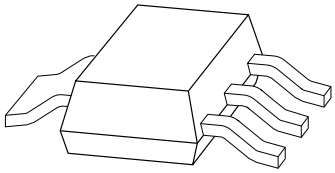
Dual Voltage Regulator with 5 V and 15 V Outputs TLE 4484

Features

- Dual output: 5 V and 15 V
- High input voltage range: up to 45 V
- High output current capability
- High output voltage accuracy
- Very low current consumption
- Short circuit protected
- Over-temperature protected
- Thermal and space optimized package



SOT-223

Type	Ordering Code	Package
TLE 4484 G	Q67006-A9396	P-SOT223-4-2 (SMD)

Functional Description

The **TLE 4484 G** is a monolithic integrated voltage regulator providing two output voltages, output Q5 is a 5 V output for loads up to 25 mA and output Q15 is a 15 V output providing up to 30 mA. The device is based on the Infineon double isolated bipolar technology **DOPL** with high accuracy polysilicon resistors and is available in the **SOT223 (SMD)** package.

The **TLE 4484 G** is designed to supply systems with a microcontroller (5 V) and a standard MOS-driver-IC (15 V) under severe conditions and is therefore equipped with additional protection functions.

Both outputs are protected against overload, short circuit to ground and to the input voltage. A build-in shutdown-circuit protects the device against overheat.

The IC operates in a wide input voltage range up to 45 V. The output voltages are regulated to V_{Q5} = 5 V and V_{Q15} = 15 V with a drop voltage less than 1.5 V. The standard **SOT223 (SMD)** package is especially suitable for this kind of application, saves PCB-board-space and reduces system cost.

Pin Configuration
(top view)

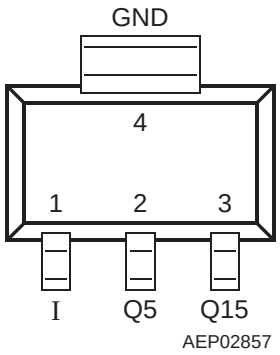


Figure 1

Pin Definitions and Functions

Pin No.	Symbol	Function
1	I	**Input voltage;** block to ground directly at the IC with a ceramic capacitor.
2	Q5	**Output voltage for microcontroller and logic circuit;** block to ground with a ceramic capacitor.
3	Q15	**Output voltage for MOS driver circuit;** block to ground with a ceramic capacitor.
4	GND	**Ground**

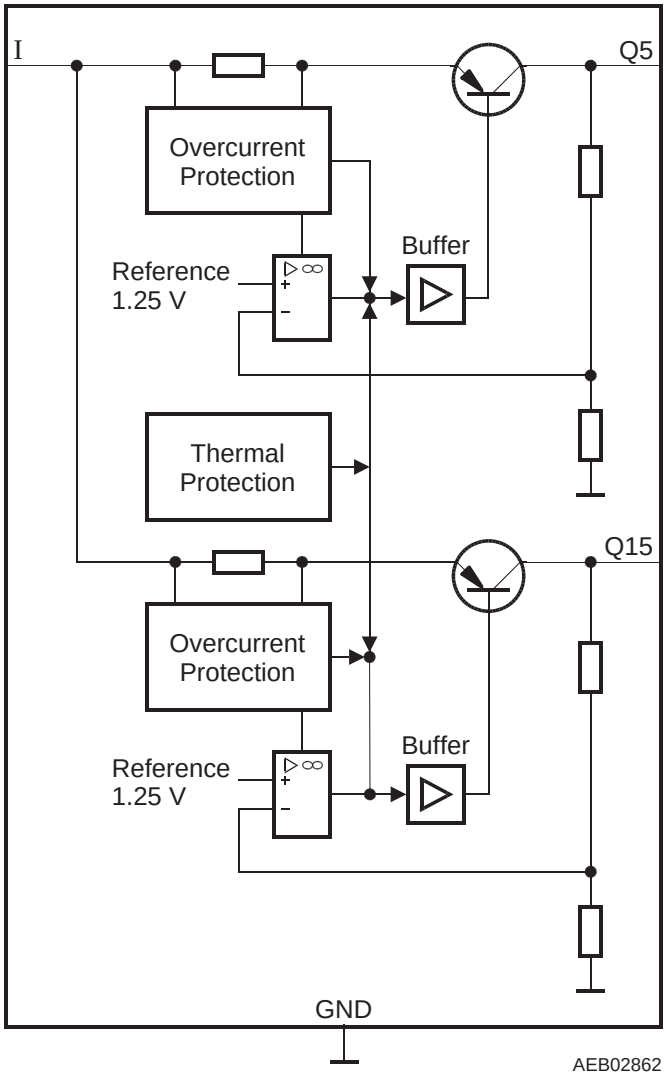


Figure 2 Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Input					
Voltage	V_I	– 0.3	45	V	–
Current	I_I	–	–	–	internally limited
Output Q5					
Voltage	V_{Q5}	– 1	45	V	$V_{Q5} < V_I$
Current	I_{Q5}	–	–	–	internally limited
Output Q15					
Voltage	V_{Q15}	– 1	45	V	$V_{Q15} < V_I$
Current	I_{Q15}	–	–	–	internally limited
GND					
Current	I_{GND}	– 5	5	mA	–
Temperatures					
Junction temperature	T_j	– 50	150	°C	1)
Storage temperature	T_{stg}	– 50	150	°C	–
ESD-Protection (Human Body Model)					
all pins	V_{ESD}	– 2	2	kV	

1) The overtemperature protection will be set to 150 °C min. The voltage regulator should not be operated continuously at 170 °C as device reliability will be reduced to 500 h.

Note: Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Output Q5 input voltage	V_{I1}	6.5	45	V	–
Output Q15 input voltage	V_{I1}	16.5	45	V	–
Junction temperature	T_j	– 40	150	°C	–

Thermal Resistances

Junction ambient	$R_{th,j-a}$	–	165	K/W	zero airflow, zero heat sink area

Note: In the operating range, the functions given in the circuit description are fulfilled.

Electrical Characteristics

17 V < V_I < 42 V; – 40 °C < T_j < 125 °C; all voltages with respect to ground; positive current defined flowing out of pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current Consumption						
Quiescent current; $I_q = I_I – (I_{Q5} + I_{Q15})$	I_q	–	450	550	µA	I_{Q5} = 1 mA; I_{Q15} = 1 mA
Quiescent current; $I_q = I_I – (I_{Q5} + I_{Q15})$	I_q	–	0.76	1	mA	I_{Q5} = 25 mA; I_{Q15} = 30 mA
5 V Output Q5						
Output voltage	V_{Q5}	4.85	5.00	5.15	V	I_{Q5} = 10 mA; T_j = 25 °C
Output voltage	V_{Q5}	4.75	–	5.25	V	1 mA < I_{Q5} < 25 mA
Output current limitation	I_{Q5}	16	40	–	mA	1)
Output current limitation	I_{Q5}	30	–	–	mA	T_j = 25 °C
Output drop voltage; $V_{DRQ5} = V_I – V_{Q5}$	V_{DRQ5}	–	0.9	1.5	V	I_{Q5} = 25 mA 1)
Load regulation	ΔV_{Q5}	–	25	50	mV	1 mA < I_{Q5} < 25 mA; V_I = 17 V
Line regulation	ΔV_{Q5}	–	20	50	mV	I_{Q5} = 1 mA; 7 V < V_I < 27 V
Power-Supply-Ripple -Rejection	$PSRR5$	–	50	–	dB	20 Hz < f_r < 20 kHz; V_r = 5 V_{SS}
Value of output cap	C_{Q5}	1.0	–	–	µF	–
ESR of output cap	R_{ESRQ5}	–	–	2.0	Ω	–

Electrical Characteristics (cont'd)
17 V < V_I < 42 V; – 40 °C < T_j < 125 °C; all voltages with respect to ground; positive current defined flowing out of pin; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
15 V Output Q15						
Output voltage	V_{Q15}	14.4	15.0	15.6	V	I_{Q15} = 15 mA; T_j = 25 °C
Output voltage	V_{Q15}	14.25		15.75	V	1 mA < I_{Q15} < 30 mA
Output current limitation	I_{Q15}	40	–	–	mA	1)
Output drop voltage; $V_{DRQ15} = V_I - V_{Q15}$	V_{DRQ15}	–	0.9	1.5	V	I_{Q15} = 30 mA1)
Load regulation	ΔV_{Q15}	–	10	50	mV	1 mA < I_{Q15} < 30 mA; V_I = 17 V
Line regulation	ΔV_{Q15}	–	80	150	mV	I_{Q15} = 5 mA; 16 V < V_I < 36 V
Power-Supply-Ripple -Rejection	$PSRR15$	–	50	–	dB	20 Hz < f_r < 20 kHz; V_r = 5 V_{SS}
Value of output cap	C_{Q15}	1.0	–	–	µF	–
ESR of output cap	R_{ESRQ15}	–	–	4.0	Ω	–

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

Note: The listed characteristics are ensured over the operating range of the integrated circuit. Typical characteristics specify mean values expected over the production spread. If not otherwise specified, typical characteristics apply at T_A = 25 °C and the given supply voltage.

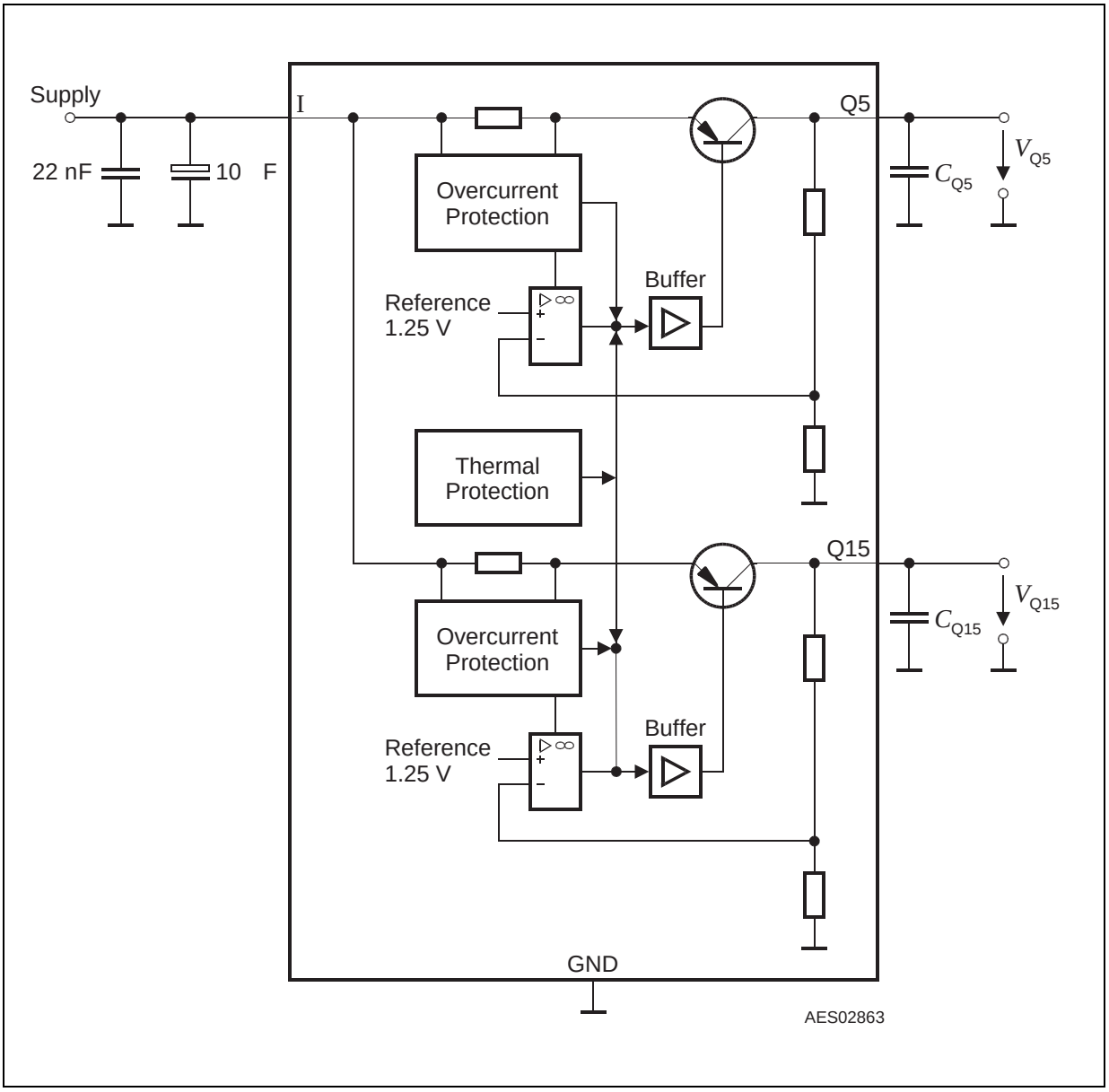
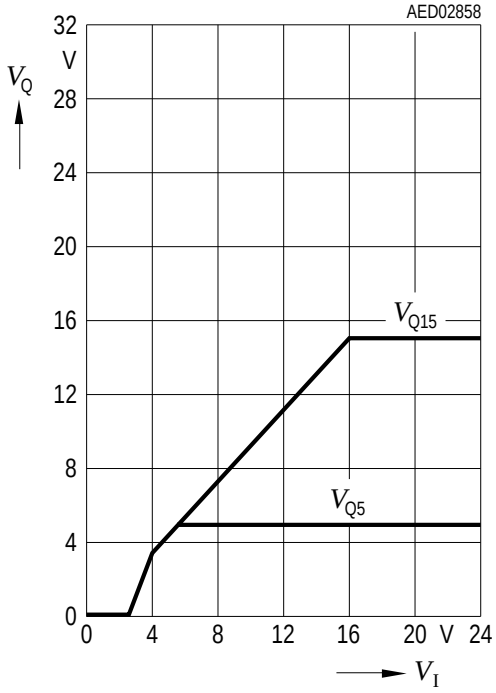


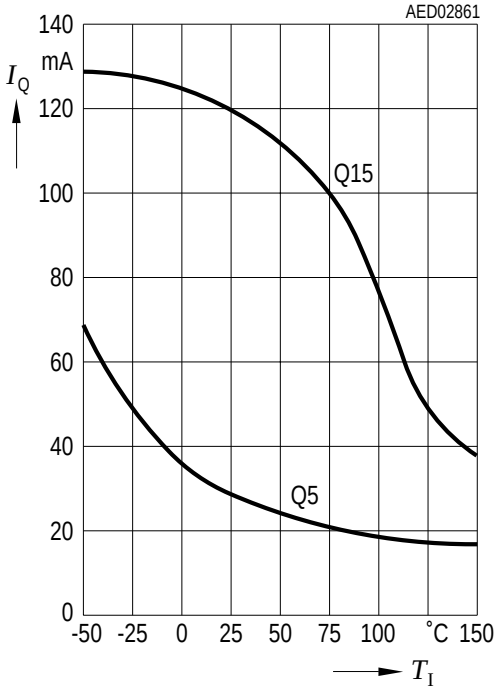
Figure 3 Application Circuit

Typical Performance Characteristics

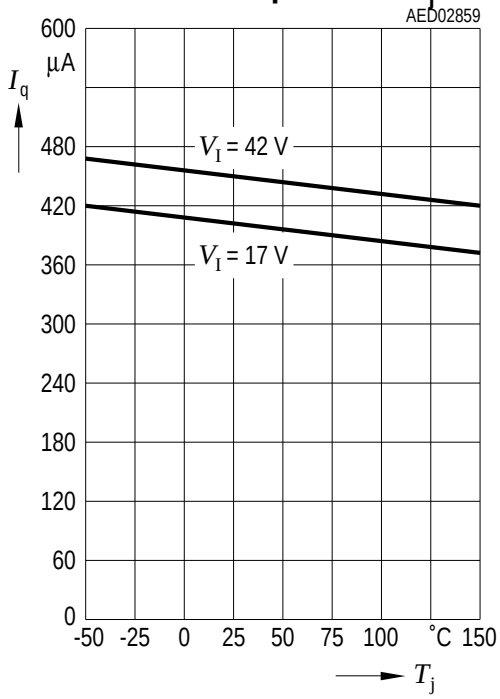
Output Voltage V_{Q5} and V_{Q15} versus Input Voltage V_I



Output Current Limit I_{Q5} and I_{Q15} versus Junction Temperature T_j

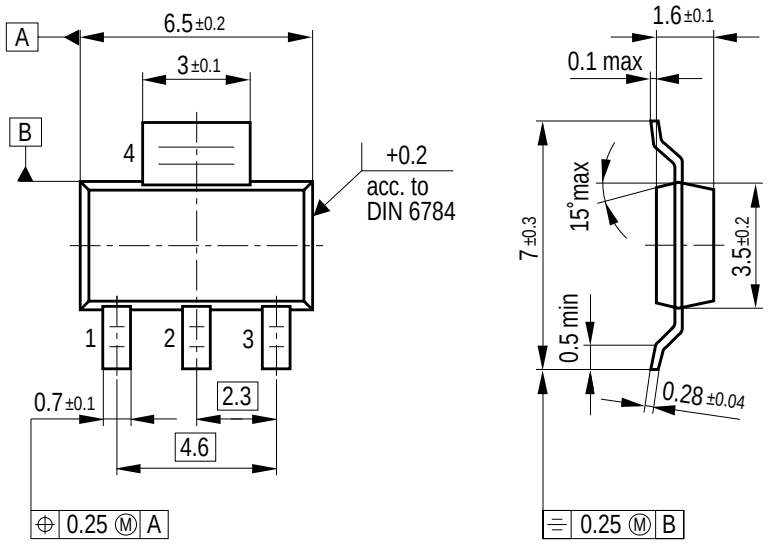


Current Consumption I_q versus Junction Temperature T_j



Package Outlines

P-SOT223-4-2 (SMD)
(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

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