SIEMENS

Low-Drop Voltage Regulator TLE 4296

Target Data

Features

- Three versions: 3.0 V, 3.3 V, 5.0 V
- Output voltage tolerance ≤ ± 4%
- Very low drop voltage
- Output current: 30 mA
- Inhibit input
- Low quiescent current consumption
- Wide operation range: up to 45 V
- Wide temperature range: – 40 °C ≤ T_j ≤ 150 °C
- Output protected against short circuit
- Overtemperature protection
- Reverse polarity proof
- Very small SMD-Package SCT-595

SCT-595

	Type	Ordering Code	Package
▼	TLE 4296G V30	Q67006-A9339	SCT-595 (SMD)
▼	TLE 4296G V33	Q67006-A9340	SCT-595 (SMD)
▼	TLE 4296G V50	Q67006-A9372	SCT-595 (SMD)

▼ New type

Functional Description

The **TLE 4296G** is a monolithic integrated low-drop voltage regulator in the very small SMD package SCT-595. 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 over load, short circuit and reverse polarity. At over temperature the regulator is automatically disabled by the incorporated temperature protection.

Of course the **TLE 4296G** can be used in other applications where a stabilized voltage is required.

Input voltages up to 40 V are regulated to V_{Qrated} = 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.

To save energy the device can be switched in stand-by mode via an inhibit input which causes the current consumption to drop below 5 µA.

Pin Configuration
(top view)

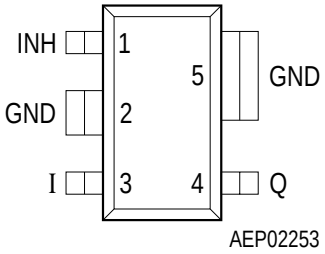


Figure 1

Pin Definitions and Functions

Pin No.	Symbol	Function
1	INH	**Inhibit input**; to switch on and off V_Q, H active input
2	GND	**Ground**; connected to pin 5
3	I	**Input voltage**
4	Q	**Output voltage**; must be blocked by a capacitor $C_Q \geq 1$ µF, ESR ≤ 5 Ω to GND
5	GND	**Ground**; connected to pin 2

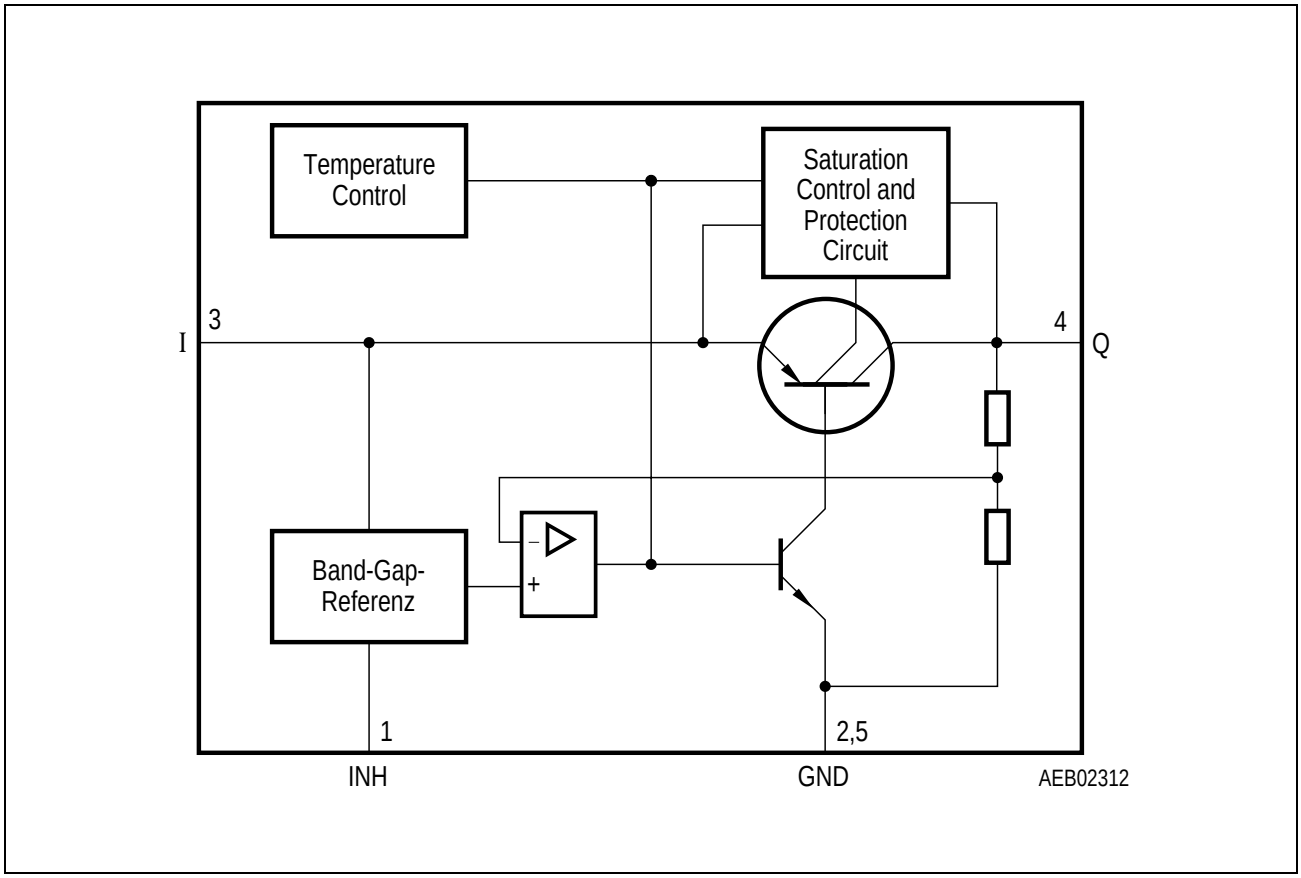


Figure 2
Block Diagram

Absolute Maximum Ratings

– 40 °C < T_j < 150 °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
Inhibit					
Voltage	V_{INH}	– 42	45	V	–
Current	I_{INH}	– 500	*	µA	* internally limited
Current	I_{INH}	– 5	5	mA	– 0.3 V < V_I < 45 V; t_p < 1 ms
Temperatures					
Junction temperature	T_j	– 40	150	°C	–
Storage temperature	T_{stg}	– 50	150	°C	–
Thermal Resistances					
Junction pin	$R_{thj\text{-}pin}$	–	30	K/W	measured to pin 5
Junction ambient [1)]	R_{thja}	–	55	K/W	–

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

[1)] Package mounted on PCB 40 mm × 40 mm × 1.5 mm / 6 cm² Cu

Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Input voltage	V_I	V_{Qnom} + 0.5 V	45	V	–
Logic input voltage (INH)	V_{INH}	– 0.3	40	V	–
Junction temperature	T_j	– 40	150	°C	–

Electrical Characteristics

V_I = 13.5 V; $V_{INH} > V_{INH, high}$; – 40 °C < T_j < 150 °C; unless otherwise specified

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Output voltage V30 version	V_Q	2.88	3.0	3.12	V	1 mA < I_Q < 30 mA V_I = 13.5 V
Output voltage V30 version	V_Q	2.88	3.0	3.12	V	I_Q = 10 mA 4 V < V_I < 40 V
Output voltage V33 version	V_Q	3.17	3.30	3.43	V	1 mA < I_Q < 30 mA V_I = 13.5 V
Output voltage V33 version	V_Q	3.17	3.30	3.43	V	I_Q = 10 mA 4.3 V < V_I < 40 V
Output voltage V50 version	V_Q	4.80	5.00	5.20	V	1 mA < I_Q < 30 mA V_I = 13.5 V
Output voltage V50 version	V_Q	4.80	5.00	5.20	V	I_Q = 10 mA 6 V < V_I < 40 V
Output current limitation	I_Q	30	–	–	mA	1)
Drop voltage	V_{dr}	–	0.25	–	V	I_Q = 20 mA 1)
Output capacitor	C_Q	1	–	–	µF	ESR ≤ 5 Ω at 10 kHz
Output voltage tolerance	ΔV_Q	–	± 4%	–	–	–
Current consumption $I_q = I_I - I_Q$	I_q	–	5	–	mA	I_Q < 30 mA
Current consumption $I_q = I_I - I_Q$	I_q	–	60	100	µA	I_Q < 1 mA
Quiescent current (stand-by) $I_q = I_I - I_Q$	I_q	–	–	1	µA	$V_{INH} < V_{INH, low}$; T_j < 85 °C
Quiescent current (stand-by) $I_q = I_I - I_Q$	I_q	–	–	5	µA	$V_{INH} < V_{INH, low}$

Electrical Characteristics (cont'd)

V_I = 13.5 V; $V_{INH} > V_{INH, high}$; – 40 °C < T_j < 150 °C; unless otherwise specified

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Load regulation	ΔV_Q	–	10	–	mV	1 mA < I_Q < 25 mA; T_j = 25 °C
Line regulation	ΔV_Q	–	10	–	mV	$\Delta V_I = V_{Q,nom}$ to 36 V I_Q = 5 mA; T_j = 25 °C
Power-Supply-Ripple-Rejection	PSRR	–	60	–	dB	f_r = 100 Hz; V_r = 0.5 V_{SS}

Logic Inhibit Input

H-input voltage	$V_{INH, high}$	–	–	3.5	V	–
L-input voltage	$V_{INH, low}$	0.3	–	–	V	–
H-input current	$I_{INH, high}$	–	8	–	µA	V_{INH} = 5 V
L-input current	$I_{INH, low}$	– 2	–	2	µA	V_{INH} = 0 V

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

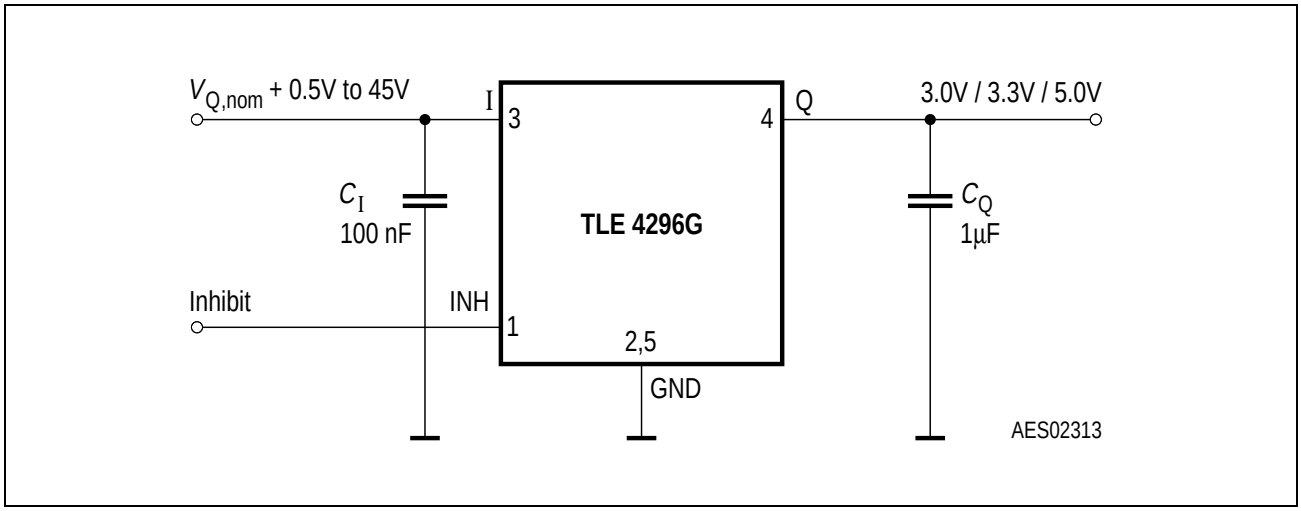
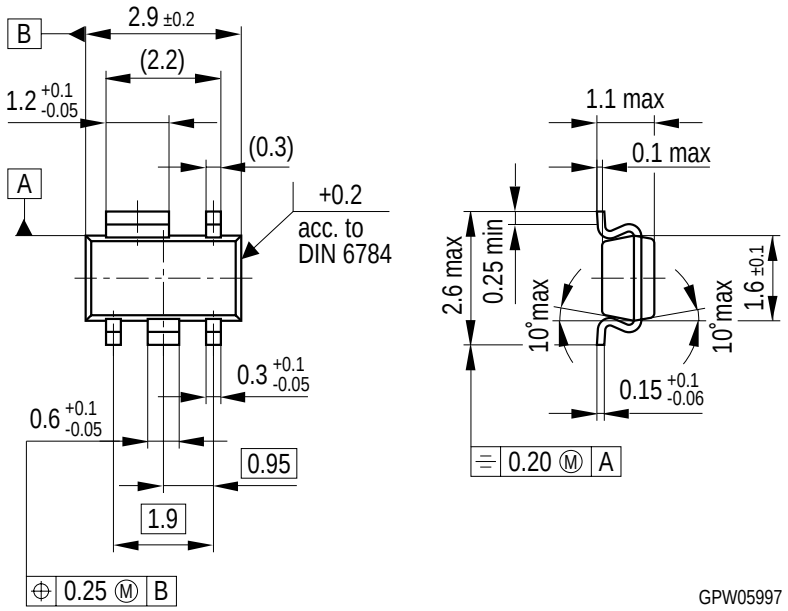


Figure 3
Application Circuit

Package Outlines

SCT-595
(Plastic Dual Small Outline)



Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”.

SMD = Surface Mounted Device

Dimensions in mm