

# SIEMENS

## Low-Drop Voltage Regulator

TLE 4274

### Features

- Output voltage tolerance  $\leq \pm 4\%$
- Low-drop voltage
- Very low current consumption
- Short-circuit proof
- Reverse polarity proof
- Suitable for use in automotive electronics

Type	Ordering Code	Package
TLE 4274 V10	Q67000-A9258	P-TO220-3-1
TLE 4274 V85	Q67000-A9257	P-TO220-3-1
TLE 4274 V50	Q67000-A9256	P-TO220-3-1
TLE 4274 D V50	Q67006-A9331	P-TO252-3-1
TLE 4274 G V10	Q67006-A9261	P-TO263-3-1
TLE 4274 G V50	Q67006-A9259	P-TO263-3-1
TLE 4274 G V85	Q67006-A9260	P-TO263-3-1

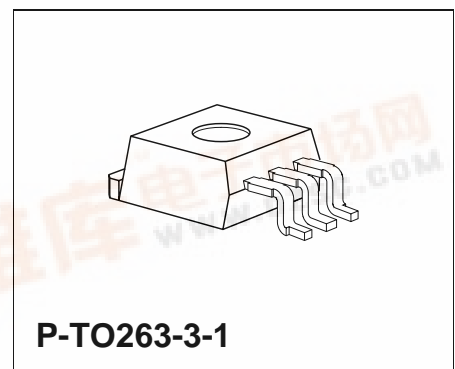
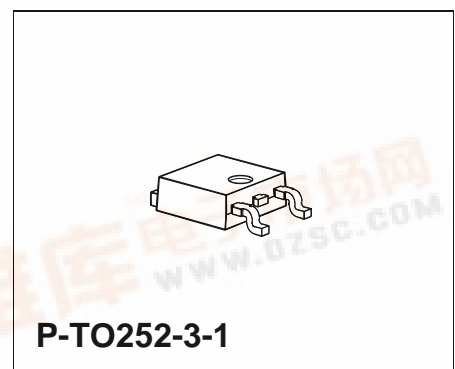
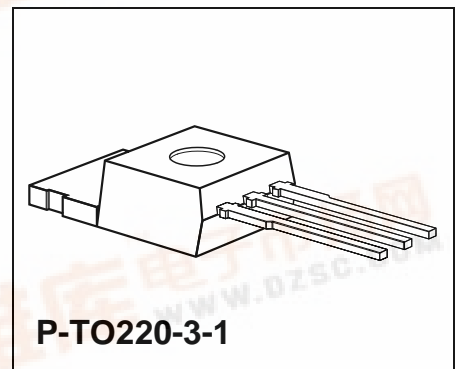
■ SMD = Surface Mounted Device

### Functional Description

The TLE 4274 is a low-drop voltage regulator in a TO220 package. The IC regulates an input voltage up to 40 V to  $V_{Qrated} = 5.0\text{ V (V50)}$ ,  $8.5\text{ V (V85)}$  and  $10\text{ V (V10)}$ . 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  $C_1$  is necessary for compensating line influences. Using a resistor of approx.  $1\ \Omega$  in series with  $C_1$ , 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  $C_Q \geq 22\ \mu\text{F}$  and an ESR of  $\leq 3\ \Omega$  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)

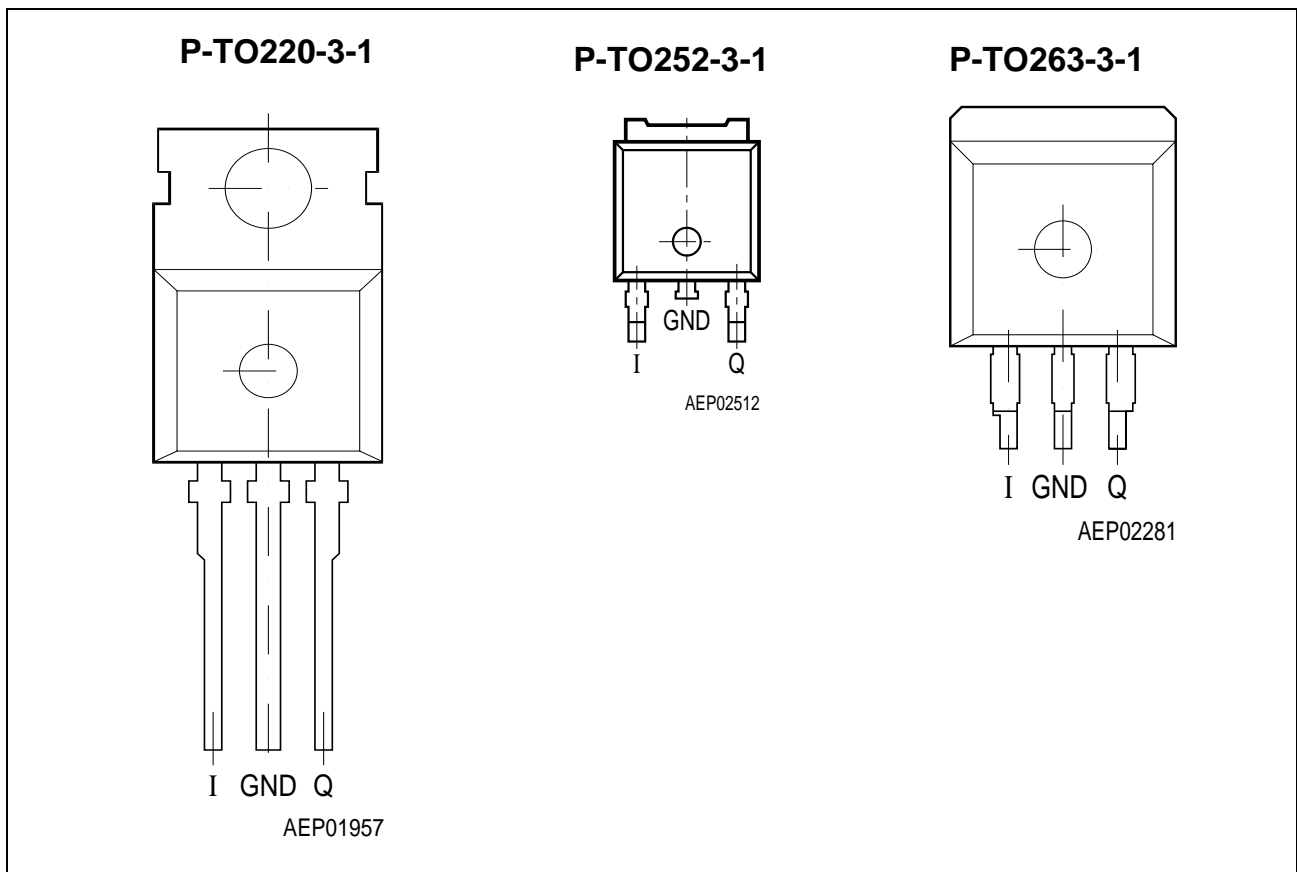
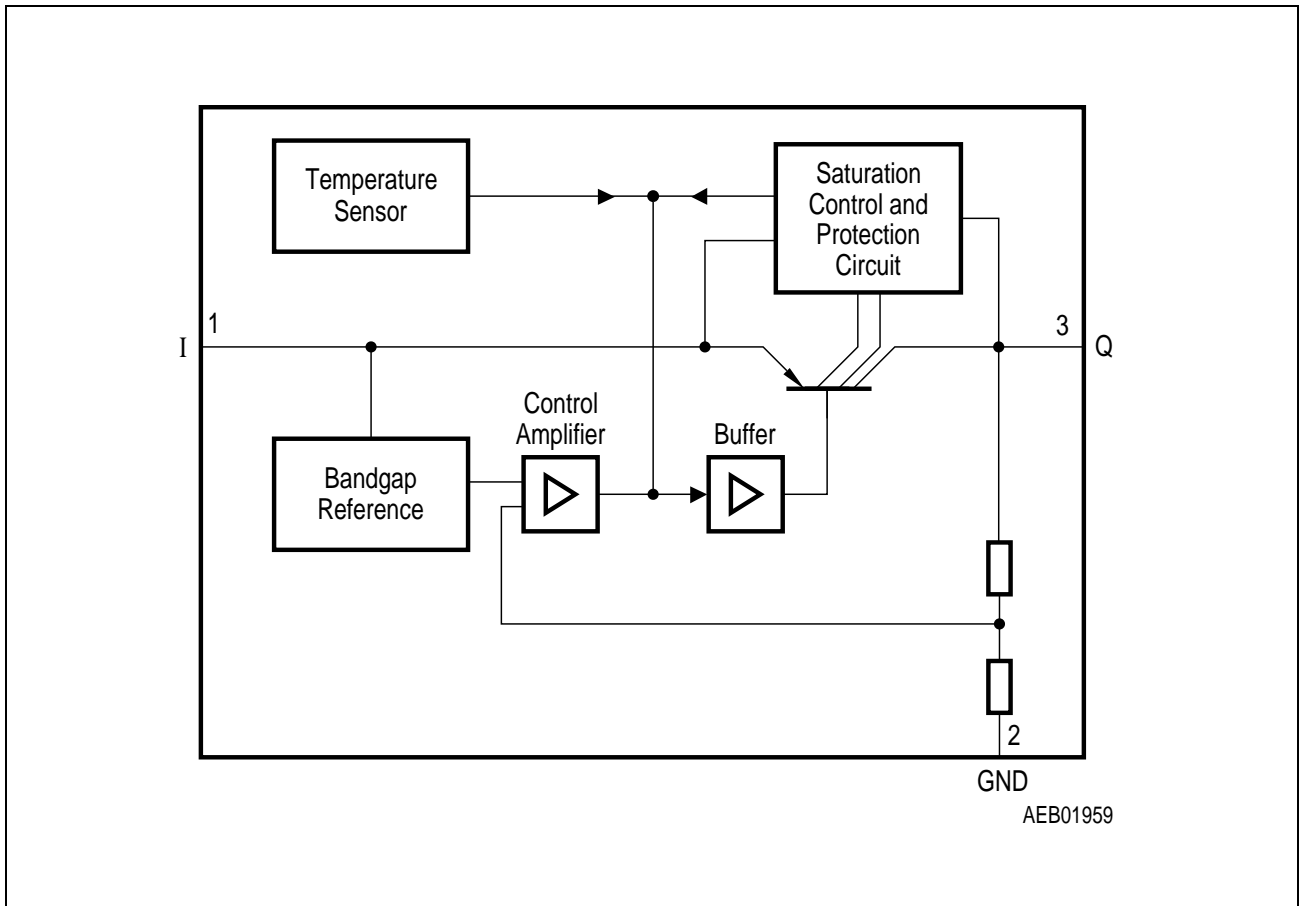


Figure 1

## Pin Definitions and Functions

Pin No.	Symbol	Function
1	I	<b>Input</b> ; block to ground directly at the IC with a ceramic capacitor.
2	GND	<b>Ground</b>
3	Q	<b>Output</b> ; block to ground with a $\geq 22 \mu\text{F}$ capacitor.



**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	-
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### 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 circuit.*

### Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Input voltage	$V_I$	5.5 9.0/10.5	40 40/40	V	V50 V85/V10
Junction temperature	$T_j$	- 40	150	°C	-

### Thermal Resistance

Junction ambient	$R_{thja}$	-	65	K/W	TO220
Junction ambient	$R_{thja}$	-	70	K/W	TO252 <sup>1)</sup> , TO263
Junction case	$R_{thjc}$	-	4	K/W	-

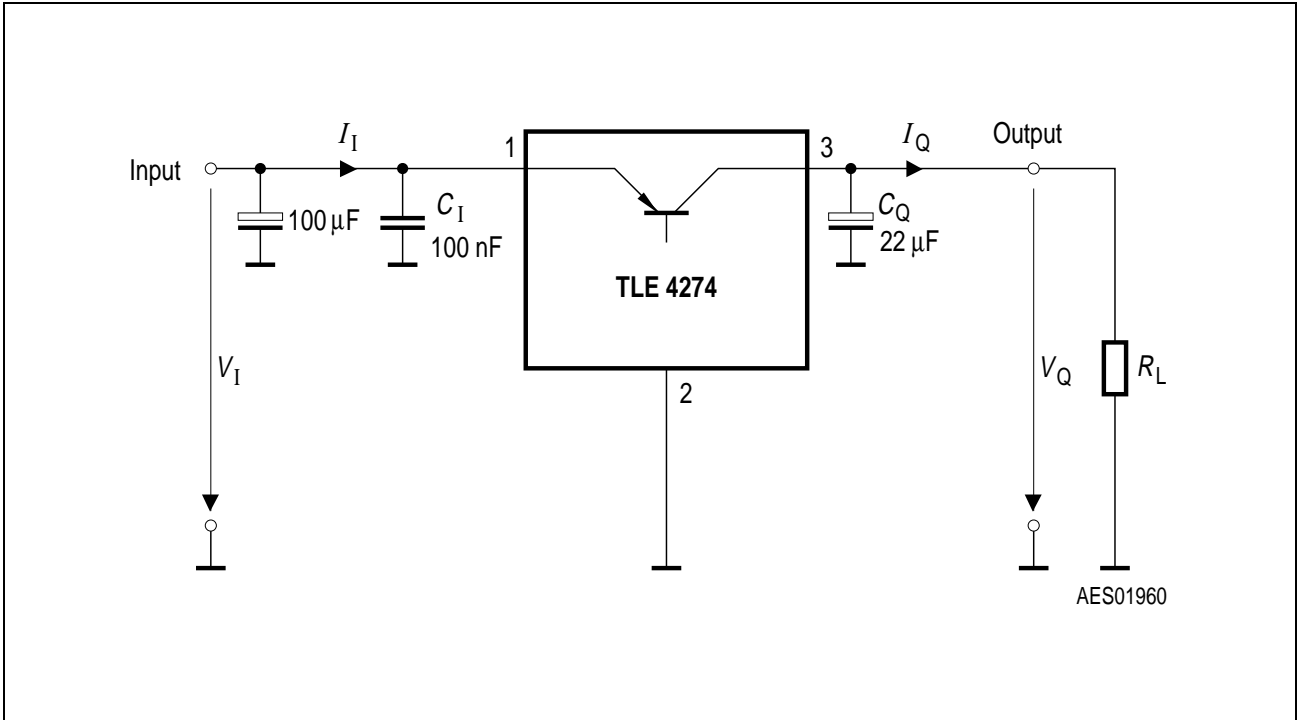
<sup>1)</sup> Soldered in, min. footprint

## Characteristics

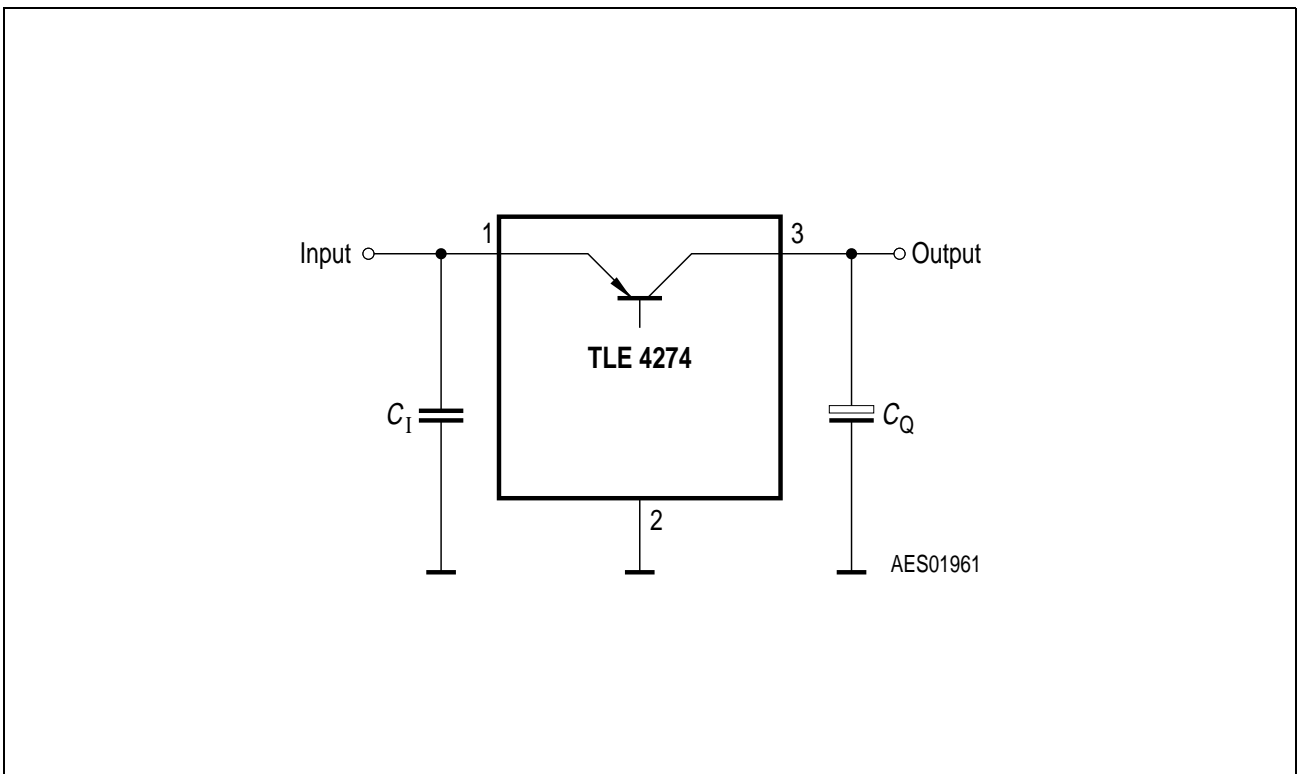
$V_I = 13.5 \text{ V}$ ;  $-40 \text{ }^\circ\text{C} < T_j < 150 \text{ }^\circ\text{C}$  (unless otherwise specified)

Parameter	Symbol	Limit Values			Unit	Measuring Conditions
		min.	typ.	max.		
Output voltage V50-Version	$V_Q$	4.8	5	5.2	V	$5 \text{ mA} < I_Q < 400 \text{ mA}$ $6 \text{ V} < V_I < 40 \text{ V}$
Output voltage V85-Version	$V_Q$	8.16	8.5	8.84	V	$5 \text{ mA} < I_Q < 400 \text{ mA}$ $9.5 \text{ V} < V_I < 40 \text{ V}$
Output voltage V10-Version	$V_Q$	9.6	10	10.4	V	$5 \text{ mA} < I_Q < 400 \text{ mA}$ $11 \text{ V} < V_I < 40 \text{ V}$
Output current limitation <sup>1)</sup>	$I_Q$	400	600	–	mA	–
Current consumption; $I_q = I_I - I_Q$	$I_q$	–	100	220	$\mu\text{A}$	$I_Q = 1 \text{ mA}$
Current consumption; $I_q = I_I - I_Q$	$I_q$	–	8	15	mA	$I_Q = 250 \text{ mA}$
	$I_q$	–	20	30	mA	$I_Q = 400 \text{ mA}$
Drop voltage <sup>1)</sup>	$V_{\text{dr}}$	–	250	500	mV	$I_Q = 250 \text{ mA}$ $V_{\text{dr}} = V_I - V_Q$
Load regulation	$\Delta V_Q$	–	20	50	mV	$I_Q = 5 \text{ mA}$ to 400 mA
Line regulation	$\Delta V_Q$	–	10	25	mV	$\Delta V_I = 12 \text{ V}$ to 32 V $I_Q = 5 \text{ mA}$
Power supply ripple rejection	$PSRR$	–	60	–	dB	$f_r = 100 \text{ Hz}$ ; $V_r = 0.5 V_{\text{SS}}$
Temperature output voltage drift	$\frac{dV_Q}{dT}$	–	0.5	–	mV/K	–

<sup>1)</sup> Measured when the output voltage  $V_Q$  has dropped 100 mV from the nominal value obtained at  $V_I = 13.5 \text{ V}$ .



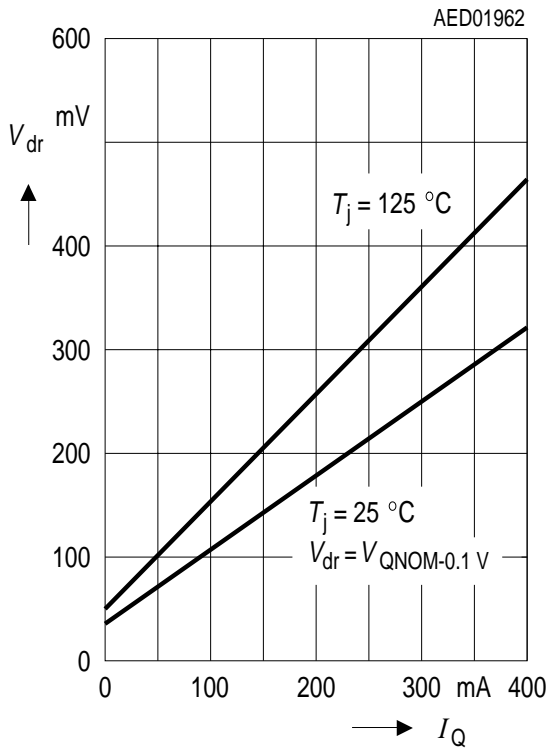
**Figure 3**  
**Measuring Circuit**



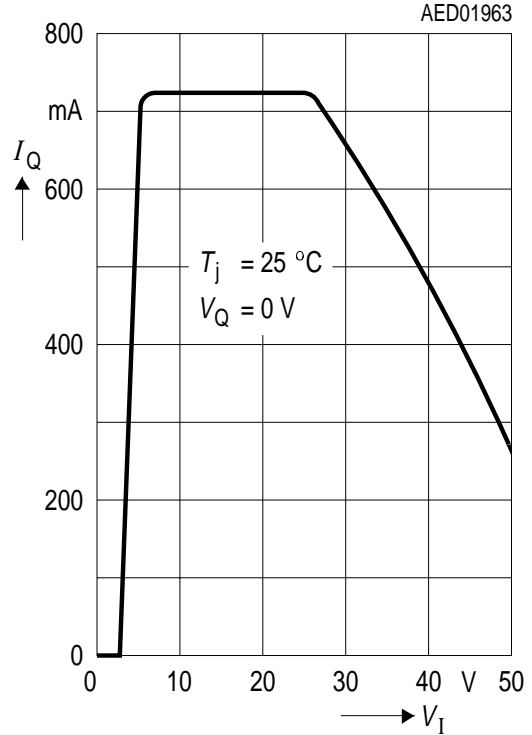
**Figure 4**  
**Application Circuit**

Typical Performance Characteristics (V50, V85 and V10):

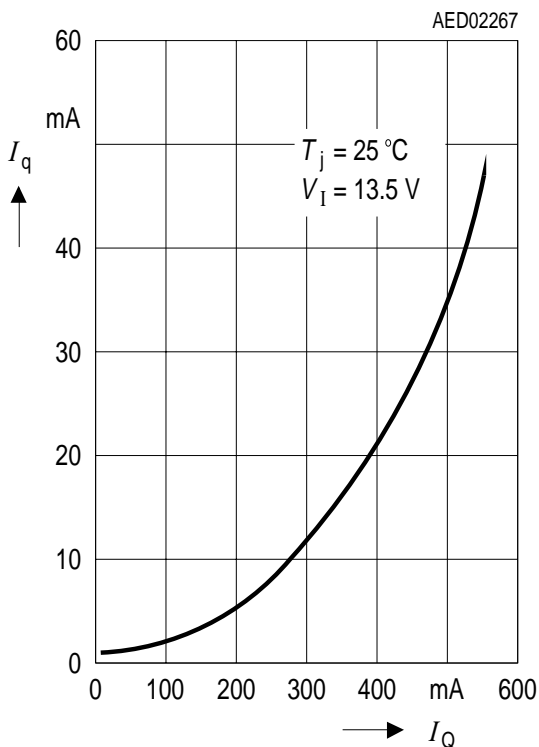
Drop Voltage  $V_{dr}$  versus Output Current  $I_Q$



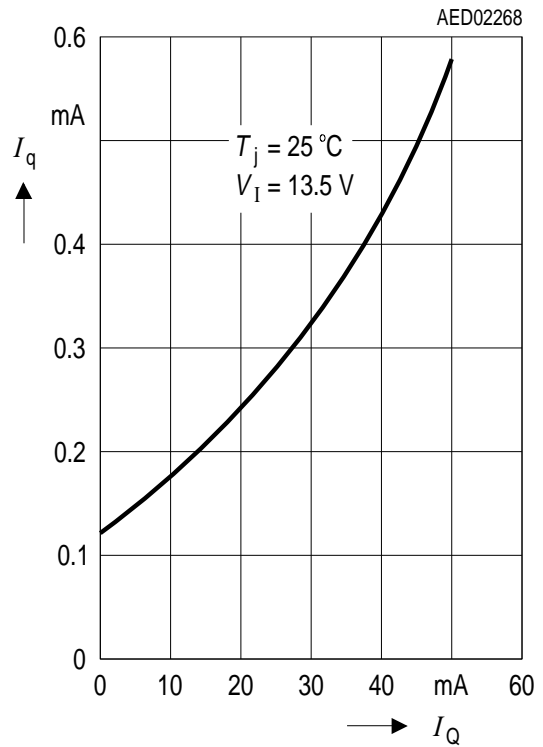
Output Current  $I_Q$  versus Input Voltage  $V_I$



Current Consumption  $I_q$  versus Output Current  $I_Q$  (high load)

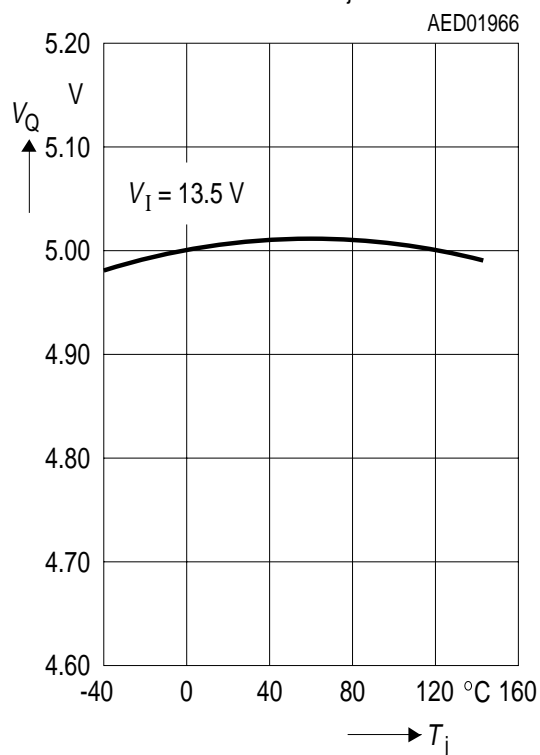


Current Consumption  $I_q$  versus Output Current  $I_Q$  (low load)

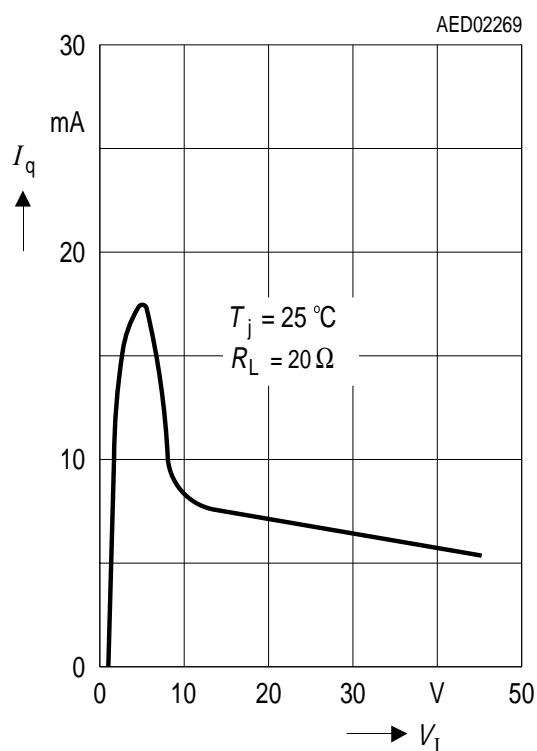


## Typical Performance Characteristics (V50):

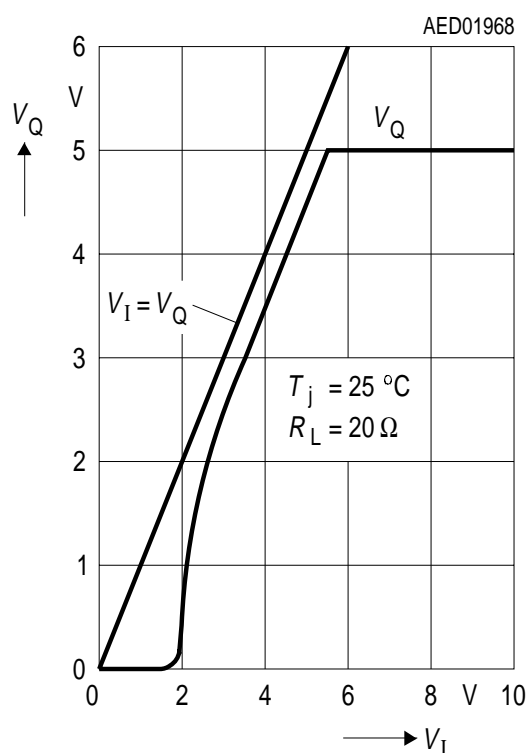
### Output Voltage $V_Q$ versus Junction Temperature $T_j$



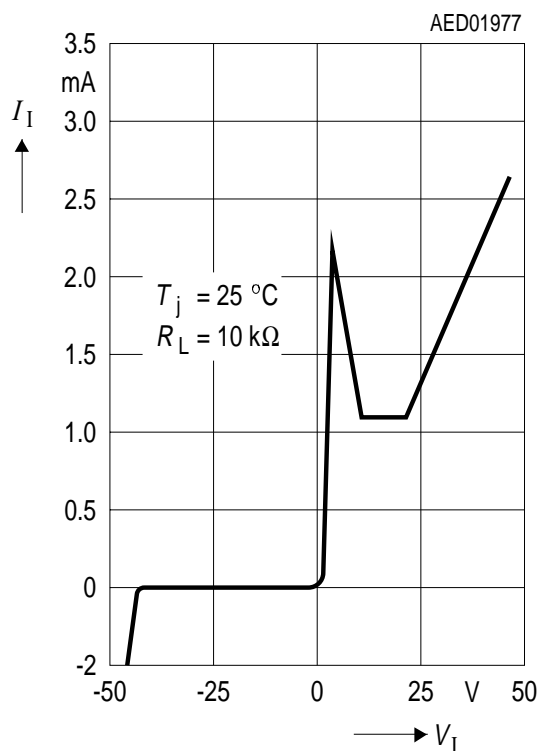
### Current Consumption $I_q$ versus Input Voltage $V_I$



### Output Voltage $V_Q$ versus Input Voltage $V_I$



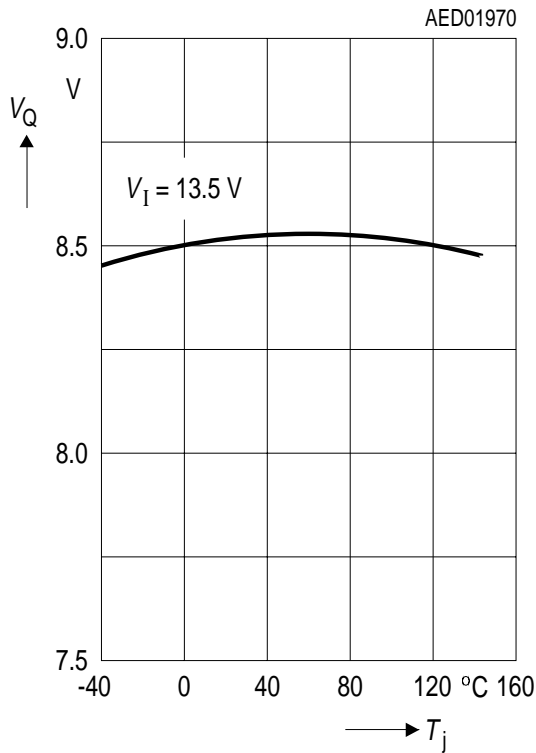
### Input Current $I_I$ versus Input Voltage $V_I$



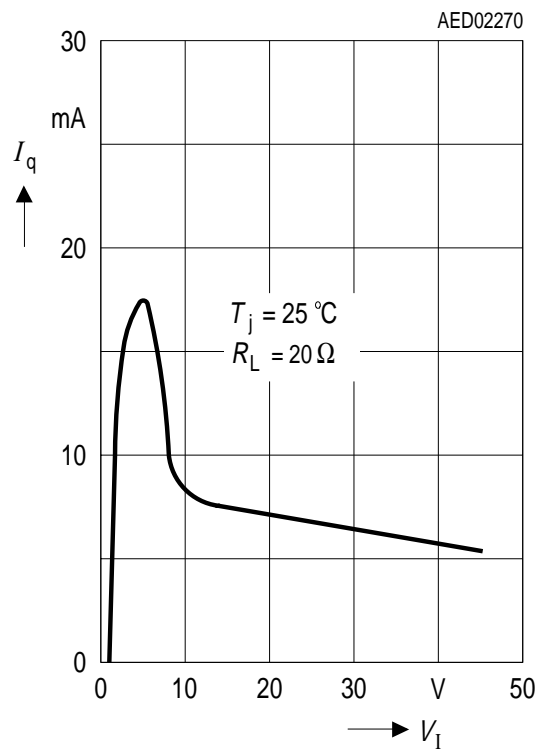


Typical Performance Characteristics for V85:

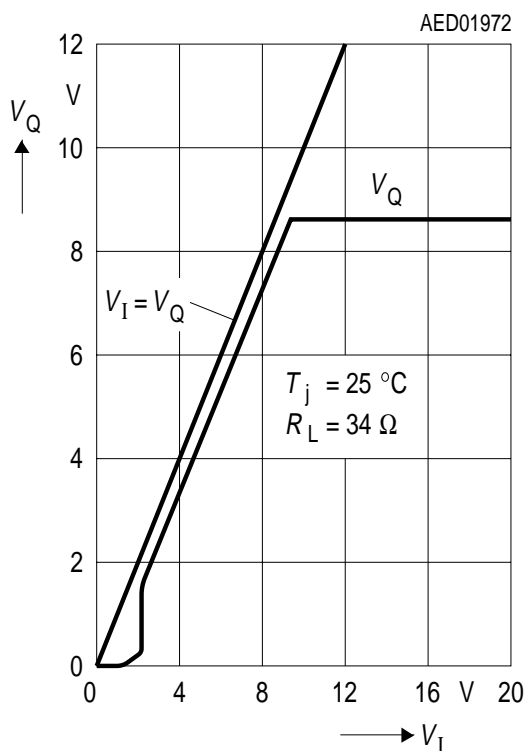
Output Voltage  $V_Q$  versus Junction Temperature  $T_j$



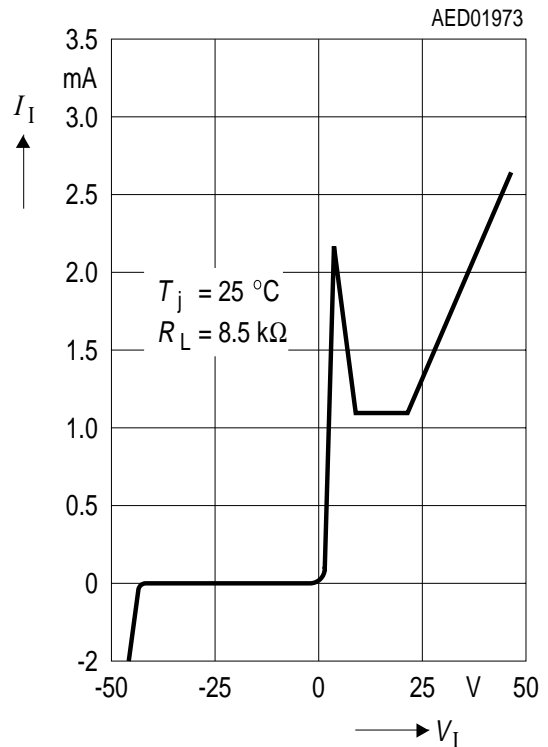
Current Consumption  $I_q$  versus Input Voltage  $V_I$



Output Voltage  $V_Q$  versus Input Voltage  $V_I$

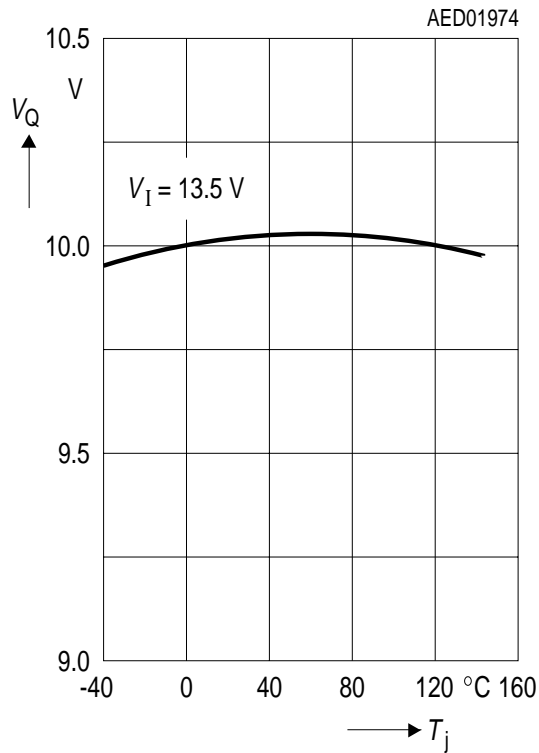


Input Current  $I_I$  versus Input Voltage  $V_I$

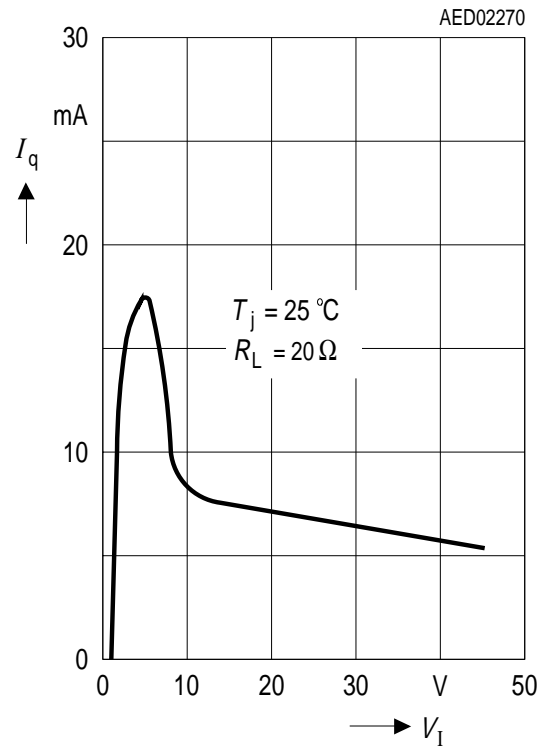


## Typical Performance Characteristics for V10:

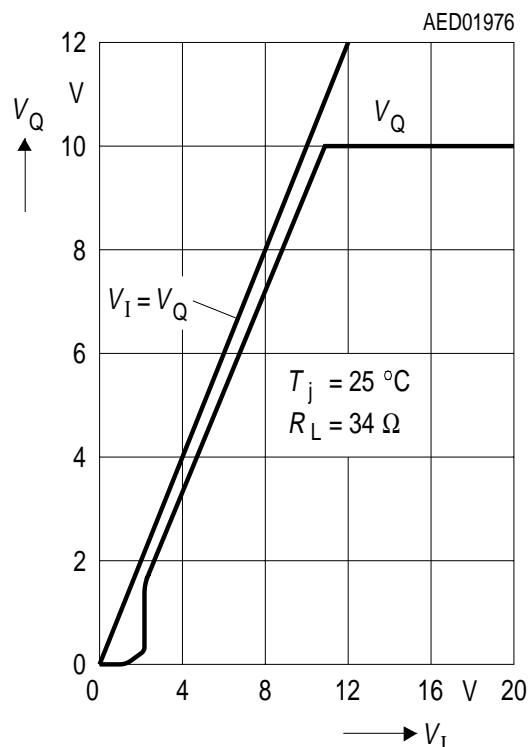
### Output Voltage $V_Q$ versus Junction Temperature $T_j$



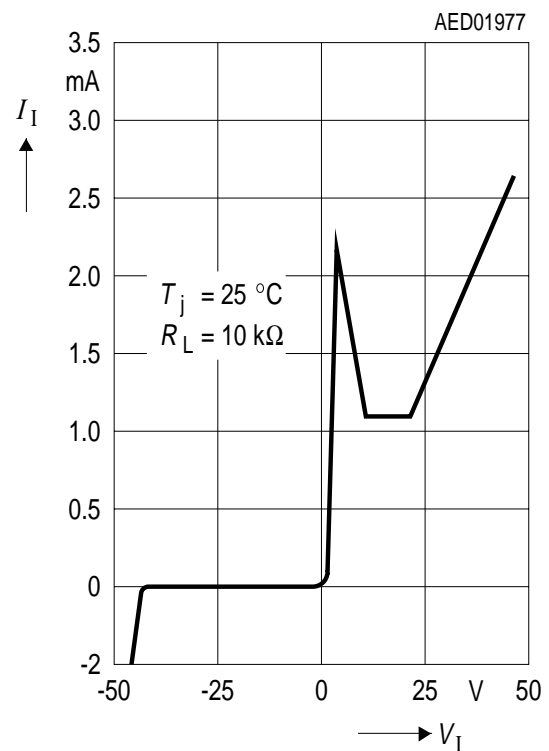
### Current Consumption $I_q$ versus Input Voltage $V_I$



### Output Voltage $V_Q$ versus Input Voltage $V_I$



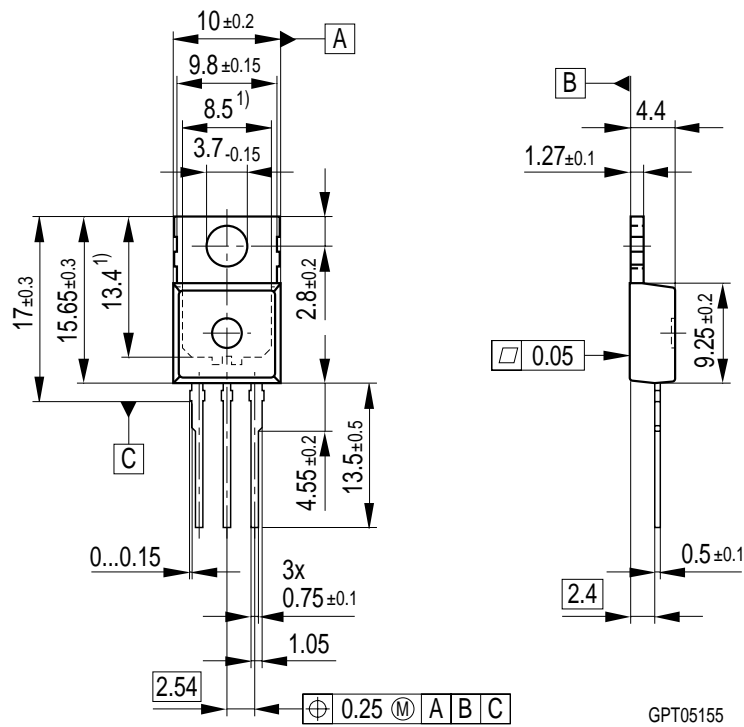
### Input Current $I_I$ versus Input Voltage $V_I$



Package Outlines

**P-TO220-3-1**

(Plastic Transistor Outline)



GPT05155

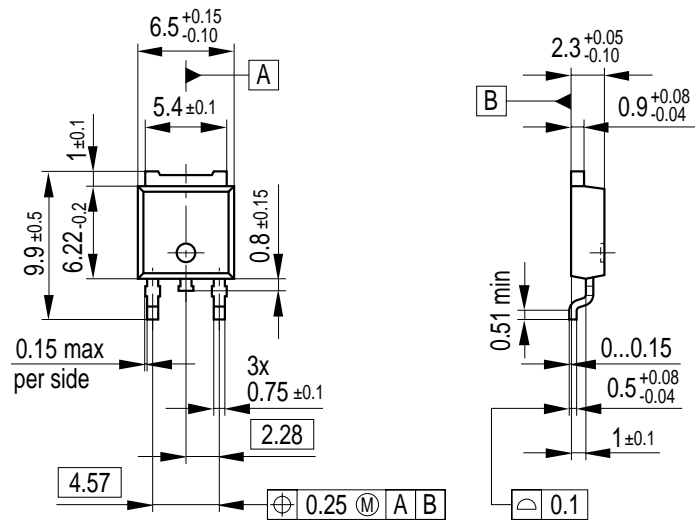
1) Typical  
All metal surfaces tin plated, except area of cut.

**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information"

Dimensions in mm

**P-TO252-3-1**  
(Plastic Transistor Single Outline)



All metal surfaces tin plated, except area of cut.

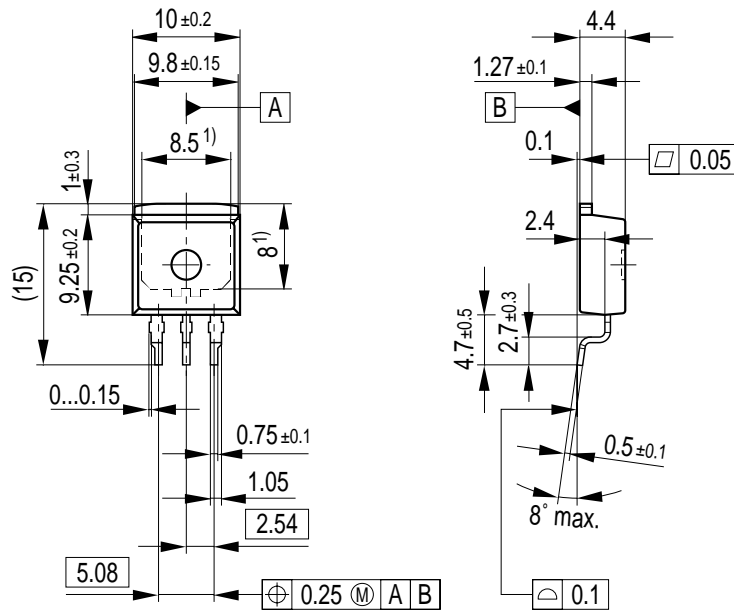
**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information"

SMD = Surface Mounted Device

Dimensions in mm

**P-TO263-3-1**  
(Plastic Transistor Single Outline)



1) Typical  
All metal surfaces tin plated, except area of cut.

GPT09057

**Sorts of Packing**

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information"

SMD = Surface Mounted Device

Dimensions in mm