

## Output Coupling Capacitor-less Video Amplifier with Power Supply Short-circuit Protection

### ■GENERAL DESCRIPTION

The **NJM2559** is a output coupling capacitor-less video amplifier with power supply short-circuit protection.\*

When the DC voltage is impressed to the output terminal, it becomes a power saving mode, and IC is protected.

The NJM2559 is suitable for the video application at risk of power supply short-circuit.

\*DC coupling. You must not connect an output capacitor.

### ■PACKAGE OUTLINE

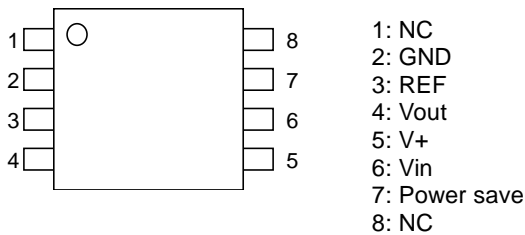


**NJM2559RB1**

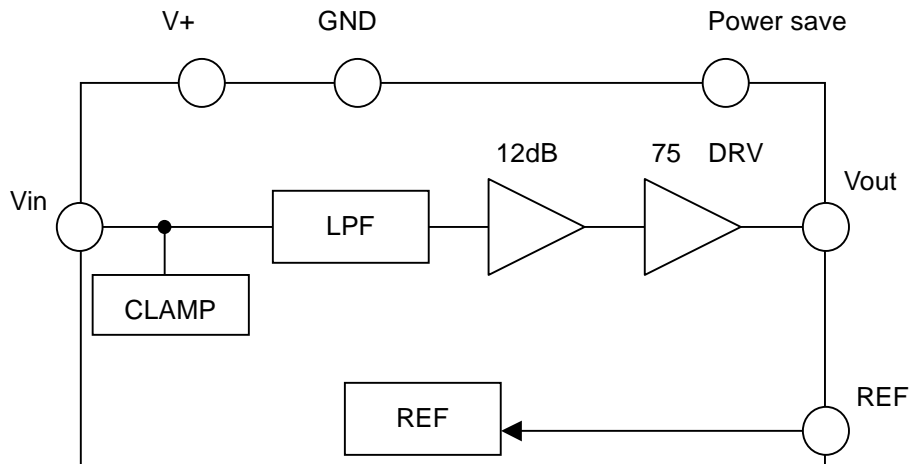
### ■FEATURES

- Operating Voltage      4.5 to 5.5V
- Output Coupling Capacitor-less (0.5V DC Output)
- Power Supply Short-circuit Protection Circuit
- Internal LPF            -32dB typ. at 19MHz
- 12dB Amplifier
- 75Ω Driver
- Power-save Circuit
- Bipolar Technology
- Package Outline        TVSP8

### ■PIN CONNECTION



### ■BLOCK DIAGRAM



# NJM2559

## ■ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	7.0	V
Output Terminal Voltage	V <sub>o</sub>	13.5	
Power Dissipation	P <sub>D</sub>	580 *1	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +150	°C

(Note) At on a board of EIA/JEDEC specification. (114.3 x 76.2 x 1.6mm Two layers, FR-4)

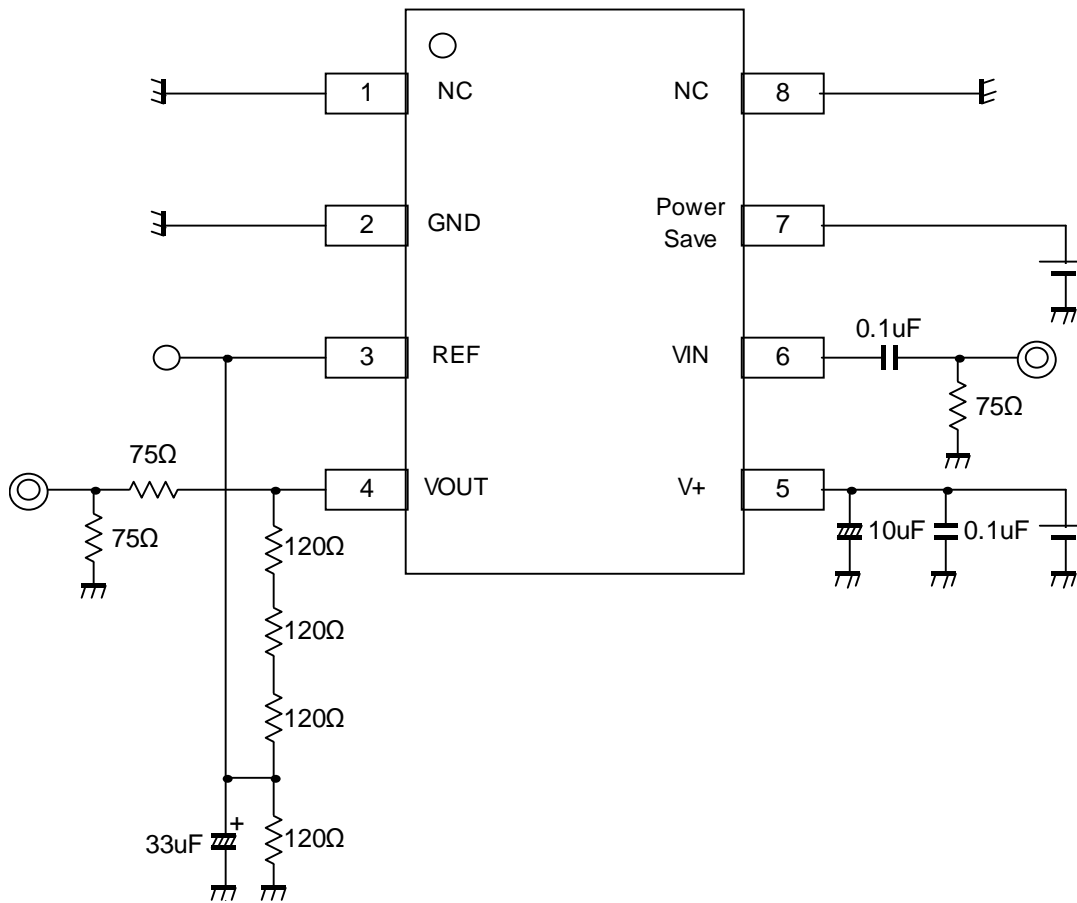
## ■ELECTRICAL CHARACTERISTICS 1( V<sup>+</sup> =5V, RL= refer to test circuit, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	Vopr		4.5	5.0	5.5	V
Supply Current	I <sub>CC</sub>	No signal	-	9.0	12.0	mA
Supply Current at Power Save Mode	I <sub>save</sub>	Power save mode	-	40	100	uA
Power Supply Short-circuit Voltage	VoDCIN	75Ω series resistance connection	-	-	16	V
Output Terminal Voltage at Power Supply Short-circuit	VoutDCIN	75Ω series resistance connection	-	-	13.5	V
REF Terminal Voltage 1 at Power Supply Short-circuit	VthREF1	Power supply short-circuit protection OFF→ON	1.2	1.5	1.8	V
REF Terminal Voltage 2 at Power Supply Short-circuit	VthREF2	Power supply short-circuit protection ON→OFF	0.8	1.1	1.4	V
Maximum Output Level	Vom	f=100kHz, THD=1%, sin-signal	2.2	2.5	-	Vp-p
Voltage Gain	Gv	Vin=100kHz,0.5Vp-p, sin-signal	11.9	12.3	12.7	dB
Low Pass Filter Characteristic	Gfy4.5M	Vin=4.5MHz/100kHz, 0.5Vp-p	-0.6	-0.1	0.4	dB
	Gfy19M	Vin=19MHz/100kHz, 0.5Vp-p	-	-32	-22	
Differential Gain	DG	Vin=0.5Vp-p, 10step video signal, RL=75Ω	-	0.5	-	%
Differential Phase	DP	Vin=0.5Vp-p, 10step video signal, RL=75Ω	-	1.5	-	deg
Output DC Voltage	VoDC	No signal	-	0.5	0.65	V
SW Voltage High Level	VthPSH	Power save terminal switch voltage	1.8	-	V <sup>+</sup>	V
SW Voltage Low Level	VthPSL	Power save terminal switch voltage	0	-	0.3	

## ■ CONTROL TERMINAL

PARAMETER	STATUS	MODE
R E F	H	Power save: ON Non-Active mode (Mute)
	L	Power save: OFF Active mode (Mute)
P o w e r S a v e	H	Power save: OFF Active mode
	L	Power save: ON Non-Active mode (Mute)
	OPEN	Power save: ON Non-Active mode (Mute)

## ■ TEST CIRCUIT

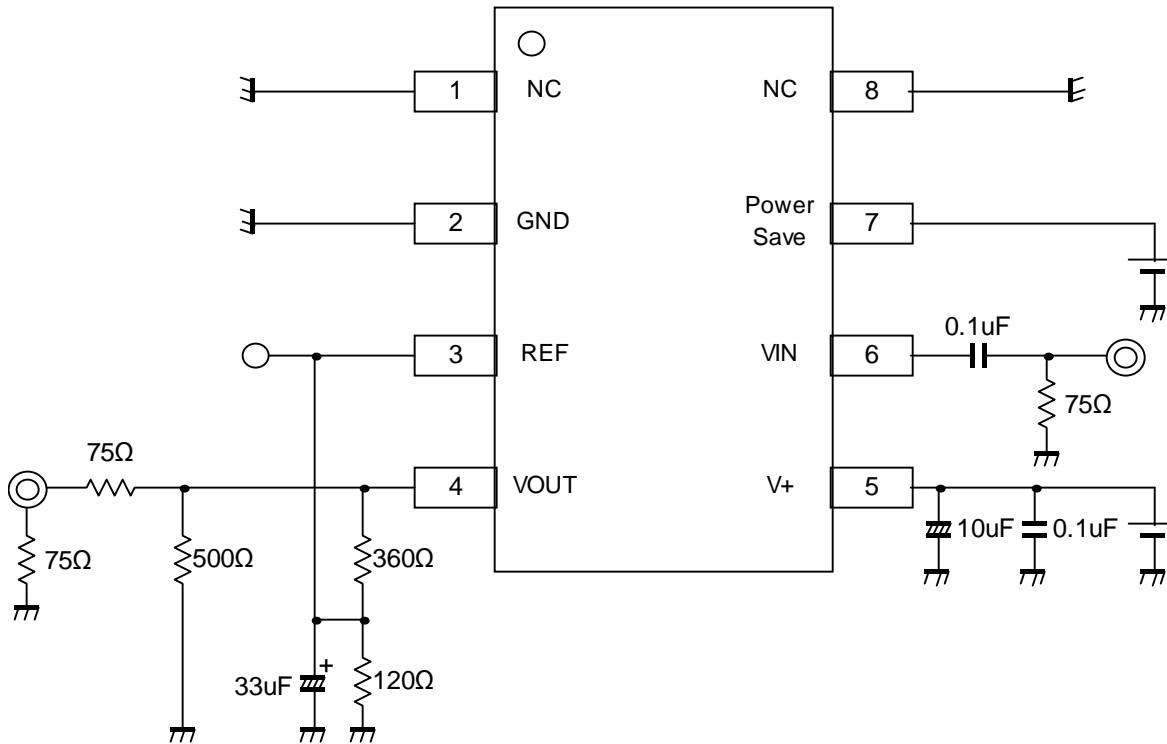


## ■ APPLICATION

- Please connect the capacitor of power supply terminal (pin 5) near IC.
- You must not connect an output capacitor.
- External resistance must use power dissipation :125mW or more.
- When  $120\Omega \times 3$  are replaced with  $360\Omega$ , 400mW or more is recommended.

# NJM2559

## ■ APPLICATION CIRCUIT: Power Supply Short-circuit for 18Vmax)



## ■ APPLICATION

Please connect the capacitor of power supply terminal (pin 5) near IC.

You must not connect an output capacitor.

The power dissipation of external resistance is as follows.

When the power supply short-circuit voltage is 18Vmax, the current that flows to each resistance is as follows.

- 75Ω (series resistance): about 60mA
- 360Ω, 120Ω (power supply short-circuit detection resistance): about 30mA
- 500Ω (pull-down resistance): about 30mA

The power dissipation recommendation value of each resistance is as follows.

- 75Ω (series resistance): 300mW or more
- 360Ω (power supply short-circuit detection resistance): 400mW or more
- 120Ω (power supply short-circuit detection resistance): 125mW or more
- 500Ω (pull-down resistance): 500mW or more

The load resistance of NJM2559 is about 93Ω in this application circuit.

Please use it more than 93Ω.

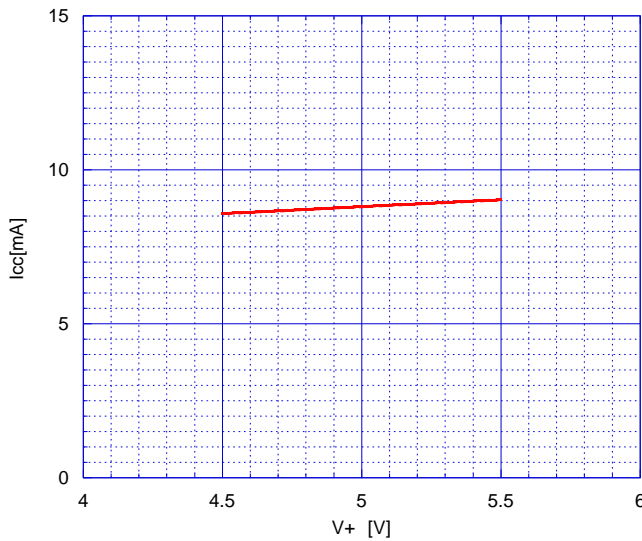
Moreover, supply current increases by 1mA when comparing with test circuit.

## ■ EQUIVALENT CIRCUIT (V<sub>cc</sub>=5V)

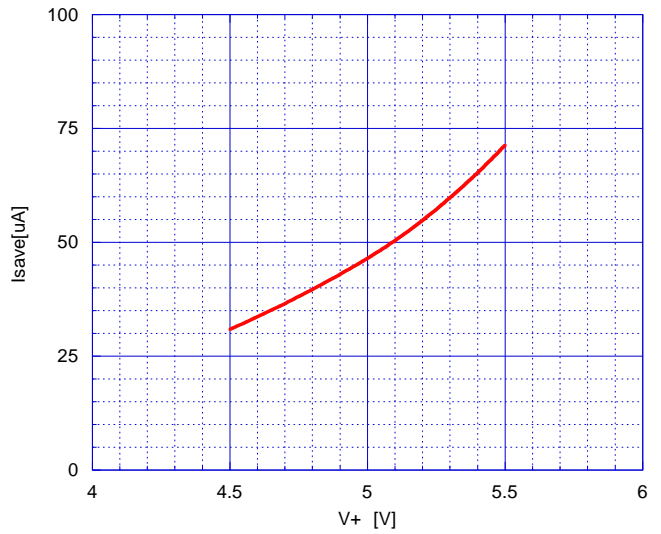
PIN No.	PIN NAME	EQUIVALENT CIRCUIT	DC VOLTAGE
1	N.C.	-	-
2	GND	-	-
3	REF		-
4	VOUT		0.5V
5	V <sub>cc</sub>	-	-
6	VIN		1.4V
7	Power Save		-
8	N.C.	-	-

## TYPICAL CHARACTERISTICS

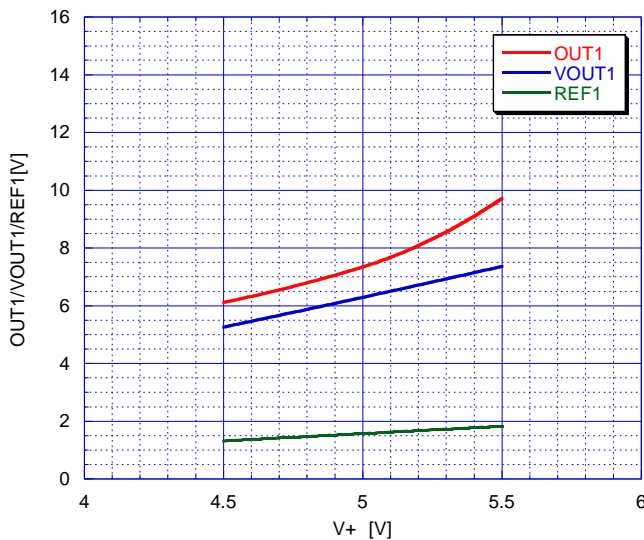
V+ vs Icc



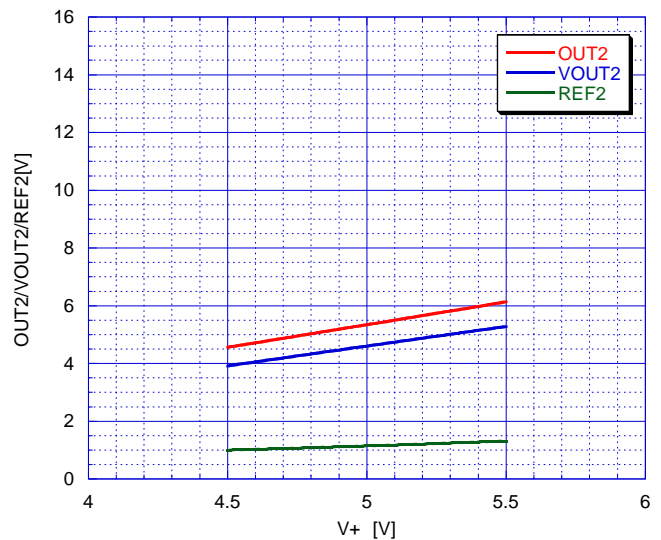
V+ vs Isave



V+ vs Protect Mode1



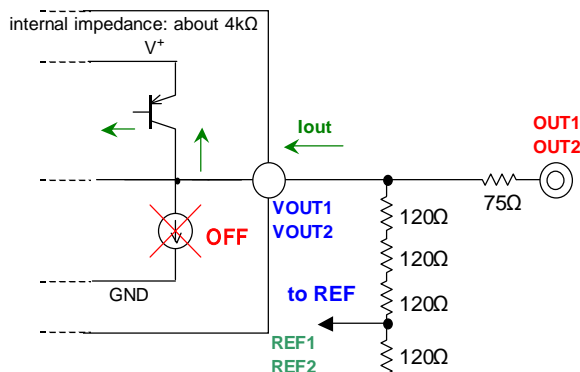
V+ vs Protect Mode2



**Mode1: Power supply short-circuit protection OFF→ON**  
 The voltage is applied to OUT from 0V in the step of +0.1V.  
 Each voltage when the voltage of VIN began to fall on Low is measured.

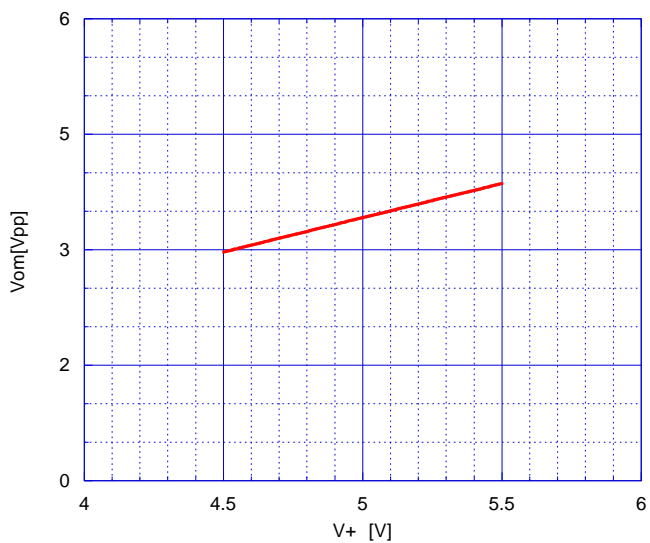
**Mode2: Power supply short-circuit protection ON→OFF**  
 The voltage is applied to OUT from 16V in the step of -0.1V.  
 Each voltage when the voltage of VIN becomes 1.4V is measured.

### Power supply short-circuit protection

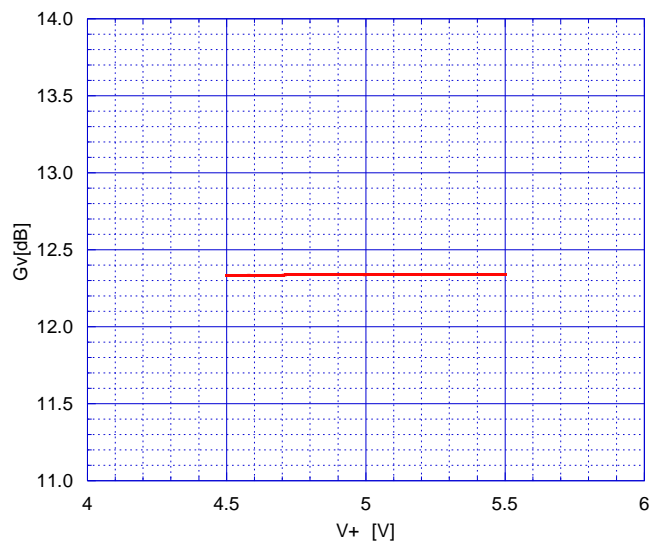


## ■ TYPICAL CHARACTERISTICS

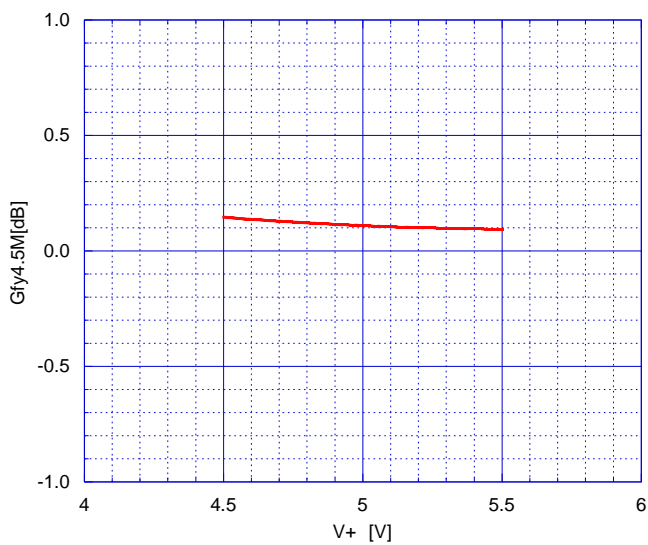
### V+ vs Vom



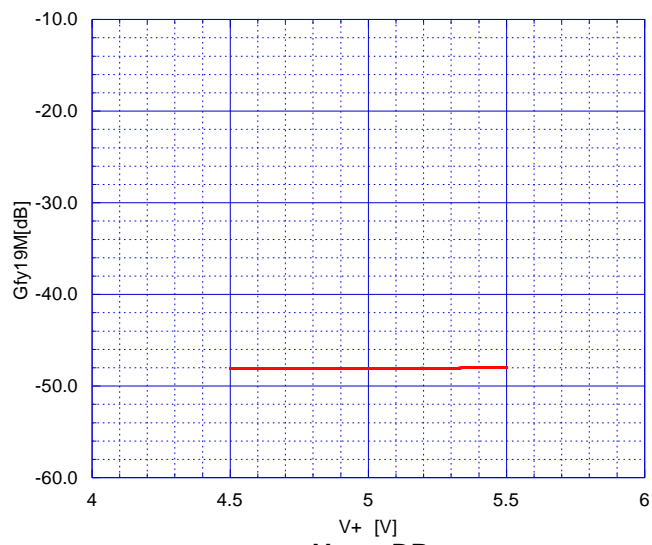
### V+ vs Gv



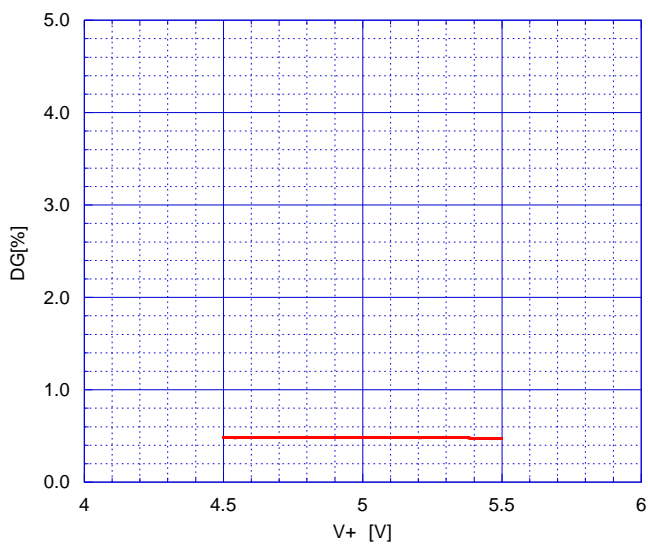
### V+ vs Gfy4.5M



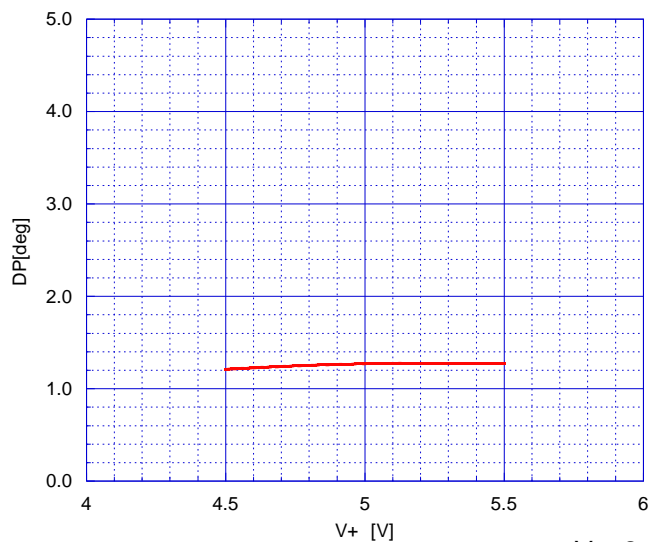
### V+ vs Gfy19M



### V+ vs DG



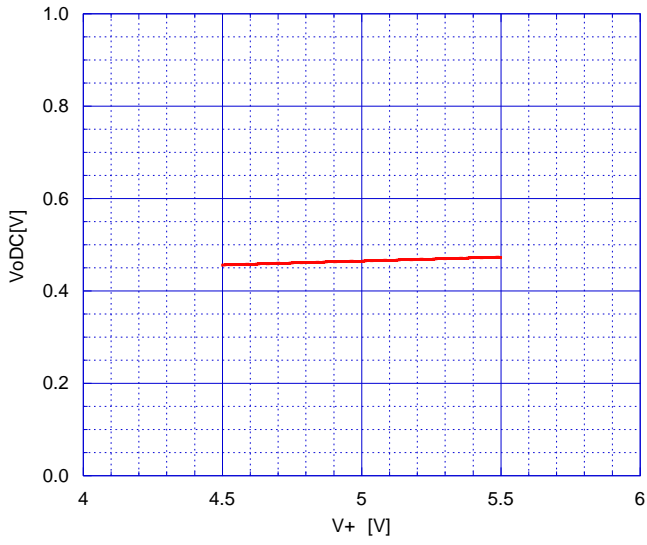
### V+ vs DP



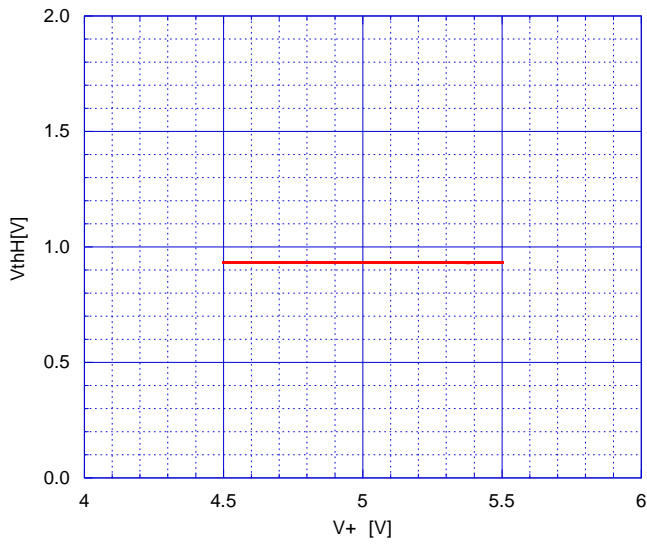
Ver.2

## ■ TYPICAL CHARACTERISTICS

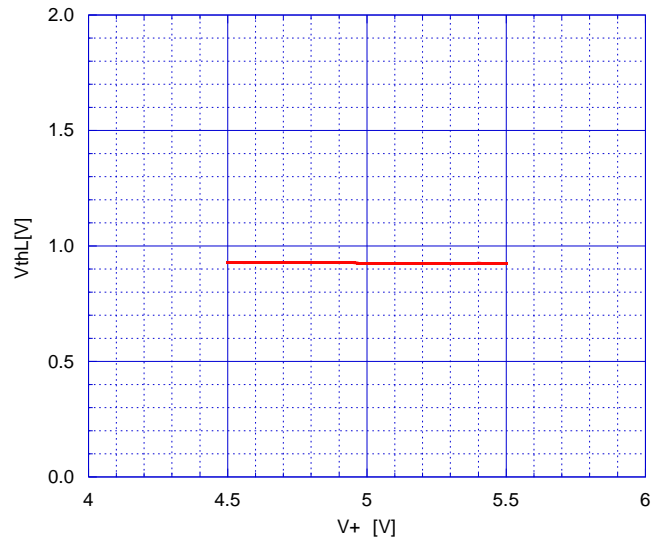
### V+ vs VoDC



### V+ vs VthH



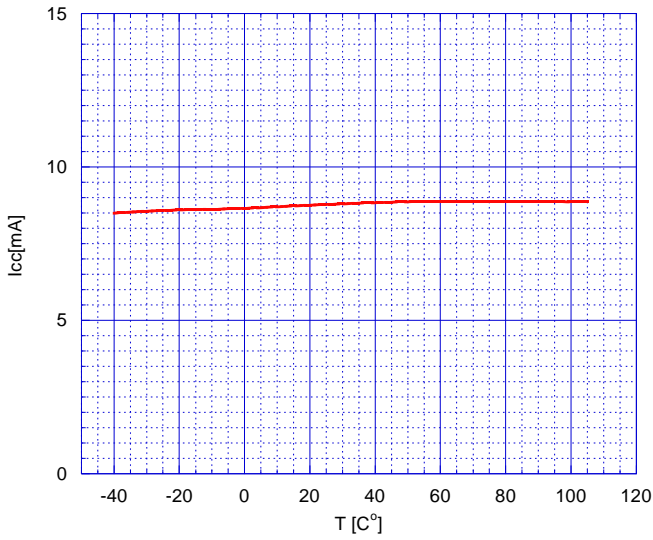
### V+ vs VthL



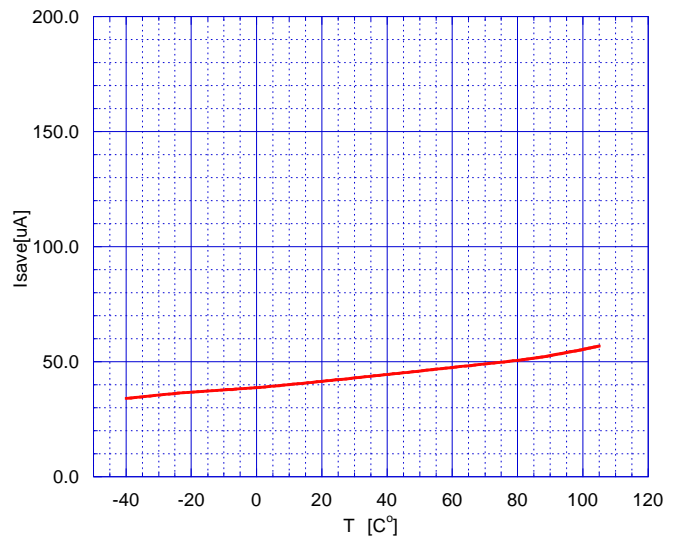


## TYPICAL CHARACTERISTICS

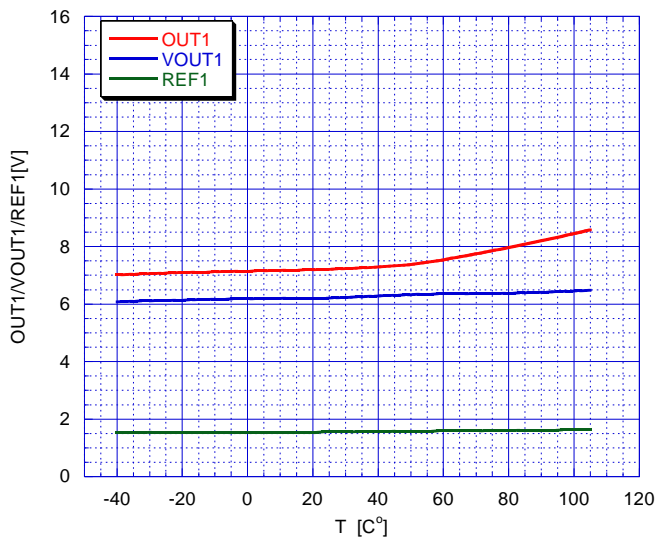
### T vs I<sub>cc</sub>



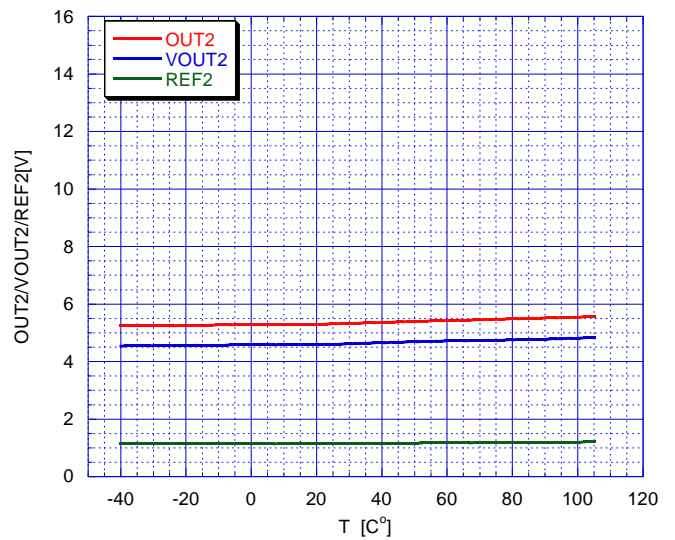
### T vs I<sub>save</sub>



### T vs Protect Mode1



### T vs Protect Mode2



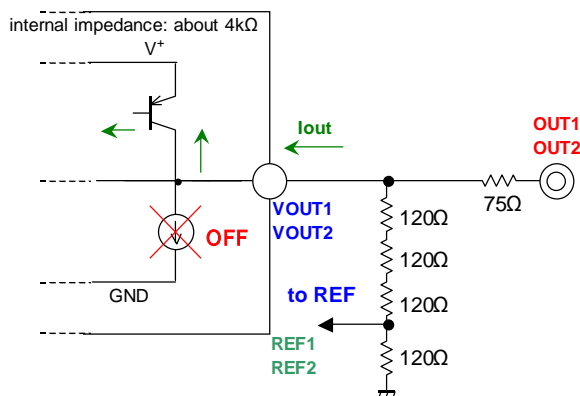
#### Mode1: Power supply short-circuit protection OFF→ON

The voltage is applied to OUT from 0V in the step of +0.1V. Each voltage when the voltage of VIN began to fall on Low is measured.

#### Mode2: Power supply short-circuit protection ON→OFF

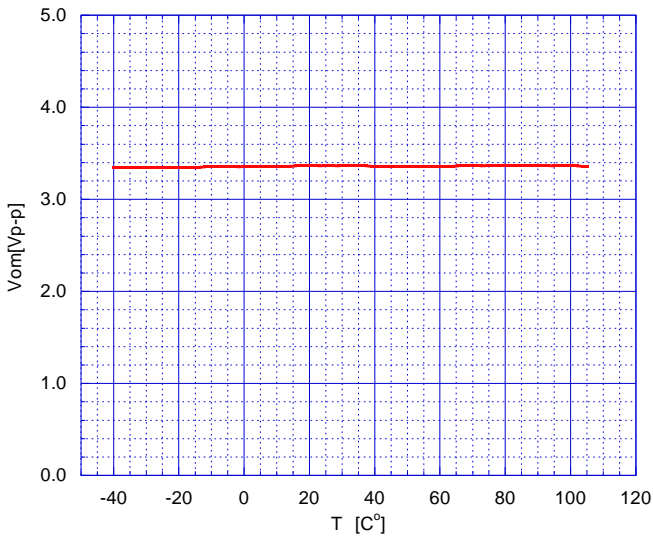
The voltage is applied to OUT from 16V in the step of -0.1V. Each voltage when the voltage of VIN becomes 1.4V is measured.

#### Power supply short-circuit protection

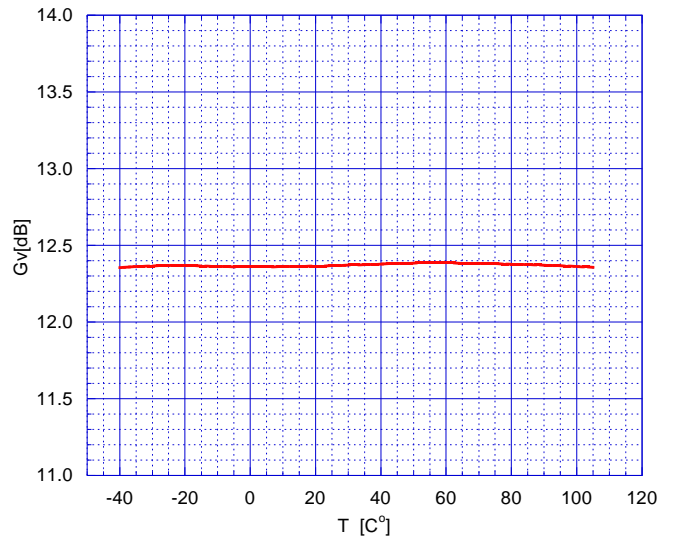


## ■ TYPICAL CHARACTERISTICS

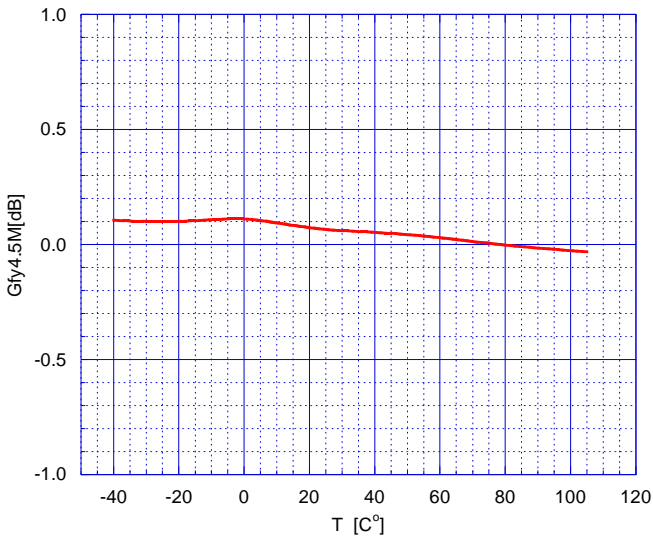
**T vs Vom**



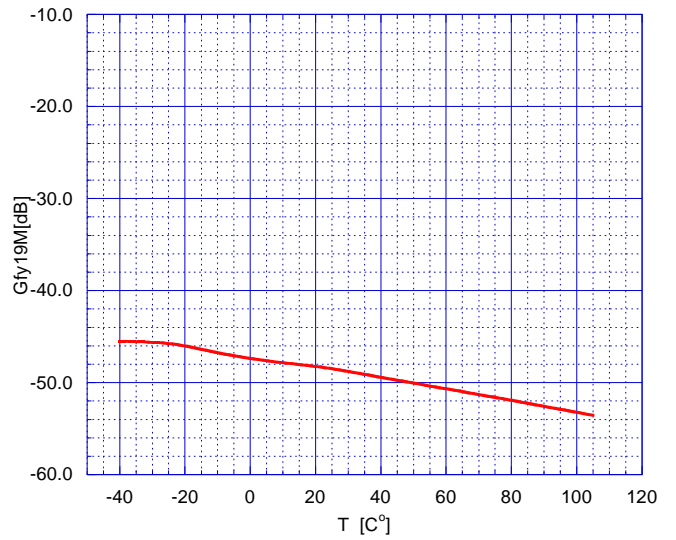
**T vs Gv**



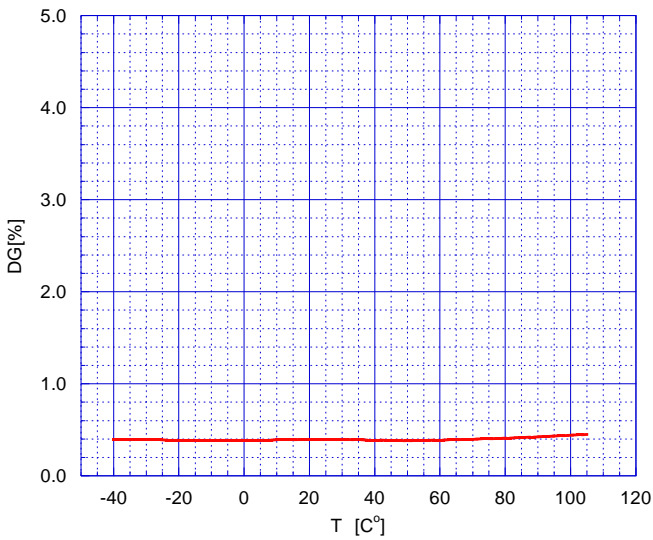
**T vs Gfy4.5M**



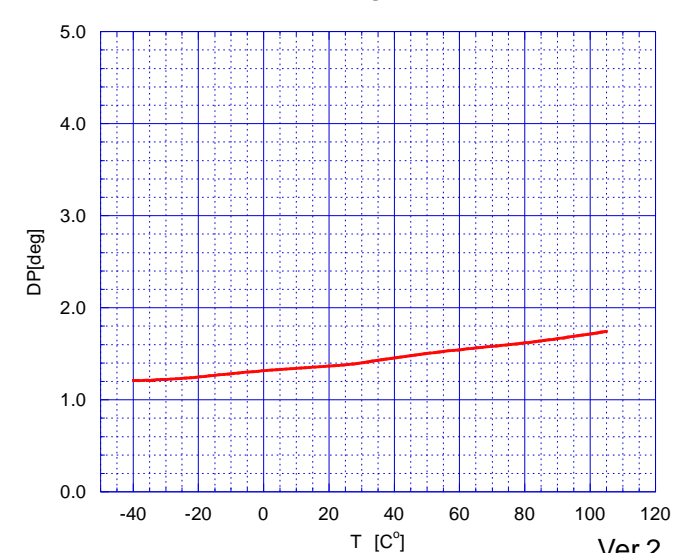
**T vs Gfy19M**



**T vs DG**

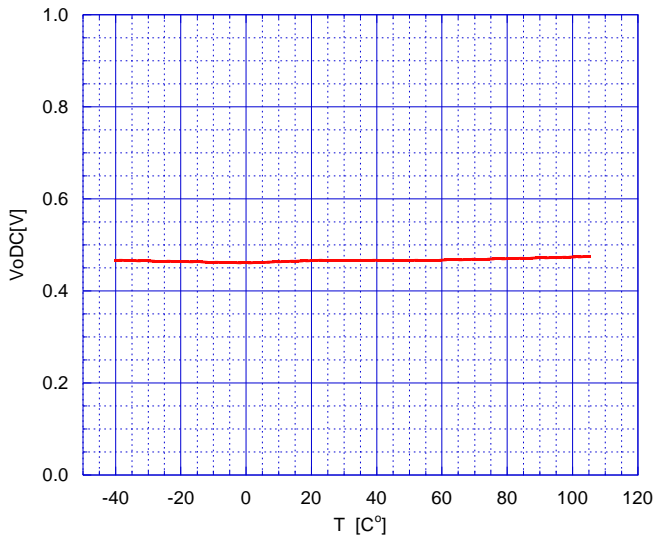


**T vs DP**

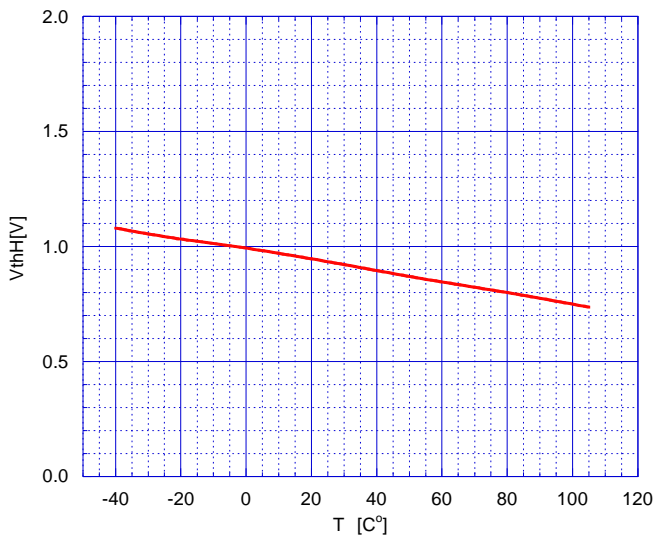


## TYPICAL CHARACTERISTICS

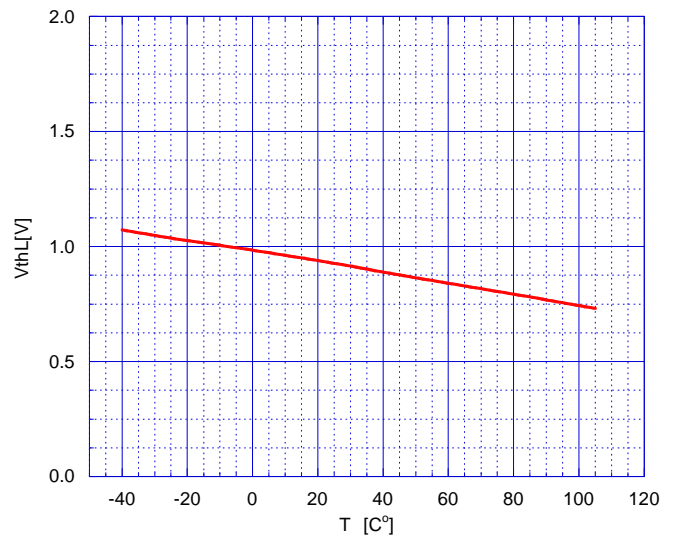
### T vs VoDC



### T vs VthH

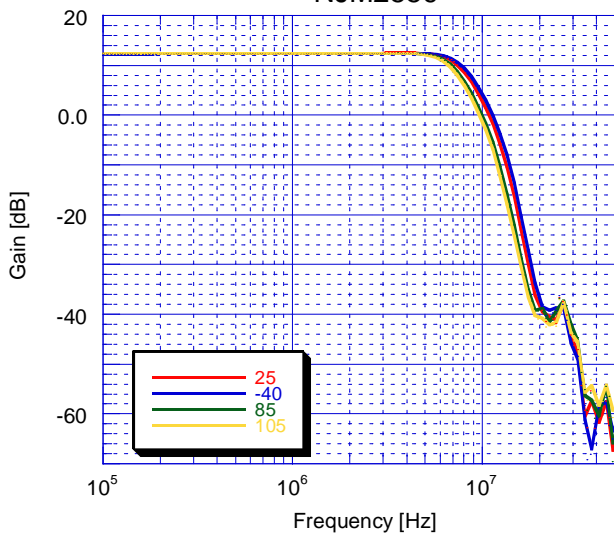


### T vs VthL



### Voltage Gain vs. Frequency

#### NJM2559



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