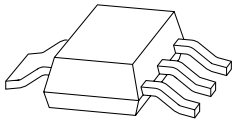
SIEMENS

Voltage Regulator — TLE 4274

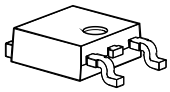
Preliminary Data

Features

- Output voltage: 3.3 V/2.5 V ± 4 %
- Very low current consumption
- Short-circuit proof
- Reverse polarity proof
- Suitable for use in automotive electronics



P-SOT223-4-1



P-TO252-3-1 (D-PAK)

Type	Ordering Code	Package
TLE 4274 GSV 33	Q67006-A9289	P-SOT223-4-1
▼ TLE 4274 DV 33	Q67006-A9348	P-TO252-3-1
▼ TLE 4274 GSV 25	Q67006-A9359	P-SOT223-4-1

SMD = Surface Mounted Device
▼ New type

Functional Description

The TLE 4274 is a voltage regulator available in a SOT223 and TO252 package. The IC regulates an input voltage up to 40 V to V_{Qrated} = 3.3 V/2.5 V. The maximum output current is 400 mA. The IC is short-circuit proof and incorporates temperature protection that disables the IC at over temperature.

Dimensioning Information on External Components

The input capacitor C_I is necessary for compensating line influences. Using a resistor of approx. 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 guaranteed at values $C_Q \geq 10$ µF and an ESR of ≤ 3 Ω within the operating temperature range.

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 incorporates a number of internal circuits for protection against:

- Overload,
- Overtemperature,
- Reverse polarity.

Pin Configuration

(top view)

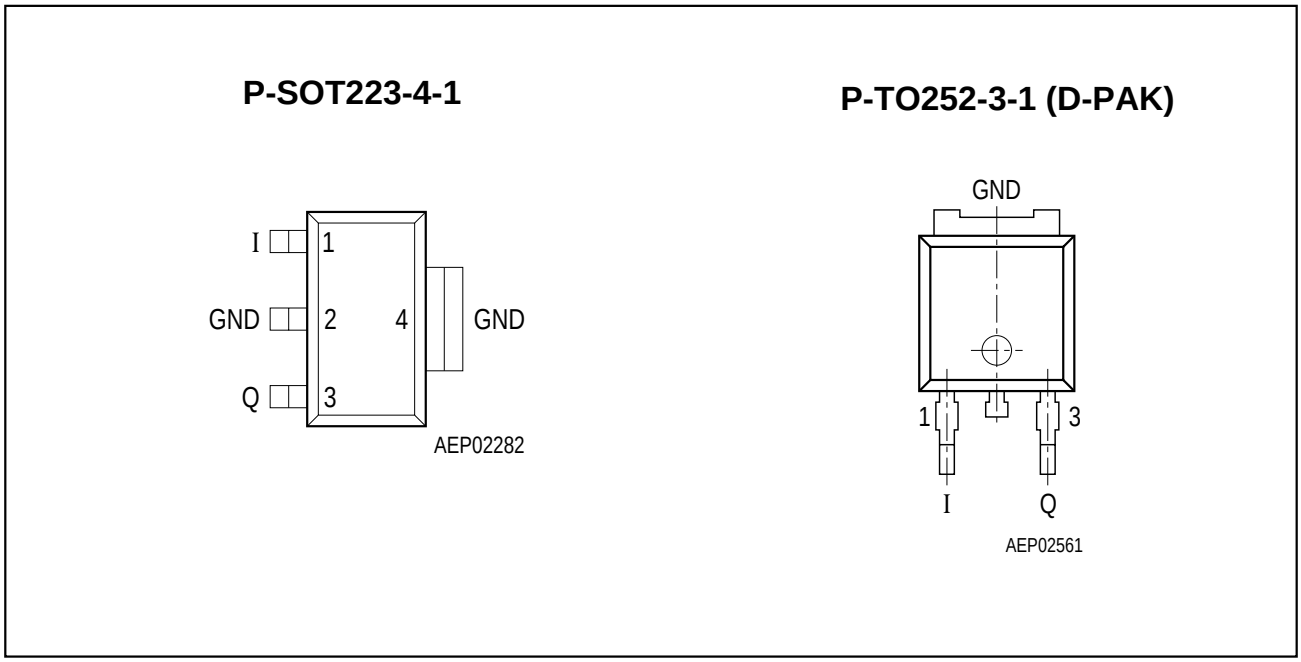


Figure 1

Pin Definitions and Functions

Pin No.	Symbol	Function
1	I	**Input**; block to ground directly at the IC with a ceramic capacitor.
2, 4	GND	**Ground**; P-TO252-3-1: internally connected to heatsink
3	Q	**Output**; block to ground with capacitor $C_Q \geq 10$ µF

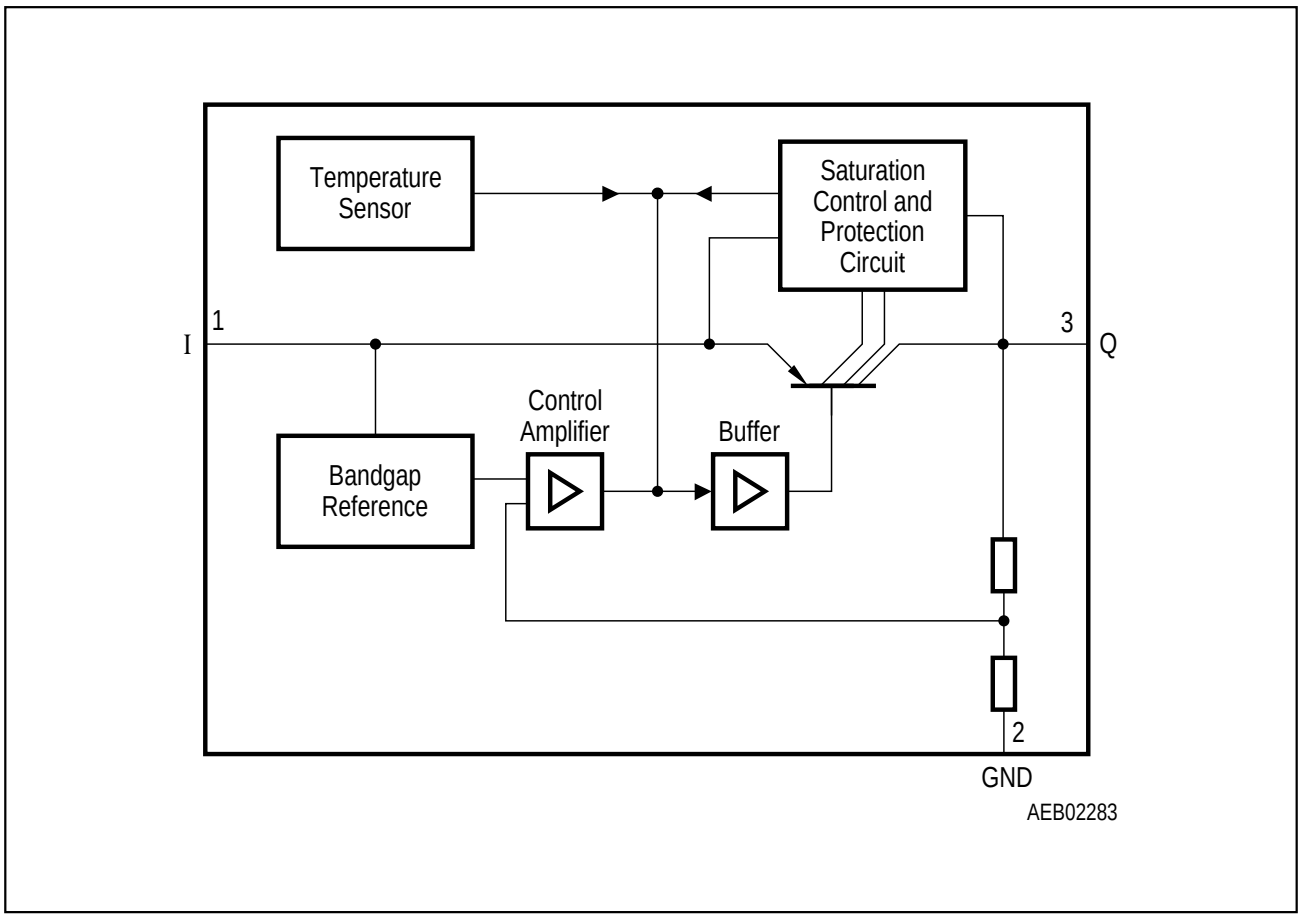


Figure 2
Block Diagram

Absolute Maximum Ratings T_j = – 40 to 150 °C

Parameter	Symbol	Limit Values		Unit	Test Condition
		min.	max.		
Voltage Regulator					
Input					
Voltage	V_I	– 42	45	V	–
Current	I_I	–	–	–	Internally limited
Output					
Voltage	V_Q	– 1.0	40	V	–
Current	I_Q	–	–	–	Internally limited
Ground					
Current	I_{GND}	–	100	mA	–
Temperature					
Junction temperature	T_j	–	150	°C	–
Storage temperature	T_{stg}	– 50	150	°C	–

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

Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Input voltage	V_I	4.7 4.0	40 40	V	V33 version V25 version
Junction temperature	T_j	– 40	150	°C	–
Thermal Resistance					
Junction ambient	R_{thja}	–	100	K/W	SOT223[1)]
Junction ambient	R_{thja}	–	70	K/W	TO252[2)]
Junction case	R_{thjc}	–	25	K/W	SOT223
Junction case	R_{thjc}	–	4	K/W	TO252

[1)] soldered in, 1 cm^2 copper area at pin 4, FR4

[2)] soldered in, minimal footprint, FR4

Characteristics

V_I = 6 V; – 40 °C < T_j < 150 °C (unless otherwise specified)

Parameter	Symbol	Limit Values			Unit	Measuring Condition
		min.	typ.	max.		
Output voltage V33-Version	V_Q	3.17	3.3	3.44	V	5 mA < I_Q < 400 mA 4.7 V < V_I < 40 V
Output voltage V25-Version	V_Q	2.4	2.5	2.6	–	5 mA < I_Q < 400 mA 4.0 V < V_Q < 40 V
Output current limitation[1)]	I_Q	400	600	–	mA	–
Current consumption; $I_q = I_I - I_Q$	I_q	–	100	220	µA	I_Q = 1 mA
Current consumption; $I_q = I_I - I_Q$	I_q I_q	–	8 20	15 30	mA mA	I_Q = 250 mA I_Q = 400 mA
Drop voltage[1)] V33-Version	V_{dr}	–	0.7	1.2	V	I_Q = 300 mA $V_{dr} = V_I - V_Q$
Drop voltage[1)] V25-Version	V_{dr}	–	1.0	1.5	V	I_Q = 300 mA $V_{dr} = V_I - V_Q$
Load regulation	ΔV_Q	–	40	70	mV	I_Q = 5 mA to 300 mA
Line regulation	ΔV_Q	–	10	25	mV	ΔV_I = 12 V to 32 V I_Q = 5 mA
Power supply ripple rejection	$PSRR$	–	60	–	dB	f_r = 100 Hz; V_r = 0.5 V_{SS}
Temperature output voltage drift	$\frac{dV_Q}{dT}$	–	0.5	–	mV/K	–

[1)] Measured when the output voltage V_Q has dropped 100 mV from the nominal value obtained at V_I = 6 V.

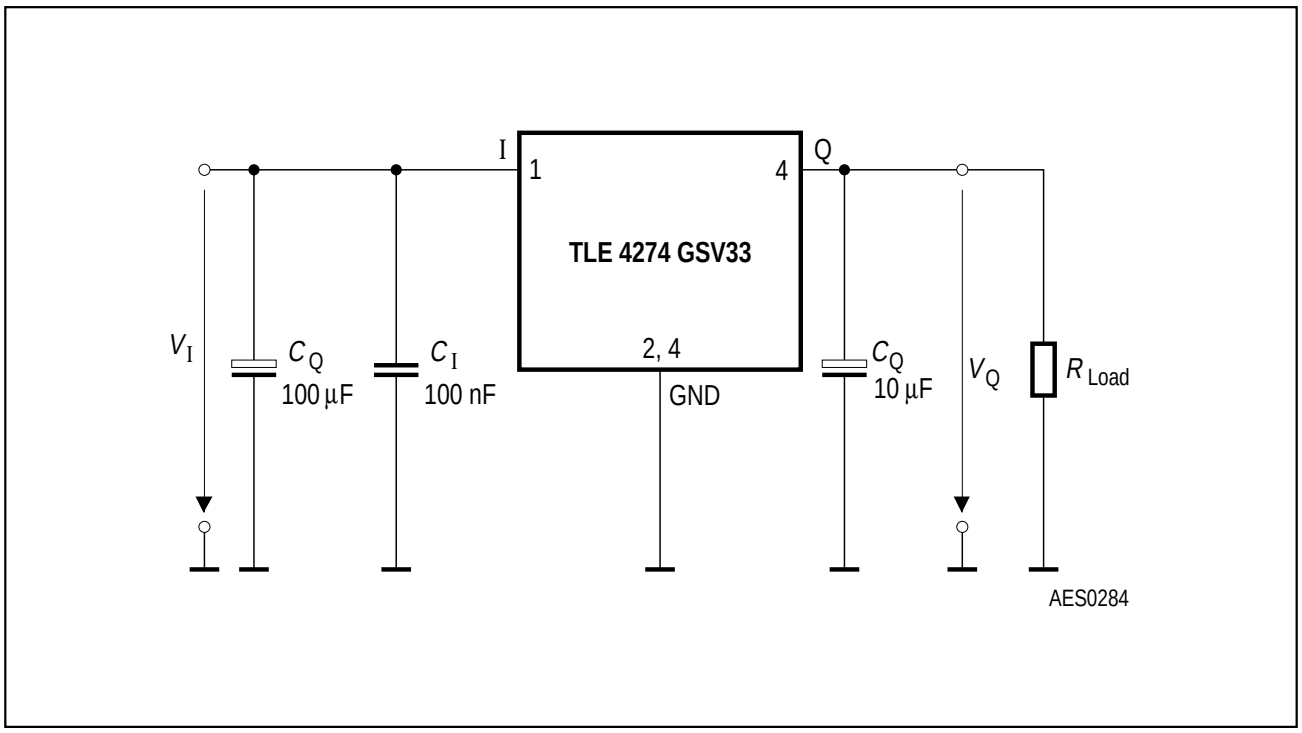


Figure 3
Measuring Circuit

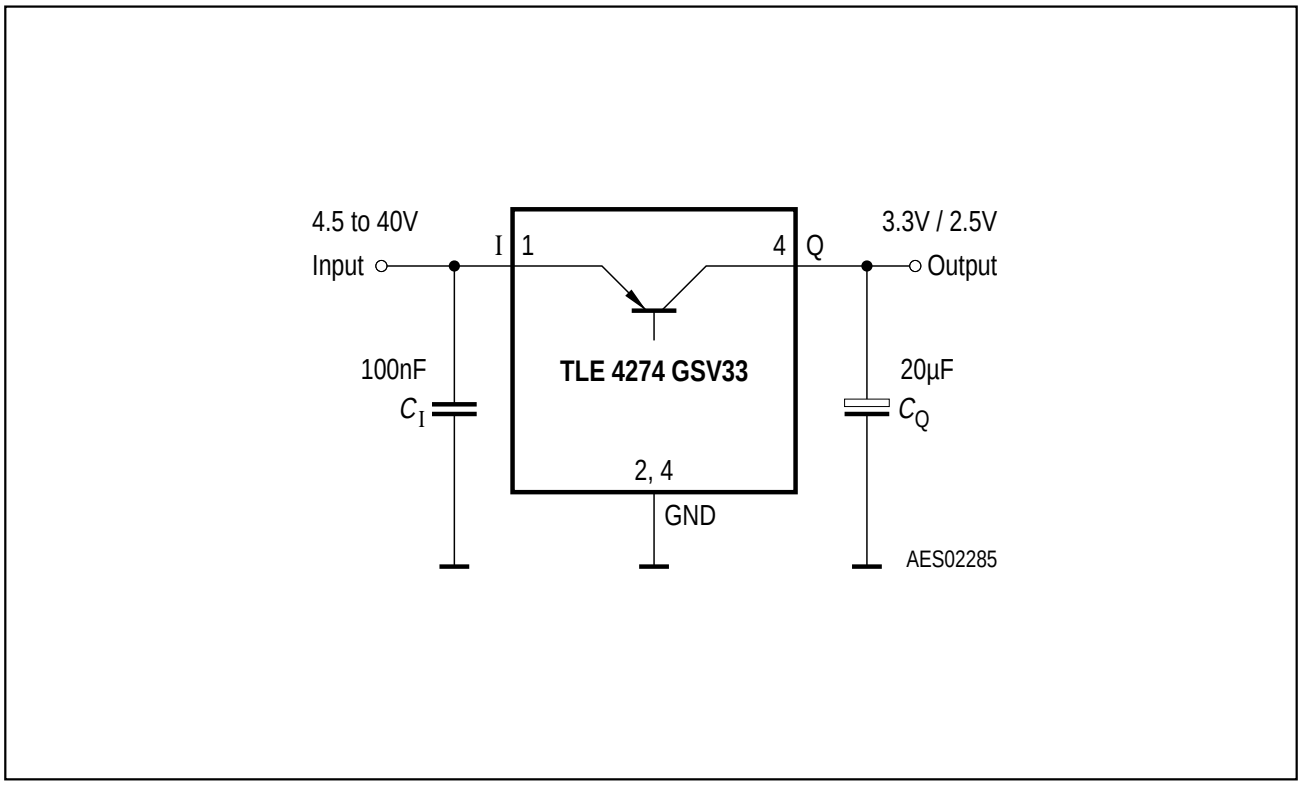


Figure 4
Application Circuit 1

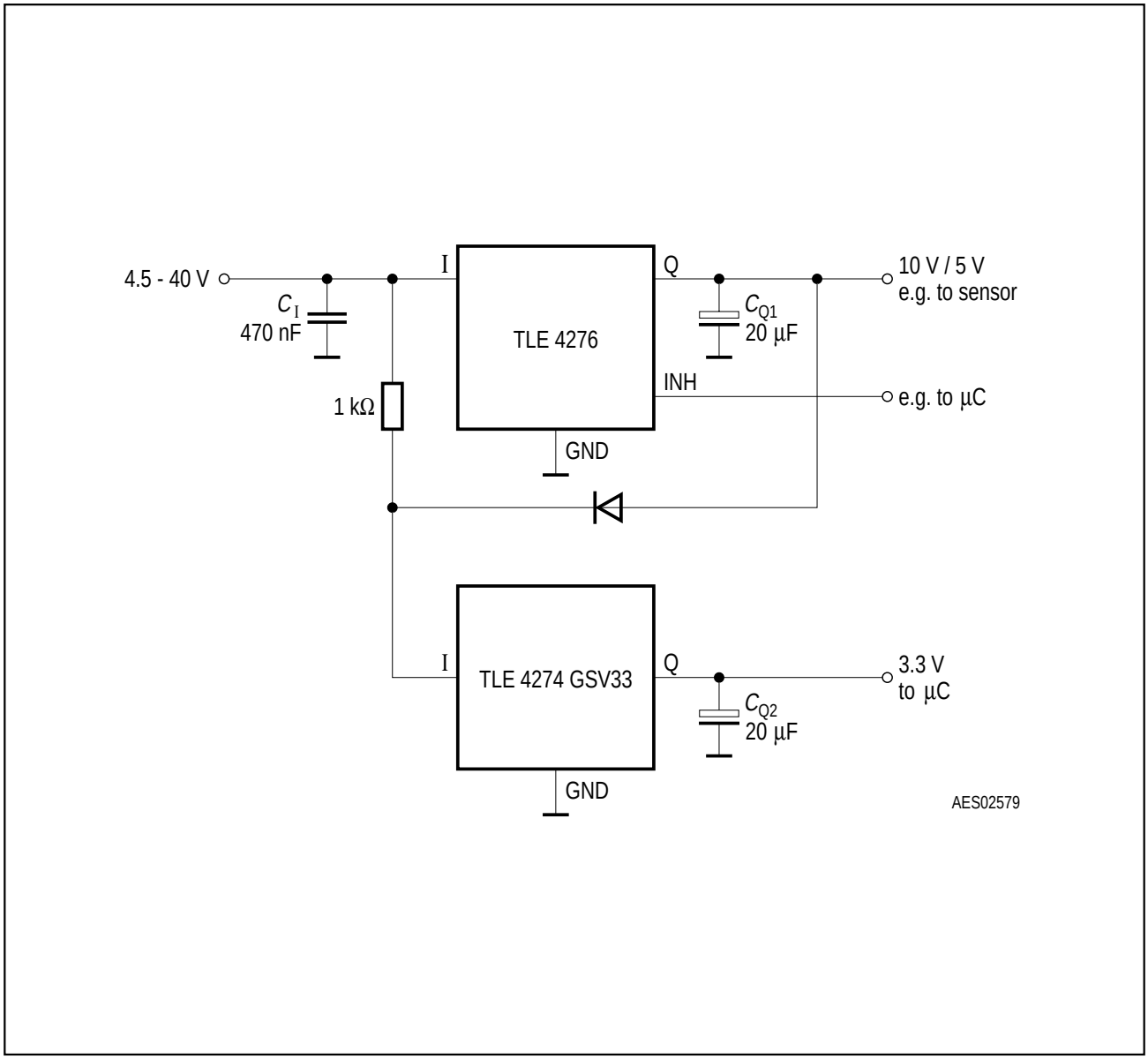
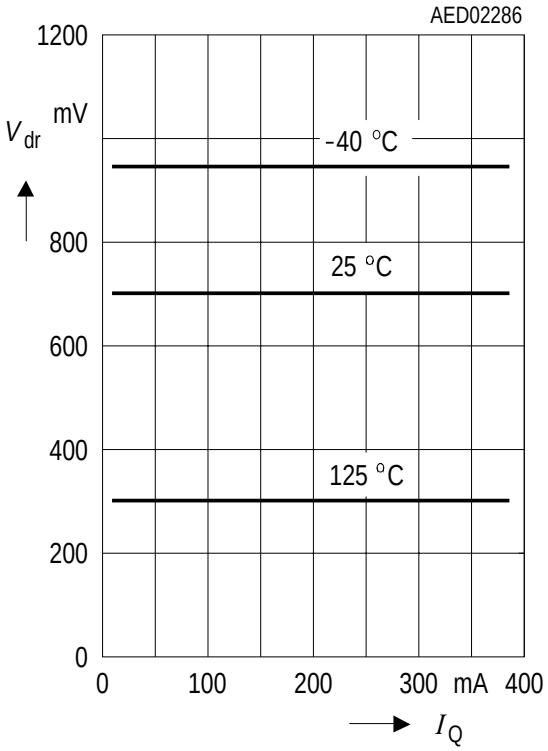


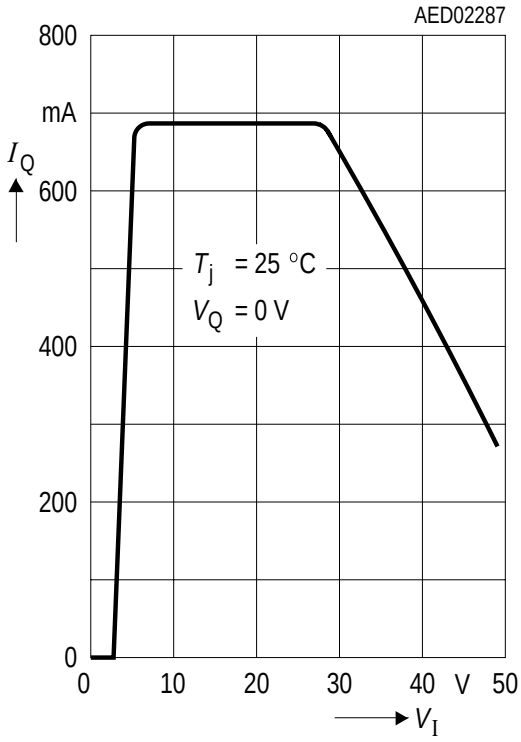
Figure 5
Application Circuit 2 (Voltage Dropper)

Typical Performance Characteristics:

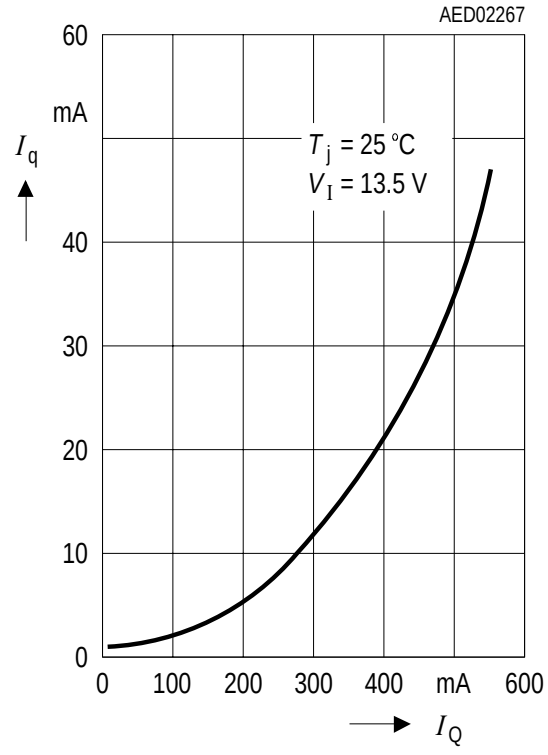
Drop Voltage V_{dr} versus Output Current I_Q



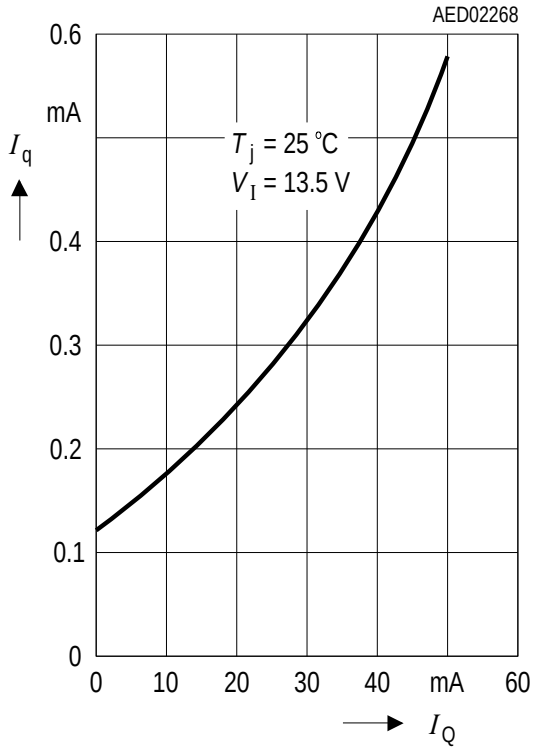
Output Current I_Q versus Input Voltage V_I



Current Consumption I_q versus Output Current I_Q (high load)

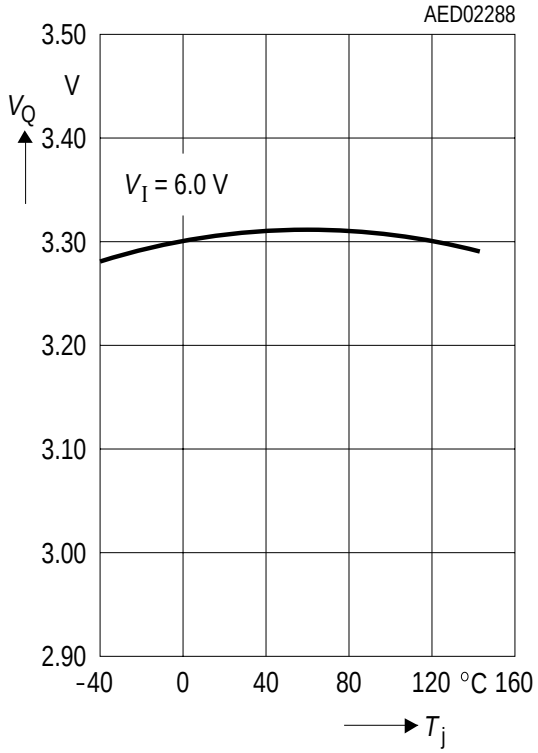


Current Consumption I_q versus Output Current I_Q (low load)

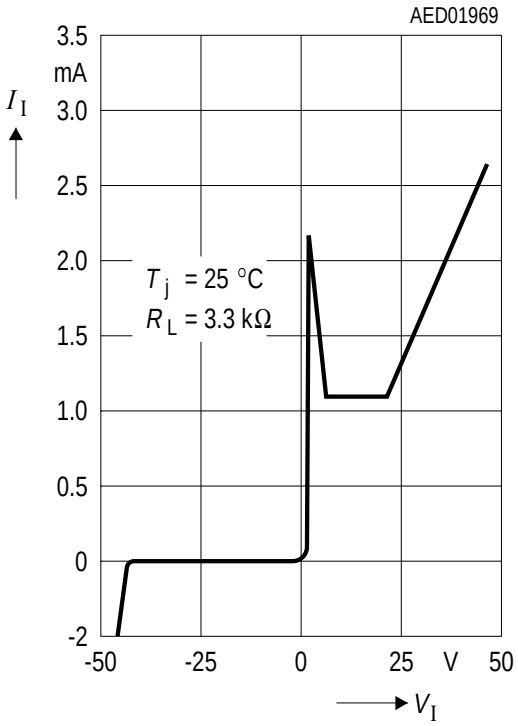


Typical Performance Characteristics:

Output Voltage V_Q versus Junction Temperature T_j (V33-Version)

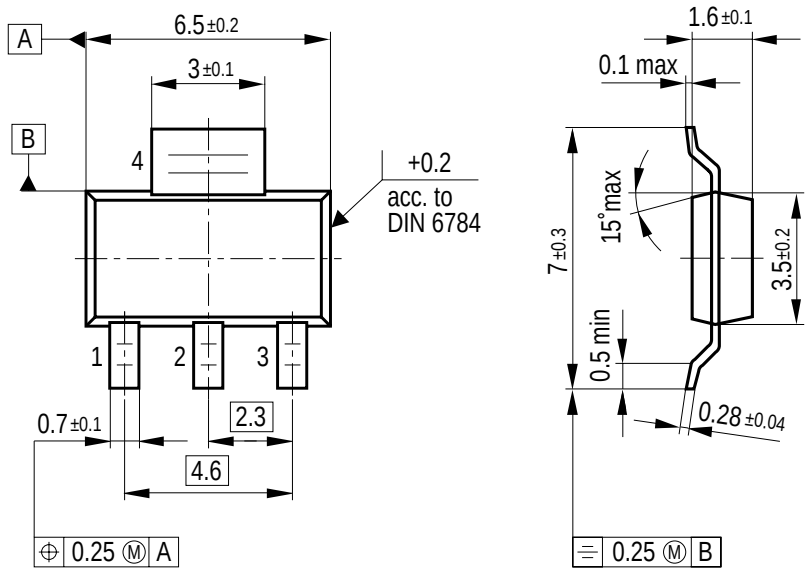


Input Current I_q versus Input Voltage V_i (V33-Version)



Package Outlines

P-SOT223-4-1 (SMD)
(Plastic Small Outline Transistor)

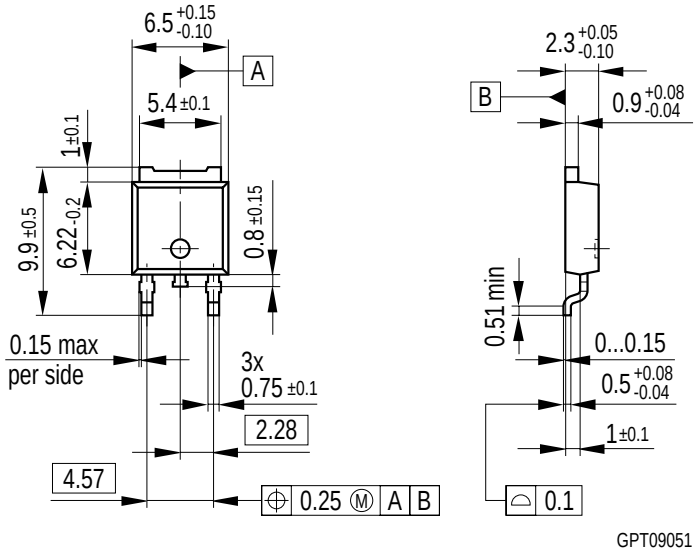


Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”

SMD = Surface Mounted Device

Dimensions in mm

P-TO252-3-1 (D-PAK)
(Plastic Transistor Single Outline)



All metal surfaces tin plated, except area of cut.

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