U6791B-C

Transimpedance Amplifier

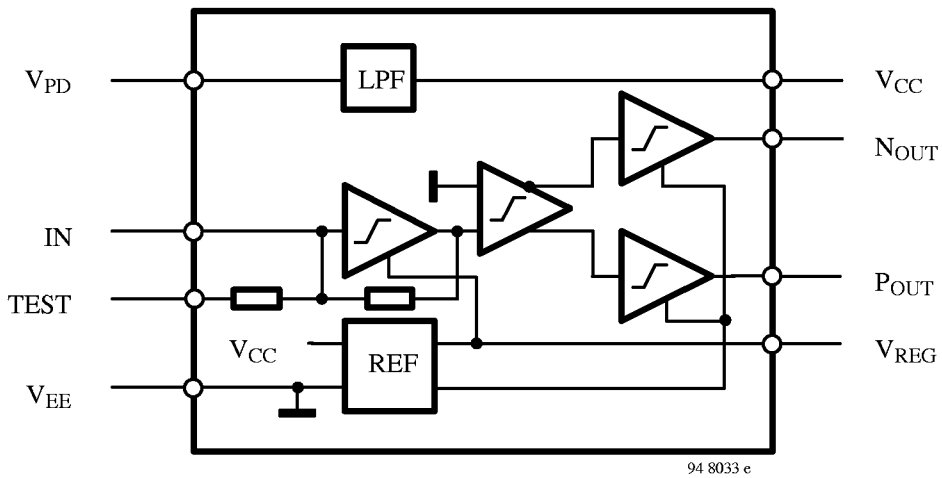
Description

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 SO8 package or chip form
- Transimpedance of 14 kΩ typical

Block Diagram



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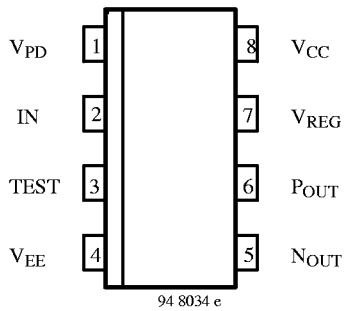
Pin Description

Pin	Symbol	Function
1	V_{PD}	Filtered positive supply voltage
2	IN	Photo diode current input
3	TEST	Testpoint (resistance between IN and TEST)
4	V_{EE}	Negative supply voltage
5	N_{OUT}	Negative output
6	P_{OUT}	Positive output
7	V_{REG}	Decoupling the internal reference voltage
8	V_{CC}	Positive supply voltage, normally grounded



Absolute Maximum Ratings

Parameters		Symbol	Value	Unit
Supply voltage	Pin 4	V_{EE}	6.0	V
Input voltage	Pin 3	V_i	V_{EE} to GND	V
Input current	Pin 2	I_i	200	µA
Junction temperature		T_j	125	°C
Storage temperature range		T_{stg}	–40 to +125	°C

Operating Range

Parameters		Symbol	Value	Unit
Supply voltage range	Pin 8	V_{EE}	4.5 to 5.7	V
Ambient temperature range		T_{amb}	–40 to +85	°C

Thermal Resistance

Parameters		Symbol	Value	Unit
Junction ambient	SO8	R_{thJA}	typ. 180	K/W

Electrical Characteristics

Operating conditions: T_{amb} = 0 to 70°C, V_{EE} = –5.2 V ± 10%

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
V_{EE} supply current		I_{EE}	–20	–16	–13	mA
Reference voltage *		V_{REG}	3.8	3.82	3.86	V
Test resistor between IN and TEST		R_{TEST}	60	75	90	kΩ

* measured with respect to V_{EE}

AC Electrical Characteristics

Operating conditions: T_{amb} = 0 to 70°C, V_{EE} = –5.2 V ± 10%

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

Functional Description

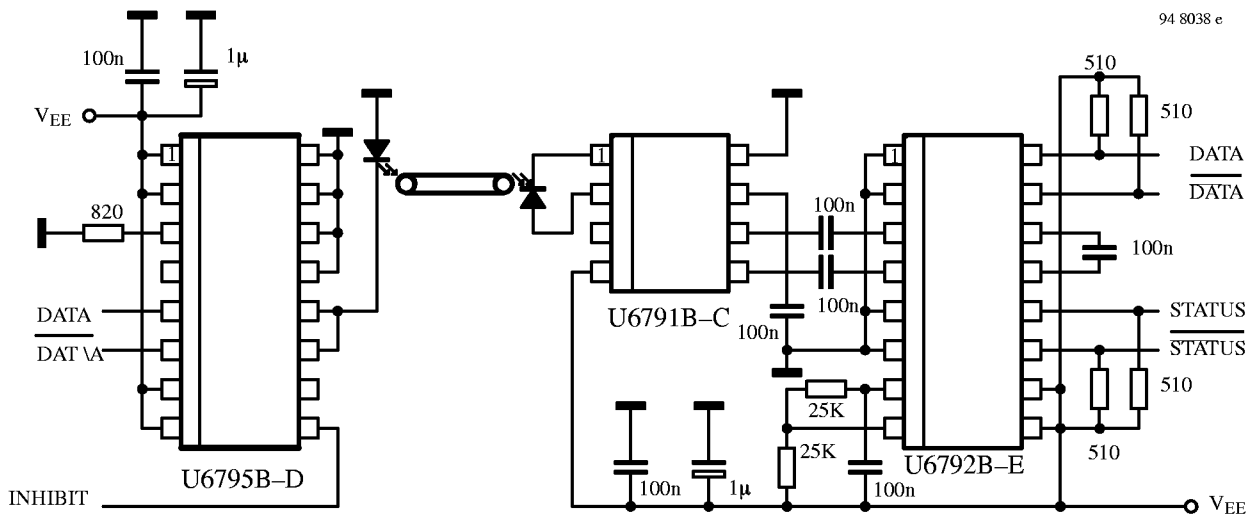
U6791B-C transforms an input current coming from a photo diode into a quasi-complementary output voltage. Output voltage can be calculated by

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

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



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Dimensions in mm

Package: SO8