

No.2605B

# L79M00T Series

- 5 to -12V 0.5A 3-Pin Voltage Regulators

**Features**

- Output voltage      L79M05T: -5V    L79M06T: -6V    L79M08T: -8V    L79M09T: -9V  
                                 L79M10T: -10V    L79M12T: -12V
- 500mA output
- Small-sized power package TP-3H permitting the equipment to be made compact
- The allowable power dissipation can be increased by being surface-mounted on the board.
- Capable of being mounted in a variety of methods because of various lead forming versions available
- On-chip protectors (overcurrent limiter, ASO protector, thermal protector)
- Can meet tape-used automatic mounting requirements.

[Common to L79M00T series]

**Maximum Ratings at Ta = 25°C**

			unit
Maximum Supply Voltage	V <sub>CC</sub> max	-5 to -12V output	-35 V
Allowable Power Dissipation	P <sub>d</sub> max		1.0 W
Operating Temperature	T <sub>opr</sub>		-30 to +80 °C
Storage Temperature	T <sub>stg</sub>		-40 to +150 °C

[L79M05T]

**Recommended Operating Conditions at Ta = 25°C**

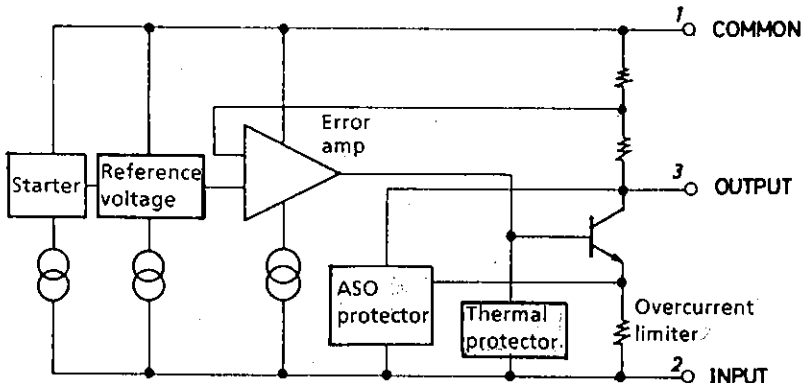
			unit
Input Voltage	V <sub>IN</sub>	-20 to -7.5	V
Output Current	I <sub>OUT</sub>	5 to 500	mA

**Operating Characteristics at Ta = 25°C, V<sub>IN</sub> = -10V, I<sub>OUT</sub> = 350mA, C<sub>IN</sub> = 2μF, C<sub>OUT</sub> = 1μF**

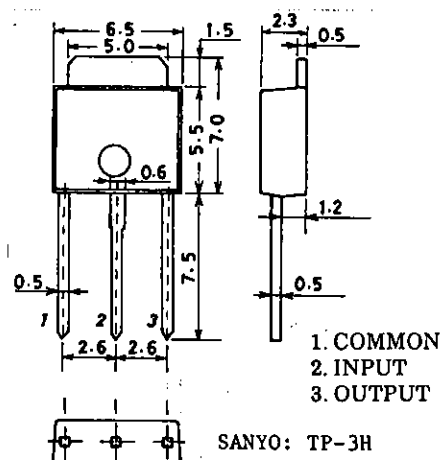
			min	typ	max	unit
Output Voltage	V <sub>OUT</sub>	T <sub>j</sub> = 25°C	-5.2	-5.0	-4.8	V
Line Regulation	ΔV <sub>oline</sub>	T <sub>j</sub> = 25°C, -25V ≤ V <sub>IN</sub> ≤ -7V		7.0	50	mV
		T <sub>j</sub> = 25°C, -18V ≤ V <sub>IN</sub> ≤ -8V		3.0	30	mV
Load Regulation	ΔV <sub>oload</sub>	T <sub>j</sub> = 25°C, 5mA ≤ I <sub>OUT</sub> ≤ 500mA		10	100	mV
		T <sub>j</sub> = 25°C, 5mA ≤ I <sub>OUT</sub> ≤ 350mA		5		mV

Continued on next page.

**Equivalent Circuit**



**Package Dimensions 3110-S3HIC (unit: mm)**



L79M00T Series

Continued from preceding page.

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$-25V \leq V_{IN} \leq -7V,$ $5mA \leq I_{OUT} \leq 350mA$	-5.25		-4.75	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ C$		1.0	2.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-25V \leq V_{IN} \leq -8V$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5mA \leq I_{OUT} \leq 350mA$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10Hz \leq f \leq 100kHz$		125		$\mu V$
Ripple Rejection	$R_{rej}$	$f = 120Hz$ $-18V \leq V_{IN} \leq -8V$ $T_j = 25^\circ C$	$I_{OUT} = 100mA$ 50 $I_{OUT} = 300mA$ 50		65	dB dB
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ C, I_{OUT} = 350mA$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ C, V_{IN} = -30V$		130		mA
Peak Output Current	$I_{op}$			800		mA

[L79M06T]

Recommended Operating Conditions at  $T_a = 25^\circ C$

				unit
Input Voltage	$V_{IN}$		-21 to -8.5	V
Output Current	$I_{OUT}$		5 to 500	mA

Operating Characteristics at  $T_a = 25^\circ C, V_{IN} = -11V, I_{OUT} = 350mA, C_{IN} = 2\mu F, C_{OUT} = 1\mu F$

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$T_j = 25^\circ C$	-6.25	-6.0	-5.75	V
Line Regulation	$\Delta V_{oline}$	$T_j = 25^\circ C, -25V \leq V_{IN} \leq -8V$		7.0	60	mV
		$T_j = 25^\circ C, -19V \leq V_{IN} \leq -9V$		3.0	40	mV
Load Regulation	$\Delta V_{oload}$	$T_j = 25^\circ C, 5mA \leq I_{OUT} \leq 500mA$		10	120	mV
		$T_j = 25^\circ C, 5mA \leq I_{OUT} \leq 350mA$		5		mV
Output Voltage	$V_{OUT}$	$-25V \leq V_{IN} \leq -8V,$ $5mA \leq I_{OUT} \leq 350mA$	-6.3		-5.7	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ C$		1.0	2.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-25V \leq V_{IN} \leq -9V$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5mA \leq I_{OUT} \leq 350mA$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10Hz \leq f \leq 100kHz$		150		$\mu V$
Ripple Rejection	$R_{rej}$	$f = 120Hz$ $-19V \leq V_{IN} \leq -9V$ $T_j = 25^\circ C$	$I_{OUT} = 100mA$ 50 $I_{OUT} = 300mA$ 50		65	dB dB
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ C, I_{OUT} = 350mA$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ C, V_{IN} = -30V$		130		mA
Peak Output Current	$I_{op}$			800		mA

[L79M08T]

Recommended Operating Conditions at  $T_a = 25^\circ C$

				unit
Input Voltage	$V_{IN}$		-23 to -11	V
Output Current	$I_{OUT}$		5 to 500	mA

## L79M00T Series

**Operating Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{IN} = -14\text{V}$ ,  $I_{OUT} = 350\text{mA}$ ,  $C_{IN} = 2\mu\text{F}$ ,  $C_{OUT} = 1\mu\text{F}$**

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$	-8.3	-8.0	-7.7	V
Line Regulation	$\Delta V_{oline}$	$T_j = 25^\circ\text{C}$ , $-25\text{V} \leq V_{IN} \leq -10.5\text{V}$		8.0	80	mV
Load Regulation	$\Delta V_{oload}$	$T_j = 25^\circ\text{C}$ , $-21\text{V} \leq V_{IN} \leq -11\text{V}$		4.0	50	mV
		$T_j = 25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 500\text{mA}$		11	160	mV
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	-8.4		-7.6	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ\text{C}$		1.0	2.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-25\text{V} \leq V_{IN} \leq -10.5\text{V}$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		200		$\mu\text{V}$
Ripple Rejection	$R_{rej}$	$f = 120\text{Hz}$ $-21.5\text{V} \leq V_{IN} \leq -11.5\text{V}$ $T_j = 25^\circ\text{C}$	$I_{OUT} = 100\text{mA}$		50	dB
			$I_{OUT} = 300\text{mA}$		50	64
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 350\text{mA}$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ\text{C}$ , $V_{IN} = -30\text{V}$		130		mA
Peak Output Current	$I_{op}$			800		mA

[L79M09T]

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

				unit
Input Voltage	$V_{IN}$		-25 to -12	V
Output Current	$I_{OUT}$		5 to 500	mA

**Operating Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{IN} = -16\text{V}$ ,  $I_{OUT} = 350\text{mA}$ ,  $C_{IN} = 2\mu\text{F}$ ,  $C_{OUT} = 1\mu\text{F}$**

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$	-9.4	-9.0	-8.6	V
Line Regulation	$\Delta V_{oline}$	$T_j = 25^\circ\text{C}$ , $-25\text{V} \leq V_{IN} \leq -11.5\text{V}$		8.0	80	mV
Load Regulation	$\Delta V_{oload}$	$T_j = 25^\circ\text{C}$ , $-20\text{V} \leq V_{IN} \leq -12\text{V}$		4.0	50	mV
		$T_j = 25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 500\text{mA}$		12	200	mV
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	-9.5		-8.5	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ\text{C}$		1.0	2.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-25\text{V} \leq V_{IN} \leq -11.5\text{V}$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		225		$\mu\text{V}$
Ripple Rejection	$R_{rej}$	$f = 120\text{Hz}$ $-22.5\text{V} \leq V_{IN} \leq -12.5\text{V}$ $T_j = 25^\circ\text{C}$	$I_{OUT} = 100\text{mA}$		50	dB
			$I_{OUT} = 300\text{mA}$		50	63
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ\text{C}$ , $I_{OUT} = 350\text{mA}$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ\text{C}$ , $V_{IN} = -30\text{V}$		130		mA
Peak Output Current	$I_{op}$			800		mA

L79M00T Series

[L79M10T]

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

			unit
Input Voltage	$V_{IN}$	-25 to -13	V
Output Current	$I_{OUT}$	5 to 500	mA

Operating Characteristics at  $T_a = 25^\circ\text{C}, V_{IN} = -17\text{V}, I_{OUT} = 350\text{mA}, C_{IN} = 2\mu\text{F}, C_{OUT} = 1\mu\text{F}$

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$	-10.4	-10	-9.6	V
Line Regulation	$\Delta V_{oline}$	$T_j = 25^\circ\text{C}, -25\text{V} \leq V_{IN} \leq -12.5\text{V}$		9.0	80	mV
Load Regulation	$\Delta V_{oload}$	$T_j = 25^\circ\text{C}, -22\text{V} \leq V_{IN} \leq -13\text{V}$		5.0	50	mV
		$T_j = 25^\circ\text{C}, 5\text{mA} \leq I_{OUT} \leq 500\text{mA}$		12	200	mV
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}, 5\text{mA} \leq I_{OUT} \leq 350\text{mA}$		7		mV
		$-25\text{V} \leq V_{IN} \leq -12.5\text{V},$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	-10.5		-9.5	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ\text{C}$		1.0	2.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-25\text{V} \leq V_{IN} \leq -12.5\text{V}$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		250		$\mu\text{V}$
Ripple Rejection	$R_{rej}$	$f = 120\text{Hz}$		50		dB
		$-23.5\text{V} \leq V_{IN} \leq -13.5\text{V}$ $T_j = 25^\circ\text{C}$	$I_{OUT} = 100\text{mA}$ $I_{OUT} = 300\text{mA}$	50 63		dB
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ\text{C}, I_{OUT} = 350\text{mA}$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ\text{C}, V_{IN} = -30\text{V}$		130		mA
Peak Output Current	$I_{op}$			800		mA

[L79M12T]

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

			unit
Input Voltage	$V_{IN}$	-25 to -15	V
Output Current	$I_{OUT}$	5 to 500	mA

Operating Characteristics at  $T_a = 25^\circ\text{C}, V_{IN} = -19\text{V}, I_{OUT} = 350\text{mA}, C_{IN} = 2\mu\text{F}, C_{OUT} = 1\mu\text{F}$

			min	typ	max	unit
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}$	-12.5	-12	-11.5	V
Line Regulation	$\Delta V_{oline}$	$T_j = 25^\circ\text{C}, -30\text{V} \leq V_{IN} \leq -14.5\text{V}$		9.0	80	mV
Load Regulation	$\Delta V_{oload}$	$T_j = 25^\circ\text{C}, -25\text{V} \leq V_{IN} \leq -15\text{V}$		5.0	50	mV
		$T_j = 25^\circ\text{C}, 5\text{mA} \leq I_{OUT} \leq 500\text{mA}$		9	240	mV
Output Voltage	$V_{OUT}$	$T_j = 25^\circ\text{C}, 5\text{mA} \leq I_{OUT} \leq 350\text{mA}$		6		mV
		$-30\text{V} \leq V_{IN} \leq -14.5\text{V},$ $5\text{mA} \leq I_{OUT} \leq 350\text{mA}$	-12.6		-11.4	V
Current Dissipation	$I_{CC}$	$T_j = 25^\circ\text{C}$		1.6	3.5	mA
Current Dissipation Variation (Line)	$\Delta I_{CCline}$	$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$			1.0	mA
Current Dissipation Variation (Load)	$\Delta I_{CCload}$	$5\text{mA} \leq I_{OUT} \leq 350\text{mA}$			0.4	mA
Output Noise Voltage	$V_{NO}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		300		$\mu\text{V}$
Ripple Rejection	$R_{rej}$	$f = 120\text{Hz}$		50		dB
		$-25\text{V} \leq V_{IN} \leq -15\text{V}$ $T_j = 25^\circ\text{C}$	$I_{OUT} = 100\text{mA}$ $I_{OUT} = 300\text{mA}$	50 72		dB
Minimum Input-Output Voltage Drop	$V_{drop}$	$T_j = 25^\circ\text{C}, I_{OUT} = 350\text{mA}$		1.1		V
Short Current	$I_{OS}$	$T_j = 25^\circ\text{C}, V_{IN} = -30\text{V}$		130		mA
Peak Output Current	$I_{op}$			800		mA

**SANYO**

No.3238

**LA5668****Multifunctional Voltage Regulator**

The LA5668 is a multifunctional voltage regulator IC especially suited for use in portable musical instrument applications.

**Functions and Features**

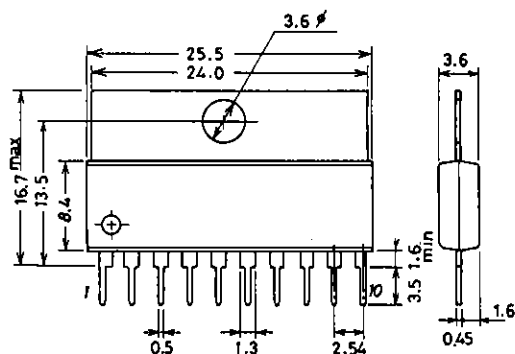
- Power output : 1.0A
- Analog output : 5.5V, 0.1A
- Digital output : 5.0V, 0.1A
- Low  $I_{CC}$  at power-OFF mode (APO = OFF) : 35 $\mu$ A typ

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

			unit
Input Voltage	$V_{IN}$ max	18	V
	$V_{DIN}$ max	18	V
Output Current	$I_{CO}$ max	1.0	A
	$I_{AO}$ max	100	mA
	$I_{DO}$ max	100	mA
Allowable Power Dissipation	$P_d$ max	2.45	W
Operating Temperature	$T_{opr}$	-30 to +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$

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

			unit
Input Voltage	$V_{IN}$	7.0 to 15	V
	$V_{DIN}$	7.0 to 15	V
APO Pin ON-State Voltage	$V_{APO ON}$	2 to $V_{IN}$	V
APO Pin OFF-State Voltage	$V_{APO OFF}$	-0.3 to +0.3	V

**Package Dimensions 3046A-S10FIC**  
(unit: mm)

SANYO: SEP10F

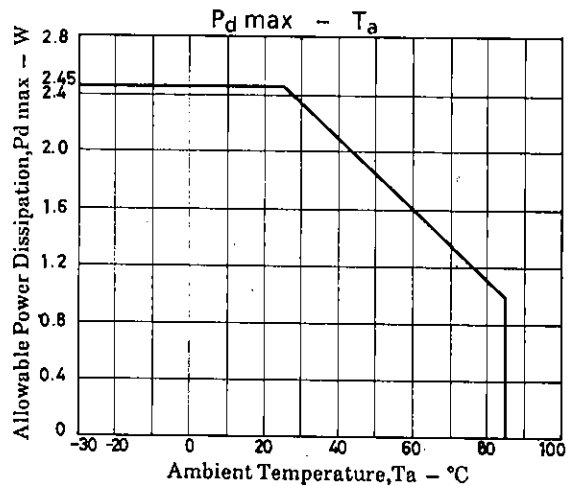
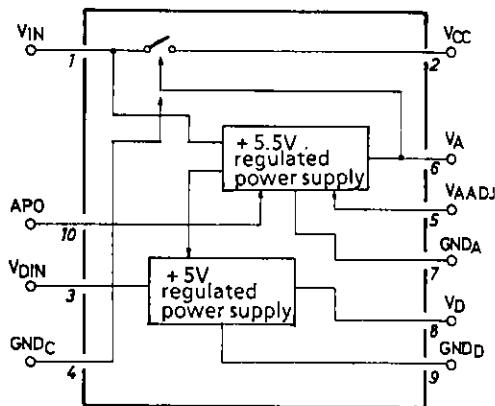
# LA5668

## Operating Characteristics at $T_a = 25^\circ\text{C}$

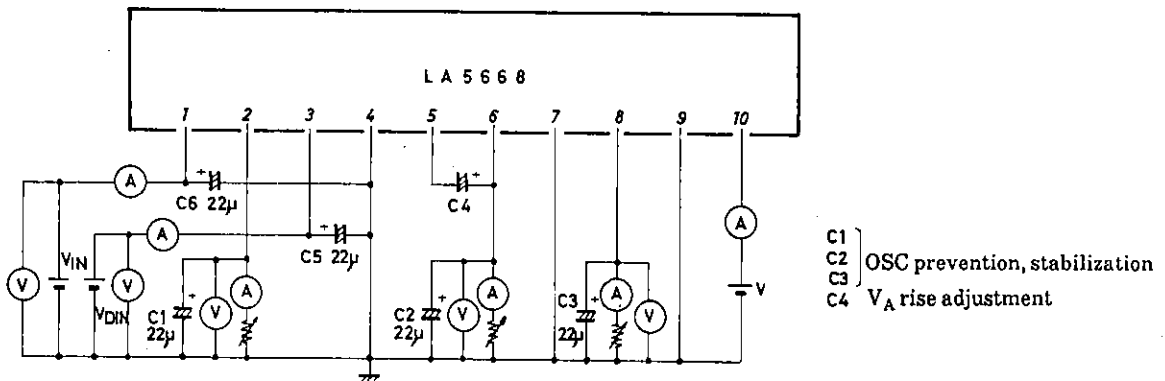
( $V_{IN} = V_{DIN} = V_{APO} = 9\text{V}$ ,  $C1 = C2 = C3 = 22\mu\text{F}$  unless otherwise specified)

			min	typ	max	unit
Quiescent Current	$I_{CC1}$	$V_{APO} = 0\text{V}$		35	50	$\mu\text{A}$
	$I_{CC2}$	$V_{APO} = V_{IN}$		8.0	11.0	$\text{mA}$
Output Voltage	$V_{AO}$	$I_{AO} = 50\text{mA}$	5.05	5.5	5.95	V
	$V_{D10}$	$V_{APO} = 0\text{V}, I_{D0} = 5\text{mA}$	4.55	5.0	5.45	V
	$V_{D20}$	$V_{APO} = V_{IN}, I_{D0} = 50\text{mA}$	4.55	5.0	5.45	V
	$V_{AO}$ Line	$7.0 \leq V_{IN} \leq 13\text{V}, I_{AO} = 50\text{mA}$			50	mV
Line Regulation	$V_{D10}$ Line	$7.0 \leq V_{IN} \leq 13\text{V}, V_{APO} = 0\text{V}, I_{D0} = 5\text{mA}$			50	mV
	$V_{D20}$ Line	$7.0 \leq V_{IN} \leq 13\text{V}, V_{APO} = V_{IN}, I_{D0} = 50\text{mA}$			50	mV
	$V_{A1}$ Load	$1 \leq I_{A10} \leq 40\text{mA}$			50	mV
Load Regulation	$V_{A2}$ Load	$1 \leq I_{A20} \leq 80\text{mA}$			100	mV
	$V_{D10}$ Load	$1 \leq I_{D0} \leq 10\text{mA}, V_{APO} = 0\text{V}$			50	mV
	$V_{D20}$ Load	$1 \leq I_{D0} \leq 80\text{mA}, V_{APO} = V_{IN}$			50	mV
	Input-Output Voltage Difference	$V_{dA}$	$V_{IN} - V_O$ at $V_d: V_O$ 5% OFF, $I_{AO} = 50\text{mA}$	0.9	1.2	
$V_{dD}$		$V_{IN} - V_O$ at $V_d: V_O$ 5% OFF, $I_{D0} = 50\text{mA}$	0.9	1.2		V
$V_{dOC}$		$I_{CD} = 500\text{mA}, V_{IN} - V_D$ at $V_{IN} = 9\text{V}$	1.1	1.6		V
Ripple Rejection	$R_{rA}$	$f = 50\text{Hz}, 120\text{Hz}, I_{AO} = 100\text{mA}$		40		dB
	$R_{rD}$	$f = 50\text{Hz}, 120\text{Hz}, I_{D0} = 100\text{mA}$		45		dB
APO Input Current	$I_{APO}$	$V_{APO} = 5\text{V}$	66	86	123	$\mu\text{A}$
$V_C$ ON-State Voltage	$V_C$ ON	$V_A$ voltage at $V_{APO} = 0\text{V}$	1.5			V
$V_C$ OFF-State Voltage	$V_C$ OFF	$V_A$ voltage at $V_{APO} = 0\text{V}$			0.5	V
$V_A - V_D$ Voltage	$V_A - V_D$	$I_{AO} = 25\text{mA}, I_{D0} = 15\text{mA}$ at $V_{CC} = 5.5\text{V}, 9\text{V}$	-0.3			V

## Block Diagram and Pin Assignment

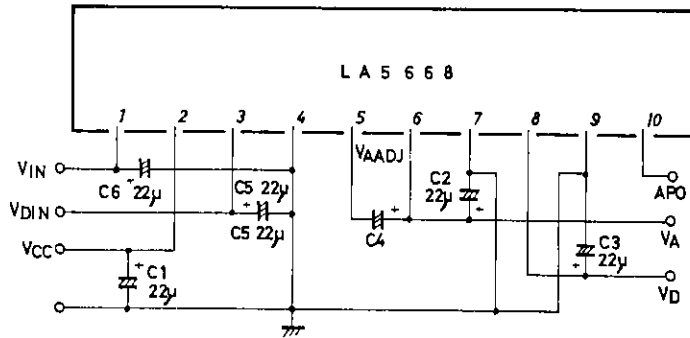


## Test Circuit



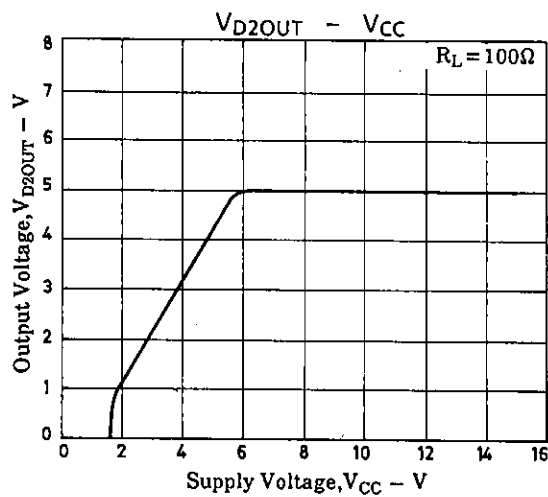
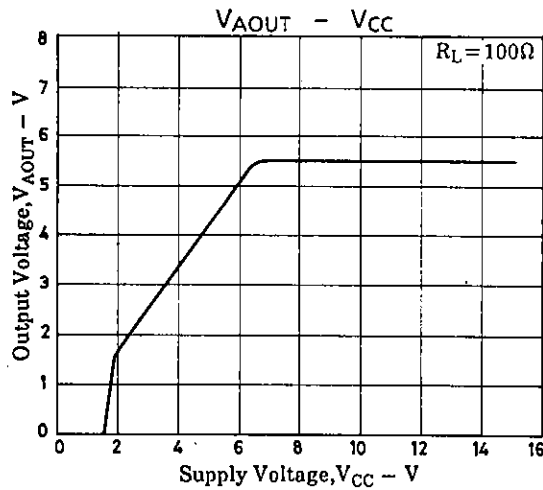
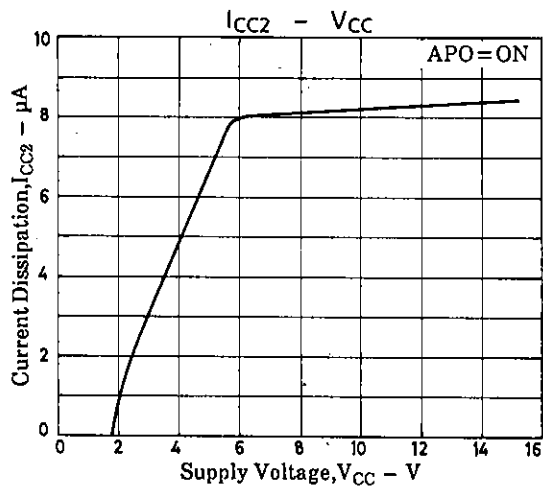
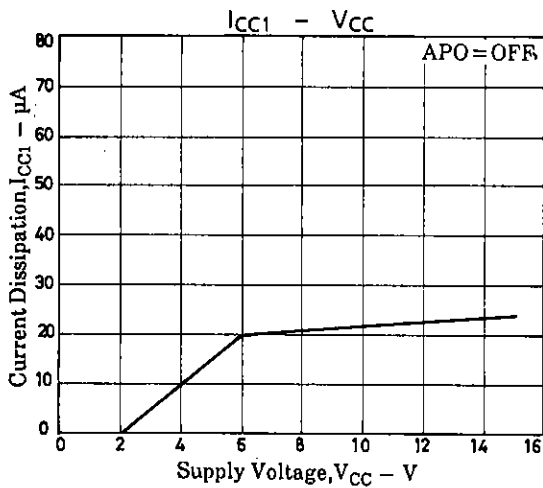
Unit (capacitance: F)

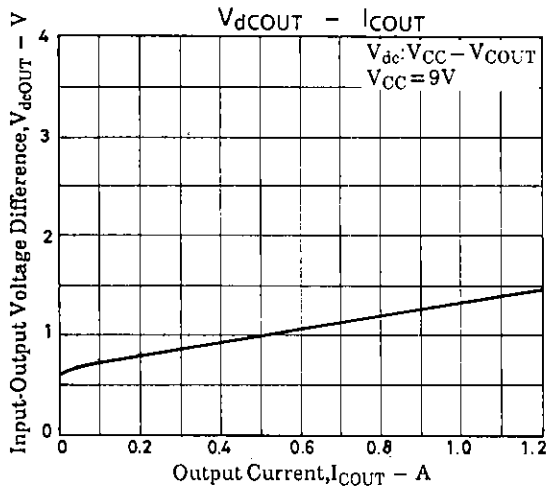
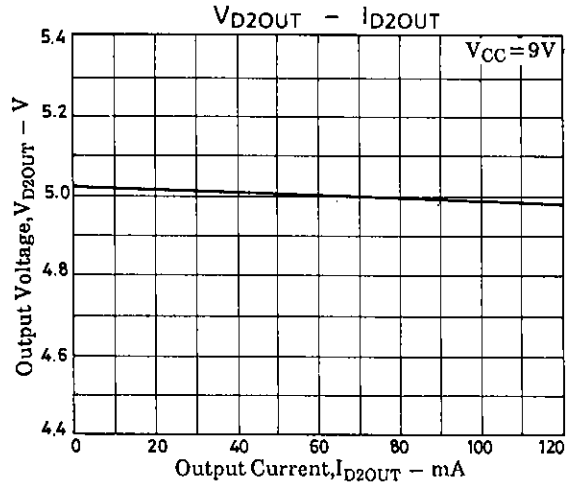
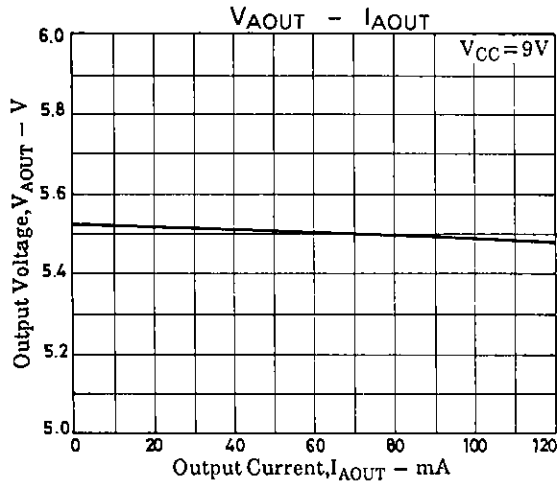
Sample Application Circuit



- C1 } OSC prevention, stabilization
- C2 } OSC prevention, stabilization
- C3 } OSC prevention, stabilization
- C4 }  $V_A$  rise adjustment

Unit (capacitance: F)





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