

Ordering number: EN 3244

Monolithic Linear IC

SANYO	No.3244	LA5691D, 5691S
	Voltage Regulator Driver with Watchdog Timer (with Output ON/OFF Function)	

The LA5691 is a single-chip voltage regulator for microcomputer system monitor use that performs the functions of 5V output voltage control, watchdog timer, and voltage detector. Since the LA5691 is capable of exercising output ON/OFF controls it is especially suited for use in battery-powered equipment.

Applications

- Microcomputer system for car equipment, refrigeration/heating equipment, office automation equipment.

Functions

- Output voltage 5Vcontrol
- Watchdog timer
- Reset generation at power-ON mode
- The enable pin can be used to exercise output ON/OFF control. (Active-low)

Features

- An external PNP transistor can be used to provide a low-saturation voltage regulator.
- Capable of reducing of power dissipation at standby mode ($I_{Q\ OFF} = 300\text{mA typ}$)
- CK input with edge detector
- Variable detection voltage

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

			unit
Control Pin Voltage	$V_{CONT\ max}$	1sec	60 V
Control Pin Voltage	$V_{CONT\ max}$		41 V
Control Pin Current	$I_{CONT\ max}$	$*V_{CC} \geq 6V$	11 mA
Enable Pin Voltage	$V_{EN\ max}$		41 V
CK Input Voltage	$V_{CK\ max}$		25 V
Reset Pin Voltage	$V_{RES\ max}$,		41 V
Allowable Power Dissipation	$P_d\ max$		500 mW
Operating Temperature	T_{opr}		-40 to +85 °C
Storage Temperature	T_{stg}		-55 to +150 °C

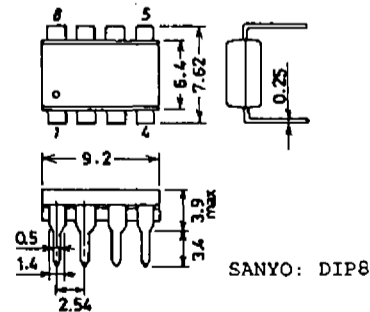
*: A PNP transistor is connected to the LA5691D, 5691S externally to provide a low-saturation voltage regulator. Therefore, $I_{CONT} \approx 100\text{mA}$ will flow, as starting current, in the V_{CC} range where the output cannot be regulated.

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

			unit
Control Pin Voltage	V_{CONT}		6 to 40 V
Control Pin Current	$I_{CONT\ max}$		10 mA
Reset Output Current	$I_{RES\ max}$,	External R pull-up (with pull-up R 10k Ω)	8 mA
Reset Detection Voltage	$V_S\ min$		4 V

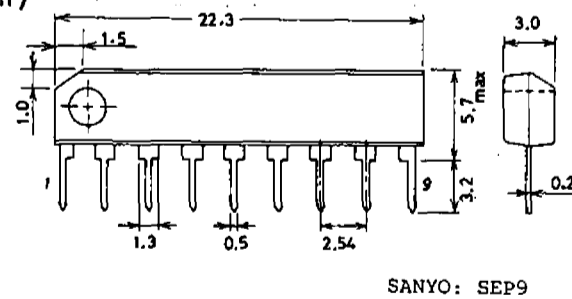
Package Dimensions (unit: mm)

3001B



Package Dimensions (unit: mm)

3017B



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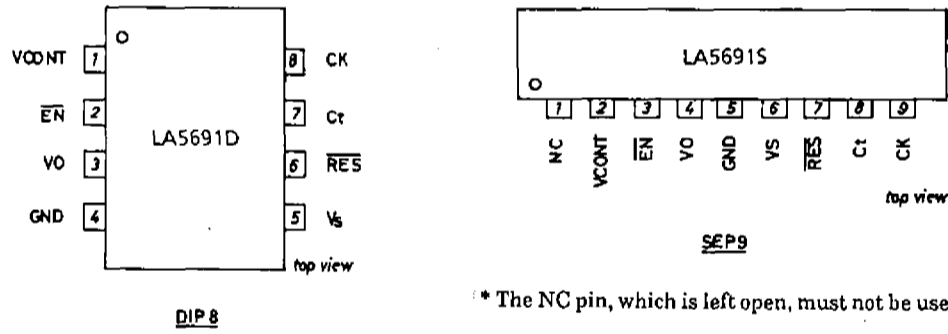
O259YT/8037TA, TS No.2895-1/6

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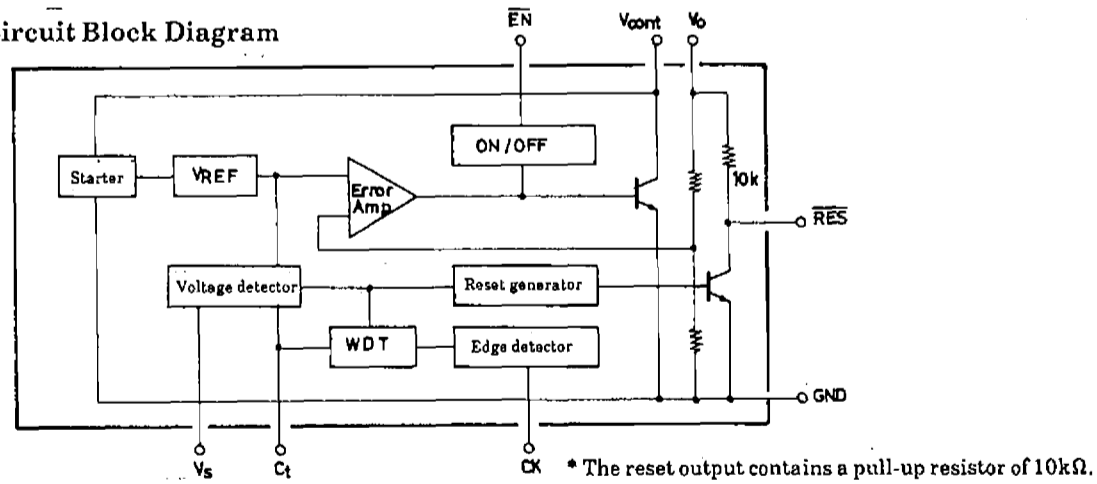
Operating Characteristics at Ta = 25°C, VCC = 14V, IO = 50mA, unless otherwise specified.

	See specified Test Circuit.	min	typ	max	unit
Output Voltage	VO	4.8	5.0	5.2	V
Line Regulation	ΔVOLN1	9V ≤ VCC ≤ 16V		2	10 mV
	ΔVOLN2	6V ≤ VCC ≤ 40V		4	30 mV
Load Regulation	ΔVOLD	1mA ≤ IO ≤ 50mA		4	30 mV
Current Dissipation	ICC	IO = 0		4.1	6.5 mA
Output Noise Voltage	VNO	10Hz ≤ f ≤ 100kHz, VCK = 0		200	μV
Temperature Coefficient of Output Voltage	ΔVO / ΔTa	IO = 5mA, -40°C ≤ Ta ≤ +85°C		±0.2	mV / °C
Reference Voltage	VREF	1.13	1.18	1.23	V
"H"-Level CK Input Voltage	VIH	2			V
"L"-Level CK Input Voltage	VIL			0.8	V
"H"-Level CK Input Current	IiH	VCK = 5V		0.3	0.7 mA
"L"-Level CK Input Current	IiL	VCK = 0		-1.0	-0.1 μA
"H"-Level Reset Output Voltage	VORH	4.8		5.0	5.2 V
"L"-Level Reset Output Voltage 1	VORL1			40	200 mV
"L"-Level Reset Output Voltage 2	VORL2	IRES = 8mA		0.16	0.8 V
CK Input Pulse Width	tCKW	VCK = 5V		3	μs
Reset Output Delay Time	td	Ct = 1μF		7.5	10 12.5 ms
Watchdog Time	tWD	Ct = 1μF		3.8	5.0 6.2 ms
Watchdog Reset Time	tWR	Ct = 1μF		0.1	0.25 0.4 ms
Reset Hysteresis Voltage	Vhys	VS = 4.5V		100	200 300 mV
"L"-Level Output Voltage	VO OFF	VEN = 5V		150	300 mV
Quiescent Current	IQ OFF	VEN = 5V		300	600 μA
Output OFF Control Voltage	VENH	Output OFF		2	V
Output ON Control Voltage	VENL	Output ON			0.8 V

Pin Assignment



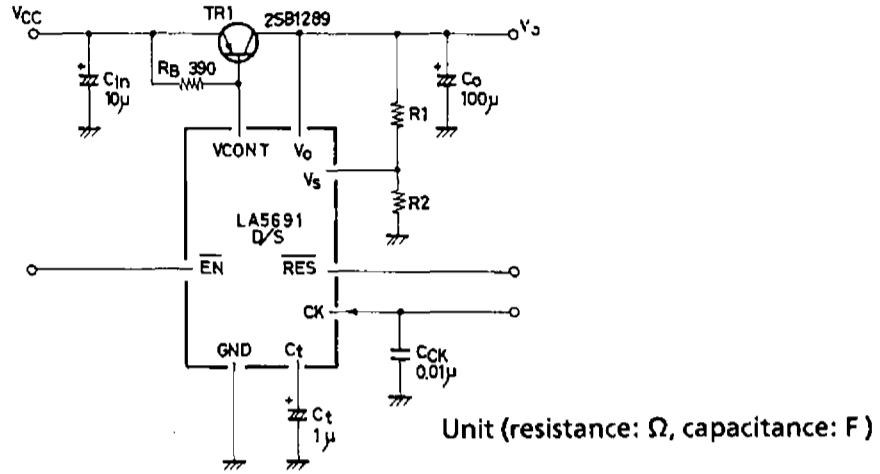
Equivalent Circuit Block Diagram



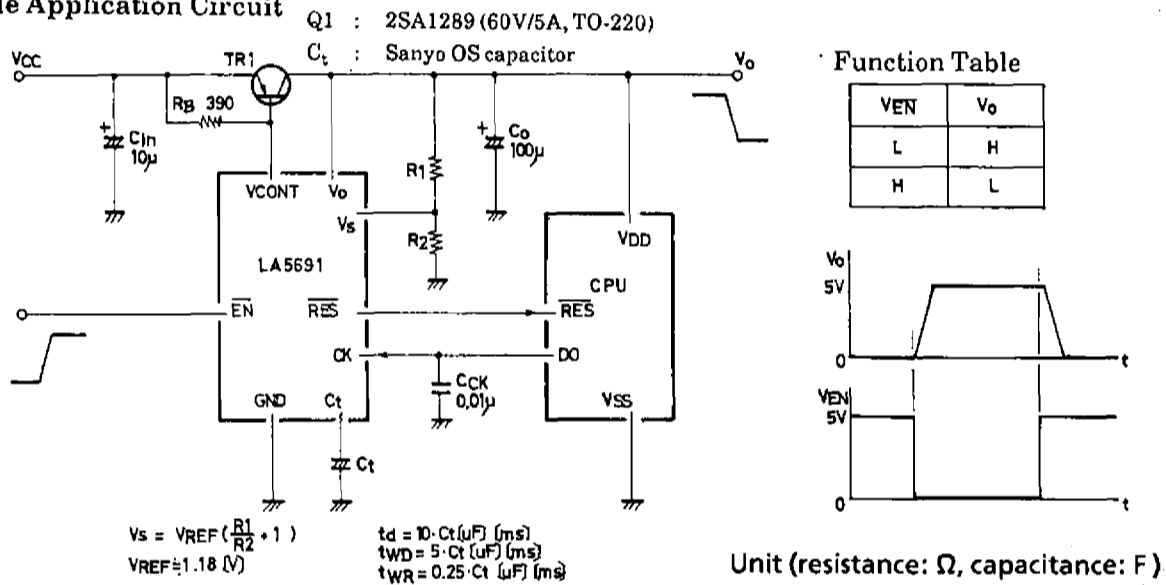
Unit (resistance: Ω)

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Test Circuit



Sample Application Circuit



$$V_s = V_{REF} \left(\frac{R_1}{R_2} + 1 \right)$$

$$V_{REF} = 1.18 \text{ (V)}$$

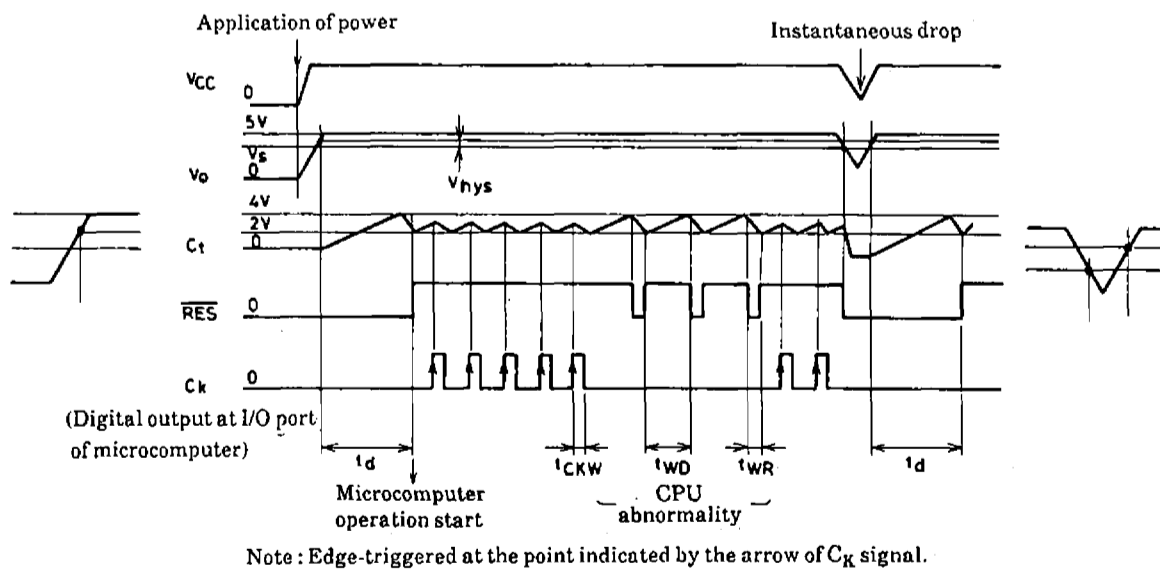
$$t_d = 10 \cdot C_t (\mu\text{F}) \text{ (ms)}$$

$$t_{WD} = 5 \cdot C_t (\mu\text{F}) \text{ (ms)}$$

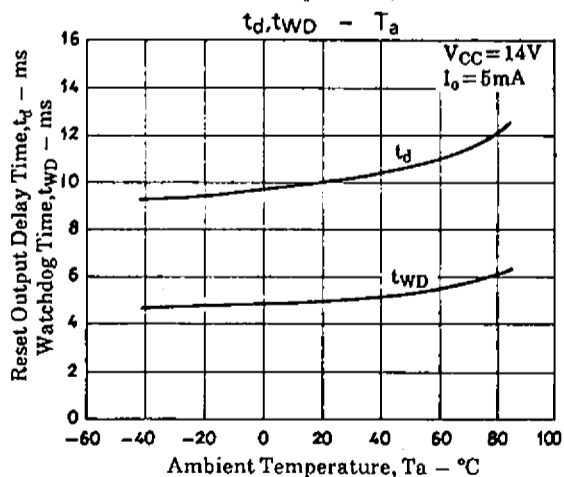
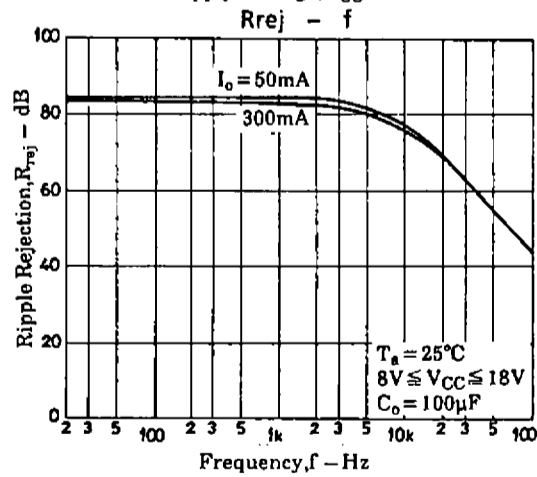
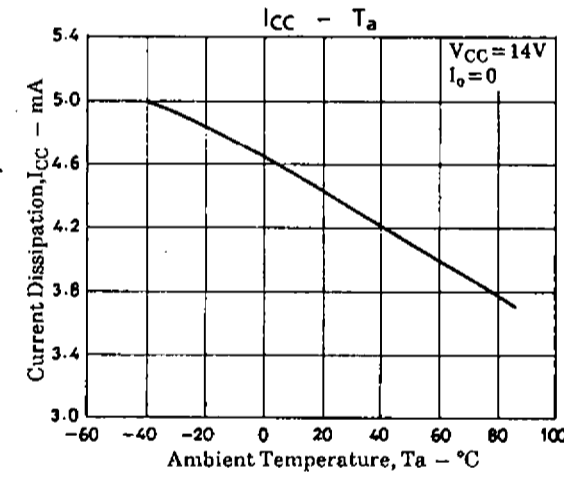
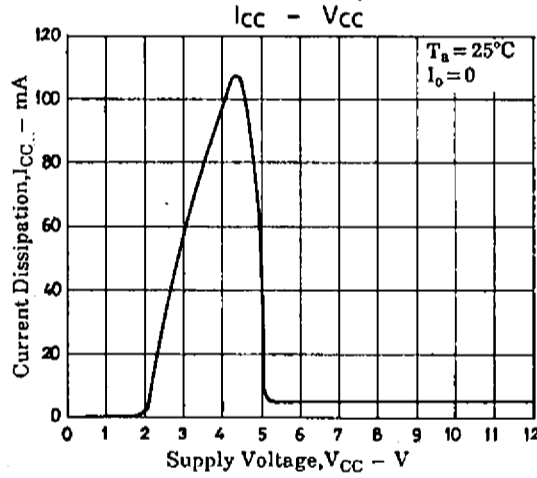
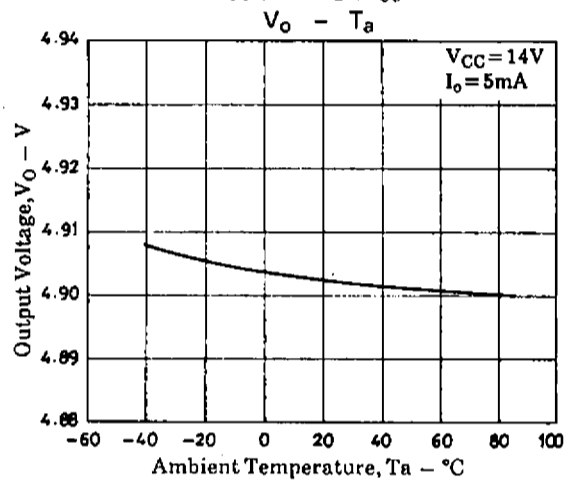
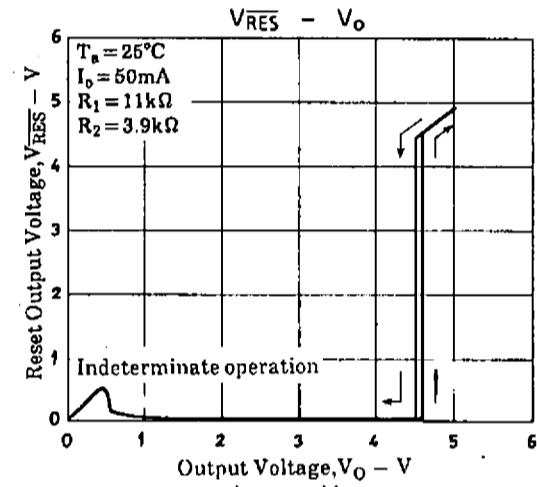
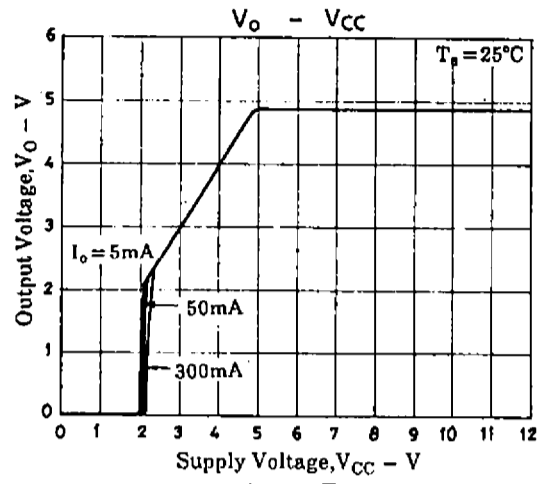
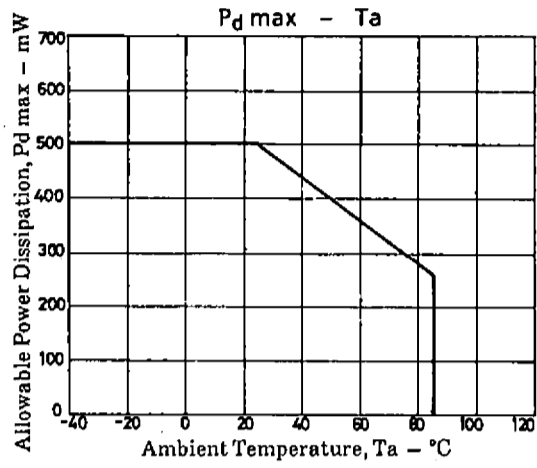
$$t_{WR} = 0.25 \cdot C_t (\mu\text{F}) \text{ (ms)}$$

- Ct, Co : Capacitors whose value does not vary with temperature very much.
- CCK : Must be used to eliminate noise in the reset output.

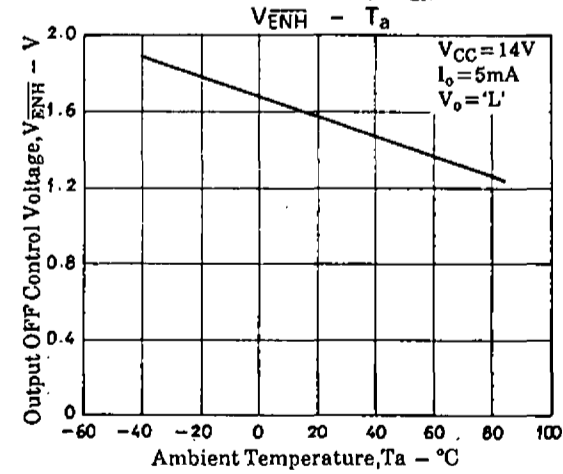
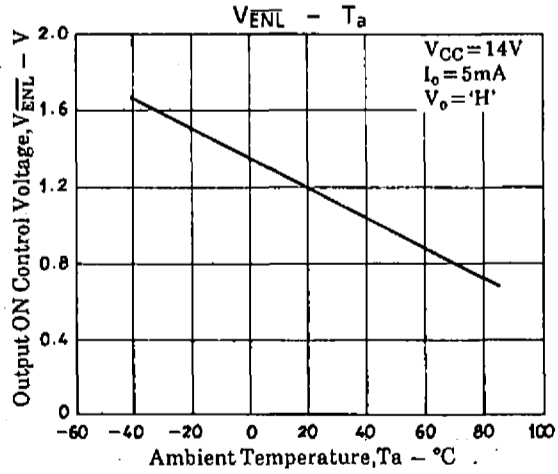
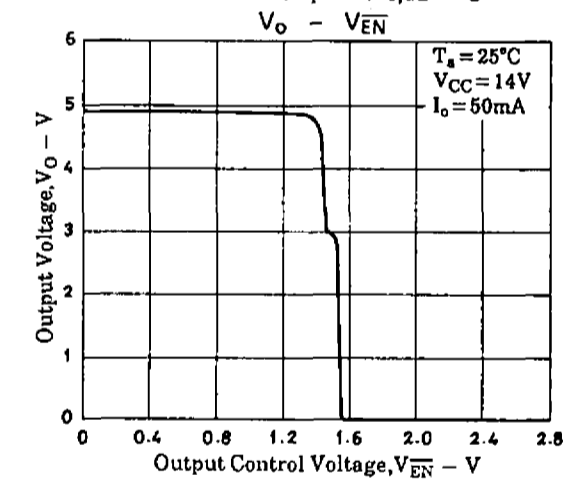
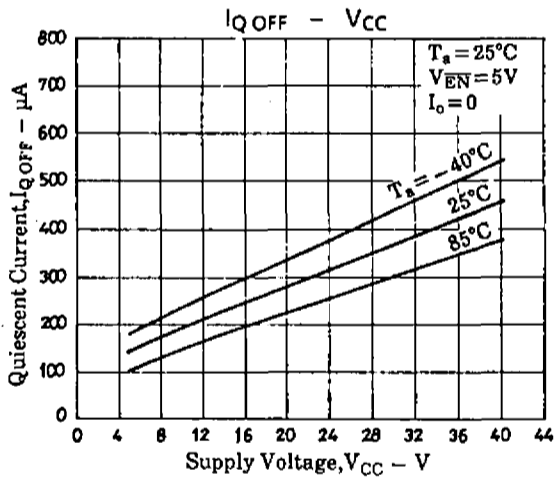
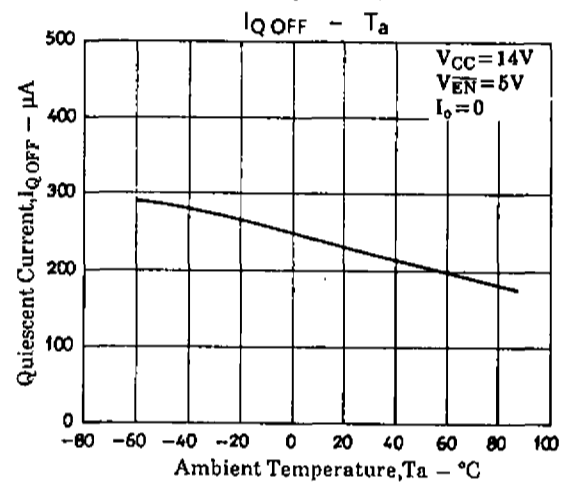
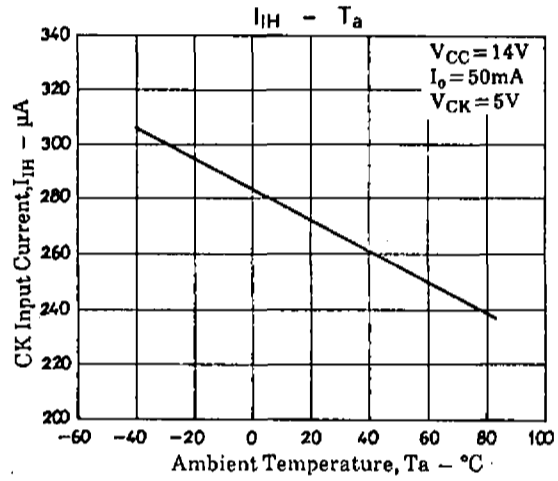
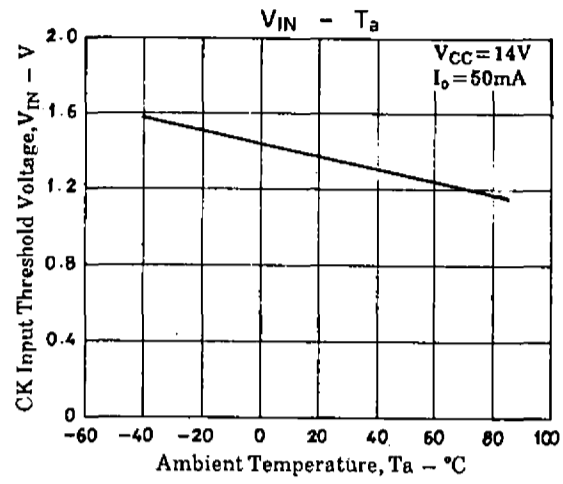
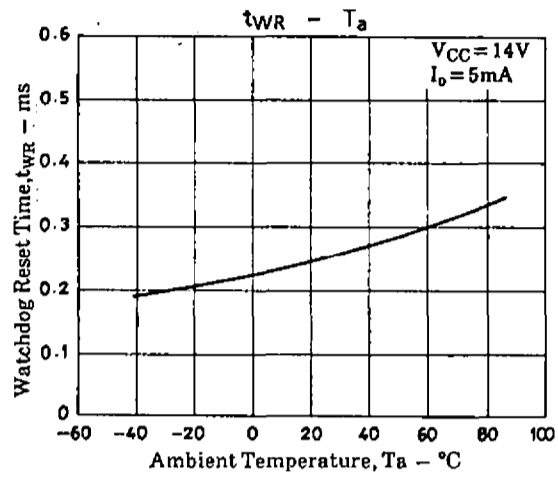
Timing Chart



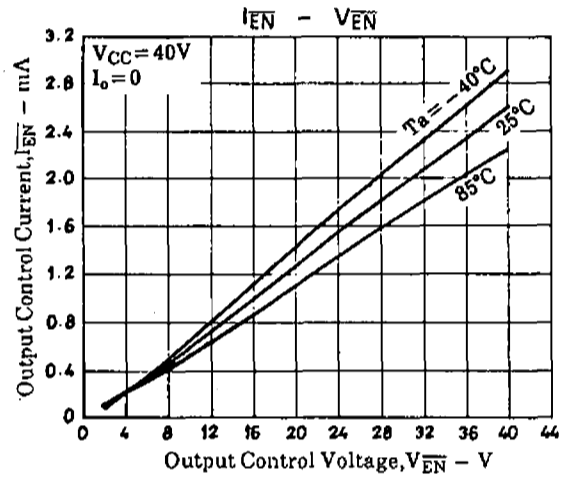
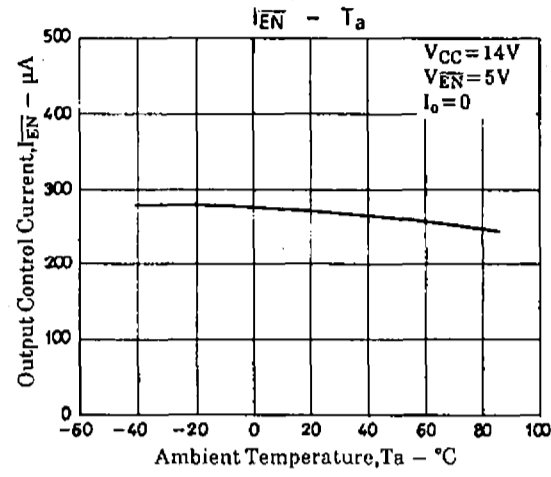
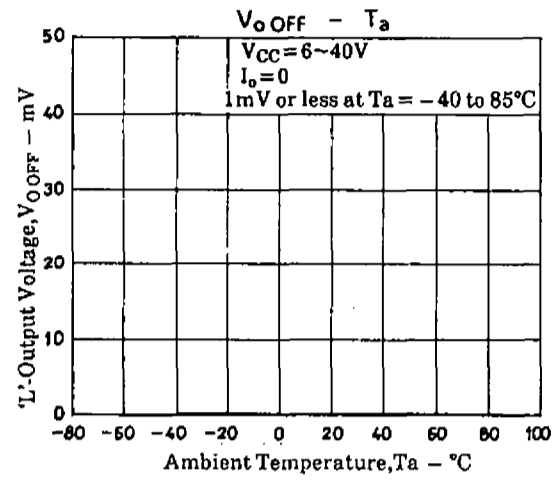
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