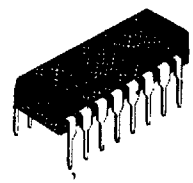
AUTOMOTIVE POWER WINDOW IC

The KA3903 is monolithic low side relay driver realized with bipolar process, suited for not only window but also sun roof, power seat and other timers in automotive application.

16 DIP



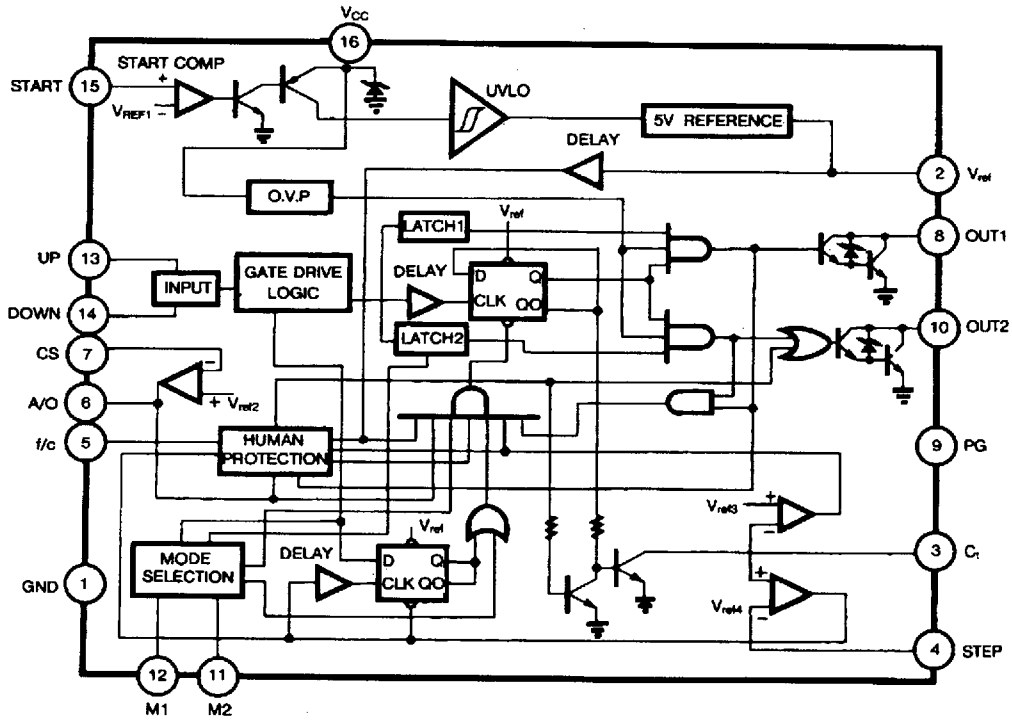
FEATURES

- Human body protection with a simple switch
- Double protection of motor (current & operation time limit)
- Very low off stage quiescent current (150 μA)
- Signal level Inputs
- A minimal and low cost external elements
- Adjustable operating time after car-key turned-off
- Four Selectatle operating modes

ORDERING INFORMATION

Device	Package	Operating Temperature
KA3903	16 DIP	-40 ~ +90℃

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS(T_A = 25℃, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Supply Voltage (1)	V_{CC1}	17	V
Supply Voltage (2)	V_{CC2}	-0.7	V
Output Current	$I_{O(Max)}$	400	mA
Power Dispation	$P_{D(MAX)}$	1.0	W
Operating ambient temperatute	$T_{(OPR)}$	-40 ~ +90	℃
Storage temperature	T_{STG}	-60 ~ +150	℃

ELECTRICAL CHARACTERISTICS

(V_{CC} = 12V, T_A = 25℃, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Under Voltage Lock Out Section						
Start-Up Threshold Voltage	V_{ST}		8.3	9.0	9.7	V
UVLO Hysteresis	V_{HYS}		1.3	1.5	1.7	V
Supply Zener Voltage	V_Z	I_{CC} = 20mA	17.2	18.6	20.0	V
Operating Range Section						
Operating Supply Voltage	V_{CC}		8.0		17.0	V
Operating Supply Current (Off)	I_{CC1}	V_{START} = OPEN		150	200	μA
Operating Supply Current (On)	I_{CC2}	V_{START} = 12V		3.0	3.5	mA
Reference Section						
Reference Voltage	V_{REF}		4.8	5.0	5.2	V
Line Regulation	Reg, 1_I	8V < V_{CC} < 17V		1	2	mV/V
Load Regulation	Reg, 1_O	OMA < I_{REF} < 2MA		1	4	mV/mA
Comparator Section (UP/Down/FC Block)						
Input Resistance	R_{IN}	V_{UP}, V_{DOWN}, V_{FC} = 0V	20	28	36	kΩ
Comparing Reference Voltage(1)	V_{TH1}	V_{OUT} ON/OFF S/W V	3.0	3.2	3.4	V

ELECTRICAL CHARACTERISTICS

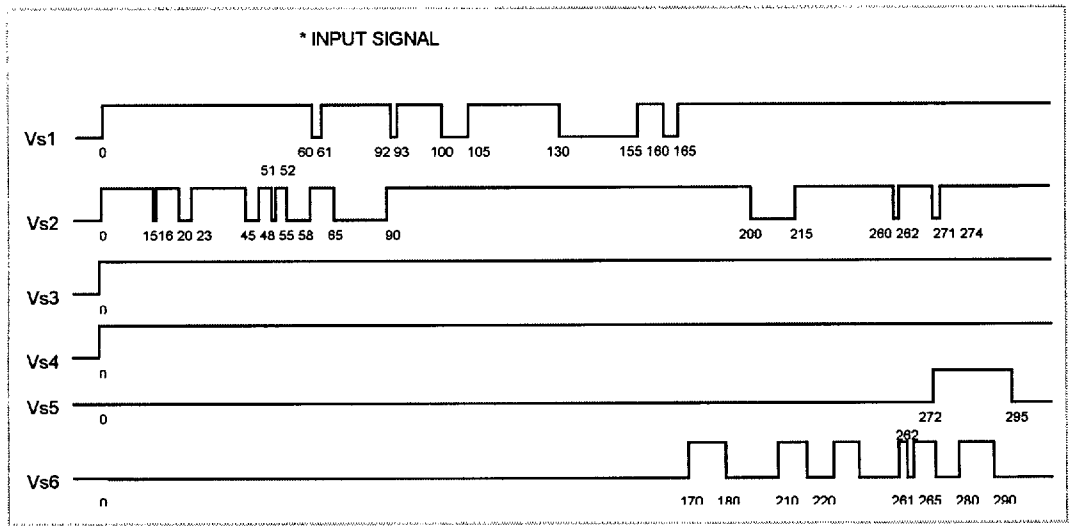
(V_{CC} = 12V, T_A = 25℃, unless otherwise specified)

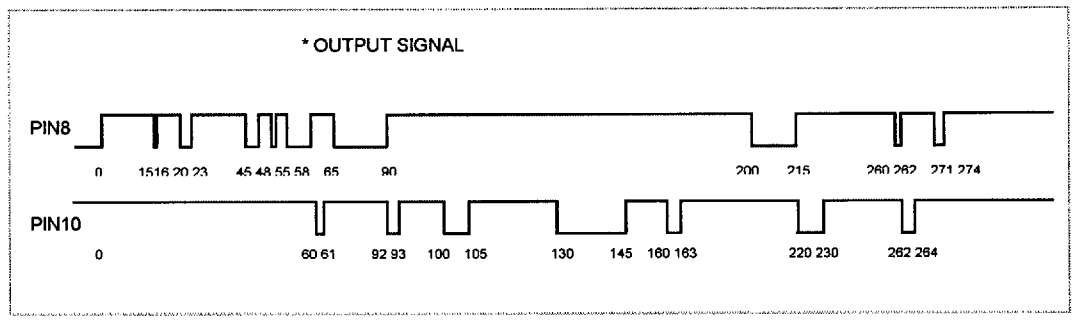
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Comparator Section (CT Block)						
Comparing Reference Voltage(2)	V_{TH2}	4.2 < Vct < 4.6V	4.2	4.4	4.6	V
Output Section						
Output Saturation Voltage	V_{SAT}	I_O = 0.2A		1.0	1.2	V
Sustain Voltage	V_{SAT}	I_O = 20mA	17.2	18.6	20.0	V
OP AMP Section						
AMP Input Current	V_{AMP}	$V_{CS} = V_{OUTA}$	0.23	0.25	0.27	V
Output Voltage Range	V_{OUTH}	I_O = -10μA	4.0	4.2		V
	V_{OUT1}	I_O = +10μA		0.05	0.1	V
Logic Section (Full Function)						
Low Low Mode	LL - Mode	M1 = 0V M2 = 0V	Fig 1-LL-Mode Timing Diagram			
Low High Mode	LH - Mode	M1 = 0V M2 = Open	Fig 2-LH-Mode Timing Diagram			
High Low Mode	HL - Mode	M1 = Open M2 = 0V	Fig 3-HL-Mode Timing Diagram			
IHigh High Mode	HH - Mode	M1 = Open M2 = Open	Fig 4-HH-Mode Timing Diagram			

* The logic section is not espeially specified to guarantee each mode timing diagram.
(These tiems are made under EDS and final tests)

LOGIC SECTION TEST TIMING

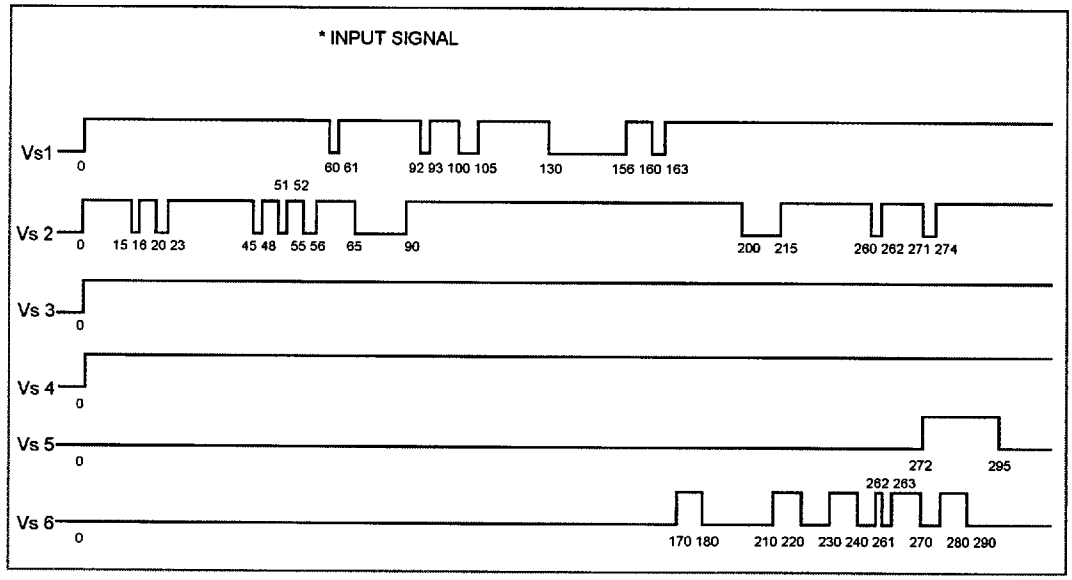
FIG 1. LL - MODE

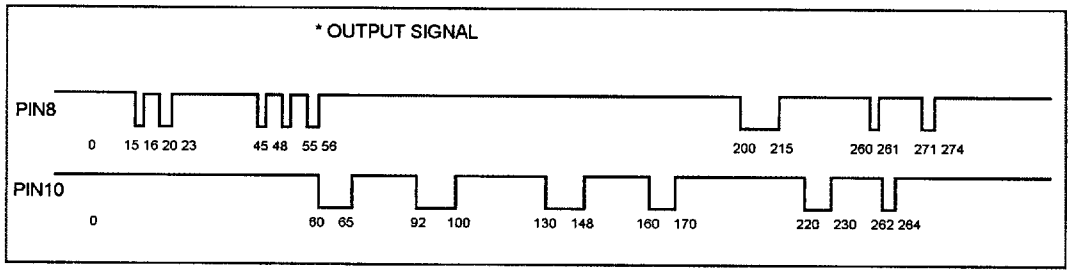




LOGIC SECTION TEST TIMING

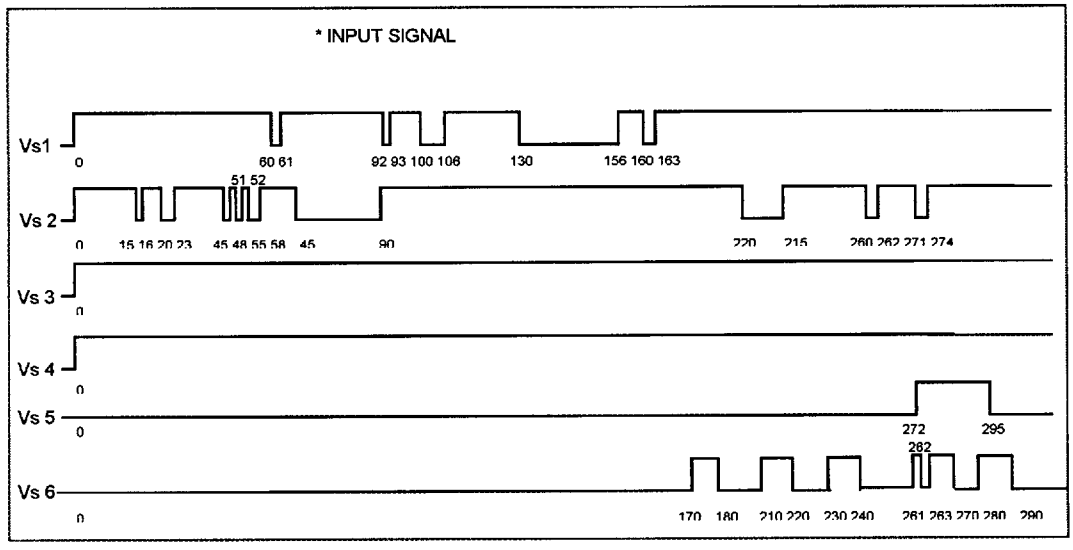
FIG 2. LH - MODE

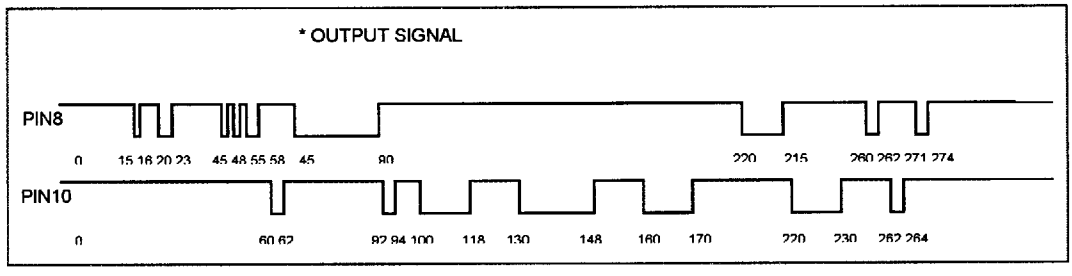




LOGIC SECTION TEST TIMING

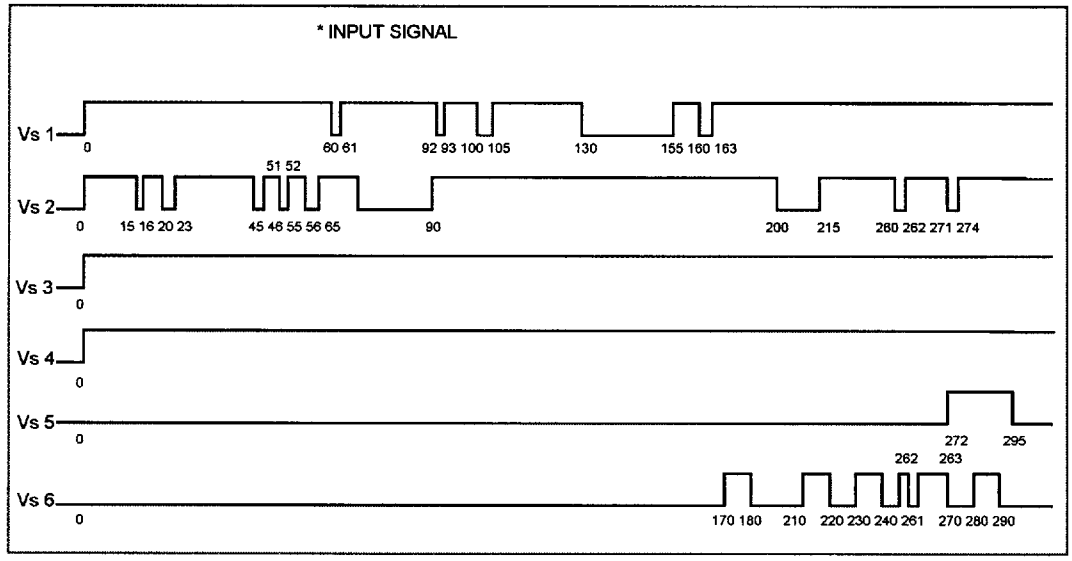
FIG 3. HL - MODE

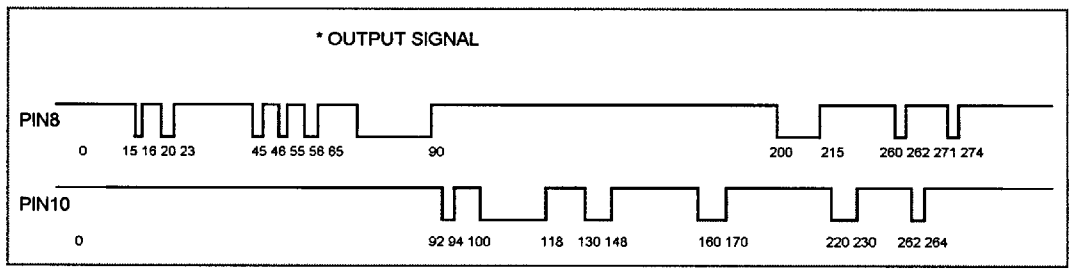




LOGIC SECTION TEST TIMING

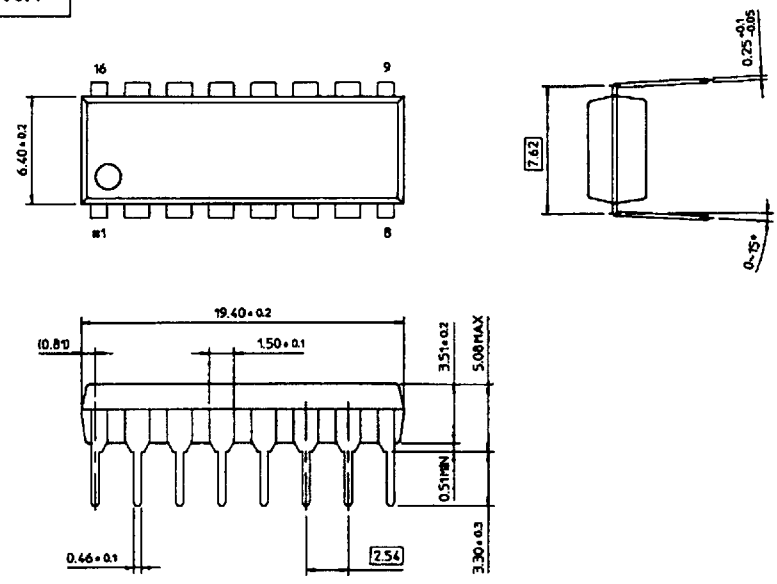
FIG 4. HH - MODE





Dimensions in Milimeters

16-DIP-300A



16-DIP-300B