CAP1188

8 Channel Capacitive Touch Sensor with 8 LED Drivers

PRODUCT FEATURES

Data Brief

General Description

The CAP1188, which incorporates SMSC's RightTouch® [1] technology, 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 input automatically recalibrates to compensate for gradual environmental changes.

The CAP1188 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 sensor inputs to be actuated when a touch is detected. As well, each LED driver may be individually controlled via a host controller.

The CAP1188 includes Multiple Pattern Touch recognition that allows the user to select a specific set of buttons to be touched simultaneously. If this pattern is detected, then a status bit is set and an interrupt generated.

Additionally, the CAP1188 includes circuitry and support for enhanced sensor proximity detection.

The CAP1188 offers multiple power states operating at low quiescent currents. In the Standby state of operation, one or more capacitive touch sensor inputs are active and all LEDs may be used. If a touch is detected, it will wake the system using the WAKE/SPI_MOSI pin.

Deep Sleep is the lowest power state available, drawing 5uA (typical) of current. In this state, no sensor inputs are active. Driving the WAKE/SPI_MOSI pin or communications will wake the device.

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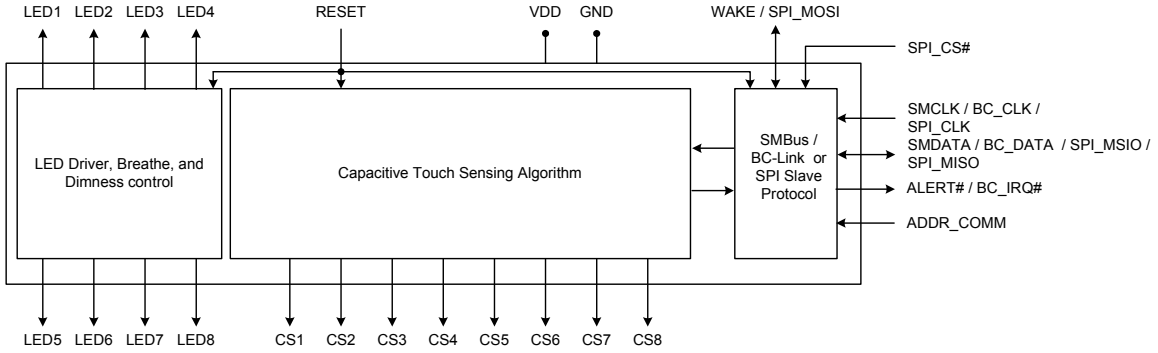
Applications

- Desktop and Notebook PCs
- LCD Monitors
- Consumer Electronics
- Appliances

Features

- Eight (8) Capacitive Touch Sensor Inputs
  - Programmable sensitivity
  - Automatic recalibration
  - Individual thresholds for each button
- Proximity Detection
- Multiple Button Pattern Detection
- Calibrates for Parasitic Capacitance
- Analog Filtering for System Noise Sources
- Press and Hold feature for Volume-like Applications
- 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
  - 5uA quiescent current in Deep Sleep
  - 50uA quiescent current in Standby (1 sensor input monitored)
  - 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 Sensor inputs
- Dedicated Wake output flags touches in low power state
- System RESET pin
- Available in 24-pin 4mm x 4mm RoHS compliant QFN package

Block Diagram



PRODUCT PREVIEW

Order Number(s):

ORDERING NUMBER	PACKAGE	FEATURES
CAP1188-1-CP-TR	24-pin QFN 4mm x 4mm (Lead-free RoHS compliant)	Eight capacitive touch sensor inputs, 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

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Package Information

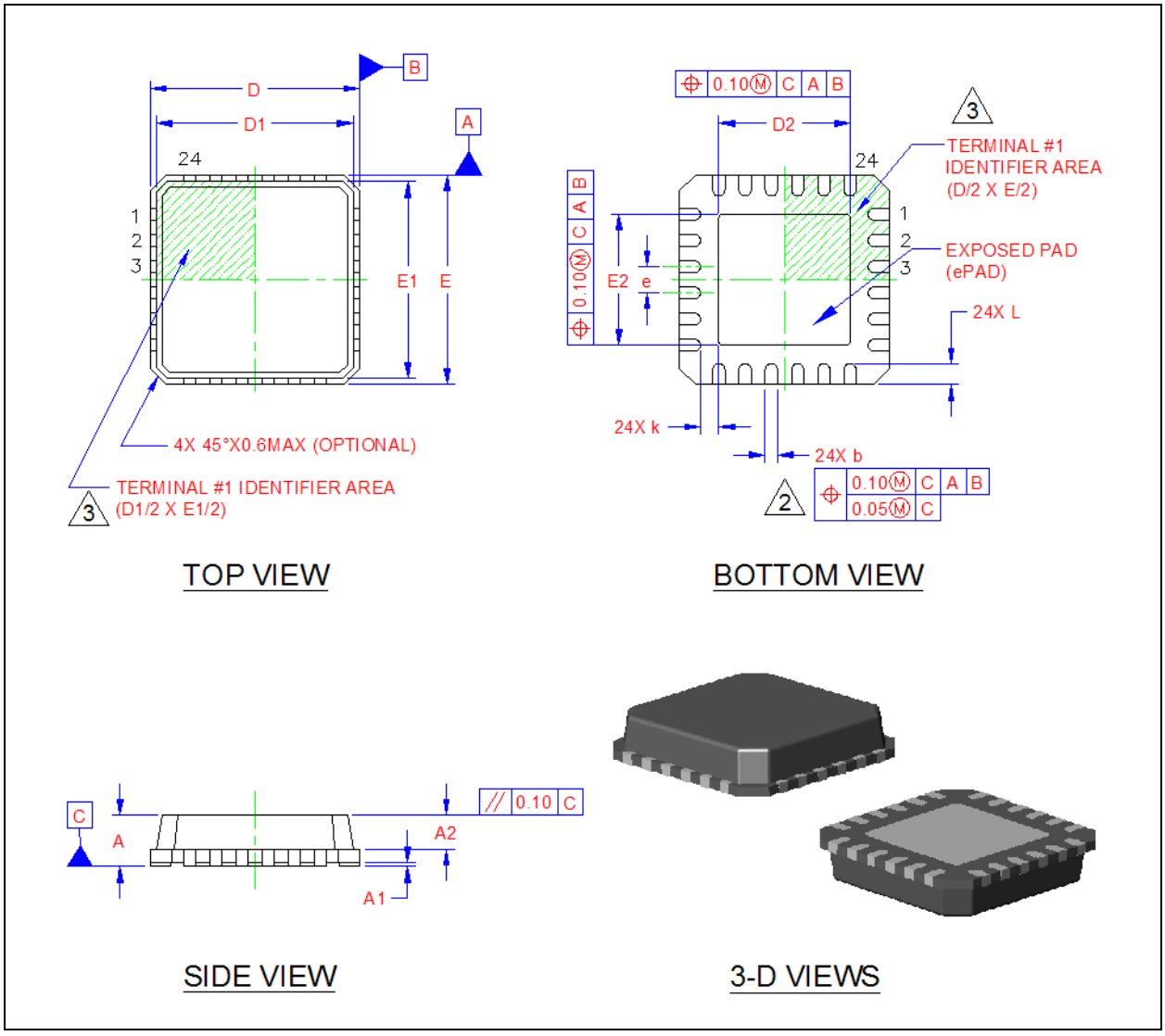


Figure 1 CAP1188 Package Drawing - 24-Pin QFN 4mm x 4mm

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 CAP1188 Package Dimensions - 24-Pin QFN 4mm x 4mm

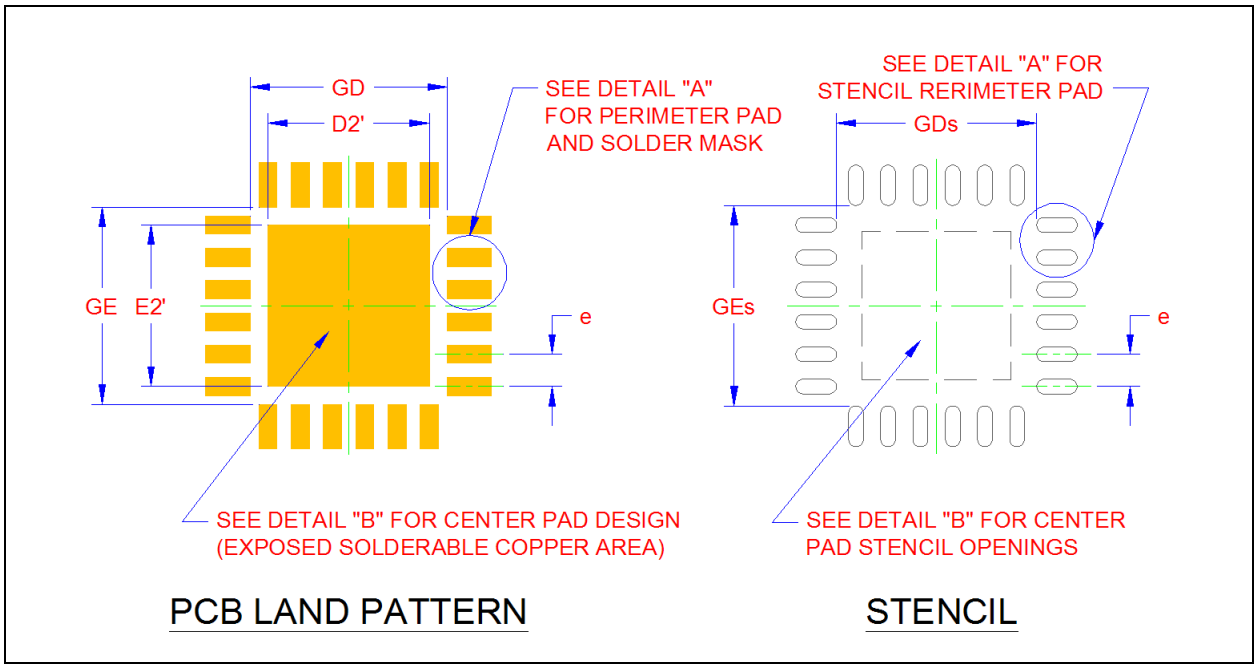


Figure 3 CAP1188 PCB Land Pattern and Stencil - 24-Pin QFN 4mm x 4mm

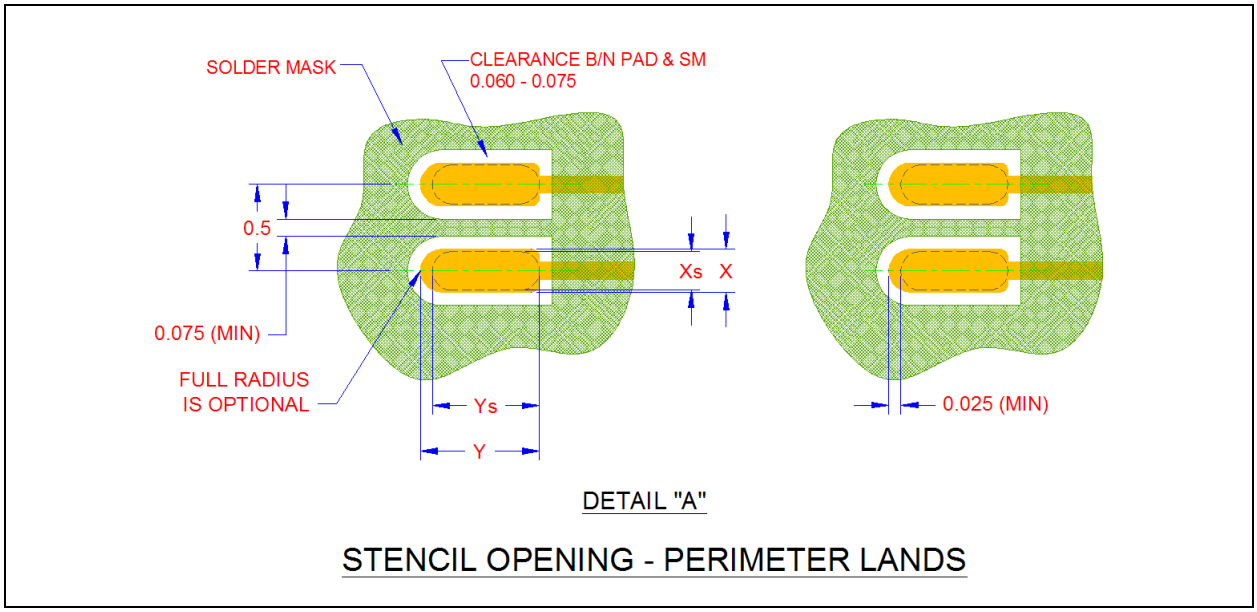


Figure 4 CAP1188 PCB Detail A - 24-Pin QFN 4mm x 4mm

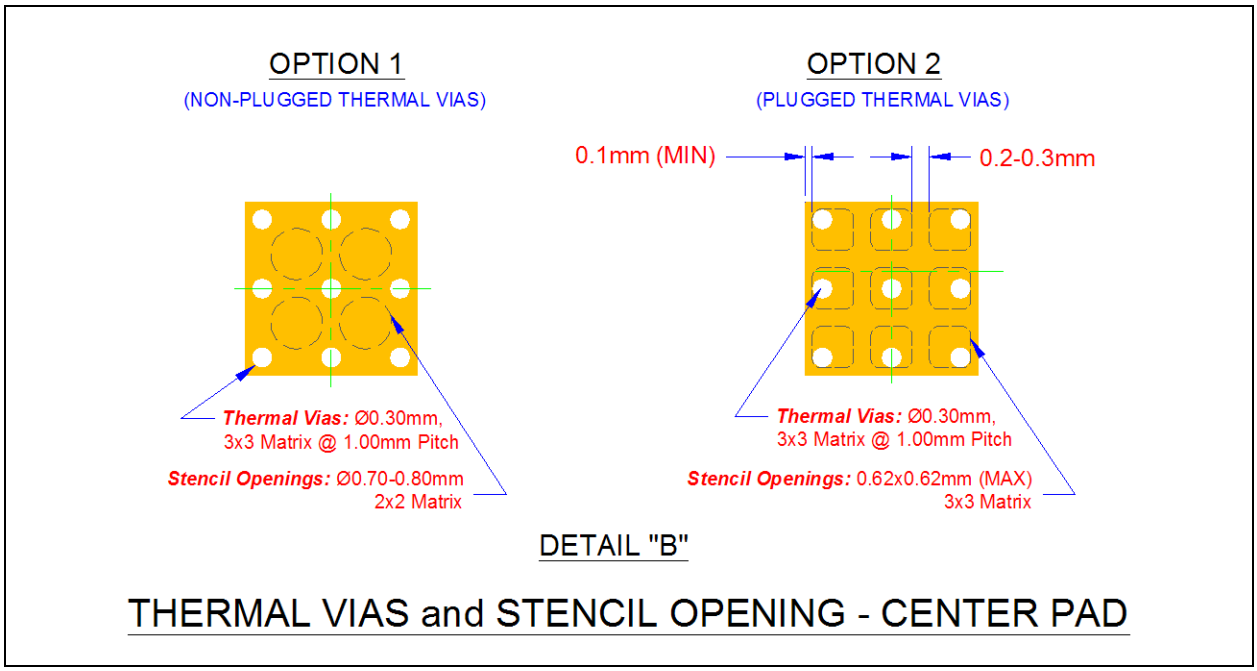


Figure 5 CAP1188 PCB Detail B - 24-Pin QFN 4mm x 4mm

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 CAP1188 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