

# High Quality Audiophile Operational Amplifier/Driver RT6863

The **RT6863** is high quality audiophile operational amplifier design for ESS Sabre ADC/DAC or others quality audio application. It is a very low noise and low distortion device idea for use as ADC Anti-Alias front stage or DAC Low Pass Filter or audio amplifier front end. **RT6863** linear output current more than 100mA, so easily to drive any loads, stable at any gain configuration.

Furthermore, **RT6863** delivers excellent audio performance while very low Vos and noise, very high PSRR for simplify audio system design. The **RT6863** input stage based optimized audiophile BJT technology for improve sound quality and more musical.

## APPLICATIONS

- High Performance Audio
- Portable/Mobile Audio
- High Resolution Audio ADC Analog Stage
- High Resolution Audio DAC Analog Stage
- Low Noise Amplifier Front End
- Headphone/Earphone Driver
- Audio Active Filters
- Audio Preamplifier
- Audio Line Receiver/Driver

## FEATURES & BENEFINTS

### General & DC Performance

Open-Loop Gain : 135dB  
Power Supply :  $\pm 2.5V$  to  $\pm 17V$   
Offset Voltage <  $\pm 80\mu V$   
CMRR : 120dB  
PSRR : 135dB  
Quiescent Current : 4.2mA / Per Amp  
Unity Gain Stable  
Gain Bandwidth : 18MHz  
Enable Control @ DFN & CSP Package

### Dynamic & AC Performance

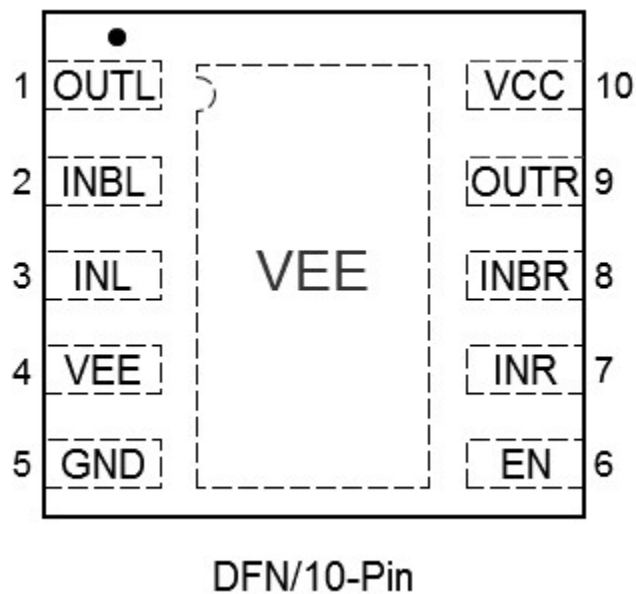
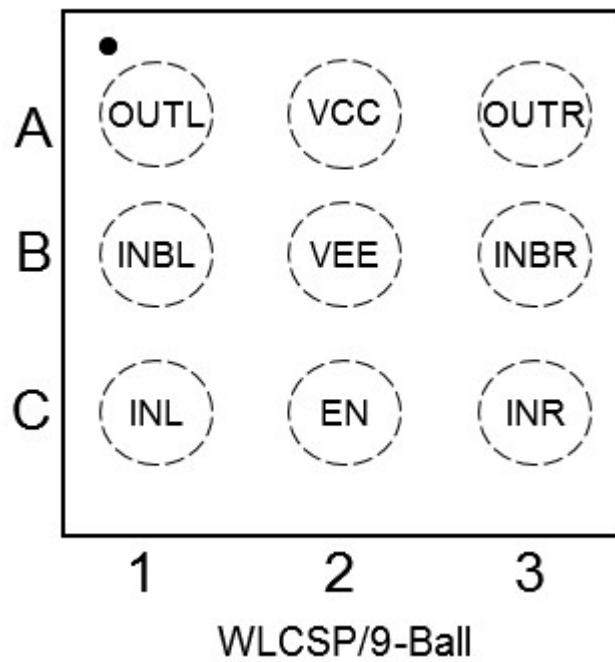
Audiophile BJT Input Stage  
Input Voltage Noise : 1.8nV rt/Hz @ 1kHz  
Input Voltage Noise 1/f Corner : 60Hz  
0.1Hz - 10Hz Noise : 100nV Peak-To-Peak  
Rail-To-Rail Output  
Slew Rate : 15V/ $\mu S$   
Linear Output Current > 100mA  
THD+n < -116dB @ 1kHz  
IMD < -120dB @ CCIF 19k/20k 1:1

# High Quality Audiophile Operational Amplifier/Driver

**RT6863**

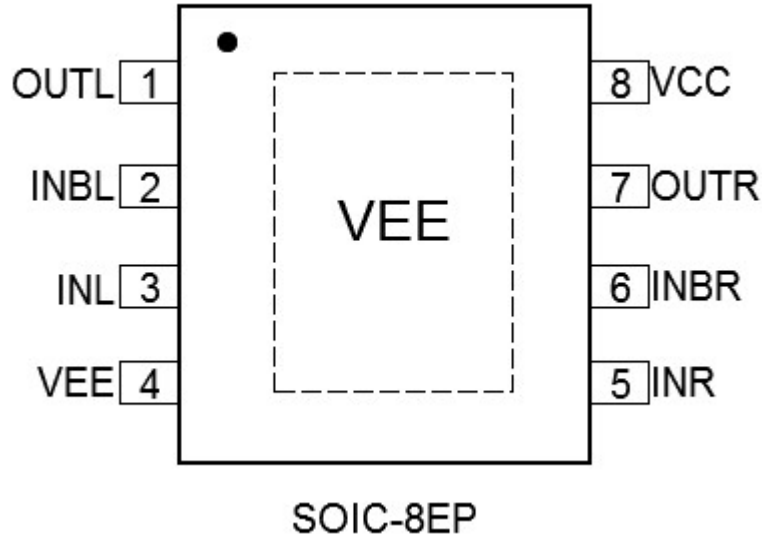
## PIN CONFIGURATION

(TOP VIEW)



# High Quality Audiophile Operational Amplifier/Driver

## RT6863



## ELECTRICAL CHARACTERISTICS

### Test Conditions (unless otherwise specified)

1.  $T_A=25^{\circ}\text{C}$ ,  $V_{CC}/V_{EE} = \pm 2.25\text{V}$  to  $\pm 17\text{V}$ ,  $R_L = 100\text{k}\Omega$ .
2. Audio Precision SYS-2722.

AUDIO PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Signal-to-Noise Ratio	SNR	$V_{OUT}=2\text{V rms}$ , A-weighted		129		dB
Total Harmonic Distortion Plus Noise	THD+N	$V_{OUT}=3.16\text{V rms}$		-116		dB
		$P_{OUT}=120\text{mW}$ , $R_L=32\Omega$		-114		dB
Inter-Modulation Distortion	IMD	$V_{OUT}=2\text{V rms}$ CCIF IMD 19k/20k 1:1		-120		dB
Inter-Modulation Distortion	IMD	$V_{OUT}=2\text{V rms}$ SMPTE/DIN IMD 70/7k 4:1		-106		dB
Inter-Modulation Distortion	DIM/TIM	$V_{OUT}=2\text{V rms}$ DIM30		-105		dB
EN / Normal	VIH	VEE = Reference "Ground"(RT6863C)	$VEE+1.6$		$VEE+5.5$	V
		GND= Reference "Ground"(RT6863D)	1.6		$\text{MIN}(5.5,+V_s)$	V
EN / Shut Down	VIL	VEE = Reference "Ground" (RT6863C)	VEE		$VEE+0.6$	V
		GND= Reference "Ground"(RT6863D)	-0.3		0.6	V

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## RT6863

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>INPUT CHARACTERISTICS</b>						
Input Offset Voltage	$V_{OS}$			±80		μV
Input Common Mode Voltage Range	$V_{CM}$		VEE+2		VCC-2	V
Common Mode Rejection Ratio	CMRR	$(VEE)+ 2V \leq V_{CM} \leq (VCC) - 2V$		120		dB
Open-Loop Gain	$A_{VOL}$	$(VEE) + 0.2V \leq V_{OL} \leq (VCC) - 0.2V$		135		dB
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			1		μV/°C
<b>OUTPUT CHARACTERISTICS</b>						
Output Voltage Swing from Rail	$V_o$	$R_L = 10K\Omega$		±0.2		V
Linear Output Current	$I_o$			100		mA
<b>FREQUENCY RESPONSE</b>						
Gain-Bandwidth Product	GBP	Gain = 1		18		MHz
Slew Rate	SR			15		V/μs
Channel Isolation & Separation		f = 1kHz		-140		dB
<b>NOISE PERFORMANCE</b>						
Input Voltage Noise Density	$e_n$	f = 1kHz		1.8		nV/√Hz
<b>POWER SUPPLY</b>						
Supply Voltage	$V_s$		±2.5		±17	V
Quiescent Current/Amplifier	$I_Q$	$I_{OUT} = 0A$		4.2		mA
Power Supply Rejection Ratio	PSRR	$VCC/VEE = \pm 2.5V$ to $\pm 17V$		135		dB

## ABSOLUTE MAXIMUM RATINGS

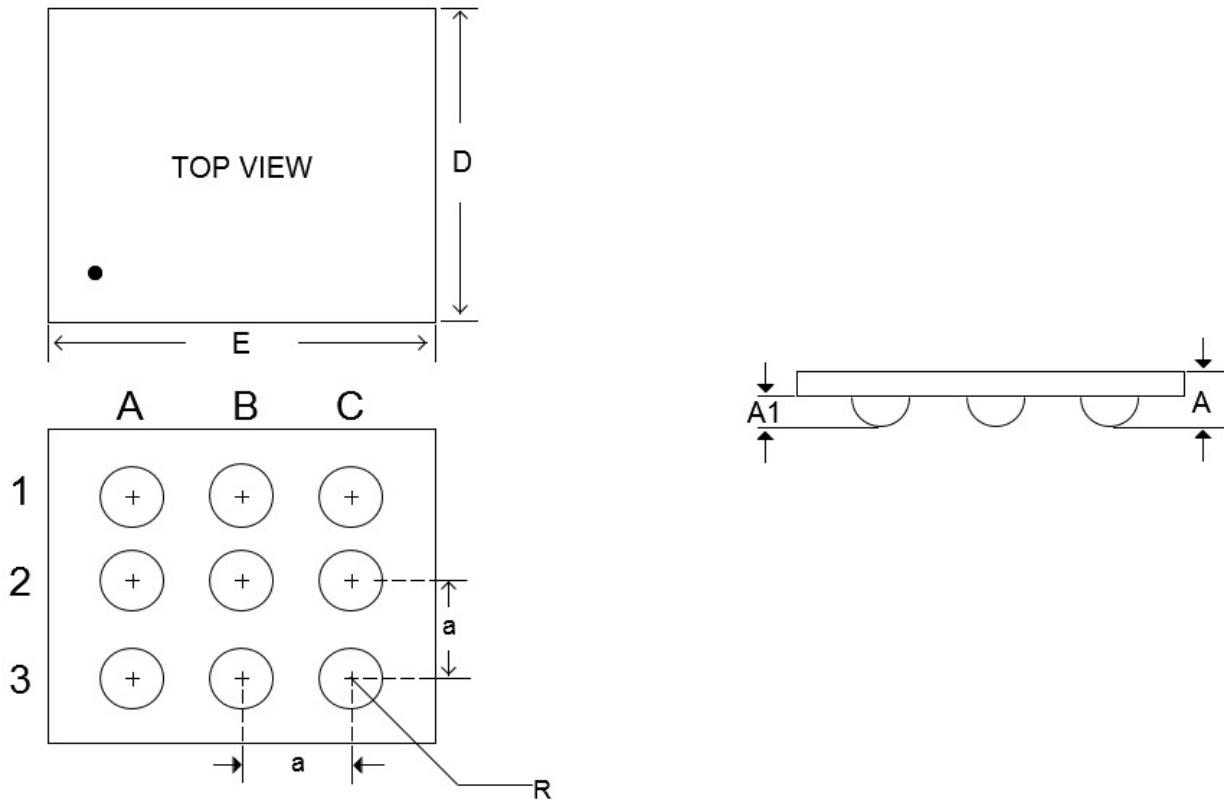
PARAMETER	RATING	UNITS
Storage temperature	-55 to +150	°C
Junction Temperature	+150	°C
Power Supply VCC-VEE	36 (+/-18)	V
Input Voltage	VCC(VEE) ±0.3	V
ESD Protection		
Human Body Model (HBM)	2000	V
Machine Model (MM)	200	

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## OUTLINE DIMENSIONS

**WLCSP 1.7mm×1.5mm 9-Ball**

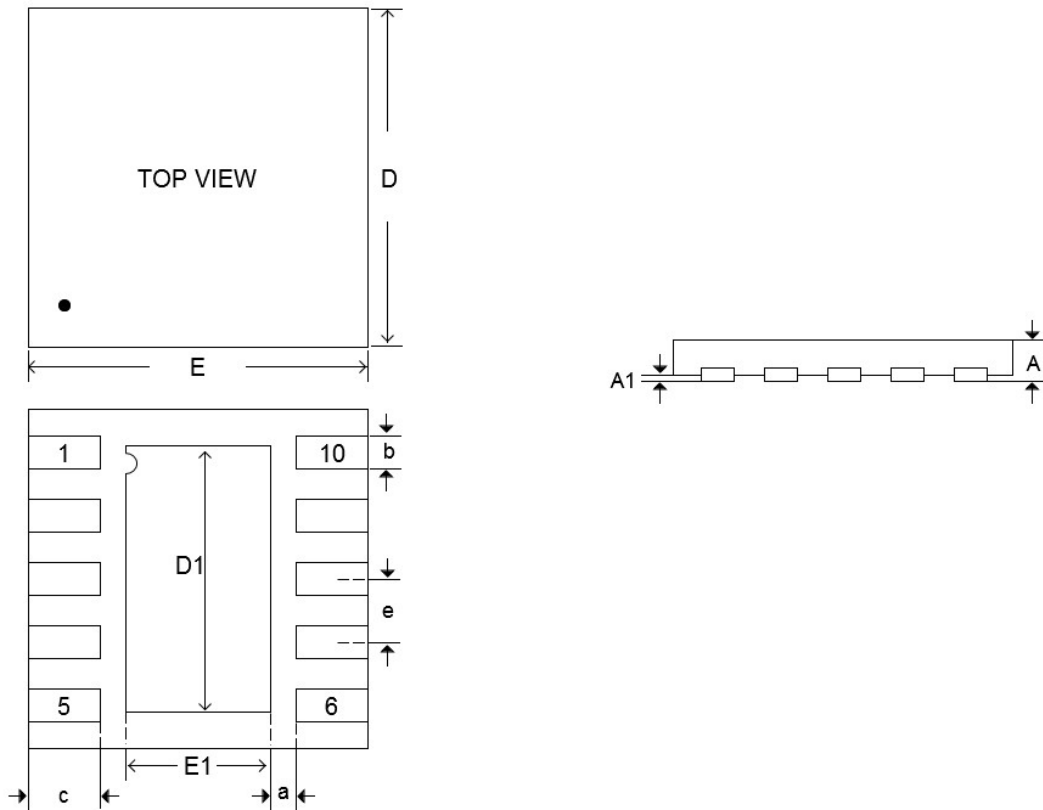


Symbol	Dimensions Millimeters		
	Normal	Min	Max
A	0.575	0.525	0.625
A1	0.194	0.169	0.219
D	1.500	1.485	1.515
E	1.700	1.685	1.715
R	0.268	0.228	0.308
a	0.4	0.4	0.4

# High Quality Audiophile Operational Amplifier/Driver

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### DFN 3mm×3mm 10-Pin

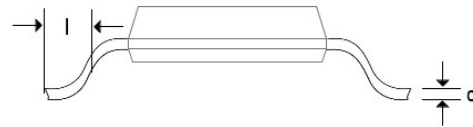
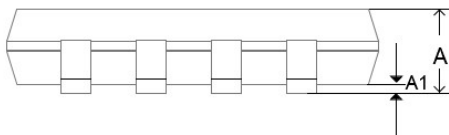
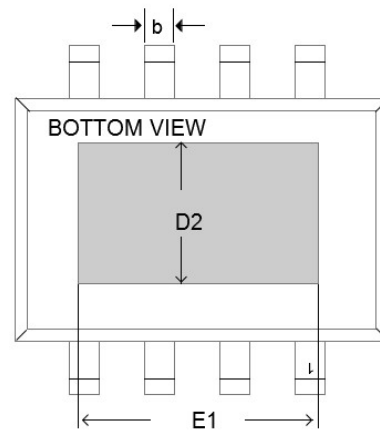
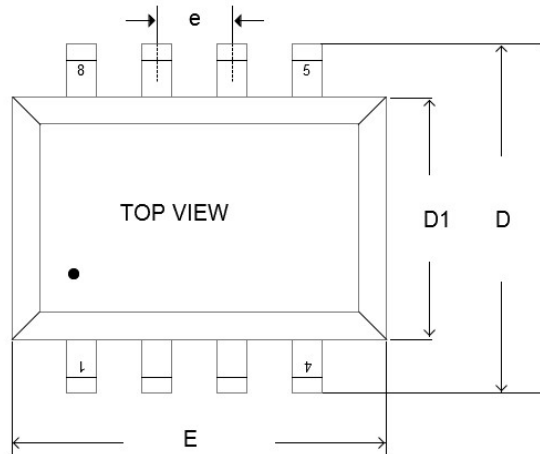


Symbol	Dimensions In Millimeters		
	Normal	Min	Max
A	0.750	0.700	0.800
A1	0.025	0.000	0.050
D	3.000	2.900	3.100
D1	2.400	2.300	2.600
E	3.000	2.900	3.100
E1	1.700	1.500	1.800
a	0.225	0.200	0.250
b	0.200	0.180	0.300
c	0.400	0.300	0.500
e	0.500 TYP		

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### SOIC-8EP



Symbol	Dimensions In Millimeters		
	Normal	Min	Max
A	1.650	1.600	1.700
A1	0.050	0.000	0.100
D	6.000	5.800	6.200
D1	3.900	3.800	4.000
D2	2.413	2.313	2.513
E	4.900	4.700	5.100
E1	3.302	3.202	3.402
b	0.355	0.330	0.510
c	0.200	0.170	0.250
e	1.270	1.270	1.270
l	0.820	0.400	1.270

# High Quality Audiophile Operational Amplifier/Driver

**RT6863**

## ORDERING INFORMATION

Part Number	Description	Package
RT6863S	Audio Operational Amplifier/Driver	SOIC-8EP
RT6863D	Audio Operational Amplifier/Driver	DFN 3mmx3mm 10-Pin
RT6863C	Audio Operational Amplifier/Driver	WLCSP 1.7mmx1.5mm 9-Ball

## REVISION HISTORY

Revision	Date	Notes
A	AUG2015	Initial Version
B	SEP2015	General Update
C	DEC2015	Enable Control Update
D	21.DEC 2015	Modify c and e Value in DFN-10P
E	28.DEC 2015	Enable Control Update(RT6863D)