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# LA4535MC

Monolithic Linear IC

## Power Amplifier for 1.5V Headphone Stereo

### Features

- Low current drain.
- 16Ω load drive capability.
- Excellent reduced voltage characteristics.
- Excellent power supply ripple rejection.
- Minimum number of external parts required (no input capacitor, feedback capacitor required).
- Less harmonic interference in radio band.
- On-chip power switch function, muting function.

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}$ max	Quiescent	4.5	V
Allowable power dissipation	$P_d$ max		290	mW
Operating temperature	$T_{opr}$		-20 to +75	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

**Operating Conditions** at  $T_a = 25^\circ\text{C}$ 

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$		1.5	V
Operating voltage range	$V_{CC}$ op		0.9 to 4.0	V
Recommended load resistance	$R_L$		16 to 32	$\Omega$

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**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $R_L = 16\Omega$ ,  $R_g = 600\Omega$ , See specified Test Circuit.

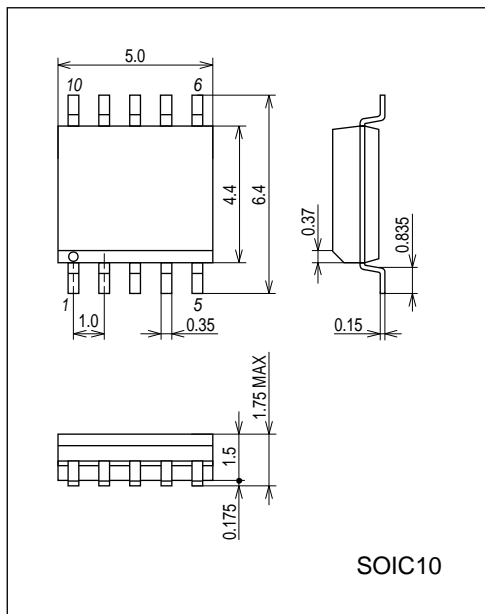
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current *1	$I_{CCO1}$	$V_{CC} = 1.2\text{V}$ , quiescent		3.5	6.0	mA
	$I_{CCO2}$	$V_{CC} = 2.5\text{V}$ , pin 10 $\rightarrow$ GND		1.5	2.5	mA
	$I_{CCO3}$	$V_{CC} = 2.5\text{V}$ , pin 1 $\rightarrow$ GND			1.0	$\mu\text{A}$
Voltage gain	VG1	$V_{CC} = 1.2\text{V}$ , $f = 1\text{kHz}$ , $V_O = -20\text{dBm}$	20.5	22	23	dB
	VG2	$V_{CC} = 0.9\text{V}$ , $f = 1\text{kHz}$ , $V_O = -20\text{dBm}$	19.5	22	23	dB
Voltage gain difference	$\Delta\text{VG1}$	$V_{CC} = 1.2\text{V}$ , $f = 1\text{kHz}$ , $V_O = -20\text{dBm}$			1.0	dB
	$\Delta\text{VG2}$	$V_{CC} = 0.9\text{V}$ , $f = 1\text{kHz}$ , $V_O = -20\text{dBm}$			1.0	dB
Total harmonic distortion	THD	$V_{CC} = 1.2\text{V}$ , $f = 1\text{kHz}$ , $P_O = 0.5\text{mW}$		0.8	1.5	%
Output power	$P_O$	$V_{CC} = 1.5\text{V}$ , $f = 1\text{kHz}$ , THD = 10%	5	8		mW
Crosstalk	CT	$V_{CC} = 1.2\text{V}$ , $f = 100\text{Hz}$ , $R_g = 1\text{k}\Omega$ , $V_O = -20\text{dB}$	40	45		dB
Ripple rejection	SVRR	$V_{CC} = 1.0\text{V}$ , $f = 100\text{Hz}$ , $R_g = 1\text{k}\Omega$ , $V_R = -30\text{dBm}$ , BPF = 100Hz	45	50		dB
Output noise voltage	$V_{NO}$	$V_{CC} = 2.5\text{V}$ , $R_g = 1\text{k}\Omega$ , BPF = 20Hz to 20kHz		30	44	$\mu\text{V}$
Power off effect	$V_{O(\text{off})}$	$V_{CC} = 0.9\text{V}$ , $f = 100\text{Hz}$ , pin 1 $\rightarrow$ GND, $V_{IN} = -10\text{dB}$			-80	dBm
Muting effect	$V_{O(\text{MT})}$	$V_{CC} = 0.9\text{V}$ , $f = 100\text{Hz}$ , pin 10 $\rightarrow$ GND, $V_{IN} = -10\text{dB}$			-80	dBm
Power on current sensitivity	$I_1(\text{on})$	$V_{CC} = 0.85\text{V}$ , $V_5 \geq 0.5\text{V}$		0.1	1.0	$\mu\text{A}$
Power off voltage sensitivity	$V_1(\text{off})$	$V_{CC} = 0.85\text{V}$ , $V_5 \leq 0.1\text{V}$	0.5	0.65		V
Muting off current sensitivity	$I_{10(\text{off})}$	$V_{CC} = 0.85\text{V}$ , $V_5 \geq 0.5\text{V}$		0.3	1.0	$\mu\text{A}$
Muting on voltage sensitivity	$V_{10(\text{on})}$	$V_{CC} = 0.85\text{V}$ , $V_5 \leq 0.1\text{V}$	0.5	0.65		V

Note) The quiescent current is represented by the current flowing into pin 6. The respective maximum currents flowing into pin 1 and pin 10 are calculated by  $(V_{\text{pin } -0.5} / 16 [V / \text{k}\Omega])$  and the total current increases by these current values.

## Package Dimensions

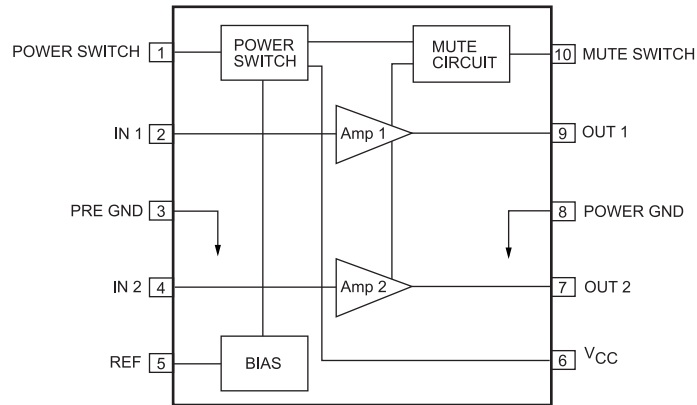
unit : mm (typ)

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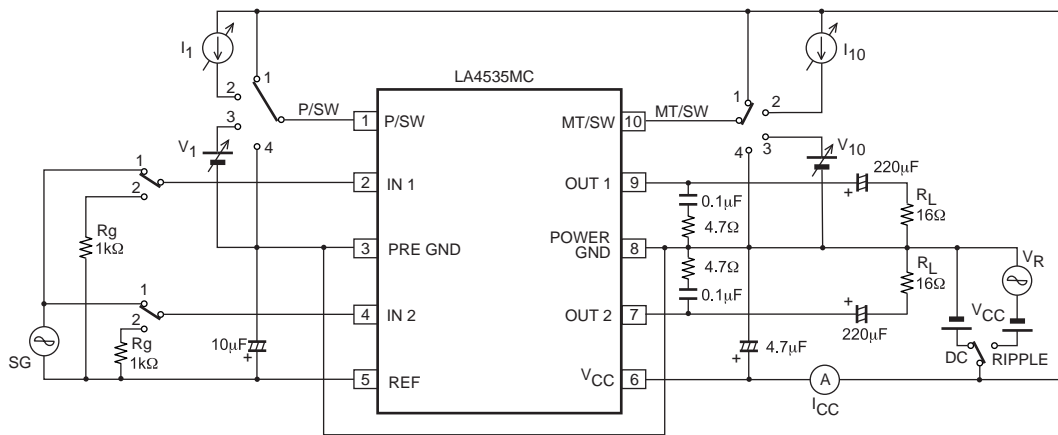


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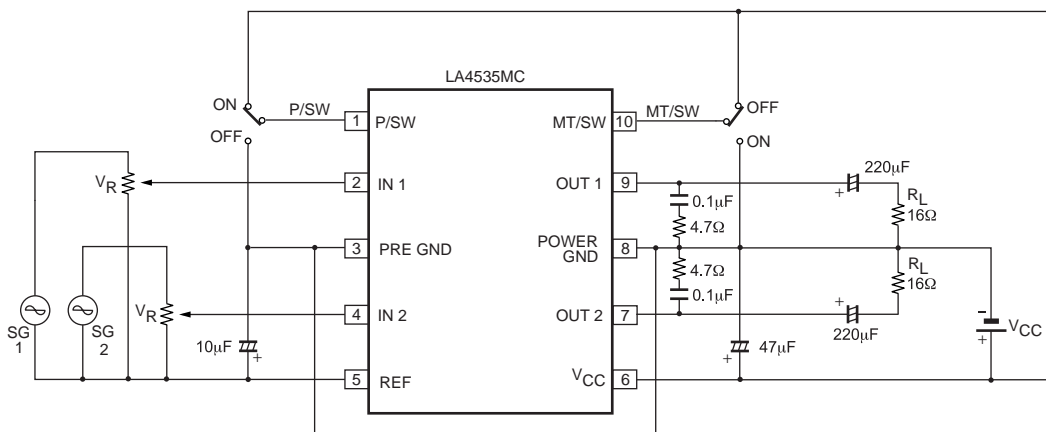
## Block Diagram



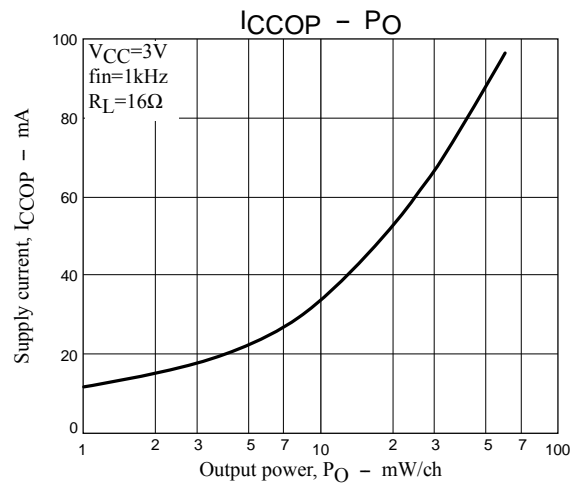
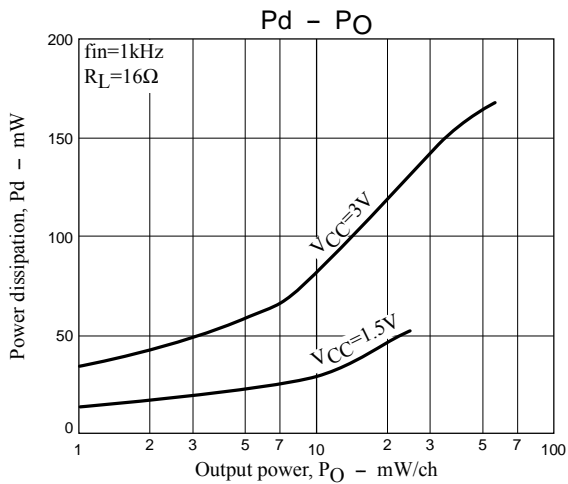
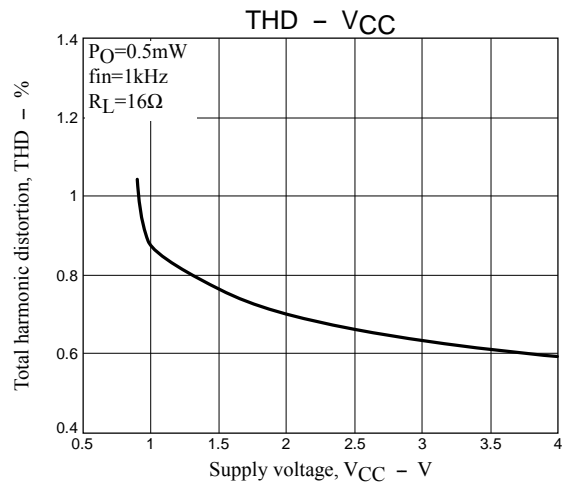
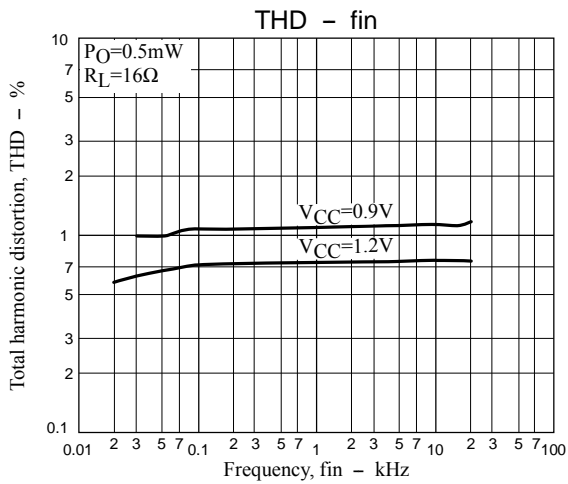
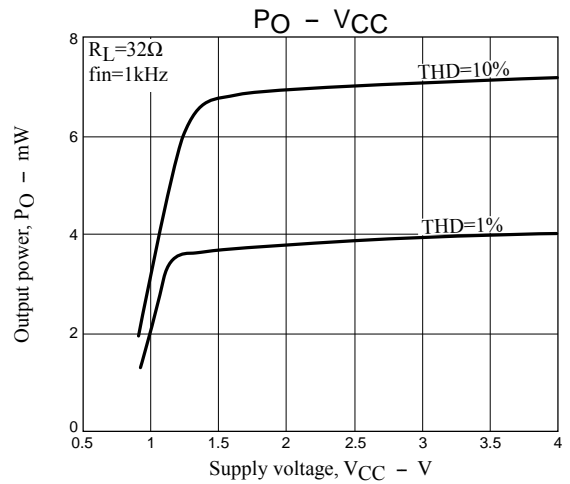
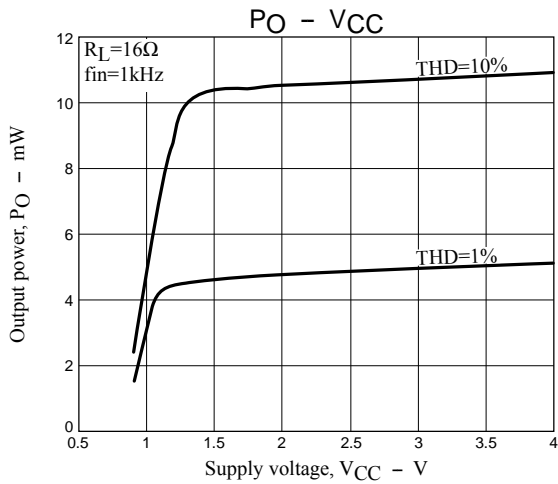
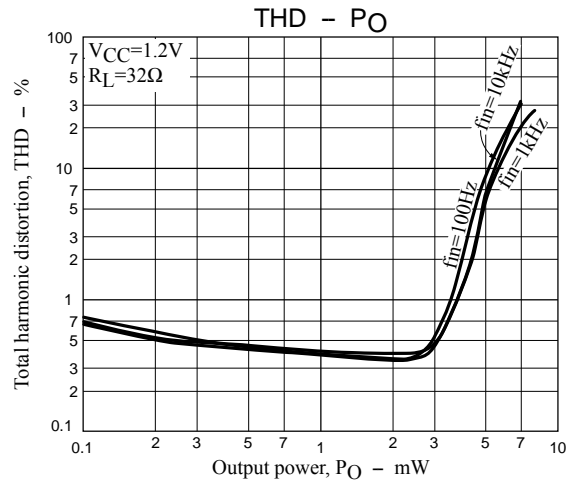
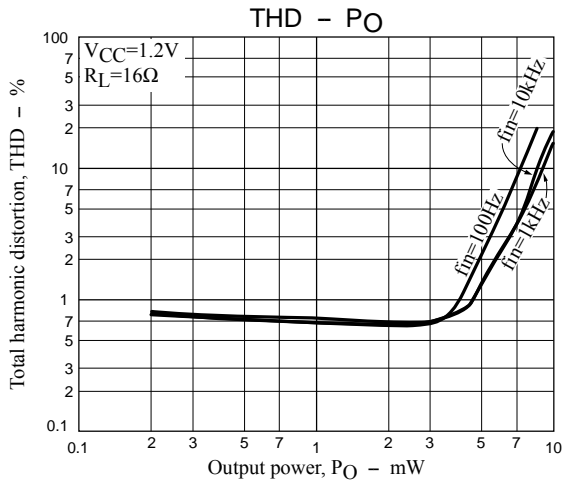
## Test Circuit



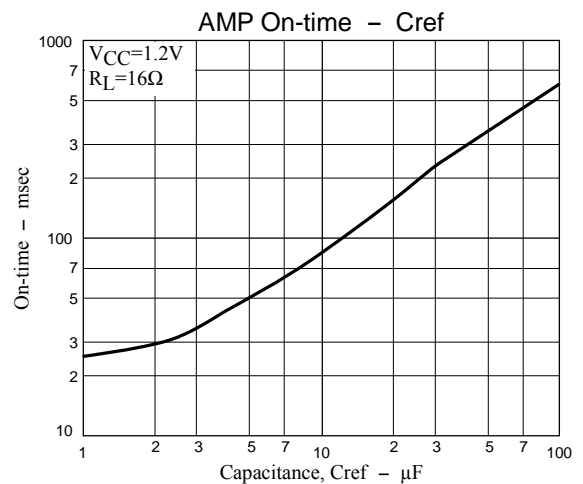
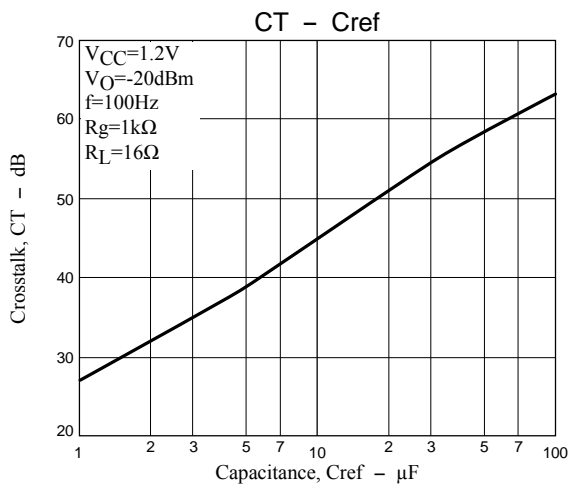
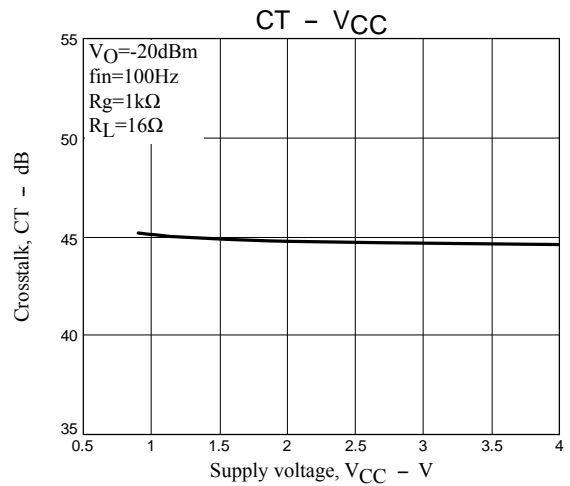
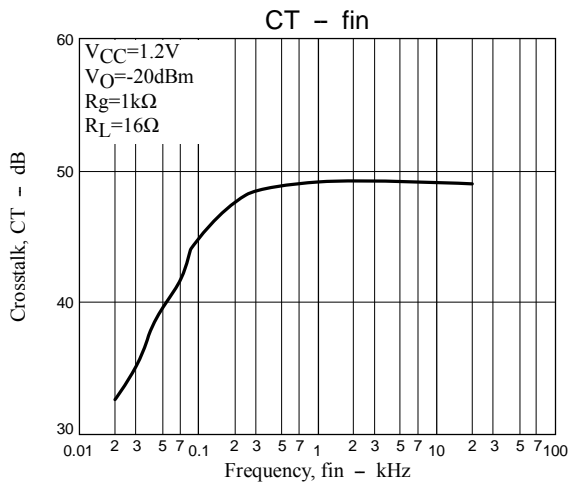
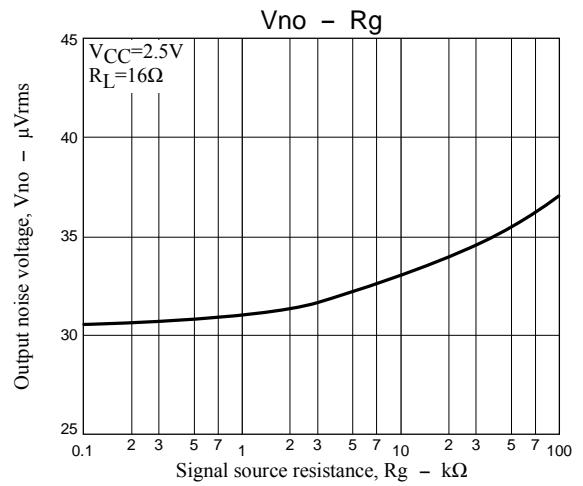
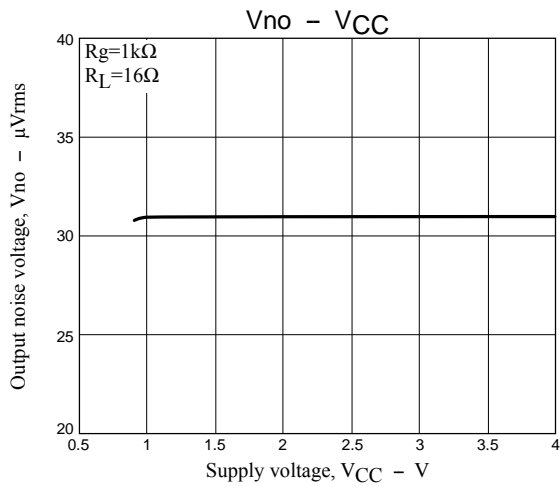
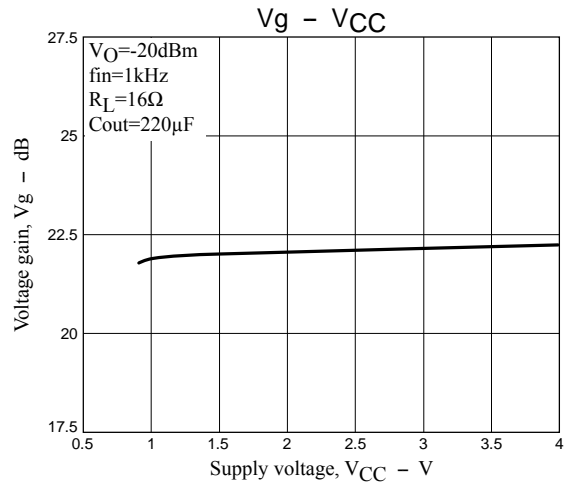
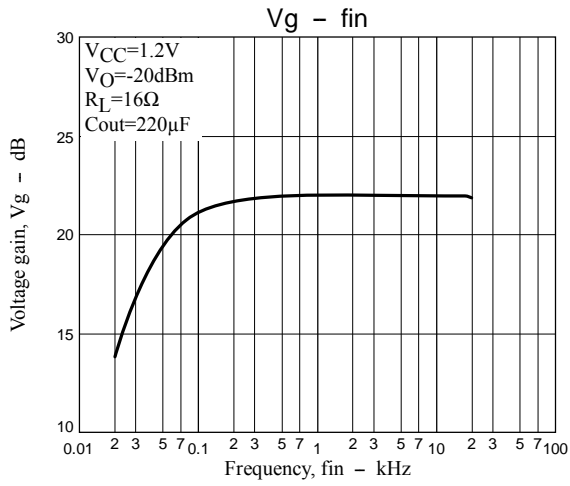
## Sample Application Circuit



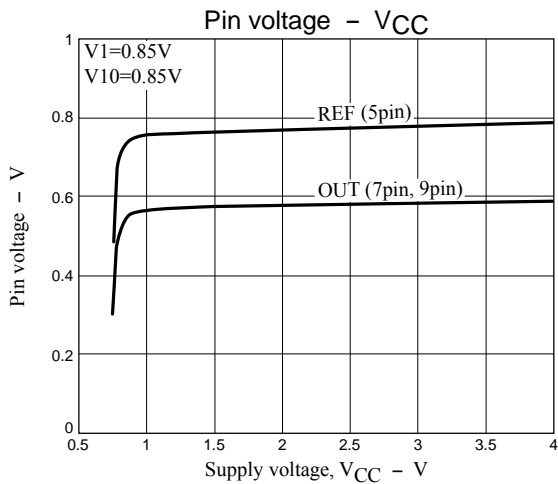
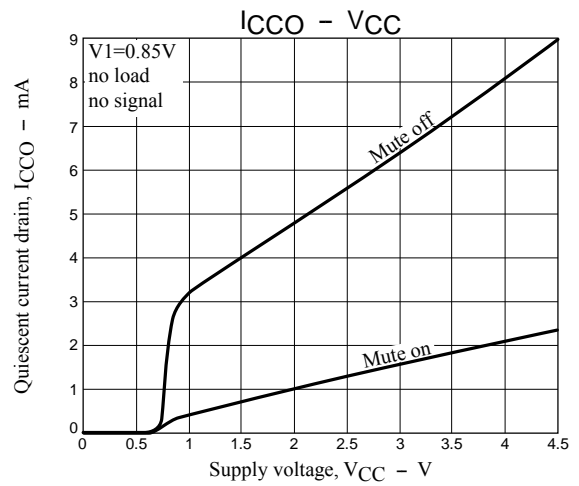
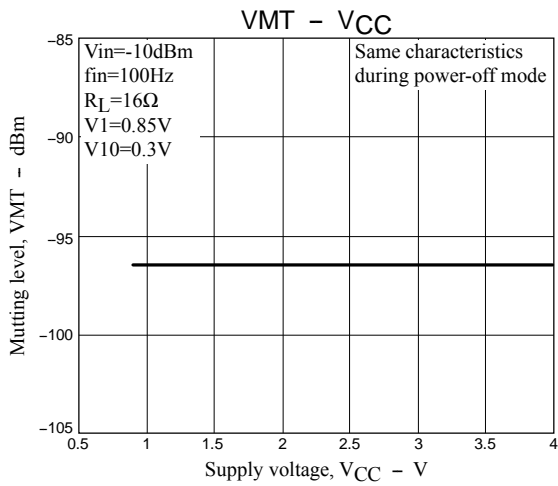
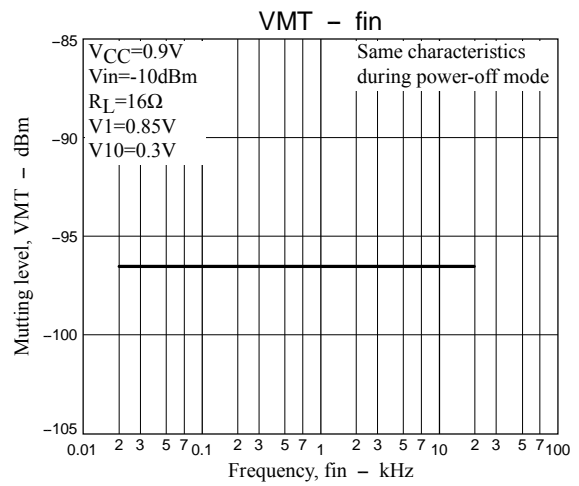
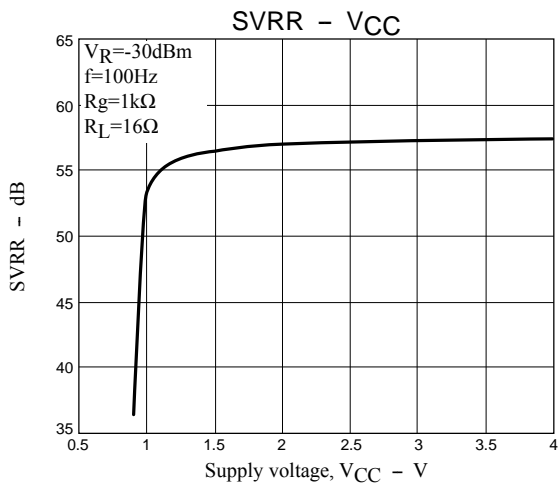
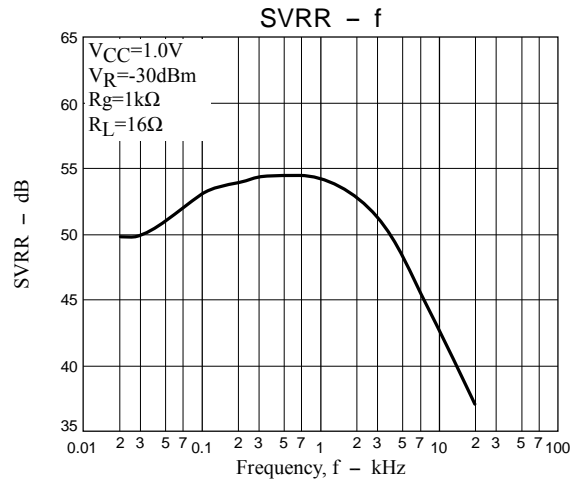
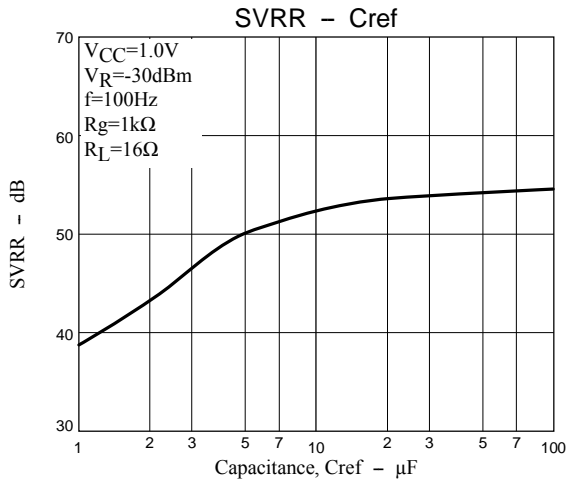
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