



## Rail-to-Rail Output, High Quality Audio, Dual Operational Amplifier

### ■ GENERAL DESCRIPTION

The MUSES8832 is a Rail-to-Rail output High quality audio operational amplifier, which is optimized for high-end audio and portable audio applications.

The MUSES8832 features 2.1nV/√Hz low noise, 10MHz wide gain bandwidth, 0.0009% low distortion, 600Ω drive capability, -40°C to +125°C operating temperature range, and various reliabilities and conveniences are improved.

It is the best for audio preamplifiers, active filters, microphone amplifiers, and line amplifiers with excellent sound.

### ■ PACKAGE OUTLINE



MUSES8832E  
(SOP8 JEDEC 150 mil)



MUSES8832VA3  
(SSOP8-A3)

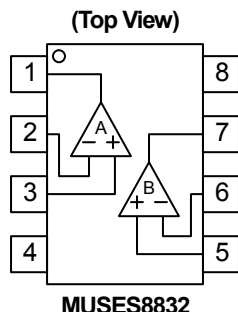
### ■ APPLICATIONS

- Home Audio
- PC Audio
- Portable Audio
- Car Audio

### ■ FEATURES

- Operating Voltage +2.7V to +14V  
±1.35V to ±7.0V
- Low Noise 2.1nV/√Hz typ. at f=1kHz  
0.3μVrms typ. (20Hz to 20kHz)
- Output Current 32mA typ. (Capability of driving 600Ω loads)
- GBW 10MHz typ.
- Low Distortion 0.0009% typ. at V+=+5V, Vo=1.3Vrms
- Slew Rate 1V/μs typ.
- Bipolar Technology
- Package Outline SOP8 JEDEC 150 mil, SSOP8-A3
- Operating Temperature Range -40 to +125°C

### ■ PIN CONFIGURATION



#### PIN FUNCTION

1. A OUTPUT
2. A -INPUT
3. A +INPUT
4. V-
5. B +INPUT
6. B -INPUT
7. B OUTPUT
8. V+



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# MUSES8832

## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER                   | SYMBOL            | RATING                                           | UNIT |
|-----------------------------|-------------------|--------------------------------------------------|------|
| Supply Voltage              | $V^+$ ( $V^+/V$ ) | +15 ( $\pm 7.5$ )                                | V    |
| Input Voltage               | $V_{IN}$          | +15 (Note1)                                      | V    |
| Differential Input Voltage  | $V_{ID}$          | $\pm 15$                                         | V    |
| Power Dissipation           | $P_D$             | SOP8 JEDEC 150 mil: 900<br>SSOP8-A3: 650 (Note2) | mW   |
| Operating Temperature Range | $T_{opr}$         | -40 to +125                                      | °C   |
| Storage Temperature Range   | $T_{stg}$         | -65 to +150                                      | °C   |

(Note1) For supply Voltages less than +15 V, the maximum input voltage is equal to the Supply Voltage.

(Note2) Mounted on the EIA/JEDEC standard board (114.3×76.2×1.6mm, two layer, FR-4).

## ■ RECOMMENDED OPERATING CONDITION (Ta=25°C)

| PARAMETER      | SYMBOL  | TEST CONDITION | MIN.       | TYP. | MAX.      | UNIT |
|----------------|---------|----------------|------------|------|-----------|------|
| Supply Voltage | $V^+$   |                | +2.7       | -    | +14.0     | V    |
|                | $V^+/V$ |                | $\pm 1.35$ | -    | $\pm 7.0$ | V    |

## ■ ELECTRIC CHARACTERISTICS

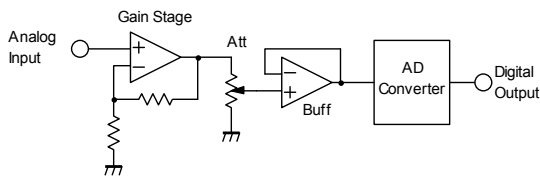
$V^+ = +5V$ ,  $V = 0V$ ,  $T_a = 25^\circ C$ ,  $R_L$  to  $V^+/2$ , unless otherwise specified

| PARAMETER                         | SYMBOL       | TEST CONDITION                                              | MIN. | TYP.   | MAX. | UNIT            |
|-----------------------------------|--------------|-------------------------------------------------------------|------|--------|------|-----------------|
| Supply Current                    | $I_{CC}$     | No Signal, $R_L = \infty$                                   | -    | 7.5    | 10   | mA              |
| Power Dissipation                 | $P_D$        | No Signal                                                   | -    | 42.5   | 60   | mW              |
| Input Offset Voltage              | $V_{IO}$     | $R_S = 50\Omega$                                            | -    | 0.1    | 0.5  | mV              |
| Input Bias Current                | $I_B$        |                                                             | -    | 4      | 6.5  | $\mu A$         |
| Input Offset Current              | $I_{IO}$     |                                                             | -    | 100    | 500  | nA              |
| Open-Loop Voltage Gain            | $A_V$        | $R_L = 10k\Omega$ to $V^+/2$ , $V_O = 0.5$ to $4.5V$        | 90   | 115    | -    | dB              |
| Common Mode Input Voltage Range   | $V_{ICM}$    | $CMR \geq 90dB$                                             | 0.5  | -      | 3.7  | V               |
| Common Mode Rejection Ratio       | CMR          | $R_S = 50\Omega$                                            | 90   | 110    | -    | dB              |
| Supply Voltage Rejection Ratio    | SVR          | $R_S = 50\Omega$                                            | 90   | 105    | -    | dB              |
| Maximum Output Voltage 1          | $V_{OH1}$    | $R_L = 10k\Omega$ to $0V$                                   | 4.9  | 4.95   | -    | V               |
|                                   | $V_{OL1}$    | $R_L = 10k\Omega$ to $0V$                                   | -    | 0.05   | 0.1  | V               |
| Maximum Output Voltage 2          | $V_{OH2}$    | $R_L = 600\Omega$ to $V^+/2$                                | 4.8  | 4.9    | -    | V               |
|                                   | $V_{OL2}$    | $R_L = 600\Omega$ to $V^+/2$                                | -    | 0.1    | 0.2  | V               |
| Output Source Current             | $I_{SOURCE}$ | $V_O = V^+ - 0.5V$                                          | 10   | 32     | -    | mA              |
| Output Sink Current               | $I_{SINK}$   | $V_O = 0.5V$                                                | 10   | 20     | -    | mA              |
| Gain Bandwidth Product            | GBW          | $f = 10kHz$                                                 | -    | 10     | -    | MHz             |
| Slew Rate                         | SR           | $R_L = 2k\Omega$                                            | -    | 1      | -    | V/ $\mu s$      |
| Total Harmonic Distortion + Noise | THD+N        | Gain=10, $V_O = 1.3V_{rms}$ , $R_L = 2k\Omega$ , $f = 1kHz$ | -    | 0.0009 | -    | %               |
| Channel Separation                | CS           | Gain=100, $R_S = 1k\Omega$ , $R_L = 10k\Omega$ , $f = 1kHz$ | -    | 140    | -    | dB              |
| Input Noise Voltage1              | $e_n$        | $f = 1kHz$                                                  | -    | 2.1    | -    | nV/ $\sqrt{Hz}$ |
| Input Noise Voltage2              | $V_n$        | $f = 20Hz$ to $20kHz$                                       | -    | 0.30   | -    | $\mu V_{rms}$   |

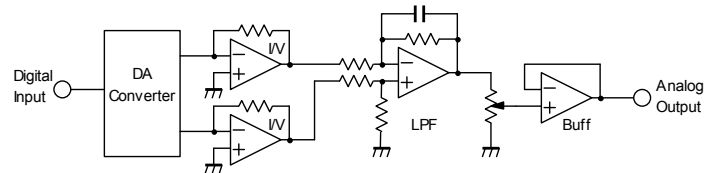
## ■ NOTE

1. The closed gain should be 6dB or higher to prevent the oscillation. Unity gain follower application may cause the oscillation.
2. Minimize the load capacitor for the better performance. A large load capacitor CL reduces the frequency response and causes oscillation or ringing.
3. Be careful to the circuit of high impedance. Input bias current influences an input noise and output offset voltage.

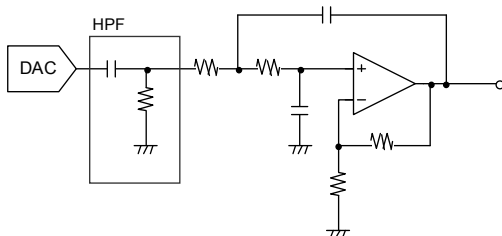
## ■ APPLICATION CIRCUIT



(Fig.1: ADC Input)

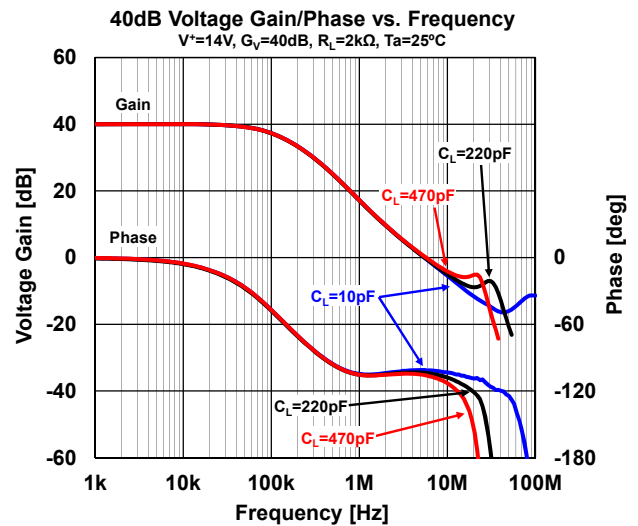
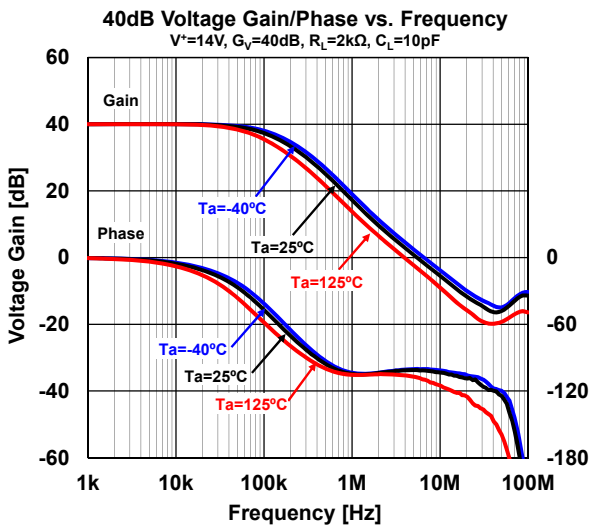
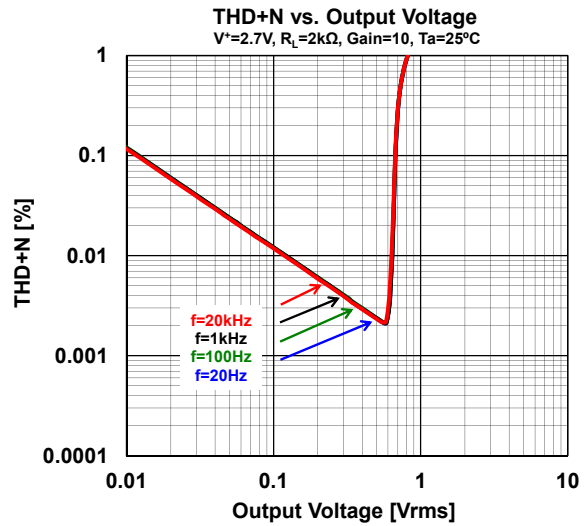
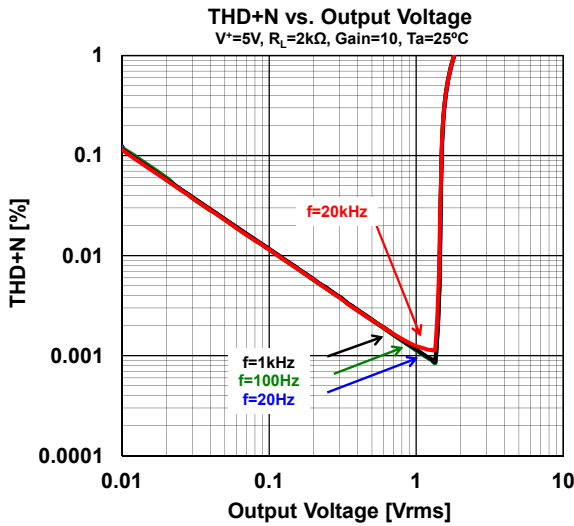
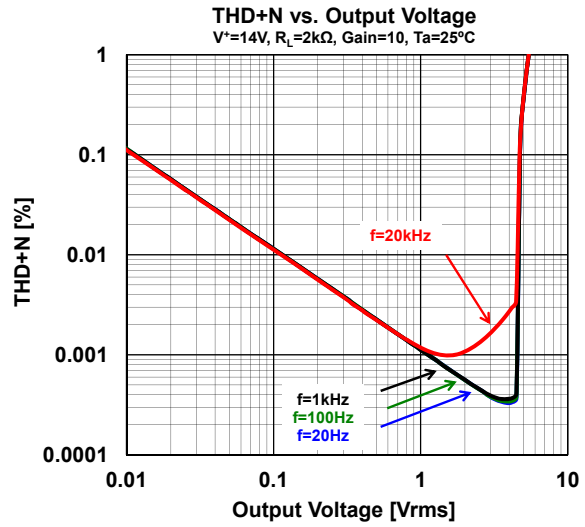
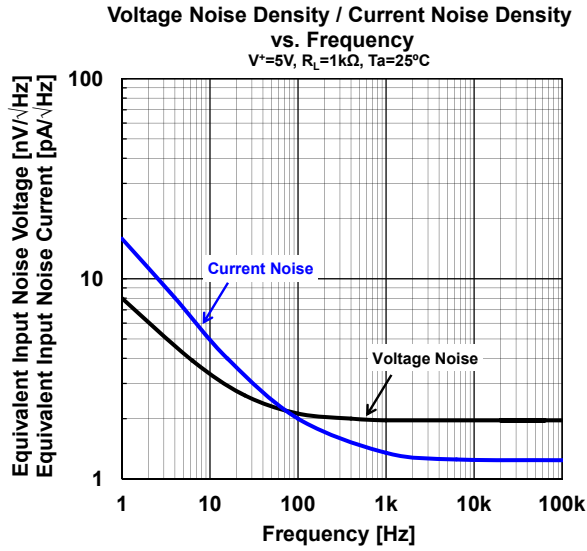


(Fig.2: DAC Output)

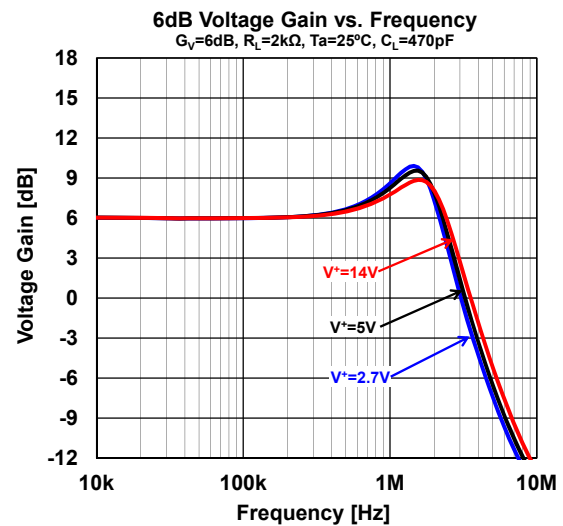
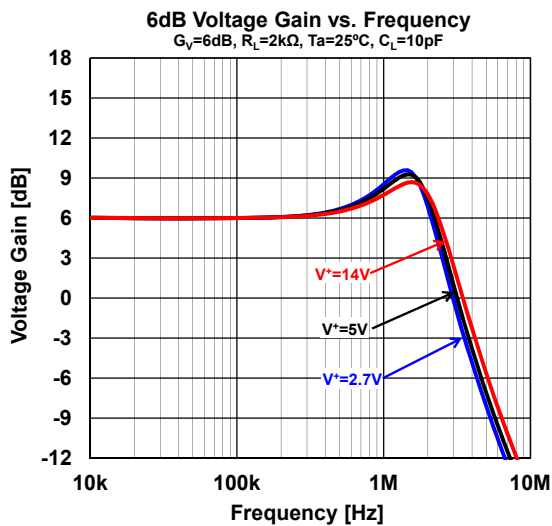
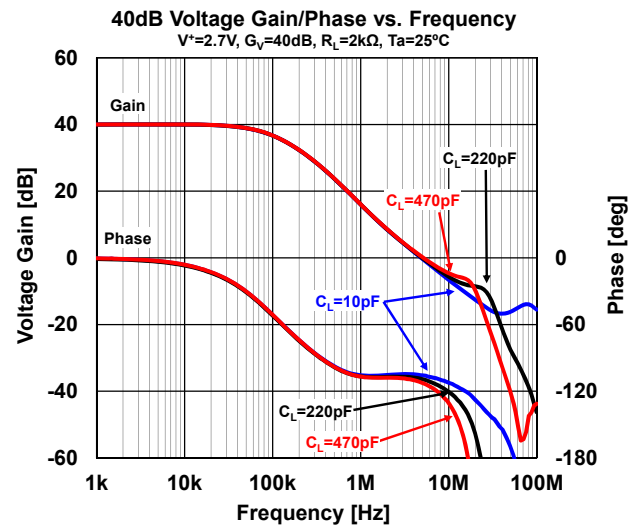
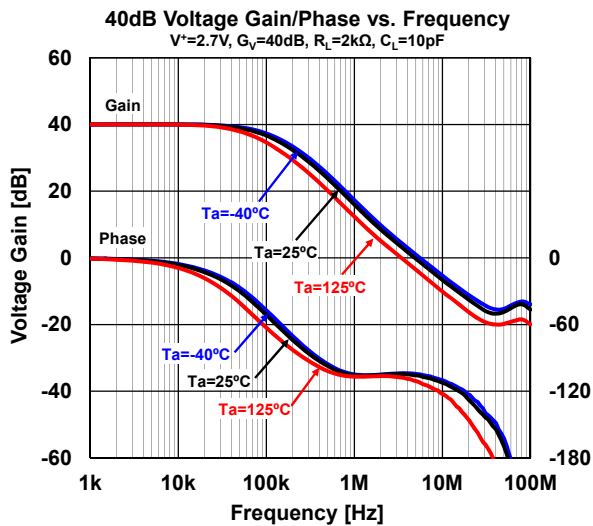
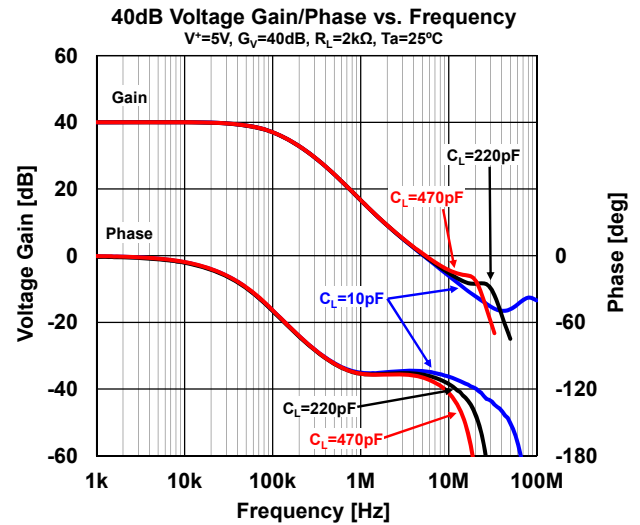
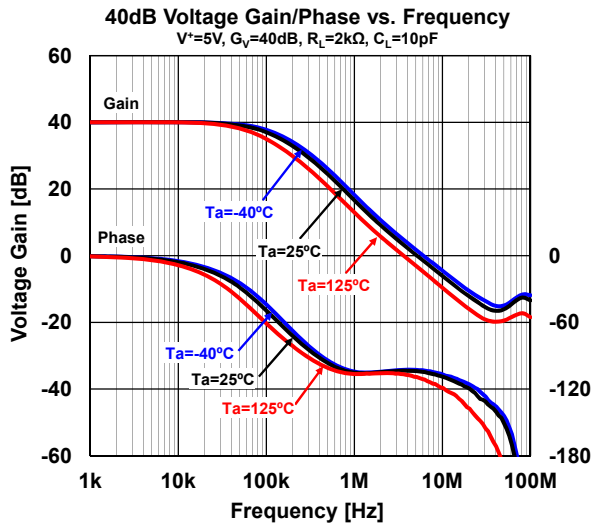


(Fig.3: DAC LPF Circuit )

## ■ TYPICAL CHARACTERISTICS ( $V^- = 0V$ , $V_{CM} = V^+/2$ , unless otherwise specified)

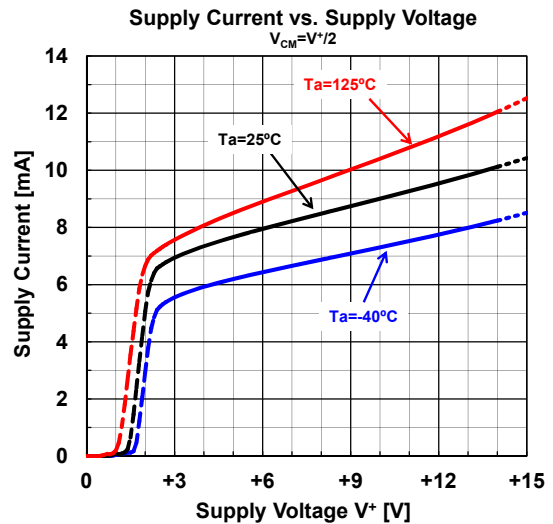
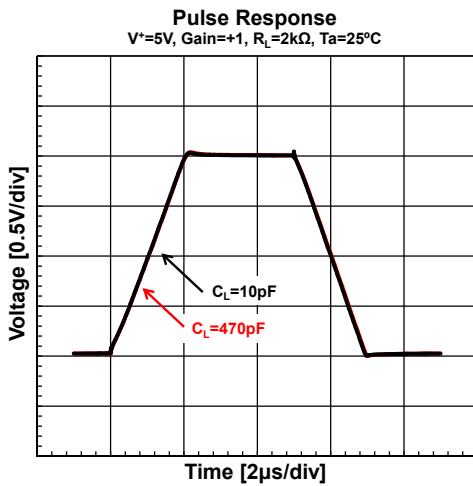
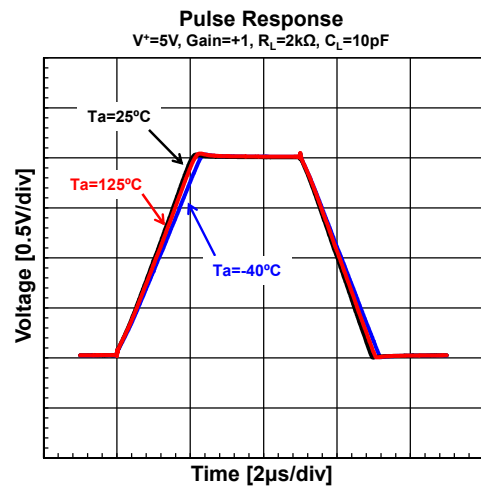
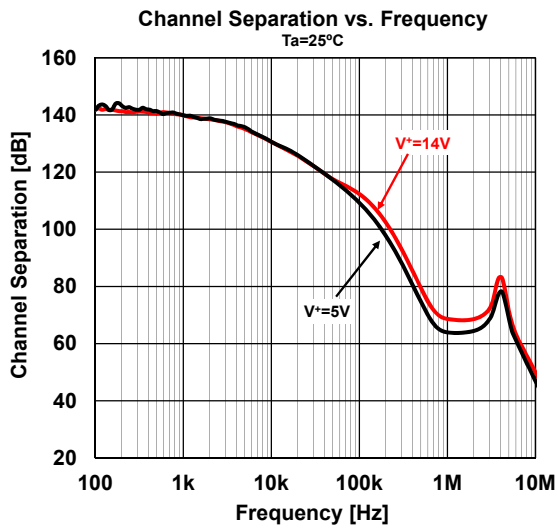
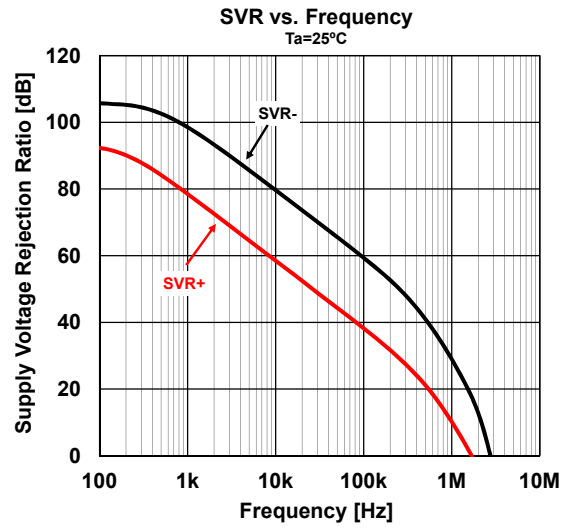
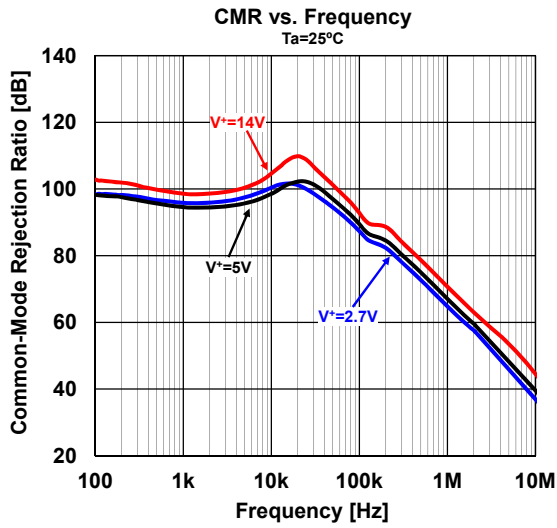


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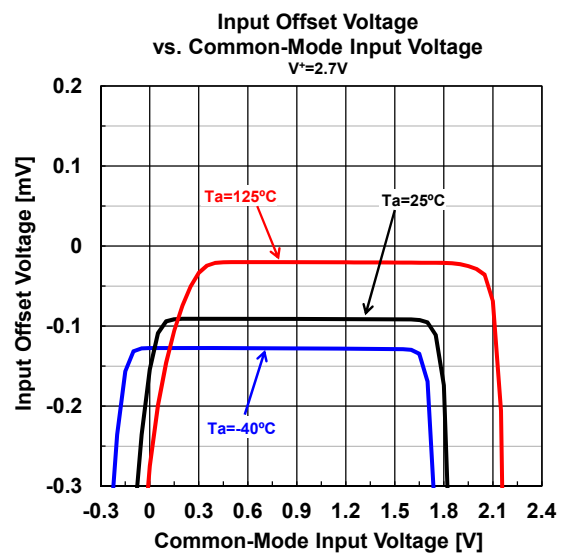
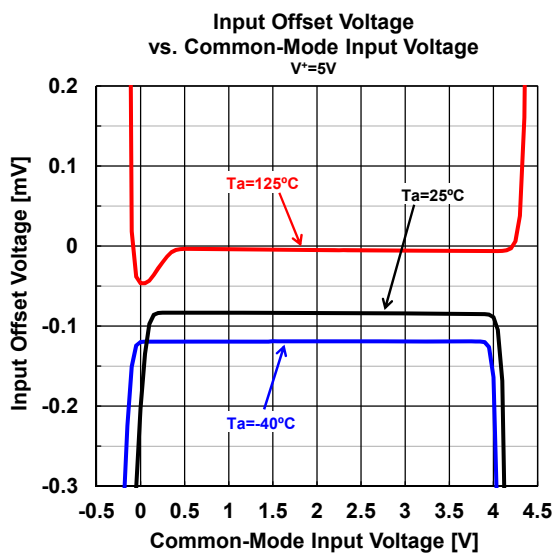
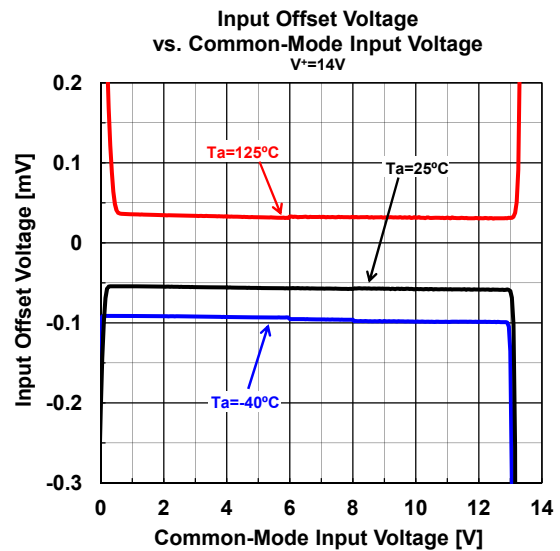
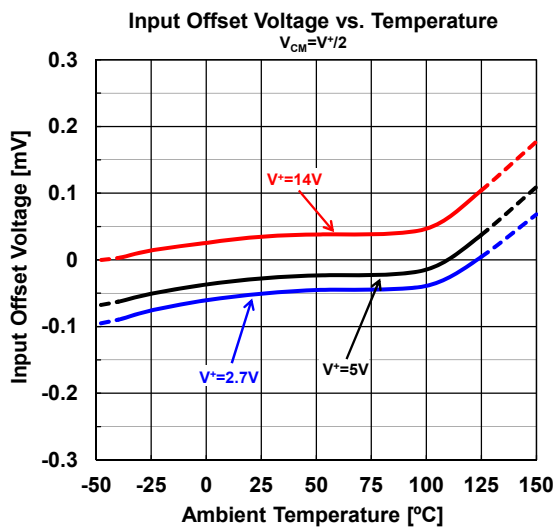
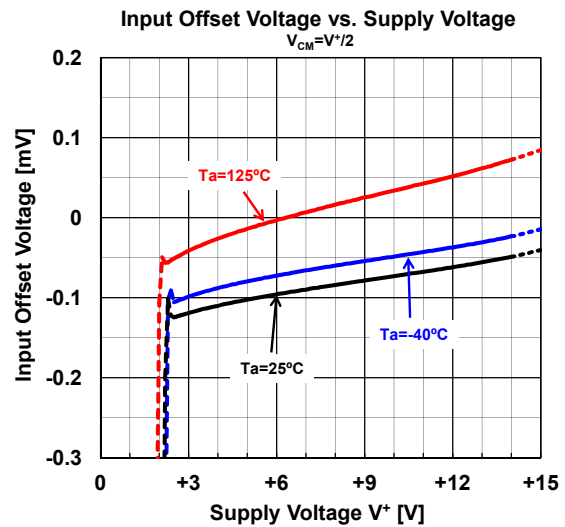
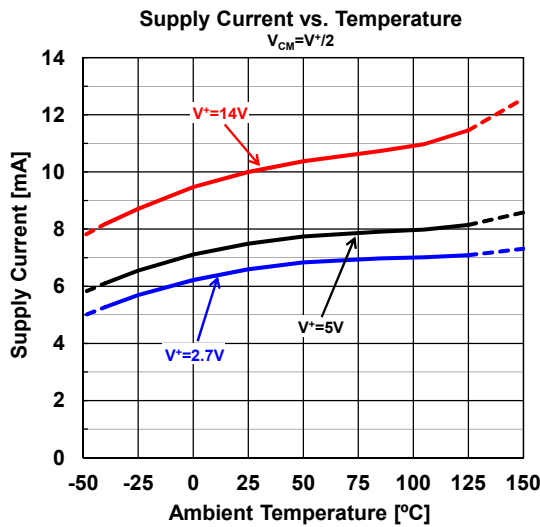


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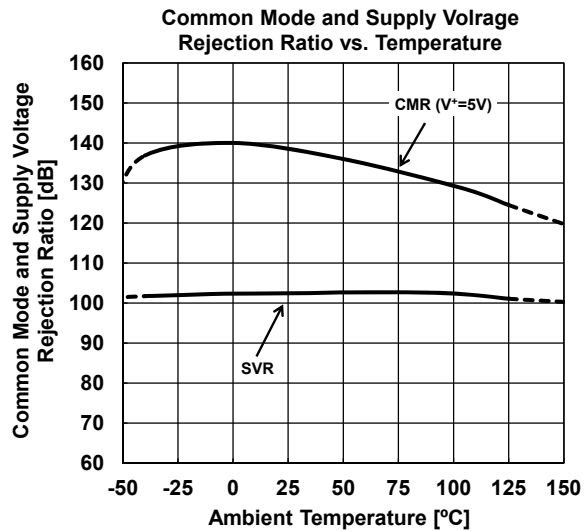
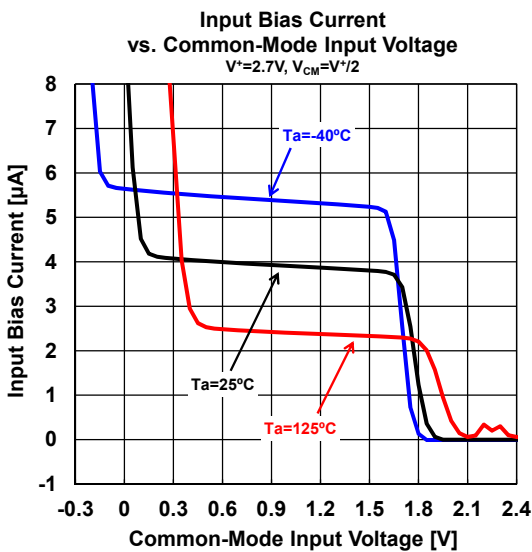
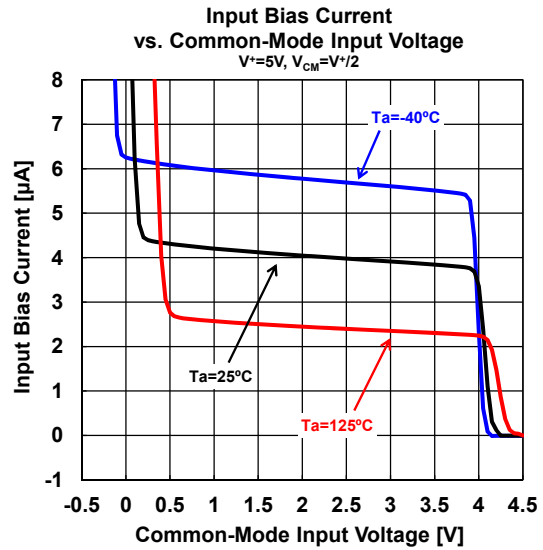
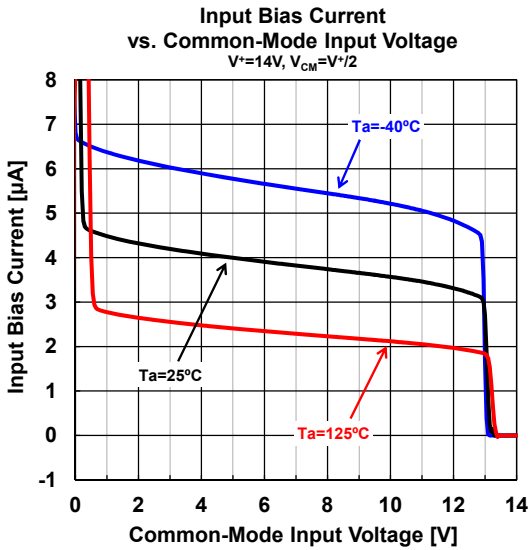
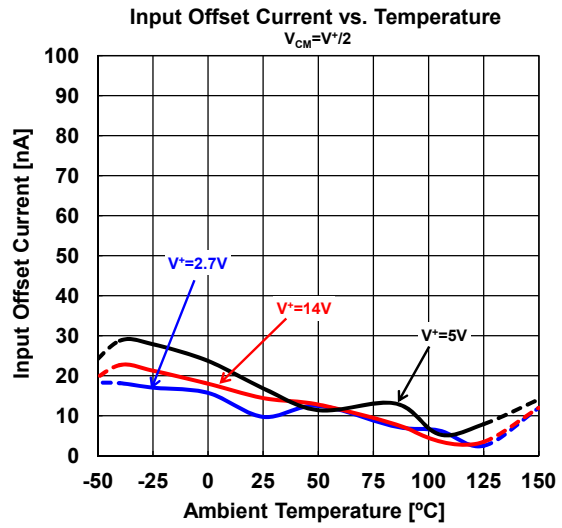
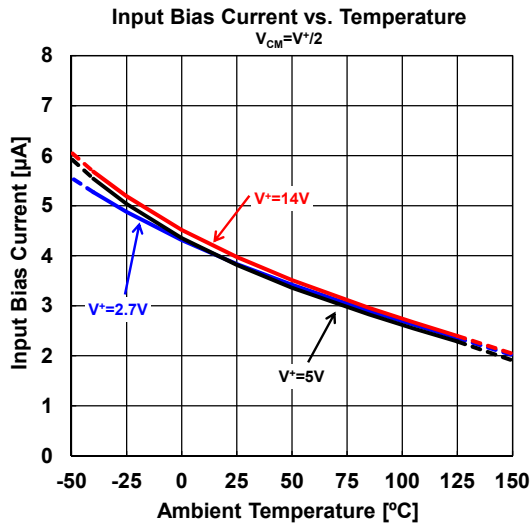
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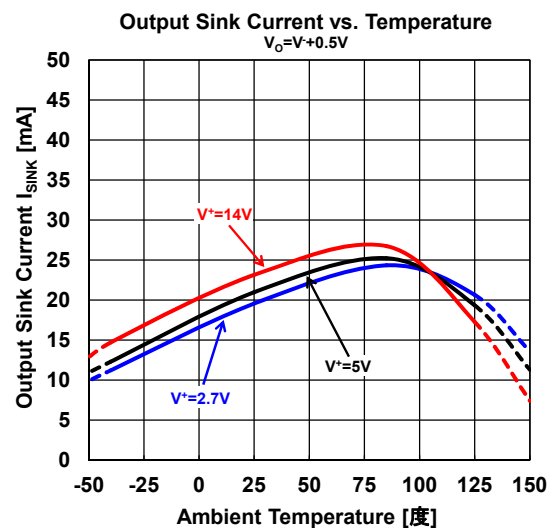
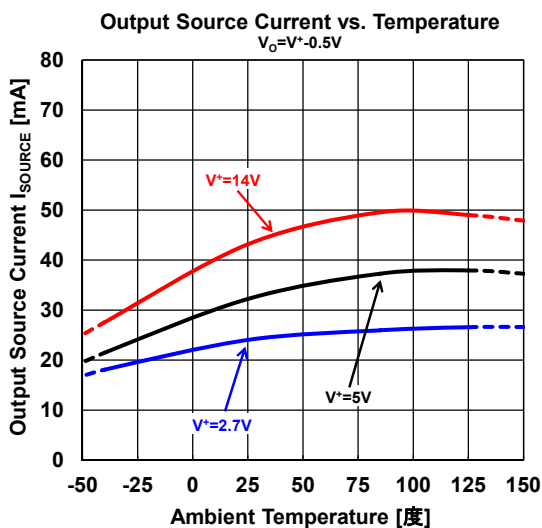
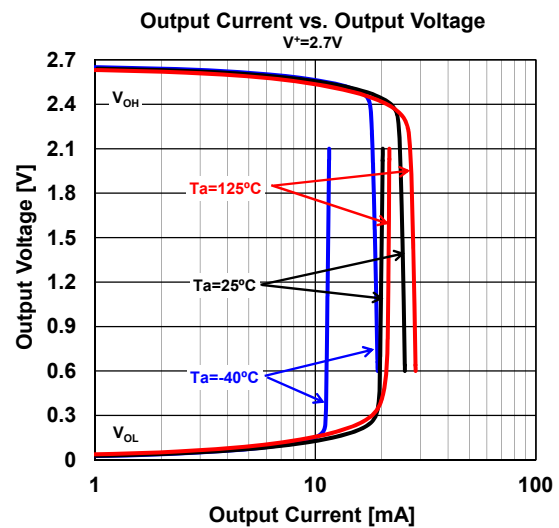
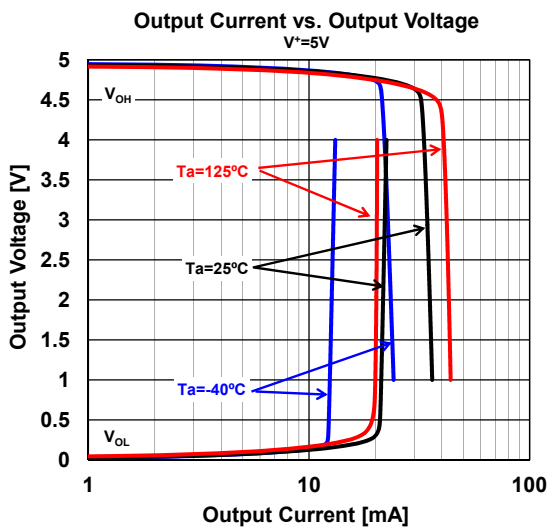
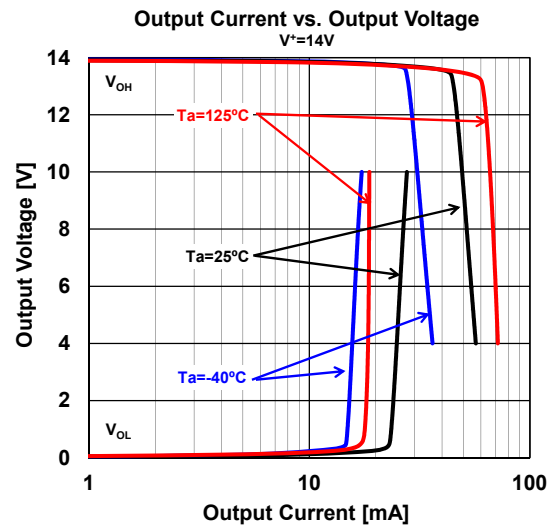
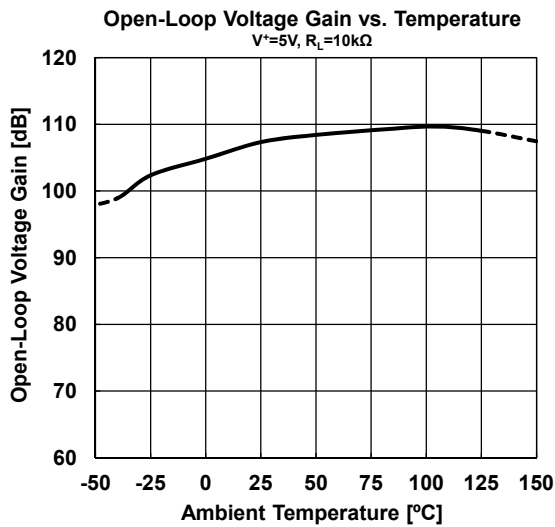
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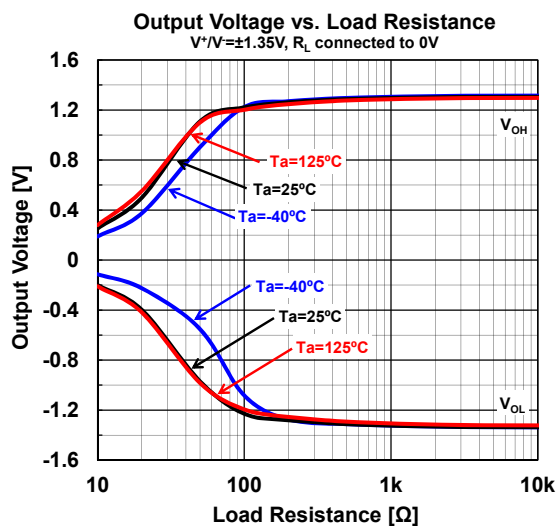
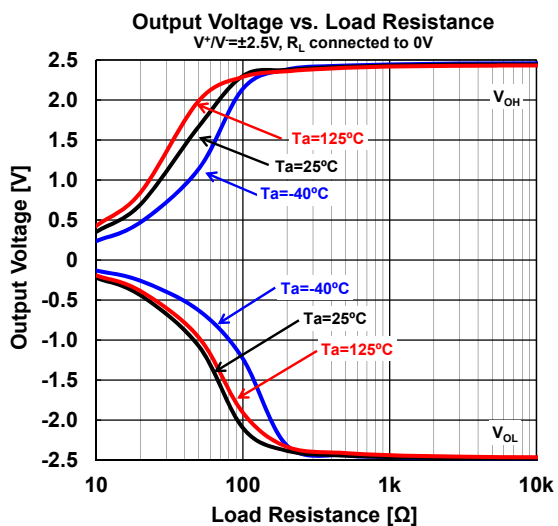
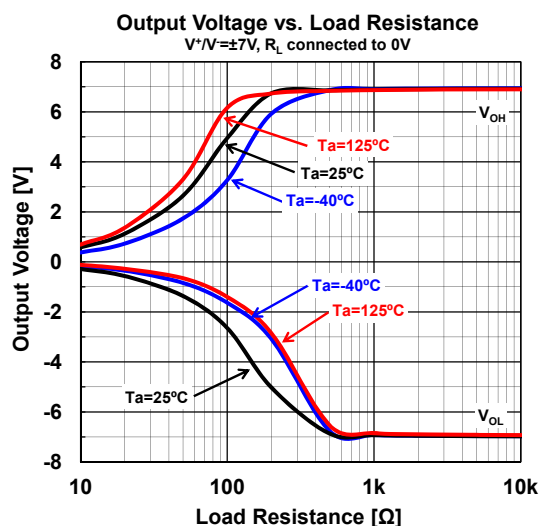
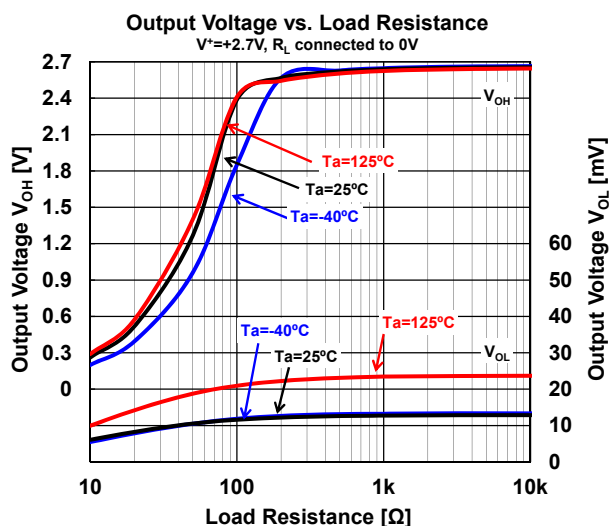
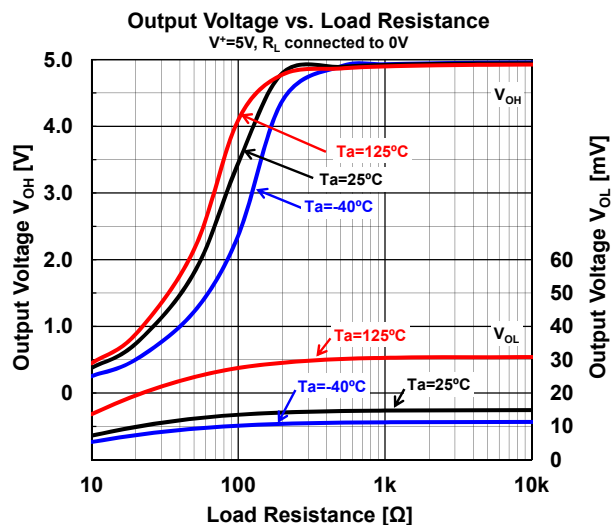
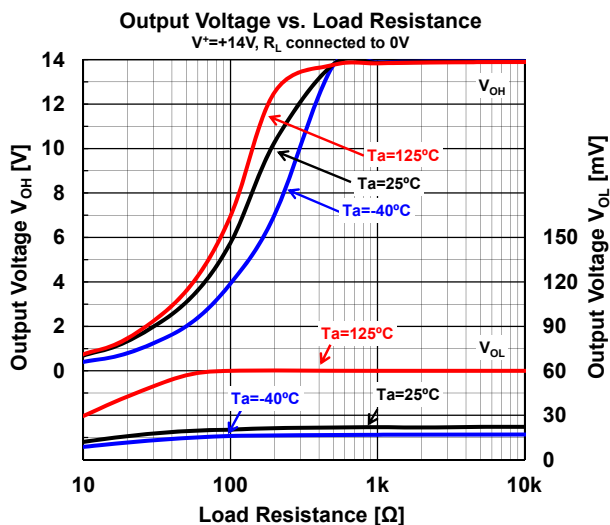
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## ■ MEMO

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## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
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