SMSC
SUCCESS BY DESIGN

CAP1088

8 Channel Capacitive Touch Sensor with 8 LED Drivers

PRODUCT FEATURES

General Description

The CAP1088 is a multiple channel Capacitive Touch sensor with multiple power LED drivers. It contains eight (8) individual Capacitive Touch sensor inputs with programmable sensitivity for use in touch sensor applications. Each sensor automatically recalibrates to compensate for gradual environmental changes.

The CAP1088 also contains eight (8) LED drivers that offer full-on / off, variable rate blinking, dimness controls, and breathing. Each of the LED drivers may be linked to one of the sensors to be actuated when a touch is detected. As well, each LED driver may be individually controlled via a host controller.

The CAP1088 offers multiple power states operating at low quiescent currents.

During the Standby mode of operation, one or more Capacitive Touch Sensors are active and all LEDs may be used. If a touch is detected, it will wake the system using the WAKE/SPI_MOSI pin.

The Deep Sleep mode of operation is the lowest power state available, drawing 3uA of current. During this mode, no sensors are active although all LEDs may be used. Driving the WAKE/SPI_MOSI pin or communications will wake the device.

Applications

- Desktop and Notebook PCs
- LCD Monitors
- Printers
- Appliances

Features

- Eight (8) Capacitive Touch Sensor Inputs
    — Programmable sensitivity
    — Automatic recalibration
    — Individual thresholds for each button
- Flexible Capacitive Touch Sense algorithm
- Multiple Communication interfaces
    — SMBus / I^2C compliant interface
    — SMSC BC-Link interface
    — SPI communications
    — Pin selectable communications protocol and multiple slave addresses (SMBus / I^2C only)
- Low Power operation
    — 3uA quiescent current in Deep Sleep
    — Samples one or more channels in Standby
- Eight (8) LED Driver Outputs
    — Open Drain or Push-Pull
    — Programmable blink, breathe, and dimness controls
    — Can be linked to Capacitive Touch Sensors
- Dedicated Wake output flags touches in low power mode
- System RESET pin
- Available in 24-pin 4mm x 4mm RoHS compliant QFN package

Block Diagram
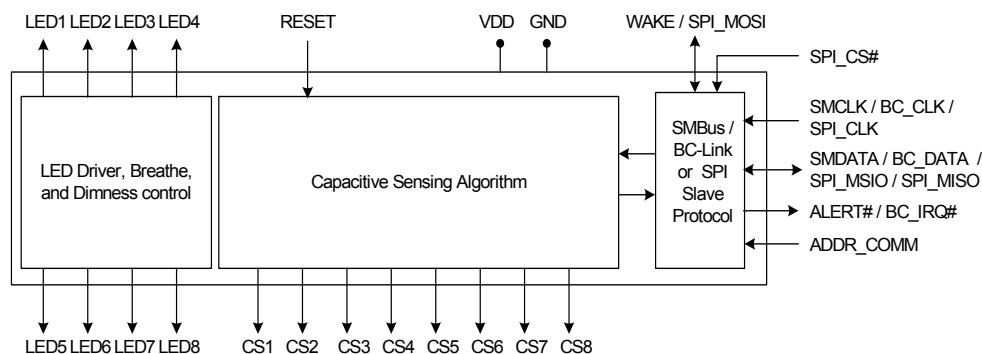
Note: I^2C is a trademark of NXP Semiconductors. SMSC BC-Link is a trademark of SMSC.

PRODUCT PREVIEW

ORDER NUMBER(S):

ORDERING NUMBER	PACKAGE	FEATURES
CAP1088-1-CP-TR	24-pin QFN 4mm x 4mm (Lead Free RoHS compliant)	Eight Capacitive Touch Sensors, Eight LED drivers, Dedicated Wake, Reset, SMBus / BC-Link / SPI interfaces

REEL SIZE IS 4,000 PIECES

This product meets the halogen maximum concentration values per IEC61249-2-21

For RoHS compliance and environmental information, please visit www.smsc.com/rohs

80 ARKAY DRIVE, HAUPPAUGE, NY 11788 (631) 435-6000, FAX (631) 273-3123

PRODUCT PREVIEW

Package Outline

CAP1088 Package Drawings
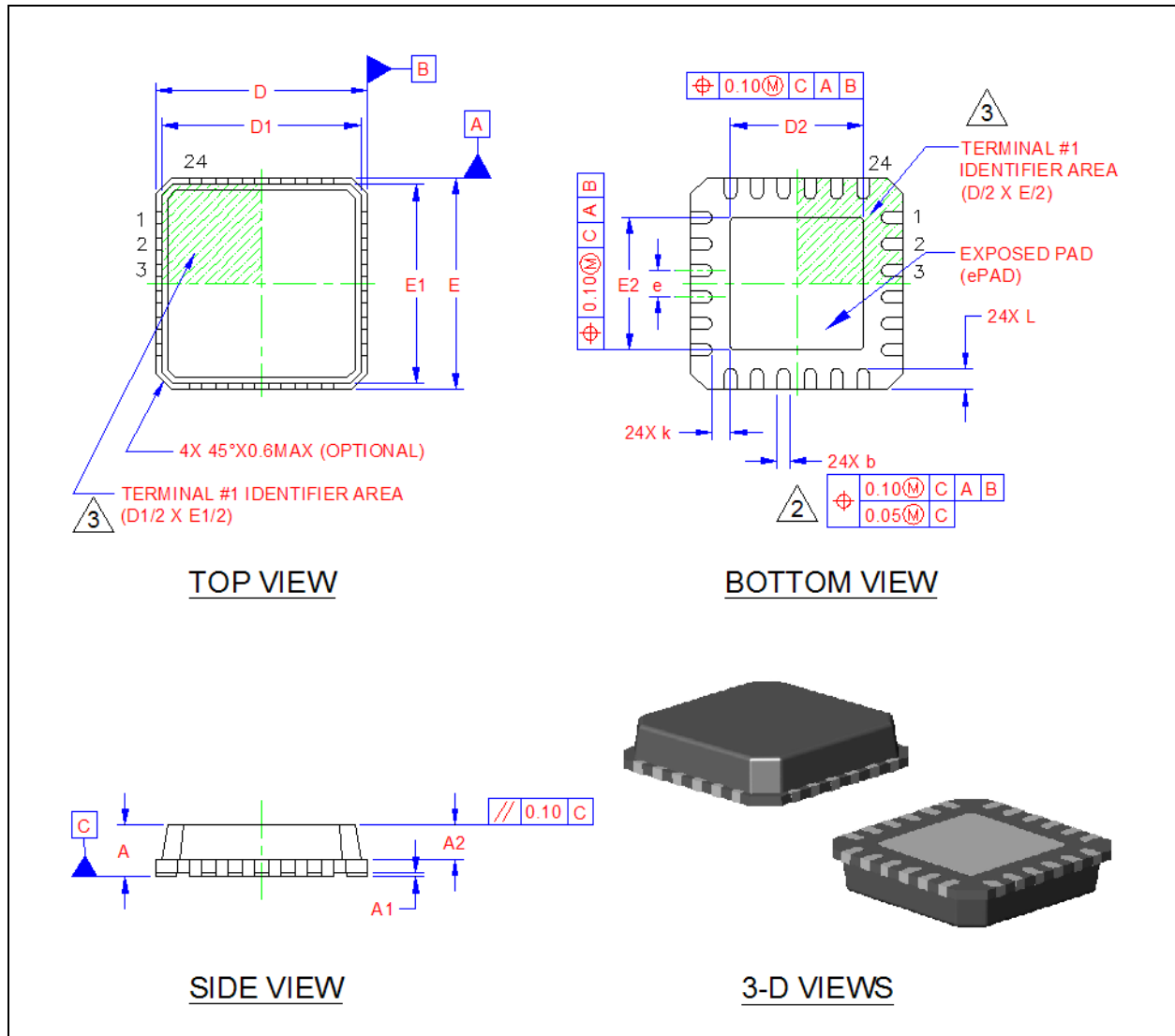
Figure 1 CAP1088 Package Drawing - 24-Pin QFN 4mm x 4mm

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D1/E1	3.55	3.75	3.95	-	X/Y MOLD CAP SIZE
D2/E2	2.40	2.50	2.60	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.25	-	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

Figure 2 CAP1088 Package Dimensions - 24-Pin QFN 4mm x 4mm
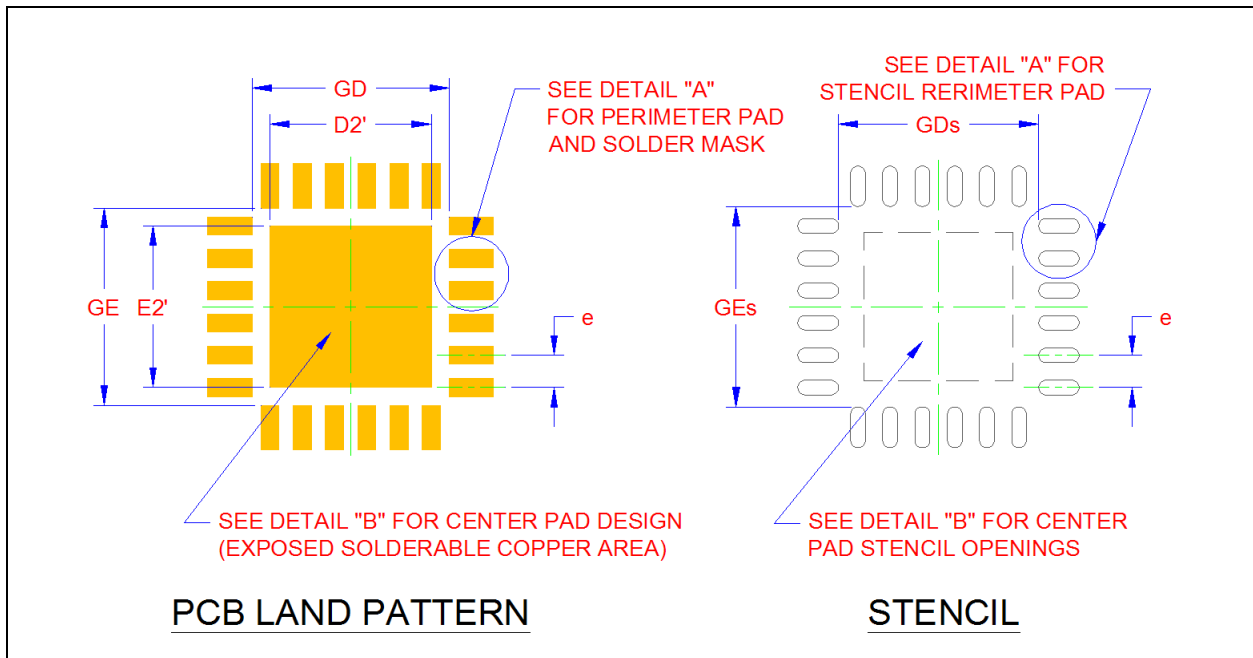
Figure 3 CAP1088 PCB Land Pattern and Stencil - 24-Pin QFN 4mm x 4mm

PRODUCT PREVIEW

SOLDER MASK

CLEARANCE B/N PAD & SM
0.060 - 0.075

0.5

Xs X

0.075 (MIN)

FULL RADIUS
IS OPTIONAL

Ys

Y

0.025 (MIN)

DETAIL "A"

STENCIL OPENING - PERIMETER LANDS
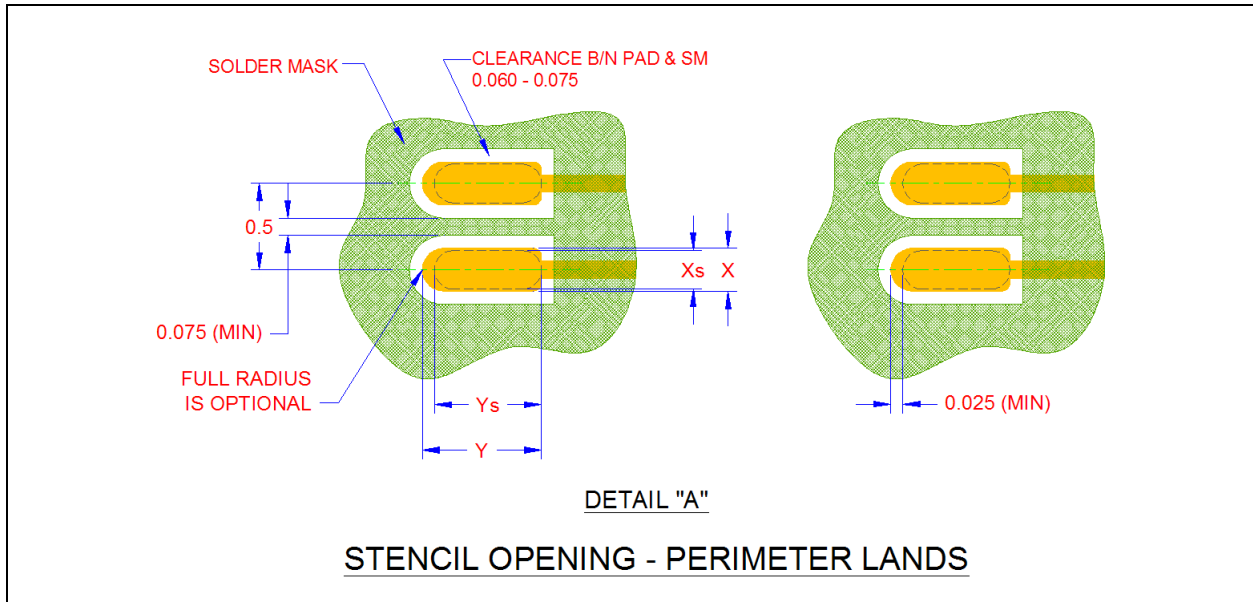
Figure 4 CAP1088 PCB Detail A - 24-Pin QFN 4mm x 4mm

OPTION 1
(NON-PLUGGED THERMAL VIAS)

OPTION 2
(PLUGGED THERMAL VIAS)

0.1mm (MIN)

0.2-0.3mm

Thermal Vias: Ø0.30mm,
3x3 Matrix @ 1.00mm Pitch

Stencil Openings: Ø0.70-0.80mm
2x2 Matrix

Thermal Vias: Ø0.30mm,
3x3 Matrix @ 1.00mm Pitch

Stencil Openings: 0.62x0.62mm (MAX)
3x3 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD
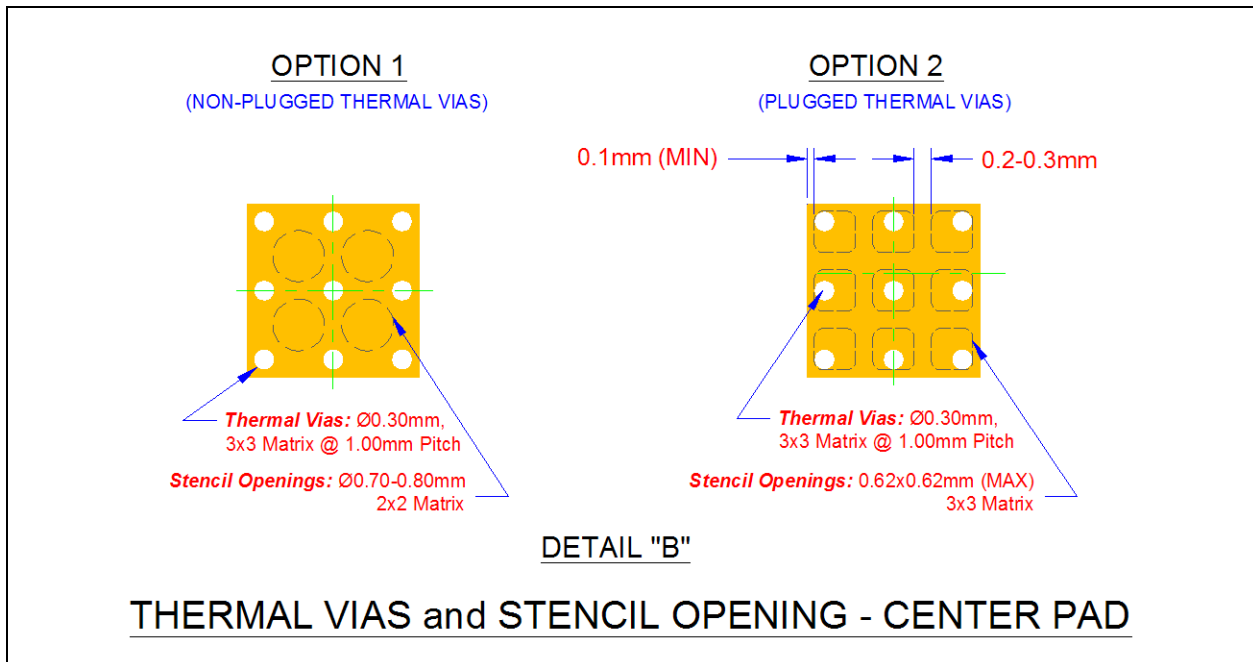
Figure 5 CAP1088 PCB Detail B - 24-Pin QFN 4mm x 4mm

PRODUCT PREVIEW

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.05	-	3.10
GDs/GEs	3.10	-	-
D2'/E2'	-	2.50	2.50
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

Figure 6 CAP1088 Land Dimensions - 24-Pin QFN 4mm x 4mm

SMT APPLICATION NOTES (QFN)

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

Figure 7 QFN Application Notes