

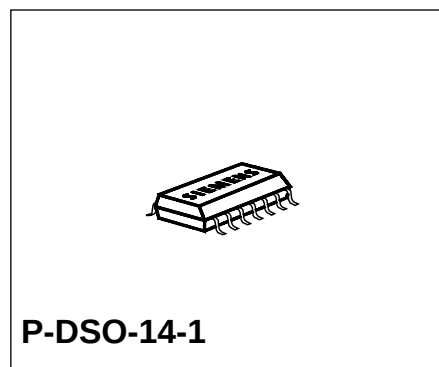
Quad PNP-Operational Amplifier

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

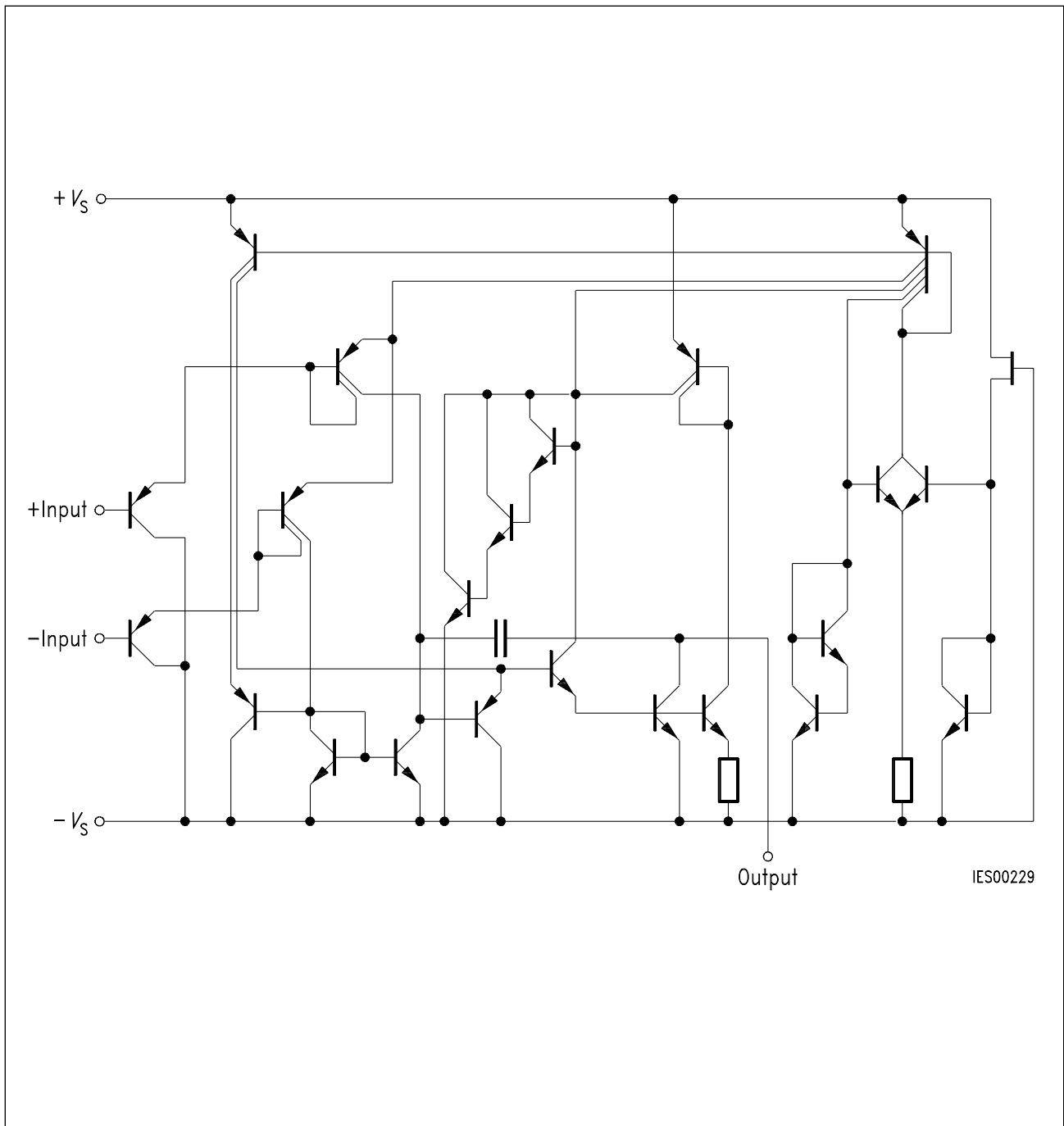


Applications

- 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.



Circuit Diagram of One Op Amp

Absolute Maximum Ratings (TAE 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	T_j	150	°C
Storage temperature range	T_{stg}	– 55 to 125	°C
Thermal resistance system - air TAE 4453 G	$R_{th SA}$	120	K/W

Operating Range (TAE 4453 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 4453 G)

$V_S = \pm 5$ V to ± 15 V; $R_L = 10$ k Ω , 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, $R_G = 50$ Ω	V_{IO}	– 5.5		5.5	– 7	7	mV
Input offset current	I_{IO}	– 15		15	– 25	25	nA
Input current	I_I		40	150		200	nA
Control range							
$R_L = 2$ k Ω , $V_S = \pm 15$ V	$V_{Q pp}$	14.9		– 14.7	14.9	– 14.7	V
$R_L = 620$ Ω , $V_S = \pm 15$ V	$V_{Q pp}$	14.9		– 14.5	14.9	– 14.4	V

Characteristics (TAE 4453 G) (cont'd)

$V_S = \pm 5 \text{ V to } \pm 15 \text{ V}$; $R_L = 10 \text{ k}\Omega$, unless otherwise specified

Parameter	Symbol	Limit Values $T_A = 25 \text{ }^\circ\text{C}$			Limit Values $T_A = -25$ to $85 \text{ }^\circ\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Input impedance, $f = 1 \text{ kHz}$	Z_i		200				$\text{k}\Omega$
Open-loop voltage gain $R_L = 2 \text{ k}\Omega$	G_{V0}	80	85		80		dB
Output reverse current	I_{QR}			10		20	μA
Common-mode input voltage range $R_L = 2 \text{ k}\Omega$	V_{IC}	$-V_S$ -0.2		$+V_S$ -1.8	$-V_S$	$+V_S$ -2.0	V
Common-mode rejection $R_L = 2 \text{ k}\Omega$	k_{CMR}	75	80		75		dB
Supply voltage rejection $G_V = 100$	k_{SVR}		25	100		100	$\mu\text{V/V}$
Temperature coefficient of I_{IO} $R_G = 50 \text{ }\Omega$	α_{IIIO}		0.1				nA/K
Temperature coefficient of V_{IO} $R_G = 50 \text{ }\Omega$	α_{VIO}		6				$\mu\text{V/K}$
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)

$$V_S = \pm 2 \text{ V}$$

Parameter	Symbol	Limit Values $T_A = 25 \text{ }^{\circ}\text{C}$			Limit Values $T_A = -25$ to $85 \text{ }^{\circ}\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Input offset voltage, $R_G = 50 \text{ }\Omega$	V_{IO}	-6		6	-7.5	7.5	mV
Input offset current	I_{IO}	-15		15	-100	100	nA
Input current	I_I		40	150		200	nA
Open-loop voltage gain; $R_L = 2 \text{ k}\Omega$	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	T_j	150	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	-55 to 125	$^{\circ}\text{C}$
Thermal resistance system - air TAF 4453 G	$R_{th SA}$	120	K/W

Operating Range (TAF 4453 G)

Supply voltage	V_S	± 2 to ± 18 ($\pm 1.5 \text{ V}$ with slightly increased offset voltage)	V
Ambient temperature	T_A	-55 to 125	$^{\circ}\text{C}$

Characteristics (TAF 4453 G)

$V_S = \pm 5 \text{ V}$ to $\pm 15 \text{ V}$; $R_L = 10 \text{ k}\Omega$, unless otherwise specified

Parameter	Symbol	Limit Values $T_A = 25 \text{ }^\circ\text{C}$			Limit Values $T_A = -55$ to $125 \text{ }^\circ\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Open-loop supply current consumption, total	I_S		1.6	3.0		3.6	mA
Input offset voltage, $R_G = 50 \text{ }\Omega$	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							
$R_L = 2 \text{ k}\Omega$, $V_S = \pm 15 \text{ V}$	$V_{Q \text{ pp}}$	14.9		- 14.7	14.8	- 14.7	V
$R_L = 620 \text{ }\Omega$, $V_S = \pm 15 \text{ V}$	$V_{Q \text{ pp}}$	14.9		- 14.5	14.8	- 14.4	V
Input impedance, $f = 1 \text{ kHz}$	Z_I		200				k Ω
Open-loop voltage gain $R_L = 2 \text{ k}\Omega$	G_{V0}	85	87		80		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
$R_L = 2 \text{ k}\Omega$							
Common-mode rejection, $R_L = 2 \text{ k}\Omega$	k_{CMR}	80	85		75		dB
Supply voltage rejection, $G_V = 100$	k_{SVR}		25	100		100	$\mu\text{V/V}$

Characteristics (TAF 4453 G) (cont'd)

$V_S = \pm 5 \text{ V}$ to $\pm 15 \text{ V}$; $R_L = 10 \text{ k}\Omega$, unless otherwise specified

Parameter	Symbol	Limit Values $T_A = 25 \text{ }^\circ\text{C}$			Limit Values $T_A = -55$ to $125 \text{ }^\circ\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Temperature coefficient of I_{IO} $R_G = 50 \text{ }\Omega$	α_{IIO}		0.1	0.8		0.8	nA/K
Temperature coefficient of V_{IO} $R_G = 50 \text{ }\Omega$	α_{VIO}		6	25		25	$\mu\text{V/K}$
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)

$V_S = \pm 2 \text{ V}$

Parameter	Symbol	Limit Values $T_A = 25 \text{ }^\circ\text{C}$			Limit Values $T_A = -55$ to $125 \text{ }^\circ\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Input offset voltage, $R_G = 50 \text{ }\Omega$	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 $R_L = 2 \text{ k}\Omega$	G_{V0}	75			70		dB

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