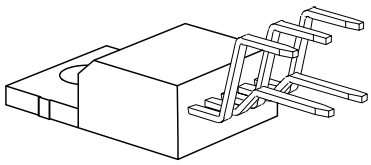
5-V Low-Drop Voltage Regulator

TLE 4265

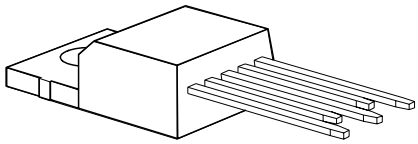
Bipolar IC

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-TO 220-5-2

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

Functional Description

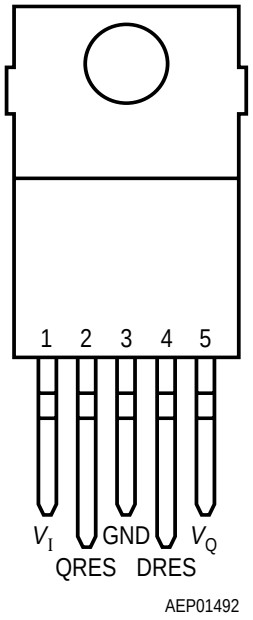
TLE 4265 is a 5-V low-drop voltage regulator in a TO220-5 package. Maximum input voltage is 45 V. It can produce an output current of > 200 mA. The IC is shortcircuit-proof and thermal protected.

Application

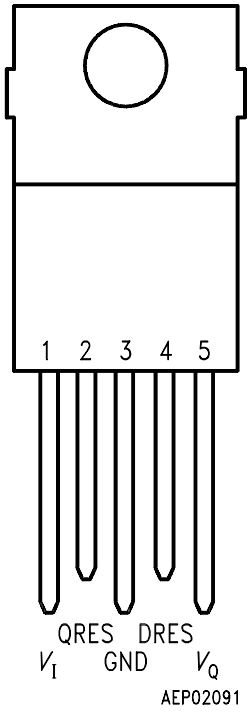
The IC regulates an input voltage V_I in the range 6 V < V_I < 45 V to V_{Qrated} = 5.0 V. A reset signal is generated for an output voltage V_Q of < 4.5 V. The reset delay can be set with an external capacitor. This voltage regulator is especially suitable for microprocessor applications in automobiles.

Pin Configuration
(top view)

P-TO220-5-1



P-TO220-5-2



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.

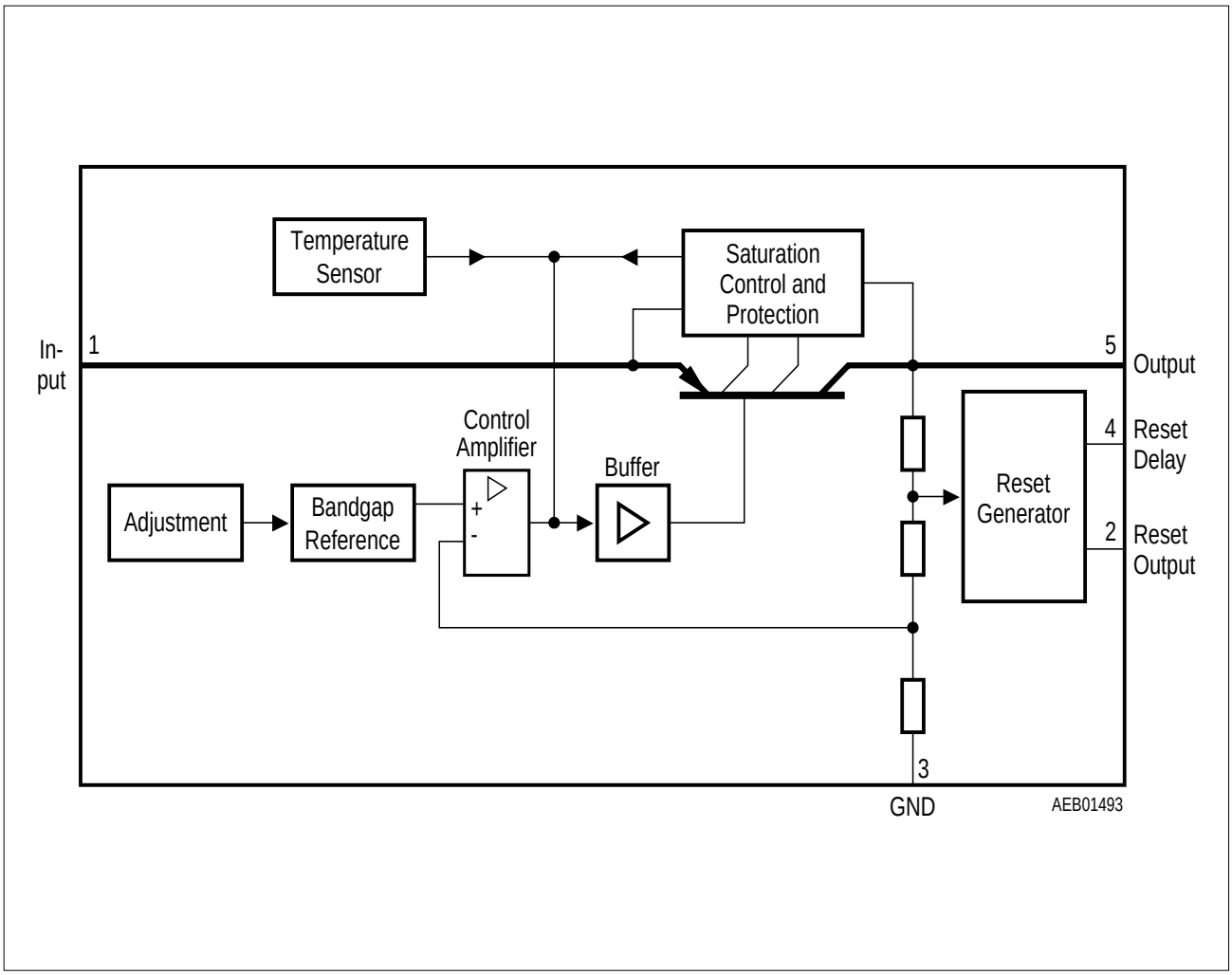


Figure 1
Block Diagram

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 Vpp
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)

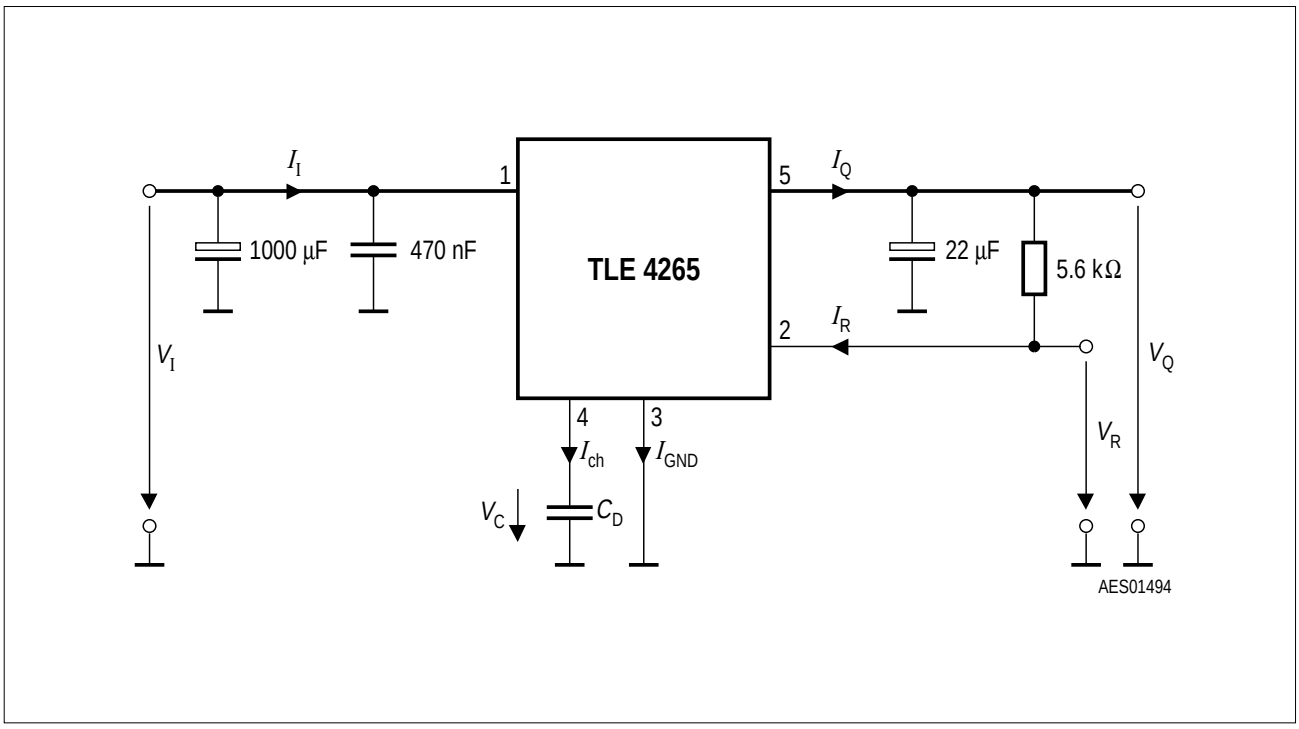


Figure 2
Test Circuit

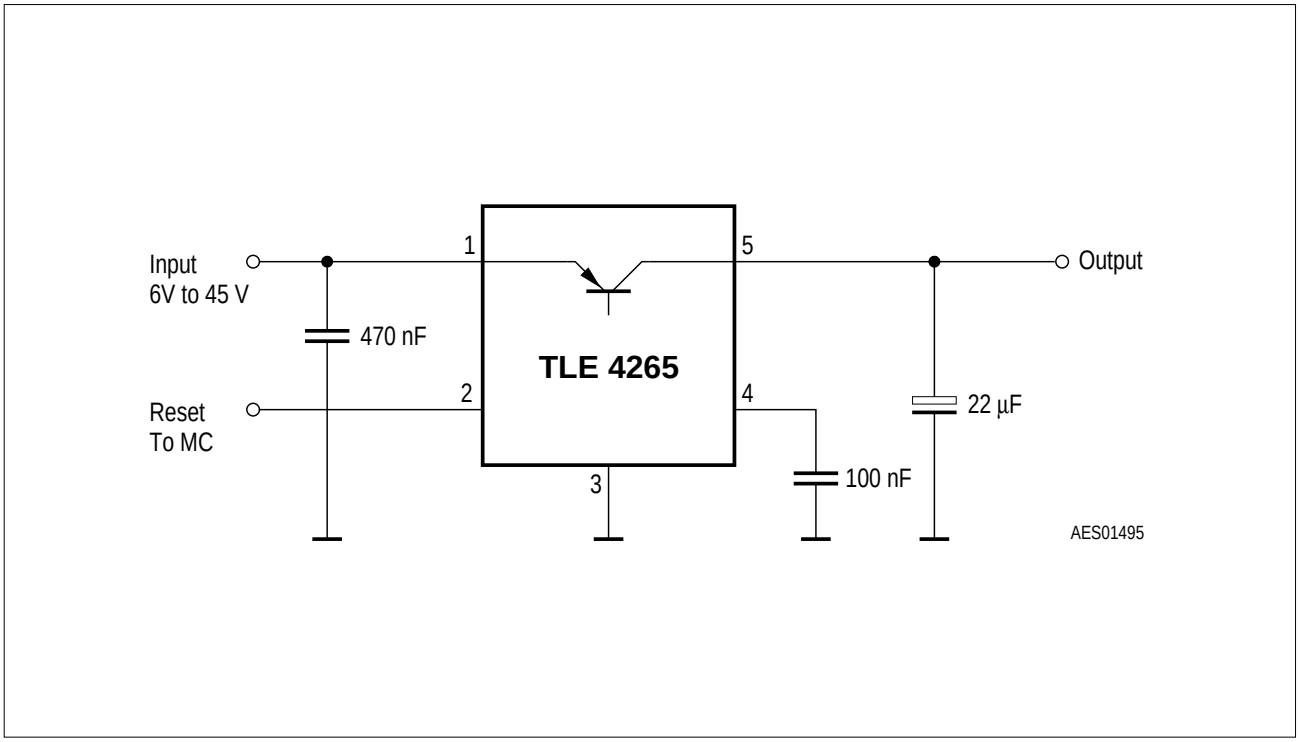
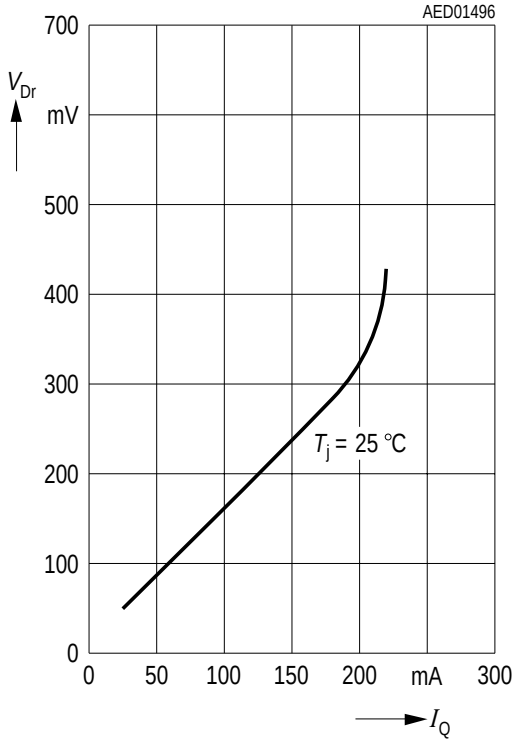
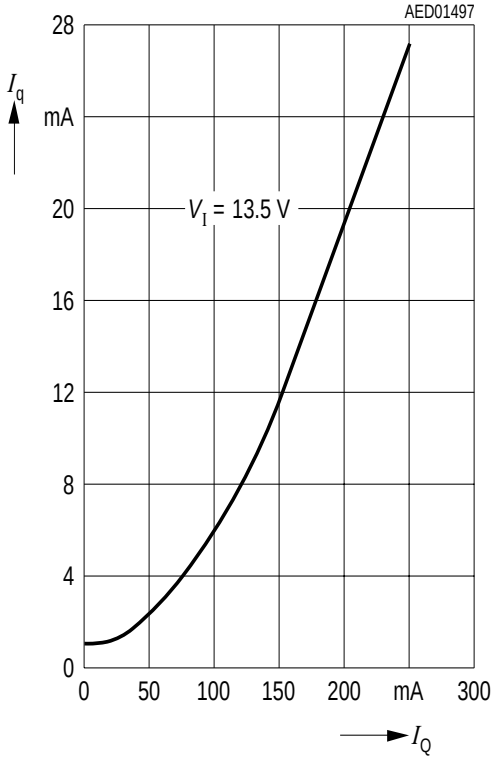


Figure 3
Application Circuit

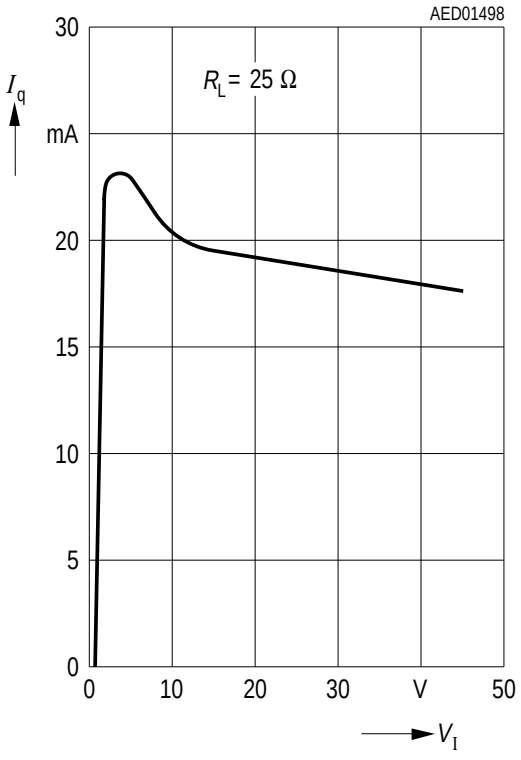
Drop Voltage versus Output Current



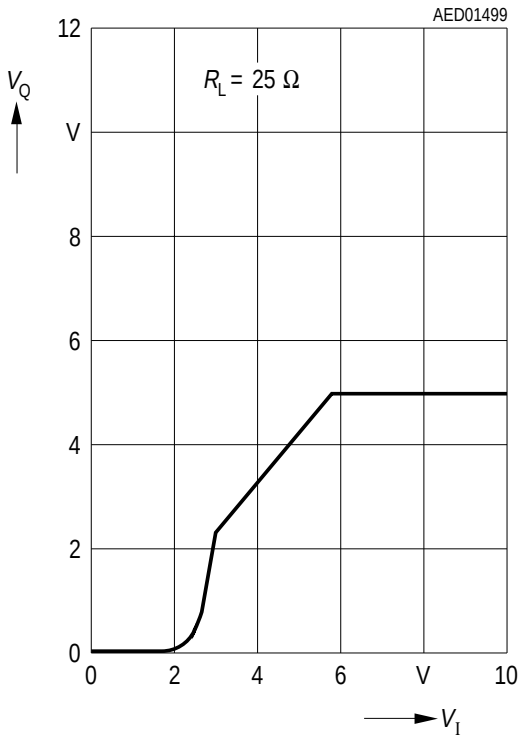
Current Consumption versus Output Current



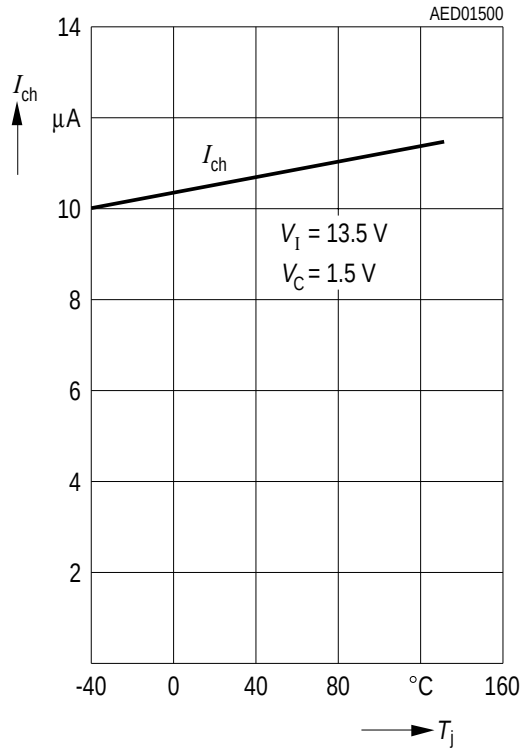
Current Consumption versus Input Voltage



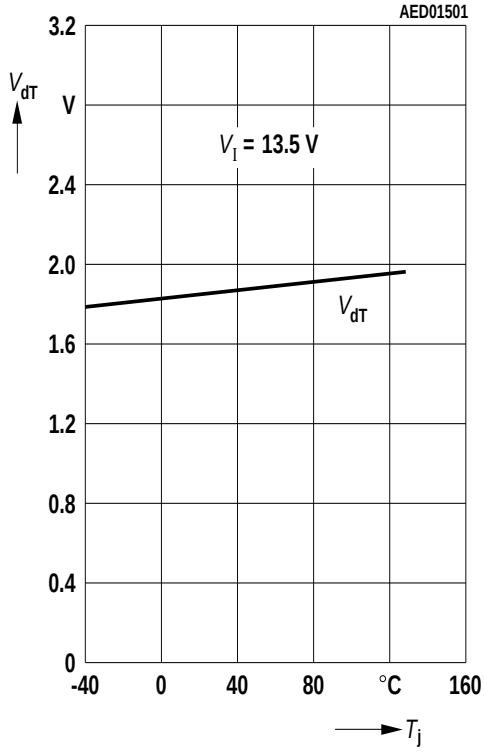
Output Voltage versus Input Voltage



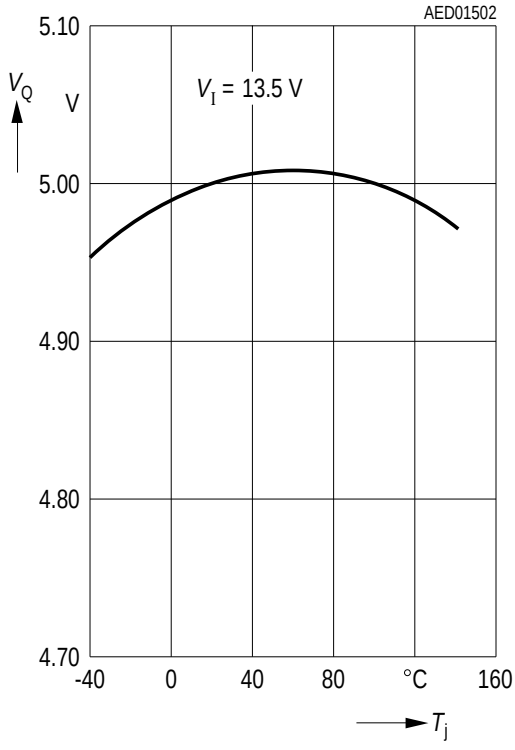
Charge Current versus Temperature



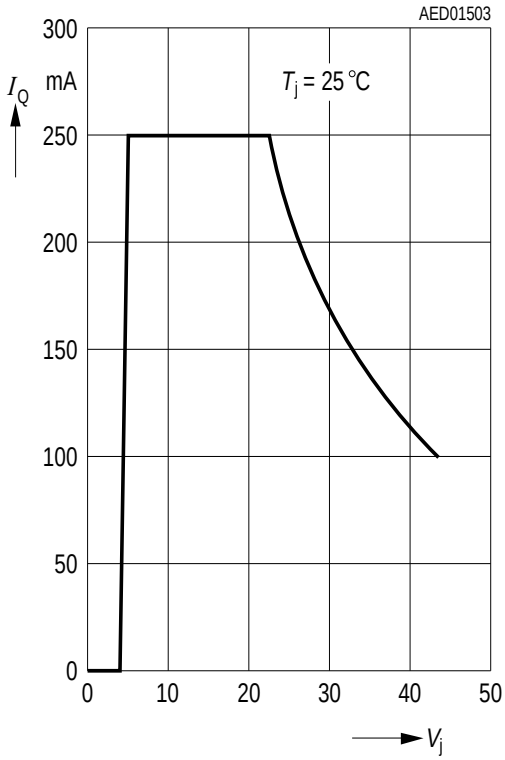
Switching Voltage V_{dT} and V_{ST} versus Temperature



Output Voltage versus Temperature

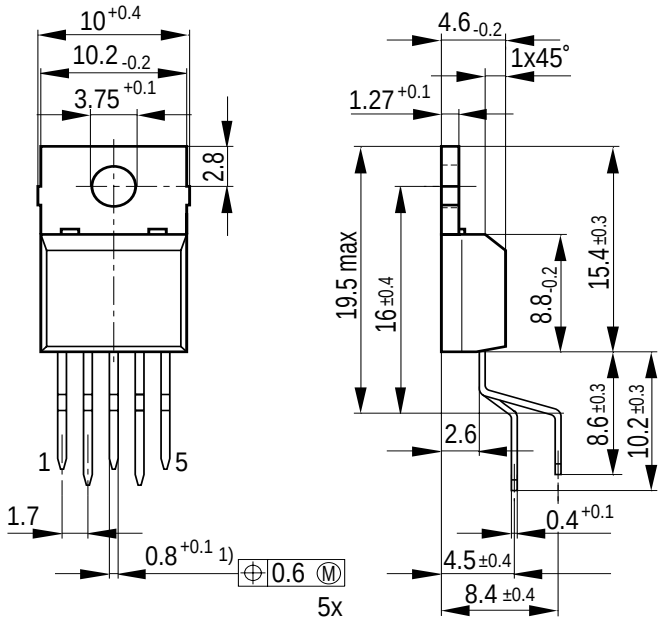


Output Voltage versus Input Voltage



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)

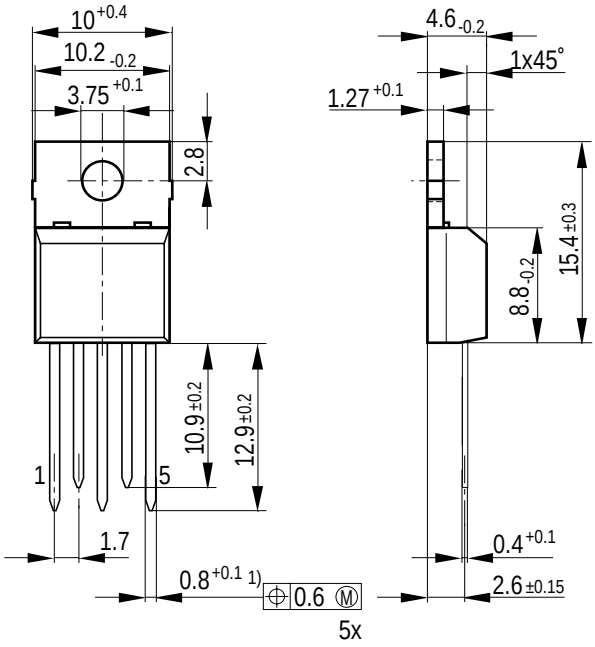
GPT05107

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

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