

series data sheet

『Representative data』

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Tamura Corporation
Technical Group
Industrial Devices Division

《Output voltage linearity》

『Hysteresis width』

RL=10k Ω Vcc=+5V

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	2.498	2.503	2.506	2.503	2.499	
12.5	2.881	2.879	2.883	2.881	2.874	
25.0	3.261	3.253	3.257	3.255	3.245	
37.5	3.644	3.633	3.635	3.634	3.622	
50.0	4.025	4.007	4.010	4.010	3.995	
62.5	4.407	4.381	4.386	4.387	4.368	

【considering offset voltage】

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	0.000	0.000	0.000	0.000	0.000	revise zero
12.5	0.383	0.376	0.377	0.378	0.375	↓
25.0	0.763	0.750	0.751	0.752	0.746	↓
37.5	1.146	1.130	1.129	1.131	1.123	↓
50.0	1.527	1.504	1.504	1.507	1.496	↓
62.5	1.909	1.878	1.880	1.884	1.869	↓

【revoising output voltage.】(converting detected current into primary value.)

Detected current If (A)	Output voltage after converting Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
12.5	1.532	1.504	1.508	1.512	1.500	four times
25.0	1.526	1.500	1.502	1.504	1.492	double
37.5	1.528	1.506	1.505	1.508	1.497	4/3 time
50.0	1.527	1.504	1.504	1.507	1.496	rated current
62.5	1.527	1.502	1.504	1.507	1.495	4/5time

Avarage A	1.528	1.503	1.505	1.508	1.496
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【calculating allowance percentage.】

1. We take average 4point ; rated current, three fourths of rated current, half of rated current, one fourth of rated current.

2. Linearity error percentage on each point is given by following equation.

$$\varepsilon = (V_{out} - A) / A \times 100(\%)$$

● 《Output voltage linearity》

【standard value】 less than $\pm 1\%$

Detected current If (A)	linearity error percentage (%)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
12.5	0.264	0.044	0.227	0.294	0.265	
25.0	-0.129	-0.222	-0.172	-0.236	-0.269	
37.5	-0.023	0.196	0.024	0.004	0.062	
50.0	-0.063	0.044	-0.039	-0.037	-0.002	
62.5	-0.050	-0.062	-0.039	-0.024	-0.056	

● 『Hysteresis width』

【standard value】 less than 20mV

	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	Remarks
+If(A)→O(A)	2.499	2.503	2.507	2.504	2.500	Output voltage
Hysteresis width	0.001	0.000	0.001	0.001	0.001	

《Output voltage linearity》

『Hysteresis width』

RL=10kΩ Vcc=+5V

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	2.500	2.506	2.501	2.501	2.498	
25.0	2.872	2.878	2.873	2.874	2.873	
50.0	3.247	3.252	3.247	3.250	3.250	
75.0	3.620	3.623	3.618	3.623	3.623	
100.0	3.994	3.997	3.992	3.998	4.000	
125.0	4.367	4.370	4.365	4.372	4.376	

【considering offset voltage】

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	0.000	0.000	0.000	0.000	0.000	revise zero
25.0	0.372	0.372	0.372	0.373	0.375	↓
50.0	0.747	0.746	0.746	0.749	0.752	↓
75.0	1.120	1.117	1.117	1.122	1.125	↓
100.0	1.494	1.491	1.491	1.497	1.502	↓
125.0	1.867	1.864	1.864	1.871	1.878	↓

【revoising output voltage.】(converting detected current into primary value.)

Detected current If (A)	Output voltage after converting Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
25.0	1.488	1.488	1.488	1.492	1.500	four times
50.0	1.494	1.492	1.492	1.498	1.504	double
75.0	1.493	1.489	1.489	1.496	1.500	4/3 time
100.0	1.494	1.491	1.491	1.497	1.502	rated current
125.0	1.494	1.491	1.491	1.497	1.502	4/5time

Avarage A	1.493	1.490	1.490	1.496	1.502
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【calculating allowance percentage.】

1. We take average 4point ; rated current, three fourths of rated current, half of rated current, one fourth of rated current.

2. Linearity error percentage on each point is given by following equation.

$$\varepsilon = (V_{out} - A) / A \times 100(\%)$$

● 《Output voltage linearity》

【standard value】 less than ±1%

Detected current If (A)	linearity error percentage (%)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
25.0	-0.302	-0.150	-0.150	-0.260	-0.107	
50.0	0.100	0.119	0.119	0.141	0.159	
75.0	0.030	-0.085	-0.085	-0.017	-0.132	
100.0	0.100	0.052	0.052	0.075	0.026	
125.0	0.073	0.065	0.065	0.061	0.053	

● 『Hysteresis width』

【standard value】 less than 20mV

	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	Remarks
+If(A)→0(A)	2.501	2.507	2.503	2.502	2.500	Output voltage
Hysteresis width	0.001	0.001	0.002	0.001	0.002	

《Output voltage linearity》

『Hysteresis width』

RL=10kΩ Vcc=+5V

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	2.501	2.502	2.504	2.501	2.499	
75.0	2.879	2.872	2.873	2.877	2.873	
150.0	3.257	3.242	3.241	3.254	3.247	
225.0	3.636	3.612	3.611	3.631	3.622	
300.0	4.016	3.983	3.981	4.008	3.997	
375.0	4.396	4.354	4.351	4.386	4.372	

【considering offset voltage】

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	0.000	0.000	0.000	0.000	0.000	revise zero
75.0	0.378	0.370	0.369	0.376	0.374	↓
150.0	0.756	0.740	0.737	0.753	0.748	↓
225.0	1.135	1.110	1.107	1.130	1.123	↓
300.0	1.515	1.481	1.477	1.507	1.498	↓
375.0	1.895	1.852	1.847	1.885	1.873	↓

【revoising output voltage.】(converting detected current into primary value.)

Detected current If (A)	Output voltage after converting Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
75.0	1.512	1.480	1.476	1.504	1.496	four times
150.0	1.512	1.480	1.474	1.506	1.496	double
225.0	1.513	1.480	1.476	1.506	1.497	4/3 time
300.0	1.515	1.481	1.477	1.507	1.498	rated current
375.0	1.516	1.482	1.478	1.508	1.498	4/5time

Avarage A	1.514	1.480	1.476	1.506	1.497
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【calculating allowance percentage.】

1. We take average 4point ; rated current, three fourths of rated current, half of rated current, one fourth of rated current.

2. Linearity error percentage on each point is given by following equation.

$$\varepsilon = (V_{out} - A) / A \times 100(\%)$$

● 《Output voltage linearity》

【standard value】 less than ±1%

Detected current If (A)	linearity error percentage (%)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
75.0	-0.105	-0.030	-0.003	-0.150	-0.072	
150.0	-0.105	-0.030	-0.139	-0.017	-0.072	
225.0	-0.042	-0.055	-0.028	0.002	-0.008	
300.0	0.093	0.037	0.065	0.049	0.062	
375.0	0.159	0.078	0.105	0.116	0.089	

● 『Hysteresis width』

【standard value】 less than 20mV

	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	Remarks
+If(A)→O(A)	2.502	2.504	2.505	2.502	2.501	Output voltage
Hysteresis width	0.001	0.002	0.001	0.001	0.002	

《Output voltage linearity》

『Hysteresis width』

RL=10kΩ Vcc=+5V

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	2.502	2.500	2.502	2.497	2.499	
150.0	2.875	2.872	2.875	2.878	2.873	
300.0	3.248	3.244	3.250	3.260	3.249	
450.0	3.622	3.617	3.624	3.642	3.626	
600.0	3.998	3.991	4.000	4.022	3.997	
750.0	4.375	4.367	4.377	4.410	4.379	

【considering offset voltage】

Detected current If (A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.0	0.000	0.000	0.000	0.000	0.000	revise zero
150.0	0.373	0.372	0.373	0.381	0.374	↓
300.0	0.746	0.744	0.748	0.763	0.750	↓
450.0	1.120	1.117	1.122	1.145	1.127	↓
600.0	1.496	1.491	1.498	1.525	1.498	↓
750.0	1.873	1.867	1.875	1.913	1.880	↓

【revoising output voltage.】(converting detected current into primary value.)

Detected current If (A)	Output voltage after converting Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
150.0	1.492	1.488	1.492	1.524	1.496	four times
300.0	1.492	1.488	1.496	1.526	1.500	double
450.0	1.493	1.489	1.496	1.526	1.502	4/3 time
600.0	1.496	1.491	1.498	1.525	1.498	rated current
750.0	1.498	1.494	1.500	1.530	1.504	4/5time

Avarage A	1.494	1.490	1.496	1.526	1.500
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【calculating allowance percentage.】

1. We take average 4point ; rated current, three fourths of rated current, half of rated current, one fourth of rated current.

2. Linearity error percentage on each point is given by following equation.

$$\varepsilon = (V_{out} - A) / A \times 100(\%)$$

● 《Output voltage linearity》

【standard value】 less than ±1%

Detected current If (A)	linearity error percentage (%)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
150.0	-0.152	-0.128	-0.289	-0.153	-0.271	
300.0	-0.152	-0.128	-0.022	-0.022	-0.004	
450.0	-0.088	-0.064	-0.047	-0.003	0.149	
600.0	0.116	0.073	0.112	-0.088	-0.137	
750.0	0.276	0.248	0.246	0.266	0.263	

● 『Hysteresis width』

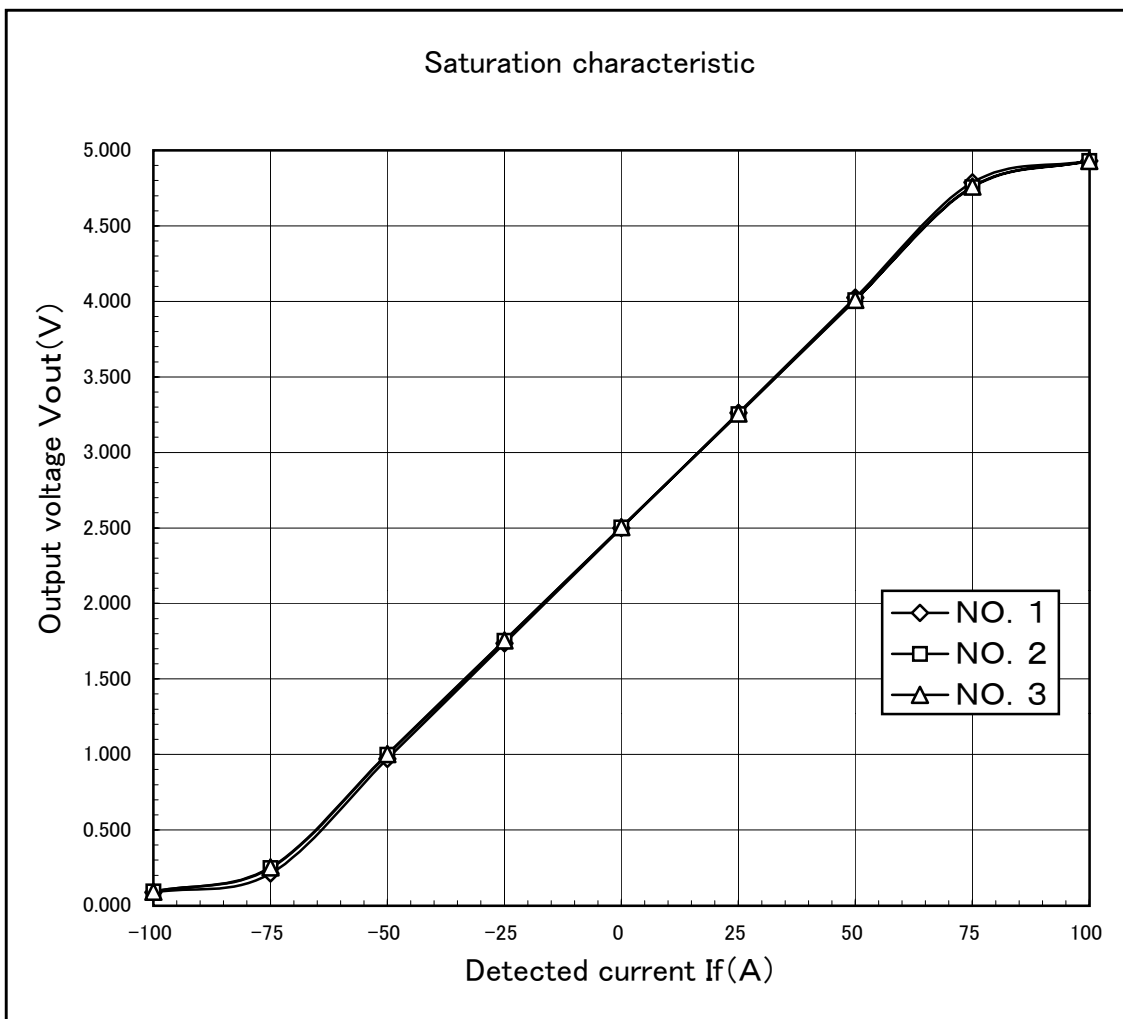
【standard value】 less than 20mV

	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	Remarks
+If(A)→O(A)	2.503	2.501	2.503	2.497	2.500	Output voltage
Hysteresis width	0.001	0.001	0.001	0.000	0.001	

《Saturation characteristic》

RL=10k Ω Vcc=+5V

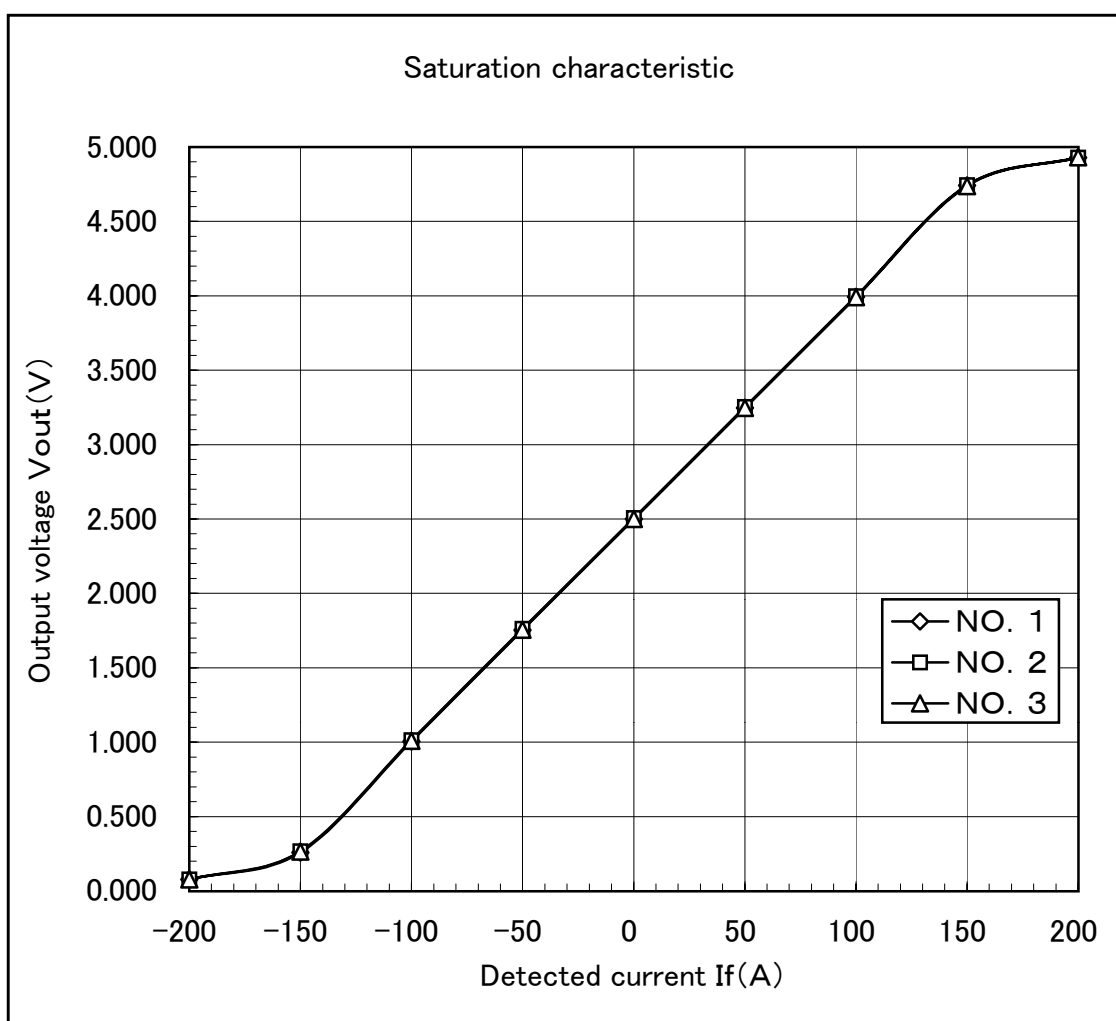
Detected current If(A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
100.0	4.931	4.931	4.931	4.931	4.930	
75.0	4.788	4.756	4.761	4.763	4.741	
50.0	4.025	4.007	4.010	4.010	3.995	
25.0	3.261	3.253	3.257	3.255	3.245	
0.0	2.498	2.503	2.506	2.503	2.499	
-25.0	1.736	1.752	1.756	1.750	1.753	
-50.0	0.970	0.998	1.002	0.994	1.004	
-75.0	0.212	0.249	0.253	0.244	0.250	
-100.0	0.087	0.094	0.092	0.087	0.092	



《Saturation characteristic》

RL=10k Ω V_{CC}=+5V

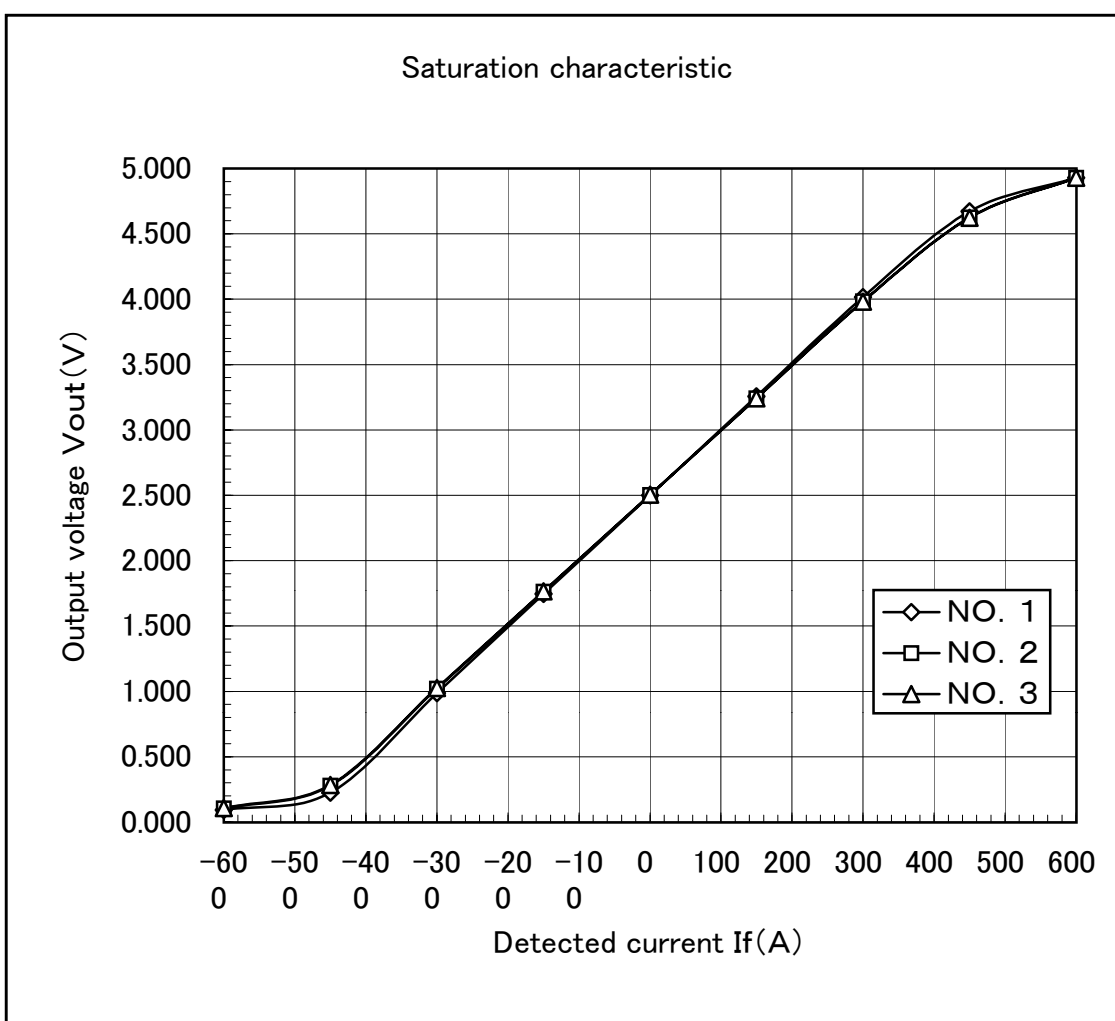
Detected current If(A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
200.0	4.930	4.930	4.931	4.929	4.931	
150.0	4.742	4.744	4.738	4.747	4.752	
100.0	3.994	3.997	3.992	3.998	4.000	
50.0	3.247	3.252	3.247	3.250	3.250	
0.0	2.500	2.506	2.501	2.501	2.498	
-50.0	1.754	1.761	1.756	1.753	1.748	
-100.0	1.005	1.013	1.008	1.002	0.997	
-150.0	0.258	0.267	0.264	0.254	0.245	
-200.0	0.077	0.077	0.078	0.075	0.077	



《Saturation characteristic》

 $RL = 10k\Omega$ $V_{CC} = +5V$

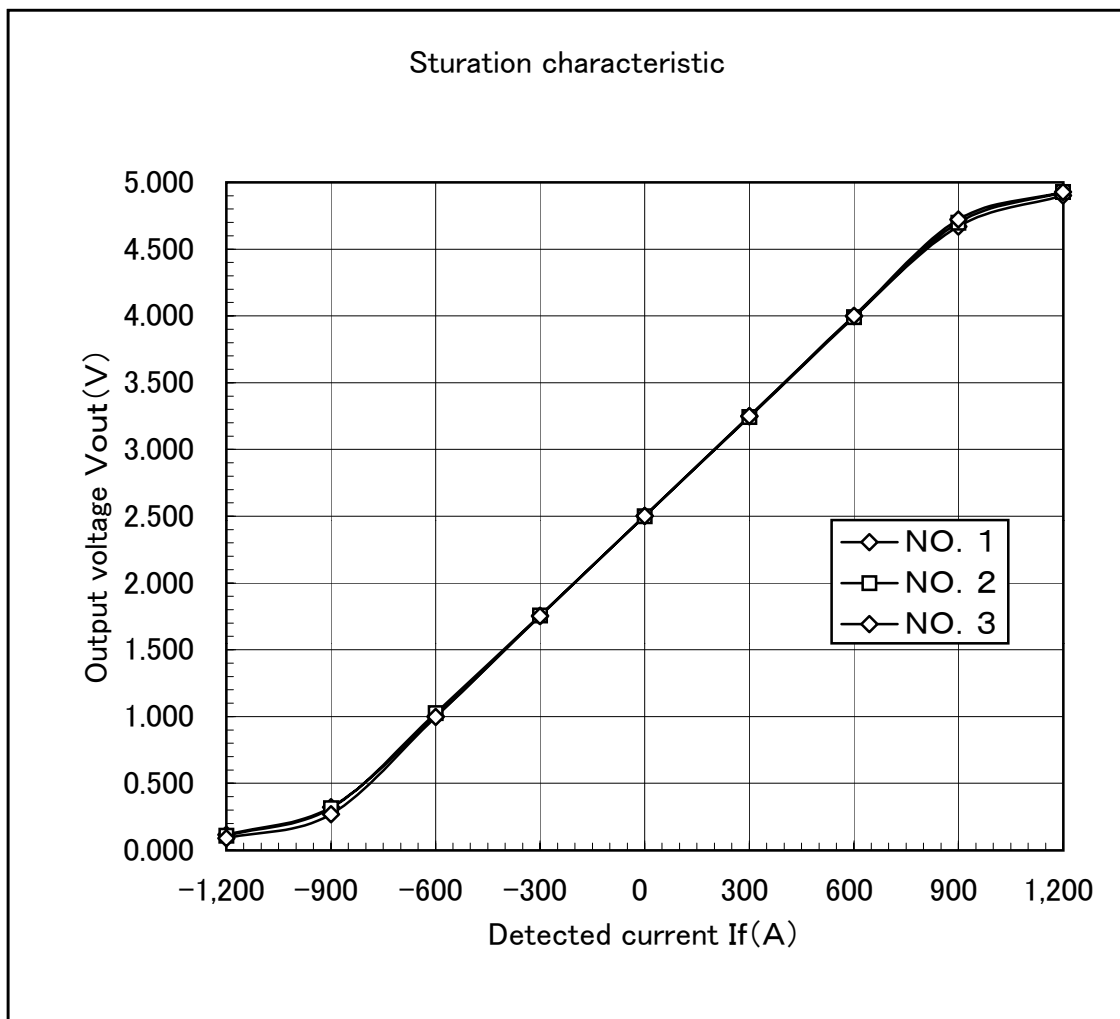
Detected current $I_f(A)$	Output voltage $V_{out}(V)$					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
600.0	4.930	4.930	4.930	4.930	4.929	
450.0	4.673	4.625	4.622	4.662	4.647	
300.0	4.016	3.983	3.981	4.008	3.997	
150.0	3.257	3.242	3.241	3.254	3.247	
0.0	2.501	2.502	2.504	2.501	2.499	
-150.0	1.745	1.763	1.766	1.748	1.751	
-300.0	0.986	1.021	1.026	0.993	1.001	
-450.0	0.226	0.278	0.285	0.236	0.249	
-600.0	0.094	0.106	0.107	0.094	0.098	



《Saturation characteristic》

RL=10k Ω V_{CC}=+5V

Detected current If(A)	Output voltage Vout(V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
1,200.0	4.901	4.929	4.928	4.928	4.922	
900.0	4.670	4.697	4.721	4.738	4.674	
600.0	3.998	3.991	4.000	4.022	3.997	
300.0	3.248	3.244	3.250	3.260	3.249	
0.0	2.502	2.500	2.502	2.497	2.499	
-300.0	1.754	1.758	1.752	1.741	1.743	
-600.0	1.002	1.027	0.998	0.982	0.986	
-900.0	0.321	0.315	0.269	0.290	0.308	
-1,200.0	0.116	0.108	0.088	0.097	0.121	

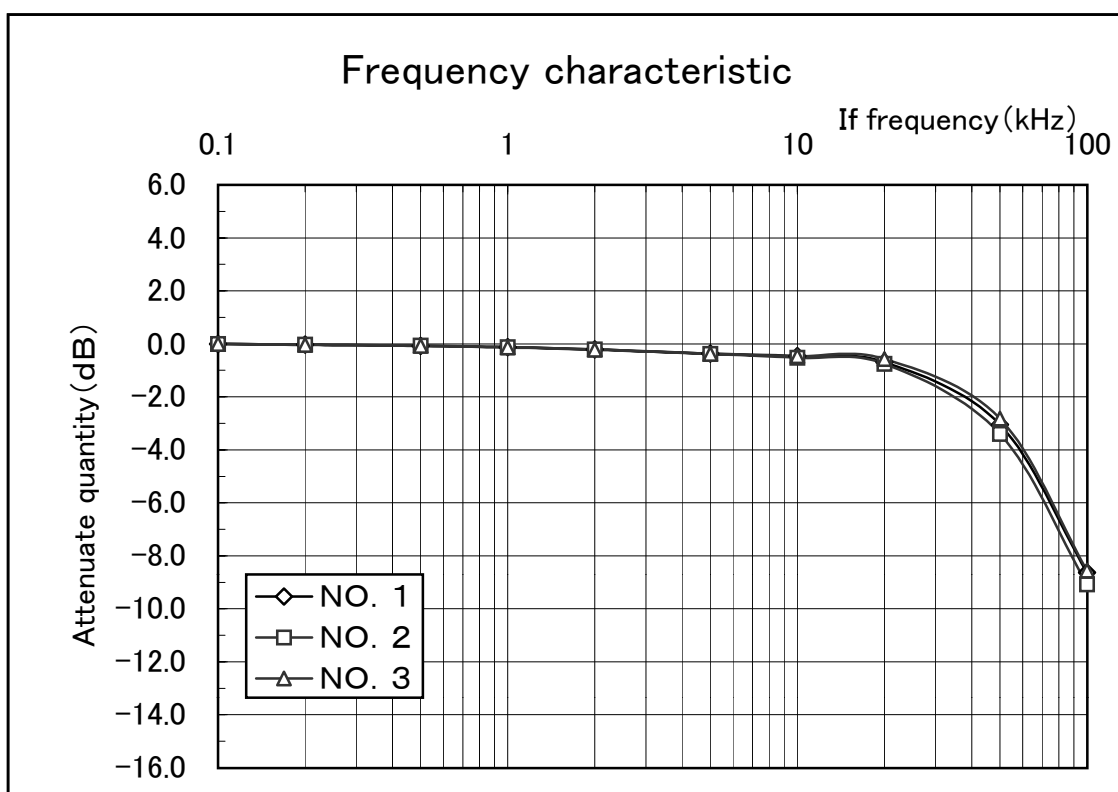


《Frequency characteristic》

Detected If=6.00(Arms) $V_{cc}=\pm 15V$ $R_L=10k\Omega$

If frequency (kHz)	Output Voltage Vout (V)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.1	0.0859	0.0859	0.0855			
0.2	0.0856	0.0856	0.0851			
0.5	0.0852	0.0853	0.0848			
1	0.0847	0.0847	0.0842			
2	0.0839	0.0838	0.0834			
5	0.0824	0.0822	0.0819			
10	0.0814	0.0809	0.0811			
20	0.0793	0.0788	0.0801			
50	0.0605	0.0581	0.0618			
100	0.0318	0.0302	0.0319			

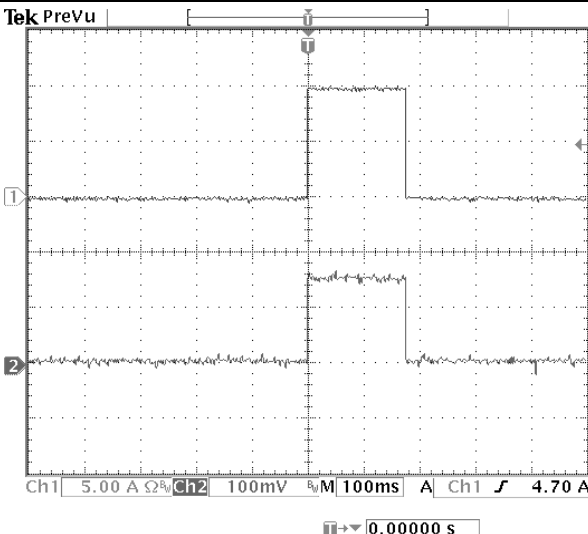
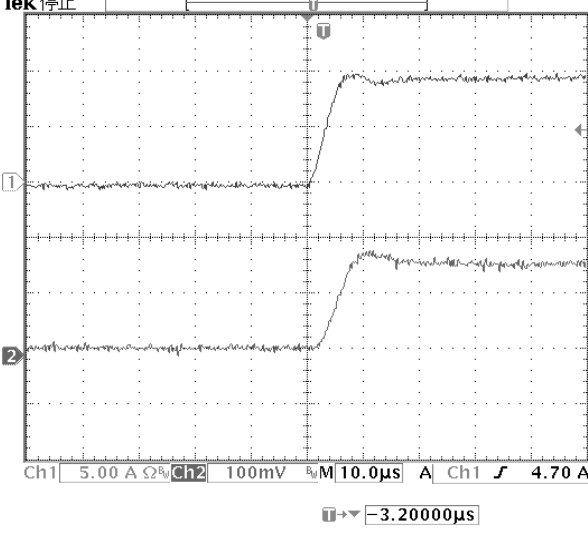
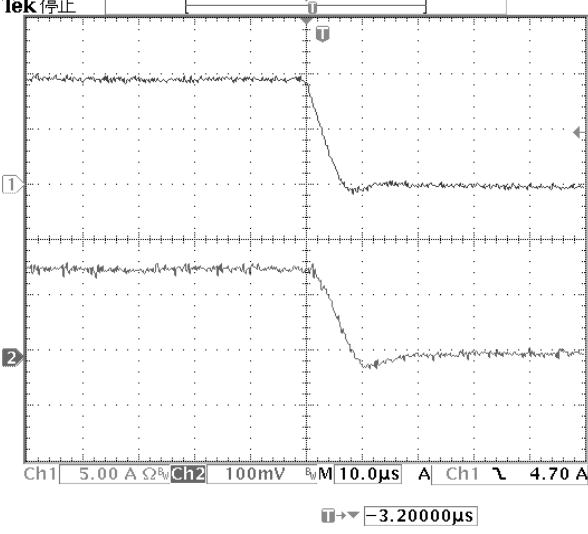
If frequency (kHz)	Output voltage attenuate quantity (dB)					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
0.1	0.000	0.000	0.000			
0.2	-0.030	-0.030	-0.041			
0.5	-0.071	-0.061	-0.071			
1	-0.122	-0.122	-0.133			
2	-0.205	-0.215	-0.216			
5	-0.361	-0.382	-0.374			
10	-0.467	-0.521	-0.459			
20	-0.694	-0.749	-0.567			
50	-3.045	-3.396	-2.820			
100	-8.631	-9.080	-8.564			



CONDITION

L01Z100S05

応答波形

TEST POINT	OSCILLOSCOPE SETTING	WAVE FORM
No. 1-1	Vert. <u>5A /div</u> <u>100mV/div</u> <u>/div</u> <u>/div</u> Horiz. <u>100ms/div</u> Notes wave form 1: input wave form wave form 2: output wave form	 Tek PreVu Ch1 5.00 A Ω Ch2 100mV $\%M$ 100ms A Ch1 4.70 A 0.00000 s 26 Feb. 2002 18:32:33
No. 1-2	Vert. <u>5A /div</u> <u>100mV/div</u> <u>/div</u> <u>/div</u> Horiz. <u>10 μs/div</u> Notes	 Tek 停止 Ch1 5.00 A Ω Ch2 100mV $\%M$ 10.0μs A Ch1 4.70 A -3.20000μs 26 Feb. 2002 18:33:04
No. 1-3	Vert. <u>5A /div</u> <u>100mV/div</u> <u>/div.</u> <u>/div.</u> Horiz. <u>10 μs/div</u> Notes	 Tek 停止 Ch1 5.00 A Ω Ch2 100mV $\%M$ 10.0μs A Ch1 4.70 A -3.20000μs 26 Feb. 2002 18:33:31

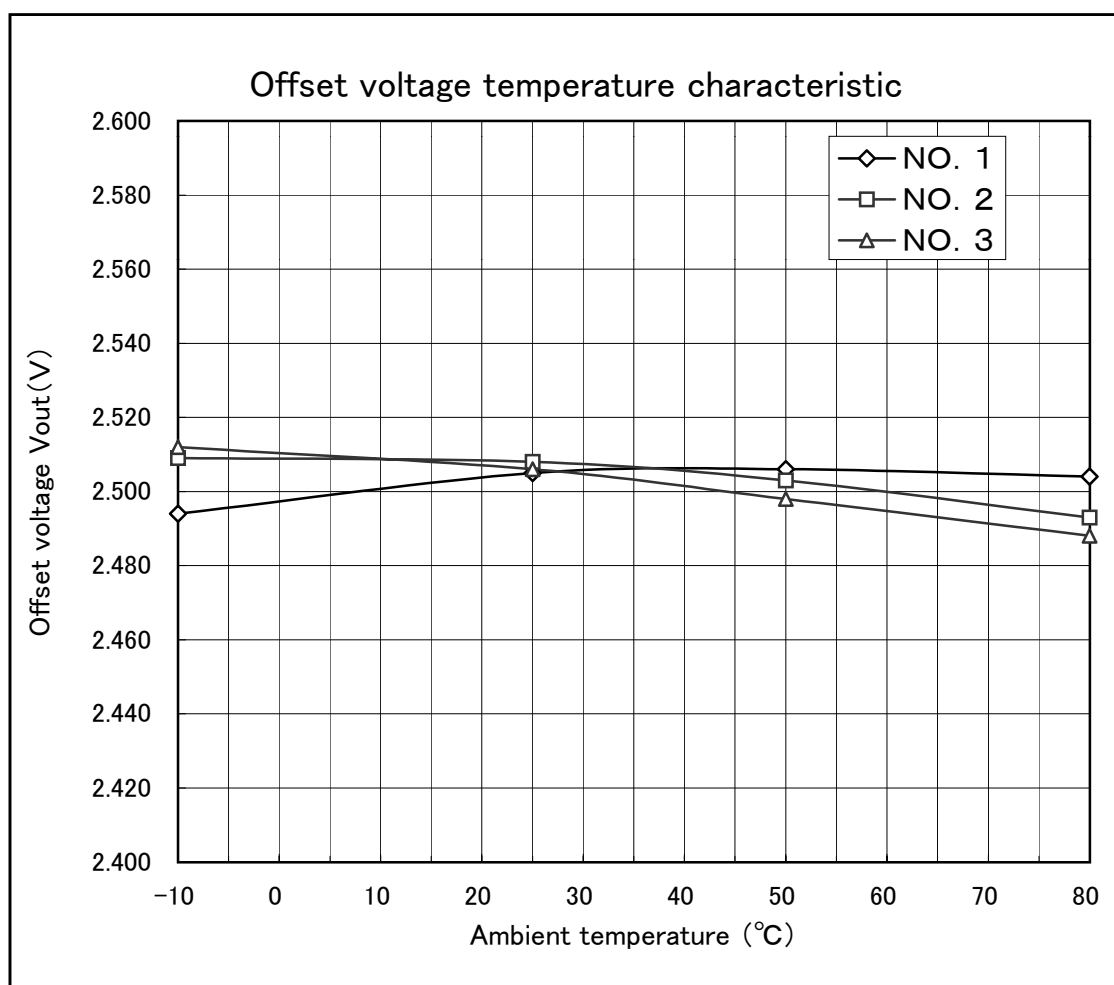
《Temperature characteristic — 1 (Offset voltage)》

Detected current $I_f=0(A)$ $R_L=10k\Omega$ $V_{CC}=\pm 15V$

Ambient temperature	Output voltage $V_{out}(V)$					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
-10	2.494	2.509	2.512			
25	2.505	2.508	2.506			
50	2.506	2.503	2.498			
80	2.504	2.493	2.488			

(mV/°C)

Coefficient 25→-1	-0.314	0.029	0.171		
Coefficient 25→80	-0.018	-0.273	-0.327		



《Temperature characteristic—2 (Rated output voltage)》

Detected current $I_f=100(\text{AT})$ $R_L=10\text{k}\Omega$ $V_{CC}=+5\text{V}$

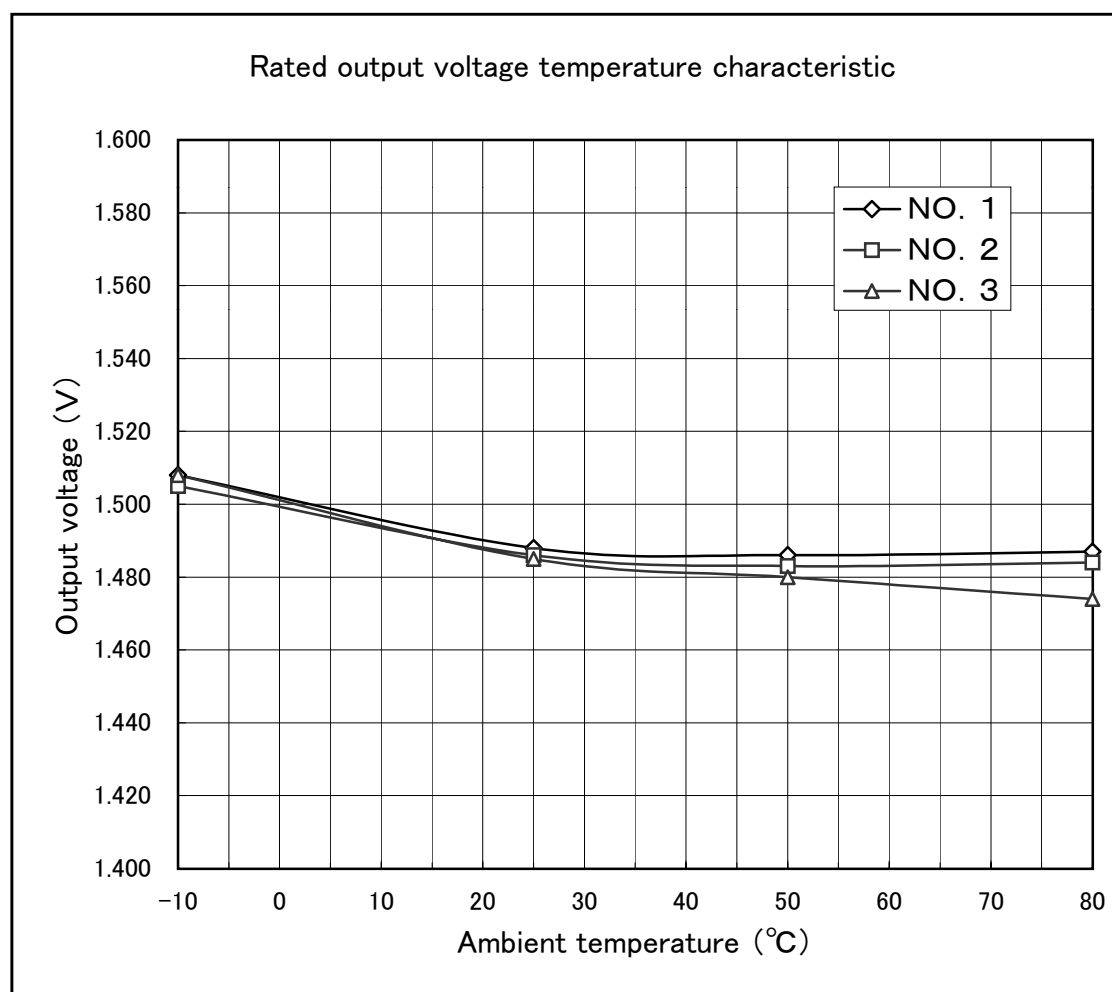
temperature (°C)	Output voltage $V_{out}(\text{V})$					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
−10	4.002	4.014	4.020			
25	3.993	3.994	3.991			
50	3.992	3.986	3.978			
80	3.991	3.977	3.962			

【considering offset voltage temperature fluctuations】 Temperature characteristic-1(Offset voltage).

Ambient temperature (°C)	Output voltage $V_{out}(\text{V})$					Remarks
	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	
−10	1.508	1.505	1.508			
25	1.488	1.486	1.485			
50	1.486	1.483	1.480			
80	1.487	1.484	1.474			

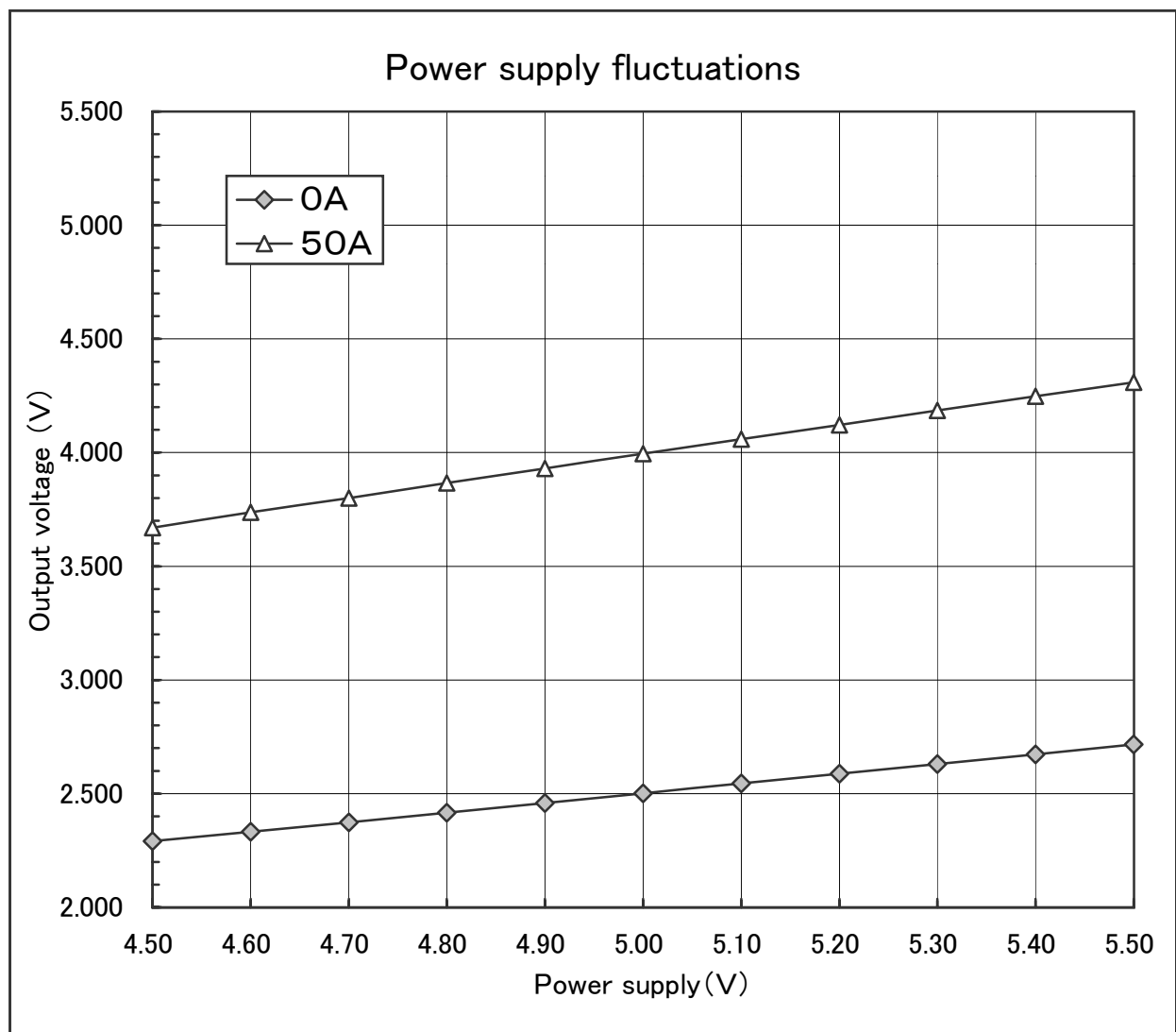
(mV/°C)

Coefficient 25→−10	0.571	0.543	0.657		
Coefficient 25→80	−0.018	−0.036	−0.200		



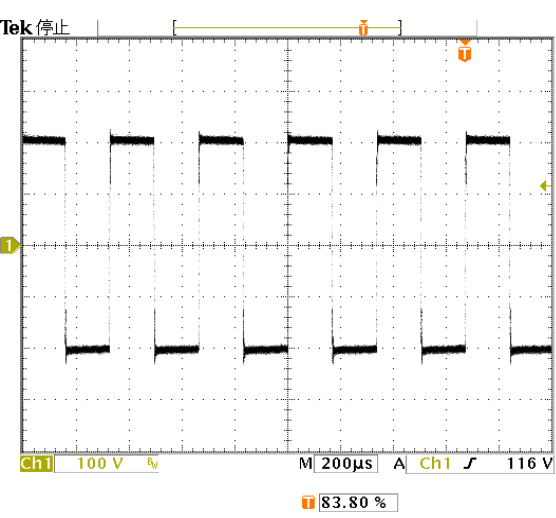
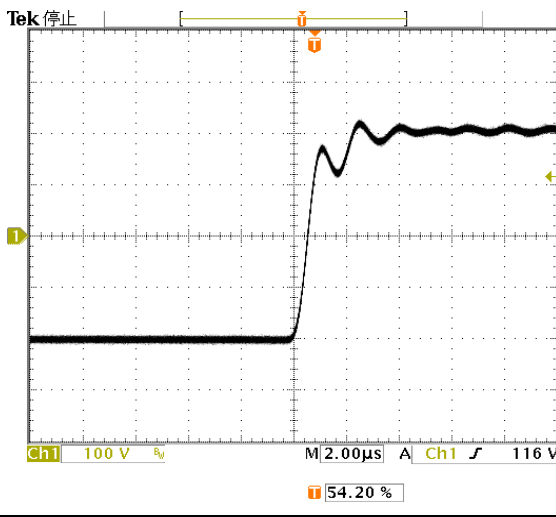
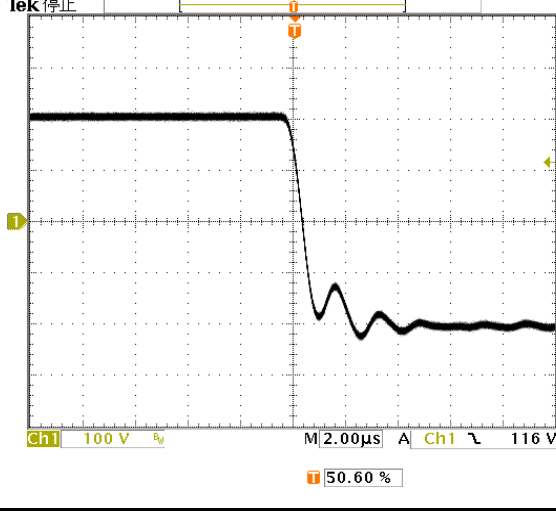
RL=10k Ω

Power Supply (V)	Vout(V)						remark
	NO. 1						
	0A	50A					
5.5	2.716	4.309					
5.4	2.672	4.248					
5.3	2.630	4.186					
5.2	2.587	4.122					
5.1	2.545	4.059					
5.0	2.501	3.995					
4.9	2.459	3.930					
4.8	2.416	3.866					
4.7	2.374	3.800					
4.6	2.332	3.737					
4.5	2.291	3.669					



CONDITION

d V / d t characteristic**Input voltage wave form (inside of through hole and terminal)**

TEST POINT	OSCILLOSCOPE SETTING	WAVE FORM
No. 1—1	Vert. <u>100V /div</u> /div /div /div Horiz. <u>200 μs/div</u> Notes Whole waves	
No. 1—2	Vert. <u>100V /div</u> /div /div /div Horiz. <u>2 μs/div</u> Notes rising wave forms	
No. 1—3	Vert. <u>100V /div</u> /div /div /div Horiz. <u>2 μs/div</u> Notes falling wave forms	

CONDITION

dV / dt 特性

L01Z * * * S05 Output voltage wave form

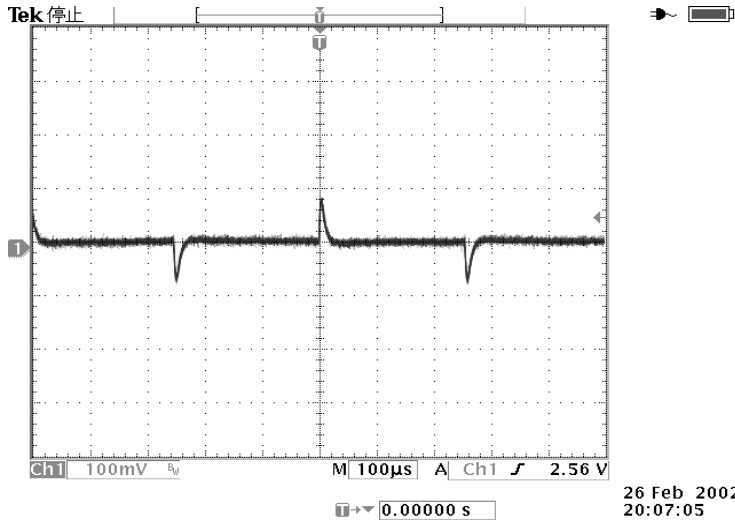
TEST POINT

OSCILLOSCOPE SETTING

WAVE FORM

No. 1

Vert. 100mV/div



/div

/div

/div

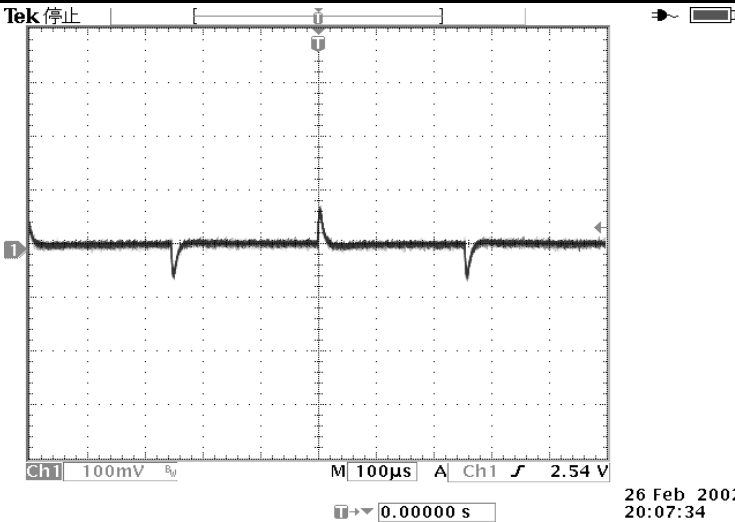
Horiz. 100 µs/div

Notes

50A

No. 1

Vert. 100mV/div



/div

/div

/div

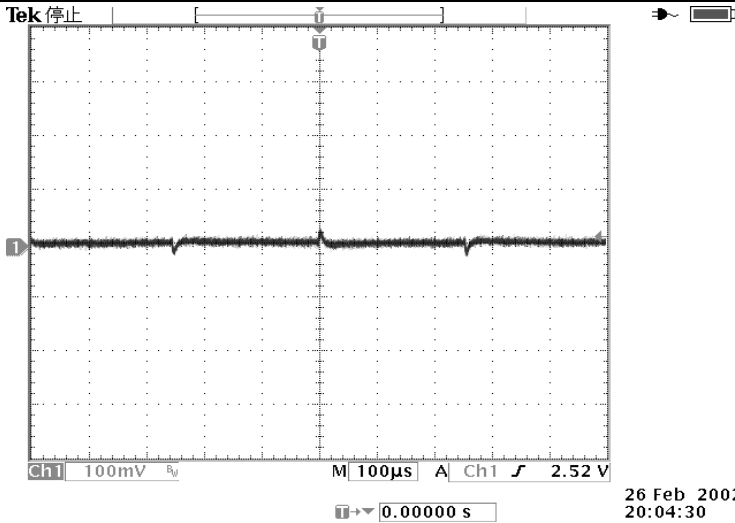
Horiz. 100 µs/div

Notes

100A

No. 1

Vert. 100mV/div



/div

/div

/div

Horiz. 100 µs/div

Notes

300A

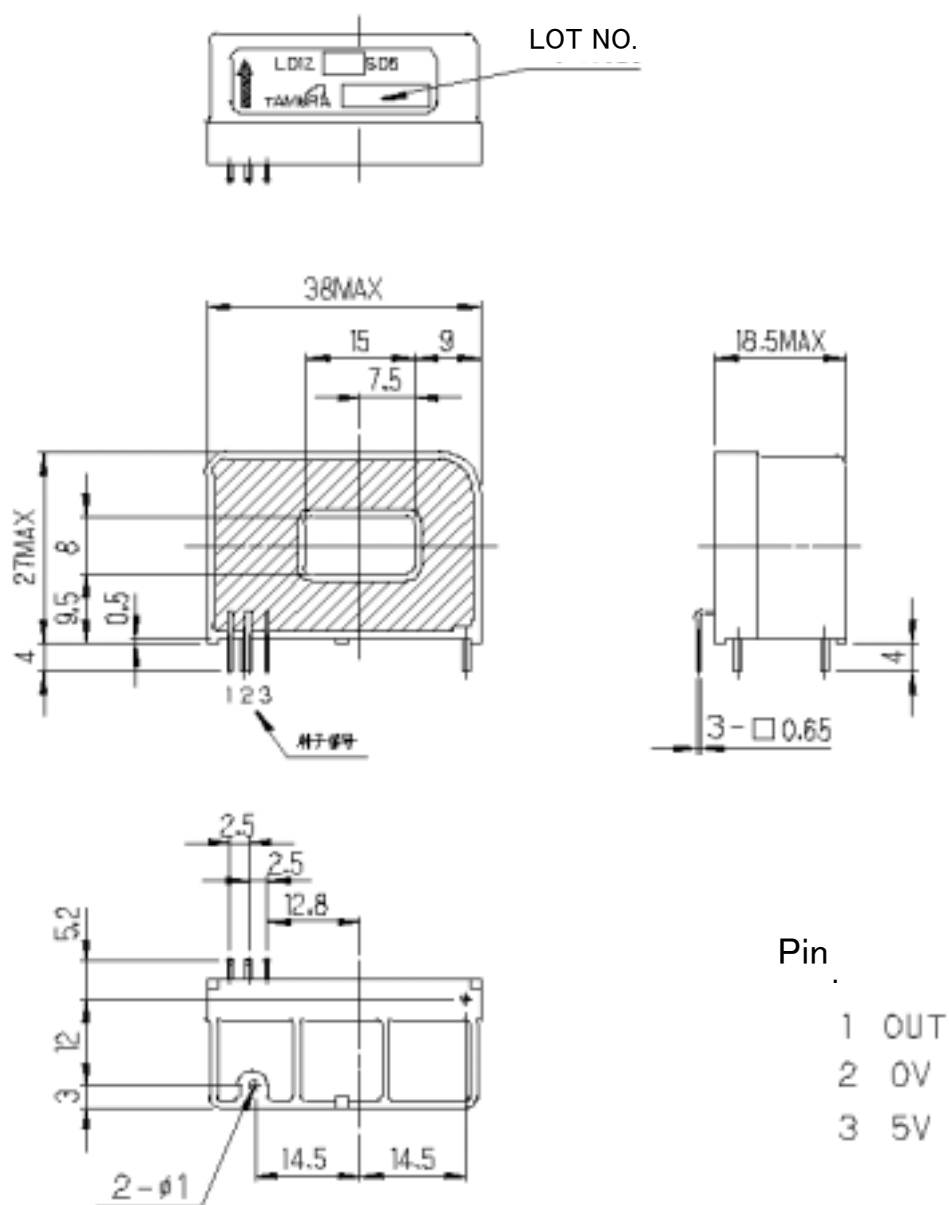
Specification of current sensors

Ta=25°C, RL=10kΩ, Vcc=5V

type specification	L01Z050S05	L01Z100S05	L01Z150S05	L01Z200S05	L01Z300S05	L01Z400S05	L01Z500S05	L01Z600S05
Rated current	50A	100A	150A	200A	300A	400A	500A	600A
Saturation current	If × 1.25							
Output voltage	Vref+1.5V±0.045V	Vref+1.5V±0.035V						
Saturation voltage	less than 0.5V and more than 4.5V							
Offset voltage	Vref±0.035V	Vref±0.030V						
Output linearity	±1% (at If) 0A~Ifmax							
Power supply	5V±0.1V							
Current consumption	less than 15mA							
di/dt Response time	less than 5 μ s (at di/dt=10A/5 μ s)							
Output temperature characteristic	less than ±2mV/°C	less than ±1.5mV/°C						
Offset temperature characteristic	less than ±2mV/°C	less than ±1mV/°C						
Hysteresis width	0.008V			0.004V		0.006V		
Insulation withstanding voltage	AC2500V for 1minute (sensing current 0.5mA) , inside of through hole ⇔ terminal							
Insulation resistance	500MΩ or more (at DC500V) ,inside of through hole ⇔ terminal							
Operating temperature	-10~+80°C							
Storage temperature	-15~+85°C							

remark 1 : Vref=Vcc/2

L01Z***S05 series current sensor dimensions



Remark

1.tolerance 0.5mm

2.unit mm