

## 6 Channel Capacitive Touch Sensor with 6 LED Drivers

### PRODUCT FEATURES

Data Brief

#### General Description

The CAP1166, which incorporates SMSC's RightTouch™ 1 technology, is a multiple channel Capacitive Touch sensor with multiple power LED drivers. It contains six (6) 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 CAP1166 also contains six (6) 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 CAP1166 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 CAP1166 includes circuitry and support for enhanced sensor proximity detection.

The CAP1166 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.

#### Applications

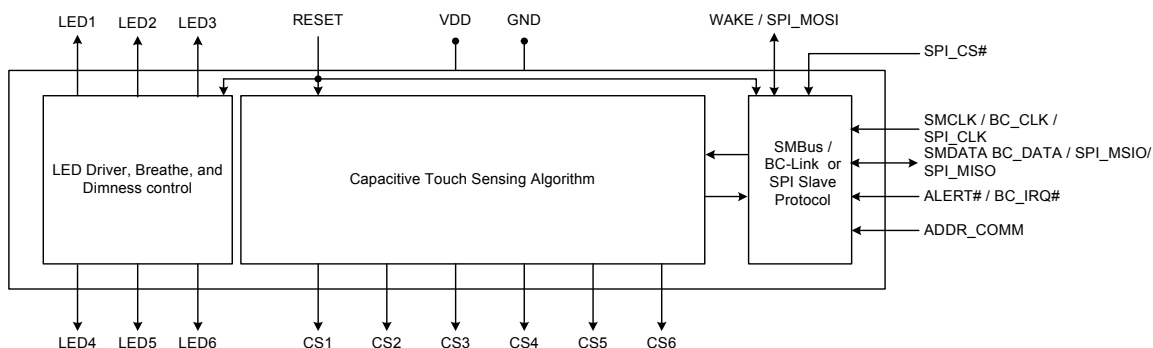
- Desktop and Notebook PCs
- LCD Monitors
- Consumer Electronics
- Appliances

#### Features

- Six (6) 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<sup>2</sup>C compliant interface
  - SMSC BC-Link interface
  - SPI communications
  - Pin selectable communications protocol and multiple slave addresses (SMBus / I<sup>2</sup>C 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
- Six (6) 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 20-pin 4mm x 4mm QFN or 24-pin SSOP RoHS compliant package

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#### Block Diagram



**Order Number(s):**

ORDERING NUMBER	PACKAGE	FEATURES
CAP1166-1-BP-TR	20-pin QFN 4mm x 4mm (Lead-free RoHS compliant)	Six capacitive touch sensor inputs, Six LED drivers, Dedicated Wake, Reset, SMBus / BC-Link / SPI interfaces
CAP1166-1-CZC-TR	24-pin SSOP (Lead-free RoHS compliant)	Six capacitive touch sensor inputs, Six LED drivers, Dedicated Wake, Reset, SMBus / BC-Link / SPI interfaces

**REEL SIZE IS 4,000 PIECES FOR 20-PIN QFN**

**REEL SIZE IS 2,500 PIECES FOR 24-PIN SSOP**

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

**For RoHS compliance and environmental information, please visit [www.smsc.com/rohs](http://www.smsc.com/rohs)**



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

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# Package Information

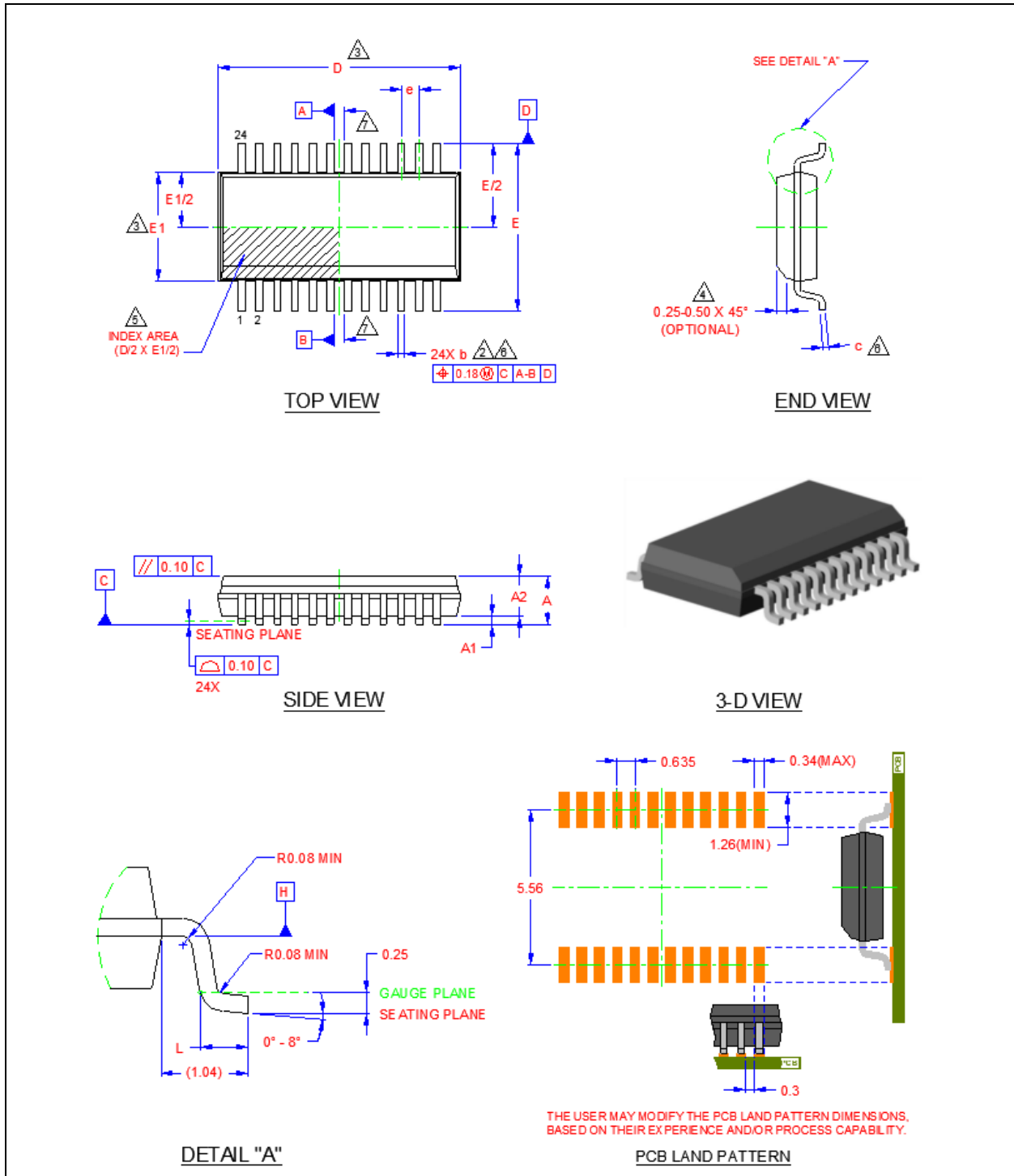


Figure 1 24-Pin SSOP Package Drawing

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	1.35	1.60	1.75	-	OVERALL PACKAGE HEIGHT
A1	0.10	0.19	0.25	-	STANDOFF
A2	1.25	1.44	1.65	-	BODY THICKNESS
D	8.55	8.65	8.75	3	X BODY SIZE
E	5.80	6.00	6.20	-	LEAD SPAN
E1	3.80	3.90	4.00	3	Y BODY SIZE
L	0.40	0.50	0.90	-	LEAD FOOT LENGTH
b	0.20	0.25	0.30	2, 6	LEAD WIDTH
c	0.15	0.20	0.25	6	LEAD FOOT THICKNESS
e	0.635 BSC			-	LEAD PITCH

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. THEY SHALL NOT EXCEED 0.15 MM PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. THEY SHALL NOT EXCEED 0.15 MM PER SIDE. "D" AND "E1" ARE DETERMINED AT DATUM "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. THIS CHAMFER FEATURE IS OPTIONAL.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 TO 0.25 MM FROM THE LEAD TIP.
7. DATUMS A & B TO BE DETERMINED AT DATUM H.

**Figure 2 24-Pin SSOP Package Dimensions**

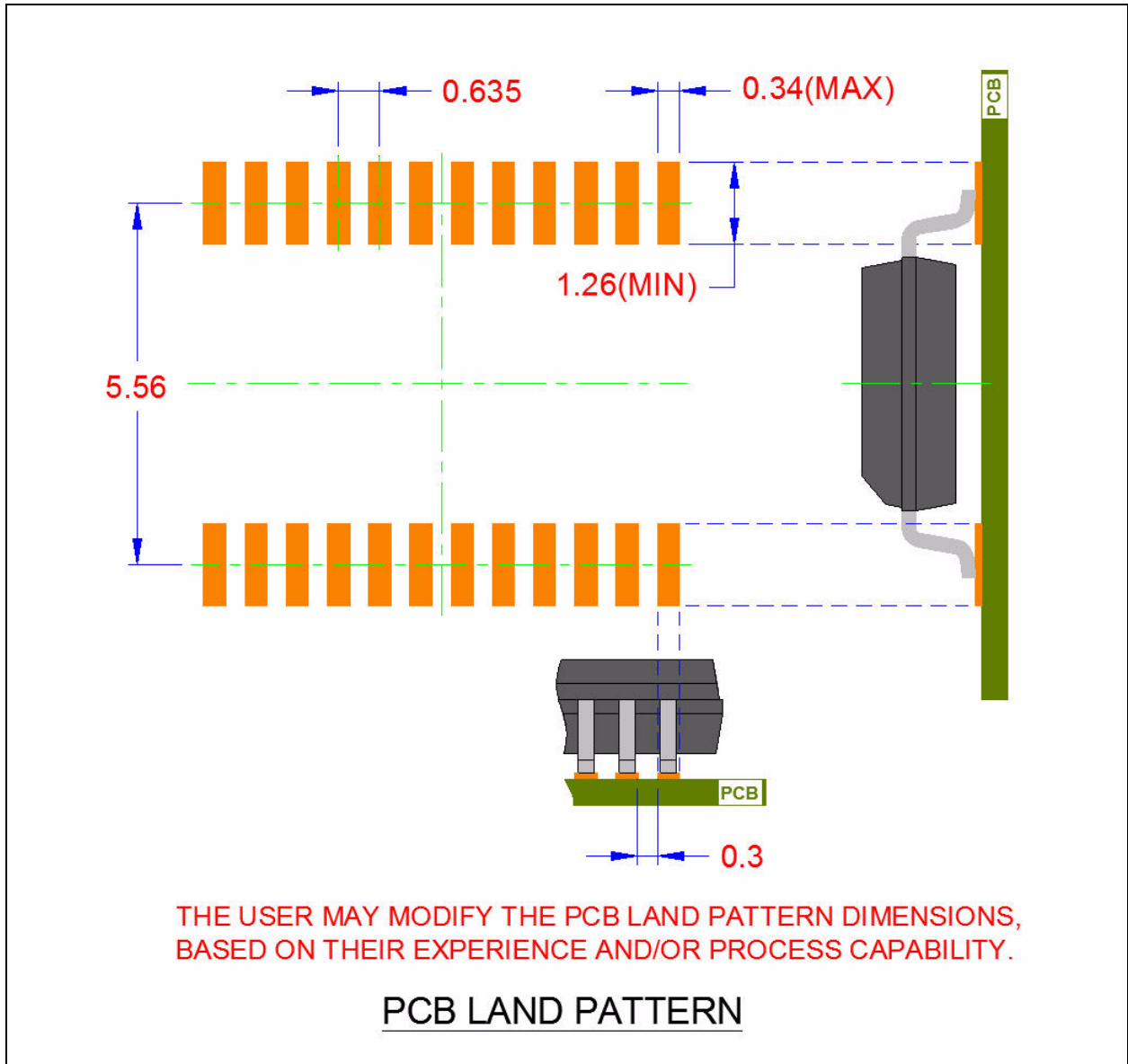
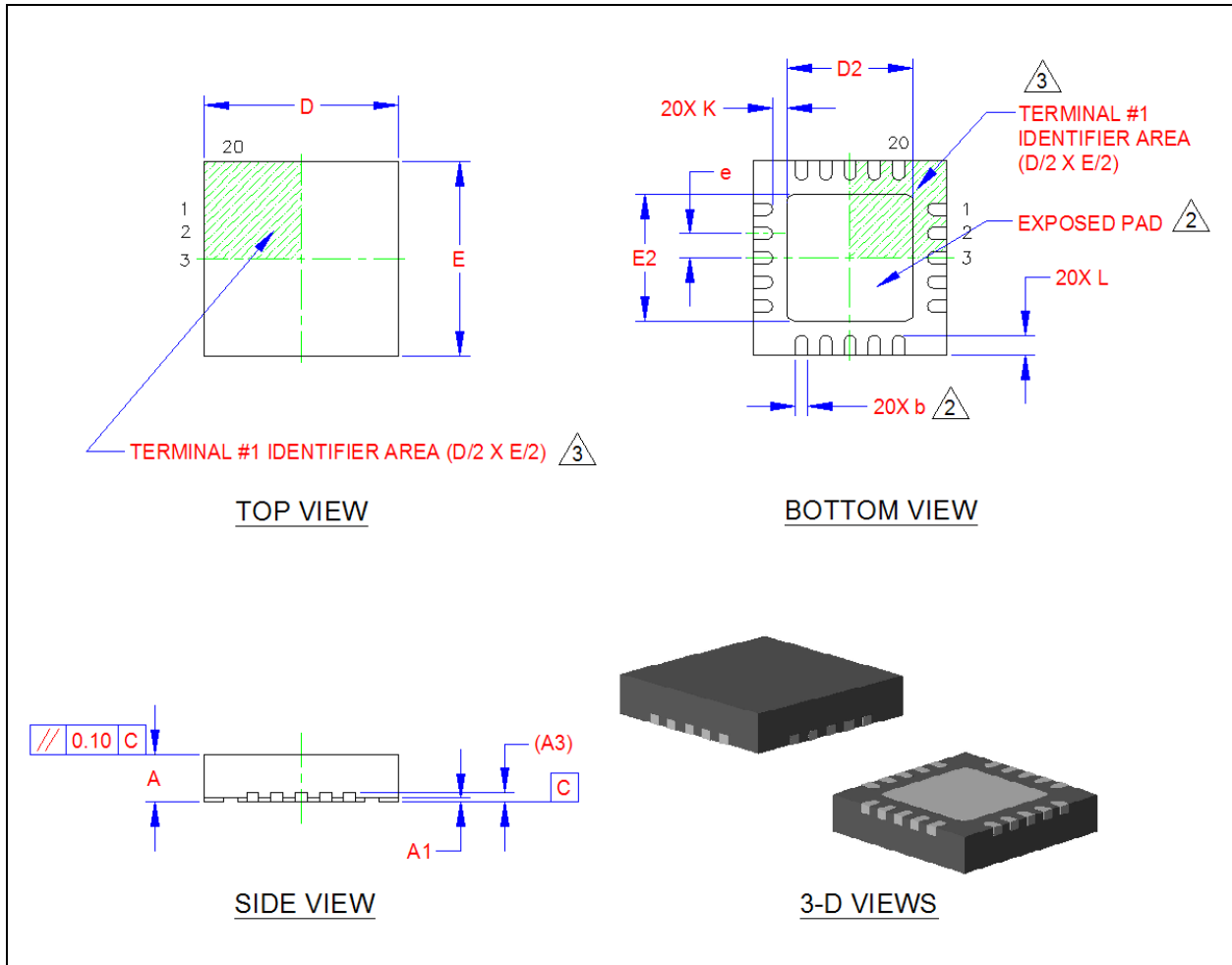


Figure 3 CAP1166 PCB Land Pattern - 24-Pin SSOP


**Figure 4 20-Pin QFN 4mm x 4mm Package Drawing**

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.50	2.60	2.70	2	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.20	-	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS  $\pm 0.05\text{mm}$  AT MAXIMUM MATERIAL CONDITION. 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 5 20-Pin QFN 4mm x 4mm Package Dimensions

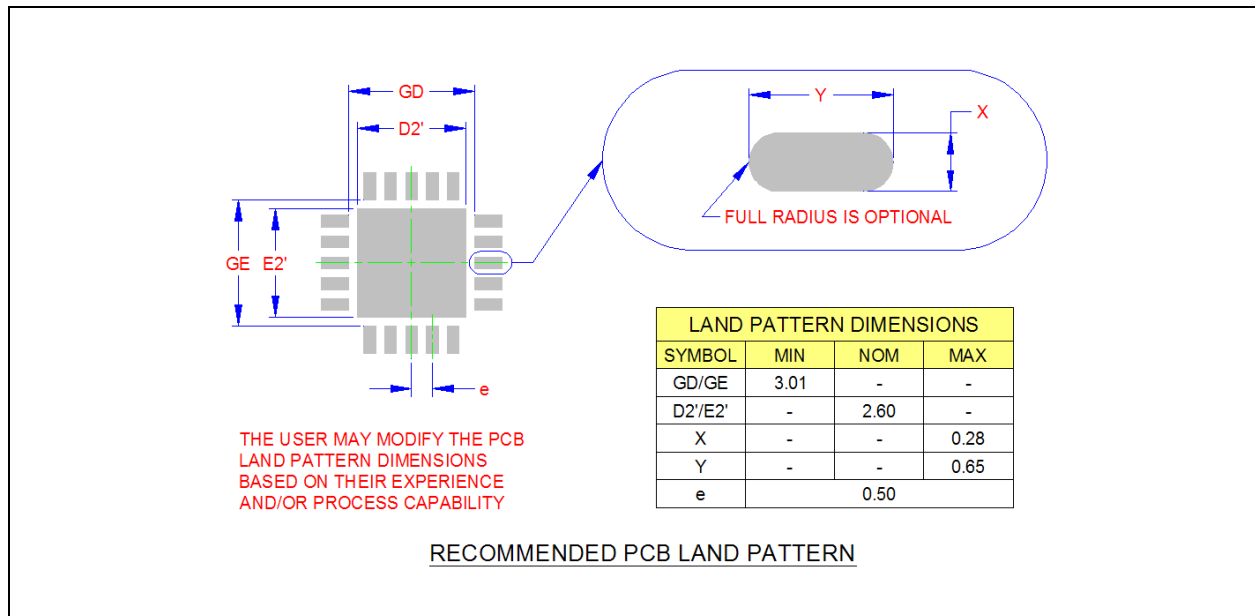


Figure 6 20-Pin QFN 4mm x 4mm PCB Drawing