

**SANYO**

No. 4281

**LA5602****Low-Dropout Voltage Regulator with Reset and On-Off Function****Overview**

The LA5602 incorporates both a 5.0V voltage regulator function and reset generator function into a single-chip for micro controller power supply application. The LA5602 supports improvements in efficiency and set compactness by permitting operation at low input-output voltage differences.

**Functions**

- Low dropout regulator with 350mA and 5.0V output
- Power supply reset generator function
- Supports on-off control of 5V using equipped enable pin (high active)

**Features**

- Low minimal input-output voltage difference (0.5V typ.)
- Supports setting of reset output delay time using external capacitor
- Built-in fold back current limiting circuit and excessive heat protection circuit
- Reset output using active pull-up for simpler noise reduction

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

Maximum input voltage	$V_{IN\text{ max}}$	18	V
Enable pin voltage	$V_{EN\text{ max}}$	$V_{IN\text{ max}}$	V
Reset output pin voltage	$V_{RES\text{ max}}$	18	V
Allowable power dissipation	$P_d\text{ max}$	1.5	W
Operating temperature	$T_{opr}$	-30 to +80	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

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

Input voltage	$V_{IN}$	5.6 to 17	V
Output current	$I_{OUT}$	0 to 350	mA
Reset output source current	$I_{ORH}$	0 to 200	$\mu\text{A}$
Reset output synch current	$I_{ORL}$	0 to 2	mA

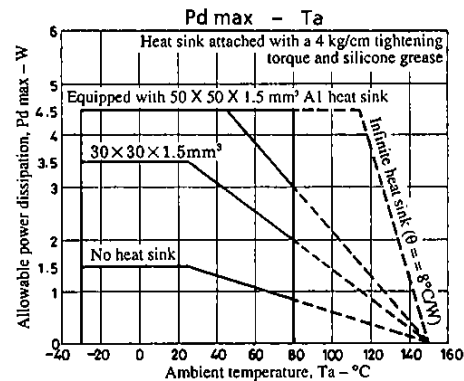
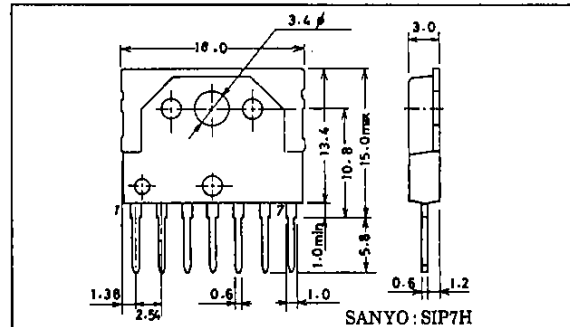
**Operating Characteristics at  $T_a = 25^\circ\text{C}$ ,  $V_{IN} = 8\text{ V}$ ,  $I_{OUT} = 350\text{ mA}$ ,  $C_{OUT} = 47\mu\text{F}$ , according to specified Test Circuit****[Power Supply Section]**

		min	typ	max	unit
Output voltage	$V_{OUT}$	4.75	5.0	5.25	V
Drop-out voltage	$V_{DROP}$		0.5	1.0	V
Line regulation	$\Delta V_{OLN}$	$5.6 \leq V_{IN} \leq 17\text{V}$	20	100	mV
Load regulation	$\Delta V_{OLD}$	$5\text{mA} \leq I_O \leq 350\text{mA}$	50	150	mV

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**Package Dimensions**

unit : mm

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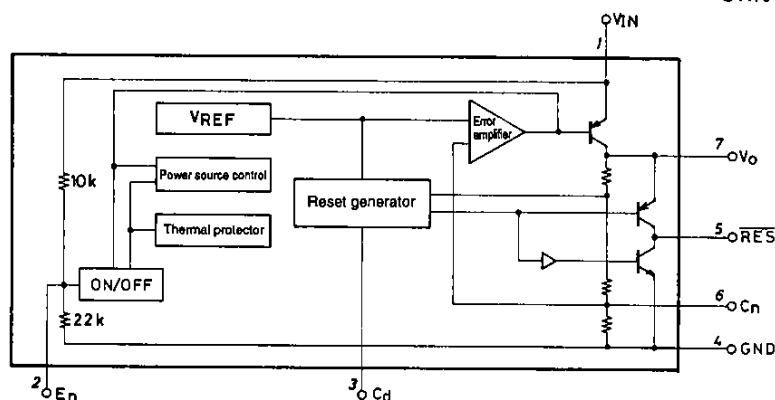
			min	typ	max	unit
Peak output current	$I_{OP}$		350	500		mA
Output short current	$I_{OSC}$			100	400	mA
Current dissipation	$I_{Q1}$	$I_{OUT} = 0$		2.1	4	mA
	$I_{Q2}$			10	50	mA
Output noise voltage	$V_{NS}$	$10\text{Hz} \leq f \leq 100\text{kHz}$		70		$\mu\text{Vrms}$
Temperature coefficient of output voltage	$\Delta V_O / \Delta T_a$	$T_j = 25 \text{ to } 125^\circ\text{C}$		1.6		$\text{mV}/^\circ\text{C}$
Ripple rejection	$R_{ref}$	$f = 120\text{Hz}, 6\text{V} \leq V_{IN} \leq 17\text{V}$		60		dB
Output on-control voltage	$V_{ENH}$		2.6			V
Output off-control voltage	$V_{ENL}$				1.0	V
Low output voltage	$V_{OFF}$				0.3	V

**[Reset Section]**

High reset output voltage	$V_{ORH}$	$I_{ORH} = 200\mu\text{A}, \text{Cd pin open}$	4.73	4.98	5.23	V
Low reset output voltage	$V_{ORL}$	$I_{SRL} = 2\text{mA}, \text{Cd - GND shorted}$		100	200	mV
Reset threshold voltage	$V_{RT}$		3.95	4.2	4.45	V
Reset hysteresis voltage	$V_{hys}$		50	100	200	mV
Reset output delay time	$t_d$	$\text{Cd} = 0.1\mu\text{F}$	7.5	10	12.5	ms

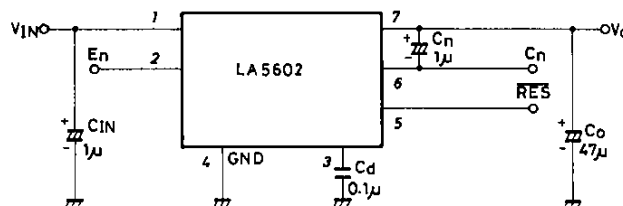
**Equivalent Circuit Block Diagram**

Unit (resistance:  $\Omega$ )



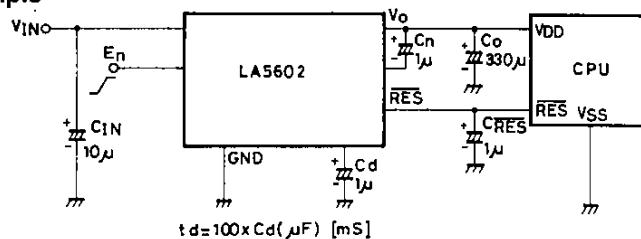
**Specified Test Circuit**

Unit (capacitance: F)



**Application Circuit Example**

Unit (capacitance: F)

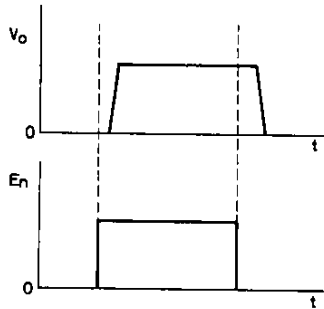


- Notes:
- 1) Capacitors  $C_n$  and  $C_{RES}$  are only required if problems are experienced with noise from external sources. If capacitor  $C_n$  is present, ensure that  $C_o$  is at least more than one-third of the value of  $C_{in}$  in order to prevent output noise at power-down due to capacitor discharge timing.
  - 2) Use a low temperature coefficient capacitor for the delay time capacitor  $C_d$ .
  - 3) The minimum recommended value of output capacitor  $C_o$  is  $47\mu\text{F}$ .

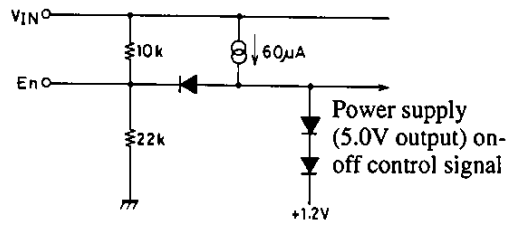
Function Table

V <sub>IN</sub>	V <sub>O</sub>
L	L
H	H

\* V<sub>EN</sub> = high or open

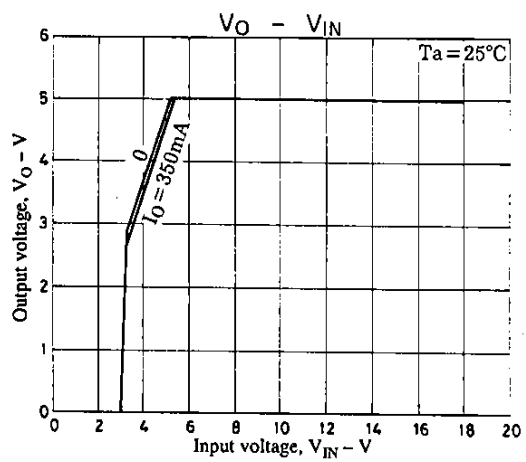
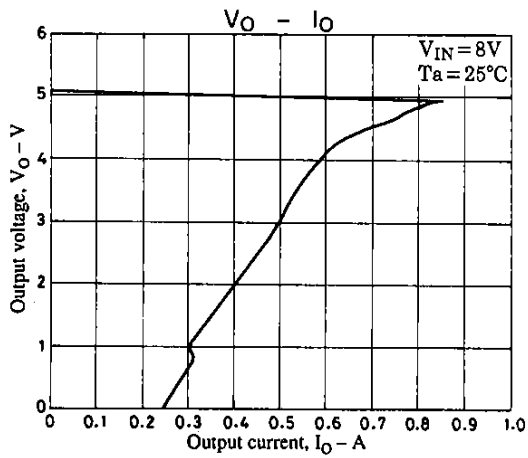
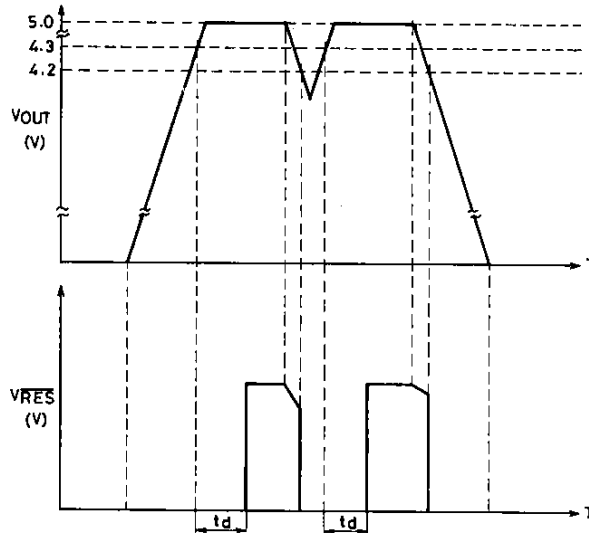


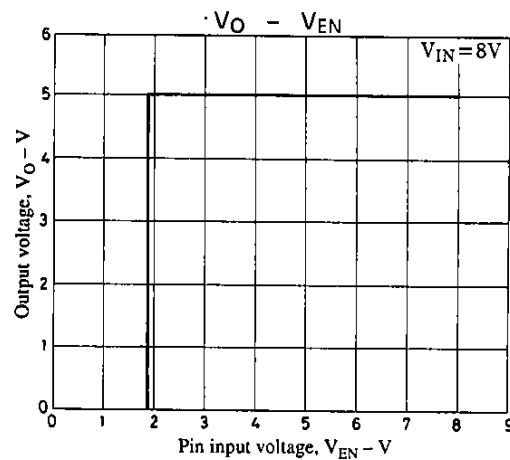
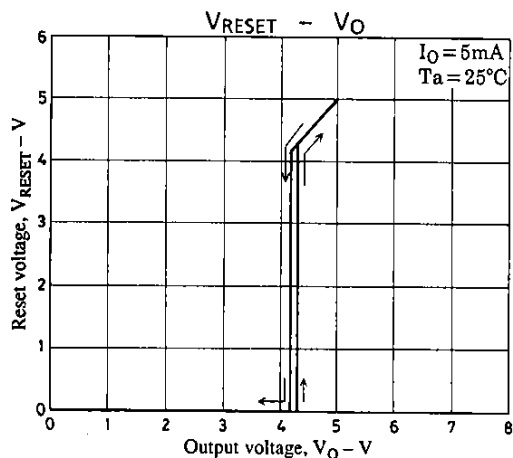
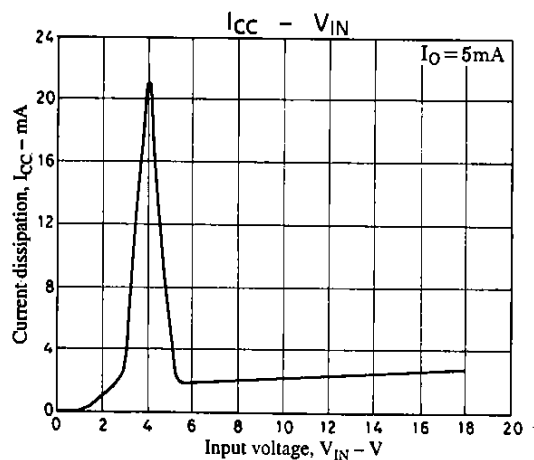
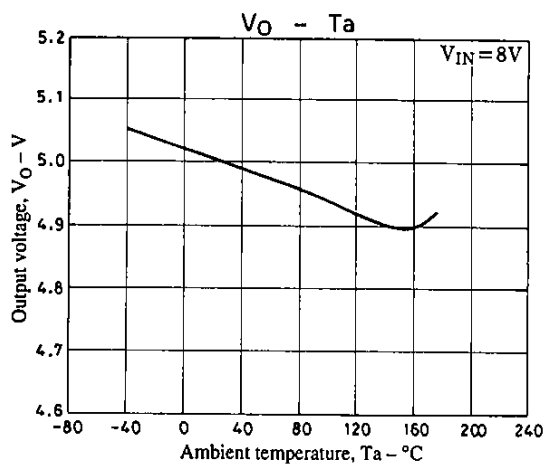
Enable Input Equivalent Circuit



Unit (resistance:  $\Omega$ )

Reset Operation





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