



## PA3211

CMOS IC

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

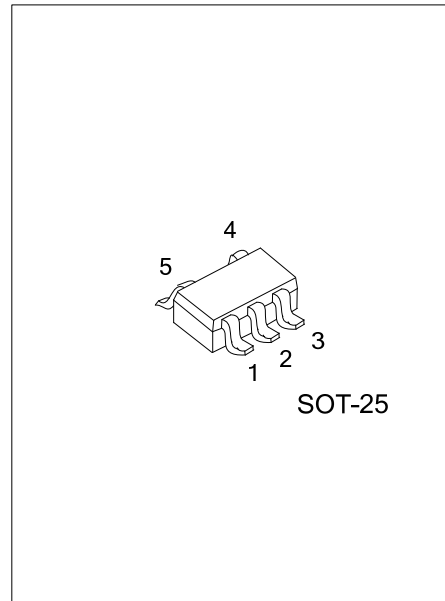
#### DESCRIPTION

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

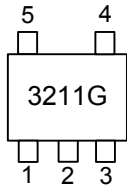
- \* Single-Supply Operation: +3V ~ +5.5V
- \* Input / Output Rail-to-Rail
- \* Low Quiescent Current: 500μA @ 5V
- \* With Low Input Current
- \* 5.23V/μs High Slew Rate
- \* High Output Driving Capacity
- \* 6.5MHz High Gain-Bandwidth Product
- \* 70dB High PSRR

#### ORDERING INFORMATION

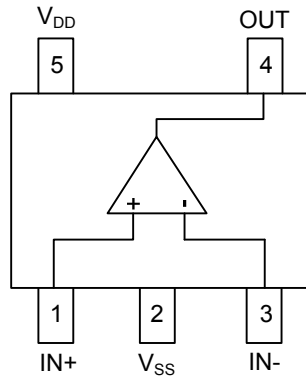
Ordering Number	Package	Packing
PA3211G-xx-AF5-R	SOT-25	Tape Reel

<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</li> </ul>
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■ MARKING



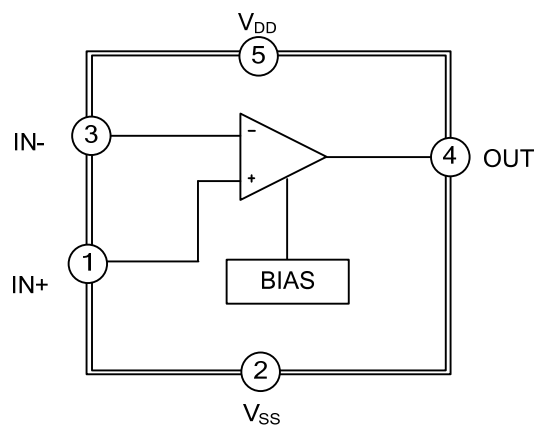
■ PIN CONFIGURATION



■ 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



### ■ 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	$^\circ\text{C/W}$

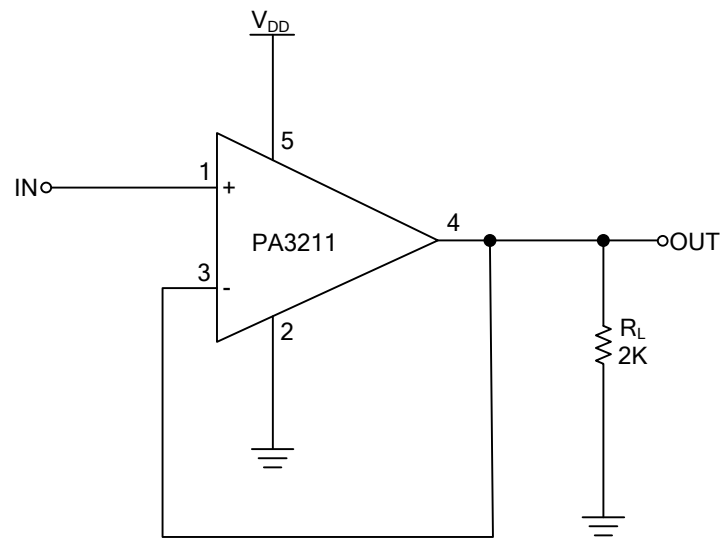
### ■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=5\text{V}$ ,  $V_{SS}=0\text{V}$ ,  $T_A=25^\circ\text{C}$ ,  $C_L=10\text{pF}$ ,  $R_L=1\text{k}\Omega \sim V_{DD}/2$ , 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	$V_{I(OS)}$			$\pm 15$	$\pm 10$	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



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