

### **General Description**

AP2204R series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 22V. And they are available with lowvoltage drop and low quiescent current, widely used in audio, video and communication appliances.

#### **Features**

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 22V
- Quiescent Current 1.5μA
- Output Voltage Accuracy: tolerance ±2%
- High output current: 300mA

### **Application**

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments

# Pin Configuration And Descriptions

**SOT-89** 



No.	Name	Functions Description
1	Vin	Input
2	GND	Ground
3	Vouт	Output

### **Order Information**

Orderable Device	Package	Output Voltage	Packing Option
AP2204R-3.0TRG1	SOT-89	3.0V	3000/Reel
AP2204R-3.3TRG1	SOT-89	3.3V	3000/Reel
AP2204R-5.0TRG1	SOT-89	5.0V	3000/Reel



# **Absolute Maximum Ratings**

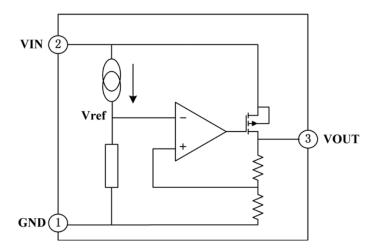
Description	Symbol	Value Range	Unit
Limit Power Voltage	VIN	-0.3∼ <b>+</b> 25	V
Storage Temperature Range	Тѕтс	-50∼+125	°C
Operating Free-air Temperature Range	TA	-40∼+85	°C

Note:Stresses greater than those listed under "Absolute Maximum Ratingsmay" cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditionsis" not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

### **Heat Dissipation**

Description	Symbol	Package	Value Range	Unit
Thermal resistance	JA	SOT-89	200	°C/W
Power dissipation	Pw	SOT-89	500	mW

# **Block Diagram**





### DC Characteristics (unless otherwise noted TA= 25°C)

( $V_{IN}=V_{OUT}+2.0V$ ,  $C_{IN}=C_{L}=10uF$ ,  $Ta=25^{\circ}C$ , unless otherwise noted)

#### Series +3.0V OUTPUT

Parameter	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Output Voltage	Vоит	Vin=Vout+2.0V, Iout=10mA	2.94	3.00	3.06	V
Output Current	<b>І</b> оит	VIN=VOUT+2.0V	300			mA
Load Regulation	∆Vоит	Vin=Vout+2.0V 1mA≤lout≤50mA		37	100	mV
Voltage Drop	Vdif	lоuт=1mA,△Vоuт=2%		210	300	mV
Quiescent Current	Iss	No Load		1.5	3.0	uA
Line Regulation	riangle Vout/ $V$ out* $ riangle V$ in	Vо∪т+1.0V≪VIN≪30V, Іо∪т=1mA			0.2	%/V
Input Voltage	Vin				22	V
Temperature Coefficient	△Vout/ △Ta*Vout	VIN=VOUT+2.0V, IOUT=10mA, -40°C≪TA≪85°C		100		ppm/°C
Output Short Circuit Current	llim	Vout=0V		400		mA

Note: When VIN=VOUT+2.0V, as the output voltage declined 2%, the VDIF=VIN-VOUT.

#### Series +3.3V OUTPUT

Parameter	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Output Voltage	Vоит	Vin=Vout+2.0V, lout=10mA	3.234	3.30	3.366	V
Output Current	<b>І</b> оит	VIN=VOUT+2.0V	300			mA
Load Regulation	∆Vоит	Vin=Vout+2.0V 1mA≤lout≤50mA		37	100	mV
Voltage Drop	Vdif	lоuт=1mA,△Vоuт=2%		195	300	mV
Quiescent Current	Iss	No Load		1.5	3.0	uA
Line Regulation	riangle Vout/ $V$ out* $ riangle V$ in	Vout+1.0V≪Vin≪30V, Iout=1mA			0.2	%/V
Input Voltage	Vin				22	V
Temperature Coefficient	△Vout/ △Ta*Vout	Vin=Vout+2.0V, Iout=10mA, -40°C≪Ta≪85°C		100		ppm/°C
Output Short Circuit Current	llim	Vout=0V		400		mA

Note: When VIN=VOUT+2.0V, as the output voltage declined 2%, the VDIF=VIN-VOUT.



#### Series +5.0V OUTPUT

Parameter	Symbol	Test Condition	Min.	Тур.	Max.	Unit
Output Voltage	Vоит	VIN=VOUT+2.0V, IOUT=10mA	4.9	5.0	5.1	V
Output Current	<b>І</b> оит	VIN=VOUT+2.0V	300			mA
Load Regulation	∆Vоит	Vin=Vout+2.0V 1mA≤Iout≤50mA		37	100	mV
Voltage Drop	Vdif	lоuт=1mA,△Vоuт=2%		170	300	mV
Quiescent Current	Iss	No Load		1.5	3.0	uA
Line Regulation	riangle Vout/ $V$ out* $ riangle V$ in	Vout+1.0V≪Vin≪30V, Iout=1mA			0.2	%/V
Input Voltage	Vin				22	V
Temperature Coefficient	△Vout/ △Ta*Vout	Vin=Vout+2.0V, Iout=10mA, -40℃≪Ta≪85℃		100		ppm/°C
Output Short Circuit Current	llim	Vout=0V		400		mA

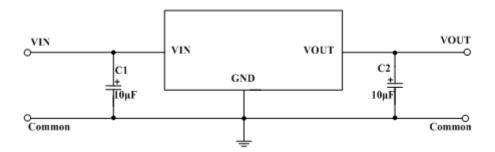
Note: When VIN=VOUT+2.0V, as the output voltage declined 2%, the VDIF=VIN-VOUT.

# **Function Description**

AP2204R series are linear voltage regulator ICs withstanding 22V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors. The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate wheb the output current or input voltage reaches limit level.

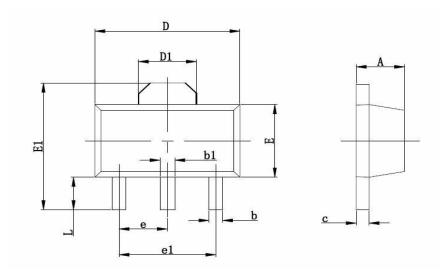
# **Application Circuit**

**Basic Circuits** 





# **SOT-89 Package Outline Dimensions**



Symbol	Dimensions In Millimeters		<b>Dimensions In Inches</b>		
Symbol	Min	Max	Min	Max	
Α	1.400	1.600	0.055	0.063	
b	0.320	0.520	0.013	0.020	
b1	0.400	0.580	0.016	0.023	
С	0.350	0.440	0.014	0.017	
D	4.400	4.600	0.173	0.181	
D1	1.550 REF.		0.061	REF.	
E	2.300	2.600	0.091	0.102	
E1	3.940	4.250	0.155	0.167	
е	1.500 TYP.		0.060 TYP.		
e1	3.000	3.000 TYP. 0.118 TYP.		TYP.	
L	0.900	1.200	0.035 0.047		



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