

## Transimpedance Amplifier

### Description

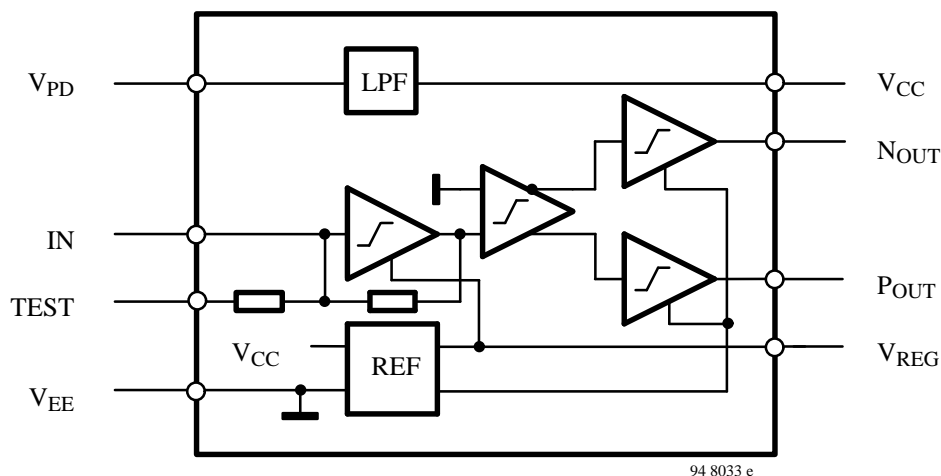
U6791B-C is a low-noise, wideband IC designed for amplifying low-level current signals delivered by PIN photo diodes in fiberoptic receiver systems. It contains a transimpedance amplifier and a voltage regulator that provides a supply independent voltage with a positive temperature coefficient to hold bandwidth constant over temperature.

For best performance, an additional pin,  $V_{PD}$ , is used to filter the supply voltage for the photo diode. The circuit provides quasi-complementary outputs and works best ac coupled to U6792B-D.

### Features

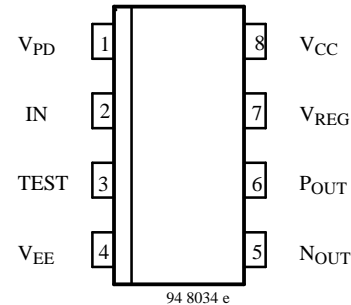
- 220 MHz bandwidth over temperature and supply voltage range
- Wide 60 dB input dynamic range
- Low-power design: 20 mA maximum
- Low-noise design
- Temperature compensated
- Available in SO-8 package or chip form
- Transimpedance of 14 k $\Omega$  typical

### Block Diagram



## Pin Description

Pin	Symbol	Function
1	V <sub>PD</sub>	Filtered positive supply voltage
2	IN	Photo diode current input
3	TEST	Testpoint (resistance between IN and TEST)
4	V <sub>EE</sub>	Negative supply voltage
5	N <sub>OUT</sub>	Negative output
6	P <sub>OUT</sub>	Positive output
7	V <sub>REG</sub>	Decoupling the internal reference voltage
8	V <sub>CC</sub>	Positive supply voltage, normally grounded



## Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
Supply voltage Pin 4	V <sub>EE</sub>	6.0	V
Input voltage Pin 3	V <sub>i</sub>	V <sub>EE</sub> to GND	V
Input current Pin 2	I <sub>i</sub>	200	μA
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature range	T <sub>stg</sub>	-40 to +125	°C

## Operating Range

Parameters	Symbol	Value	Unit
Supply voltage range Pin 8	V <sub>EE</sub>	4.5 to 5.7	V
Ambient temperature range	T <sub>amb</sub>	-40 to +85	°C

## Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient SO-8	R <sub>thJA</sub>	typ. 180	K/W

## Electrical Characteristics

Operating conditions: T<sub>amb</sub> = 0°C to 70°C, V<sub>EE</sub> = -5.2V ± 10%

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
V <sub>EE</sub> supply current		I <sub>EE</sub>	-20	-16	-13	mA
Reference voltage *		V <sub>REG</sub>	3.8	3.82	3.86	V
Test resistor between IN and TEST		R <sub>TEST</sub>	60	75	90	kΩ

\* measured with respect to V<sub>EE</sub>

## AC Electrical Characteristics

Operating conditions:  $T_{amb} = 0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ,  $V_{EE} = -5.2\text{V} \pm 10\%$

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Bandwidth		BW	220			MHz
Input current range		$I_{IN}$	0.1		70	$\mu\text{A}$
Output voltage swing $P_{OUT}, N_{OUT}$	$I_{IN} = 70 \mu\text{A}$	$V_{OUT}$			1.2	V
Transimpedance		$R_T$		14		$\text{k}\Omega$
Input equivalent noise		$N_E$		4		$\frac{\text{pA}}{\sqrt{\text{Hz}}}$

## Functional Description

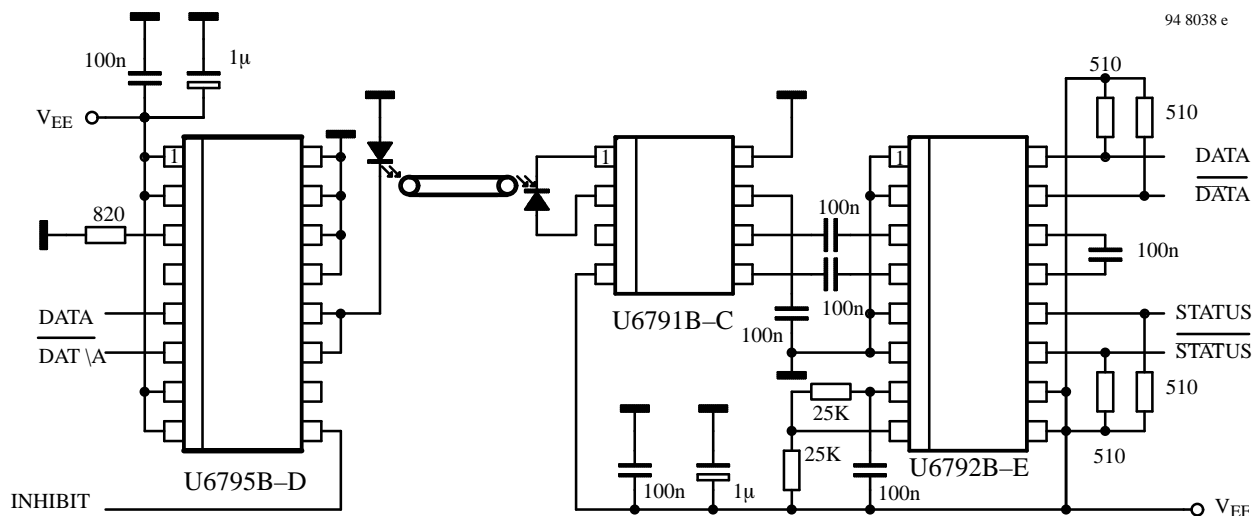
U6791B-C transforms an input current coming from a photo diode into a quasi-complementary output voltage. Output voltage can be calculated by

$$V_{OUT,PP} [\text{mV}] = R_T [\text{k}\Omega] * I_{IN} [\mu\text{A}]$$

The photo diode is connected between  $V_{PD}$  and IN to reduce feedthrough of supply variations.  $V_{PD}$  provides  $V_{CC}$  by means of a dual pole low pass filter.

To maintain a constant bandwidth over supply voltage and temperature variations,  $V_{REG}$  is provided and should be decoupled by an external capacitor. For best results it is recommended to use the U6791B-C ac coupled to the U6792B-D data quantizer, because these two IC's are well matched for amplification and signal monitoring.

## Typical Application



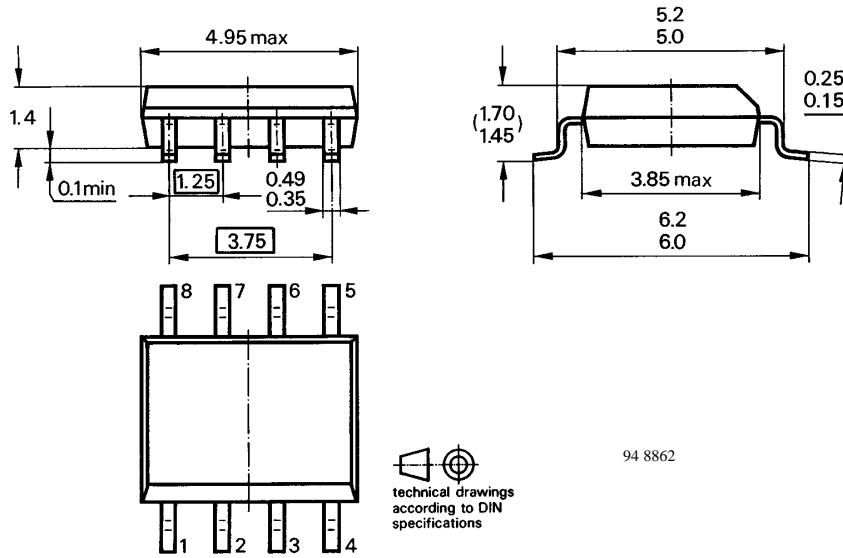
# U6791B-C

# TEMIC

TELEFUNKEN Semiconductors

## Dimensions in mm

Package: SO 8



## Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**TEMIC TELEFUNKEN microelectronic GmbH** semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**TEMIC** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany  
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423