Q,nom} + 0.5\text{ V}$ | 45 | V | – |
| Input voltage | V_I | 3.5 V | 45 | V | 2.6 V version |
| Output current | I_Q | – | – | mA | internally limited |
| Junction temperature | T_j | -40 | 150 | $^{\circ}\text{C}$ | – |

Table 4 Electrical Characteristics
 $V_I = 13.5 \text{ V}; -40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C};$ unless otherwise specified

| Parameter | Symbol | Limit Values | | | Unit | Test Condition |
|--|----------|--------------|------|------|---------------|--|
| | | Min. | Typ. | Max. | | |
| Output | | | | | | |
| Output voltage V26 version | V_Q | 2.50 | 2.60 | 2.70 | V | $1 \text{ mA} < I_Q < 30 \text{ mA}$ $V_I = 13.5 \text{ V}$ |
| Output voltage V26 version | V_Q | 2.50 | 2.60 | 2.70 | V | $I_Q = 10 \text{ mA}$ $3.5 \text{ V} < V_I < 40 \text{ V}$ |
| Output voltage V30 version | V_Q | 2.88 | 3.0 | 3.12 | V | $1 \text{ mA} < I_Q < 30 \text{ mA}$ $V_I = 13.5 \text{ V}$ |
| Output voltage V30 version | V_Q | 2.88 | 3.0 | 3.12 | V | $I_Q = 10 \text{ mA}$ $4 \text{ V} < V_I < 40 \text{ V}$ |
| Output voltage V33 version | V_Q | 3.17 | 3.30 | 3.43 | V | $1 \text{ mA} < I_Q < 30 \text{ mA}$ $V_I = 13.5 \text{ V}$ |
| Output voltage V33 version | V_Q | 3.17 | 3.30 | 3.43 | V | $I_Q = 10 \text{ mA}$ $4.3 \text{ V} < V_I < 40 \text{ V}$ |
| Output voltage V50 version | V_Q | 4.80 | 5.00 | 5.20 | V | $1 \text{ mA} < I_Q < 30 \text{ mA}$ $V_I = 13.5 \text{ V}$ |
| Output voltage V50 version | V_Q | 4.80 | 5.00 | 5.20 | V | $I_Q = 10 \text{ mA}$ $6 \text{ V} < V_I < 40 \text{ V}$ |
| Output current limitation | I_Q | 30 | – | – | mA | ¹⁾ |
| Drop voltage | V_{dr} | – | 0.25 | 0.40 | V | $I_Q = 20 \text{ mA}^1)$ |
| Output capacitor | C_Q | 2.2 | – | – | μF | $\text{ESR} \leq 5 \Omega$ at 10 kHz |
| Current Consumption | | | | | | |
| Current consumption $I_q = I_l - I_Q$ | I_q | – | 2 | 4 | mA | $I_Q < 30 \text{ mA}$ |
| Current consumption $I_q = I_l - I_Q$ | I_q | – | 120 | 200 | μA | $I_Q < 1 \text{ mA}$ |

Table 4 Electrical Characteristics (cont'd)
 $V_I = 13.5\text{ V}; -40\text{ }^\circ\text{C} < T_j < 150\text{ }^\circ\text{C};$ unless otherwise specified

| Parameter | Symbol | Limit Values | | | Unit | Test Condition |
|-------------------------------|----------------------|--------------|------|------|------------|--|
| | | Min. | Typ. | Max. | | |
| Regulator Performance | | | | | | |
| Load regulation | $ \Delta V_Q $ | – | 10 | 25 | mV | $1\text{ mA} < I_Q < 25\text{ mA};$ $T_j = 25\text{ }^\circ\text{C}$ |
| Load regulation | $ \Delta V_Q $ | – | 10 | 30 | mV | $1\text{ mA} < I_Q < 25\text{ mA}$ |
| Line regulation | $ \Delta V_Q $ | – | 5 | 25 | mV | $\Delta V_I = V_{I, \text{min}}$ to $36\text{ V};$ $I_Q = 5\text{ mA};$ $T_j = 25\text{ }^\circ\text{C}$ |
| Line regulation | $ \Delta V_Q $ | – | 10 | 30 | mV | $\Delta V_I = V_{I, \text{min}}$ to $36\text{ V};$ $I_Q = 5\text{ mA}$ |
| Power Supply Ripple Rejection | $PSRR$ | – | 60 | – | dB | $f_r = 100\text{ Hz};$ $V_r = 0.5\text{ Vpp}$ |
| Power Fail Output | | | | | | |
| Power fail threshold | V_{QPF} | – | 4.86 | – | V | TLE 4295 GV50 |
| | | – | 3.20 | – | V | TLE 4295 GV33 |
| | | – | 2.91 | – | V | TLE 4295 GV30 |
| | | – | 2.52 | – | V | TLE 4295 GV26 |
| Power Fail Headroom | $V_{Qnom} - V_{QPF}$ | 50 | 140 | 300 | mV | TLE 4295 GV50 |
| | | 33 | 100 | 200 | mV | TLE 4295 GV33 |
| | | 30 | 90 | 180 | mV | TLE 4295 GV30 |
| | | 27 | 80 | 160 | mV | TLE 4295 GV26 |
| Power fail low voltage | V_{PFL} | – | 150 | 300 | mV | $I_{PF} = 0.1\text{ mA}$ |
| Pull-up resistor | R_{PF} | 70 | 100 | 130 | k Ω | internal connected to V_Q |

 1) Measured when the output voltage V_Q has dropped 100 mV from the nominal value.

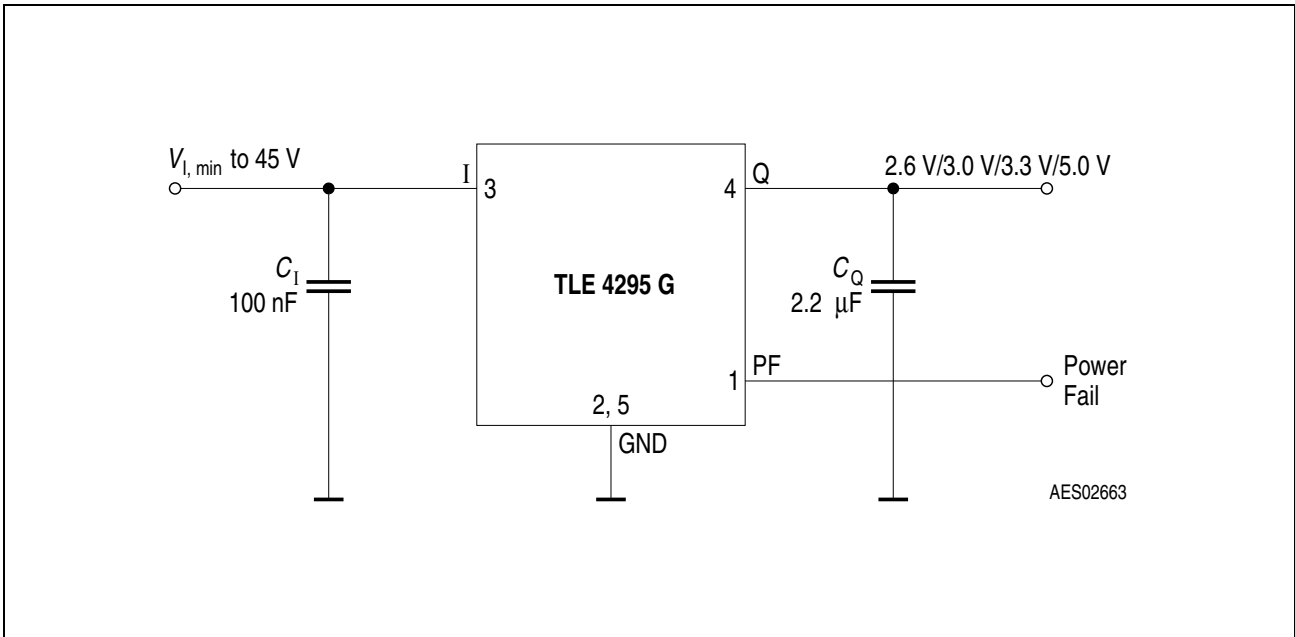


Figure 3 Application Circuit

Package Outlines

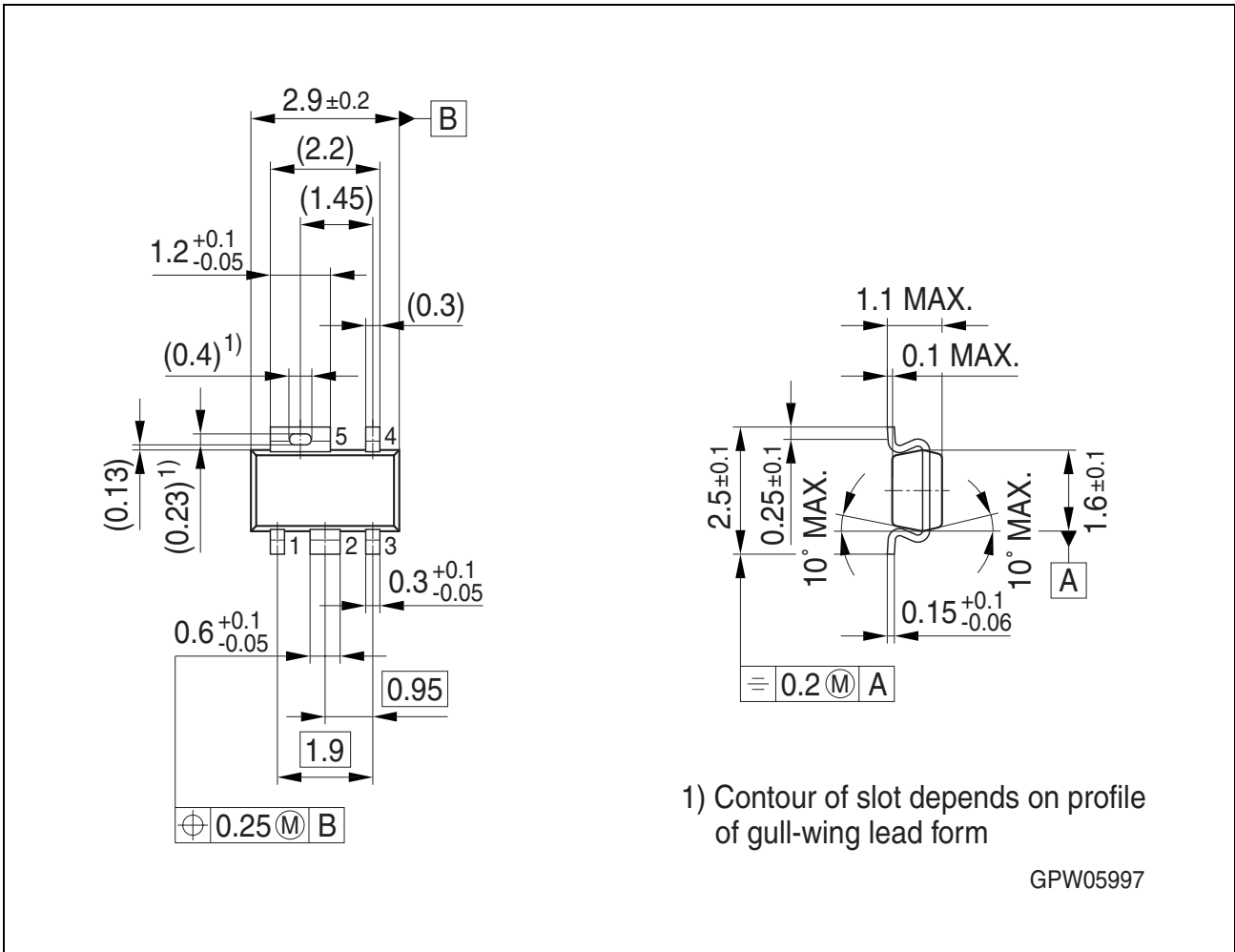


Figure 4 Outline PG-SCT595-5

Green Product (RoHS compliant)

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

You can find all of our packages, sorts of packing and others in our Infineon Internet Page "Products": <http://www.infineon.com/packages>.

SMD = Surface Mounted Device

Dimensions in mm

Revision History

| Version | Date | Changes |
|----------|------------|---|
| Rev. 1.4 | 2008-04-21 | Initial version of RoHS-compliant derivate of TLE 4295. Page 1 : AEC certified statement added. Page 1 and Page 8 : RoHS compliance statement and Green product feature added. Page 1 and Page 8 : Package changed to RoHS compliant version. Page 1 : Marking information added. Legal Disclaimer updated |
| Rev. 1.3 | 2004-01-01 | Final datasheet |

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