

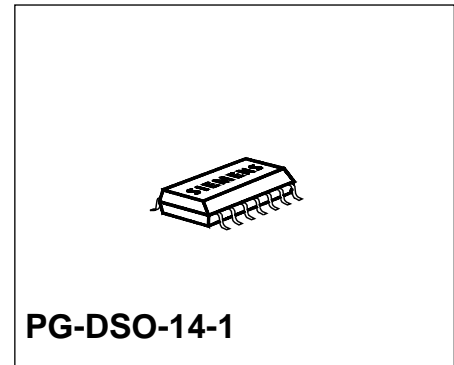
Quad PNP-Operational Amplifier

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
- Pb-free lead plating; RoHS compliant



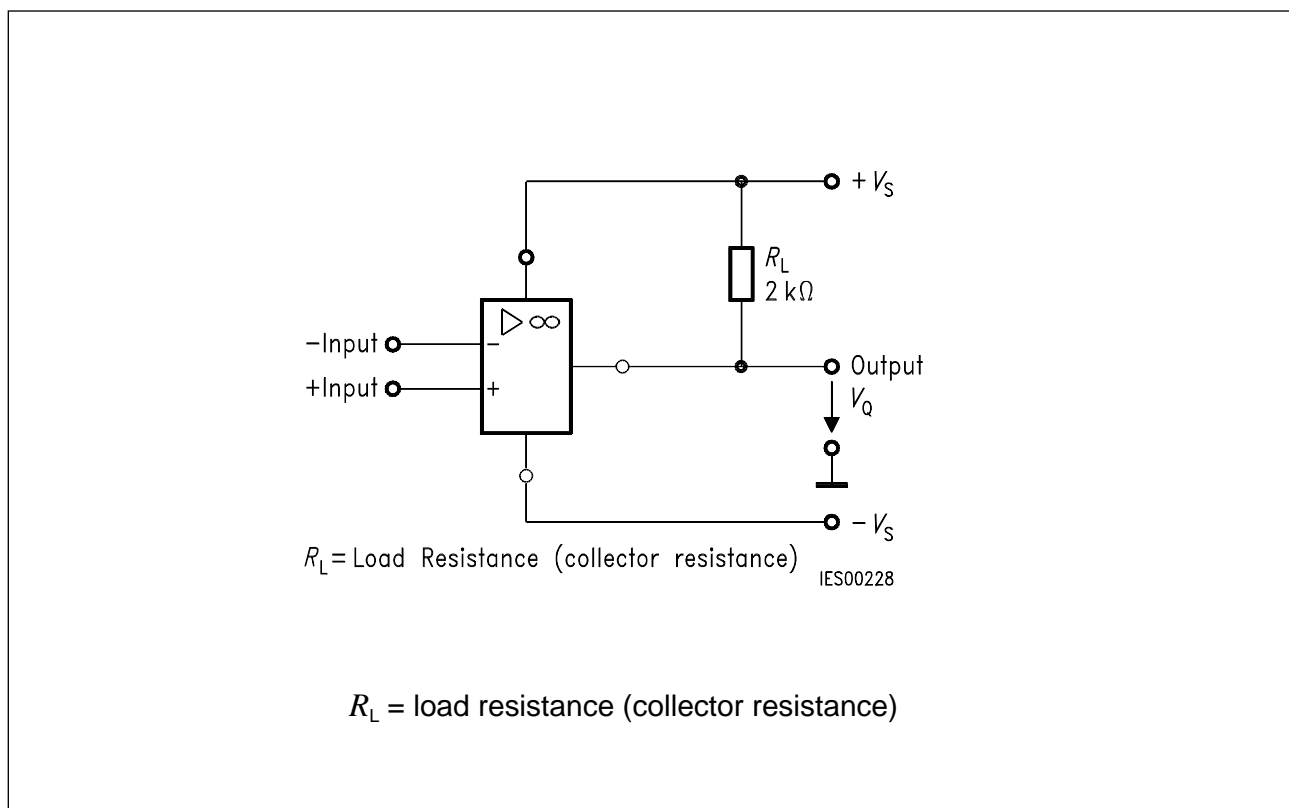
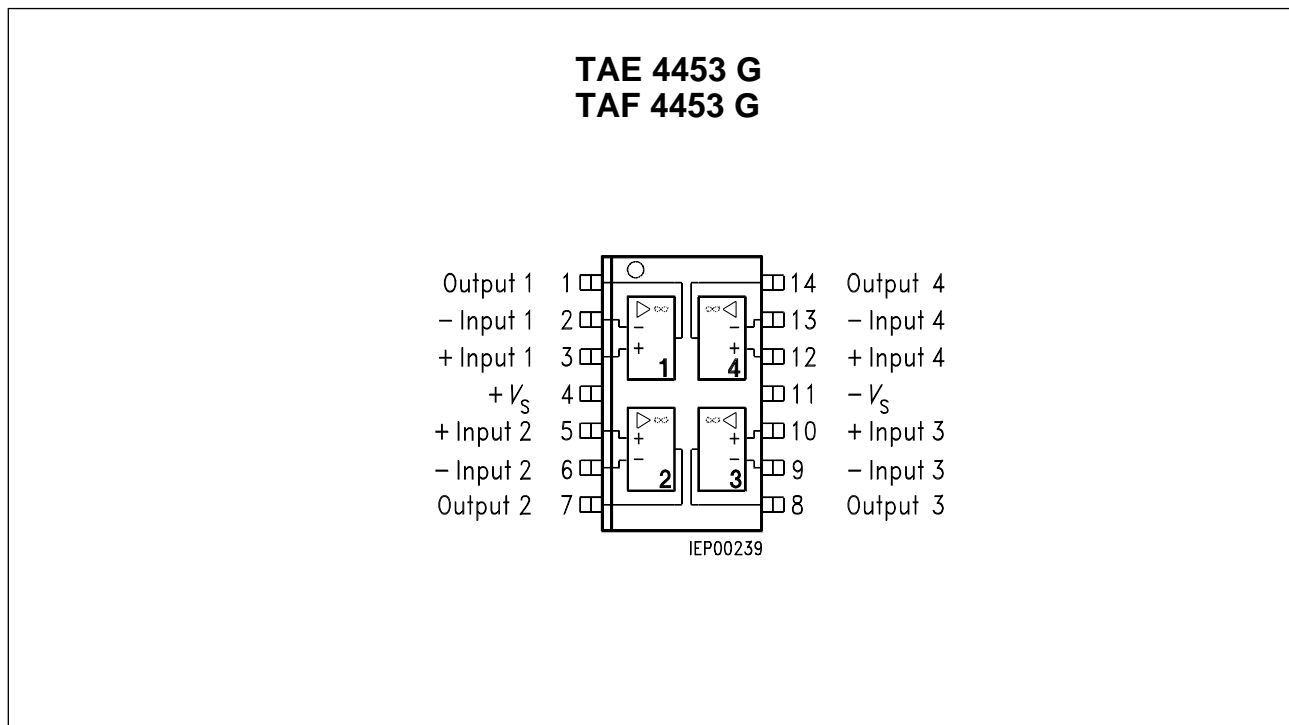
Applications

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

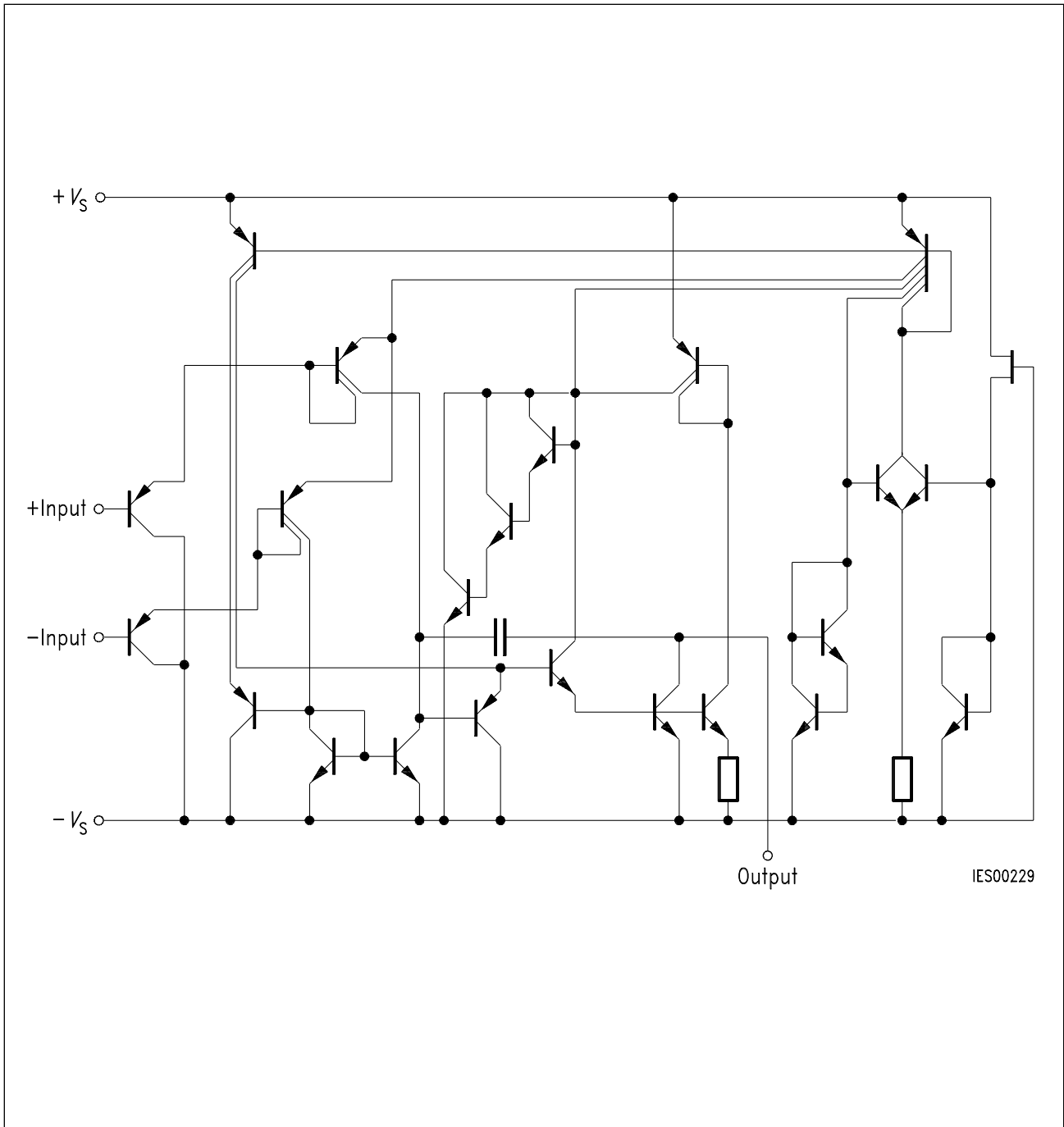
Type	Ordering Code	Package
TAE 4453 G	Q67000-A2152	PG-DSO-14-1 (SMD)
TAF 4453 G	Q67000-A2213	PG-DSO-14-1 (SMD)

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)



Connection Diagram



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	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	- 55 to 125	$^{\circ}\text{C}$
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	$^{\circ}\text{C}$

Characteristics (TAE 4453 G)

$V_S = \pm 5$ V to ± 15 V; $R_L = 10$ k Ω , unless otherwise specified

Parameter	Symbol	Limit Values $T_A = 25$ $^{\circ}\text{C}$			Limit Values $T_A = - 25$ to 85 $^{\circ}\text{C}$		Unit
		min.	typ.	max.	min.	max.	
Open-loop supply current consumption, total	I_S		1.6	3.0		3.6	mA
Input offset voltage, $R_G = 50$ 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_{Qpp}	14.9		- 14.7	14.9	- 14.7	V
$R_L = 620$ Ω , $V_S = \pm 15$ V	V_{Qpp}	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_{IIO}		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	$\text{V}/\mu\text{s}$
Slew rate for inverting operation	SR		1.1		0.5	1.6	$\text{V}/\mu\text{s}$

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 Input current	I_{IO} I_I	-15	40	15 150	-100	100 200	nA 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 Storage temperature range	T_j T_{stg}	150 -55 to 125	$^\circ\text{C}$ $^\circ\text{C}$
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 (± 1.5 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_{Qpp}	14.9		- 14.7	14.8	- 14.7	V
$R_L = 620 \text{ }\Omega$, $V_S = \pm 15 \text{ V}$	V_{Qpp}	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 $R_L = 2 \text{ k}\Omega$	V_{IC}	- V_S - 0.2		+ V_S - 1.5	- V_S + 0.2	+ V_S - 1.8	V
Common-mode rejection, $R_L = 2 \text{ k}\Omega$	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.