Descriptions

The CH440G is a high performance, quad, Single Pole Double Throw (SPDT) analog switch that features ultra-low Ron of 0.5 Ω (typical) at 3.0V VCC. The CH440G operates over a wide VCC range of 2.3V to 4.5V and is designed for break-before-make operation. The select input is TTL-level compatible.

CH440G is also featured with smart circuitry to minimize VCC leakage current even when the control voltage is lower than VCC supply voltage. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose IO with minimal battery consumption. In other word, there is no need of additional device to shift control level to be the same as that of VCC in real application.

The CH440G is available in SOP-16 package. Standard Products are Pb-free and halogen-free.

Features

- Supply voltage: 1.5 ~ 5.5V
- ultra-low On Resistance: 1.5 Ω
- -3dB Bandwidth :700MHz
- Rail-to-Rail Signal Range
- Break-Before-Make Switching
- Low quiescent current over an Expanded Control Input Range

Applications

- Cell phones, PDA, Digital Camera and Notebook
- LCD Monitor, TV and Set-Top Box
- Audio and Video Signal Routing
- Other electronics equipment

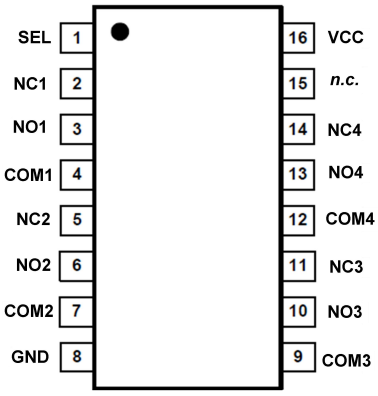
Order Information

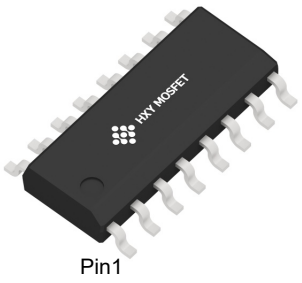
Part Number	Package		Quantity Per Reel
CH440G	SOP-16	Tape and Reel	3,000PCS

Functions and Pin Configuration

Pin Number	Symbol	Descriptions
4,7,9,12	COMX	Common Data Port
2,5,11,14	NCX	Data Port (Normally closed)
3,6,10,13	NOX	Data Port (Normally open)
1	SEL	Logic Input Control
16	VCC	Positive Power Supply
8	GND	Ground

Note: X=1 or 2,3,4





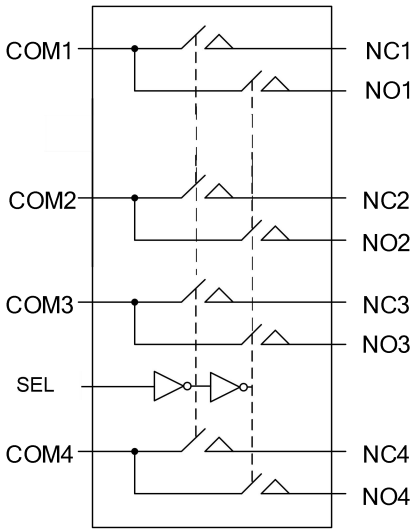
SOP-16

Pin configuration (Top view)

Function Descriptions

SEL	Function
0	NC1 Connected to COM1, NC2 Connected to COM2 NC3 Connected to COM3, NC4 Connected to COM4
1	NO1 Connected to COM1, NO2 Connected to COM2 NO3 Connected to COM1, NO4 Connected to COM2

Functional Block Diagram



Absolute Maximum Ratings (1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 ~ 6.5	V
Control Input Voltage	V_{IN}	-0.3 ~ 6.5	V
DC Input Voltage (2)	V_{INPUT}	-0.3 ~ 6.5	V
Continuous Current NO_NC_COM_		±100	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 50% duty cycle)		±200	mA
Peak Current NO_NC_COM_ (pulsed at 1ms 10% duty cycle)		±200	mA
Storage Temperature Range	T_{STG}	-65 ~ 150	^{o}C
Junction Temperature under Bias	T_J	150	^{o}C
Lead Temperature (Soldering, 10 seconds)	T_L	260	^{o}C
Power Dissipation	P_D	250	mW

Recommend operating ratings (3)

Parameter	Symbol	Value	Unit
Supply Voltage Operating	V_{CC}	1.5 ~ 5.5	V
Control Input Voltage	V_{IN}	0.0 ~ V_{CC}	V
Input Signal Voltage	V_{IS}	0.0 ~ V_{CC}	V
Operating Temperature	T_A	-40 ~ 85	^{o}C
Input Raise and Fall Time(Control Input VCC=2.3~3.6V)	t_r,t_f	0 ~ 10	ns/V
Thermal Resistance	$R_{\theta JA}$	350	^{o}C/W

Note:

1. “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.
2. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.
3. Control input must be held high or Low, it must not float.

DC Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	V_{IH}	VCC: 3.0 ~ 4.5	1.6			V
		VCC: 2.3 ~ 3.0	1.4			V
Input logic low level	V_{IL}	VCC: 3.0 ~ 4.5			0.6	V
		VCC: 2.3 ~ 3.0			0.4	V
Supply quiescent current	I_{CC}	I_{OUT}=0, V_{IN} =0 or V_{IN} =VCC			1.0	uA
Increase in ICC per input	I_{CCT}	I_{OUT}=0, VCC=4.5 V_{IN}>1.8 or V_{IN}<0.5			2.0	uA
Input leakage current	I_{IN}	V_{SEL}=VCC			±1.0	uA
Off state switch leakage current	I_{OFF}				±1.0	uA
On state switch leakage current	I_{ON}				±1.0	uA
On-Resistance	R_{ON}	VCC=4.5V, V_{IS}=0~4.5V, I_{ON}=100mA,		1.5		Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,		1.8		Ω
On-Resistance Matching Between Channels	ΔR_{ON}	VCC=4.5V, V_{IS}=0.8V, I_{OUT}=100mA,		0.1		Ω
		VCC=3.0V, V_{IS}=0.8V, I_{OUT}=100mA,		0.14		Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	VCC=4.5V, V_{IS}=0~4.5V, I_{OUT}=100mA,			0.5	Ω
		VCC=3.0V, V_{IS}=0~3.0V, I_{OUT}=100mA,			0.8	Ω

AC Electronics Characteristics (Ta=25°C, VCC=4.5V, unless otherwise noted)

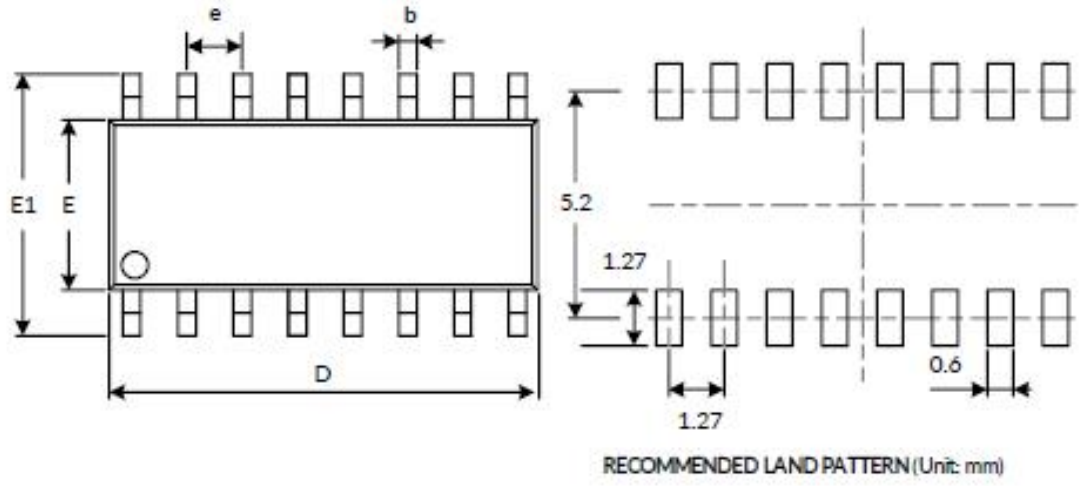
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T_{ON}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Turn-Off Time	T_{OFF}	VCC=4.5V, V_{IS}=1.5V, C_L=35pF, R_L=50Ω		200		ns
Break-Before-Make time	T_{BBM}	Generate by design		100		ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF		700		MHz
Off isolation (Per Channel)	OIRR	F=100KHz, R_L=50Ω		-50		dB
Crosstalk (Channel to Channel)	Xtalk	F=100KHz, R_L=50Ω		-50		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz R_L=32Ω, V_{IS}=0.5Vp-p		-80		dB

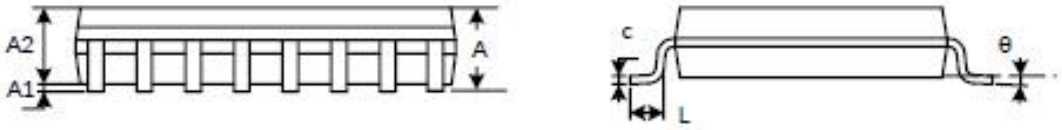
Capacitance (Ta=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=1MHz, VCC=3.3V		5		pF
On capacitance	C_{ON}	F=1MHz, VCC=3.3V		8		pF

Package Outline Dimensions

SOP-16





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D (1)	9.800	10.200	0.386	0.402
E (1)	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC) (2)		0.050(BSC) (2)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Note:
1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic"' spacing is nominal.
3. This drawing is subject to change without notice.

Attention

■ Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.

■ HUA XUAN YANG ELECTRONICS assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein.

■ Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could
give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.