



# BCT44603

## 5Ω, High Speed, Low Voltage Quad SPDT Analog Switch

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#### GENERAL DESCRIPTION

The BCT44603 is a high-speed, low-voltage, quad, bidirectional, single-pole double-throw (SPDT) COMS analog switch that is designed to operate from a single +1.8V to +5.5V power supply. It features high-bandwidth (500MHz) and low on-resistance (5Ω TYP).

The BCT44603 is configured as a quad single-pole double-throw(SPDT) device with one logic control inputs that control two multiplexer/demultiplexer each. The configuration can also be used as a dual differential 2-to-1 multiplexer/demultiplexer.

BCT44603 is available in QFN2.6X1.8-16L packages.

#### FEATURES

- Low Voltage Operation: 1.8V to 5.5V
- On-Resistance: 5Ω(TYP)
- -3dB Bandwidth: 500MHz
- Rail-to-Rail Input and Output Operation
- High Off-Isolation: -55dB at 10MHz
- Low Crosstalk: -60dB at 10MHz
- Low Power Consumption(<0.01uW)
- -40°C to +85°C Operating Temperature Range

#### APPLICATIONS

- Communication Systems
- Portable Instrumentation
- Audio and Video Switching
- PCMCIA Cards
- Computer Peripherals
- Modems
- PDAs

#### ORDERING INFORMATION

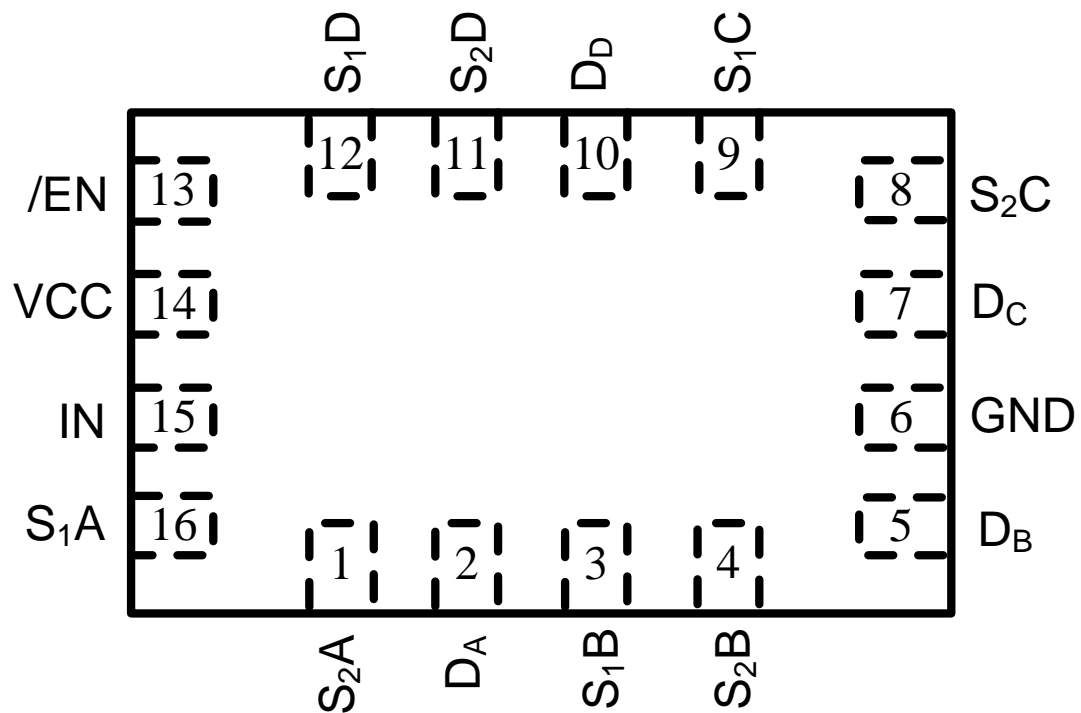
Order Number	Package Type	Temperature Range	Marking	QTY/Reel
BCT44603EGE-TR	QFN2.6x1.8-16L	-40°C to +85°C	KKWZD XXXXX	3000

Mark Note:

"XXXXX" in Marking will be appeared as the batch code.

**PIN CONFIGURATION (Top View)**

QFN2.6X1.8-16L





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### PIN DESCRIPTIONS

PIN	Name	Function
1	S <sub>2</sub> A	Normally Open Terminal Switch 1
2	D <sub>A</sub>	Common Terminal Switch 1
3	S <sub>1</sub> B	Normally Closed Terminal Switch 2
4	S <sub>2</sub> B	Normally Open Terminal Switch 2
5	D <sub>B</sub>	Common Terminal Switch 2
6	GND	Ground
7	D <sub>C</sub>	Common Terminal Switch 3
8	S <sub>2</sub> C	Normally Open Terminal Switch 3
9	S <sub>1</sub> C	Normally Closed Terminal Switch 3
10	D <sub>D</sub>	Common Terminal Switch 4
11	S <sub>2</sub> D	Normally Open Terminal Switch 3
12	S <sub>1</sub> D	Normally Closed Terminal Switch 4
13	/EN	Switch-Enable Input
14	VCC	Positive Power Supply
15	IN	Select Input
16	S <sub>1</sub> A	Normally Closed Terminal Switch 1

### LOGIC DIAGRAM

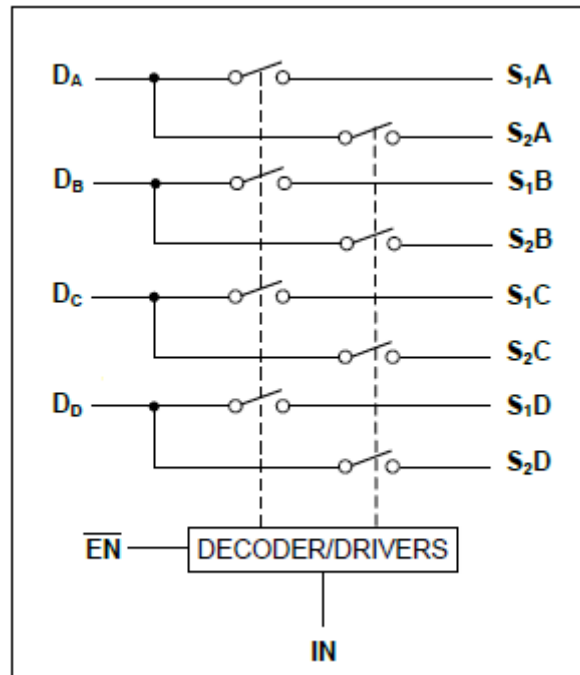


Figure1. Block Diagram

### TRUTH TABLE

$\overline{EN}$	IN	SWITCH STATE
0	0	$D_A = S_1A, D_B = S_1B, D_C = S_1C, D_D = S_1D$
0	1	$D_A = S_2A, D_B = S_2B, D_C = S_2C, D_D = S_2D$
1	X	Disabled



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### ABSOLUTE MAXIMUM RATINGS

VCC, IN, /EN, to GND.....-0.3V to +6.0V  
All Other Pins to GND (Note 1).....-0.3V to (VCC + 0.3V)  
Continuous Current (NOx, NCx, COM\_)..... ±100mA  
Operating Temperature Range.....-40°C to +85°C  
Storage Temperature Range.....-65°C to +150°C  
Junction Temperature.....+150°C  
Lead Temperature (soldering, 10s).....+260°C  
Package Thermal Resistance @ TA = +25°C  
QFN2.6X1.8-16L,θJA.....117.6°C/W

### 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.

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.

### RECOMMENDED OPERATING CONDITONS

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications.

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply Voltage	1.8	5.5	V
V <sub>CTRL</sub>	Control Input Voltage(IN) <sup>(2)</sup>	0	VCC	V
V <sub>SW</sub>	Switch I/O Voltage	0	VCC	V
T <sub>A</sub>	Operating Temperature	-40	+85	°C

#### Notes:

1. The input and output negative ratings maybe exceed if the input and output diode current ratings are observed.
2. The control input must be held HIGH or LOW; it must not float.

### DC ELECTRICAL CHARACTERISTICS

Unless otherwise noted. TA = +25°C. (Note 1)

PARAMETER	SYM	CONDITIONS	V <sub>CC</sub> (V)	MIN	TYP	MAX	UNITS
Supply Voltage	V <sub>CC</sub>			1.8		5.5	V
Quiescent Supply Current	I <sub>CC</sub>	/EN=0V, IN=0V or V <sub>CC</sub> , I <sub>OUT</sub> =0	5.5			1	uA
Switch On Resistance	R <sub>ON</sub>	0V ≤ V <sub>SW</sub> ≤ V <sub>CC</sub> , I <sub>SW</sub> =10mA,	4.5		5.0	8.0	Ω
			2.7		12	24	Ω
On Resistance Matching Between Channels	Δ R <sub>ON</sub>	V <sub>SW</sub> =0V, I <sub>SW</sub> =10mA,	4.5		0.3	1.0	Ω
			2.7		1.0	3.0	Ω
Flatness for On Resistance	Δ R <sub>ON</sub>	0V ≤ V <sub>SW</sub> ≤ V <sub>CC</sub> , I <sub>SW</sub> =10mA,	4.5		2.0	3.0	Ω
			2.7		12	20	Ω
Off leakage Current of Open Data Paths (NCx and NOx Pin)	I <sub>OFF</sub>	0V ≤ V <sub>SW</sub> ≤ V <sub>CC</sub>	1.8 to 5.5	-1		1	uA
On leakage Current of Close Data Paths (NCx, NOx and COMx Pin)	I <sub>ON</sub>	0V ≤ V <sub>SW</sub> ≤ V <sub>CC</sub>	1.8 to 5.5	-1		1	uA
Input Voltage High (IN, /EN)	VIH		1.8 to 5.5	1.5			V
Input Voltage Low (IN, /EN)	VIL		1.8 to 5.5			0.4	V



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### AC ELECTRICAL CHARACTERISTICS

Unless otherwise noted. TA = +25°C. (Note 1)

PARAMETER	SYM	CONDITIONS	V <sub>CC</sub> (V)	MIN	TYP	MAX	UNITS
Turn-On Time	t <sub>ON</sub>	R <sub>L</sub> =300Ω, C <sub>L</sub> =35pF, V <sub>SW</sub> =0 to 1.5 V	3.0		35		ns
Turn-Off Time	t <sub>OFF</sub>	R <sub>L</sub> =300Ω, C <sub>L</sub> =35pF, V <sub>SW</sub> =0 to 1.5 V	3.0		45		ns
Break-Before-Make Time	t <sub>BBM</sub>	V <sub>NC</sub> = V <sub>NC</sub> =1.5 V , R <sub>L</sub> =300Ω, C <sub>L</sub> =35pF	3.0		6		ns
Charge Injection	Q	V <sub>G</sub> = 0V, R <sub>G</sub> = 0Ω, C <sub>L</sub> = 1nF	3.0		5		pC
-3db Bandwidth <sup>(2)</sup>	BW	V <sub>S</sub> =0dBm, R <sub>L</sub> =50Ω, C <sub>L</sub> =5pF	3.0		500		MHz
Off Isolation <sup>(2)</sup>	O <sub>IRR</sub>	V <sub>S</sub> =0dBm, f=10MHz, R <sub>L</sub> =50Ω	3.0		-55		dB
Crosstalk <sup>(2)</sup>	X <sub>TALK</sub>	V <sub>S</sub> =0dBm, f=10MHz, R <sub>L</sub> =50Ω	3.0		-60		dB
Output On Capacitance <sup>(2)</sup>	C <sub>ON</sub>	/OE=0V, f=1MHz	3.0		10		pF
Output Off Capacitance <sup>(2)</sup>	C <sub>OFF</sub>	/OE=3.3V, f=1MHz	3.0		6		pF

Note 1: Devices are 100% tested at TA = +25°C. Limits across the full temperature range are guaranteed by design and correlation.

Note 2: Guaranteed by characterization.

### TEST CIRCUITS

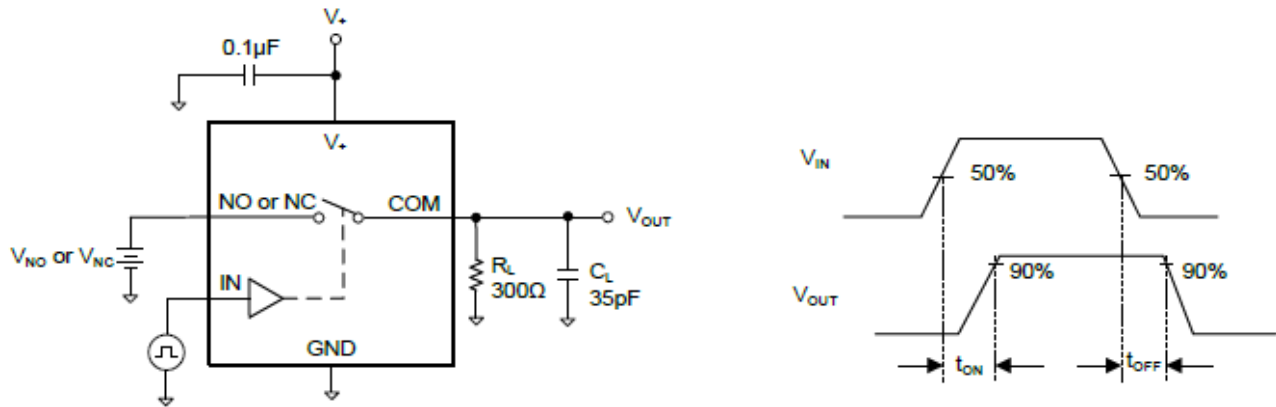


Figure 2. Switching Time

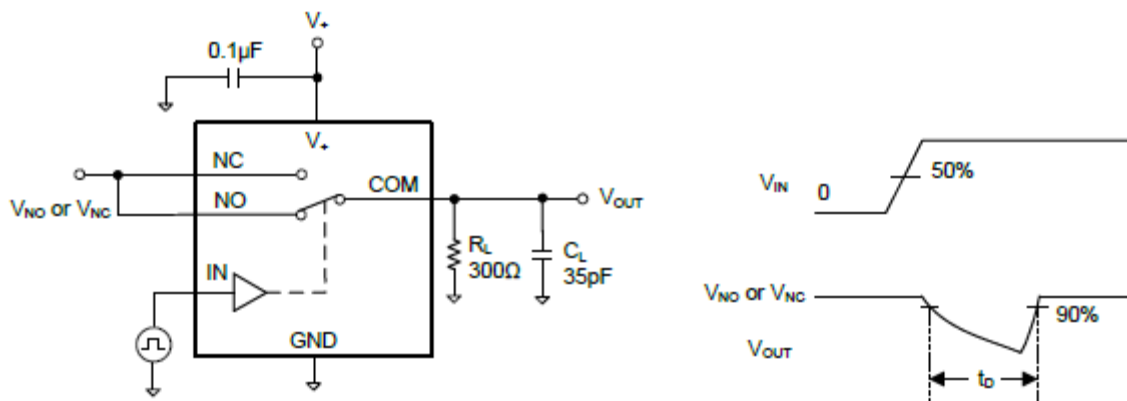


Figure 3. Break-Before-Make Interval

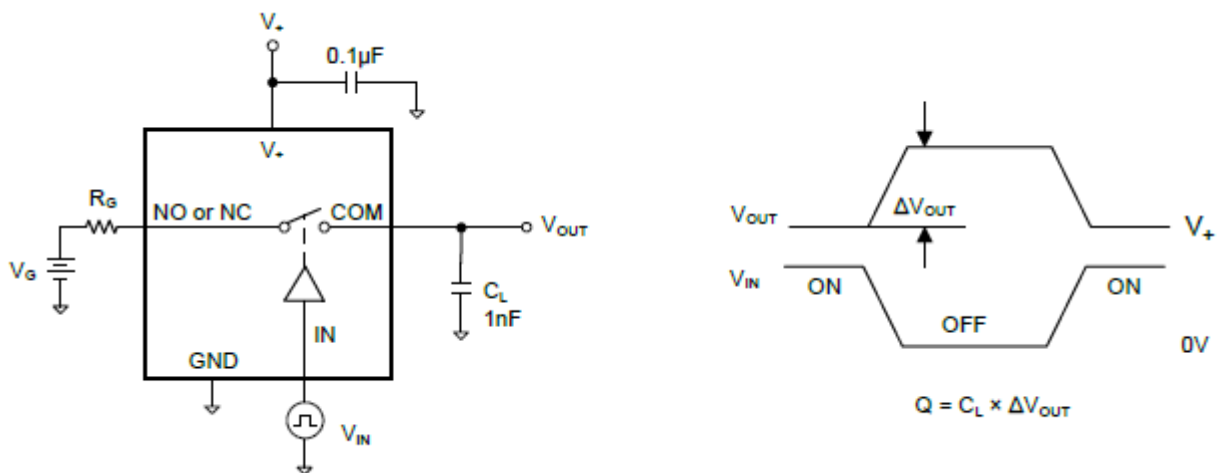


Figure 4. Charge Injection



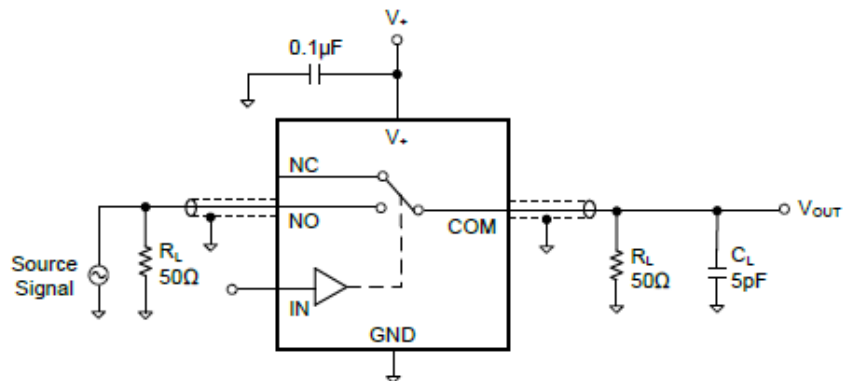


Figure 5. Off Isolation

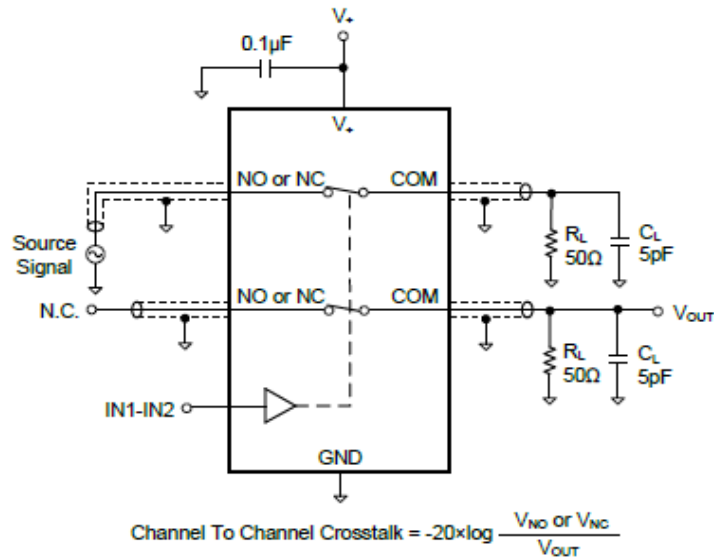


Figure 6. Channel-to-Channel Crosstalk

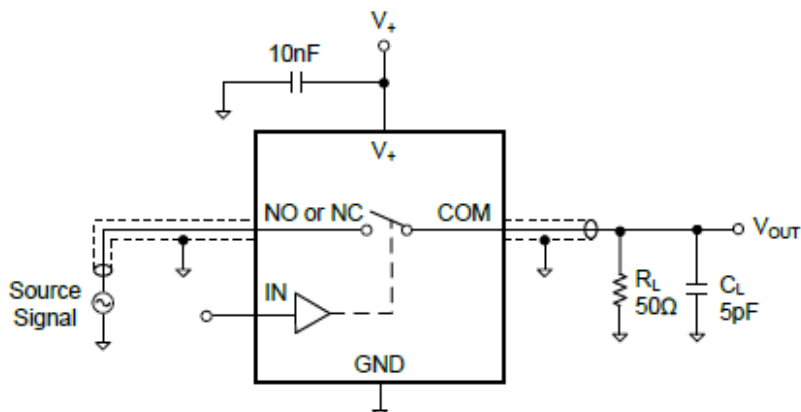
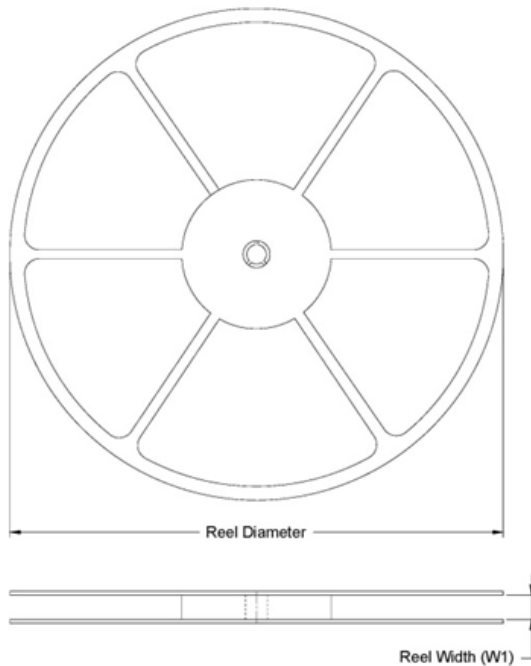


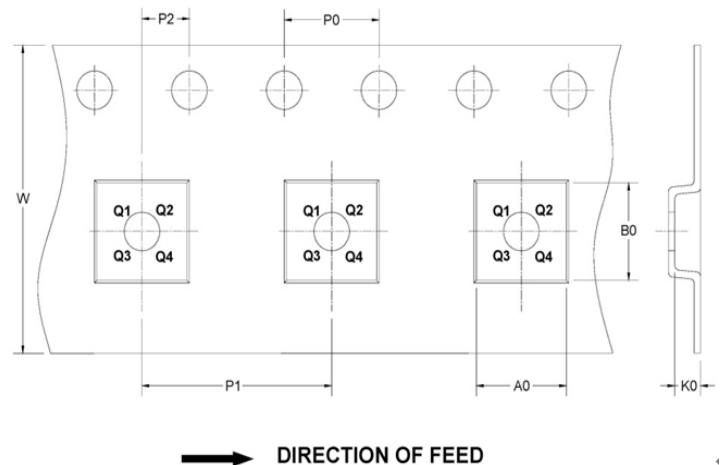
Figure 7. -3dB Bandwidth

### TAPE AND REEL INFORMATION

#### REEL DIMENSIONS



#### TAPE DIMENSIONS



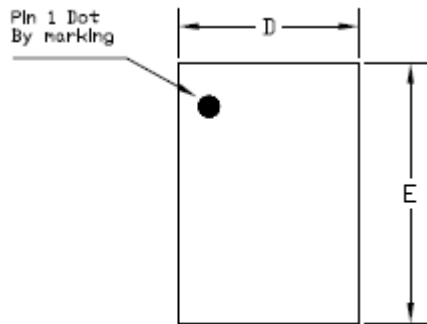
- Notes:
1. The above picture is for reference only, please refer to the value in the table below for the actual size.
  2. For Pin 1 Orientation, please check the physical reel before use.

### KEY PARAMETER LIST OF TAPE AND REEL

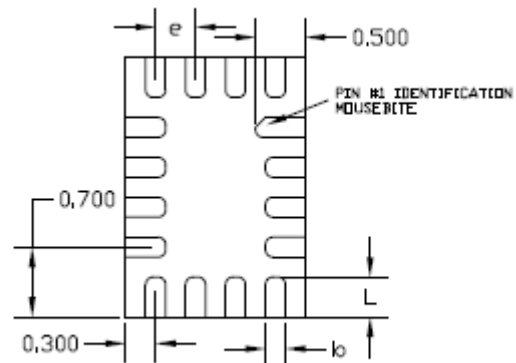
Device Name	Package Type	Reel Diameter	Unit: mm								Pin 1 Quadrant	Reel Q'ty
			Reel Width W1	A0	B0	K0	P0	P1	P2	W		
BCT44603EGE-TR	QFN2.6x1.8-16L	7"	9.04	2.1	2.9	0.75	4	4	2	8	Q1	3000

## PACKAGE OUTLINE DIMENSIONS

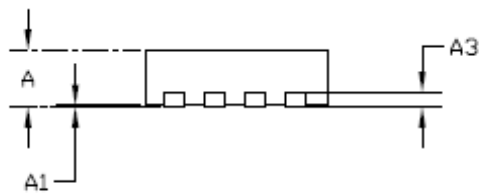
QFN2.6x1.8-16L



TOP VIEW



BOTTOM VIEW



SIDE VIEW

COMMON DIMENSIONS(MM)			
PKG.	UT:ULTRA THIN		
REF.	MIN.	NOM.	MAX
A	>0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 REF.		
D	1.75	1.80	1.85
E	2.55	2.60	2.65
L	0.30	0.40	0.50
b	0.15	0.20	0.25
e	0.40 BSC		

## PCB Layout Pattern

QFN2.6x1.8-16L

