OPTIREG™ linear TLE4274

Low dropout voltage regulator

AEC Qualified RoHS



Features

- Output voltage 5 V or 10 V
- Output voltage tolerance ≤±4%
- Current capability 400 mA
- Low dropout voltage
- Very low current consumption
- Short-circuit proof
- Reverse polarity proof
- Suitable for use in automotive electronics
- Green Product (RoHS-compliant)

Potential applications

General automotive applications.

Product validation

Qualified for automotive applications. Product validation according to AEC-Q100.

Description

The OPTIREG™ linear TLE4274 is a low drop voltage regulator available in a PG-TO252-3 and PG-TO263-3 package. The IC regulates an input voltage up to 40 V to V_{Qrated} = 5.0 V (V50) and 10 V (V10). The maximum output current is 400 mA. The IC is short-circuit proof and incorporates temperature protection that disables the IC at overtemperature. A 3.3 V and 2.5 V version is also available. For information about the low output voltage types please refer to the datasheet TLE4274 / 3.3 V; 2.5 V.

Type	Package	Marking
TLE4274DV50	PG-TO252-3	4274V50
TLE4274GV10	PG-TO263-3	4274V10

Table of contents

Features **1**
Potential applications **1**
Product validation **1**
Description **1**
Table of contents **2**
1 Block diagram **3**
2 Pin configuration **4**
2.1 Pin assignment 4
2.2 Pin definitions and functions 4
3 General product characteristics **5**
3.1 Absolute maximum ratings 5
3.2 Functional range 5
4 Circuit description **6**
4.1 Dimensioning information on external components 6
4.2 Circuit description 6
5 Electrical characteristics **7**
6 Typical performance characteristics **8**
6.1 Typical performance characteristics (V50 and V10) 8
6.2 Typical performance characteristics (V50) 9
6.3 Typical performance characteristics (V10) 10
7 Package information **11**
8 Revision history **12**

1 Block diagram

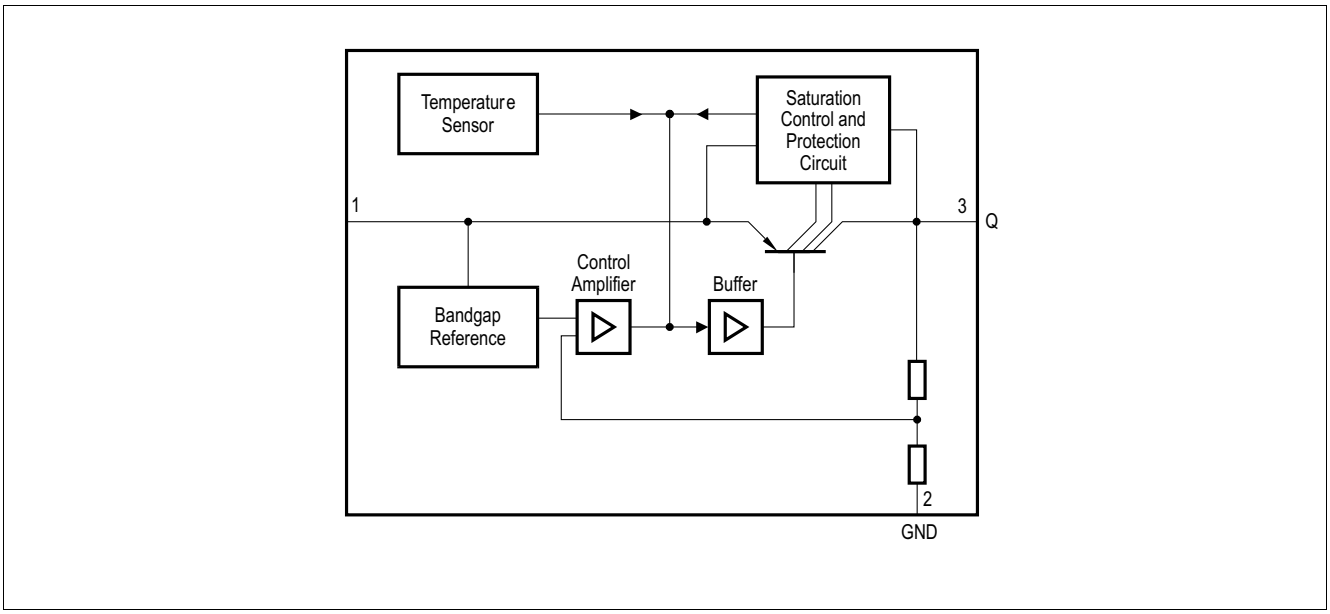


Figure 1 Block diagram

2 Pin configuration

2.1 Pin assignment

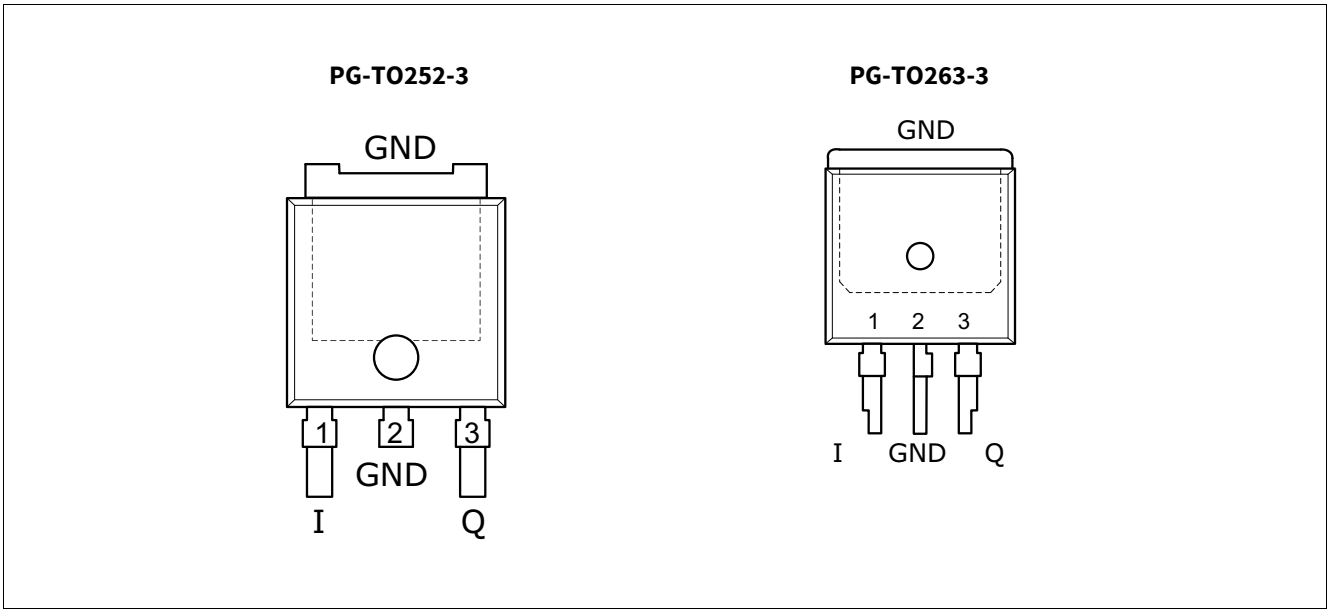


Figure 2 Pin configuration

2.2 Pin definitions and functions

Table 1 Pin definitions and functions

Pin	Symbol	Function
1	I	**Input** Block to ground directly at the IC with a ceramic capacitor
2	GND	**Ground**
3	Q	**Output** Block to ground with a capacitor ≥ 22 µF, ESR ≤ 3 Ω
TAB	–	**TAB** Connect to heatsink and GND to improve thermal performance

3 General product characteristics

3.1 Absolute maximum ratings

Table 2 Absolute maximum ratings

T_j = -40°C to 150°C

Parameter	Symbol	Values			Unit	Note or Test Condition	Number
		Min.	Typ.	Max.			
Input							
Voltage	V_I	-42	–	45	V	–	P_3.1.1
Current	I_I	–	–	–	–	Internally limited	P_3.1.2
Output							
Voltage	V_Q	-1.0	–	40	V	–	P_3.1.3
Current	I_Q	–	–	–	–	Internally limited	P_3.1.4
Ground							
Current	I_{GND}	–	–	100	mA	–	P_3.1.5
Temperature							
Junction temperature	T_j	–	–	150	°C	–	P_3.1.6
Storage temperature	T_{stg}	-50	–	150	°C	–	P_3.1.7

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

3.2 Functional range

Table 3 Operating range

Parameter	Symbol	Values			Unit	Note or Test Condition	Number
		Min.	Typ.	Max.			
Input voltage, V50	V_I	5.5	–	40	V	–	P_3.2.1
Input voltage, V10	V_I	10.5	–	40	V	–	P_3.2.3
Junction temperature	T_j	-40	–	150	°C	–	P_3.2.4
Thermal resistance							
Junction ambient	R_{thja}	–	–	78	K/W	1) PG-TO252-3	P_3.2.6
Junction ambient	R_{thja}	–	–	52	K/W	1) PG-TO263-3	P_3.2.7
Junction case	R_{thjc}	–	–	4	K/W	–	P_3.2.8

1) Worst case; regarding peak temperature, zero airflow mounted on PCB 80 × 80 × 1.5 mm^3, 300 mm^2 heat sink area.

4 Circuit description

4.1 Dimensioning information on external components

The input capacitor C_I is necessary for compensating line influences. Using a resistor of approximately 1 Ω in series with C_I, the oscillating of input inductivity and input capacitance can be damped. The output capacitor C_Q is necessary for the stability of the regulation circuit. Stability is specified at values $C_Q \geq 22$ µF and an *ESR* of ≤ 3 Ω within the operating temperature range.

4.2 Circuit description

The control amplifier compares a reference voltage to a voltage that is proportional to the output voltage and drives the base of the series transistor via a buffer. Saturation control as a function of the load current prevents any oversaturation of the power element. The IC also includes a number of internal circuits for protection against:

- Overload
- Overtemperature
- Reverse polarity

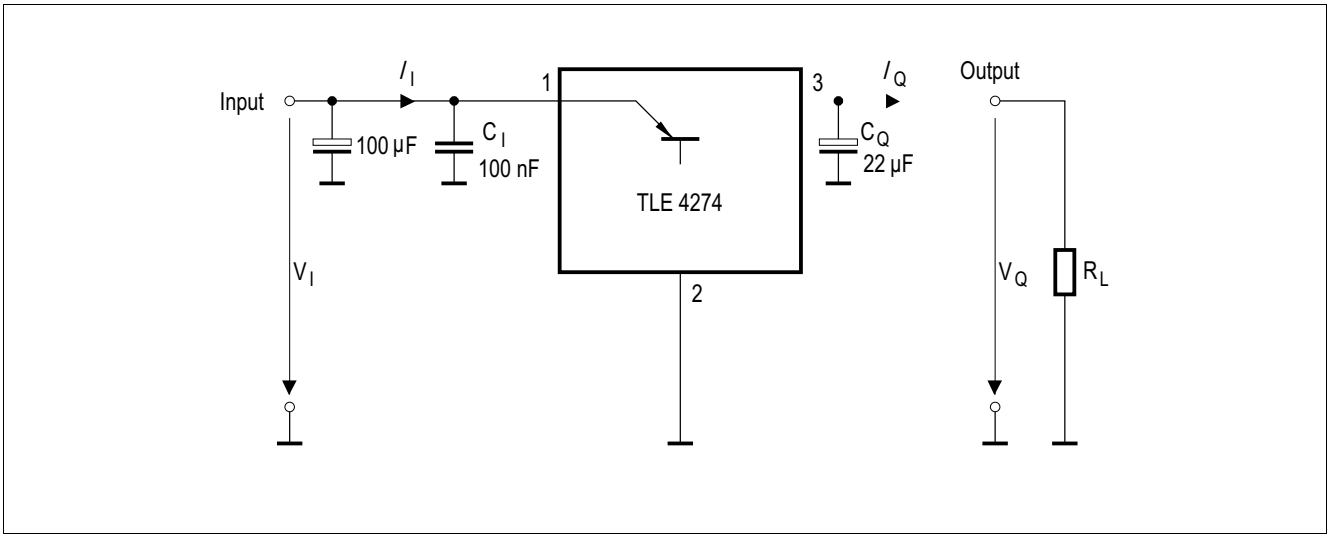


Figure 3 Measuring circuit

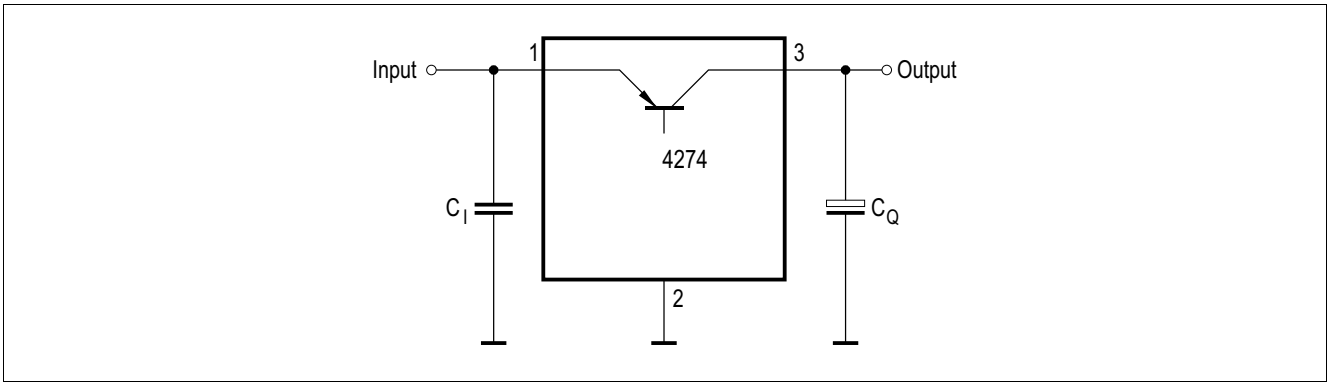


Figure 4 Application circuit

5 Electrical characteristics

Table 4 Electrical characteristics

V_I = 13.5 V; T_j = -40°C to 150°C (unless otherwise specified)

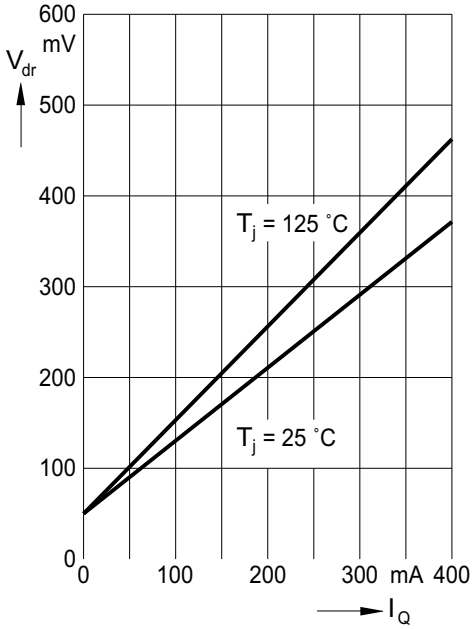
Parameter	Symbol	Values			Unit	Note or Test Condition	Number
		Min.	Typ.	Max.			
Output voltage V50-version	V_Q	4.8	5	5.2	V	5 mA < I_Q < 400 mA 6 V < V_I < 28 V	P_5.1.1
Output voltage V50-version	V_Q	4.8	5	5.2	V	5 mA < I_Q < 200 mA 6 V < V_I < 40 V	P_5.1.2
Output voltage V10-version	V_Q	9.6	10	10.4	V	5 mA < I_Q < 400 mA 11 V < V_I < 28 V	P_5.1.5
Output voltage V10-version	V_Q	9.6	10	10.4	V	5 mA < I_Q < 200 mA 11 V < V_I < 40 V	P_5.1.6
Output current limitation	I_Q	400	600	–	mA	1)	P_5.1.7
Current consumption $I_q = I_I - I_Q$	I_q	–	100	220	mA	I_Q = 1 mA	P_5.1.8
		–	8	15	mA	I_Q = 250 mA	P_5.1.9
		–	20	30	mA	I_Q = 400 mA	P_5.1.10
Drop voltage	V_{dr}	–	250	500	mV	I_Q = 250 mA $V_{dr} = V_I - V_Q$	P_5.1.11
Load regulation	ΔV_Q	–	20	50	mV	I_Q = 5 mA to 400 mA	P_5.1.12
Line regulation	ΔV_Q	–	10	25	mV	ΔV_I = 12 V to 32 V I_Q = 5 mA	P_5.1.13
Power supply ripple rejection	*PSRR*	–	60	–	dB	f_r = 100 Hz V_r = 0.5 Vpp	P_5.1.14
Temperature output voltage drift	$\Delta V_Q/\Delta T$	–	0.5	–	mV/K	–	P_5.1.15

1) Measured when the output voltage V_Q has dropped 100 mV from the nominal value obtained at V_I = 13.5 V.

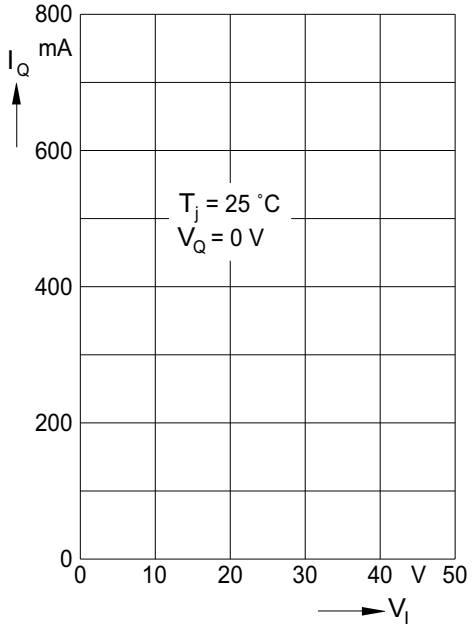
6 Typical performance characteristics

6.1 Typical performance characteristics (V50 and V10)

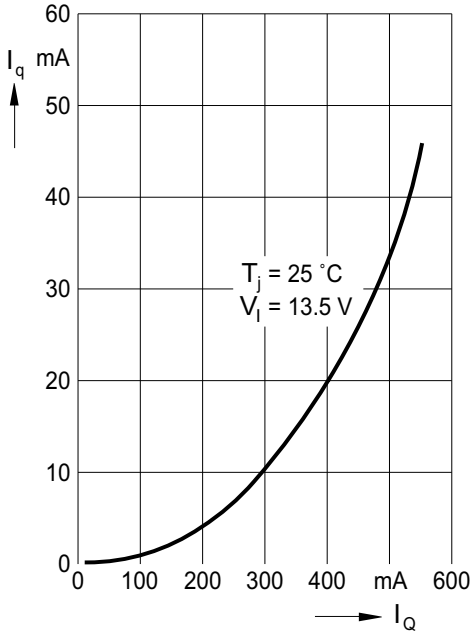
Drop voltage V_{dr} versus output current I_Q



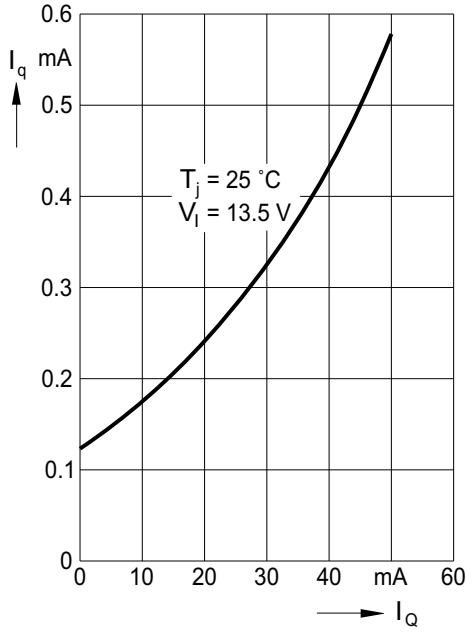
Output current I_Q versus input voltage V_I



Current consumption I_q versus output current I_Q (high load)

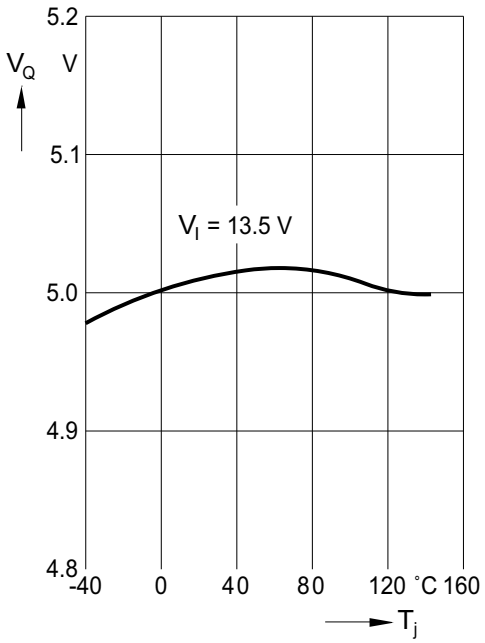


Current consumption I_q versus output current I_Q (low load)

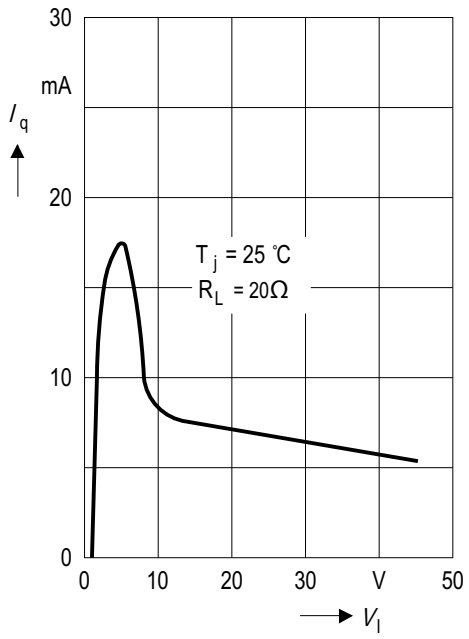


6.2 Typical performance characteristics (V50)

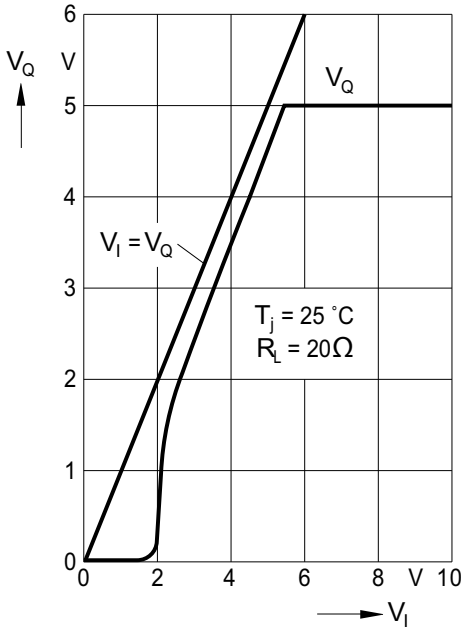
Output voltage V_Q versus junction temperature T_j



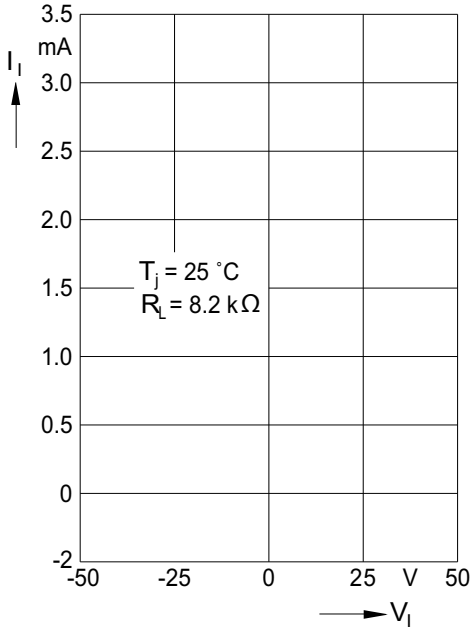
Current consumption I_q versus input voltage V_I



Output voltage V_Q versus Input voltage V_I

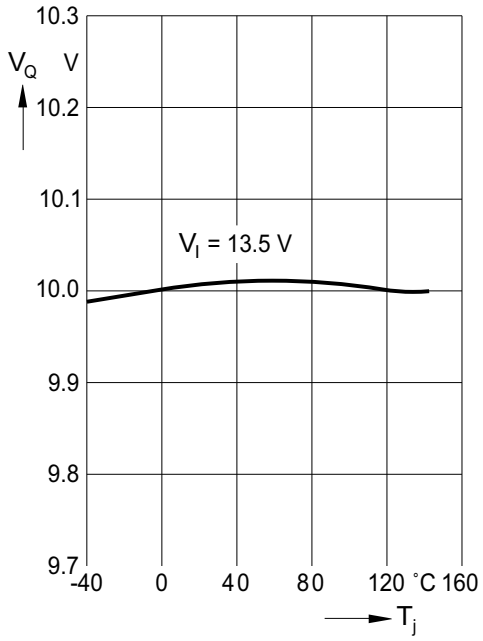


Input current I_I versus input voltage V_I

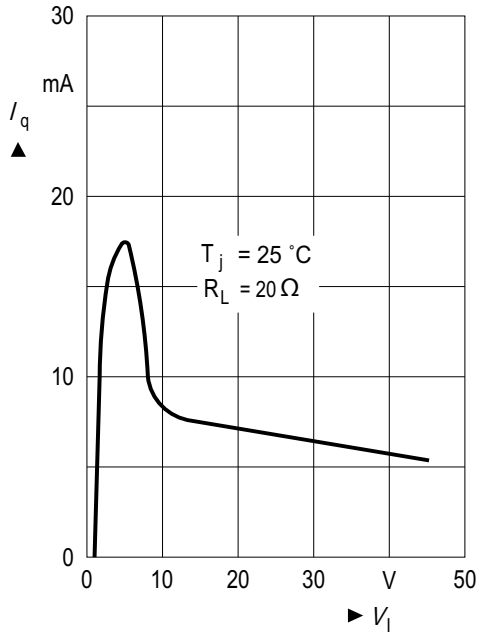


6.3 Typical performance characteristics (V10)

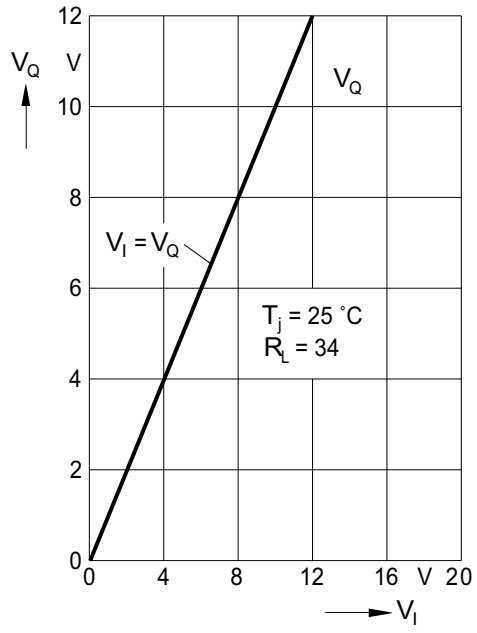
Output voltage V_Q versus junction temperature T_j



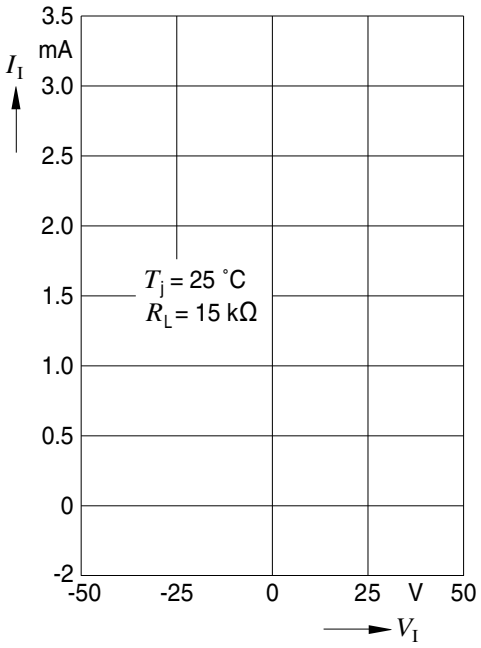
Current consumption I_q versus input voltage V_I



Output voltage V_Q versus input voltage V_I



Input current I_I versus input voltage V_I



7 Package information

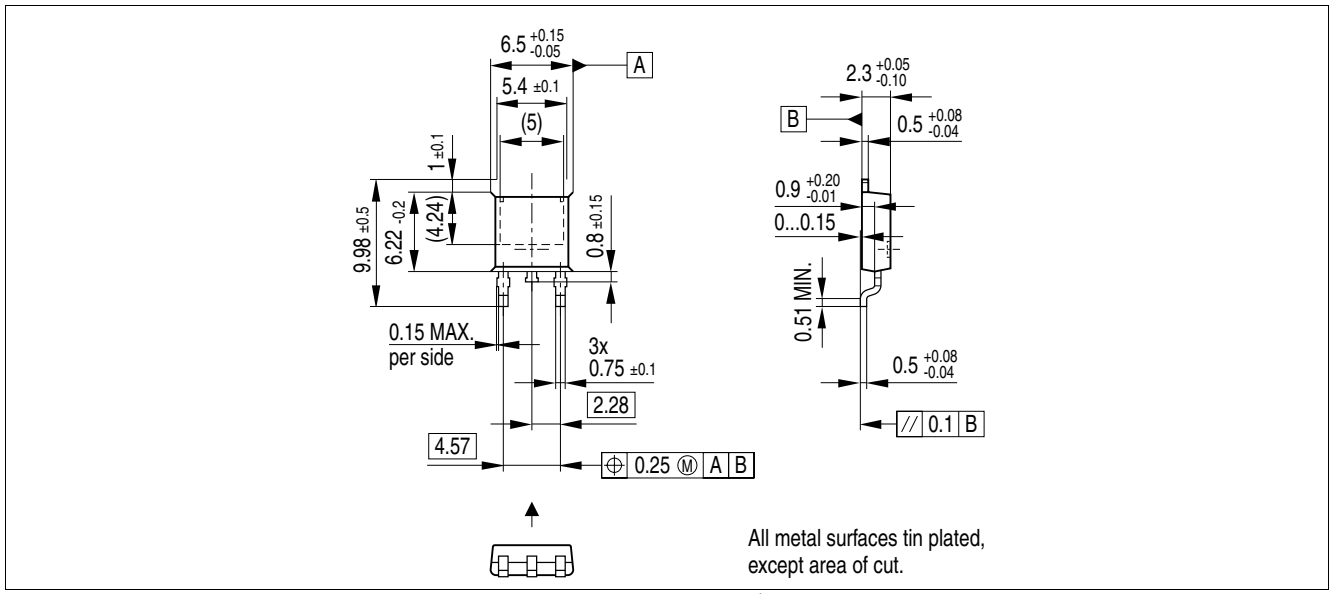


Figure 5 PG-TO252-3 (Plastic transistor, single outline)[1)]

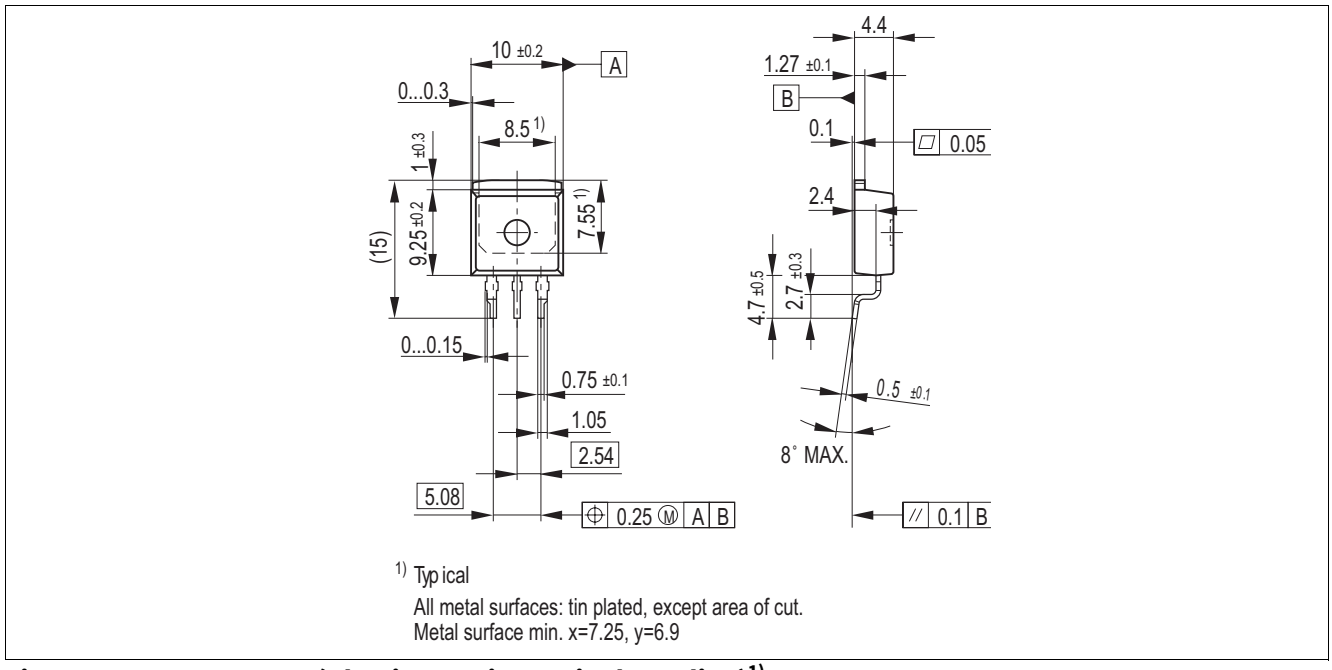


Figure 6 PG-TO263-3 (Plastic transistor, single outline)[1)]

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 (Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

Further information on packages

https://www.infineon.com/packages

1) Dimensions in mm

8 Revision history

Revision	Date	Changes
1.71	2025-02-06	• Editorial changes and template update • Removed discontinued product variants
1.7	2011-01-20	Updated Infineon logo Added “AEC” and “Green” logo Added “Green Product” and “AEC qualified” to the feature list Updated package names to “PG-xxx” Removed leadframe variant “P-TO-252-1” Added “Green Product” remark Disclaimer update Updated Package Outlines (added TAB potential)
1.5		Previous version

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