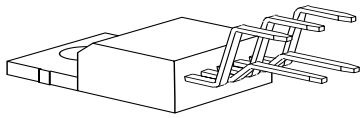
SIEMENS

5-V Low-Drop Voltage Regulator — TLE 4265

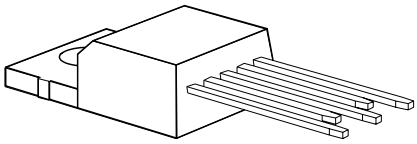
Bipolar IC

Features

- Output voltage tolerance ≤ ± 2 %
- Low-drop voltage
- Very low standby current consumption
- Overtemperature protection
- Reverse polarity protection
- Short-circuit proof
- Setable reset threshold
- Wide temperature range
- Suitable for use in automotive electronics



P-TO220-5-1



P-TO220-5-2

Type	Ordering Code	Package
TLE 4265	Q67000-A9138	P-TO220-5-1
TLE 4265S	Q67000-A9277	P-TO220-5-2

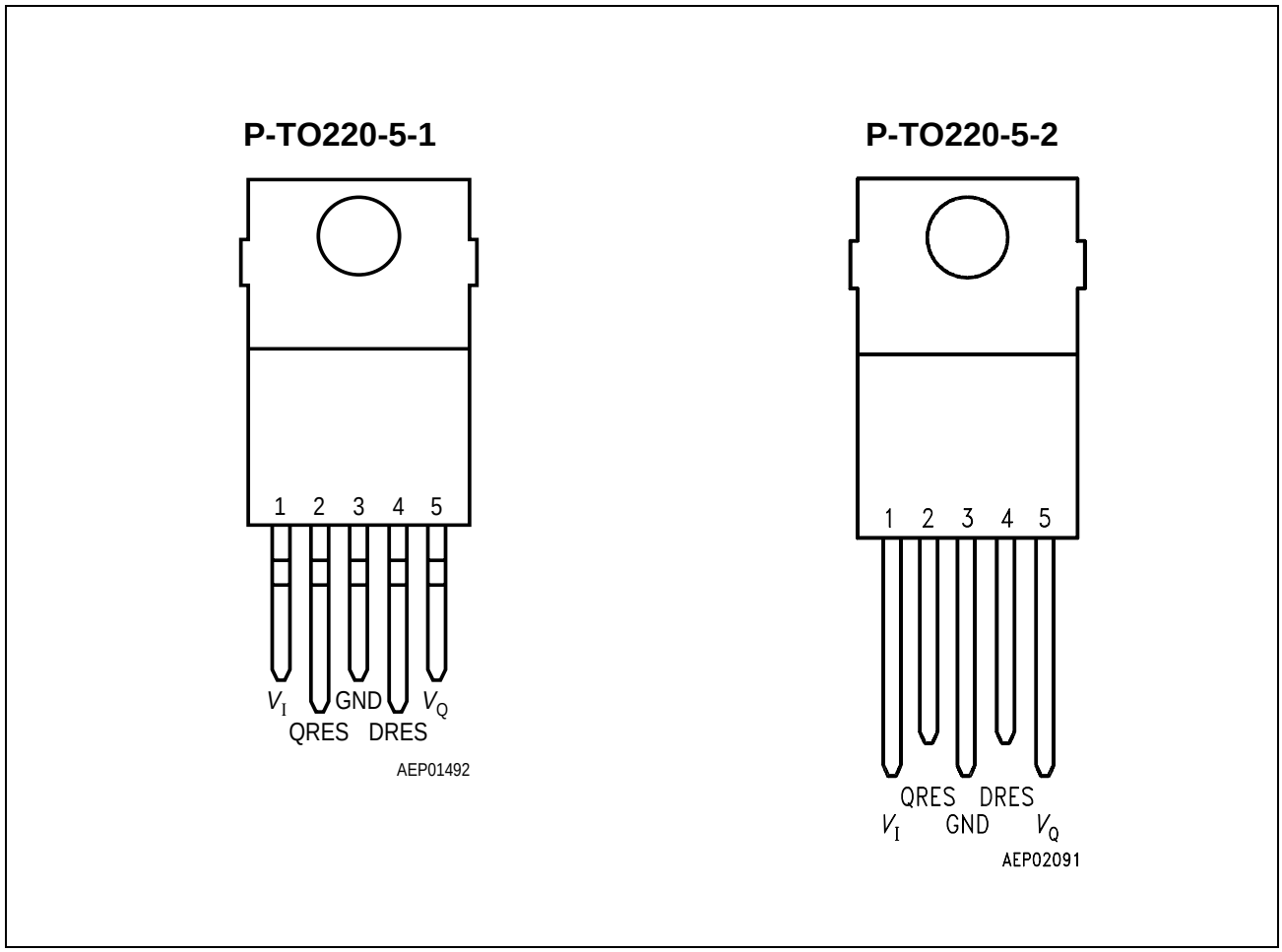
Functional Description

TLE 4265 is a 5-V low-drop voltage regulator in a TO220-5 package. Maximum input voltage is 45 V. It can produce an output current of > 200 mA. The IC is shortcircuit-proof and thermal protected.

Application

The IC regulates an input voltage V_I in the range 6 V < V_I < 45 V to V_{Qrated} = 5.0 V. A reset signal is generated for an output voltage V_Q of < 4.5 V. The reset delay can be set with an external capacitor. This voltage regulator is especially suitable for microprocessor applications in automobiles.

Pin Configuration
(top view)

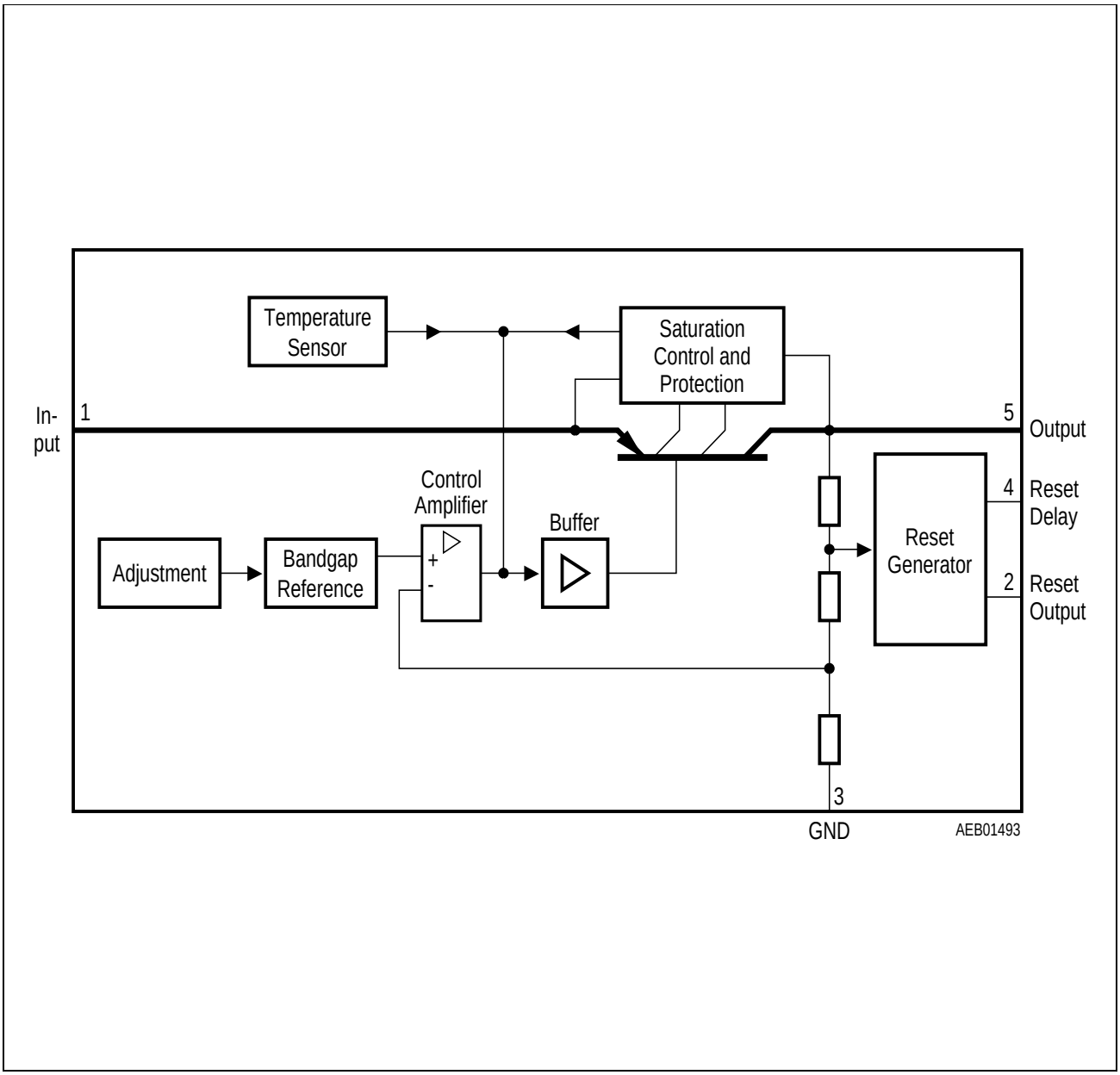


Pin Definitions and Functions

Pin	Symbol	Function
1	V_I	**Input voltage;** block direct on IC with ceramic capacitor to GND
2	QRES	**Reset output;** open-collector output connected to output across resistor of 30 kΩ
3	GND	**Ground**
4	DRES	**Reset delay;** wire with capacitor to GND for setting delay
5	V_Q	**5-V output voltage;** block to GND with 22-µF capacitor

Circuit Description

The control amplifier compares a highly precise reference voltage, produced by resistor alignment, to a voltage that is proportional to the output voltage and drives the base of the series transistor via a buffer. A saturation control, a function of the load current, prevents any over-saturating of the power element. If the output voltage drops below 4.5 V, the external reset-delay capacitor is discharged by the reset generator. If the voltage on the capacitor reaches the lower threshold V_{ST}, a signal is triggered on the reset output and not canceled again until the upper threshold V_{dT} is exceeded. The IC is protected against overload, overtemperature and reverse polarity.



Block Diagram
Absolute Maximum Ratings
T_J = – 40 to 150 °C

Parameter	Symbol	Limit Values		Unit	Notes
		min.	max.		
Input					
Input voltage	V_I	– 42	45	V	–
Reset Output					
Voltage	V_R	– 0.3	42	V	–
Reset Delay					
Voltage	V_d	– 0.3	42	V	–
Output					
Output voltage	V_Q	– 0.3	7	V	–
Output current	I_Q	–	–	–	Limited internally
GND					
Current	I_{GND}	– 0.1	–	A	–
Temperatures					
Junction temperature	T_J	–	150	°C	–
Storage temperature	T_{stg}	– 50	150	°C	–
Operating Range					
Input voltage	V_I	–	45	V	–
Junction temperature	T_J	– 40	150	°C	–

Absolute Maximum Ratings (cont'd)
T_J = – 40 to 150 °C

Parameter	Symbol	Limit Values		Unit	Notes
		min.	max.		

Thermal Resistance

Junction ambient	R_{thja}	–	70	K/W	–
Junction-case	R_{thjc}	–	10	K/W	–

Optimum reliability and lifetime can be ensured in integrated circuits by not exceeding a junction temperature of 125 °C during operation. Although operation up to the maximum permissible junction temperature of 150 °C is possible, such boundary conditions, if sustained, may affect device reliability.

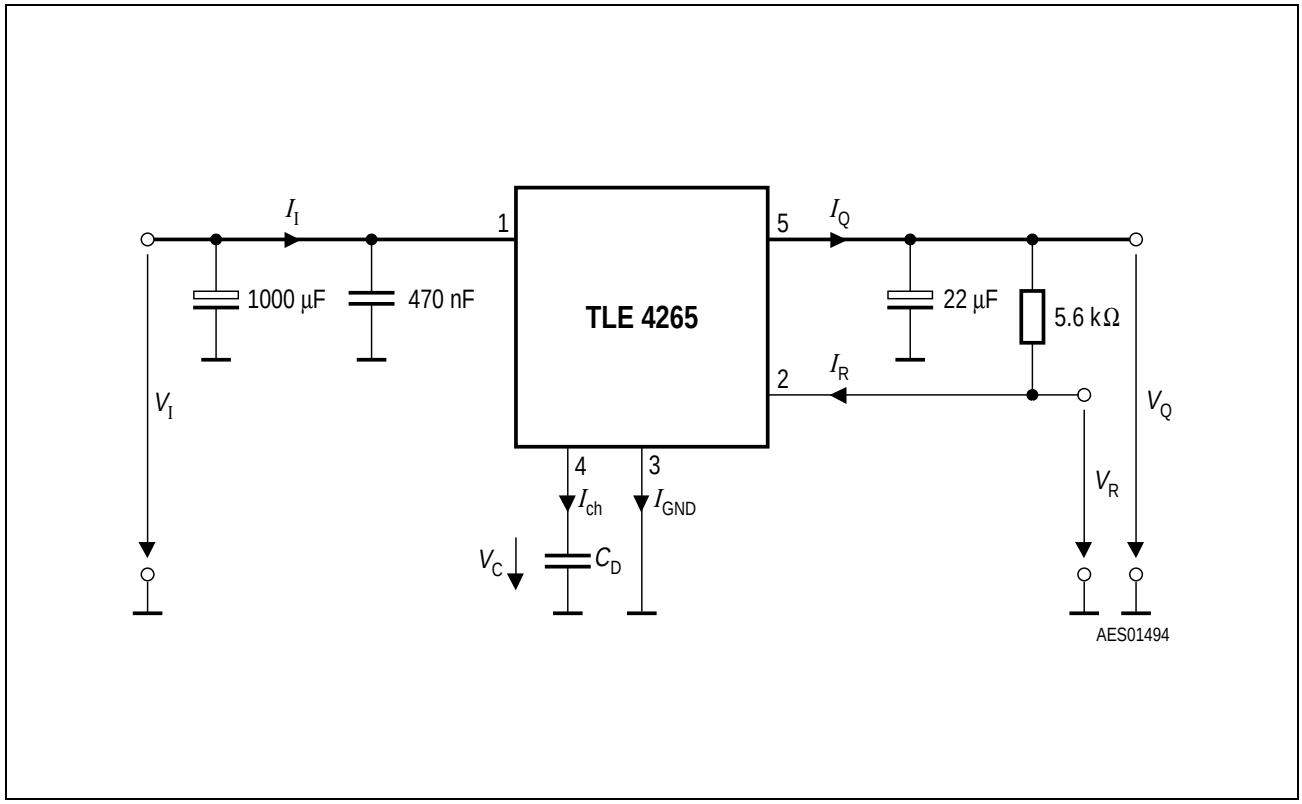
Characteristics
V_I = 13.5 V; T_J = 25 °C (unless specified otherwise)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Output voltage	V_Q	4.9	5	5.1	V	5 mA ≤ I_Q ≤ 150 mA 6 V ≤ V_I ≤ 28 V – 40 °C ≤ T_J ≤ 125 °C
Output-current limiting	I_Q	200	250	–	mA	–
Current consumption $I_q = I_I - I_Q$	I_q	–	750	1000	µA	I_Q = 0 mA
Current consumption $I_q = I_I - I_Q$	I_q	–	10	15	mA	I_Q = 150 mA
Current consumption $I_q = I_I - I_Q$	I_q	–	15	20	mA	I_Q = 150 mA V_I = 4.5 V
Drop voltage	V_{Dr}	–	0.35	0.5	V	I_Q = 150 mA[1)]
Load regulation	ΔV_Q	–	–	25	mV	I_Q = 5 to 150 mA

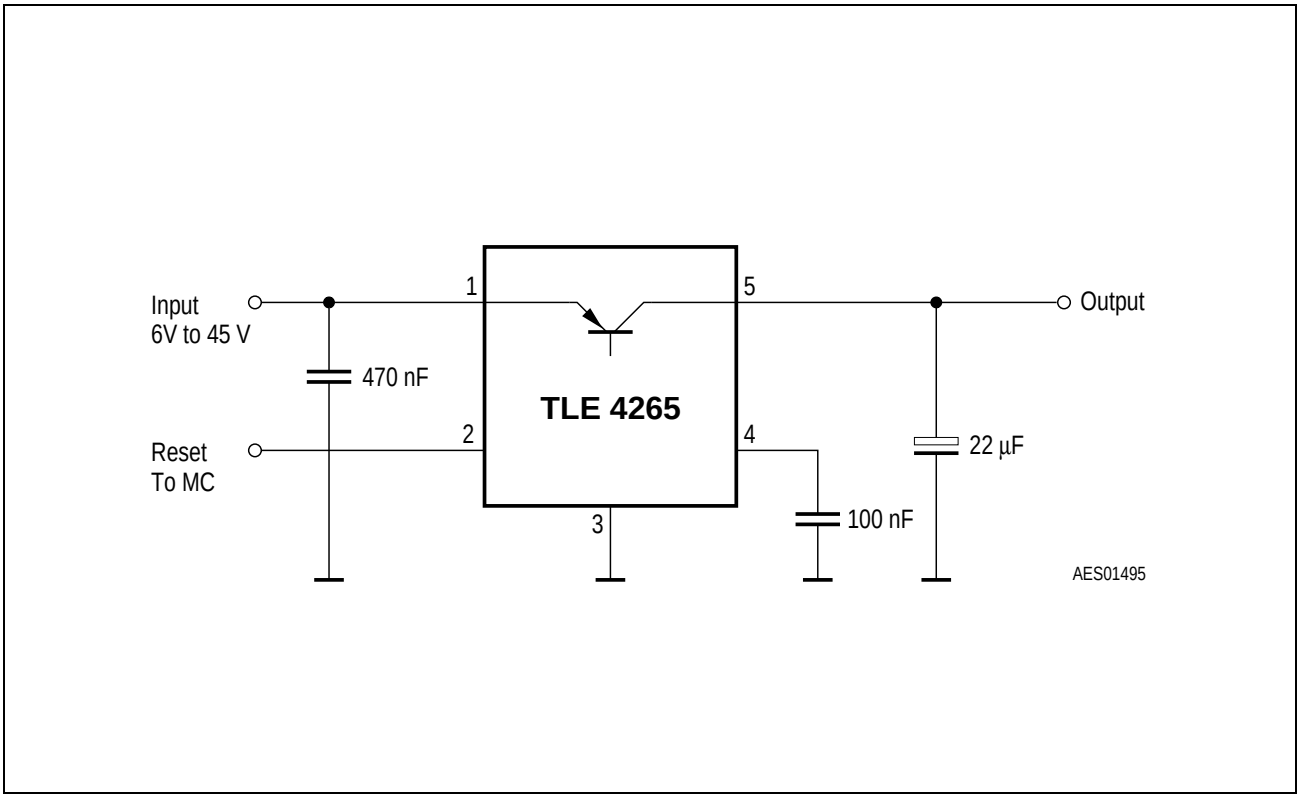
Characteristics (cont'd)
V_I = 13.5 V; T_J = 25 °C (unless specified otherwise)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Line regulation	ΔV_Q	–	15	25	mV	V_I = 6 to 28 V I_Q = 150 mA
Supply-voltage rejection	SVR	–	54	–	dB	f_r = 100 Hz V_r = 0.5 V_{pp}
Reset Generator						
Switching threshold	V_{RT}	4.2	4.5	4.8	V	–
Saturation voltage	V_R	–	0.1	0.4	V	I_R = 1 mA
Saturation voltage	V_C	–	50	100	mV	$V_Q < V_{RT}$
Charge current	I_{ch}	7	10	14	µA	–
Delay switching threshold	V_{dt}	1.5	1.8	2.1	V	–
Delay	t_d	–	18	–	ms	C_d = 100 nF
Delay	t_t	–	2	–	µs	C_d = 100 nF

1) Drop voltage = $V_I - V_Q$ (measured at point where V_Q is 100 mV smaller than at V_I = 13.5 V)

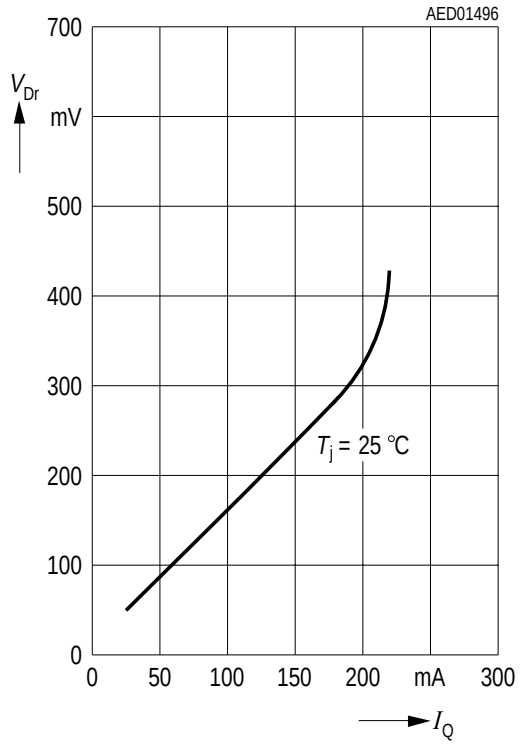


Test Circuit

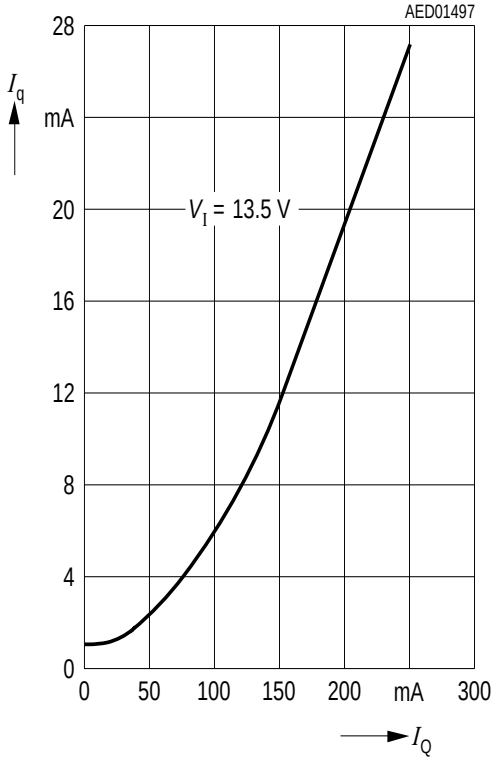


Application Circuit

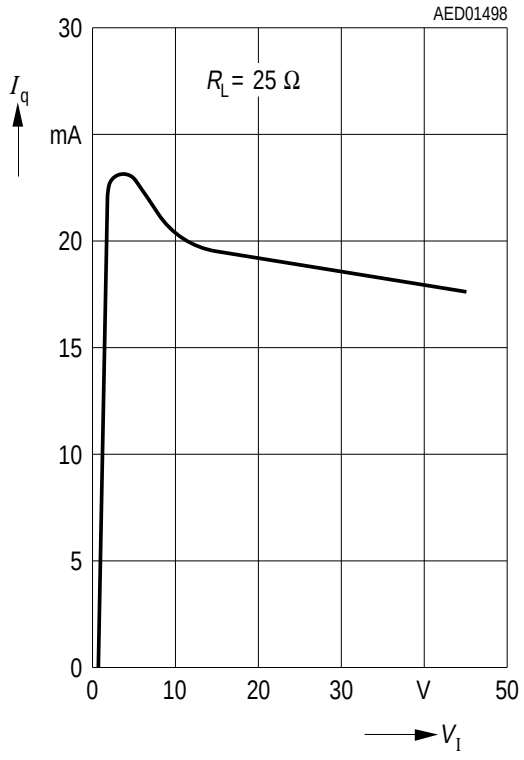
Drop Voltage versus Output Current



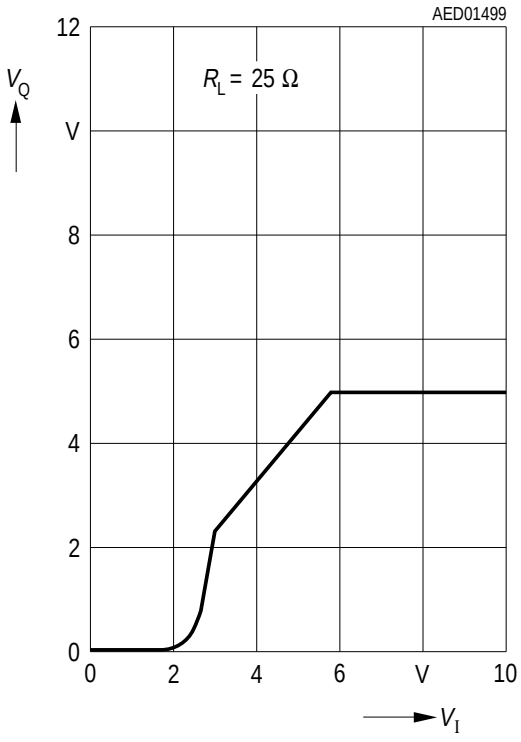
Current Consumption versus Output Current



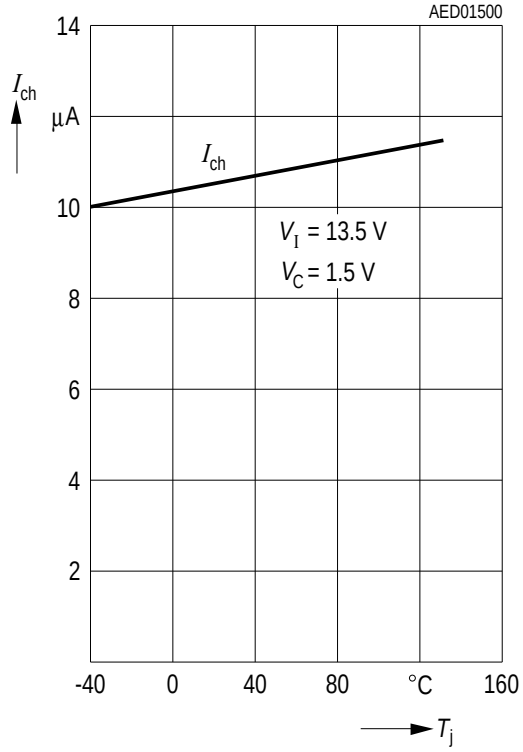
Current Consumption versus Input Voltage



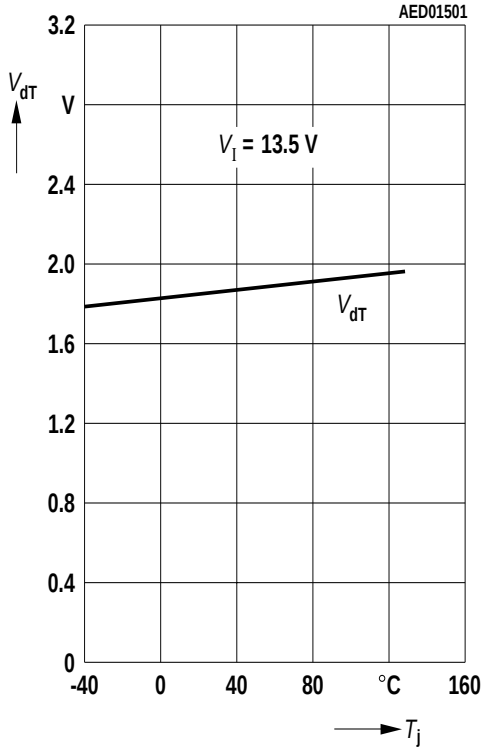
Output Voltage versus Input Voltage



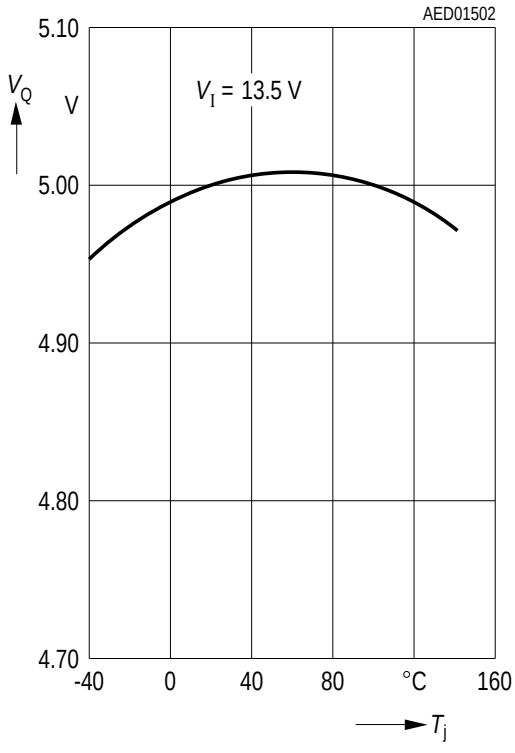
Charge Current versus Temperature



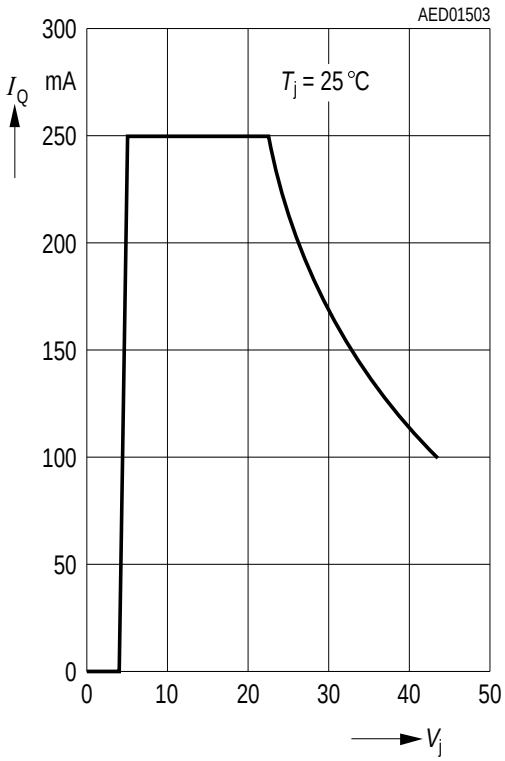
Switching Voltage V_{dT} and V_{ST} versus Temperature



Output Voltage versus Temperature



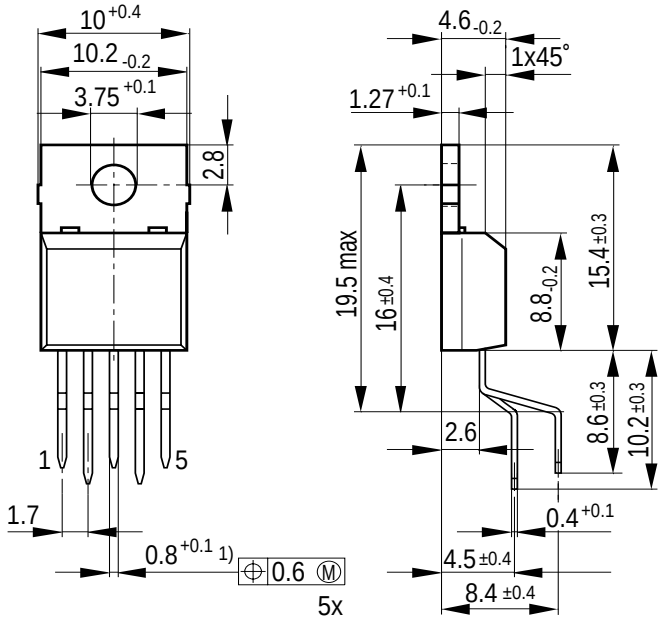
Output Voltage versus Input Voltage



Package Outlines

P-TO220-5-1

(Plastic Transistor Single Outline)



1) $1_{-0.15}$ at dam bar (max 1.8 from body)

1) $1_{-0.15}$ im Dichtstegbereich (max 1.8 vom Körper)

GPT05107

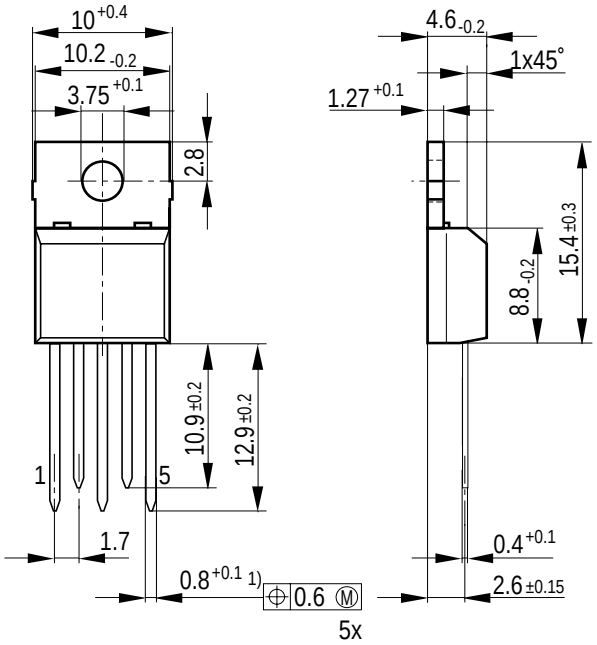
Sorts of Packing

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

Dimensions in mm

P-TO220-5-2

(Plastic Transistor Single Outline)



1) $1_{-0.15}$ at dam bar (max 1.8 from body)

1) $1_{-0.15}$ im Dichtstegbereich (max 1.8 vom Körper)

GPT05256

Sorts of Packing

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Dimensions in mm