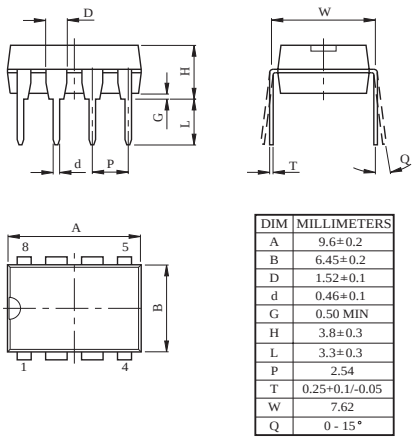
DUAL OPERATIONAL AMPLIFIER

· In the Linear Mode the Input Common Mode Voltage Range Includes Ground.
· Two Internally Compensated OP Amps are in Single Package.
· Low Power Dissipation and Power Drain Suitable for Battery Operation.
· Differential Input Voltage Range Equal to the Power Supply Voltage.
· Wide Power Supply Voltage Range and Signal Power Supply
: Single Supply $3V_{DC}$ to $36V_{DC}$ Dual Supplies $\pm 1.5V_{DC}$ to $\pm 18V_{DC}$
· Large Output Voltage Swing : $0V_{DC}$ to V_{CC}-$1.5V_{DC}$
· Low Input Biasing Current : I_I=$45nA_{DC}$ (Typ.)
· Possible to Exchange the Position of Pin⑨ for Pin①

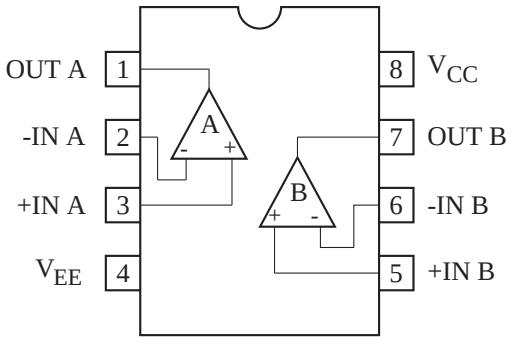


DIM	MILLIMETERS
A	9.6±0.2
B	6.45±0.2
D	1.52±0.1
d	0.46±0.1
G	0.50 MIN
H	3.8±0.3
L	3.3±0.3
P	2.54
T	0.25+0.1/-0.05
W	7.62
Q	0 - 15°

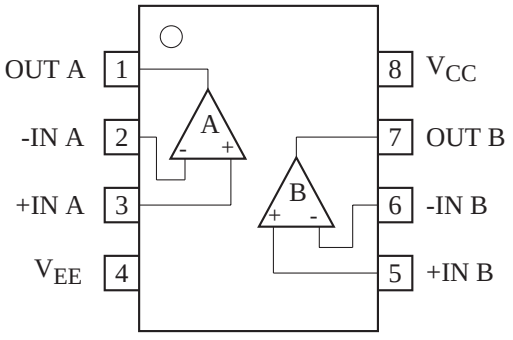
DIP-8

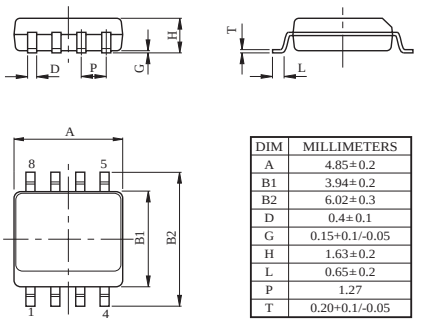
PIN CONNECTION (TOP VIEW)

LM2904P



LM2904F





DIM	MILLIMETERS
A	4.85±0.2
B1	3.94±0.2
B2	6.02±0.3
D	0.4±0.1
G	0.15+0.1/-0.05
H	1.63±0.2
L	0.65±0.2
P	1.27
T	0.20+0.1/-0.05

SOP-8

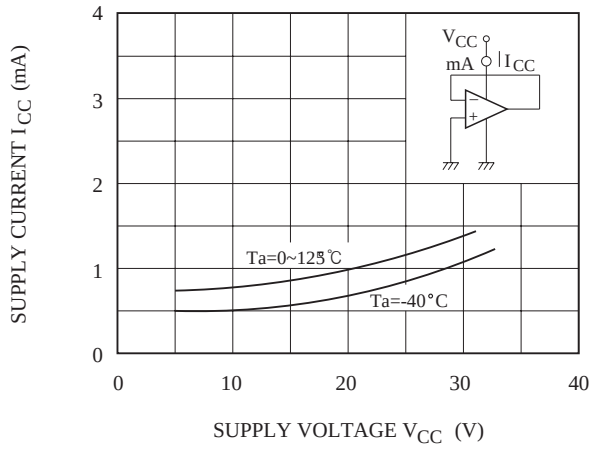
MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	36, ±18	V
Differential Input Voltage		DV_{IN}	±36	V
Input Voltage		V_{IN}	-0.3 ~ 36	V
Power Dissipation	LM2904P	P_D	500	mW
	LM2904F		280	
Operating Temperature		T_{opr}	-40 ~ 125	℃
Storage Temperature		T_{stg}	-55 ~ 125	℃

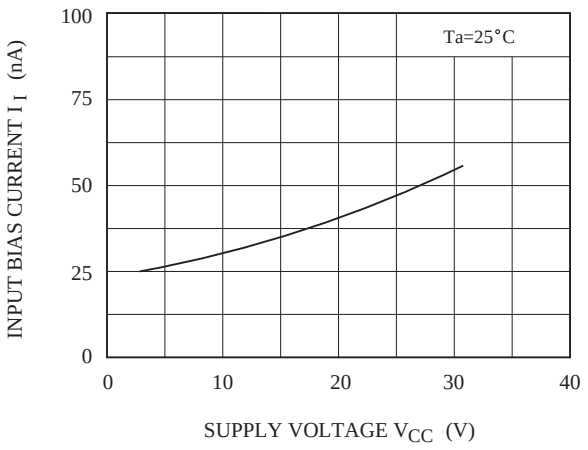
ELECTRICAL CHARACTERISTICS (V_{CC}=5V, V_{EE}=GND, Ta=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage	V_{IO}	Rg≤ 10kΩ	-	-	5	mV
Input Offset Current	I_{IO}	-	-	-	50	nA
Input Bias Current	I_I	-	-	45	210	nA
Common Mode Input Voltage	CMV_{IN}	V_{CC}=30V, V_{EE}=GND	0	-	28	V
Supply Current	I_{CC}, I_{EE}	R_L= ∞, All OP Amps	-	0.7	1.2	mA
Voltage Gain	G_V	R_L≤ 2kΩ	86	-	-	dB
Maximum Output Voltage Swing	V_{OP-P}	R_L=2kΩ, V_{CC}=30V	26	-	-	V
Common Mode Input Signal Rejection Ratio	CMRR	V_{CC}=30V, R_S=10kΩ	65	-	-	dB
Supply Voltage Rejection Ratio	SVRR	Rg=10kΩ, V_{CC}=30V	65	-	-	dB
Source Current	I_{source}	-IN=0V_{DC}, +IN=1V_{DC}	10	-	-	mA
Sink Current	I_{sink}	-IN=1V_{DC}, +IN=0V_{DC}	10	-	-	mA

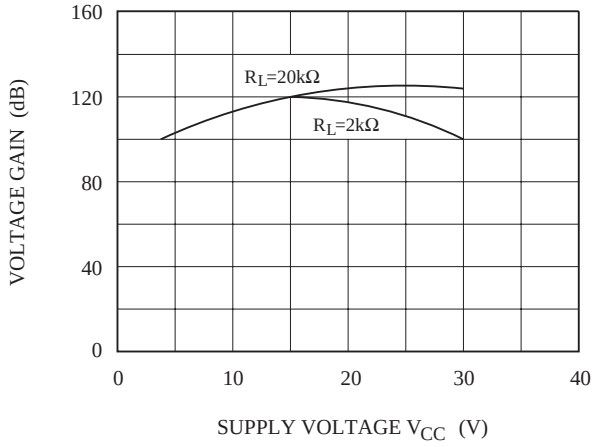
V_{CC} - I_{CC}



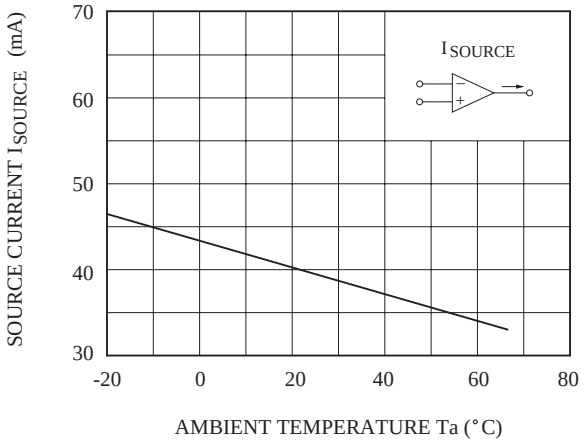
V_{CC} - I_I



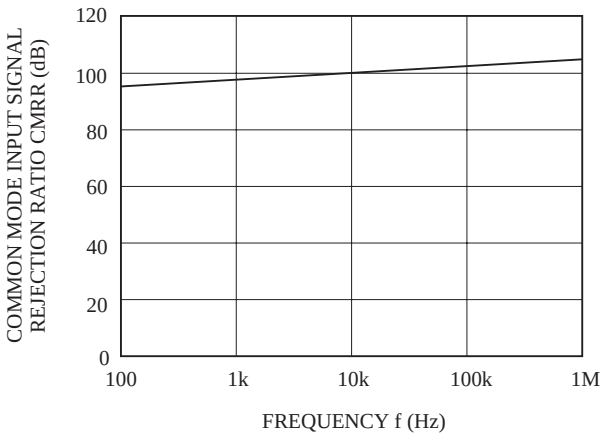
V_{CC} - G_V



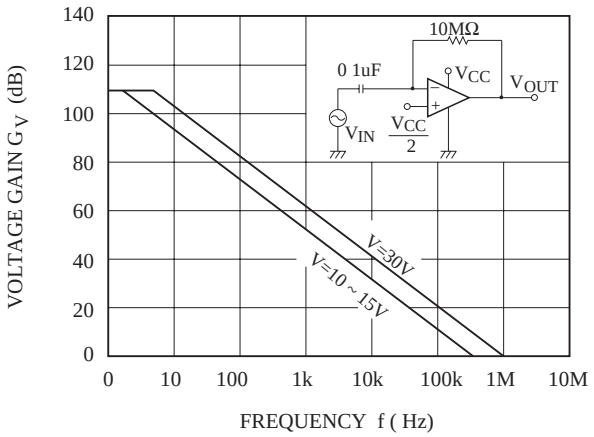
I_{SOURCE} - Ta



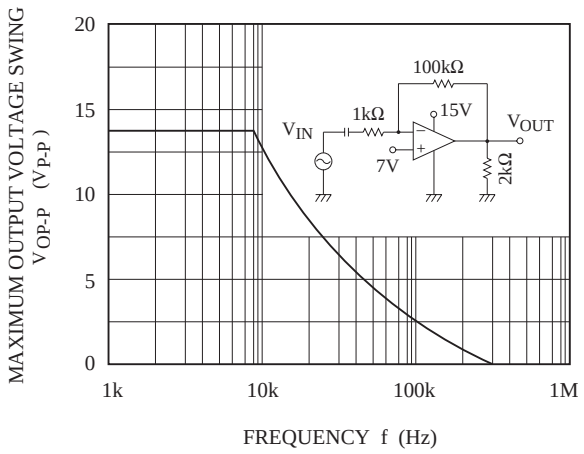
CMRR - f



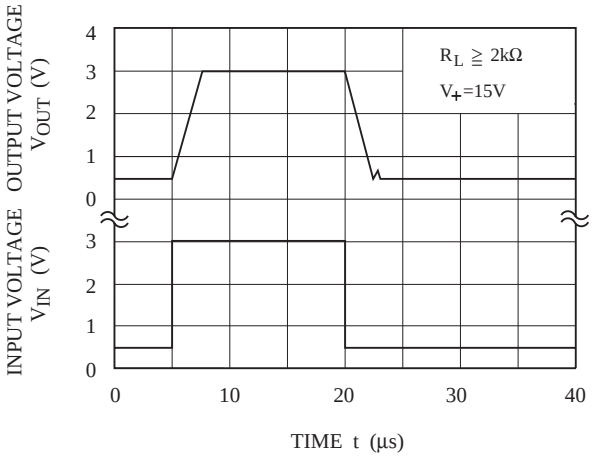
G_V - f



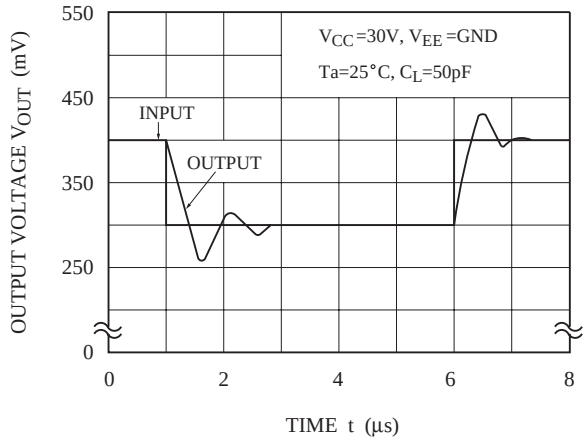
V_{OP-P} - f



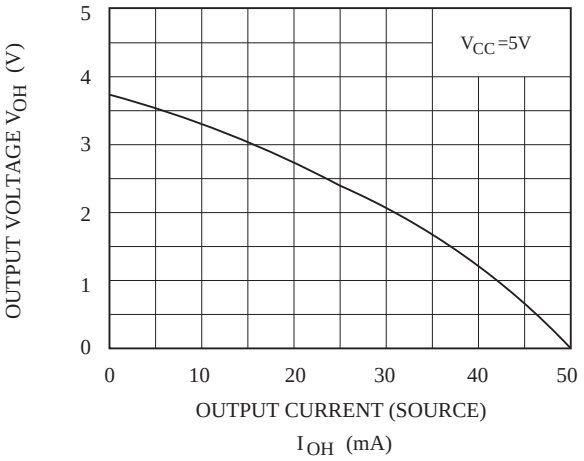
V_{IN} , V_{OUT} - t



V_{OUT} - t



V_{OH} - I_{OH}



V_{OL} - I_{OL}