# SIEMENS

Quad PNP-Operational Amplifier

TAE 4453

TAF 4453

Bipolar IC

Features

- Supply voltage range between 3 V and 36 V
- Low current consumption, 1.6 mA typ.
- Extremely large control range
- Low output saturation voltage, almost independent of load current
- Output current up to 70 mA (100 mA max.)
- Output virtually short-circuit proof
- Wide common-mode range
- Wide temperature range (TAF 4453 G)
- Pin-compatible to LM 324
- The typical characteristics of the electric parameters correspond to those of the TAE 1453 G
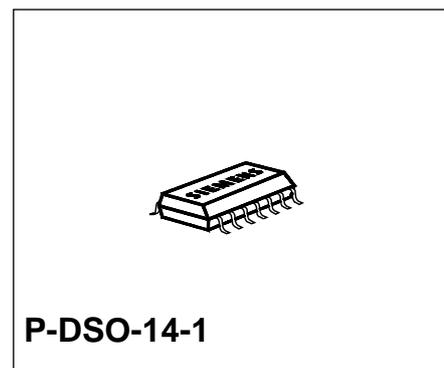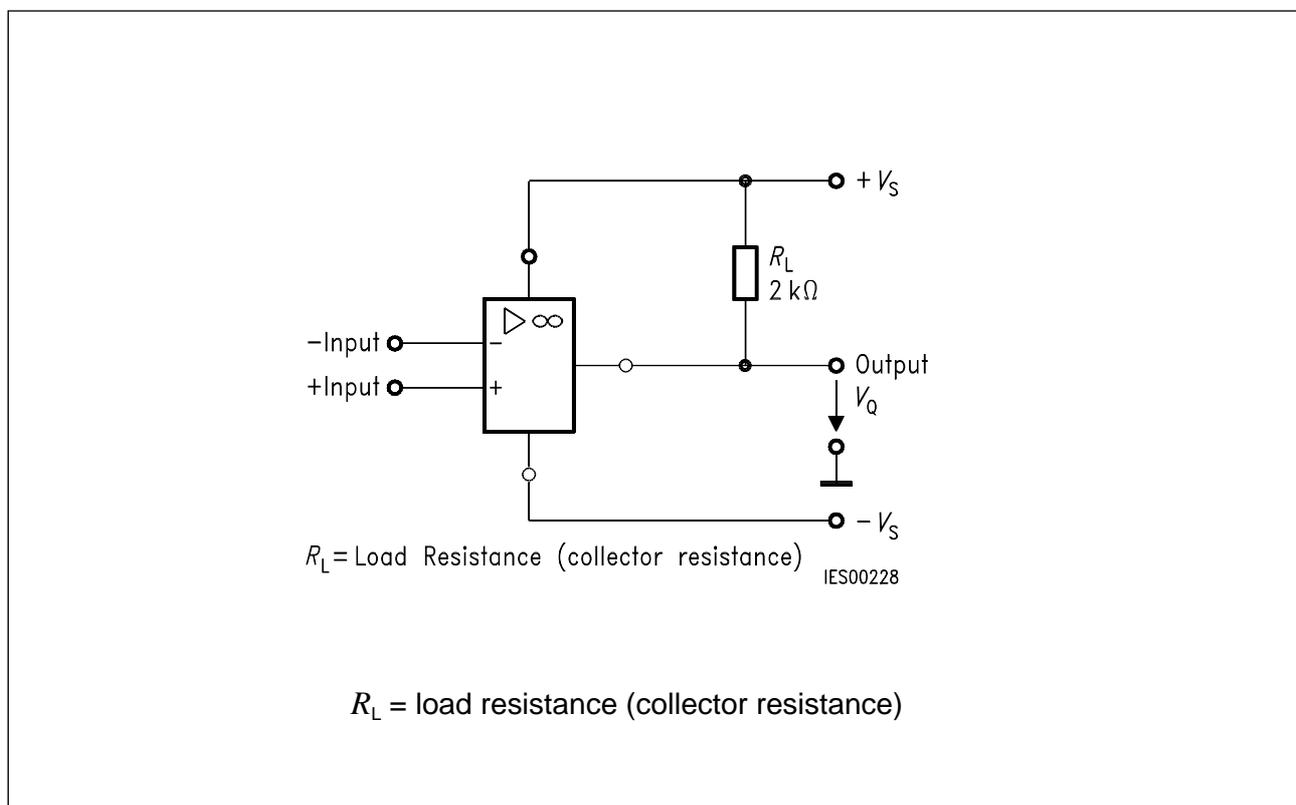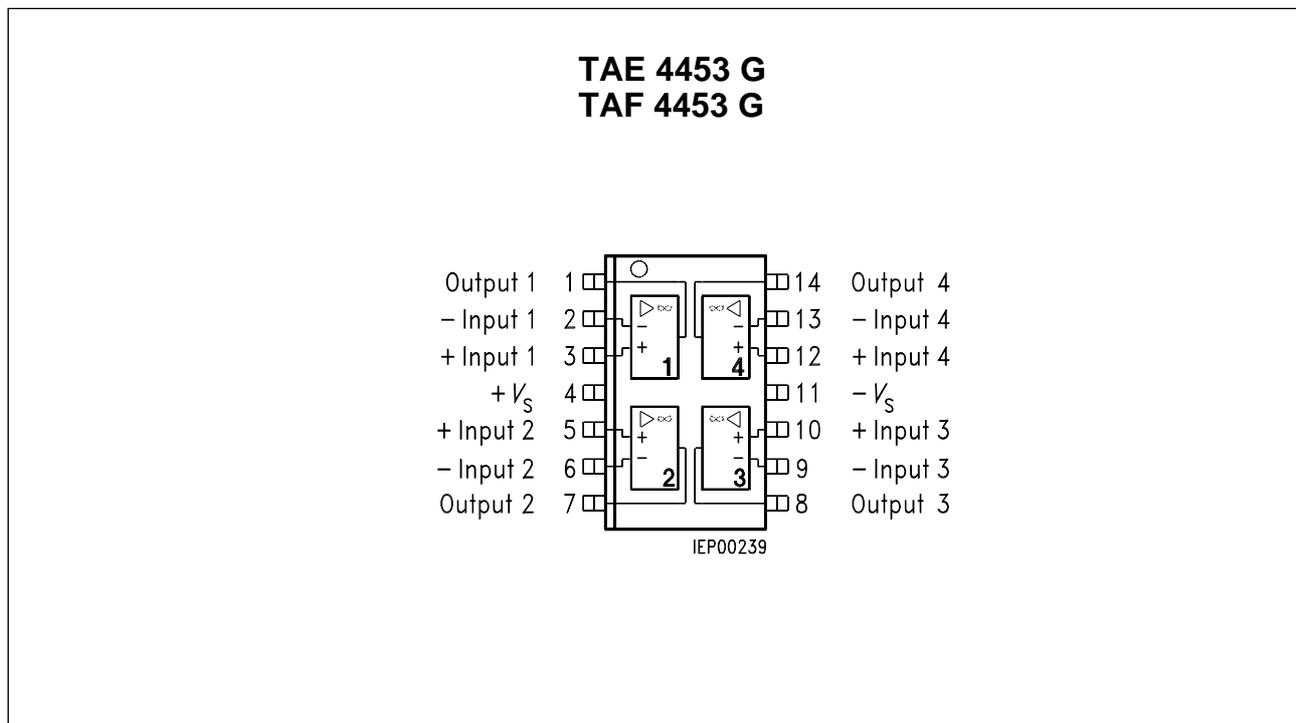
P-DSO-14-1

Applications

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

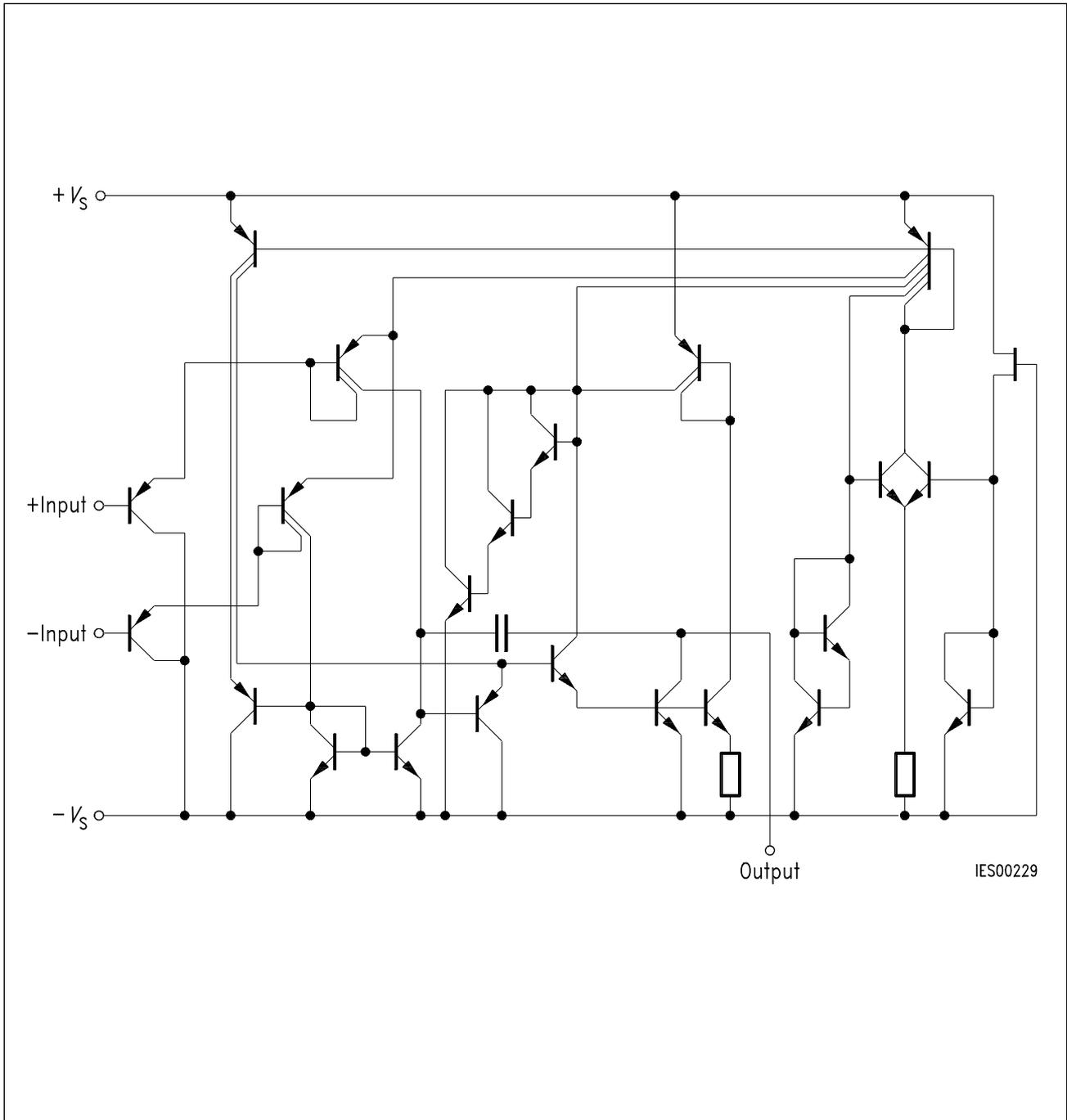| Type	Ordering Code	Package
TAE 4453 G	Q67000-A2152	P-DSO-14-1 (SMD)
TAF 4453 G	Q67000-A2213	P-DSO-14-1 (SMD)

The TAE 4453 / TAF 4453 consists of four independent, frequency-compensated op amps, each having a PNP-input differential stage and an open collector output. The integrated regulator provides for all parameters a large degree of independence of the supply voltage.

Pin Configurations
(top view)

TAE 4453 G
TAF 4453 G

Output 1 1
− Input 1 2
+ Input 1 3
+ V_S 4
+ Input 2 5
− Input 2 6
Output 2 7

14 Output 4
13 − Input 4
12 + Input 4
11 − V_S
10 + Input 3
9 − Input 3
8 Output 3

IEP00239

−Input
+Input

R_L
2 kΩ

+ V_S

Output
V_Q

− V_S

R_L = Load Resistance (collector resistance)

IES00228

R_L = load resistance (collector resistance)

Connection Diagram

IES00229

Circuit Diagram of One Op Amp

Absolute Maximum Ratings (TAE 4453 G)

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	$\pm$ 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 125	°C °C
Thermal resistance system - air TAE 4453 G	$R_{th\,SA}$	120	K/W

Operating Range (TAE 4453 G)

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	$\pm$ 2 to $\pm$ 18 ($\pm$ 1.5 V with slightly increased offset voltage)	V
Ambient temperature	T_A	$-$ 25 to 85	°C

Characteristics (TAE 4453 G)

$V_S = \pm 5$ 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 supply current consumption, total	I_S		1.6	3.0		3.6	mA
Input offset voltage, $R_G = 50\ \Omega$	V_{IO}	$-$ 5.5		5.5	$-$ 7	7	mV
Input offset current Input current	I_{IO} I_I	$-$ 15	 40	15 150	$-$ 25	25 200	nA nA
Control range $R_L = 2$ kΩ, $V_S = \pm 15$ V $R_L = 620\ \Omega$, $V_S = \pm 15$ V	$V_{Q\,pp}$ $V_{Q\,pp}$	14.9 14.9		$-$ 14.7 $-$ 14.5	14.9 14.9	$-$ 14.7 $-$ 14.4	V V

Characteristics (TAE 4453 G) (cont'd)

$V_S = \pm\,5$ V to $\pm\,15$ 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.	
Input impedance, $f = 1$ kHz	Z_I		200				kΩ
Open-loop voltage gain $R_L = 2$ kΩ	G_{V0}	80	85		80		dB
Output reverse current	I_{QR}			10		20	µA
Common-mode input voltage range $R_L = 2$ kΩ	V_{IC}	$-V_S$ -0.2		$+V_S$ -1.8	$-V_S$	$+V_S$ -2.0	V
Common-mode rejection $R_L = 2$ kΩ	k_{CMR}	75	80		75		dB
Supply voltage rejection $G_V = 100$	k_{SVR}		25	100		100	µV/V
Temperature coefficient of I_{IO} $R_G = 50$ Ω	α_{IIO}		0.1				nA/K
Temperature coefficient of V_{IO} $R_G = 50$ Ω	α_{VIO}		6				µV/K
Slew rate for non-inverting operation	SR		0.65		0.25	1.0	V/µs
Slew rate for inverting operation	SR		1.1		0.5	1.6	V/µs

Characteristics (TAE 4453 G)

$V_S = \pm 2$ V

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, $R_G = 50\,\Omega$	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; $R_L = 2\,k\Omega$	G_{V0}	70			70		dB

Absolute Maximum Ratings (TAF 4453 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 125	°C °C
Thermal resistance system - air TAF 4453 G	$R_{th\,SA}$	120	K/W

Operating Range (TAF 4453 G)

Parameter	Symbol	Limit Values	Unit
Supply voltage	V_S	± 2 to ± 18 (± 1.5 V with slightly increased offset voltage)	V
Ambient temperature	T_A	-55 to 125	°C

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Characteristics (TAF 4453 G)

$V_S = \pm 5$ 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 supply current consumption, total	I_S		1.6	3.0		3.6	mA
Input offset voltage, $R_G = 50\ \Omega$	V_{IO}	-4		4	-6	6	mV
Input offset current	I_{IO}	-10		10	-15	15	nA
Input current	I_I		40	100		150	nA
Control range $R_L = 2$ kΩ, $V_S = \pm 15$ V	$V_{Q\,pp}$	14.9		-14.7	14.8	-14.7	V
$R_L = 620\ \Omega$, $V_S = \pm 15$ V	$V_{Q\,pp}$	14.9		-14.5	14.8	-14.4	V
Input impedance, $f = 1$ kHz	Z_I		200				kΩ
Open-loop voltage gain $R_L = 2$ kΩ	G_{V0}	85	87		80		dB
Output reverse current	I_{QR}			1		5	µA
Common-mode input voltage range $R_L = 2$ kΩ	V_{IC}	$-V_S$ -0.2		$+V_S$ -1.5	$-V_S$ $+0.2$	$+V_S$ -1.8	V
Common-mode rejection, $R_L = 2$ kΩ	k_{CMR}	80	85		75		dB
Supply voltage rejection, $G_V = 100$	k_{SVR}		25	100		100	µV/V

Characteristics (TAF 4453 G) (cont'd)

$V_S = \pm 5$ 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.	
Temperature coefficient of I_{IO} $R_G = 50$ Ω	α_{IIO}		0.1	0.8		0.8	nA/K
Temperature coefficient of V_{IO} $R_G = 50$ Ω	α_{VIO}		6	25		25	µV/K
Slew rate for non-inverting operation	SR		0.65		0.2	0.65	V/µs
Slew rate for inverting operation	SR		1.1		0.4	1.7	V/µs

Characteristics (TAF 4453 G)

$V_S = \pm 2$ V

Parameter	Symbol	Limit Values $T_A = 25$ °C			Limit Values $T_A = -55$ to 125 °C		Unit
		min.	typ.	max.	min.	max.	
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 $R_L = 2$ kΩ	G_{V0}	75			70		dB

Note: For typical performance curves, please refer to the data sheets of TAE 1453 and TAF 1453.