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# Datasheet

## EETI

### PCAP Touch Controller EXC80H60

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# EXC80H60

**Projected Capacitive Touchscreen Controller Chip**

 eGalax\_eMPIA Technology Inc.

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## Introduction

EXC80H60 is a MCU based projected capacitive touch screen controller designed for commercial and industrial application.

EXC80H60 controller supports high voltage driving signal to achieve high SNR and better wideband interference susceptibility.

EXC80H60 needs an external DC/DC booster chip to generate high voltage.

EXC80H60 provides different working frequencies to avoid narrow band interference. With high voltage driving and different working frequencies, EXC80H60 provides an excellent interference susceptibility performance. With eGalaxTouch software package, EXC80H60 supports different touch sensor structures - OGS, SITO, DITO, G/F, G/F/F and G/G structure. With high SNR, EXC80H60 provides an excellent solution for not only finger operation but also with thin gloves, etc application.

## 1 Features

Clocks	<ul style="list-style-type: none"> <li>• External 12 MHz crystal</li> <li>• Internal PLL</li> <li>• Internal 32 bits RTC</li> <li>• Clock generator for digital modules</li> <li>• Clock generator for analog modules</li> </ul>
Power Management	<ul style="list-style-type: none"> <li>• Power supply : 3.0~3.6 VDC</li> <li>• Internal regulator for analog block</li> <li>• Internal regulator for digital core</li> <li>• Idle mode</li> <li>• Sleep mode</li> </ul>
Memory	<ul style="list-style-type: none"> <li>• 256KB embedded flash</li> <li>• 128KB SRAM + 1KB USB FIFO</li> </ul>
ESD	<ul style="list-style-type: none"> <li>• 2000V(HBM)</li> </ul>
Analog Modules	<ul style="list-style-type: none"> <li>• Up to 66 RX channels</li> <li>• Up to 44 TX channels</li> <li>TX + RX must <math>\leq</math> 104 channels</li> <li>• Signal generator</li> </ul>
Communication Interface	<ul style="list-style-type: none"> <li>• USB 2.0 compliant full speed with LPM L1 supported.</li> <li>• Configurable Serial Interface <ul style="list-style-type: none"> <li>- UART : baud rate 115200(programmable), none parity, 8 data bits and 1 stops bit</li> <li>Support HW flow control</li> <li>- I2C : up to 400 KHz, Voltage Level:3.3V</li> </ul> </li> </ul>
Digital Modules	<ul style="list-style-type: none"> <li>• Timers, watch dog Timer</li> <li>• Multi-touch algorithm engine</li> <li>• Hardware algorithm accelerator</li> <li>• Hardware scan engine</li> </ul>
Active Pen	<ul style="list-style-type: none"> <li>• Support Microsoft pen protocol (MPP) version 1.51</li> <li>• Support eGalax pen protocol</li> </ul>
Temperature Range	<ul style="list-style-type: none"> <li>• -40 to 85°C operation</li> <li>• -40 to 125°C storage</li> </ul>
Package	<ul style="list-style-type: none"> <li>• TFBGA 6.5mm x 12mm x 0.8mm</li> <li>• Ball Pitch : 0.5mm</li> <li>• Ball Count : 264</li> </ul>

Table 1-1 Features

## 2 Electrical Characteristics

VDD = 3.3V, TA = 25°C, all voltage are with respect to ground, unless otherwise noted.

Symbol	Parameter	Condition	Min	TYP	Max	Unit
VDD-GND	Supply Power	-	3.0	3.3	3.6	V
Crystal Clock	Crystal Clock	-	-	12	-	MHz
VIH	Input high level voltage	-	0.8VDD	-	-	V
VIL	Input Low level	-	-	-	0.4	V
VOH	Output high voltage	I = 2mA	VDD-0.4	-	-	V
VOL	Output low voltage	I = 2mA	-	-	0.4	V
VDDH	High Voltage Power	-	-	-	32	V
DVDD15	1.5V Power		1.425	1.5	1.575	V

Table 2-1 Electrical Characteristics

Symbol	Parameter	Min	Max	Unit
VDD-GND	Maximum Power Supply Voltage	-0.3	3.6	V
Vin	Input I/O Pin Voltage	GND-0.3	4	V
IVDD	Total current at power	-	200	mA
IGND	Total current at Gnd	-	200	mA
Vesd	Electrostatics Discharge Voltage(HBM) <sup>(1)</sup>	2000	-	V
DVDD15	Maximum 1.5V Power		1.8	V

Table 2-2 Maximum Rating

(1) This test conforms to the MIL-STD-883J/Method 3015.8.

Each I/O has two protection diodes as shown in Figure 2-1. These diode used for ESD protection and to clamp input voltage to a save level to prevent internal logic circuit damage.

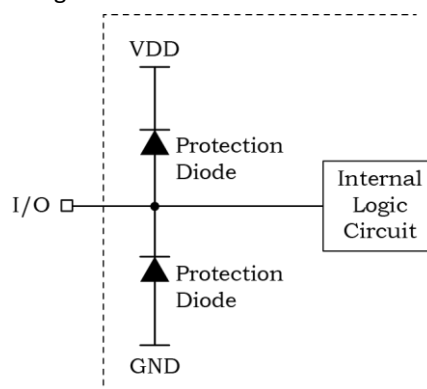


Figure 2-1 Protection Diode Scheme

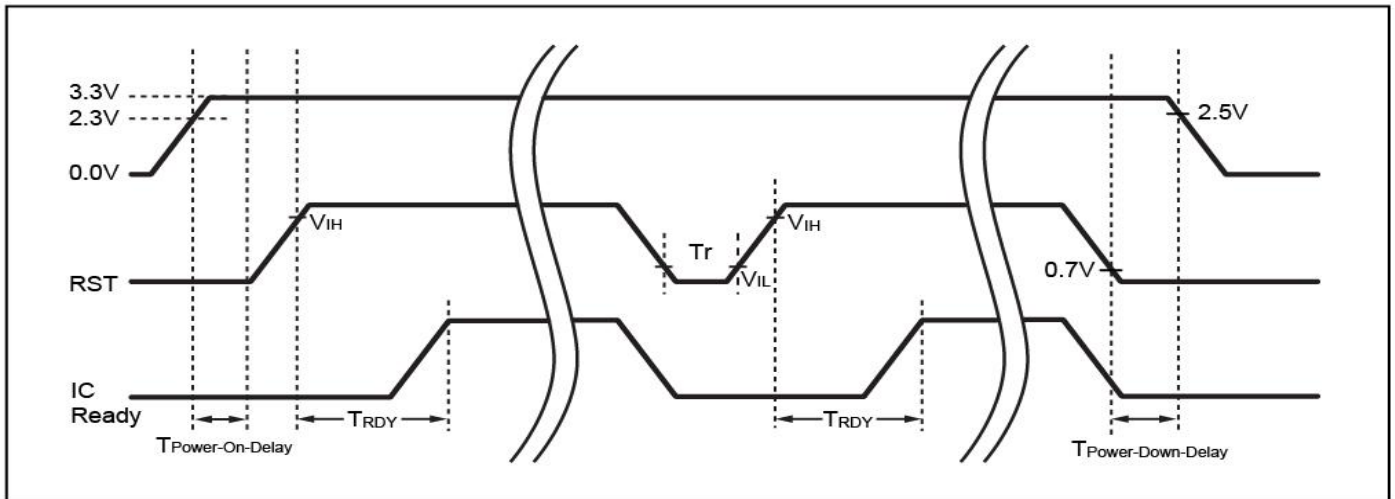


Figure 2-2 Power On Sequence Diagram

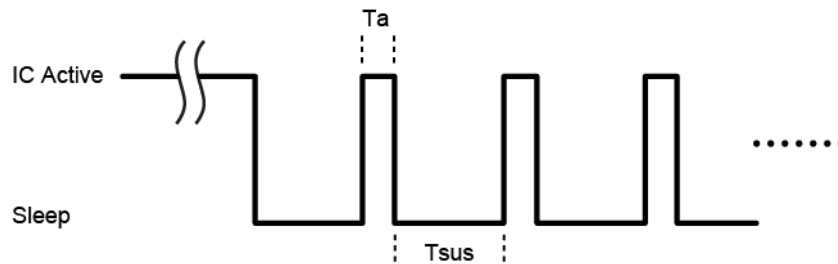


Figure 2-3 Idle Sequence Diagram

Symbol	Parameter	Condition	Min	TYP	Max	Unit
Tr	Host pull low period	-	1	-	-	ms
T <sub>RDY</sub>	IC ready to communication	-	-	65	-	ms
Ta	IC active period	-	-	5	-	ms
Tsus	IC suspend period	-	-	10	-	ms
T <sub>Power-On-Delay</sub>	Power-on delay	-	100	-	-	us
T <sub>Power-Down-Delay</sub>	Power-down delay	-	0	-	-	ms
V <sub>IL</sub>	RST input low Voltage	-	-	-	0.4	V
V <sub>IH</sub>	RST input high Voltage	-	0.8VDD	-	-	V

Table 2-3 Description

NOTE :

If host needs to control RST pin or connect any GPIO pins, please make sure Host’s GPIO is configured to open-drain mode and pull-up(3.3V) resistor should be at touch IC side.

NOTE :

If host needs to reset EXC80H60, drive low voltage, after ‘Tr’ time, please pull high again.

NOTE :

Incorrect power sequence may cause IC damage.

### 3 General Reflow Profiles( For Reference )

A PCBA reflow profile depends on the thermal mass of the entire populated board.

The actual temperature used in the reflow oven is a function of:

- Solder paste types
- Board density
- Component location
- Component mass
- Board finish

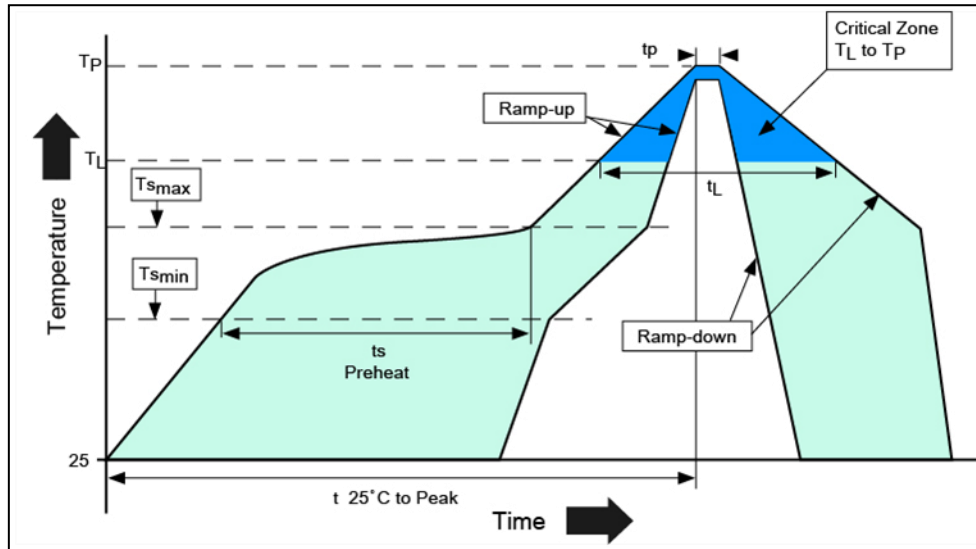


Figure 3-1 Diagram



Profile Feature	Pb-Free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	1.5°C/second max
Preheat -Temperature Min (T <sub>smin</sub> ) -Temperature Max (T <sub>smax</sub> ) -Time (min to max) (t <sub>s</sub> )	150°C 200°C 60~180 seconds
Time maintained above: -Temperature (T <sub>L</sub> ) -Time (t <sub>L</sub> )	217°C 60-150 seconds
Peak Temperature (T <sub>p</sub> )	245±5°C
Time within 5°C of actual Peak Temperature (t <sub>p</sub> )	30 seconds max
Ramp-down Rate	3°C/second max
Time 25°C to Peak Temperature	8 minutes max

Table 3-1 Description

## Note:

1. All temperatures refer to topside of the package, measured on the package body surface.
2. Actual board assembly depends on other parts on board density and follow solder paste manufacturer's guideline.

**4 Order Information**

ETP-CP-EXC80H60	-	F	G	3	1
CP = Chip EX = Slave ASIC EXC = MCU	-	Tracking Code 1	Green Part	0 = LQFP 1 = QFN 2 = TSSOP 3 = BGA 4 = TQFP	Tracking Code 2

Table 4-1 Description

Our company network supports you worldwide with offices in Germany, Austria, Switzerland, Great Britain and the USA. For more information please contact:

## Headquarters

### Germany



**FORTEC Elektronik AG**  
Lechwiesenstr. 9  
86899 Landsberg am Lech

Phone: +49 8191 91172-0  
E-Mail: [sales@forteca.de](mailto:sales@forteca.de)  
Internet: [www.forteca.de](http://www.forteca.de)

## Fortec Group Members

### Austria



**FORTEC Elektronik AG**  
**Office Vienna**

Nuschinggasse 12  
1230 Wien

Phone: +43 1 8673492-0  
E-Mail: [office@fortec.at](mailto:office@fortec.at)  
Internet: [www.fortec.at](http://www.fortec.at)

### Germany



**Distec GmbH**

Augsburger Str. 2b  
82110 Germering

Phone: +49 89 894363-0  
E-Mail: [info@distec.de](mailto:info@distec.de)  
Internet: [www.distec.de](http://www.distec.de)

### Switzerland



**ALTRAC AG**

Bahnhofstraße 3  
5436 Würenlos

Phone: +41 44 7446111  
E-Mail: [info@altrac.ch](mailto:info@altrac.ch)  
Internet: [www.altrac.ch](http://www.altrac.ch)

### United Kingdom



**Display Technology Ltd.**

5 The Oaks Business Village  
Revenge Road, Lordswood  
Chatham, Kent, ME5 8LF

Phone: +44 1634 627255  
E-Mail: [info@displaytechnology.co.uk](mailto:info@displaytechnology.co.uk)  
Internet: [www.displaytechnology.co.uk](http://www.displaytechnology.co.uk)

### USA



**Apollo Display Technologies, Corp.**

87 Raynor Avenue,  
Unit 1 Ronkonkoma,  
NY 11779

Phone: +1 631 5804360  
E-Mail: [info@apolloDisplays.com](mailto:info@apolloDisplays.com)  
Internet: [www.apolloDisplays.com](http://www.apolloDisplays.com)