SIEMENS

Single PNP-Operational Amplifiers

TAE 1453
TAF 1453

Bipolar IC

Features

- PNP input
- Supply voltage range between 3 V and 36 V
- Low current consumption, 0.25 mA typ.
- Extremely large control range
- Low output saturation voltage, almost independent of load current
- Output current up to 70 mA (100 mA max.)
- Wide common-mode range
- Wide operating temperature range (TAF 1453)
- Open collector output

P-DSO-6-1

Applications

- Amplifier
- Level converter
- Driver
- Zero voltage switch
- Comparator

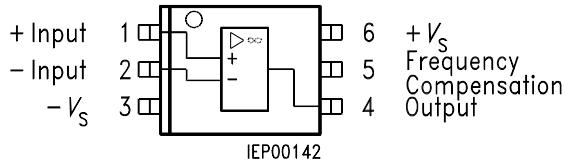
Type	Ordering Code	Package
TAE 1453 G	Q67000-A2106	P-DSO-6-1 (SMD)
TAF 1453 G	Q67000-A2209	P-DSO-6-1 (SMD)

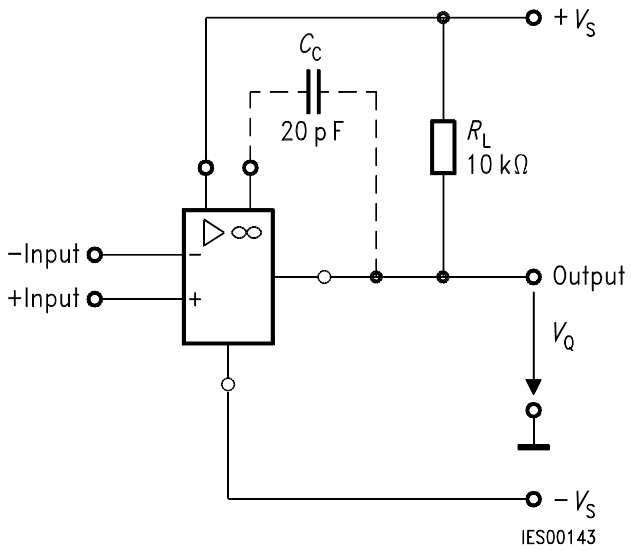
These operational amplifiers are circuits for universal applications having a PNP-input differential stage and an open collector output. Apart from one resistor, only active components are used. The integrated regulator provides for all parameters a large degree of independence from the supply voltage.

Pin Configurations

(top view)

TAE 1453 G
TAF 1453 G

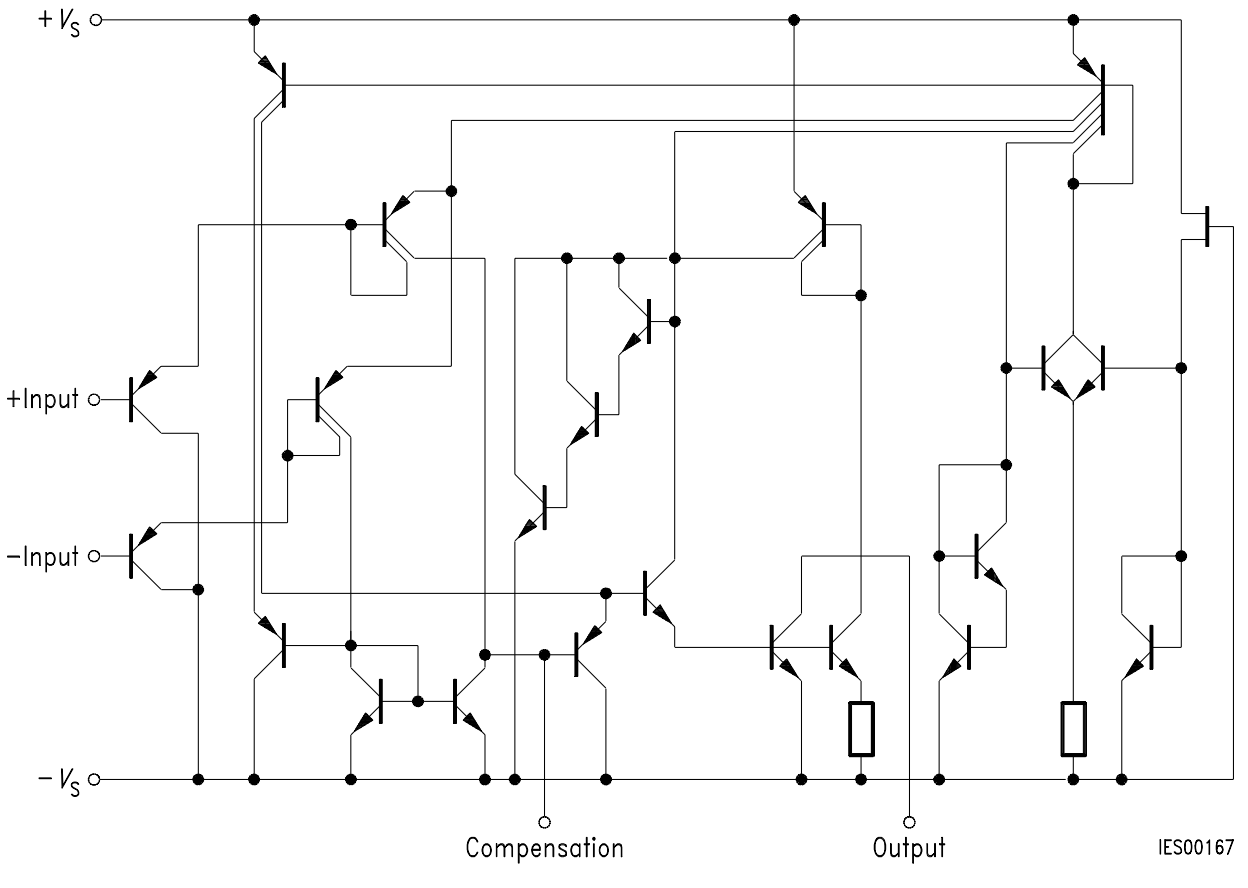




C_C = output frequency compensation (if required);

R_L = load resistance (collector resistance)

Connection Diagram



Circuit Diagram

Absolute Maximum Ratings (TAE 1453 G)

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	± 18	V
Output current	I_Q	100	mA
Differential input voltage	V_{ID}	$\pm V_S$	V
Junction temperature Storage temperature range	T_j T_{stg}	150 – 55 to 150	°C °C
Thermal resistance system - air TAE 1453 G	$R_{th\ SA}$	200	K/W

Operating Range (TAE 1453 G)

Supply voltage	V_S	± 2 to ± 18 (± 1.5 V with slightly increased offset voltage)	V
Ambient temperature	T_A	– 25 to 85	°C

Characteristics (TAE 1453 G)

V_S = ± 5 V to ± 15 V; R_L = 10 kΩ, unless otherwise specified

Parameter	Symbol	Limit Values T_A = 25 °C			Limit Values T_A = – 25 to 85 °C		Unit
		min.	typ.	max.	min.	max.	
Open-loop current consumption	I_S		0.25	0.4		0.45	mA
Input offset voltage, R_G = 50 Ω	V_{IO}	– 5.5		5.5	– 7	7	mV
Input offset current Input current	I_{IO} I_I	– 15	 40	15 150	– 100	100 200	nA nA

Characteristics (TAE 1453 G) (cont'd)
V_S = ± 5 V to ± 15 V; R_L = 10 kΩ, unless otherwise specified

Parameter	Symbol	Limit Values T_A = 25 °C			Limit Values T_A = – 25 to 85 °C		Unit
		min.	typ.	max.	min.	max.	
Control range R_L = 2 kΩ, V_S = ± 15 V R_L = 620 Ω, V_S = ± 15 V R_L = 2 kΩ, V_S = ± 15 V, f = 100 kHz	 $V_{Q\,pp}$ $V_{Q\,pp}$ $V_{Q\,pp}$	 14.9 14.9 10		 – 14.7 – 14.5 – 10	 14.9 14.9	 – 14.7 – 14.4	 V V V
Input impedance, f = 1 kHz	Z_I		200				kΩ
Open-loop voltage gain	G_{V0}	78	85		78		dB
Output reverse current	I_{QR}			10		20	µA
Common-mode input voltage range	V_{IC}	$-V_S$ – 0.2		V_S – 1.8	$-V_S$	V_S – 2.0	V
Common-mode rejection	k_{CMR}	75	80		75		dB
Supply voltage rejection G_V = 100	k_{SVR}		25	100		120	µV/V
Temperature coefficient of I_{IO} R_G = 50 Ω Temperature coefficient of V_{IO} R_G = 50 Ω	α_{IIO} α_{VIO}		0.1 6				nA/K µV/K
Slew rate for non-inverting operation Slew rate for inverting operation	SR SR		6 6		3 3	11 10	V/µs[1)] V/µs[1)]

[1)] C_k = 15 pF

Characteristics (TAE 1453 G)
V_S = ± 2.5 V, R_L = 10 kΩ

Parameter	Symbol	Limit Values T_A = 25 °C			Limit Values T_A = – 25 to 85 °C		Unit
		min.	typ.	max.	min.	max.	
Input offset voltage, R_G = 50 Ω	V_{IO}	– 6		6	– 7.5	7.5	mV
Input offset current Input current	I_{IO} I_I	– 15	 40	15 150	– 100	100 200	nA nA
Open-loop voltage gain	G_{V0}	70			70		dB

Absolute Maximum Ratings (TAF 1453 G)

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	± 18	V
Output current	I_Q	100	mA
Differential input voltage	V_{ID}	± V_S	V
Junction temperature Storage temperature range	T_j T_{stg}	150 – 55 to 125	°C °C
Thermal resistance system - air TAF 1453 G	$R_{th\ SA}$	200	K/W

Operating Range (TAF 1453 G)

Supply voltage	V_S	± 2 to ± 18 (± 1.5 V with slightly increased offset voltage)	V
Ambient temperature	T_A	– 55 to 125	°C

Characteristics (TAF 1453 G)

V_S = ± 5 V to ± 15 V; R_L = 10 kΩ, unless otherwise specified

Parameter	Symbol	Limit Values T_A = 25 °C			Limit Values T_A = – 55 to 125 °C		Unit
		min.	typ.	max.	min.	max.	
Open-loop current consumption (Output in H state)	I_S		0.25	0.35		0.45	mA
Input offset voltage, R_G = 50 Ω	V_{IO}	– 4		4	– 6	6	mV
Input offset current Input current	I_{IO} I_I	– 10	 40	10 100	– 75	75 150	nA nA
Control range R_L = 2 kΩ, V_S = ± 15 V R_L = 620 Ω, V_S = ± 15 V R_L = 2 kΩ, V_S = ± 15 V, f = 100 kHz	 $V_{Q\,pp}$ $V_{Q\,pp}$ $V_{Q\,pp}$	 14.9 14.9 10		 – 14.7 – 14.5 – 10	 14.9 14.9	 – 14.7 – 14.4	 V V V
Input impedance, f = 1 kHz	Z_I		200				kΩ
Open-loop voltage gain	G_{V0}	80	85		75		dB
Output reverse current	I_{QR}			1		5	µA
Common-mode input voltage range	V_{IC}	$-V_S$ – 0.2		V_S – 1.5	$-V_S$ + 0.2	V_S – 1.8	V
Common-mode rejection	k_{CMR}	80	85		75		dB
Supply voltage rejection G_V = 100	k_{SVR}		25	100		100	µV/V
Temperature coefficient of I_{IO} R_G = 50 Ω Temperature coefficient of V_{IO} R_G = 50 Ω	α_{IIO} α_{VIO}		0.1 6	0.8 25			nA/K µV/K

Characteristics (TAF 1453 G)

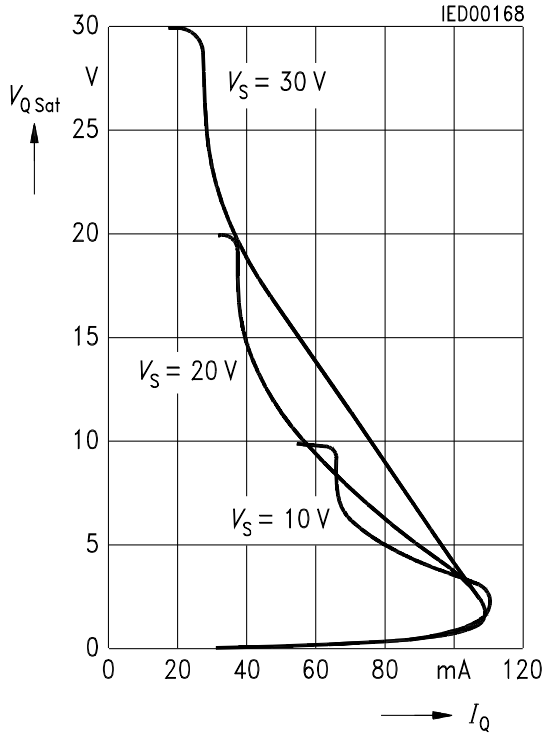
V_S = ± 2.5 V, R_L = 10 kΩ

Parameter	Symbol	Limit Values T_A = 25 °C			Limit Values T_A = – 55 to 125 °C		Unit
		min.	typ.	max.	min.	max.	
Slew rate for non-inverting operation	SR		6		2	12	V/µs[1]
Slew rate for inverting operation	SR		6		2	11	V/µs[1]
Input offset voltage, R_G = 50 Ω	V_{IO}	– 4		4	– 6	6	mV
Input offset current	I_{IO}	– 50		50	– 75	75	nA
Input current	I_I		40	100		150	nA
Open-loop voltage gain	G_{V0}	75			70		dB

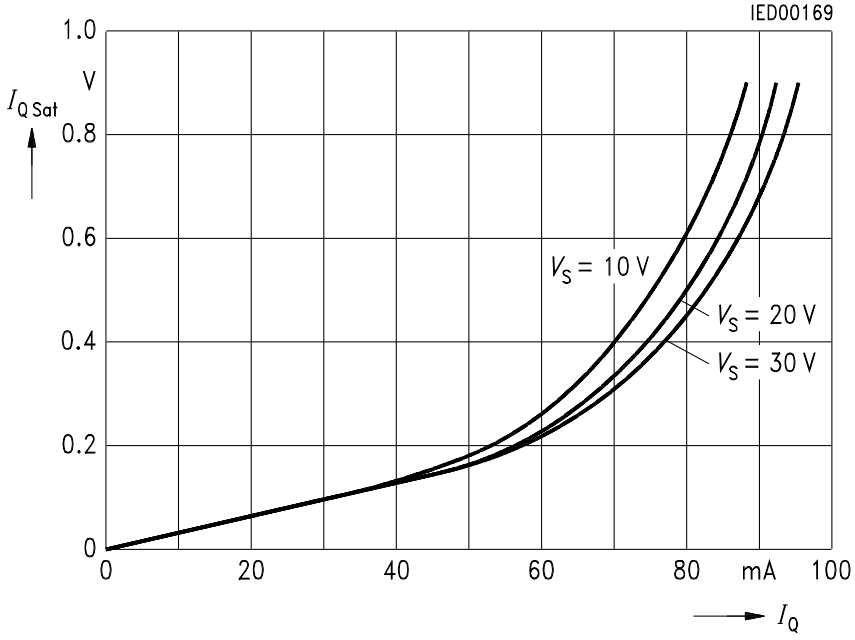
1) C_k = 15 pF

Typical Characteristics of Electrical Parameters

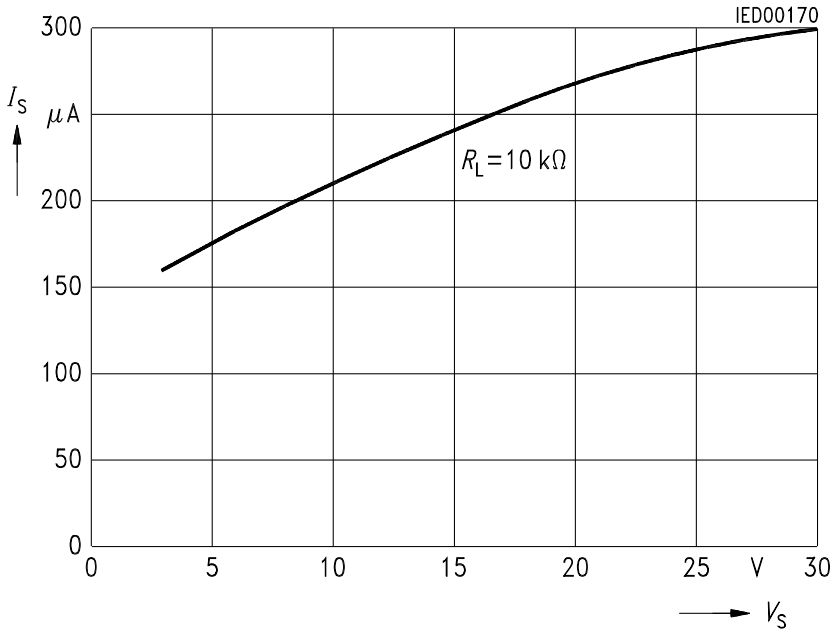
Load Characteristics
Output Saturation Voltage versus Output Current



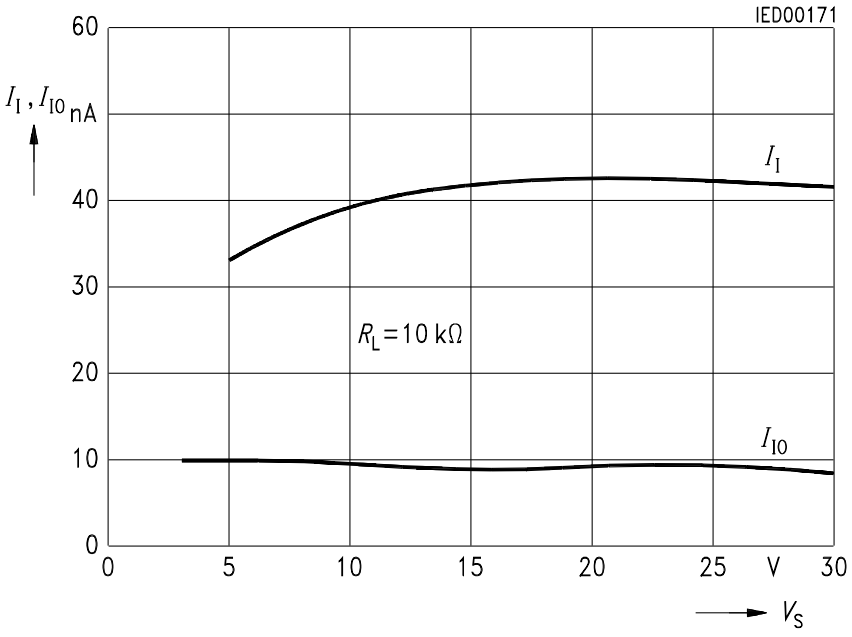
Output Saturation Voltage versus Output Current



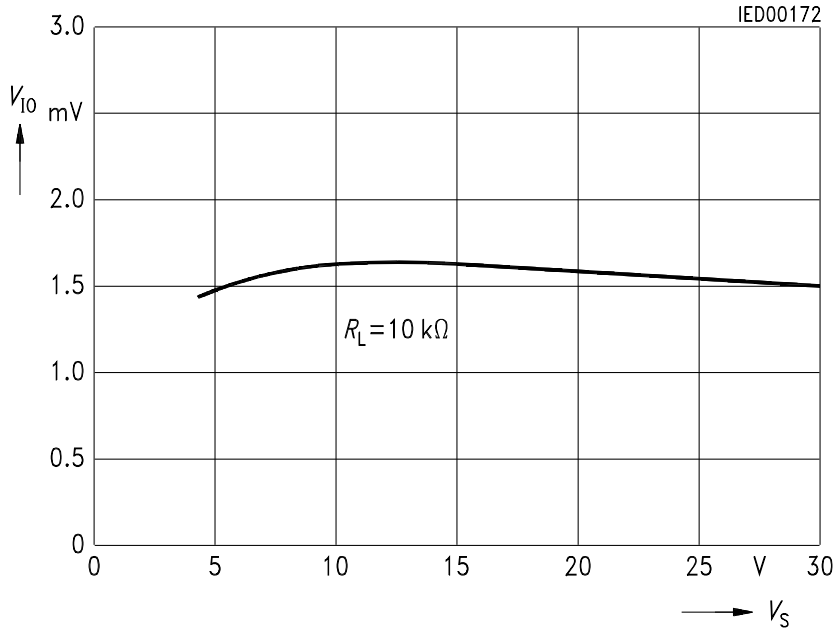
Supply Current versus Supply Voltage



Input Current and Input Offset Current versus Supply Voltage



Input Offset Voltage versus Supply Voltage



V_{IO} Behavior at Low Operating Voltages
Input Offset Voltage versus Supply Voltage