



5-V Low Drop Voltage Regulator

TLE 4262

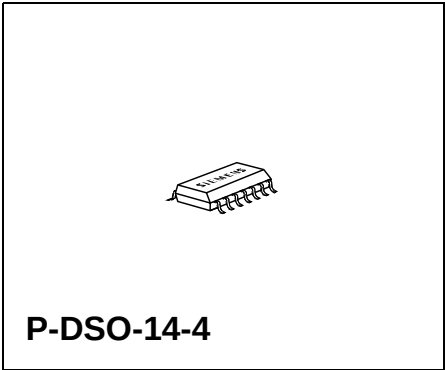
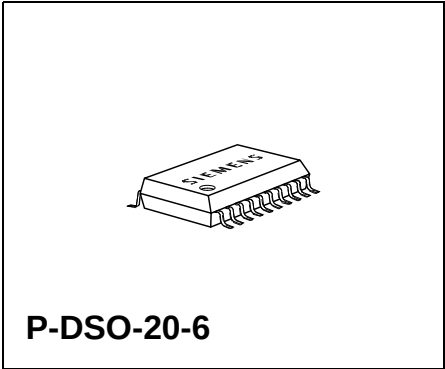
Bipolar IC

Features

- Output voltage tolerance $\leq \pm 2 \%$
- Low-drop voltage
- Very low standby current consumption
- Overtemperature protection
- Reverse polarity protection
- Short-circuit proof
- Settable reset threshold
- Wide temperature range
- Suitable for use in automotive electronics

Type	Ordering Code	Package
TLE 4262 G	Q67006-A9068	P-DSO-20-6 (SMD)
▼ TLE 4262 GM	Q67006-A9356	P-DSO-14-4 (SMD)

▼ New type



Functional Description

TLE 4262 G is a 5-V low-drop voltage regulator in a P-DSO-20-6 SMD package. The maximum input voltage is 45 V. The maximum output current is more than 200 mA. The IC is short-circuit proof and incorporates temperature protection that disables the IC at overtemperature.

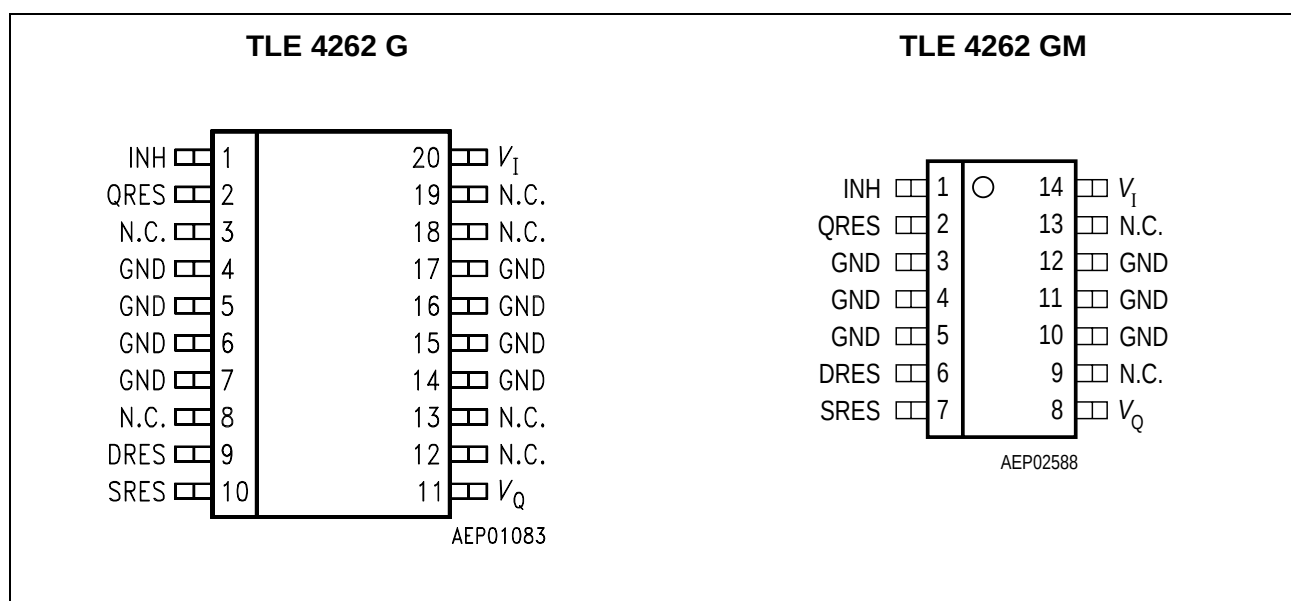
The IC regulates an input voltage V_I in the range of $6\text{ V} < V_I < 45\text{ V}$ to $V_{Qrated} = 5.0\text{ V}$. A reset signal is generated for an output voltage of $V_Q < 4.5\text{ V}$. This voltage threshold can be decreased to 3.5 V by external connection. The reset delay can be set externally with a capacitor. The IC can be switched off via the inhibit input, which causes the current consumption to drop from 720 μA to $< 50\text{ }\mu\text{A}$.

Dimensioning Information on External Components

The input capacitor C_i is necessary for compensating line influences. Using a resistor of approx. $1\ \Omega$ in series with C_i , the oscillating circuit consisting of input inductivity and input capacitance can be damped. The output capacitor is necessary for the stability of the regulating circuit. Stability is guaranteed at values $\geq 22\ \mu\text{F}$ and an ESR of $\leq 3\ \Omega$ within the operating temperature range. For small tolerances of the reset delay, the spread of the capacitance of the delay capacitor and its temperature coefficient should be noted.

Pin Configuration

(top view)



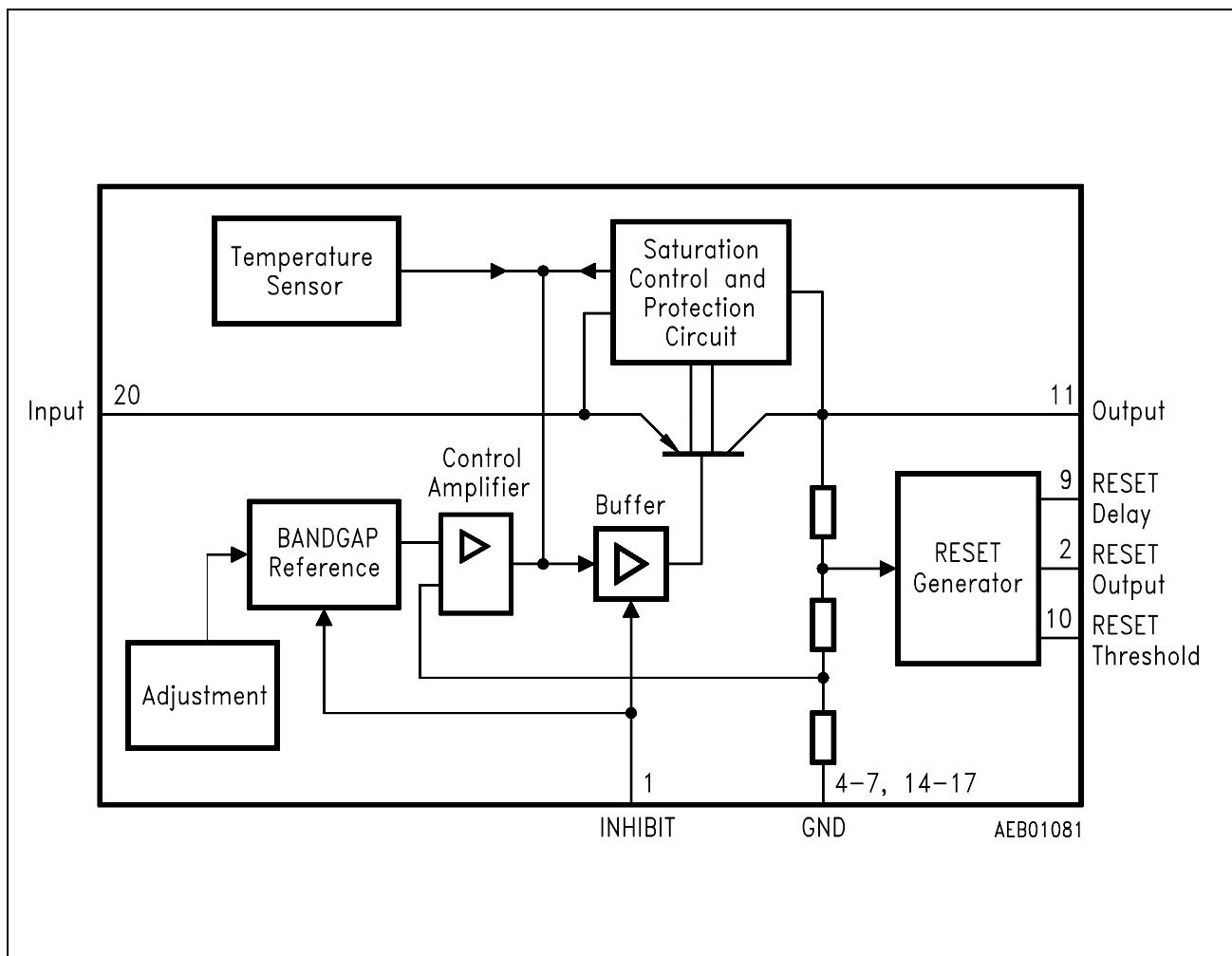
Pin Definitions and Functions

Pin	Symbol	Function
1	INH	Inhibit ; TTL-compatible, low-active input
2	QRES	Reset output ; open-collector output internally connected to the output via a resistor of 30 k Ω .
4-7, 14-17	GND	Ground
9	DRES	Reset delay ; connected to ground by a capacitor
10	SRES	Reset threshold ; for setting the switching threshold connect by a voltage divider from output to ground. If this input is connected to GND, reset is triggered at an output voltage of 4.5 V.
11	V_Q	5-V output voltage ; block to ground by a 22- μ F capacitor.
20	V_I	Input voltage ; block to ground directly at the IC by a ceramic capacitor.
3, 8, 12, 13, 18, 19	N.C.	Not connected

Circuit Description

The control amplifier compares a reference voltage, which is kept highly accurate by resistance adjustment, 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 over-saturation of the power element. If the externally scaled down output voltage at the reset threshold input drops below 1.35 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 reset signal is issued on the reset output and not cancelled again until the upper threshold V_{dT} is exceeded. If the reset threshold input is connected to GND, reset is triggered at an output voltage of 4.5 V. The IC can be switched at the TTL-compatible, low-active inhibit input. It also incorporates a number of internal circuits for protection against:

- Overload
- Overtemperature
- Reverse polarity



Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		

Input

Input voltage	V_I	– 42	45	V	–
Input current	I_I	–	–	–	internally limited

Reset Output

Voltage	V_R	– 0.3	42	V	–
Current	I_R	–	–	–	internally limited

Reset Input

Reset threshold	V_{RE}	– 0.3	6	V	–
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Reset Delay

Voltage	V_d	– 0.3	42	V	–
Current	I_d	–	–	–	internally limited

Output

Voltage	V_Q	– 5.25	V_I	V	–
Current	I_Q	–	–	–	internally limited

Inhibit

Voltage	V_e	– 42	45	V	–
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Ground

Current	I_{GND}	– 0.5	–	A	–
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Absolute Maximum Ratings (cont'd)

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		

Temperature

Junction temperature	T_j	–	150	°C	–
Storage temperature	T_{stg}	– 50	150	°C	–

Operating Range

Input voltage	V_I	5.2	45	V	*)
Junction temperature	T_j	– 40	150	°C	–
Thermal resistance junction-ambient	$R_{th JA}$	–	70	K/W	soldered
junction-case	$R_{th JC}$	–	25	K/W	–

*) Corresponds with characteristics of drop voltage, output current and power description (**see diagrams**).

Characteristics

$V_I = 13.5 \text{ V}$; $T_j = 25 \text{ °C}$; $V_e > 3.5 \text{ V}$; (unless specified otherwise)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		

Normal Operation

Output voltage	V_Q	4.9	5.00	5.10	V	$5 \text{ mA} \leq I_Q \leq 150 \text{ mA}$; $6 \text{ V} \leq V_I \leq 28 \text{ V}$; $-40 \text{ °C} \leq T_j \leq 125 \text{ °C}$
Output voltage	V_Q	4.95	5.00	5.05	V	$6 \text{ V} \leq V_I \leq 32 \text{ V}$; $I_Q = 100 \text{ mA}$ $T_j > 100 \text{ °C}$
Output current limiting	I_Q	200	250		mA	–
Current consumption; $I_q = I_i - I_Q$	I_q	–	–	50	μA	$V_e < 0.8 \text{ V}$
	I_q	–	720	–	μA	$I_Q = 0 \text{ mA}$
	I_q	–	10	15	mA	$I_Q = 150 \text{ mA}$
	I_q	–	15	20	mA	$I_Q = 150 \text{ mA}$; $V_I = 4.5 \text{ V}$
Drop voltage	V_{Dr}	–	0.35	0.6	V	$I_Q = 150 \text{ mA}$ *)
Load regulation	ΔV_Q	–	–	25	mV	$I_Q = 5 \text{ mA}$ to 150 mA
Supply-voltage regulation	ΔV_Q	–	15	25	mV	$V_I = 6 \text{ V}$ to 28 V ; $I_Q = 150 \text{ mA}$
Ripple rejection	SVR	–	54	–	dB	$f_r = 100 \text{ Hz}$; $V_r = 0.5 \text{ Vpp}$

Reset Generator

Switching threshold	V_{RT}	4.2	4.5	4.8	V	$V_{RE} = 0 \text{ V}$
Switching voltage	V_{RE}	1.28	1.35	1.42	V	$V_Q > 3.5 \text{ V}$
Saturation voltage	V_R	–	0.10	0.40	V	$I_R = 1 \text{ mA}$

*) Drop voltage $V_I \geq 4.5 \text{ V}$; drop voltage = $V_I - V_Q$ (below regulating range)

Note: The reset output is low within the range $V_Q = 1 \text{ V}$ to V_{RT} .

Characteristics (cont'd)

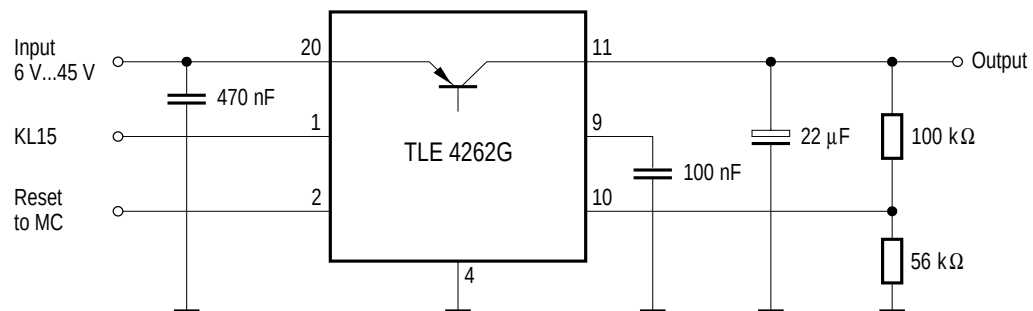
$V_I = 13.5 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$; $V_e > 3.5 \text{ V}$; (unless specified otherwise)

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Saturation voltage	V_C	–	50	100	mV	$V_Q < V_{RT}$
Charge current	I_d	7	10	14	μA	–
Delay switching threshold	V_{dT}	1.5	1.7	2.1	V	–
Switching threshold	V_{ST}	0.2	0.35	0.55	V	–
Delay time	t_D	–	17	–	ms	$C_d = 100 \text{ nF}$
Delay time	t_t	–	2	–	μs	$C_d = 100 \text{ nF}$

Inhibit

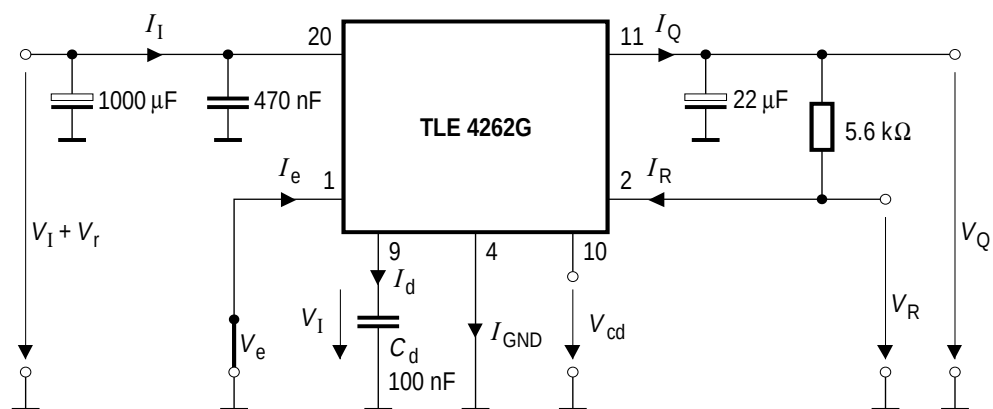
Switch-ON voltage	$V_{e \text{ ON}}$	3.5	–	–	V	IC turned on
Switch-OFF voltage	$V_{e \text{ OFF}}$	–	–	0.8	V	IC turned off
Input current	I_e	5	10	15	μA	$V_e = 5 \text{ V}$

Note: The reset output is low within the range $V_Q = 1 \text{ V}$ to V_{RT} .



AES01084

Application Circuit



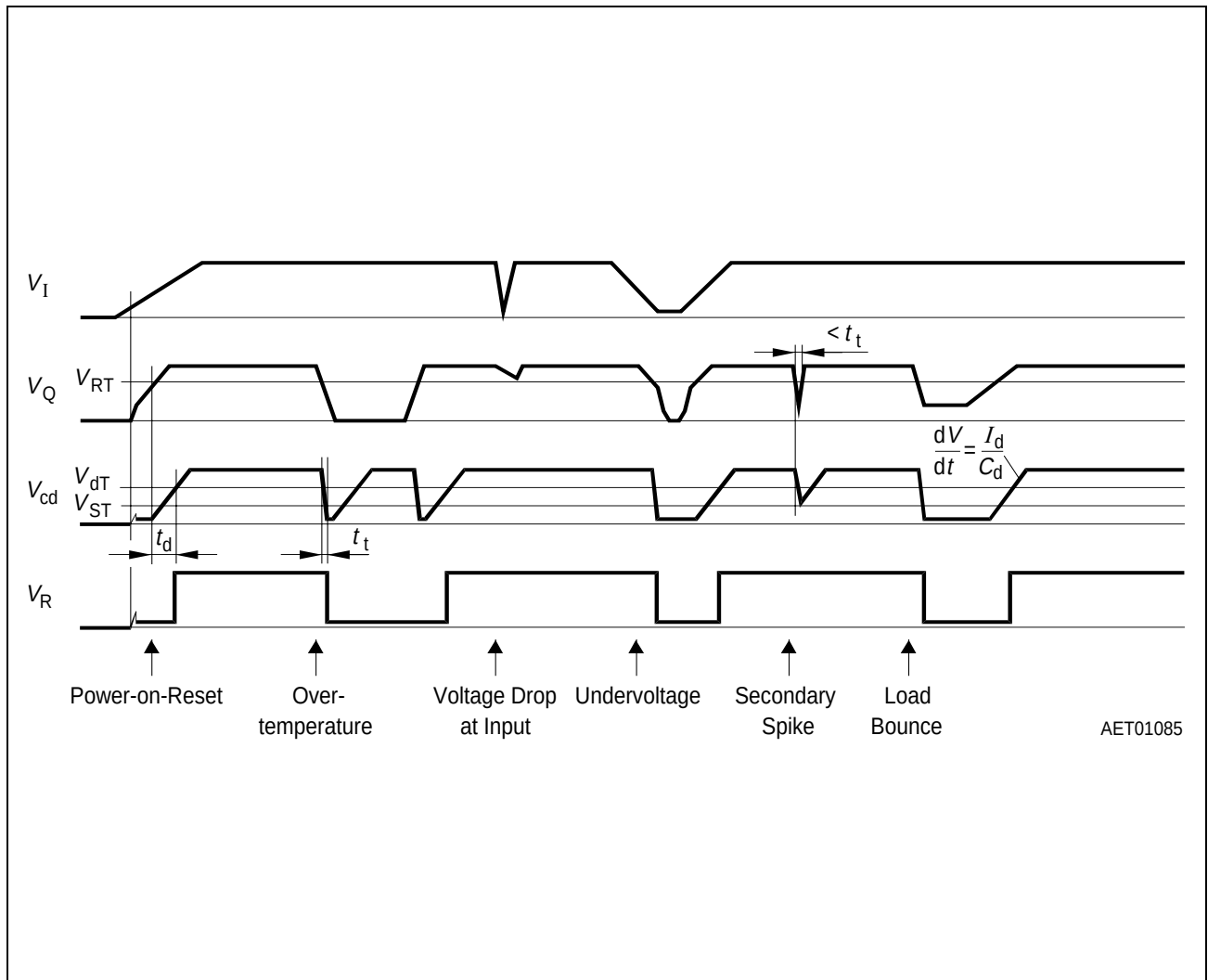
$$V_{Dr} = V_I - V_Q \text{ *)}$$

$$SVR = 20 \log \frac{V_r}{\Delta V_Q}$$

*) Below Regulating Range

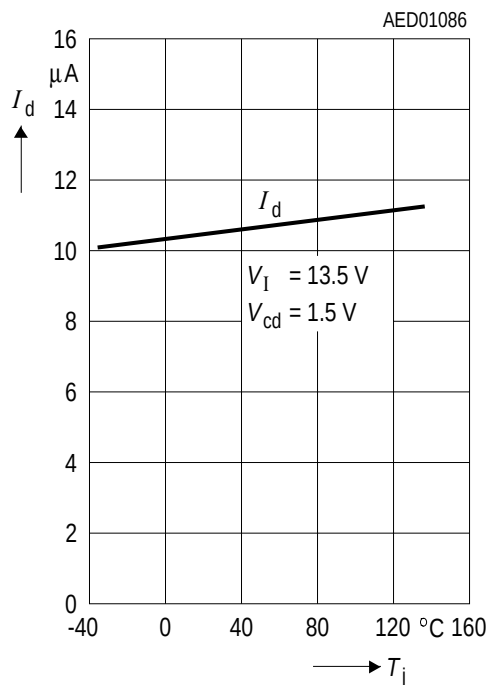
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Test Circuit

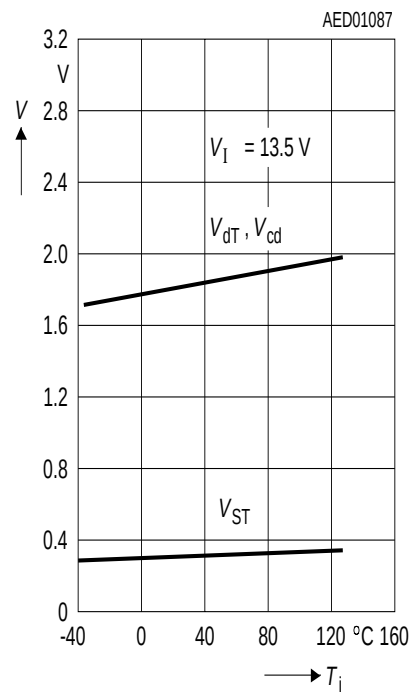


Time Response

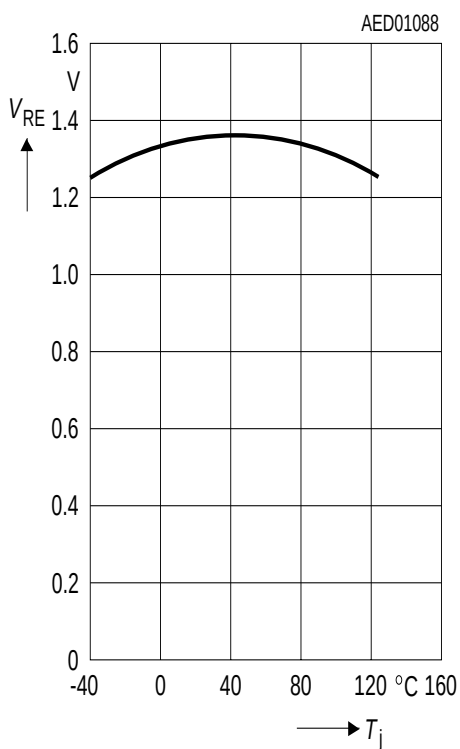
Charge Current versus Temperature



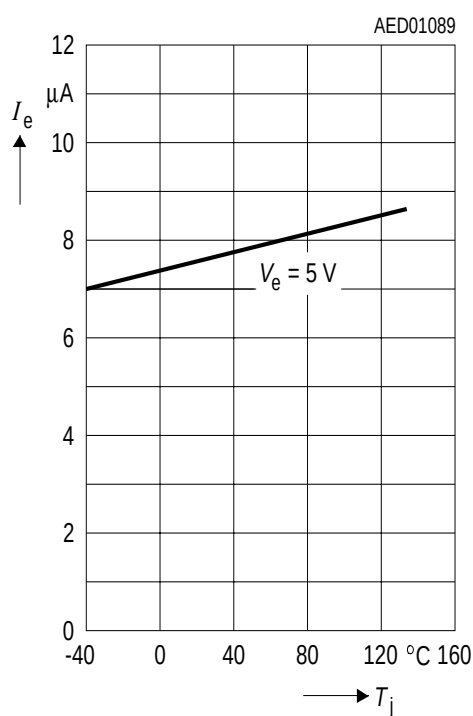
Switching Voltage V_{dT} and V_{ST} versus Temperature



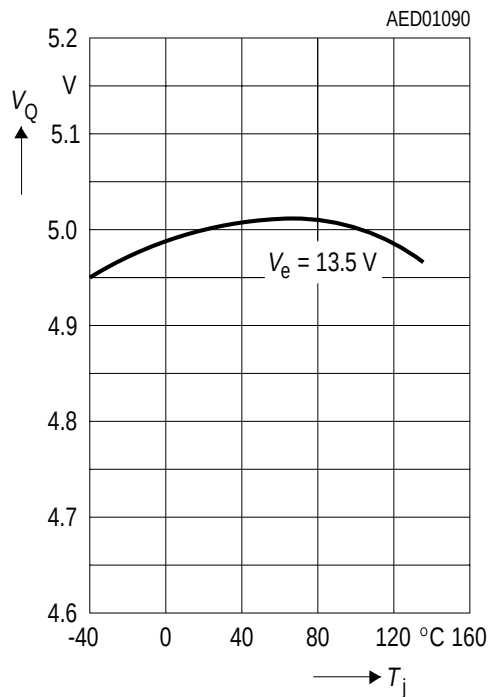
Reset Switching Threshold versus Temperature



Current Consumption of Inhibit versus Temperature Output Current



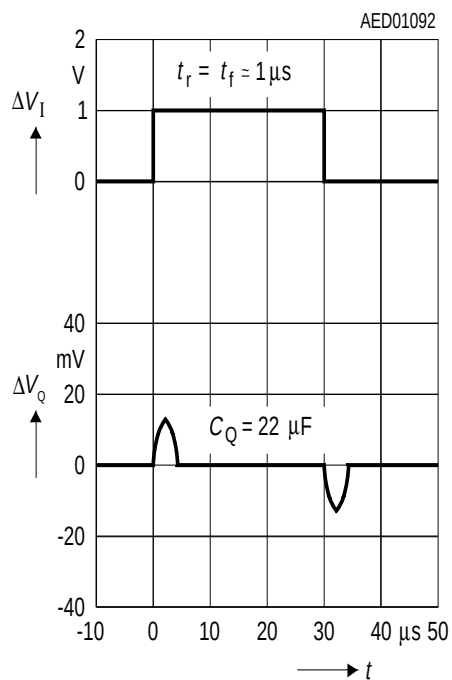
Output Voltage versus Temperature



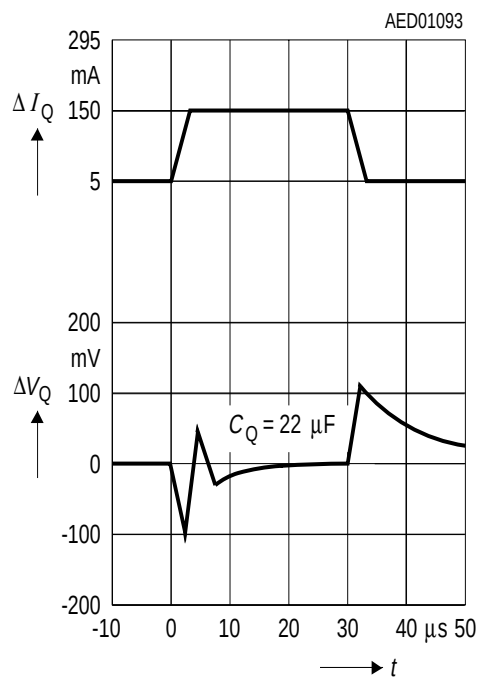
Output Current versus Input Voltage

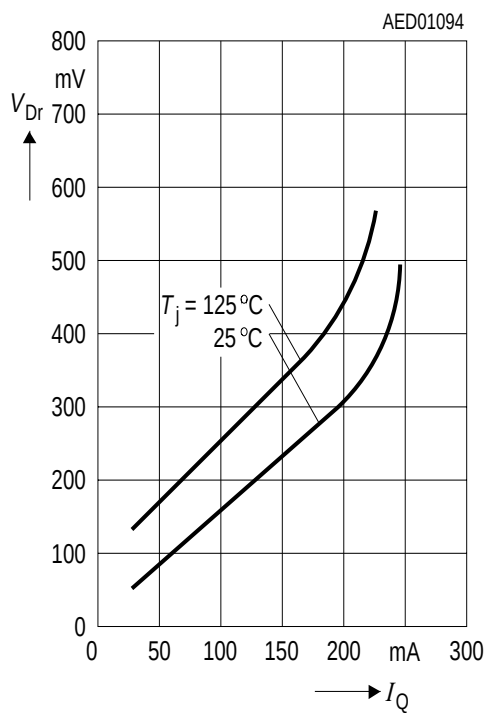
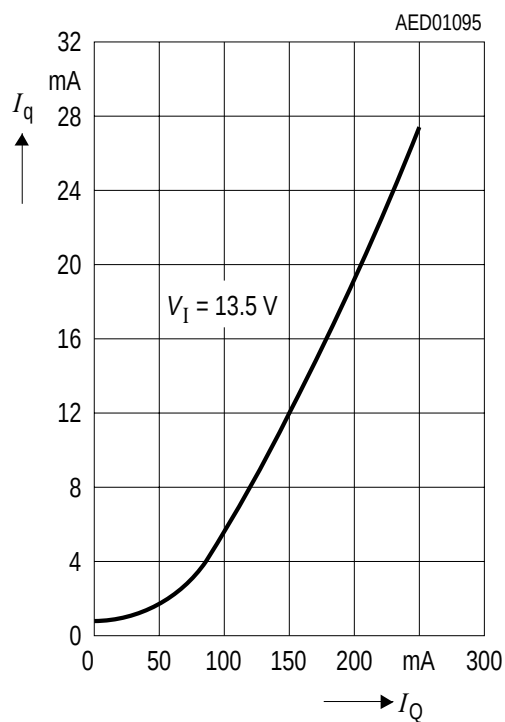
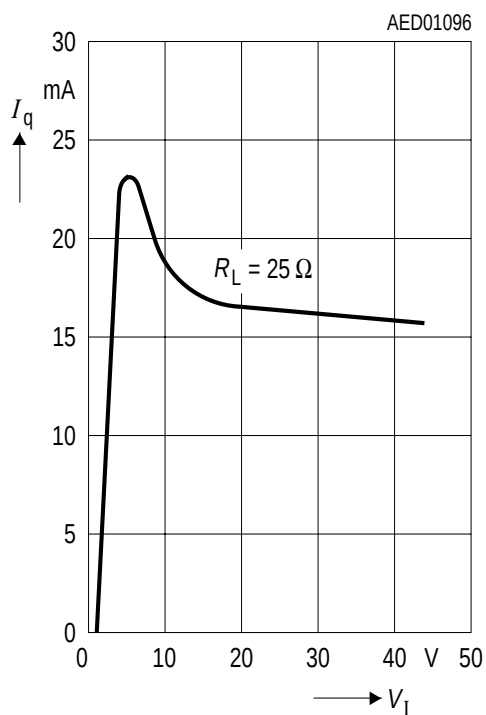
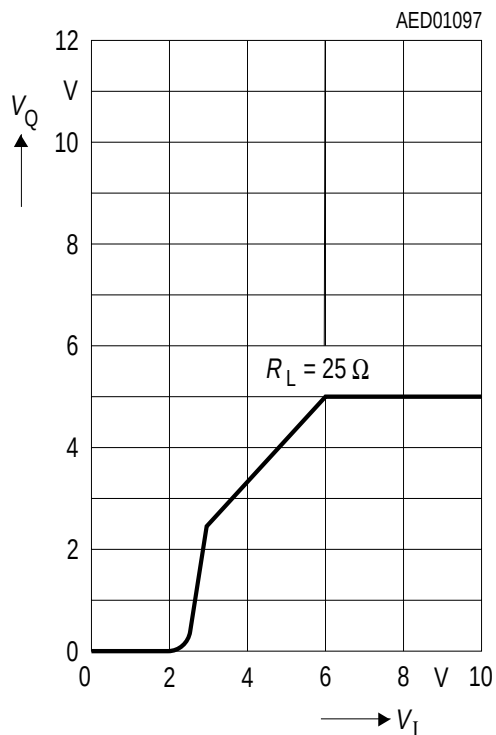


Input Response



Load Response

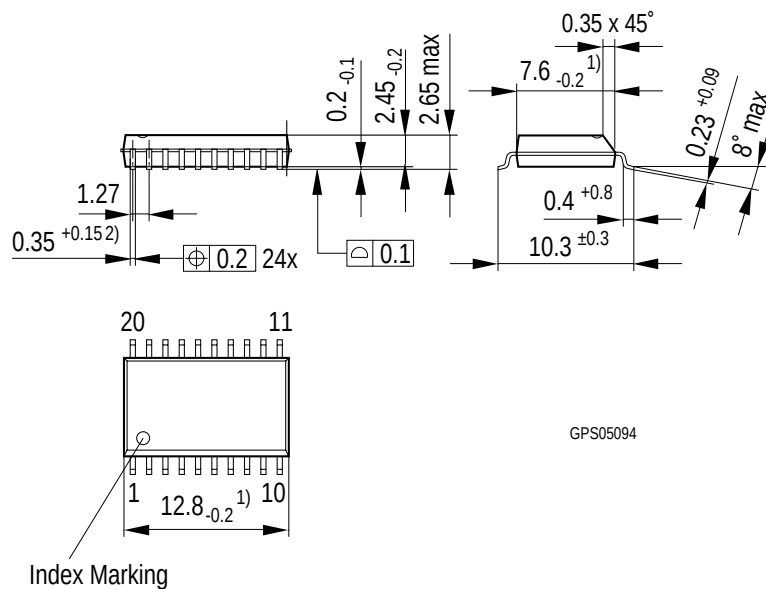


Drop Voltage versus Output Current**Current Consumption versus Output Current****Current Consumption versus Input Voltage****Output Voltage versus Input Voltage**

Package Outlines

P-DSO-20-6

(Plastic Dual Small Outline)



- 1) Does not include plastic or metal protrusions of 0.15 max per side
- 2) Does not include dambar protrusion of 0.05 max per side

Weight approx. 0.6 g

Sorts of Packing

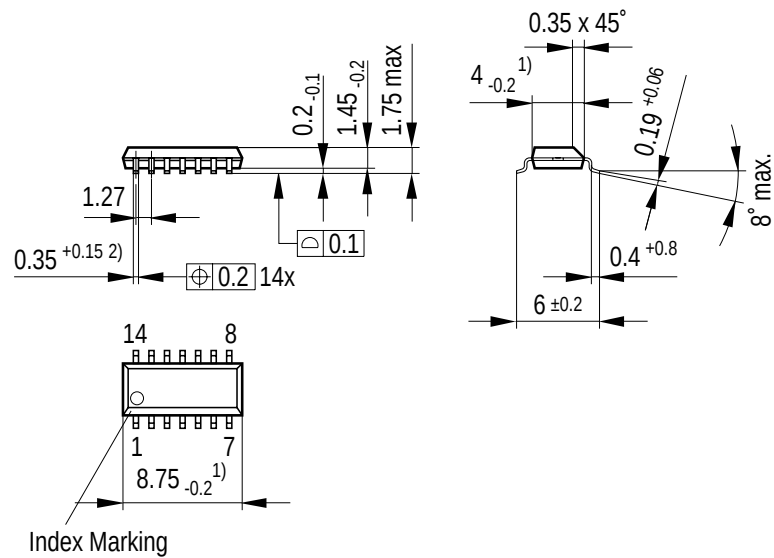
Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

SMD = Surface Mounted Device

Dimensions in mm

P-DSO-14-4

(Plastic Dual Small Outline)



- 1) Does not include plastic or metal protrusion of 0.15 max. per side
- 2) Does not include dambar protrusion of 0.05 max. per side

GPS05093

Sorts of Packing

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

SMD = Surface Mounted Device

Dimensions in mm