2496 to 2690 MHz Wide Instantaneous Bandwidth High-Efficiency Power Amplifier

DESCRIPTION

CB6317 is a high-efficiency, wide instantaneous bandwidth, fully input/output matched power amplifier (PA) with high gain and linearity. The compact 5x5 mm PA is designed for FDD and TDD 4G LTE and 5G systems operating from 2496 to 2690 MHz. The active biasing circuitry is integrated to compensate PA performance over temperature, voltage, and process variation.

A block diagram of the CB6317 is shown in Figure 1. The device package and pinout are shown in Figure 2.

BLOCK DIAGRAM

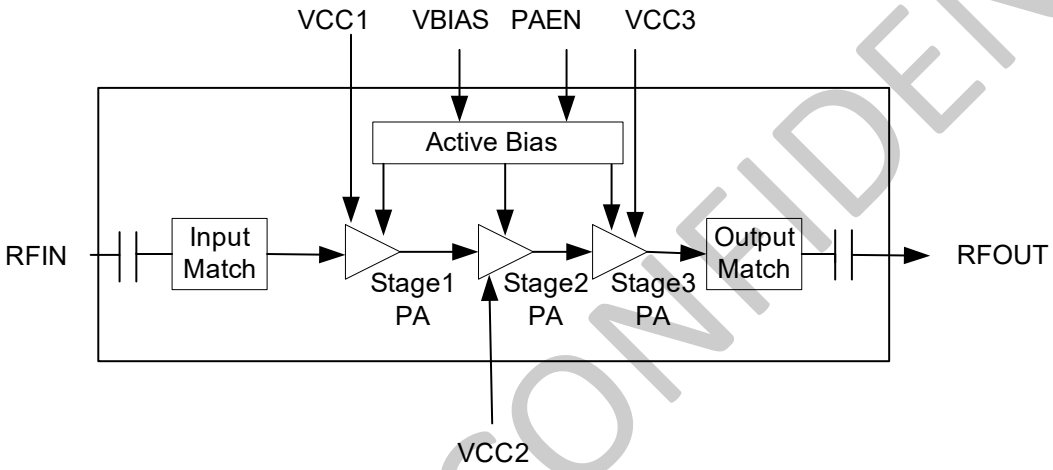


Figure 1. CB6317 Block Diagram

FEATURES

- Wide instantaneous signal bandwidth: 100 MHz
- High efficiency: PAE = 26% @ +28 dBm
- High linearity: +28 dBm with < -45 dBc ACLR with pre-distortion (100 MHz 5G,NR, 8.5 dB PAR signal)
- High gain: 34 dB
- Excellent input and output return loss: to 50Ω system
- Integrated active bias: performance compensated over temp
- Integrated enable On/Off function: PAEN = 1.7 to 2.5 V
- Single supply voltage: 5.0 V
- Pin-to-pin compatible PA family supporting all 3GPP bands
- Compact (16-pin, 5 x 5 x 0.77 mm) package (MSL3, 260℃ per JEDEC J-STD-020)

APPLICATIONS

- FDD and TDD 4G LTE and 5G systems
- Supports 3GPP Bands 7, 38, and 41
- Driver amplifier for micro-base and macro-base stations
- Enterprise small cell and massive MIMO

PIN-OUT DIAGRAM

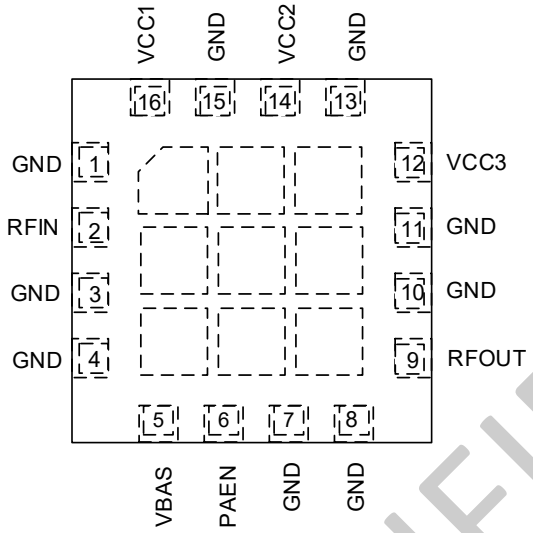


Figure 2. CB6317 Pin out (Top View)

PIN ASSIGNMENTS

Pin	Name	Description	Pin	Name	Description
1	GND	Ground	9	RFOUT	RF output port
2	RFIN	RF input port	10	GND	Ground
3	GND	Ground	11	GND	Ground
4	GND	Ground	12	VCC3	Stage 3 collector voltage
5	VBIAS	Bias voltage	13	GND	Ground
6	PAEN	PA enable	14	VCC2	Stage 2 collector voltage
7	GND	Ground	15	GND	Ground
8	GND	Ground	16	VCC1	Stage 1 collector voltage

ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Minimum	Maximum	Units
RF input power (CW, 50Ω load)	PIN		+10	dBm
Supply voltage (VCC1, VCC2, VCC3, VBIAS)	VCC		5.5	V
PA enable	VEN		2.8	V
Operating temperature	TC	-25	+115	°C
Storage temperature	TST	-55	+125	°C
Junction Temperature	TJ		+150	°C
Power dissipation	PD		1.3	W
Device thermal resistance	θJC		19.5	°C/W
Electrostatic discharge: Charged Device Model (CDM) Human Body Model (HBM)			 500 1000	 V V

NOTE:

Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

ESD HANDLING:	Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.

RECOMMENDED OPERATING CONDITIONS

Parameters	Symbol	Minimum	Typical	Maximum	Units
Supply voltage	VCC1, VCC2, VCC3, VBIAS	4.5	5	5.25	V
PA enable: ON OFF	PAEN	1.7	 2.0 0	 2.5 0.5	 V V
PA enable current	IENABLE		1	12	μA
Operating frequency	f	2496		2690	MHz
Operating temperature	TC	-40	+25	+110	℃

CB6317 ELECTRICAL SPECIFICATIONS[1]

Parameters	Symbol	Test Condition	Min	Typ.	Max	Units
Transmit Mode：(VCC1 = VCC2 = VCC3 = VBIAS = 5 V, PAEN = 2.0 V, f = 2593 MHz, TC = +25 ℃, Input/Output Load = 50 Ω, Unless Otherwise Noted)						
Frequency	f		2496		2690	MHz
Small signal gain	|S21|	PIN = -30 dBm	33.5	34		dB
Input return loss	|S11|	PIN = -30 dBm		28		dB
Output return loss	|S22|	PIN = -30 dBm		8		dB
Reverse isolation[2]	|S12|	PIN = -30 dBm		50		dB
ACLR @ raw dBm	ACLR	POUT = +28 dBm		-35		dBc
Output power at 1 dB gain compression	P1dB	CW, reference to small signal gain		+33.5		dBm
Output power at 3 dB gain compression	P3dB	CW, reference to small signal gain		+35.5		dBm
2nd harmonic	2fo	CW, POUT = +28 dBm		-45		dBc
3rd harmonic	3fo	CW, POUT = +28 dBm		-45		dBc
Power-added efficiency	PAE	CW, POUT = +28 dBm		27		%
Quiescent current	ICQ	No RF signal		140		mA
Load mismatch stress with no permanent degradation or failure		VCC =+5 V, CW Pout = +28 dBm		6:1		VSWR
RF turn-on/turn-off time[2]	Ton	Measured from 50% PA enable voltage level to 90% of RF amplitude			3	us

NOTE:

1. Performance is guaranteed only under the conditions listed in this table.
2. RF turn-on time is measured from the time the PA enable reaches 50% of PA enable "on" level to the time at which the RF output power achieves 90% of the average steady-state “on” level. RF turn-off time is measured from the time the PA enable reaches 50% of PA enable "on" level to the time at which the RF output power decreases to 10% of the average steady-state “on” level.

EVALUATION BOARD SCHEMATIC

The CB6317 Evaluation Board is used to test the performance of the CB6317 PA. An Evaluation Board schematic is provided in Figure 3

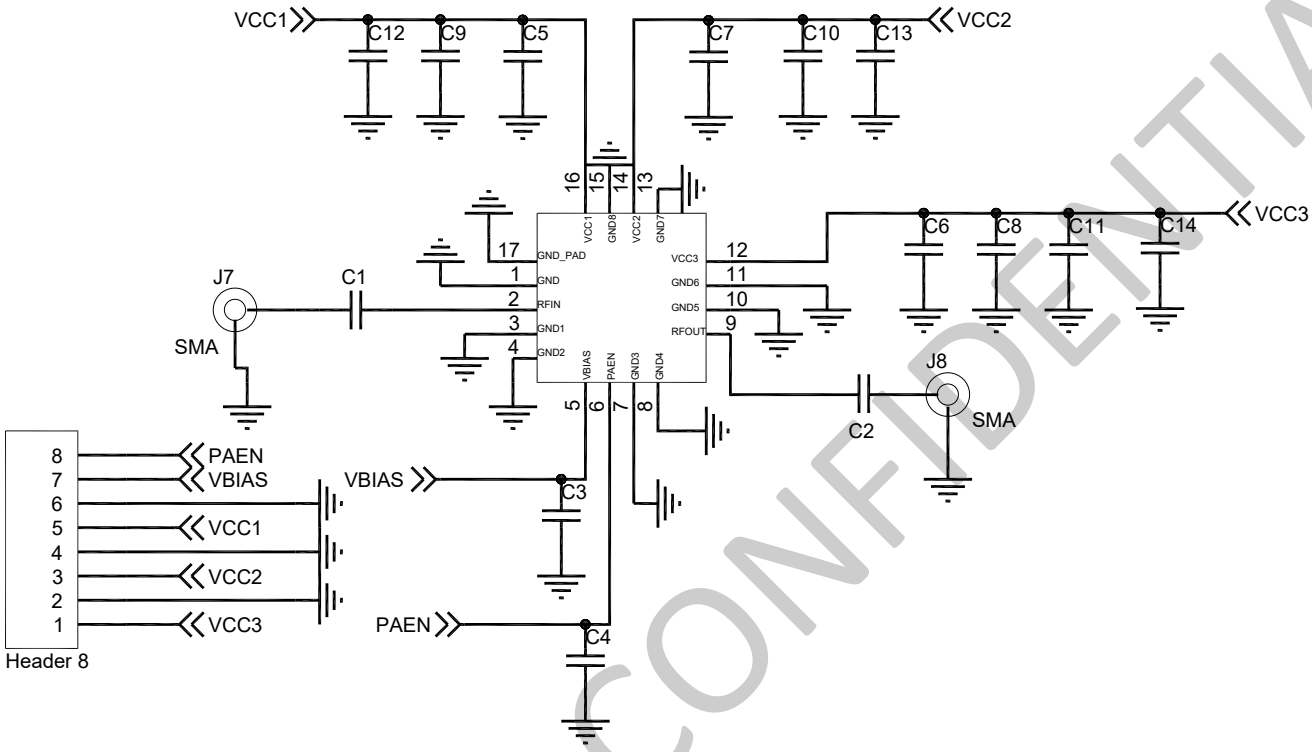


Figure 3. CB6317 Evaluation Board Schematic

EVALUATION BOARD ASSEMBLY DRAWING

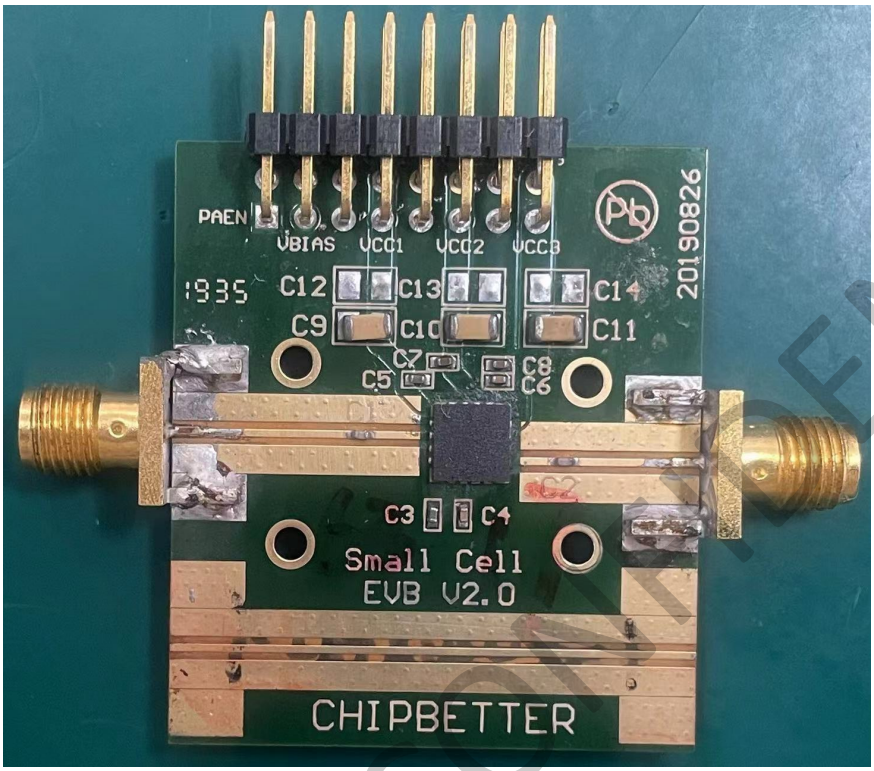
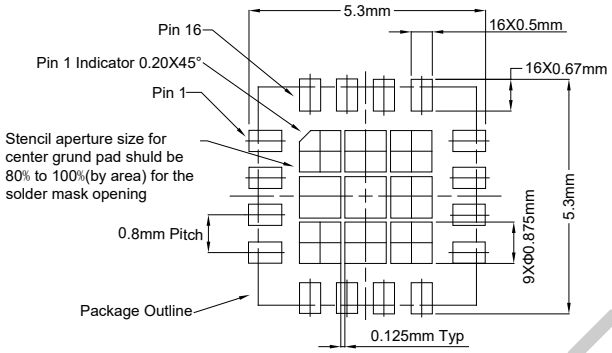


Figure 4. CB6317 Evaluation Board Assembly Drawing

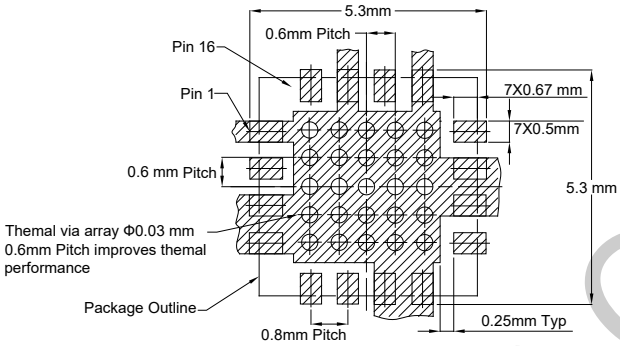
BILL OF MATERIALS

Component	Value	Size	Vendor	Part Number
C1, C2	100pF	0402	Murata	GRT1555C1E101JA02D
C4	4.7nF	0402	Murata	GRM155R71C472KA01D
C3	1uF	0402	Murata	GRM155R60J105KE19D
C5, C7, C8	0.47uF	0402	Murata	GRM155R61E474KE01D
C6	0.22uF	0402	Murata	GRM155C81E224KE01D
C9,C10,C11	10uF	1206	Murata	GRM155R60J106ME44D

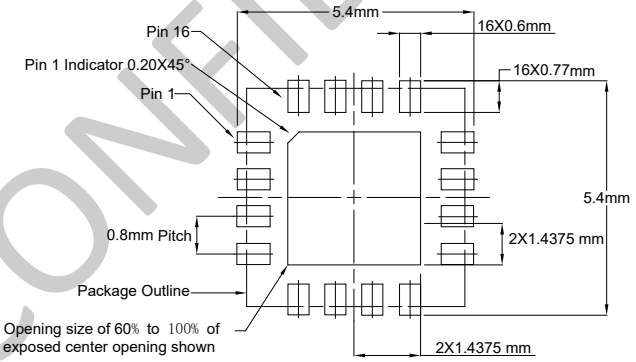
PCB LAND PATTERN



Stencil Aperture
Top View



Metallization
Top View



Solder Mask Opening
Top View

Figure 7. CB6317 PCB Layout Footprint

TYPICAL PART MARKING

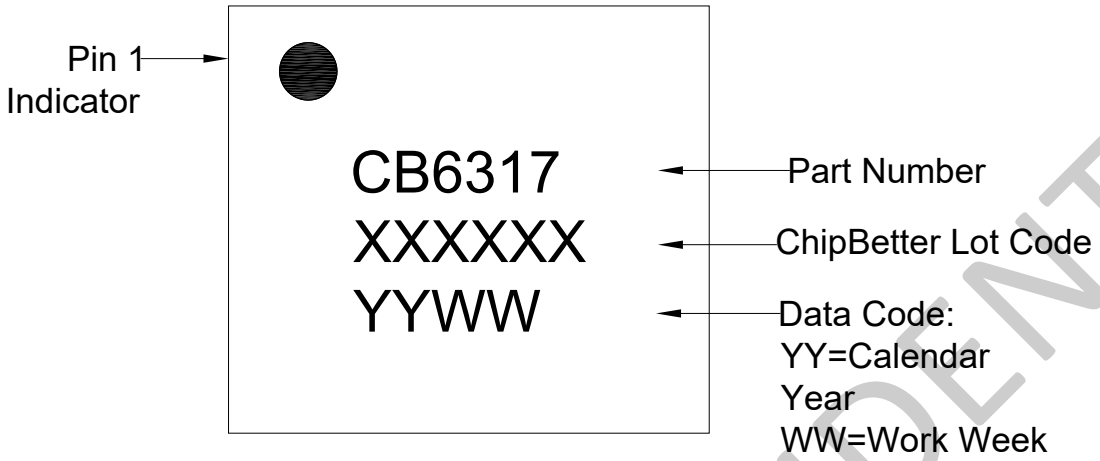
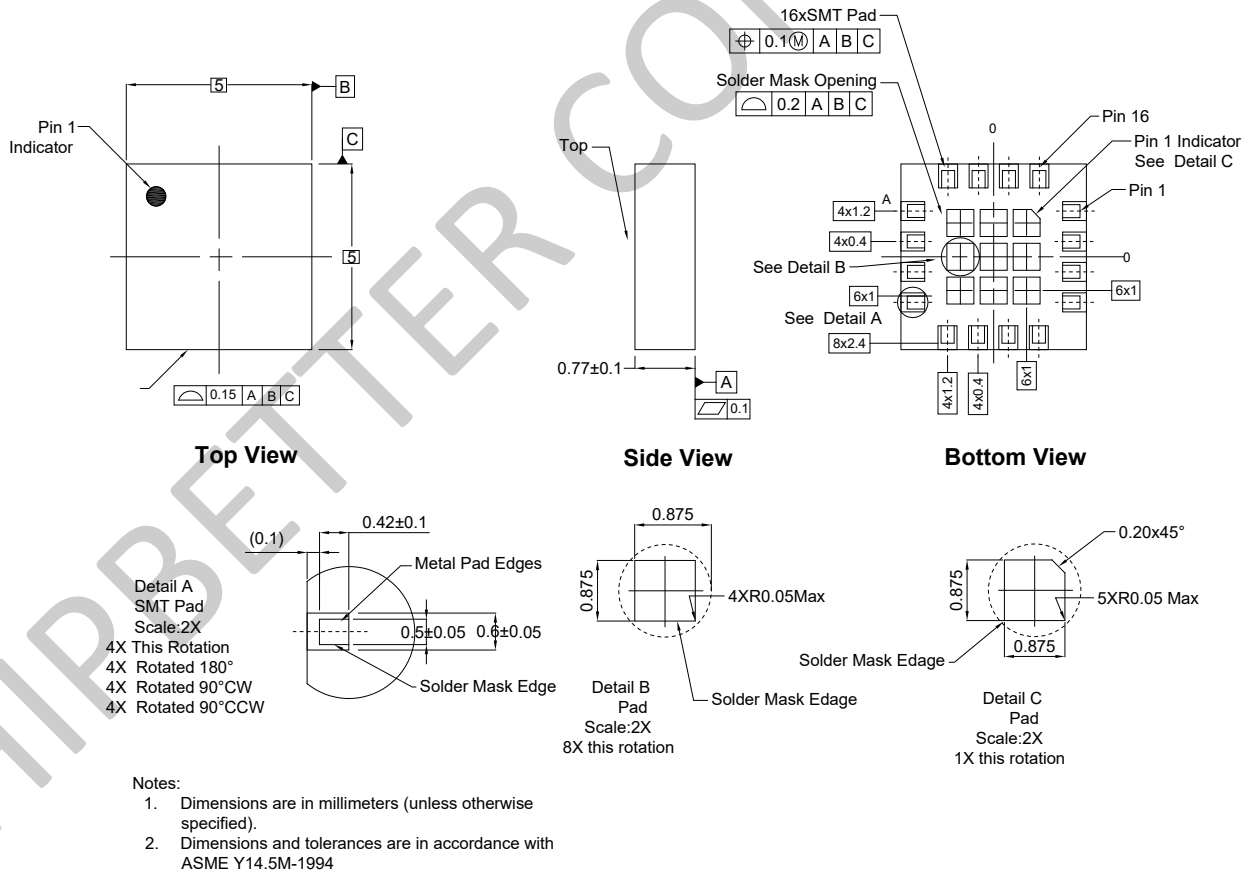


Figure 6. Typical Part Marking for the CB6317

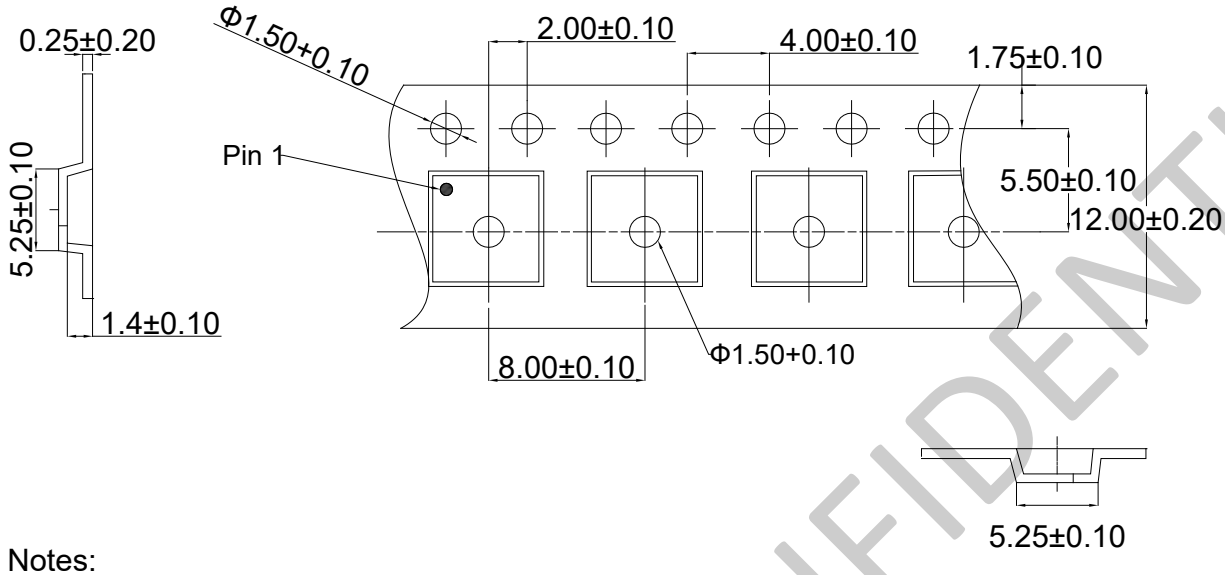
PACKAGE DIMENSIONS (All Dimensions in mm):



Notes:
1. Dimensions are in millimeters (unless otherwise specified).
2. Dimensions and tolerances are in accordance with ASME Y14.5M-1994

Figure 8. CB6317 Package Dimension

TAPE AND REEL DIMENSIONS



Notes:

1. Carrier tapes must meet all requirements of Chipbetter spec for tape and reel shipping.
2. Carrier tape shall be black conductive polycarbonate.
3. Cover tape shall be transparent conductive material.
4. ESD-surface resistivity shall be ≤ 1 × 1010 Ω/square per EJA, JEDEC TNR specification.
5. All measurements are in millimeters.

Figure 9. CB6317 Tape and Reel Dimensions

CONTACT INFORMATION

For the latest specifications, additional product information, worldwide sales and distribution locations:

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Tel: 0755-26654180

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