TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT   SILICON MONOLITHIC
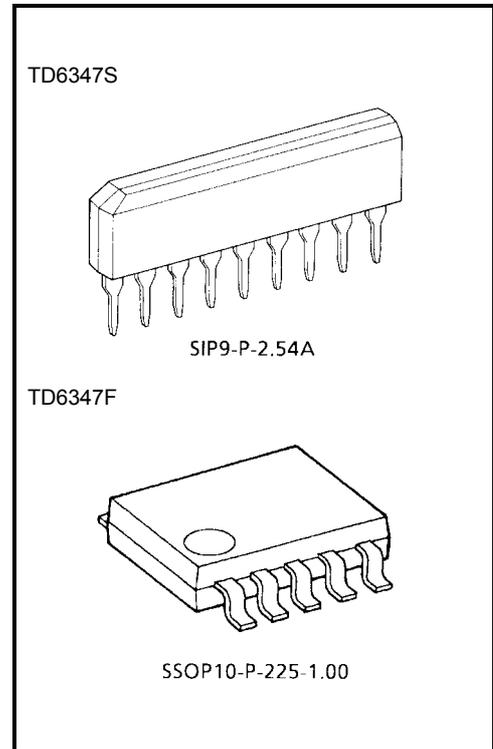
TD6347S,TD6347F

CONVENTIONAL TIMER

The TD6347S、TD6347F is an automotive I^{2}L monolithic timer. It is a long-term timer superior in voltage and temperature characteristics. It produces an NPN transistor open-collector output.

The IC has three inputs : start / reset and two modes, so that it can be used in a variety of application fields.

FEATURES

● Small standby current　　　　　　　: 1mA

● 3 inputs : start / reset and two modes

● Power-on reset function incorporated

● Good voltage characteristics　　　　: ± 0.05% / V

● Good temperature characteristics　　: ± 0.02% / °C

● Output current / output withstand voltage　: 250mA / 30V

● SIP9-PIN (TD6347S)
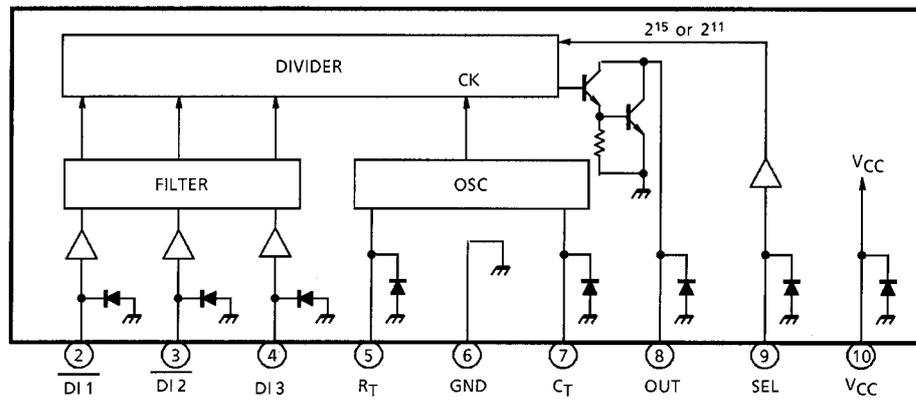
● SSOP10-PIN (TD6347F)

TD6347S

SIP9-P-2.54A

TD6347F

SSOP10-P-225-1.00

Wegiht
SIP9-P-2.54A　　　　　: 0.92 g (Typ.)
SSOP10-P-225-1.00　　: 0.10 g (Typ.)
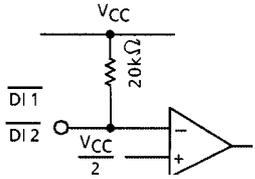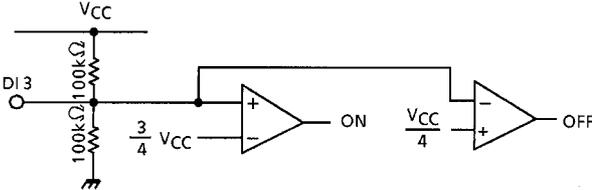
BLOCK DIAGRAM AND PIN LAYOUT

TD6347S
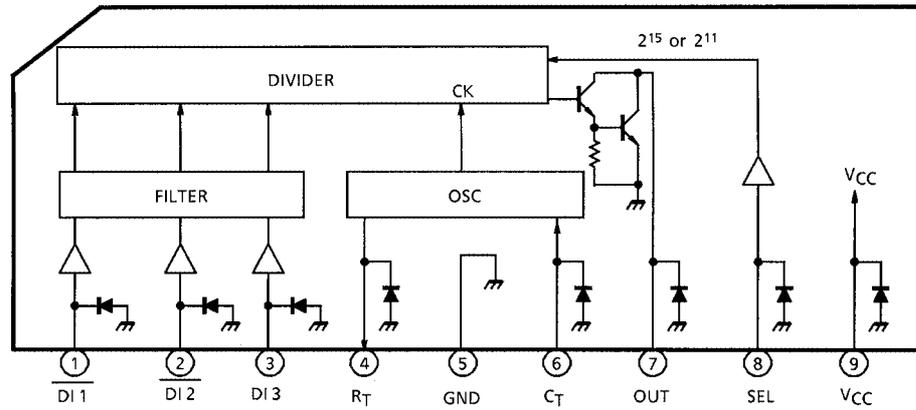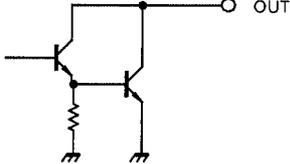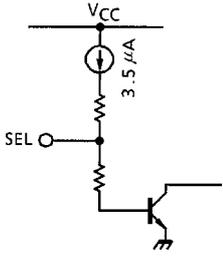

TD6347F

Note: TD6347S and TD6347F are the same chip; only the packages are different.

PIN DESCRIPTION

PIN No. TD6347S	PIN No. TD6347F	SYMBOL	DESCRIPTION
1	2	$\overline{DI1}$	Connected to the input switch. When this pin is grounded, the IC accepts the input, and the output is reversed. The input circuit is shown at right.
2	3	$\overline{DI2}$	When this pin is grounded, the IC is reset. The input circuit construction is the same as that of $\overline{DI1}$.
3	4	DI3	When the input switch is connected and this pin is grounded, the output turns off. When this pin is connected to V_{CC}, the output turns on. The input circuit is shown at right.
4	5	R_T	The resistor for basic clock oscillation is connected between this pin and C_T pin.
5	6	GND	Grounded
6	7	C_T	The capacitor for basic clock oscillation is connected to this pin. The clock frequency T is determined by external resistor R and capacitor C as follows : $T\,(ms)=1.75C\,(\mu F)\,R\,(k\Omega)$ The time constant of the input filter consisting of $\overline{DI1}$, $\overline{DI2}$, and DI3 is four times the basic clock period.
7	8	OUT	Output pin. The circuit is shown at right.
8	9	SEL	Timer time select pin. When this pin is open, the timer time is 32768 (2^{15}) times the clock period. When it is grounded, the timer time is 2048 (2^{11}) times the clock period. The input circuit is shown at right.
9	10	V_{CC}	Power supply pin
—	1	NC	Not connected pin.(Electrically, this pin is completely open.)

TRUTH TABLE

(1) Input Switch

Input			Output
$\overline{DI1}$	$\overline{DI2}$	$\overline{DI3}$	
H ⌐_L	H	H or M	Inversion
H	H	M _⌐ H	ON
H	H	L	OFF
don't care	L	don't care	OFF

(2) Timer Time

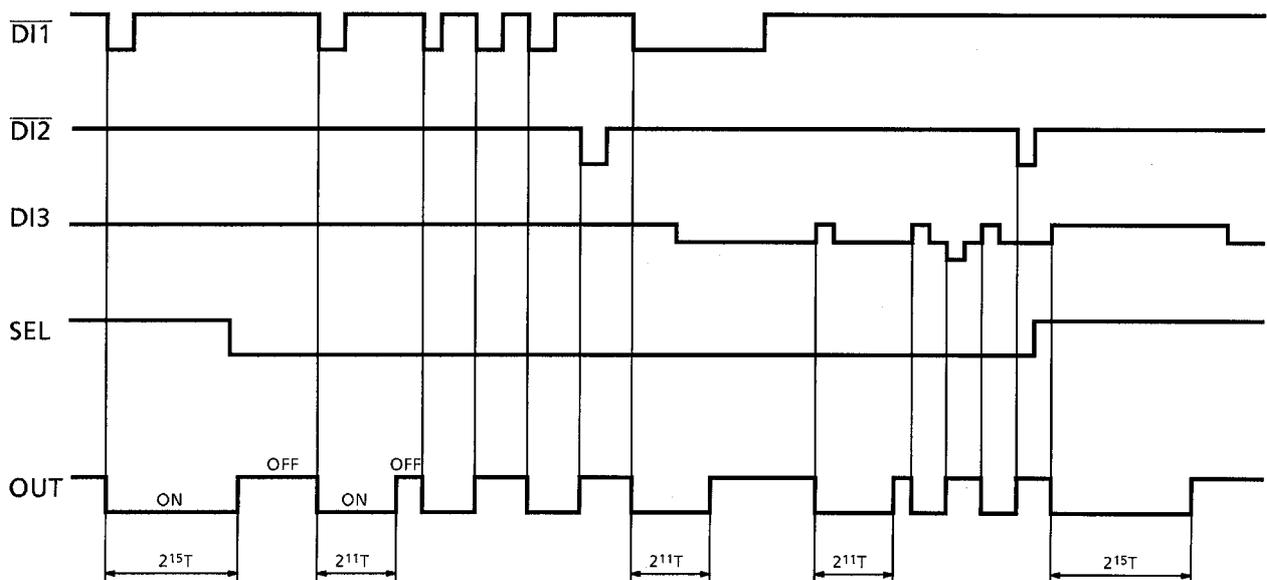| SEL	Timer Time (ms)
H	2^{15} T *
L	2^{11} T *

*:   T＝1.75CR、 C : (μF)、 R : (kΩ)

(3) Filter Time (L,M and H level detection time)

$2 \times T \sim 4 \times T$

(4) C / R Recommend

C	0.001μF～10μF
R	100kΩ～500kΩ

TIMING CHART

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	30	V
Output Current	I_{OUT}	250	mA
Output Voltage	V_{OUT}	30	V
Operating Voltage	V_{opr}	5〜16	V
Power Dissipation	P_D	500 / 400 *	mW
Operating Temperature	T_{opr}	−40〜85	°C
Storage Temperature	T_{stg}	−55〜150	°C

*:PD TD6347S/TD6347F

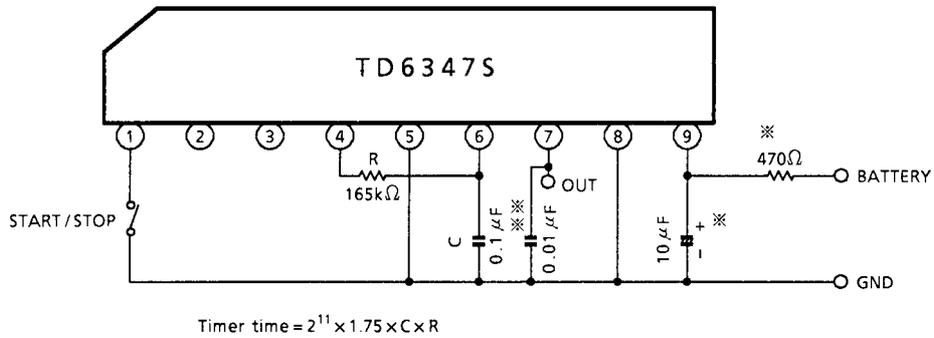## ELECTRICAL CHARACTERISTICS (Ta = 25°C, V_{CC} = 12V,unless otherwise specified)

CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Current Consumption	I_{CC}	V_{CC}	—	OUT = OFF	—	—	1.0	mA
Input Threshold Voltage	V_{TH}	$\overline{DI1}$	—	—	5.4	6	6.6	V
		$\overline{DI2}$	—	—	5.4	6	6.6	
		DI3	—	START mode	8.1	9	9.9	
			—	STOP mode	2.7	3	3.3	
Input Current	I_{IL}	$\overline{DI1}$	—	V_{IL} = 0V	—	—	−1.0	mA
		$\overline{DI2}$	—	V_{IL} = 0V	—	—	−1.0	
		DI3	—	V_{IL} = 0V	—	—	−0.25	
	I_{IH}		—	V_{IH} = 12V	—	—	0.25	
Output Voltage	V_{OL}	OUT	—	I_{OL} = 200mA	—	—	1.3	V
Output Leakage Current	I_{LEAK}		—	V_{OUT} = 30V	—	—	100	µA
Input Current	I_{IN}	C_T	—	V_{IN} = 1 to 4V	—	—	±1	µA
Output Voltage	V_{OH}	R_T	—	I_{OH} = 50µA	3.5	3.9	4.3	V
	V_{OL}			I_{OL} = 50µA	—	—	0.3	

EXAMPLE OF APPLICATION CIRCUIT

(1) 15-minute timer (using DI3) (Numbers in ◯ show pin numbers of the TD6347S, those in ( ) show pin numbers of the TD6347F)

TD6347S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

R 165kΩ
STOP
START
OUT
0.1μF
0.01μF
10μF
470Ω
BATTERY
GND

$$\text{Timer time} = 2^{15} \times 1.75 \times C \times R$$
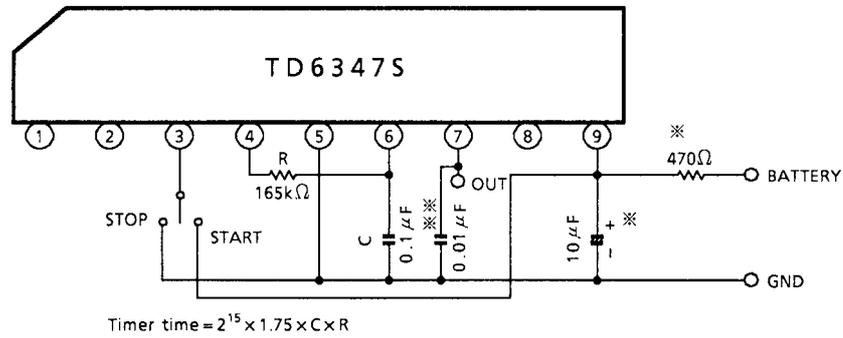
(2) 56-second timer (using $\overline{\text{DI1}}$)

TD6347S

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

R 165kΩ
START / STOP
OUT
0.1μF
0.01μF
10μF
470Ω
BATTERY
GND

$$\text{Timer time} = 2^{11} \times 1.75 \times C \times R$$

※: If the IC is used with a regulated power supply which is free from surge voltage, the CR combination is unnecessary.

※※: For negative surge absorption

PACKAGE DIMENSIONS

SIP9-P-2.54A

Unit : mm
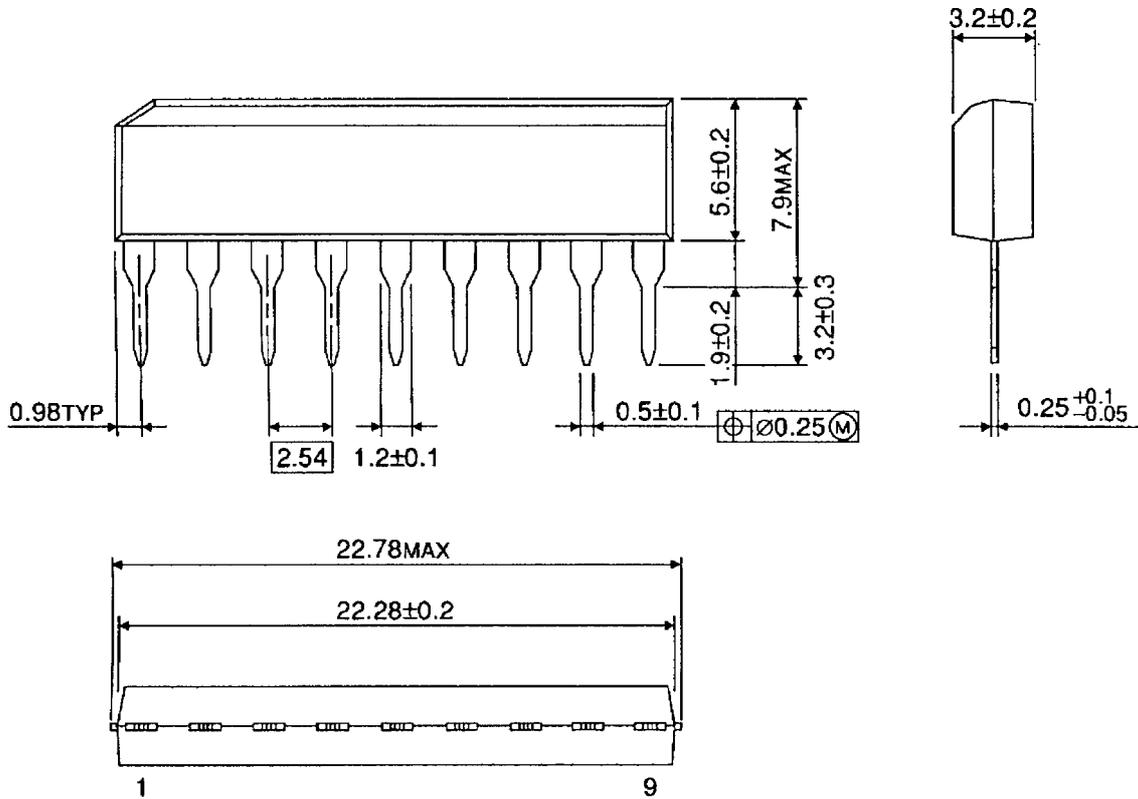
Weight: 0.92 g (Typ.)

PACKAGE DIMENSIONS

SSOP10-P-225-1.00

Unit : mm
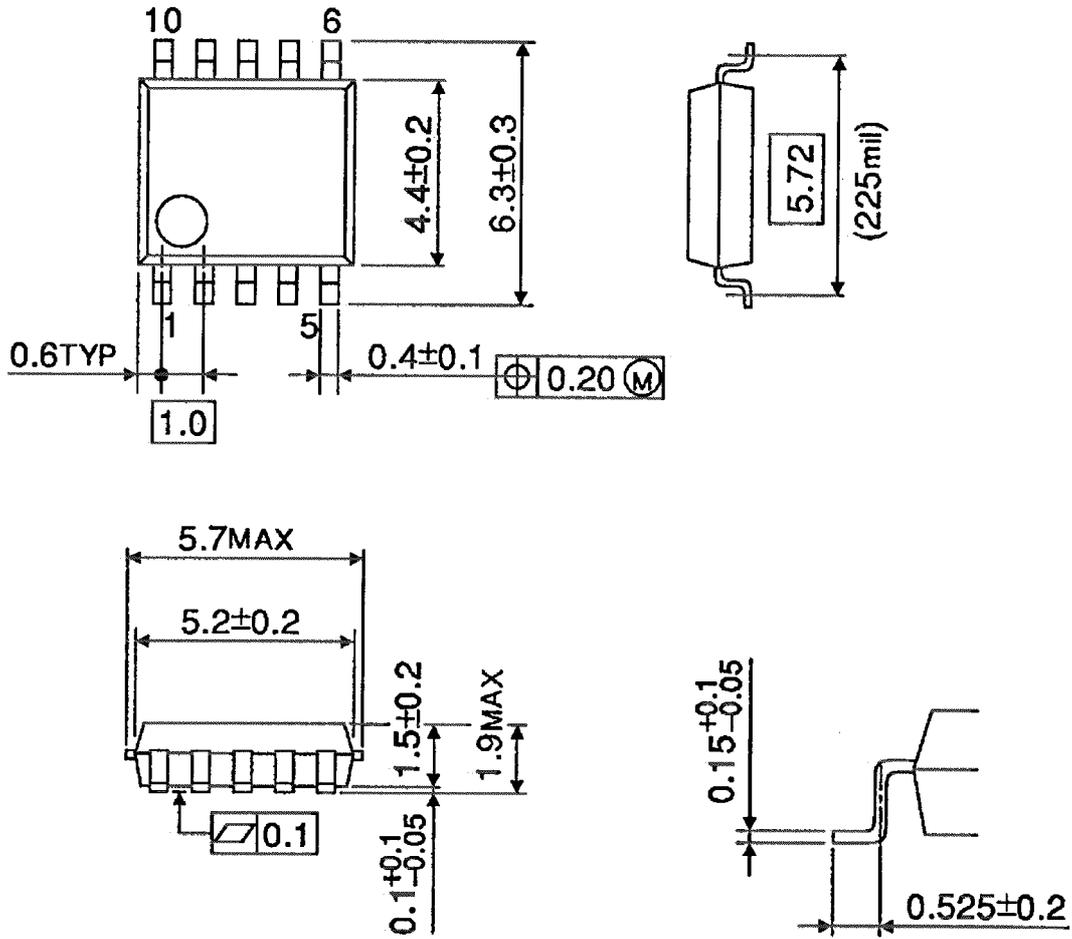
Weigh : 0.10 g (Typ.)

RESTRICTIONS ON PRODUCT USE