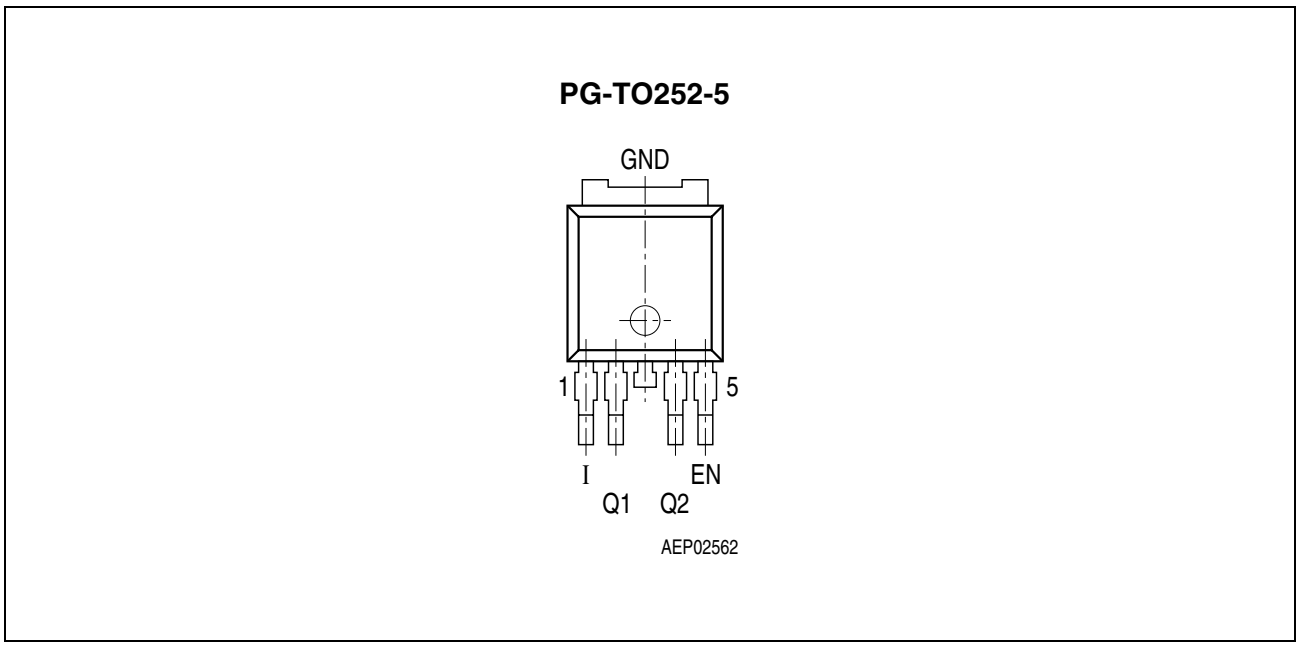


Figure 1 **Pin Configuration** (top view)

Table 1 **Pin Definitions and Functions**

Pin No.	Symbol	Function
1	I	**Input voltage;** block to GND directly at the IC with a ceramic capacitor
2	Q1	**3.3 V output;** block to GND with a capacitor $C_{Q1} \geq 10$ µF, ESR < 2 Ω at 10 kHz
3	GND	**Ground**
4	Q2	**5.0 V output;** block to GND with a capacitor $C_{Q2} \geq 10$ µF, ESR < 3 Ω at 10 kHz
5	EN	**Enable input;** to switch ON and OFF Q2, ON with high signal

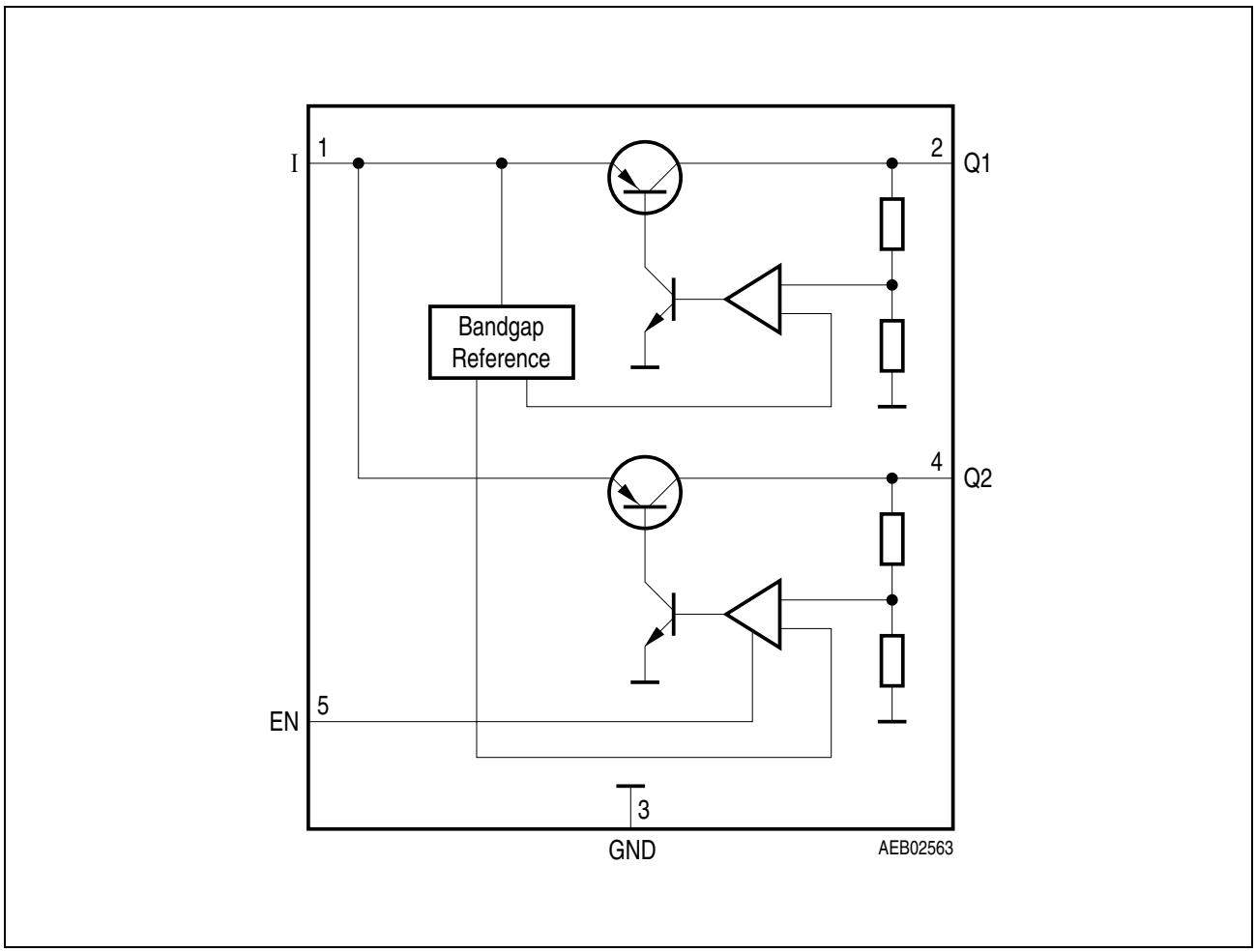


Figure 2 Block Diagram

Table 2 Absolute Maximum Ratings

-40 °C < T_j < 170 °C

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
Input I					
Voltage	V_I	-42 –	42 65	V V	– t < 400 ms
Current	I_I	–	–	mA	Internally limited
3.3 V Output Q1					
Voltage	V_{Q1}	-1	36	V	–
Current	I_{Q1}	–	–	mA	Internally limited
5.5 V Output Q2					
Voltage	V_{Q2}	-1	36	V	–
Current	I_{Q2}	–	–	mA	Internally limited
Inhibit EN					
Voltage	V_{EN}	-42 –	42 65	V V	– t < 400 ms
Current	I_{EN}	–	–	mA	Internally limited
Temperatures					
Junction temperature	T_j	-50	170	°C	–
Storage temperature	T_{stg}	-50	150	°C	–

Notes

1. *ESD-Protection according to MIL Std. 883: ±2 kV.*
2. *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.*

Table 3 Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	Max.		
Output 1 input voltage	V_{I1}	4.5	42	V	1)
Output 2 input voltage	V_{I1}	5.7	42	V	2)
3.3 V regulator output current	I_{O1}	0	350	mA	–
5 V regulator output current	I_{O2}	0	430	mA	–
Junction temperature	T_j	-40	170	°C	3)
Thermal Resistances					
Junction case	$R_{th,j\text{-}case}$	–	3	K/W	–
Junction ambient	$R_{th,j\text{-}a}$	–	80	K/W	4)

1) Input voltage V_I required for operation of output Q1

2) Input voltage V_I required for operation of output Q2

3) The overtemperature protection is set to > 170 °C. The voltage regulator may not be operated continuously at 170 °C as device reliability will be reduced to 500 h statistic lifetime.

4) Worst case regarding peak temperature, zero airflow; mounted on a PCB 80 × 80 × 1.5 mm^3, 35 µm Cu, 5 µm Sn, heat sink area 300 mm^2.

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

Table 4 Electrical Characteristics

V_I = 13.5 V; $V_{EN} > V_{ENH}$; -40 °C < T_j < 150 °C; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Test Condition
		Min.	Typ.	Max.		
3.3 V Output Q1						
Output voltage	V_{Q1}	3.17	3.3	3.43	V	1 mA < I_{Q1} < 250 mA
Output current limitation	I_{Q1}	350	–	900	mA	[1]
Load regulation	ΔV_{Q1}	–	–	30	mV	1 mA < I_{Q1} < 250 mA
Line regulation	ΔV_{Q1}	–	–	20	mV	I_{Q1} = 5 mA; 6 V < V_I < 28 V
Power Supply Ripple Rejection	$PSRR$	–	60	–	dB	20 Hz < f_r < 20 kHz[2]; V_r = 5 Vpp
Output capacitor	C_{Q1}	10	–	–	µF	–
ESR of output capacitor	R_{ESRQ1}	–	–	2	Ω	at 10 kHz
5.0 V Output Q2						
Output voltage	V_{Q2}	4.8	5.0	5.2	V	1 mA < I_{Q2} < 330 mA
Output current limitation	I_{Q2}	430	–	900	mA	[1]
Drop voltage; $V_{DRQ2} = V_I - V_{Q2}$	V_{DRQ2}	–	0.3	0.7	V	I_{Q2} = 330 mA[1]
Load regulation	ΔV_{Q2}	–	–	50	mV	5 mA < I_{Q2} < 330 mA
Line regulation	ΔV_{Q2}	–	–	50	mV	I_{Q2} = 5 mA; 6 V < V_I < 28 V
Power Supply Ripple Rejection	$PSRR$	–	60	–	dB	20 Hz < f_r < 20 kHz[2]; V_r = 5 Vpp
Output capacitor	C_{Q2}	10	–	–	µF	–
ESR of output capacitor	R_{ESRQ2}	–	–	3	Ω	at 10 kHz

Table 4 Electrical Characteristics (cont'd)

V_I = 13.5 V; $V_{EN} > V_{ENH}$; -40 °C < T_j < 150 °C; unless otherwise specified.

Parameter	Symbol	Limit Values			Unit	Test Condition
		Min.	Typ.	Max.		
Current Consumption						
Quiescent current; $I_q = I_I - I_{Q1}$	I_q	–	100	150	µA	T_j < 85 °C; V_{EN} = 0 V
Quiescent current; $I_q = I_I - I_{Q1} - I_{Q2}$	I_q	–	300	400	µA	$I_{Q1} = I_{Q2}$ = 300 µA; T_j < 85 °C
Quiescent current; $I_q = I_I - I_{Q1} - I_{Q2}$	I_q	–	2.5	10	mA	I_{Q1} = 150 mA; I_{Q2} = 300 µA
Quiescent current; $I_q = I_I - I_{Q2} - I_{Q1}$	I_q	–	5	13	mA	I_{Q1} = 300 µA; I_{Q2} = 250 mA
Enable Input EN						
EN ON voltage	$V_{EN\ ON}$	1.8	–	–	V	V_{Q2} ON
EN OFF voltage	$V_{EN\ OFF}$	–	–	1.0	V	V_{Q2} OFF
Input current	V_{EN}	–	20	30	µA	V_{EN} = 13 V

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

2) Guaranteed by design.

Application Information

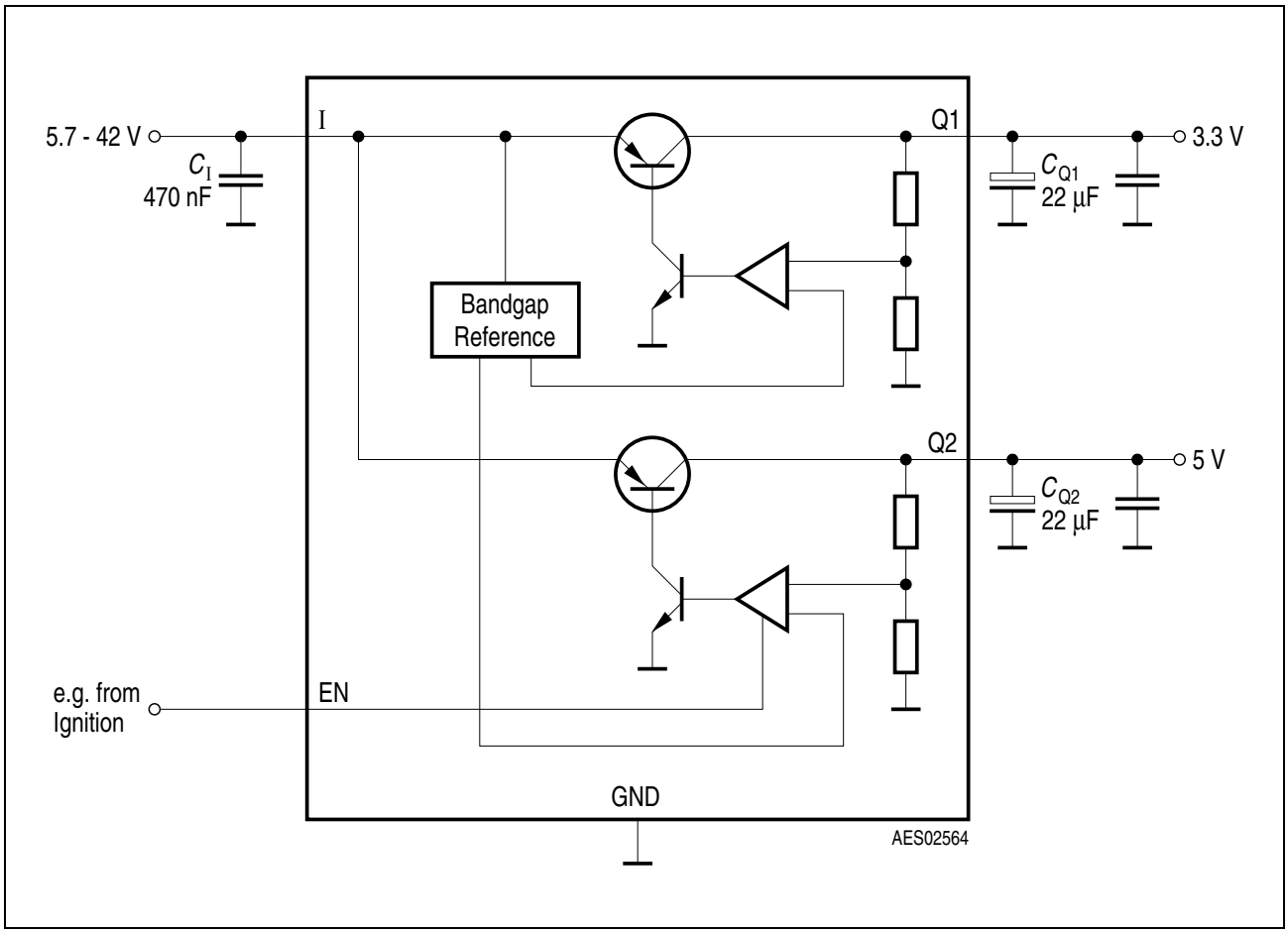


Figure 3 Application Circuit

Input, Output

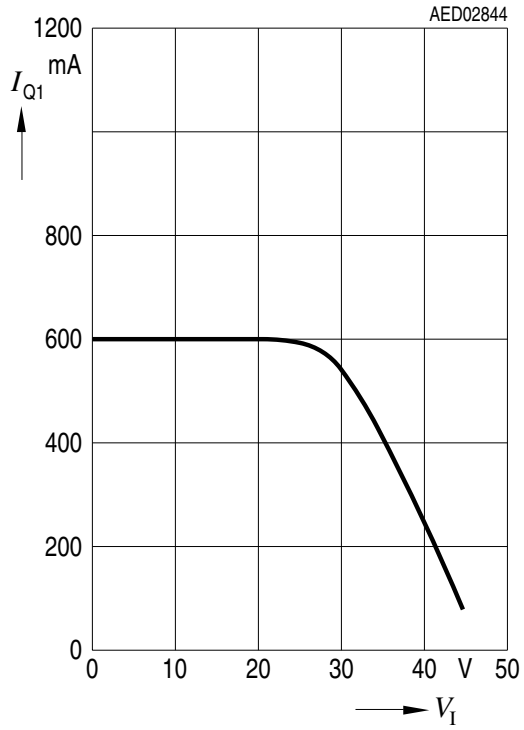
The input capacitor C_I is necessary for compensating line influences. Using a resistor of approx. 1 Ω in series with C_I, the LC circuit of input inductivity and input capacitance can be damped. To stabilize the regulation circuits of the stand-by and main regulator, output capacitors C_{Q1} and C_{Q2} are necessary. Stability is guaranteed at values $C_{Q1} \geq 10$ µF (ESR ≤ 2 Ω) and $C_{Q2} \geq 10$ µF (ESR ≤ 3 Ω) within the operating temperature range.

Enable

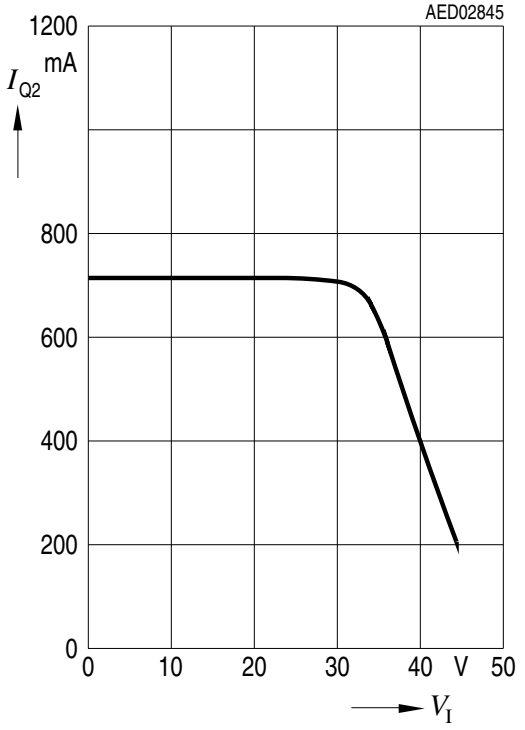
Using the enable feature the output 2 (5 V output) can be switched ON or OFF. The enable input can be connected directly to terminal 30 (battery line) or 15 (ignition line). It is also possible to control the output 2 via the microcontroller.

Typical Performance Characteristics

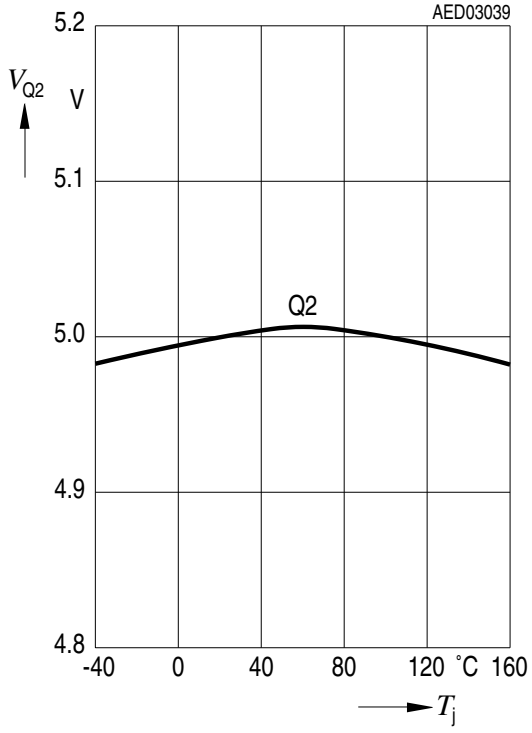
Output Current I_{Q1} versus Input Voltage V_I



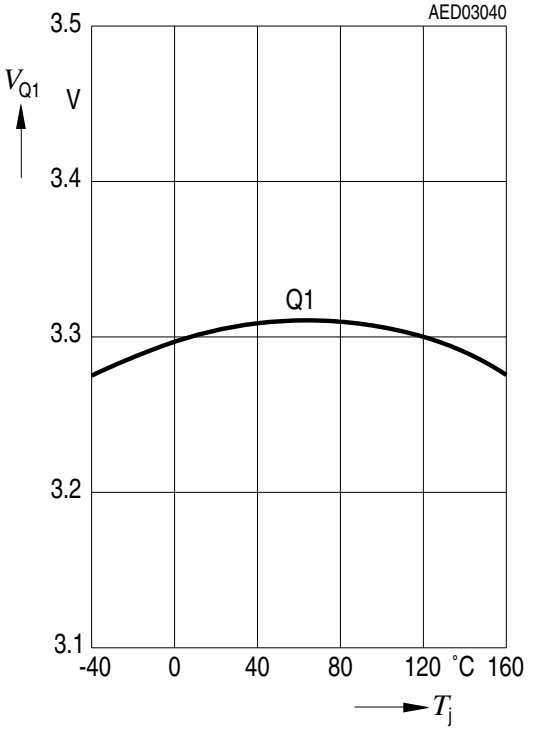
Output Current I_{Q2} versus Input Voltage V_I Enable ON



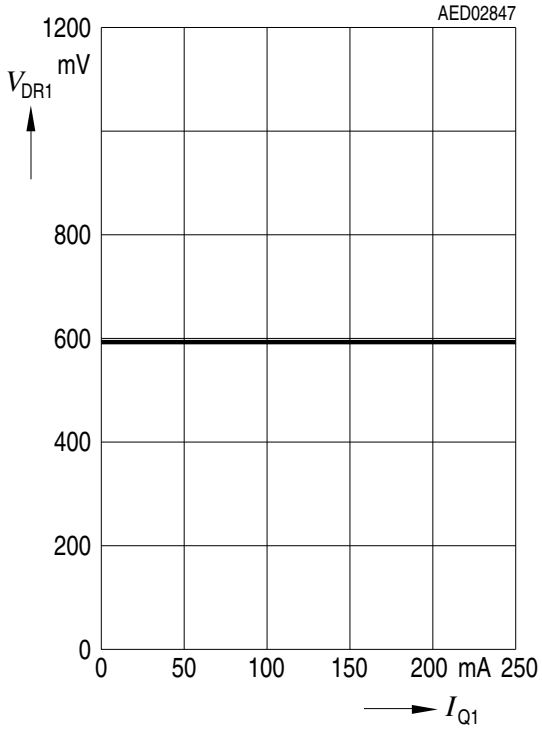
Output Voltage V_{Q2} versus Temperature T_j



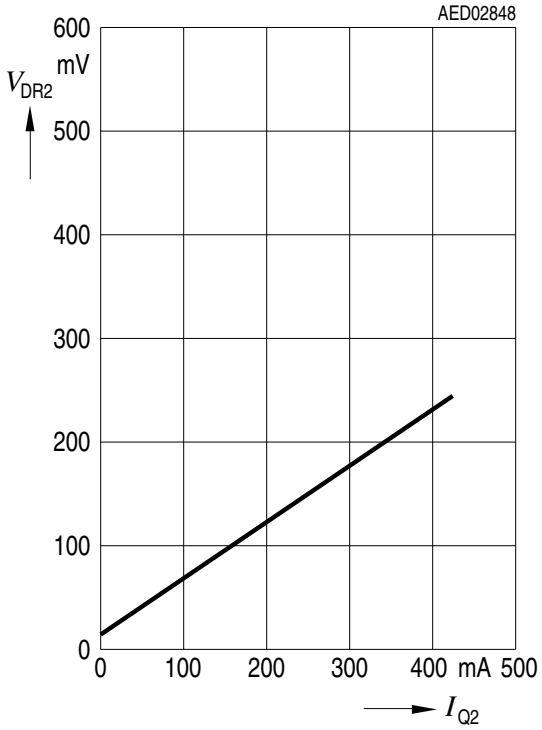
Output Voltage V_{Q1} versus Temperature T_j



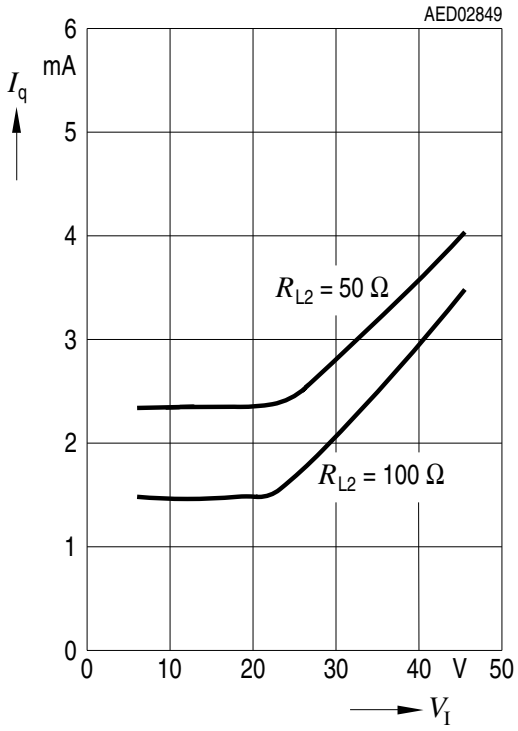
Drop Voltage V_{DR1} versus Output Current I_{Q1}



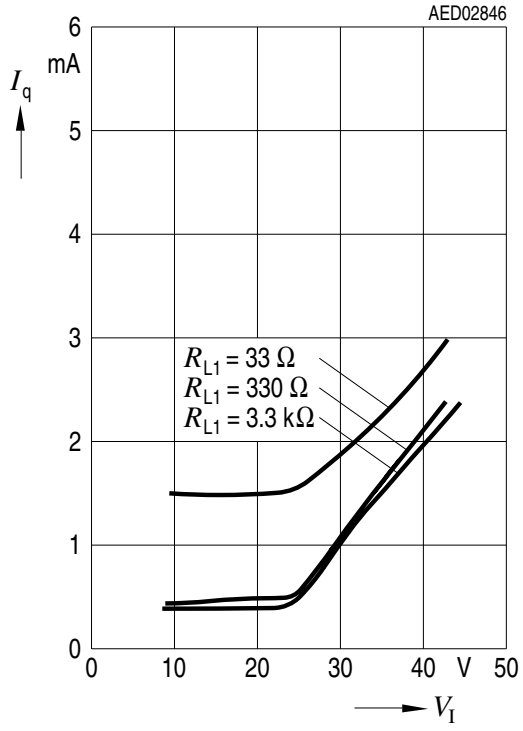
Drop Voltage V_{DR2} versus Output Current I_{Q2} EN ON



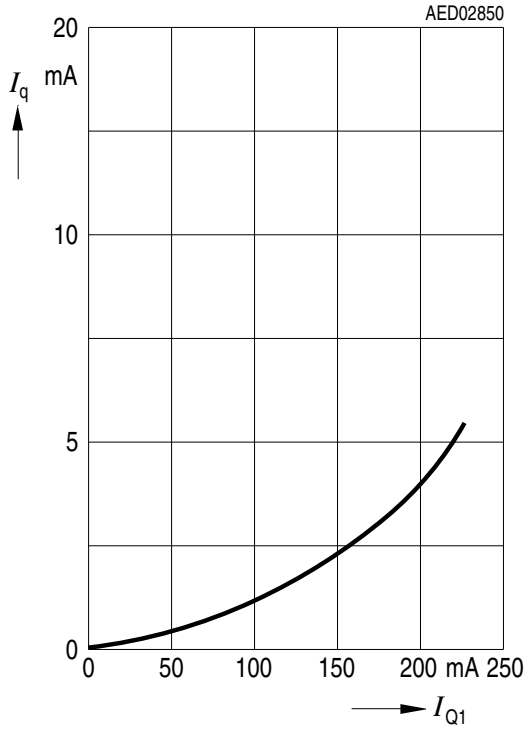
Current Consumption I_q versus Input Voltage V_I



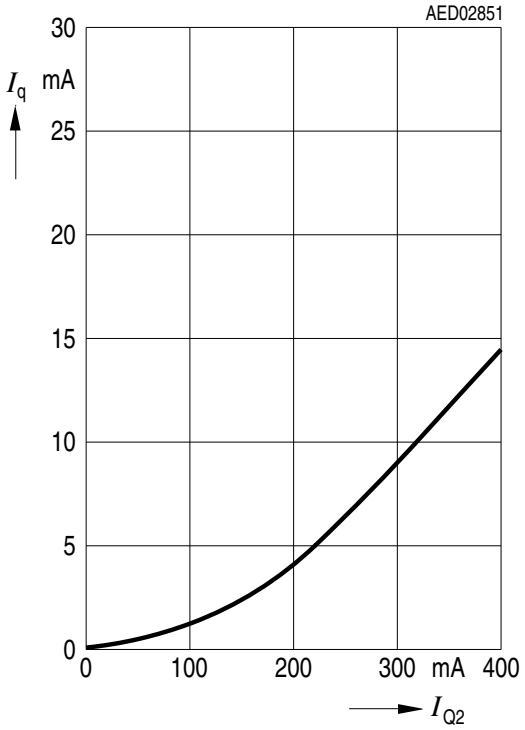
Current Consumption I_q versus Input Voltage V_I



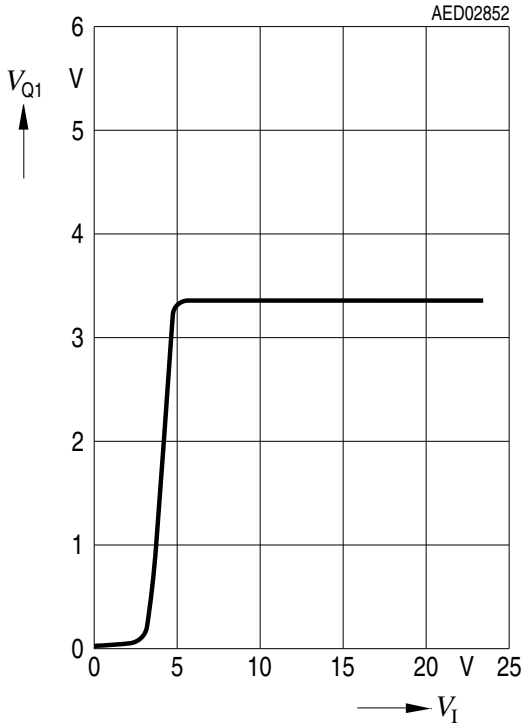
Current Consumption I_q versus Output Current I_{Q1}



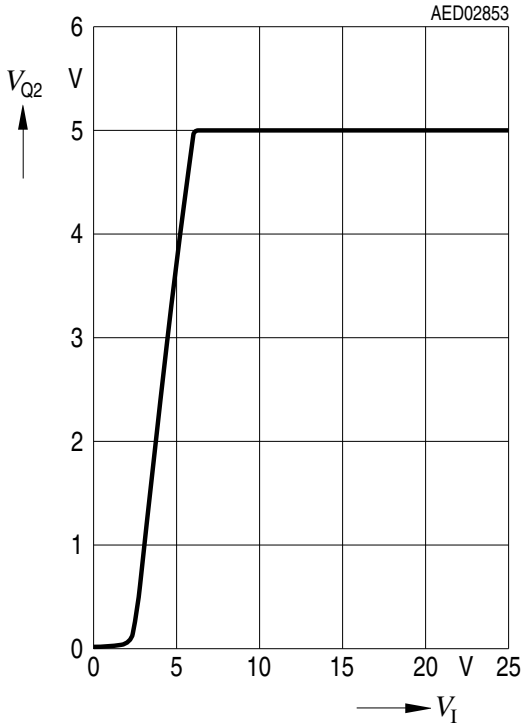
Current Consumption I_q versus Output Current I_{Q2}



Output Voltage V_{Q1} versus Input Voltage V_I



Output Voltage V_{Q2} versus Input Voltage V_I



Package Outlines

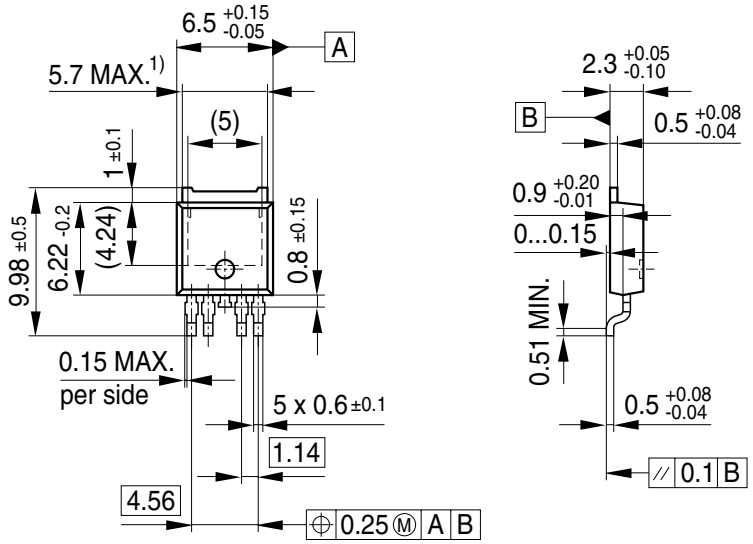


Figure 4 **PG-TO252-5-11** (Plastic Transistor Single Outline)

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/products**.

SMD = Surface Mounted Device

Dimensions in mm

Revision History

Version	Date	Changes
Rev. 2.5	2007-03-20	Initial version of RoHS-compliant derivate of TLE 4476 **Page 1**: AEC certified statement added **Page 1** and **Page 12**: RoHS compliance statement and Green product feature added **Page 1** and **Page 12**: Package changed to RoHS compliant version Legal Disclaimer updated

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