PULSE/DTMF SWITCHABLE DIALER

S-72361A

The S-72361A is a CMOS PULSE/DTMF switchable dialer with a 32-digit redial memory, key board scan circuit and serial I/O to interface with a microprocessor. The dialer can operate solely by power from telephone lines.

■ Features

- Wide operating voltage range
  - PULSE mode: 1.7 to 5.5 V
  - DTMF mode : 2.0 to 5.5 V
- Low current consumption (V_{DD} = 3.0 V)
  - PULSE mode: 600 μA max.
  - DTMF mode : 1 mA max.
- Low memory retention current (V_{DD} = 3.0 V) : 0.1 μA max.
- PULSE/DTMF mode selection
- Selectable interface of 4 × 4 keyboard and 4-bit/8-bit serial input
- Built-in 32-digit (31-digit in mix dialing) redial memory
- 3.579545MHz quartz crytal or ceramic resonator
- Selectable make/break ratio (33% and 40%)
- On chip power-on clear
- 28-pin DIP/SOP

■ Functions

- Flash
- Auto-pause
- Wait-pause
- Pause-skip
- Redial inhibition
- PULSE and DTMF mix dialing

■ Block Diagram

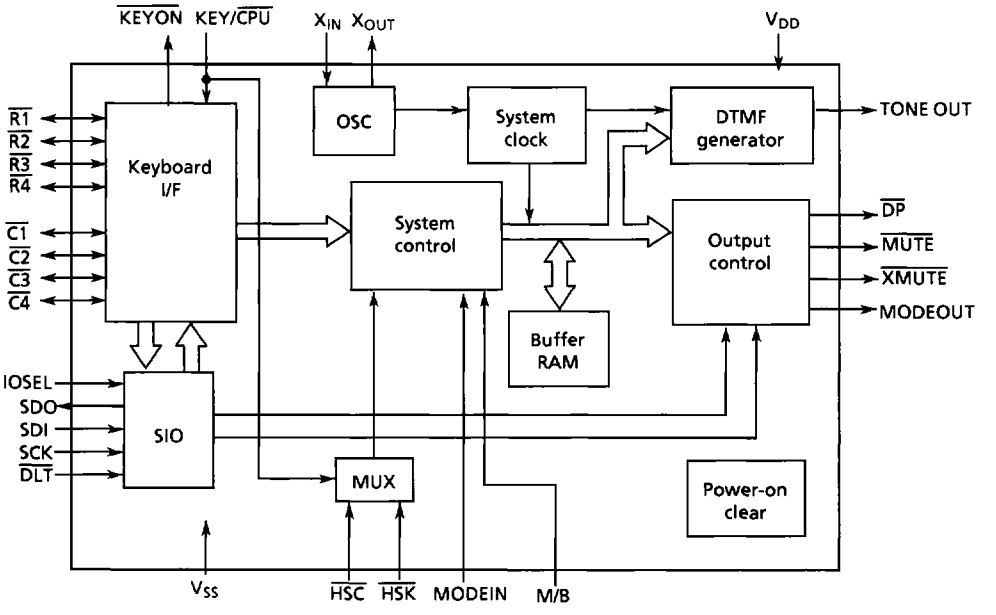


Figure 1

■ Pin Assignment

Top view
28-pin DIP/SOP

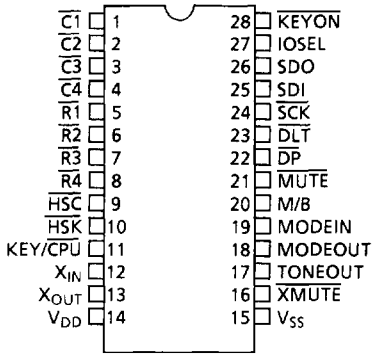


Figure 2

■ Pin Functions

Table 1

Pin name	Functions	
$\overline{C1}$ to $\overline{C4}$ $\overline{R1}$ to $\overline{R4}$	Keyboard interface inputs/outputs • These inputs/outputs can interface with 2 of 8, 2 of 7 and single contact type keyboard. They read logic levels of the pins by scanning themselves. First input is detected first and duplicate input is ignored. Allowable keyboard contact : 10 kΩ max. A chatter-free circuit at key-on/key-off is built in. Chatter detection time : key-on 20.3 ms typ., key-off 16.9 ms typ. Allowable time lag between column and row inputs : 6 ms max.	
$\overline{HSC}$	Hook switch control input when CPU mode is selected. • When this pin is set high, key input is accepted but dial signal is not transmitted.	
$\overline{HSK}$	Hook switch control input when stand-alone mode is selected. • When this pin is set high, key input is ignored and dial signal is not transmitted.	
KEY/$\overline{CPU}$	Mode selection pin KEY/$\overline{CPU}$ = High : Stand-alone mode KEY/$\overline{CPU}$ = Low : CPU mode	
X_{IN}	Resonator (3.58 MHz) connection pin	A quartz crystal or a ceramic resonator is connected between X_{IN} and X_{OUT}. When ceramic resonator is used, 30 pF of capacitors are required between X_{IN} and V_{SS}, and between X_{OUT} and V_{SS}.
X_{OUT}	Resonator (3.58 MHz) connection pin	
V_{DD}	Positive power supply	
V_{SS}	Ground pin	
$\overline{XMUTE}$	Transmit mute output (Nch opendrain) • This output is set low (on) in PULSE/DTMF dialing (including t_{PDP}, t_{TPP}, t_{IDP} and t_{TIP}) and in flashing. It is in high impedance state (off) in other operations.	
TONEOUT	DTMF signal output (Pch opendrain) • This output remains in high impedance state unless DTMF signal is output. The minimum output duration is t_{MF} both in redialing and in normal dialing. When key input time for normal dialing exceeds t_{MF}, the pin outputs DTMF signal until the key is released.	
MODEOUT	PULSE/DTMF mode output (Nch opendrain) • This output is set in high impedance state during on-hook, PULSE mode, flashing and flash-pause. It is set low during DTMF mode. • This output blinks during wait-puase in redialing. (Blinking frequency : 2.3 Hz typ.)	
MODEIN	PULSE/DTMF mode selection in CMOS input MODE IN = High:PULSE mode MODE IN = Low:DTMF mode	
M/B	Dial pulse make/break ratio selection in CMOS input M/B = High: M/B ratio 40% M/B = Low: M/B ratio 33.3%	

Table 1

Pin name	Functions
$\overline{MUTE}$	Mute output (Nch opendrain) • This output is set low (on) in PULSE dialing (including t_{PDP} and t_{IDP}) and flashing. It is set in high impedance state (off) in other operations.
$\overline{DP}$	Dial pulse output (Nch opendrain) • This output is set low (on) at break in pulse dialing and during flashing. It is set in high impedance state (off) in other operations. Dial pulses appear after t_{PDP} when $\overline{XMUTE}$ and $\overline{MUTE}$ go low; $\overline{XMUTE}$ and $\overline{MUTE}$ turn in high impedance state after t_{MOP1} or t_{MOP2} has passed, following the last pulse signal transmission.
$\overline{DLT}$	Data latch signal input to serial I/O • Applying low level to $\overline{DLT}$ makes the data in the input shift register valid. This input can also be used to control DTMF signal output duration.
$\overline{SCK}$	Clock input for serial I/O
SDI	Serial data input • Serial input data are accepted when IOSEL is set high.
SDO	Serial data output • Serial output data are transmitted when IOSEL is set low. This output is in high impedance state (off) when IOSEL is set high.
IOSEL	Control input for serial I/O • IOSEL = High : Serial data input is enabled. IOSEL = Low : Serial data output is enabled.
$\overline{KEYON}$	Valid key input indicate output • A valid key input turns this output low. A chatter-free circuit is included.

■ Application Circuit

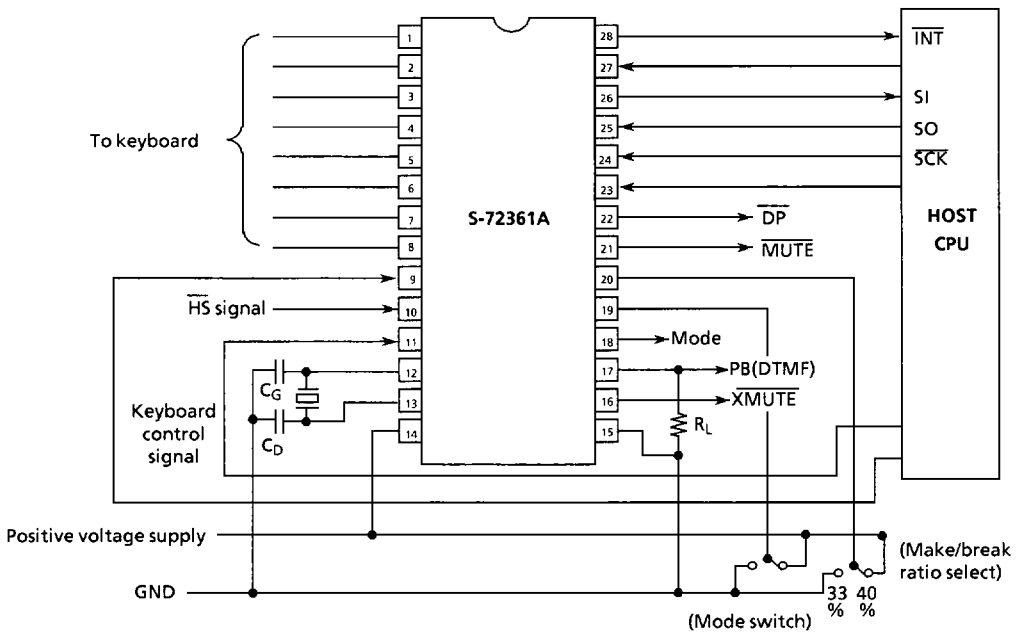
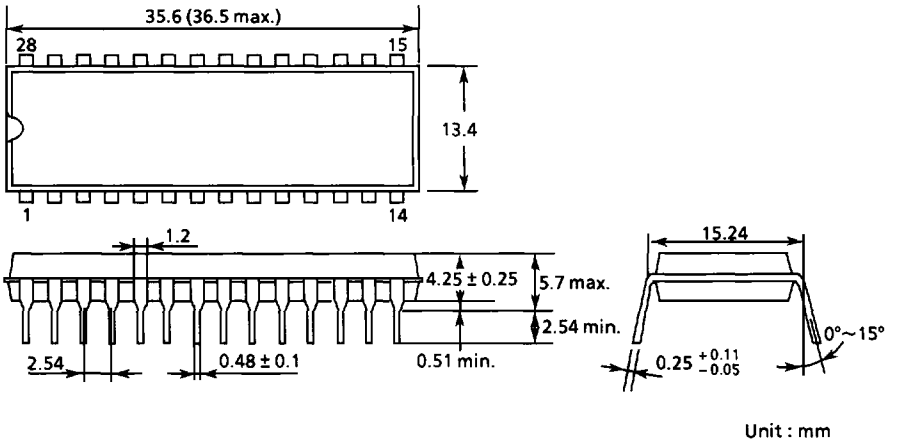


Figure 3

■ Dimensions

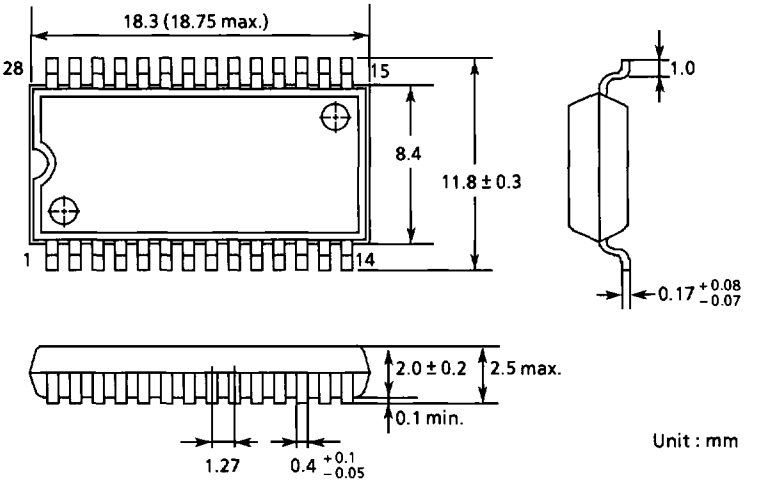
1. 28-pin DIP



Unit : mm

Figure 4

2. 28-pin SOP



Unit : mm

Figure 5

■ Ordering Information

Table 2

Product name	Package
S-72361A	28-pin DIP
S-72361AF	28-pin SOP