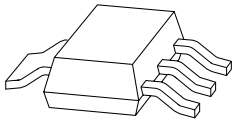
SIEMENS

Voltage Regulator — TLE 4274

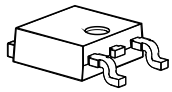
Preliminary Data

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)

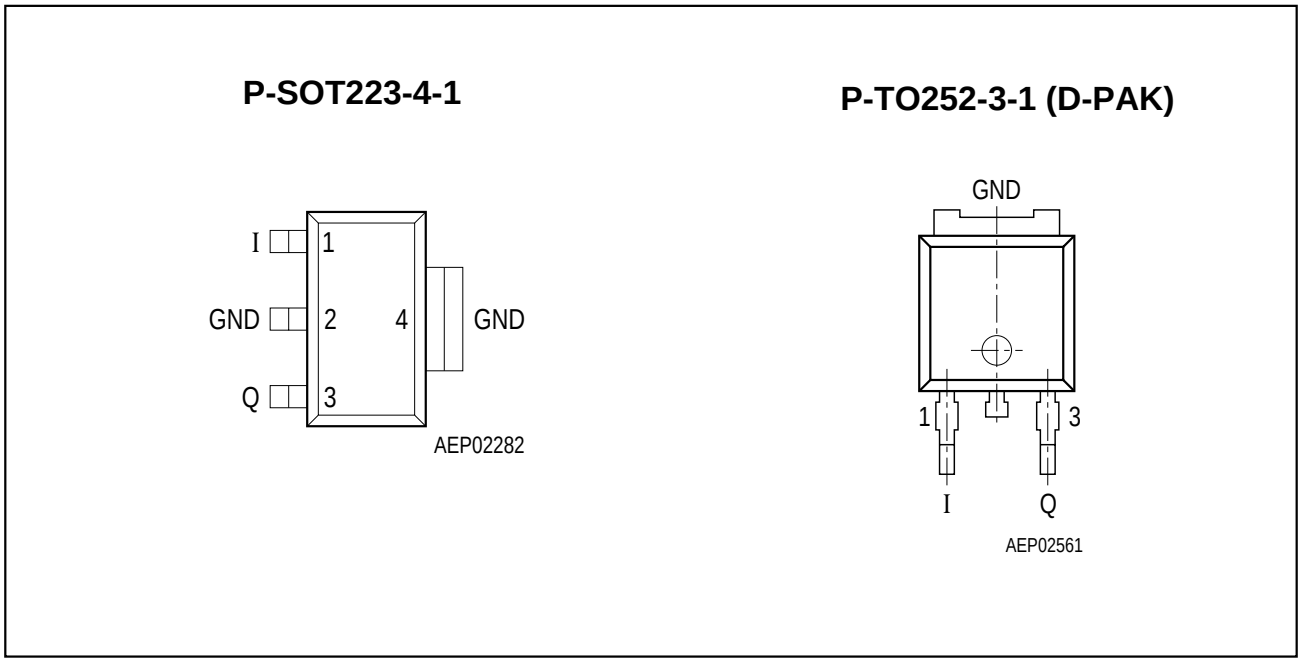


Figure 1

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

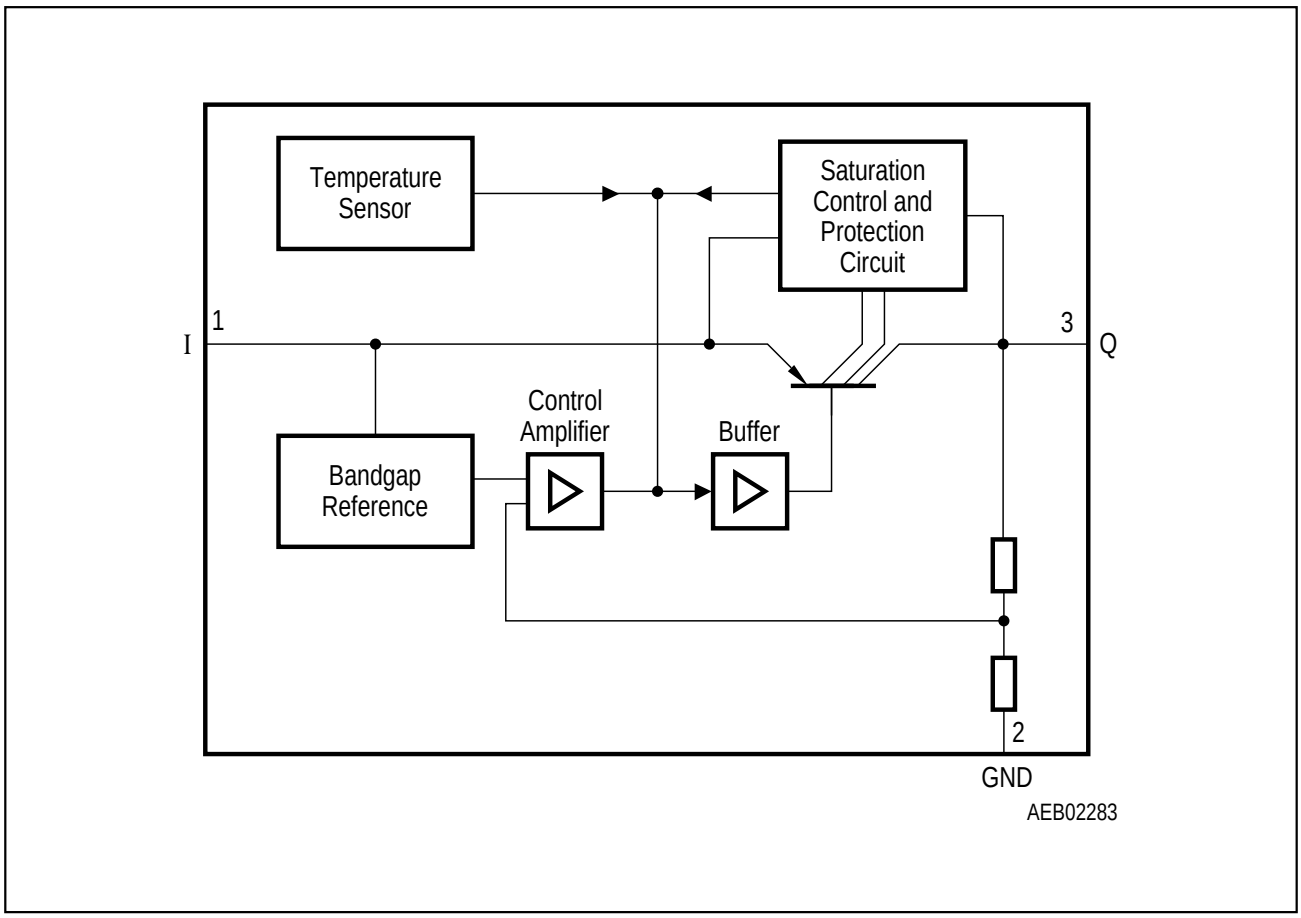


Figure 2
Block Diagram

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	40	V	–
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 < 28 V
Output voltage V33-Version	V_Q	3.17	3.3	3.44	V	5 mA < I_Q < 200 mA 4.7 V < V_I < 40 V
Output voltage V25-Version	V_Q	2.4	2.5	2.6	V	5 mA < I_Q < 400 mA 4.7 V < V_I < 28 V
Output voltage V25-Version	V_Q	2.4	2.5	2.6	V	5 mA < I_Q < 200 mA 4.7 V < V_I < 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	2.0	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.

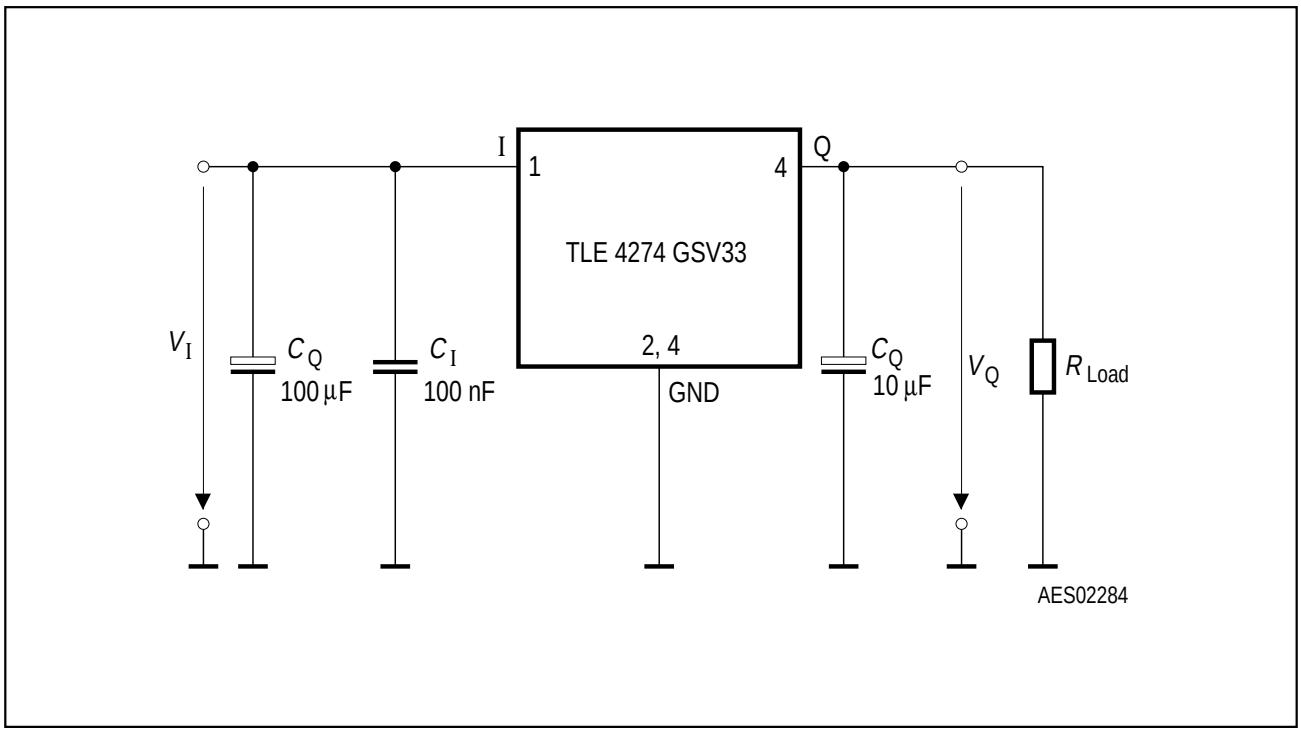


Figure 3
Measuring Circuit

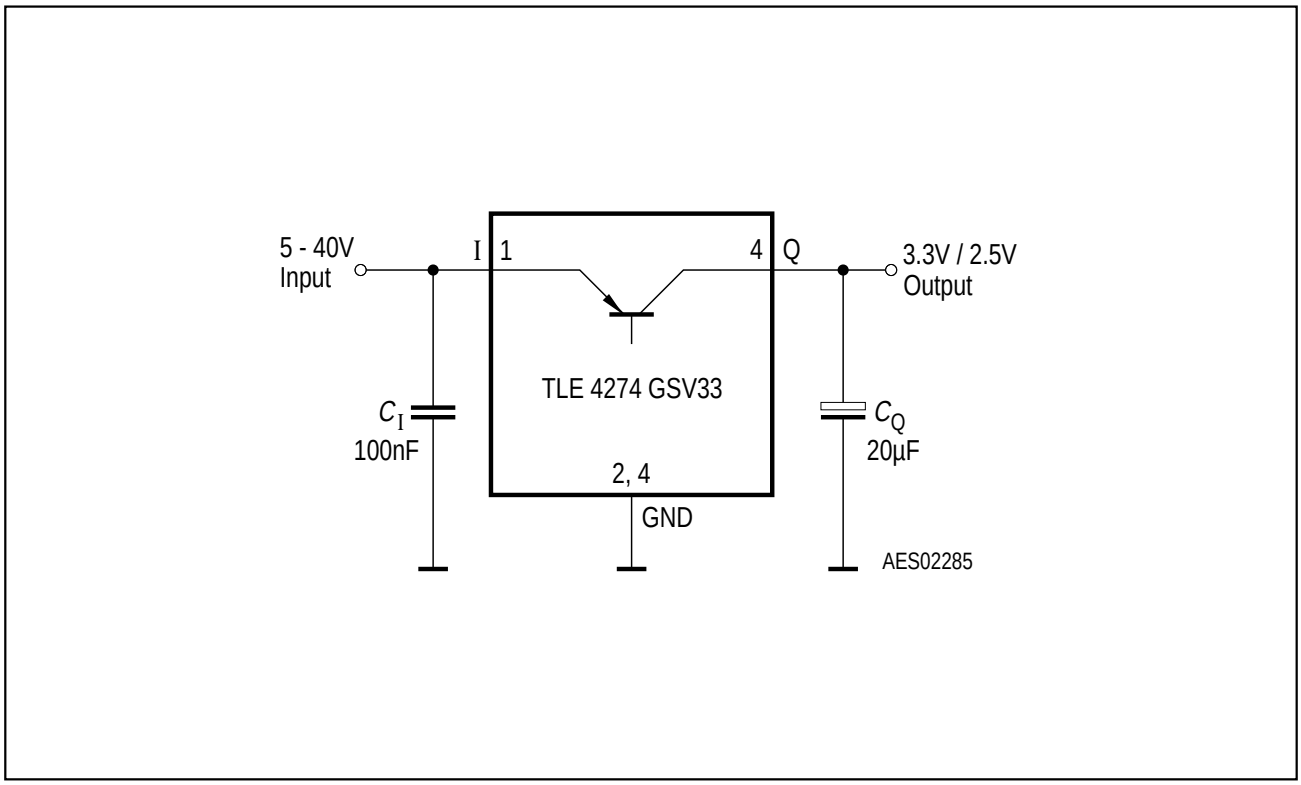


Figure 4
Application Circuit 1

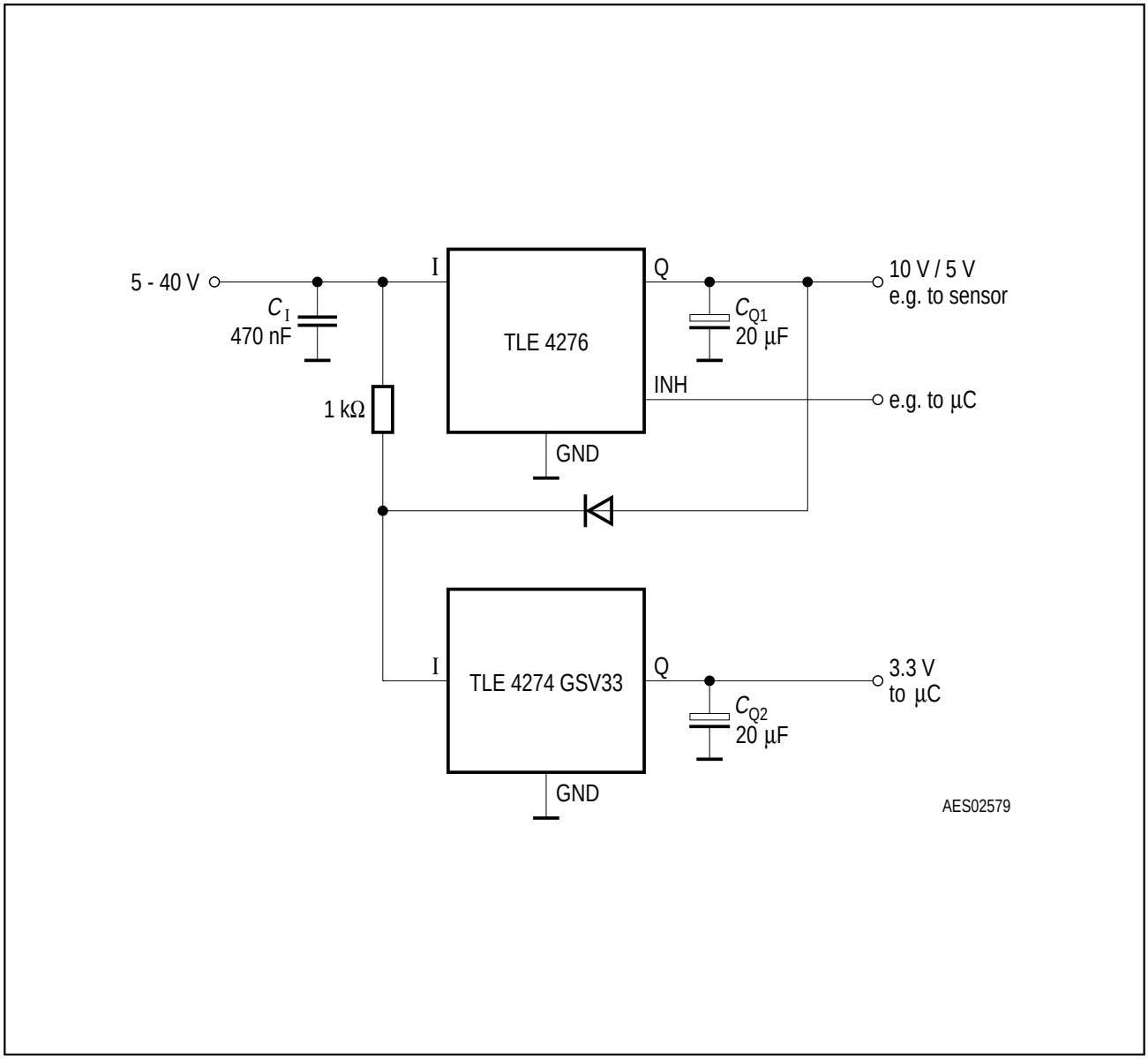
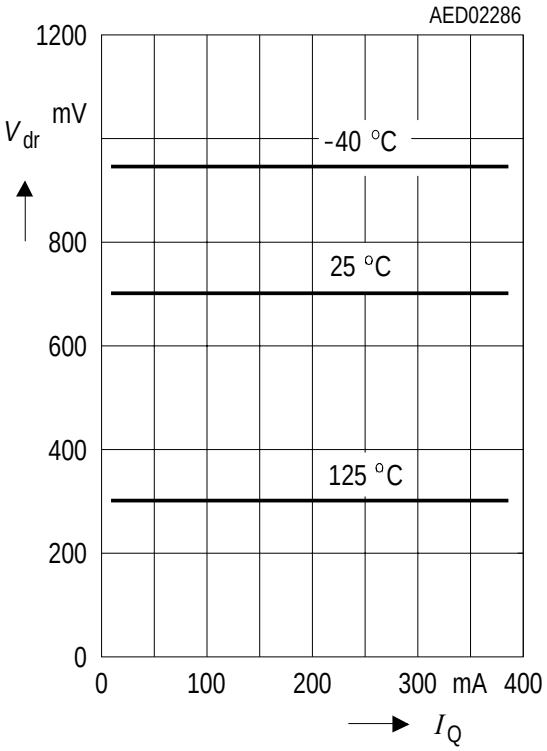


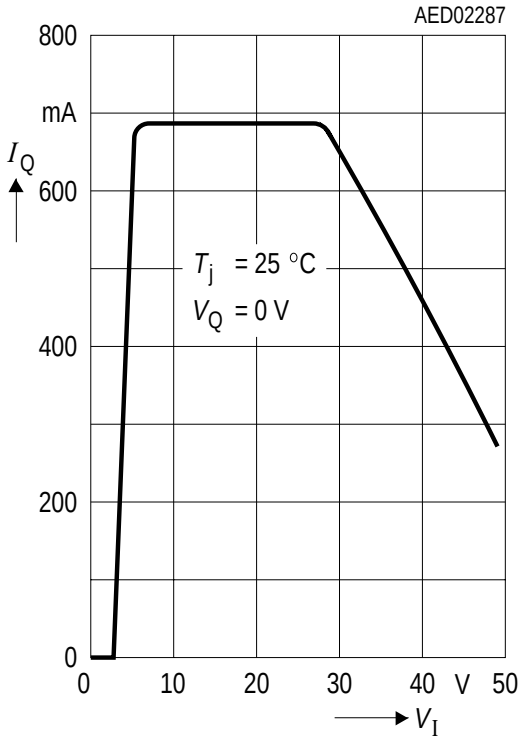
Figure 5
Application Circuit 2 (Voltage Dropper)

Typical Performance Characteristics:

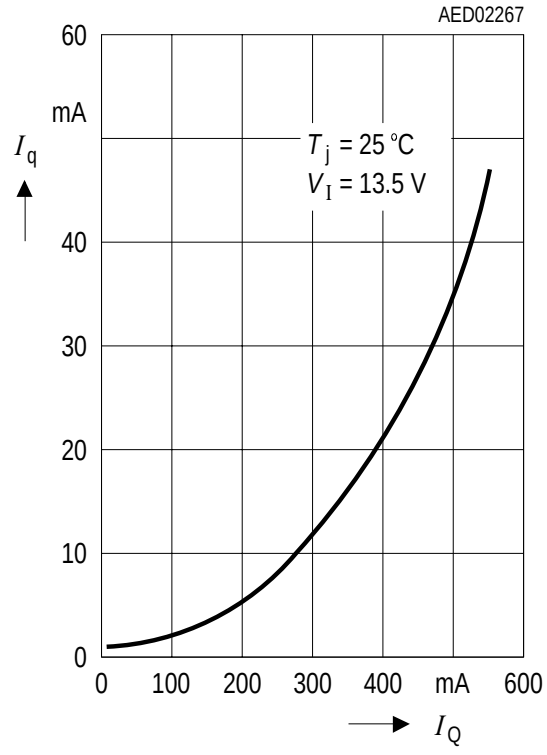
Drop Voltage V_{dr} versus Output Current I_Q (V33-Version)



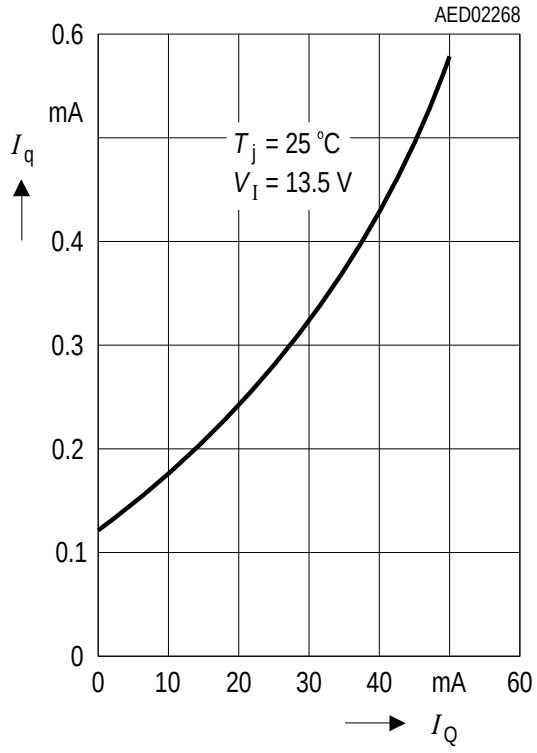
Output Current I_Q versus Input Voltage V_I



Current Consumption I_q versus Output Current I_Q (high load)

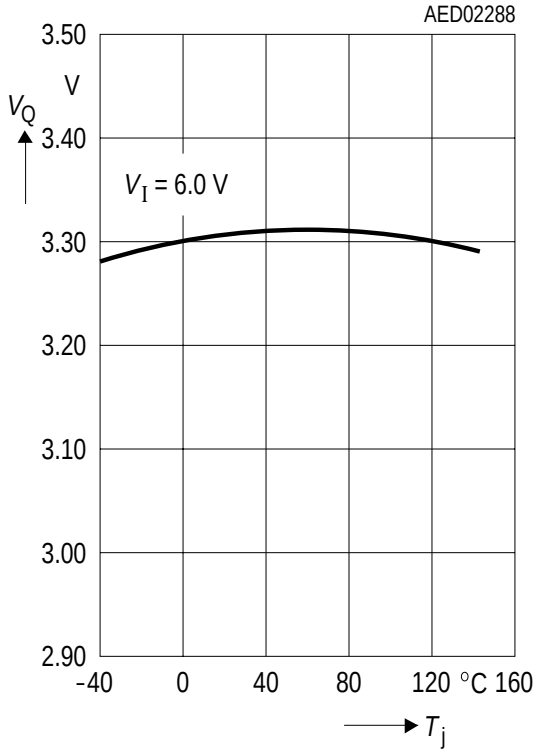


Current Consumption I_q versus Output Current I_Q (low load)

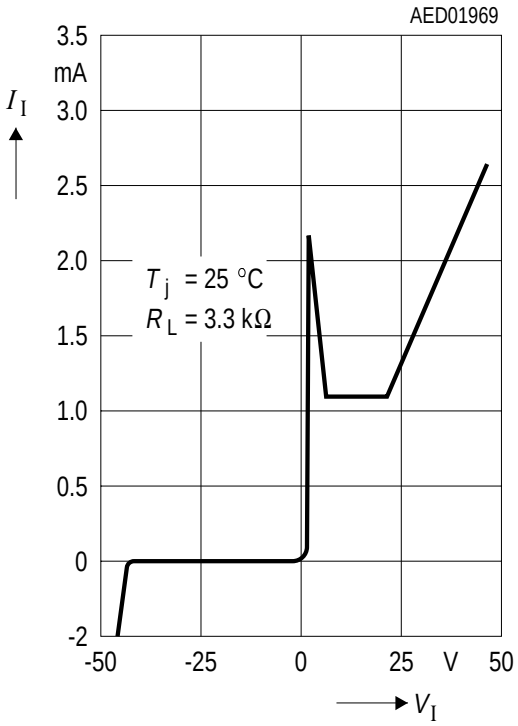


Typical Performance Characteristics:

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

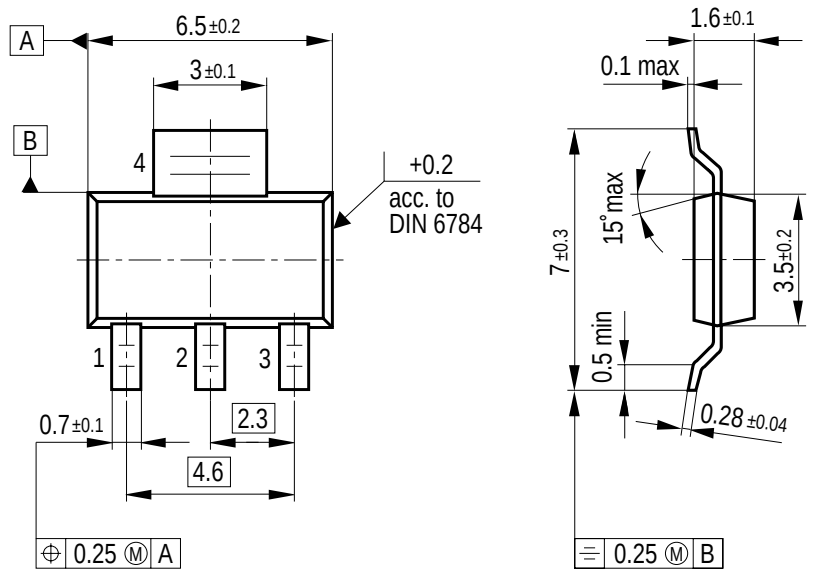


Input Current I_q versus Input Voltage V_i (V33-Version)



Package Outlines

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

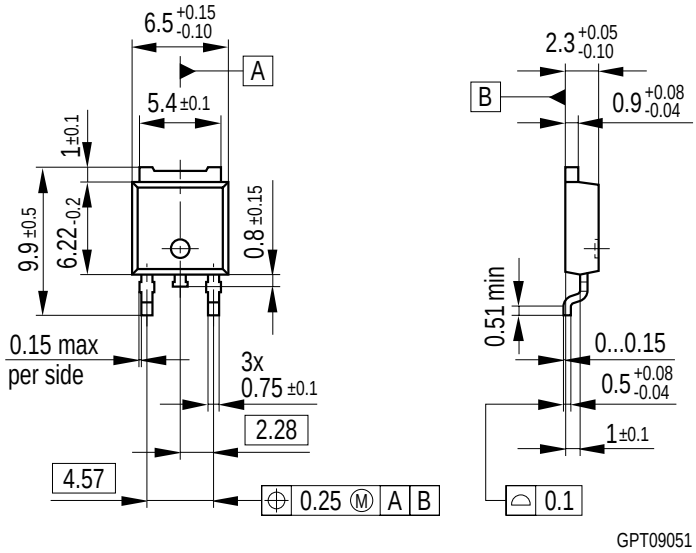


Sorts of Packing
Package outlines for tubes, trays etc. are contained in our Data Book “Package Information”

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.

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

SMD = Surface Mounted Device

Dimensions in mm