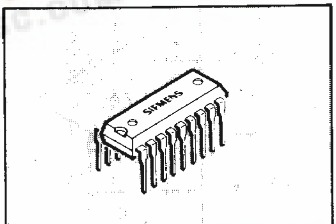
SIEMENS

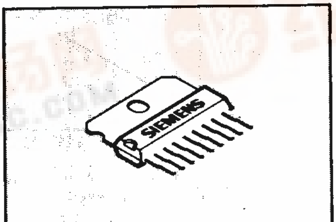
Dual Power Operational Amplifier

TCA 2365

Bipolar IC



P-DIP-18-L-9



P-SIP-9

Features

- High output peak current of twice 2.5 A
- Wide supply voltage range, 8 V to 32 V
- High slew rate 4 V/µs
- Outputs entirely protected (DC short-circuit proof)
- Thermal overload protection
- Inhibit input enables "tristate" outputs

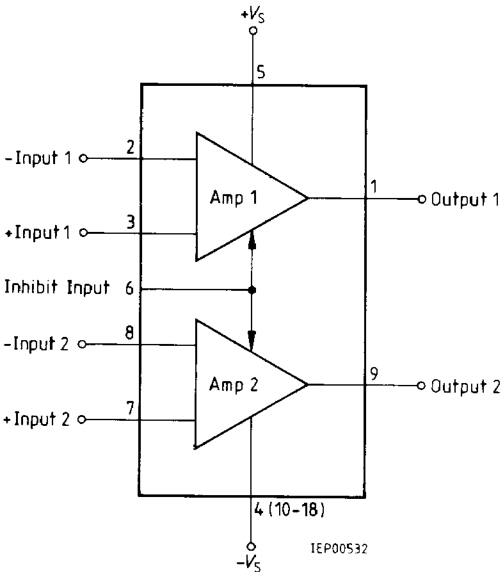
Applications

- Power comparator
- Power Schmitt trigger
- Speed control of DC motors

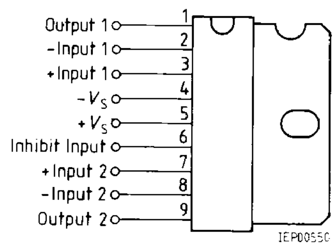
Type	Ordering Code	Package
TCA 2365	Q67000-A1876	P-SIP-9
TCA 2365 A	Q67000-A8017	P-DIP-18-L-9

The TCA 2365 is a dual power op amp in a P-SIP-9 or P-DIP-18L-9 package. The IC contains two identical op amps, each supplying a high output peak current of 2.5 A at supply voltages between ±4 V and ±15 V. Both amplifiers can be disconnected simultaneously (tristate; $Z_Q \approx 4$ kΩ) via an inhibit input. Integrated protective circuits protect the outputs against short circuit to $+V_S$ and $-V_S$ and prevent thermal overloading of the IC.

Pin Configuration
TCA 2365 A



TCA 2365



Pin 4 is electrically connected to cooling fin.
(Establish external connection between pin 4 and pin 10-18)

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		TCA 2365	TCA 2365 A	
Supply voltage	V_S	± 16	± 16	V
t = 50 ms	V_S	± 18	± 18	V
Differential input voltage	V_{ID}	± V_S	± V_S	V
Output voltage range	V_Q	$-V_S$ −1 to $+V_S$ +1		V
Peak output current	I_Q	± 2.5	± 2.5	A
Supply current	I_S	5.5	5.5	A
Junction temperature	T_j	150	150	°C
Storage temperature range	T_{stg}	−55 to 125	−55 to 125	°C
Thermal resistance				
junction – ambient	$R_{th\,jA}$	65	60	K/W
junction – case	$R_{th\,jC}$	6	10	K/W

Operating Range

Supply voltage	V_S	± 4 to ± 15	± 4 to ± 15	V
Case temperature P_{tot} = 10.0 W	T_C	−25 to 85	−25 to 85	°C
Voltage gain	$G_{V\,min}$	10	10	dB

Characteristics

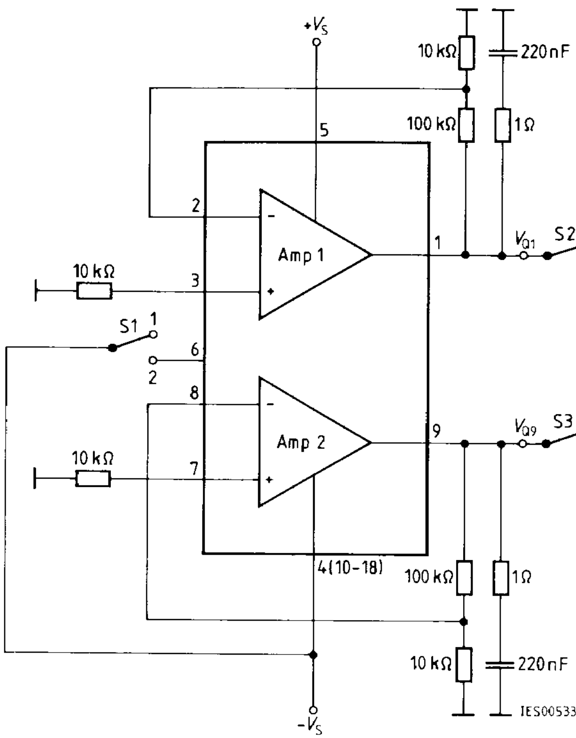
$V_S = \pm 10$ V; $T_j = 25\,°C$

Parameter	Symbol	Limit Values			Unit	Test Circuit
		min.	typ.	max.		
Open-loop supply current consumption S1 in position 1 S1 in position 2	 I_S I_{SM}		 30 5	 50 8	 mA mA	 1 1
Input offset voltage	V_{IO}	−10		10	mV	2
Input offset current Input current	I_{IO} I_I	−100	 0.25	100 1	nA µA	3 3
Output voltage ($R_L = 12\ \Omega$; $f = 1$ kHz) ($R_L = 4\ \Omega$; $f = 1$ kHz) ($R_L = 470\ \Omega$; $f = 50$ kHz)	 $V_{Q\,pp}$ $V_{Q\,pp}$ $V_{Q\,pp}$	 ± 8.5 ± 8.0	 ± 9.0 ± 8.5 ± 6.0		 V V V	 4 4 4
Input resistance ($f = 1$ kHz)	R_I	1	5		MΩ	4
Open-loop voltage gain ($f = 100$ Hz)	G_{V0}	70	80		dB	5
Common-mode input voltage range	V_{IC}	+7/−10	+7.5/-10.5		V	6
Common-mode rejection Supply voltage rejection	k_{CMR} k_{SVR}	70 70	80 80		dB dB	6 7
Temperature coefficient of V_{IO} $-25\,°C \leq T_j \leq +85\,°C$ Temperature coefficient of I_{IO} $-25\,°C \leq T_j \leq +85\,°C$	α_{VIO} α_{IIO}		50 0.4		µV/K nA/K	2 3
Slew rate of V_q for non-inverting operation[1]) Slew rate of V_q for inverting operation[1])	 SR SR		 4 4		 V/µs V/µs	 8 9
Noise voltage referred to input Inhibit input (referred to $-V_S$) V_6 for IC turned off V_6 for IC turned on	V_n $V_{6\,OFF}$ $V_{6\,ON}$	 0 3.0	3	 1.0 6	µV V V	1 1 1
Turn-on time $\mid I_{1;9} \mid > 1$ A } referred Turn-off time } to $V_{6\,OFF/ON}$ $\mid I_{1;9} \mid < 1$ A S2 and S3 in position 2	$t_{D\,ON}$ $t_{D\,OFF}$		2 15	5 30	µs µs	1 1

1) For the relationship between power bandwidth and slew rate refer to **"General Information"**

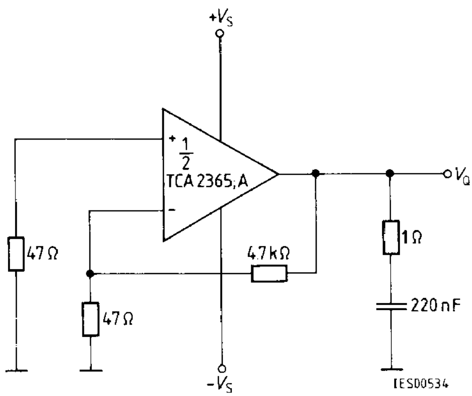
Test Circuits

Figure 1
Open-Loop Supply Current Consumption, Noise Voltage, Turn-Off Voltage



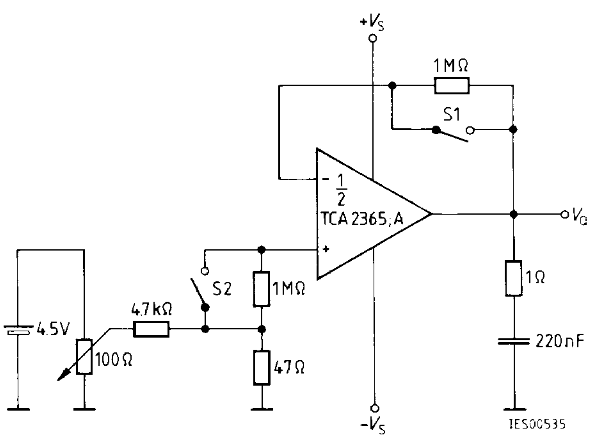
Switch as drawn unless otherwise specified.

Figure 2
Input Offset Voltage, Temperature Coefficient of V_{IO}



$V_Q = 100 \times V_{IO}$

Figure 3
Input Offset Current, Input Current, Temperature Coefficient of I_{IO}



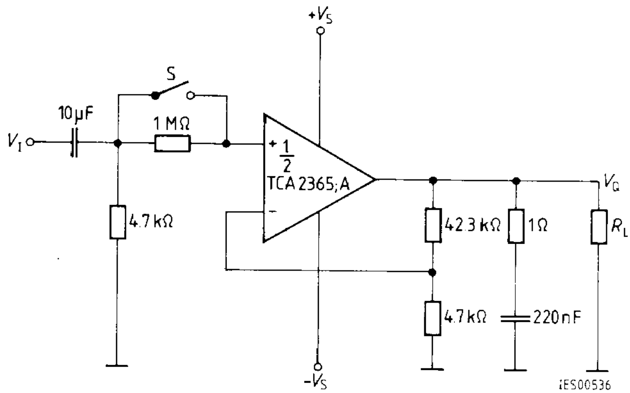
S1 open – S2 closed: $I_{I-} = \frac{V_Q}{1\ \text{M}\Omega}$

S2 open – S1 closed: $I_{I+} = \frac{V_Q}{1\ \text{M}\Omega}$

S1 open – S2 open: $I_{IO} = \frac{V_Q}{1\ \text{M}\Omega}$

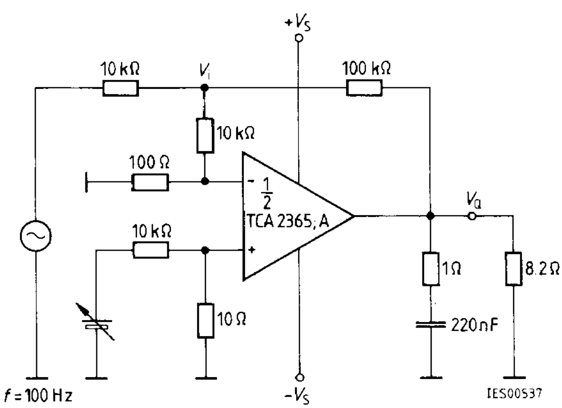
S1 closed – S2 closed: offset alignment

Figure 4
Output Voltage, Input Resistance



S closed: to measure V_{Qpp}
S open/closed: to measure R_I

Figure 5
Open-Loop Voltage Gain



$$G_{V0} = \left| 20 \times \log 101 \frac{V_Q}{V_I} \right|$$

Figure 6
Common-Mode Voltage Gain G_{VC}
Common-Mode Rejection k_{CMR} (dB) = G_{V0} (dB) – G_{VC} (dB)

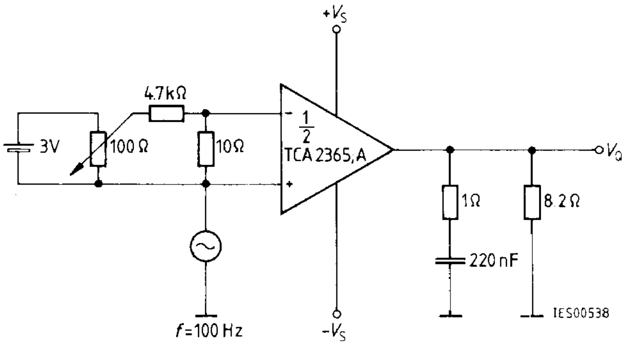
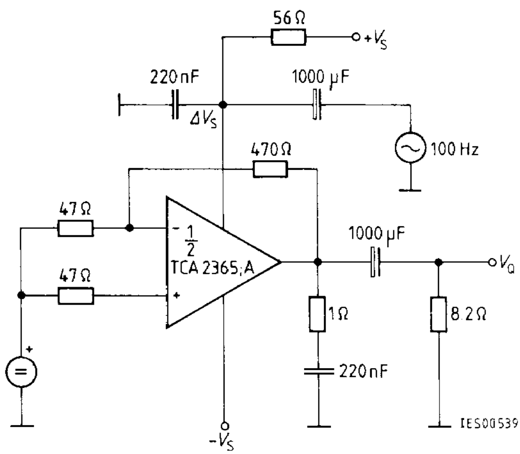


Figure 7
Supply Voltage Rejection



$$k_{SVR} = 20 \log \frac{\Delta V_Q}{G_V \cdot \Delta V_S} \quad [\text{dB}]$$

Figure 8
Slew Rate for Non-Inverting Operation

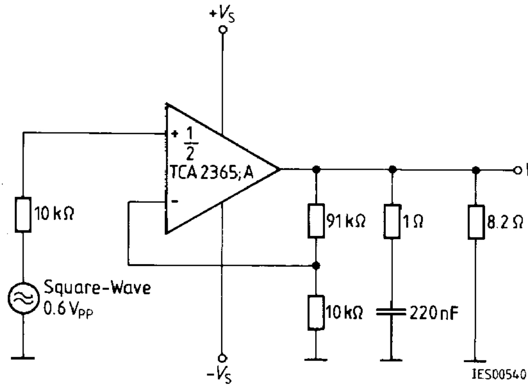
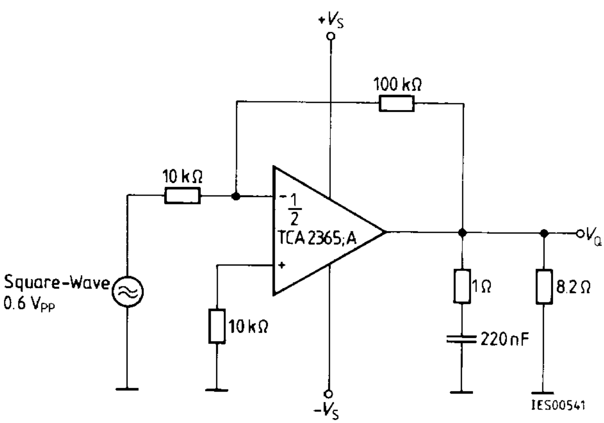
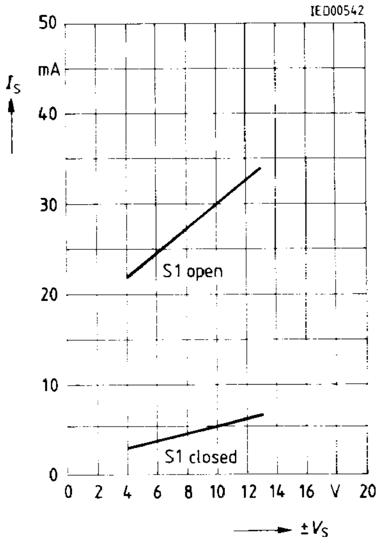


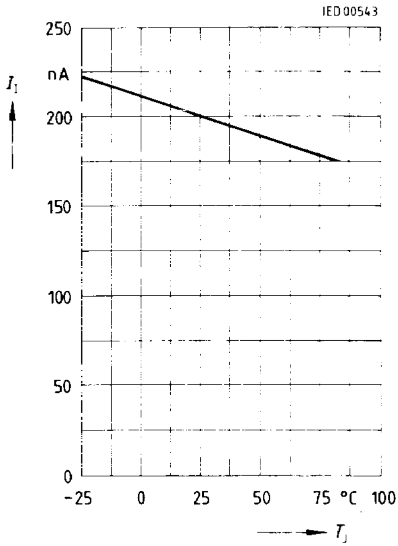
Figure 9
Slew Rate for Inverting Operation



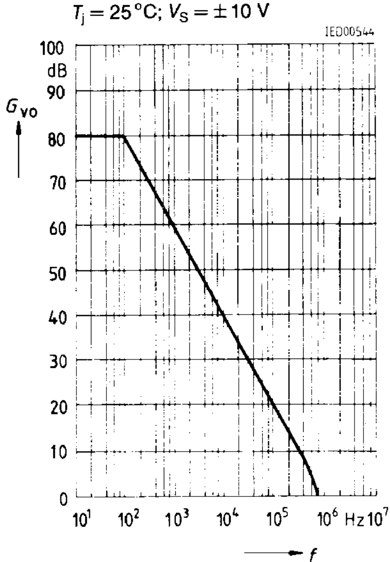
Supply Current I_S and I_{SM} versus Supply Voltage
$T_j = 25\,°C$



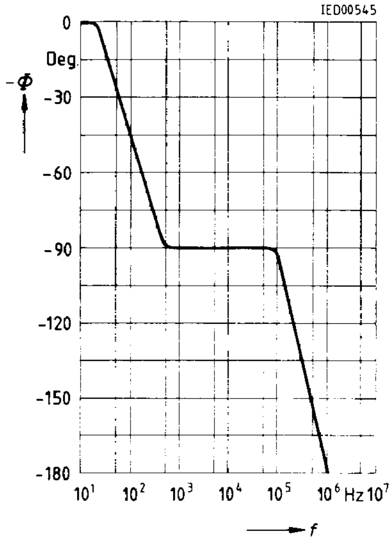
Input Current versus Junction Temperature



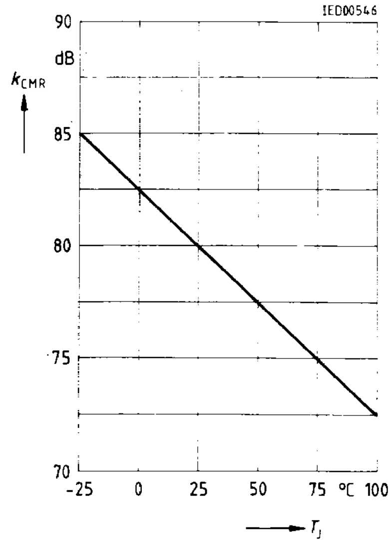
Open-Loop Voltage Gain versus Frequency
$T_j = 25\,°C$; $V_S = \pm 10\,V$



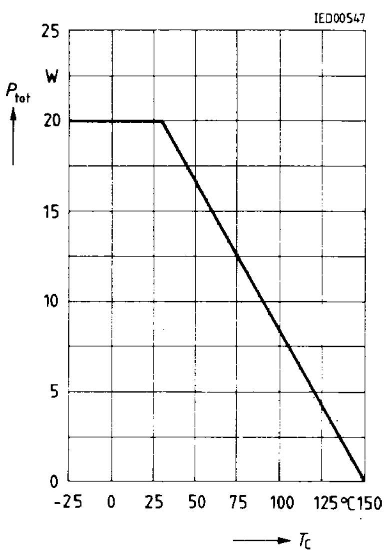
Phase Response versus Frequency
$T_j = 25\,°C$; $V_S = \pm 10\ V$



Common-Mode Rejection versus Junction Temperature
$V_S = \pm 10\ V$



Max. Permissible Power Dissipation versus Case Temperature



Max. Permissible Power Dissipation versus Case Temperature