



## PA3211

CMOS IC

### RAIL TO RAIL I/O, HIGH-SLEW-RATE OP AMP

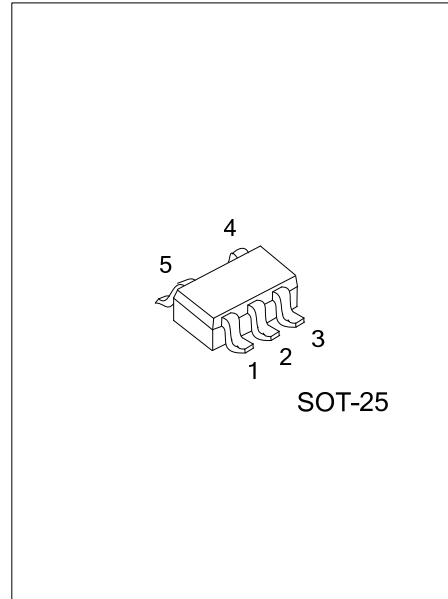
#### DESCRIPTION

The UTC **PA3211** is an input/output rail-to-rail operational amplifier. This device can be operated on either a single supply varying from +3V to +5.5V or dual supply ranging from ±1.5V to ±2.75V.

The UTC **PA3211** has a perfect AC performance with 6.5MHz bandwidth, 5.23V/μs slew rate.

The supply current for each amplifier of the UTC **PA3211** is only 500μA that makes it suitable for low current consumption applications to control high current loads. Applications include audio amplification for computers, sound ports, sound cards and set-top boxes.

The UTC **PA3211** is generally applied in portable equipment, headphone driver, multimedia audio, battery-powered equipment, ASIC input or output amplifier, sensor amplifier, and low power/low voltage device.



#### FEATURES

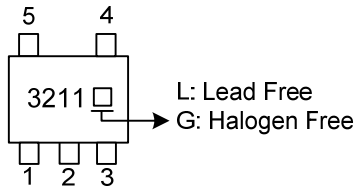
- \* Single-Supply Operation: +3V ~ +5.5V
- \* Input / Output Rail-to-Rail
- \* Low Quiescent Current: 500μA @ 5V
- \* With Low Input Current
- \* 5.23V/μs High Slew Rate
- \* High Output Driving Capacity
- \* 6.5MHz High Gain-Bandwidth Product
- \* 70dB High PSRR

#### ORDERING INFORMATION

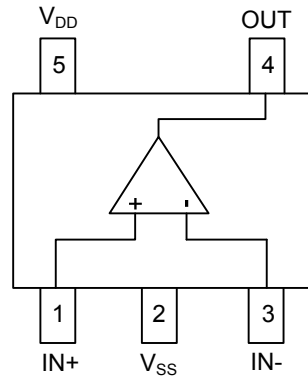
Ordering Number		Package	Packing
Lead Free	Halogen Free		
PA3211L-AF5-R	PA3211G-AF5-R	SOT-25	Tape Reel

<p>PA3211G-AF5-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AF5: SOT-25</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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MARKING



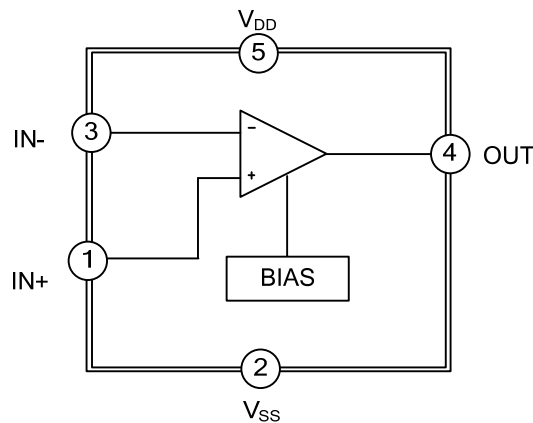
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	IN+	Positive differential input
2	V <sub>SS</sub>	Ground
3	IN-	Negative differential input
4	OUT	Output
5	V <sub>DD</sub>	Positive analog supply of the cell

BLOCK DIAGRAM



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### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
All Other Pins		$V_{SS}-0.3 \sim V_{DD}+0.3$	V
Supply Voltage	$V_{DD} \sim V_{SS}$	6.5	V
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	520	mW
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Operating Temperature	$T_{OPR}$	-40 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ +160	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	240	$^\circ\text{C/W}$

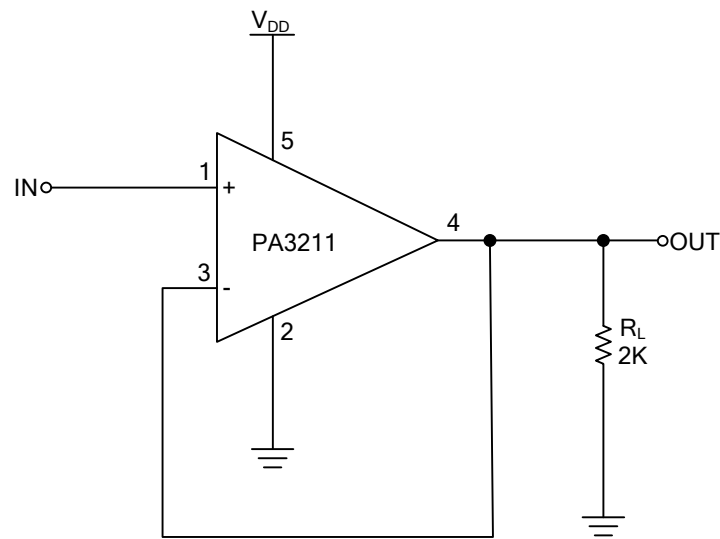
### ■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=5\text{V}$ ,  $V_{SS}=0\text{V}$ ,  $T_A=25^\circ\text{C}$ ,  $C_L=10\text{pF}$ ,  $R_L=1\text{k}\Omega \sim V_{DD}/2$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>Supplies</b>						
Supply Voltage Range (Note)	$V_{DD}$		3		5.5	V
Supply Current	$I_{DD}$	No load		0.5	0.7	mA
Total Power Dissipation	$P_{TOT}$	No load		0.25	0.35	mW
<b>DC Characteristics</b>						
Input Offset Voltage	$V_{I(OS)}$			$\pm 1.5$	$\pm 10$	mV
Common Mode Voltage	$V_{CM}$	Inferred from CMRR test	0		5	V
Input Bias Current	$I_B$			$\pm 1.5$	$\pm 20$	nA
Input Bias Current Offset	$I_{OS}$			$\pm 1.5$	$\pm 20$	nA
Input Resistance	$R_{IN}$			1000		$\text{M}\Omega$
Open Loop Gain	$A_V$		85	95		dB
Maximum Output Current	$I_O$	$V_{OUT}=\pm V_{IN} \times 90\%$	55	$\pm 66$		mA
Output Voltage Swing High	$V_{OH}$	$R_L=2\text{k}\Omega$	4.96	4.99		V
Output Voltage Swing Low	$V_{OL}$	$R_L=2\text{k}\Omega$		0.012	0.04	V
Power Supply Rejection Ratio	PSRR	$3\text{V} \leq V_{DD} \leq 5.5\text{V}$	45	70		dB
Common-Mode Rejection Ratio	CMRR	$V_{SS} \leq V_{CM} \leq V_{DD}$	45	65		dB
<b>AC Characteristics</b>						
Gain-Bandwidth Product	GBWP	Open-loop, No load		6.5		$\text{MHz}$
Slew-Rate	SR	Measured from 10%~90% of $4V_{P-P}$ step, $R_L=1\text{k}\Omega$ , $C_L=10\text{pF}$		5.23		$\text{V}/\mu\text{s}$
Phase Margin	PM			60		deg
Maximum Output Power	$I_O$	THD<0.1%, $R_L=16\Omega$		100		mA

Note: Guaranteed by the Power-Supply Rejection Ratio (PSRR) test.

## ■ TYPICAL APPLICATION CIRCUIT



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.