BCT2211
Low Power, Low Dropout, RF-Linear Regulators

GENERAL DESCRIPTION

The BCT2211 series low-power, low-dropout, CMOS linear voltage regulators operate from a 1.6V to 5.5V input voltage and deliver up to 500mA output current. They are the perfect choice for low voltage, low power applications. A low ground current makes this part attractive for battery operated power systems. The BCT2211 series also offer low dropout voltage to prolong battery life in portable electronics. Systems requiring a quiet voltage source, such as RF applications, will benefit from the BCT2211 series low output noise and high PSRR.

Other features include a 10nA logic-controlled shutdown mode, short current limit and thermal shutdown protection.

The BCT2211 has auto-discharge function to quickly discharge VOUT in the disable status.

The BCT2211 is available in Green SOT23-5, SC70-5,packages. It operates over an ambient temperature range of -40℃ to +85°C .

FEATURES

- Low Dropout Voltage
- Thermal Overload Protection
- Built-In Fold Back Protection Circuit
- 20μA Low Supply Current
- 10nA Logic-Controlled Shutdown
- 1.6V to 5.5V Input Voltage Range
- Fixed Outputs of 1.2V, 1.8V, 2.8V, 3.0V,and 3.3V
- Adjustable Output from 0.8V to 5.0V
- Short Auto-Discharge Function
- 500mA Output Current
- High Output Voltage Accuracy
- Quick Start-Up Time
- -40℃ to +85℃ Operating Temperature Range Available in Green SOT23-5, SC70-5, Packages.

APPLICATIONS

Cellular Telephones
Cordless Telephones
PCMCIA Cards
Modems
MP3 Player
Hand-Held Instruments
Palmtop Computers
Electronic Planners
Portable/Battery-Powered Equipment

ORDERING INFORMATION

Order Number	V_{OUT}(V)	Package Type	Temperature Range	Marking	QTY/Reel
BCT2211EUK12-TR	1.2	SOT23-5	-40°C to +85°C	W2XX	3000
BCT2211EUK18-TR	1.8	SOT23-5	-40°C to +85°C	W8XX	3000
BCT2211EUK28-TR	2.8	SOT23-5	-40°C to +85°C	$\overline{W8XX}$	3000
BCT2211EUK30-TR	3.0	SOT23-5	-40°C to +85°C	W0XX	3000
BCT2211EUK33-TR	3.3	SOT23-5	-40°C to +85°C	W3XX	3000
BCT2211EUKAJ-TR	ADJ	SOT23-5	-40°C to +85°C	JJXX	3000
BCT2211EXK12-TR	1.2	SC70-5	-40°C to +85°C	U2XX	3000
BCT2211EXK18-TR	1.8	SC70-5	-40°C to +85°C	U8XX	3000
BCT2211EXK28-TR	2.8	SC70-5	-40°C to +85°C	$\overline{U8XX}$	3000
BCT2211EXK30-TR	3.0	SC70-5	-40°C to +85°C	U0XX	3000
BCT2211EXK33-TR	3.3	SC70-5	-40°C to +85°C	U3XX	3000
BCT2211EXKAJ-TR	ADJ	SC70-5	-40°C to +85°C	JJXX	3000

Note:
"XX" in Marking will be appeared as the batch code.

ABSOLUTE MAXIMUM RATINGS

IN to GND.....-0.3V to 6.0V
Output Short-Circuit Duration.....Infinite
EN to GND…….....-0.3V to 6.0V
OUT,BP/FB to GND.....-0.3V to (VIN +0.3V)
Power Dissipation, P_D@T_A=25℃
SOT23-5.....0.48W
SC70-5.....0.38W
Package Thermal Resistance
SOT23-5, θ_{JA}.....260℃/W
SC70-5, θ_{JA}.....330℃/W
Junction Temperature.....150℃
Storage Temperature Range.....-65℃ to 150℃
Lead Temperature (Soldering, 10 sec).....260℃
ESD Susceptibility
HBM.....4000V
MM.....400V

RECOMMENDED OPERATING CONDITIONS

Operating Voltage Range.....1.6V to 5.5V
Operating Temperature Range .....-40℃ to +85℃

OVERSTRESS CAUTION

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

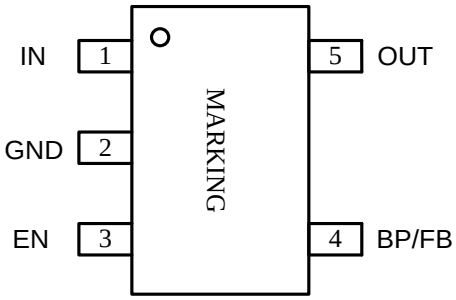
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged by ESD if you don’t pay attention to ESD protection. Broadchip recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

DISCLAIMER

Broadchip reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact Broadchip sales office to get the latest datasheet.

PIN CONFIGURATION (TOP VIEW)



SOT23-5/SC70-5

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	IN	Regulator Input. Supply voltage can range from 1.6V to 5.5V. Bypass with a 1μF capacitor to GND.
2	GND	Ground.
3	EN	Enable Pin. This pin has an internal pull-down resistor. A logic low reduces the supply current to less than 1μA.Connect to IN for normal operation.
4	BP	Reference-Noise Bypass Pin (fixed voltage version only). Bypass with a low-leakage 0.01μF ceramic capacitor for reduced noise at the output. The capacitor is recommended to be placed very close to the pin for high PSRR.
	FB	Adjustable Voltage Version Only. This is used to set the output voltage of the device.
5	OUT	Regulator Output.

ELECTRICAL CHARACTERISTICS

(V_{IN}= $V_{OUT(NOMINAL)}$+0.5V or 1.6V, whichever is greater, Full = -40℃ to +85℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN	TYP	MAX	UNITS
Input Voltage	V_{IN}			+25℃	1.6		5.5	V
Output Voltage Accuracy		I_{OUT} = 0.1mA		+25℃	-2.5		+2.5	%
Feedback Voltage	V_{FB}	I_{OUT} = 0.1mA, BCT2211-ADJ		+25℃	0.78	0.8	0.82	V
Maximum Output Current (1)				+25℃	500			mA
Current Limit	I_{LIM}			+25℃	560	800		mA
Supply Pin Current	I_Q	No Load, V_{EN} = V_{IN}		+25℃		20	26	μA
Dropout Voltage (2)	V_{DROP}	I_{OUT} = 500mA	1.2V ≤ V_{OUT} < 1.8V	+25℃		945	1280	mV
			1.8V ≤ V_{OUT} < 2.5V	+25℃		510	670	
			2.5V ≤ V_{OUT} < 3.0V	+25℃		345	450	
			3.0V ≤ V_{OUT} < 3.6V	+25℃		305	400	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	V_{IN} = 1.6V or (V_{OUT} + 0.5V) to 5.5V, I_{OUT} = 1mA	1.8V ≤ V_{OUT} ≤ 3.3V	+25℃		0.01	0.06	%/V
			V_{OUT} < 1.8V or V_{OUT} > 3.3V	+25℃		0.01	0.1	
Load Regulation	ΔV_{OUT}	I_{OUT} = 0.1mA to 500mA		+25℃		12	40	mV
Short Current Limit	I_{SHORT}	V_{OUT} = 0V		+25℃		320		mA
Power Supply Rejection Ratio	PSRR	C_{BP} = 0μF, I_{OUT} = 30mA, C_{OUT} = 1μF, V_{IN} = V_{OUT} + 1V, ΔV_{RIPPLE} = 0.2V_{P-P}	f = 217Hz	+25℃		80		dB
			f = 1kHz	+25℃		70		
		C_{BP} = 0.01μF, I_{OUT} = 30mA, C_{OUT} = 1μF, V_{IN} = V_{OUT} + 1V, ΔV_{RIPPLE} = 0.2V_{P-P}	f = 217Hz	+25℃		82		
			f = 1kHz	+25℃		70		
Output Voltage Noise	e_n	C_{BP} = 0μF, f = 10Hz to 100kHz, C_{OUT} = 1μF, V_{OUT} = 1.8V	I_{OUT} = 0mA	+25℃		100		μV_{RMS}
			I_{OUT} = 30mA	+25℃		200		
		C_{BP} = 0.01μF, f =10Hz to 100kHz, C_{OUT} = 1μF, V_{OUT} = 1.8V	I_{OUT} = 0mA	+25℃		30		
			I_{OUT} = 30mA	+25℃		75		
Output Voltage Temperature Coefficient (3)	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	I_{OUT} = 0.1mA		Full		30		ppm/℃

ELECTRICAL CHARACTERISTICS

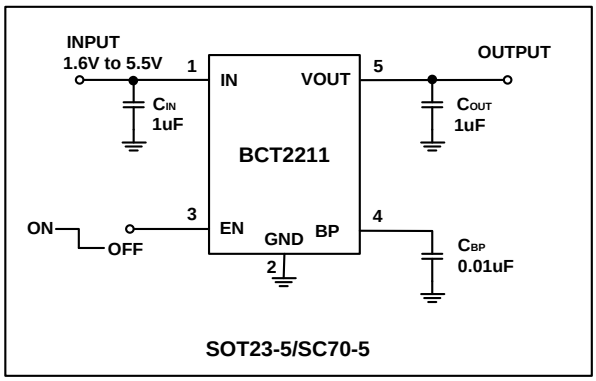
(V_{IN}= $V_{OUT(NOMINAL)}$+0.5V or 1.6V, whichever is greater, Full = -40℃ to +85℃, unless otherwise noted.)

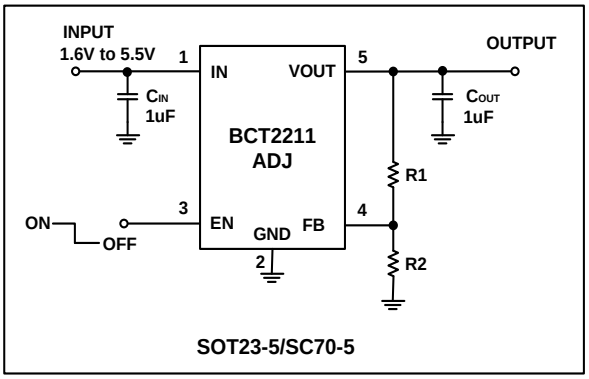
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
SHUTDOWN							
EN Input Threshold	V_{IH}	V_{IN} = 1.6V to 5.5V	Full	1.5			V
	V_{IL}		Full			0.4	
EN Input Bias Current	I_{BH}	V_{EN} = 5.5V	Full		0.8	2	μA
	I_{BL}	V_{EN} = 0V	Full		0.01	1	
Shutdown Supply Current	I_{SHDN}	V_{EN} = 0V	Full		0.01	1	μA
Start-Up Time (4)	t_{STR}	C_{OUT} = 1μF, No Load, C_{BP} = 0μF	+25℃		30		μs
R_{ON} of Discharge MOSFET		V_{IN} = 4.0V, V_{EN} = 0V	+25℃		50		Ω
THERMAL PROTECTION							
Thermal Shutdown Temperature	T_{SHDN}				140		℃
Thermal Shutdown Hysteresis	ΔT_{SHDN}				15		℃

NOTES:

1. Maximum output current is affected by the PCB layout, size of metal trace, the thermal conduction path between metal layers, ambient temperature and the other environment factors of system. Attention should be paid to the dropout voltage when VIN < VOUT + VDROP.
2. The dropout voltage is defined as VIN - VOUT, when VOUT is 100mV below the value of VOUT.
3. Output voltage temperature coefficient is defined as the worst-case voltage change divided by the total temperature range.
4. Time needed for VOUT to reach 90% of final value.

TYPICAL APPLICATION CIRCUIT



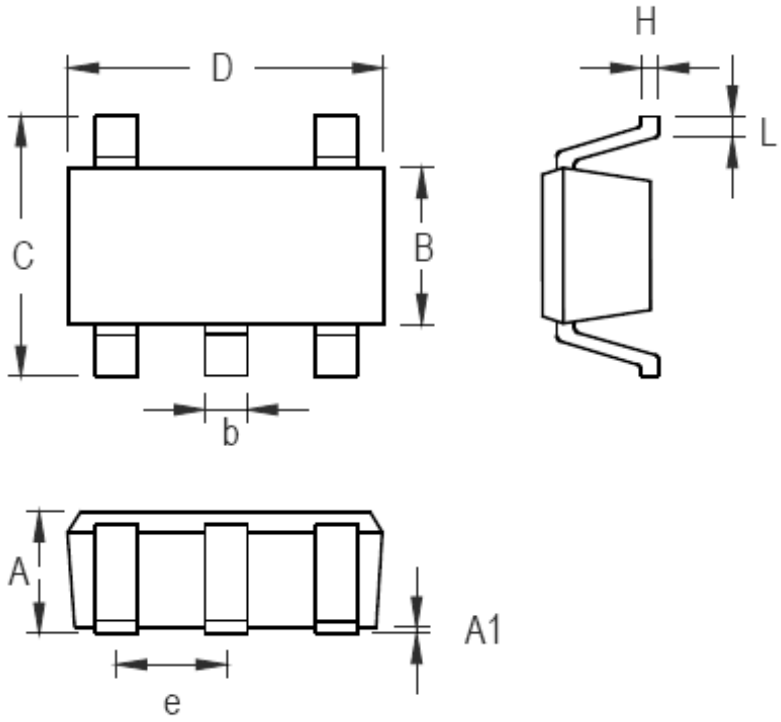


NOTES: Choose R2 = 160kΩ to maintain a 5μA minimum load.
Calculate the value for R1 using the following equation:

$$R_1 = R_2 \times \left(\frac{V_{OUT}}{0.8V} - 1 \right)$$

PACKAGE OUTLINE DIMENSIONS

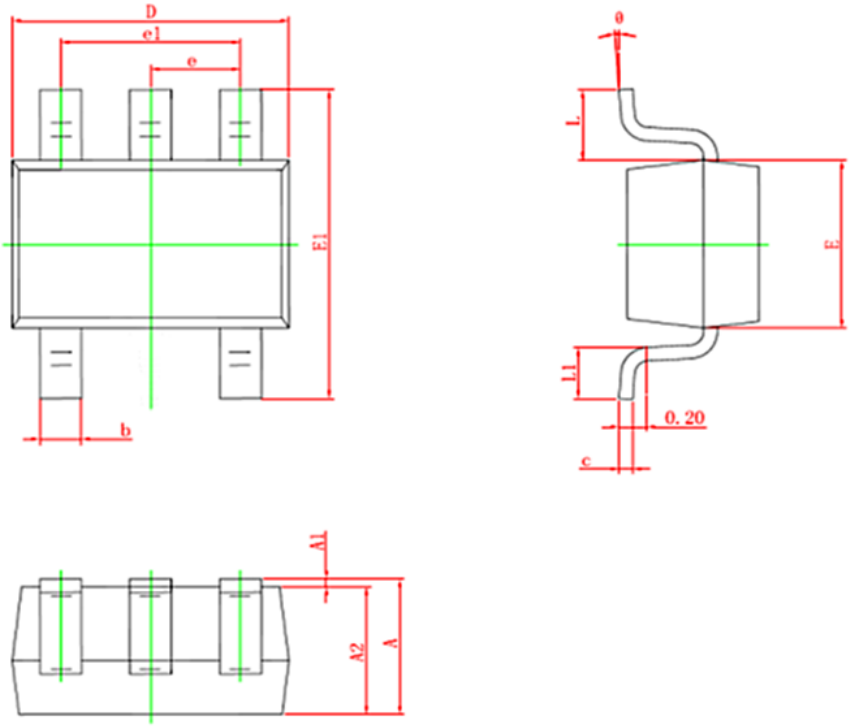
SOT23-5



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.05	1.15
A1	0.03	0.15
B	1.5	1.7
b	0.28	0.45
C	2.75	3.05
D	2.82	3.02
e	0.95(BSC)	
H	0.12	0.23
L	0.35	0.55

SOT23-5 Surface Mount Package

SC70-5

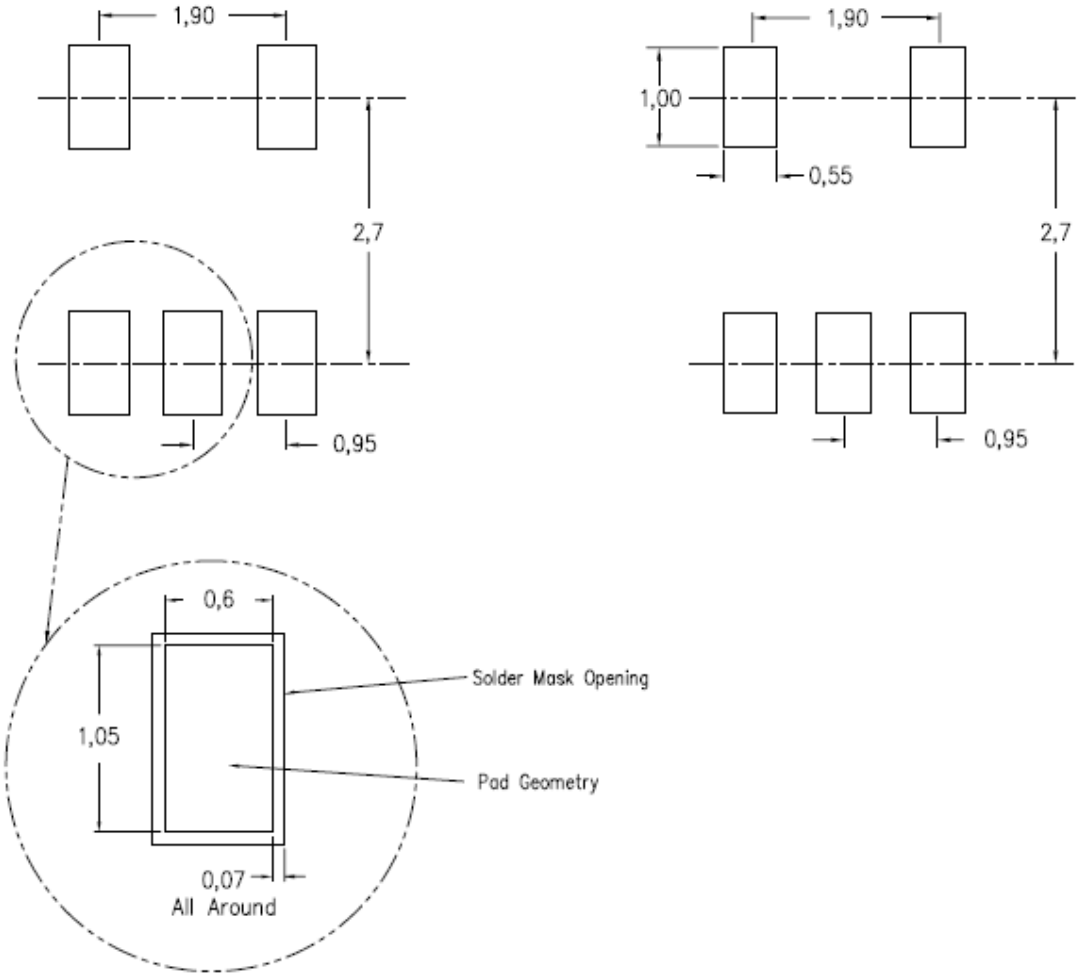


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.110	0.175
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.650 TYP.	
e1	1.200	1.400
L	0.525 REF.	
L1	0.260	0.460
θ	0°	8°

SC70-5 Surface Mount Package

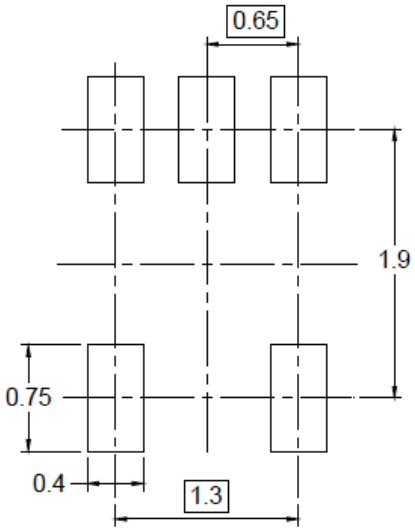
LAND PATTERN DATA

SOT23-5



RECOMMENDED PCB LAYOUT PATTERN (Unit: mm)

SC70-5



RECOMMENDED PCB LAYOUT PATTERN (Unit: mm)