3300 to 3600 MHz Wide Instantaneous Bandwidth High-Efficiency Power Amplifier

DESCRIPTION

CB6318 is a highly efficient, 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 3300 to 3600 MHz. The active biasing circuitry is integrated to compensate PA performance over temperature, voltage, and process variation.

A block diagram of the CB6318 is shown in Figure 1. The device package and pin out are shown in Figure 2.

BLOCK DIAGRAM

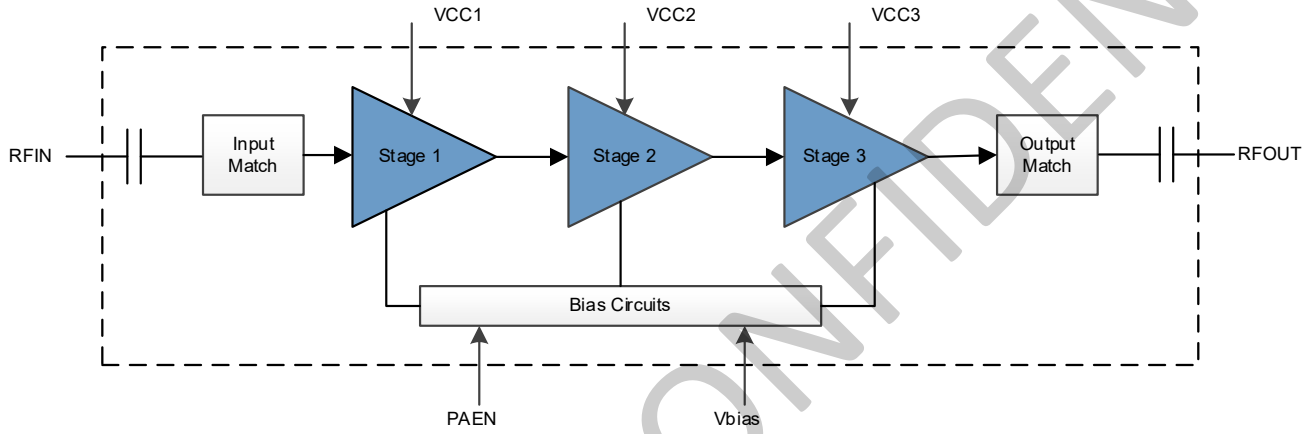


Figure 1. CB6318 Block Diagram

FEATURES

- Wide instantaneous signal bandwidth: 100 MHz
- High efficiency: PAE = 22%~23% @ +28 dBm
- High gain: 36 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 3 V
- Single supply voltage: 5.0 V
- Pin-to-pin compatible PA family supporting major 3GPP bands
- Compact (16-pin, 5 x 5 x 1.1 mm) package (MSL3, 260℃ per JEDEC J-STD-020)

APPLICATIONS

- 5G and 4G FDD and TDD systems
- Supports 3GPP and 5G Bands 22, 42, n77, and n78
- Driver amplifier for micro-base and macro-base stations
- Enterprise small cell and massive MIMO

PIN-OUT DIAGRAM

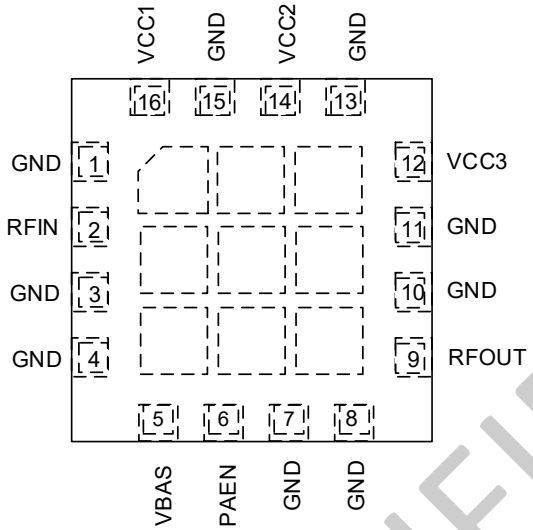


Figure 2. CB6318 Pin out (Top View)

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		+16	dBm
Supply voltage (VCC1, VCC2, VCC3, VBIAS)	VCC		5.5	V
PA enable	VEN	1.7	3	V
Operating temperature	TC	-40	+110	°C
Storage temperature	TST	-55	+125	°C
Junction Temperature	TJ		+150	°C
Power dissipation (TCASE = 100°C): POUT = +28 dBm	PDISS_28dBm		2.3	W
Device thermal resistance (TCASE = 100°C): POUT = +28 dBm	RTH28dBm		16.5	°C/W
Electrostatic discharge: Charged Device Model (CDM) Human Body Model (HBM)	PIN		 1000 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	4.75	5	5.25	V
PA enable: ON OFF	PAEN	1.7	 0	 3 0.5	 V V
PA enable current	IENABLE		1	202	μA
Operating frequency	f	3300		3600	MHz
Operating temperature	TC	-40	+25	+110	℃

CB6318 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		3300		3600	MHz
Small signal gain	|S21|	PIN = -30 dBm	33	34.8		dB
Gain @ +23 dBm	|S21|@ +28 dBm	POUT = +28 dBm	35	36		dB
Input return loss	|S11|	PIN = -20 dBm	14	16		dB
Output return loss	|S22|	PIN =-20 dBm	9	10		dB
Reverse isolation[2]	|S12|	PIN =-30 dBm		58		dB
ACLR @ +28 dBm	ACLR	POUT = +28 dBm (After DPD)		-50	-47	dBc
Output power at 1 dB gain Compression[2]	P1dB	CW, reference to small signal gain (Pin= -30dBm)	+34	+35		dBm
Output power at 3 dB gain Compression[2]	P3dB	CW, reference to small signal gain (Pin= -30dBm)	+35	+36		dBm
2nd harmonic	2fo	CW, POUT = +28 dBm		-49	-42	dBc
3rd harmonic	3fo	CW, POUT = +28 dBm		-50		dBc
Power-added efficiency	PAE	CW, POUT = +28 dBm	20	22		%
Quiescent current	ICQ	No RF signal		102		mA
RF turn-on/turn-off time[3]	Ton	Measured from 50% PA enable voltage level to 90% of RF amplitude		<1	2	uS

NOTE:

1. Performance is guaranteed only under the conditions listed in this table.
2. Not tested in production. Verified by design.
3. 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 CB6318 Evaluation Board is used to test the performance of the CB6318 PA. An Evaluation Board schematic is provided in Figure 3

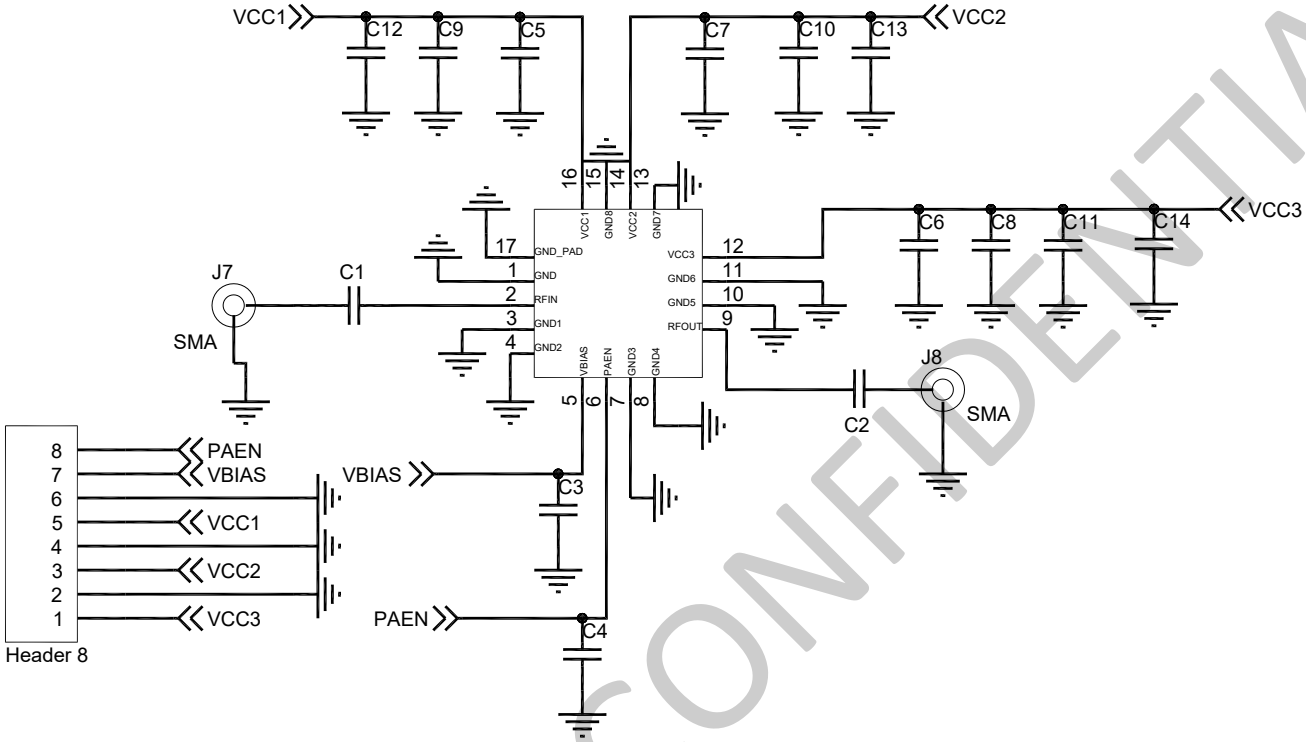


Figure 3. CB6318 Evaluation Board Schematic

EVALUATION BOARD ASSEMBLY DRAWING

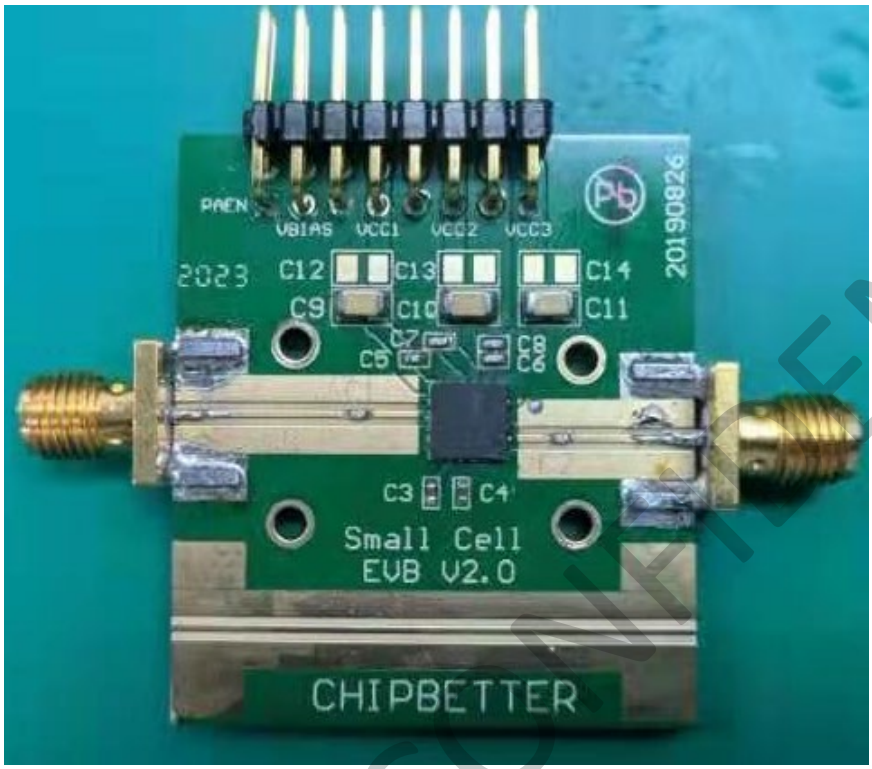


Figure 4. CB6318 Evaluation Board Assembly Drawing

BILL OF MATERIALS

Component	Value	Size	Vendor	Part Number
C1, C2, C5, C6, C7	1000pF	0402	Murata	GRM1555C1E102JA01D
C3, C4	⩾1uF	0402	Murata	GRM155R61E105KA12D
C8	3300 pF	0402	Murata	GRM1555C1H332JE01D
C9, C10, C11	10uF	1206	Murata	GRM31C5C1H104JA01D
C12, C13, C14	Null			

PCB LAND PATTERN

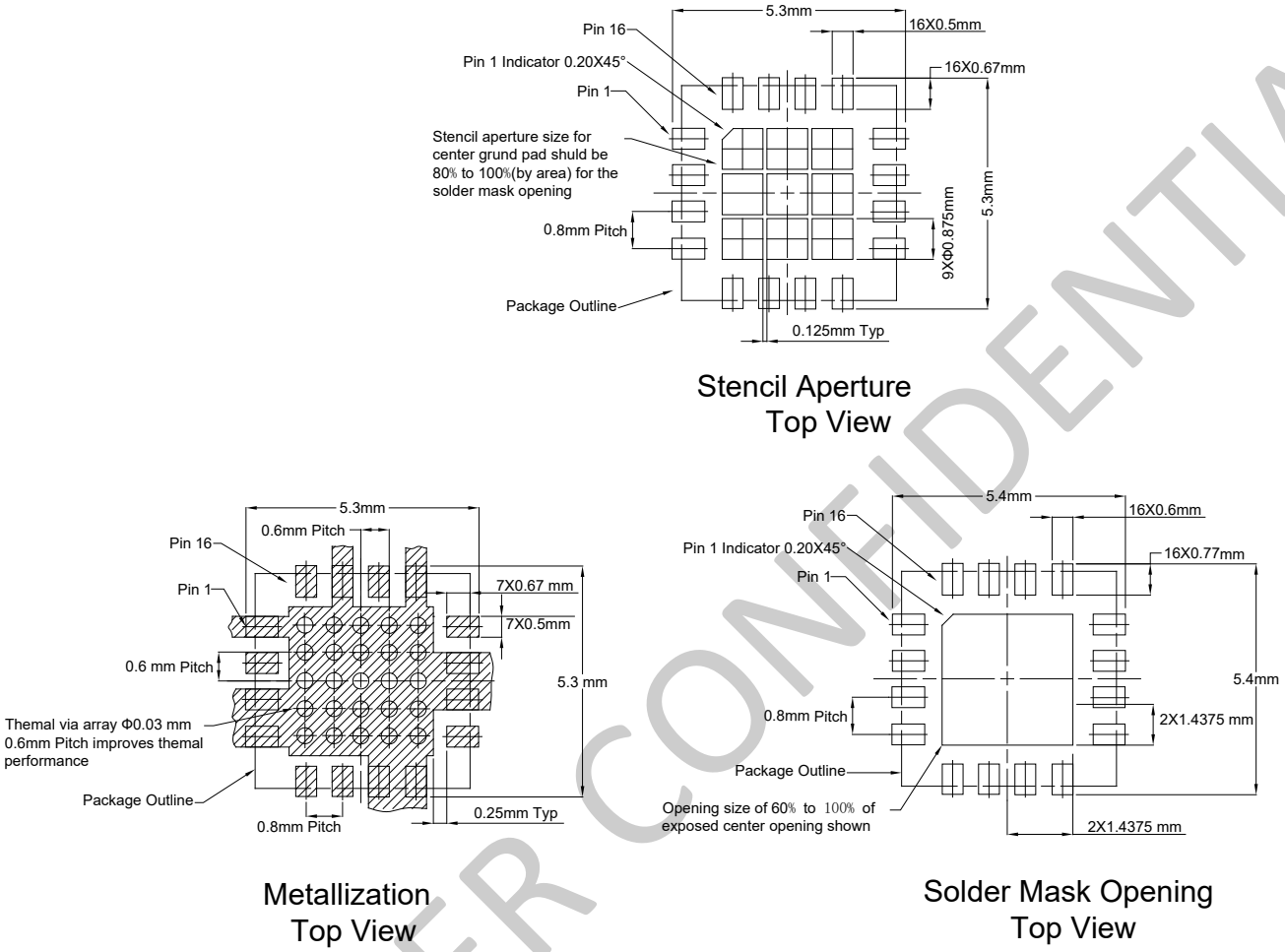


Figure 5. CB6318 PCB Layout Footprint

TYPICAL PART MARKING

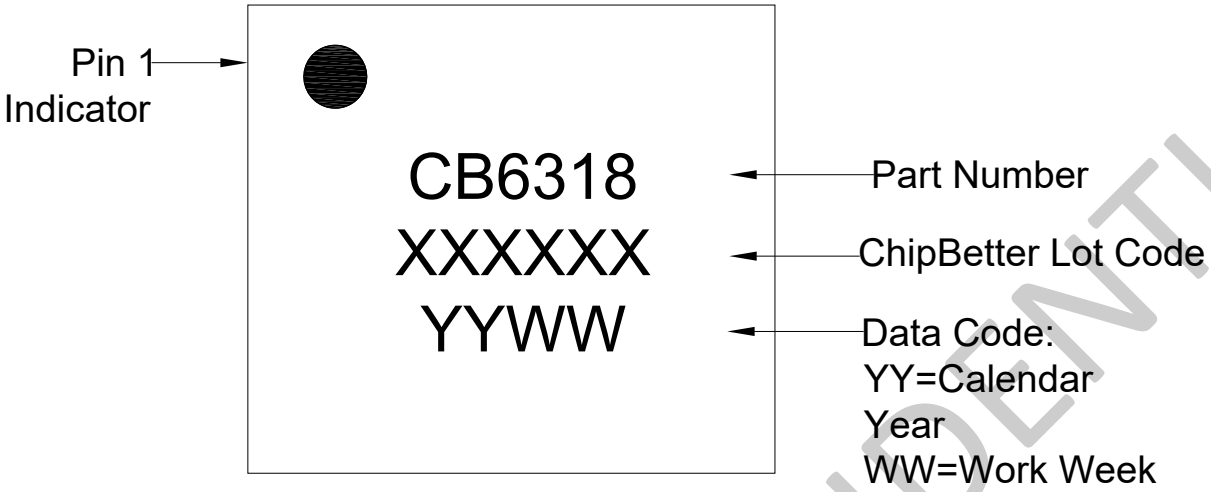


Figure 6. Typical Part Marking for the CB6318

PACKAGE DIMENSIONS (All Dimensions in mm):

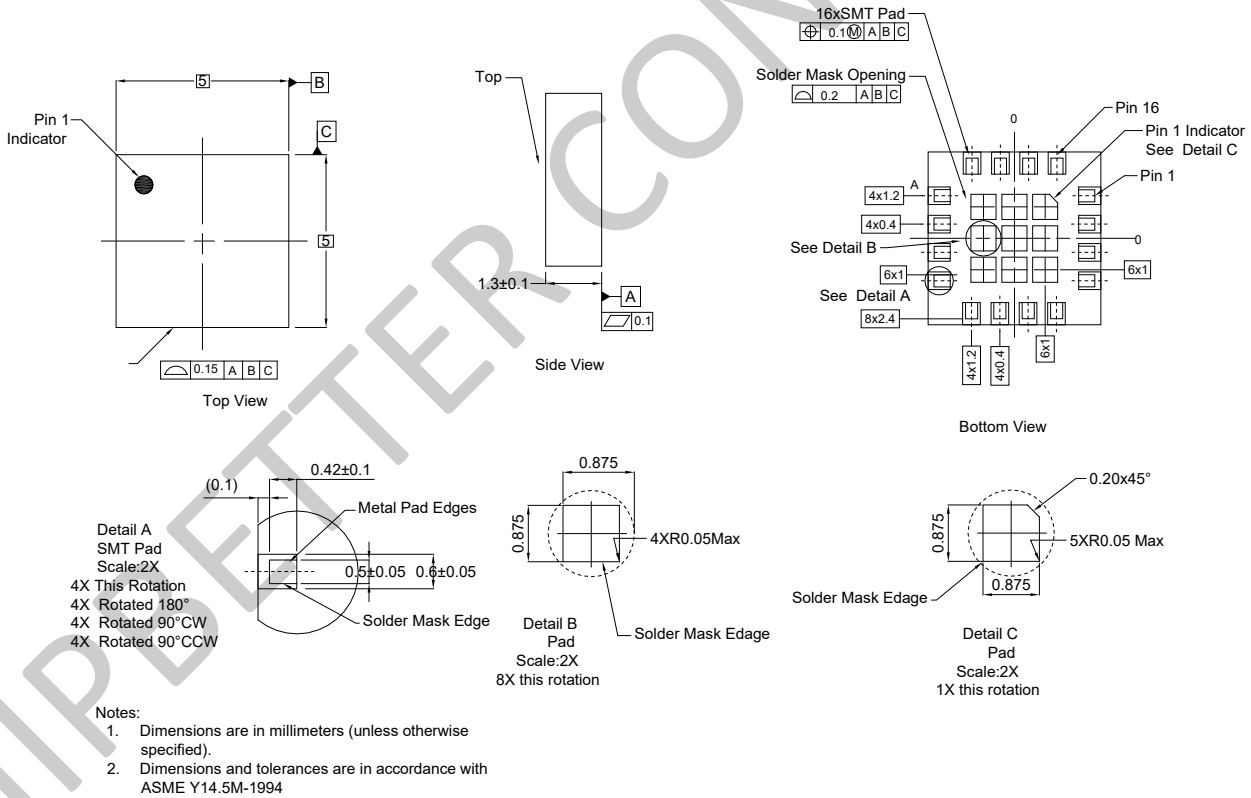
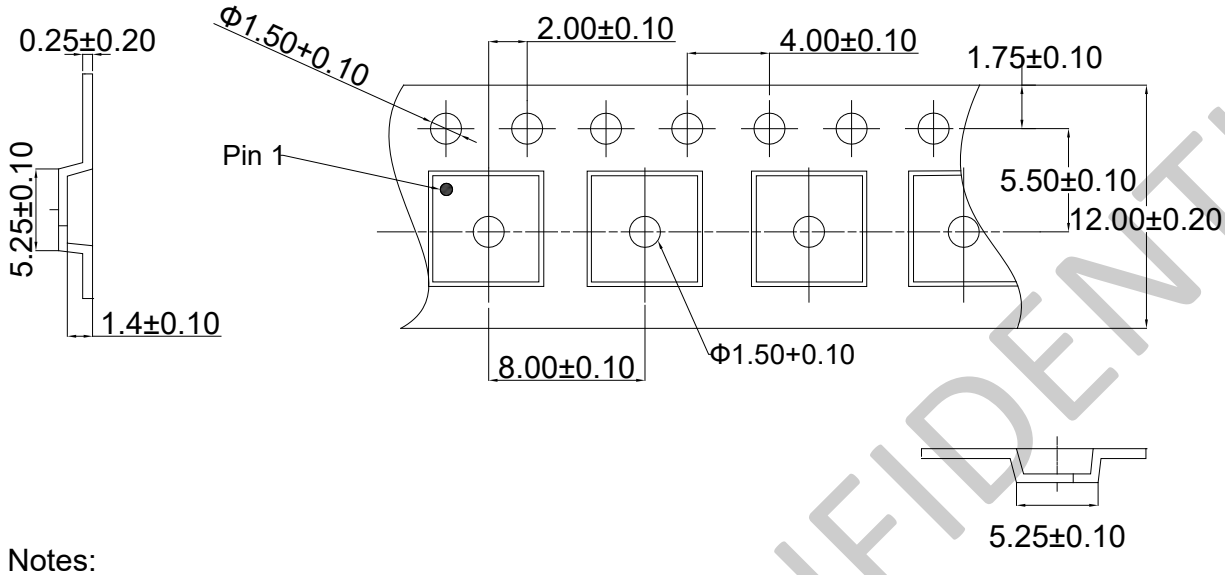


Figure 7. CB6318 Package Dimension

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 8. CB6318 Tape and Reel Dimensions

CONTACT INFORMATION

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

Web: www.chipbetter.com
Tel: 0755-26654180

DISCLAIMERS

ChipBetter reserves the right to make changes without further notice to specifications and product descriptions in this document to improve reliability, function or design. ChipBetter does not assume any liability arising out of the application or use of information or product described in this document. Neither does ChipBetter convey any license under its intellectual property rights nor licenses to any of circuits described in this document to any third party.
The information in this document is believed to be accurate and reliable and is provided on an "as is" basis, without any express or implied warranty. Any information given in this document does not constitute any warranty of merchantability or fitness for a particular use. The operation of this product is subject to the user's implementation and design practices. ChipBetter products are not designed or intended for use in life support equipment, devices or systems, or other critical applications, and are not authorized or warranted for such use.