S T R U C T U R E　Silicon Monolithic Integrated Circuit

PRODUCT SERIES　Strobe Charge Control IC

T Y P E　**BD4216NUV**

F u n c t i o n s

1. Built-in power transistor
2. Adjustable transformer primary-side peak current
3. Standby mode switching with the START pin
4. Includes charge complete signal output (FULL) pin.
   Includes charge voltage detection (VC) pin (can be set externally).
5. Built-in thermal shutdown circuit (TSD)
6. Built-in IGBT driver
7. Thermally enhanced VSON010V3030 package. (3.0mm x 3.0mm, 1.0mm pitch)

○Absolute maximum ratings(Ta=25℃)

Parameter	Symbol	Limit	Unit
VCC pin	VCC	-0.3 to 7	V
PVC pin	PVC	50	V
VC pin	VC	-10 to 36	V
START pin	START	-0.3 to 7	V
ADJ pin	ADJ	-0.3 to 7	V
FULL pin	FULL	-0.3 to 7	V
IGBT_IN pin	IGBT_IN	-0.3 to 7	V
Operating temperature	Topr	−35 to 85	°C
Storage temperature range	Tstg	−55 to 150	°C
Junction temperature	Tjmax	150	°C
Power dissipation	Pd	1270*1	mW

*1: Reduced by 10.16 mW/°C over Ta = 25°C. (When mounted on 74.2 mm × 74.2 mm × 1.6 mm, glass epoxy)

○Recommended operating ranges

Parameter	Symbol	Limit	Unit
VCC power supply input voltage range	VCC	2.5 to 5.5	V
START pin input voltage range	VSTART	0 to VCC	V
ADJ pin input voltage range	VADJ	0 to VCC	V
IGBT_IN pin input voltage range	VIGBT_IN	0 to VCC	V
FULL pin input voltage range	VFULL	0 to 5.5	V

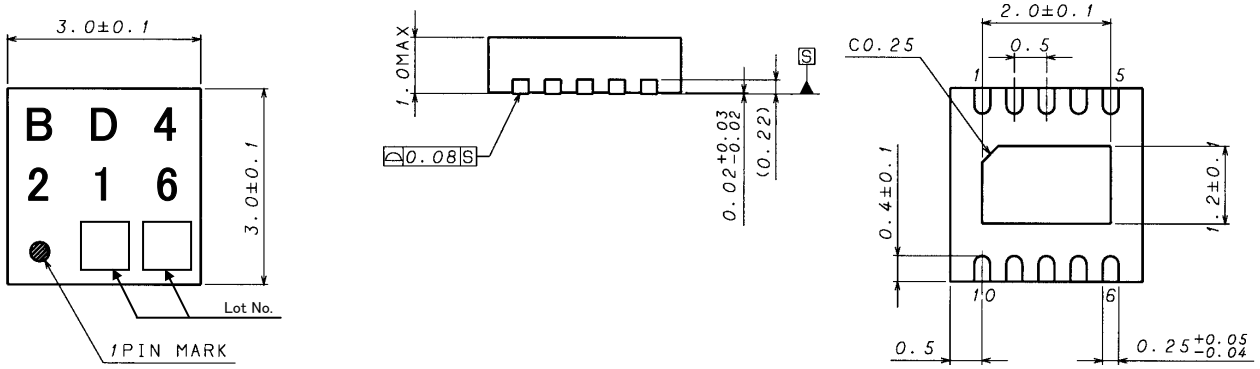
◎This product is not designed for normal operation within a radioactive environment.

Status of this document
The Japanese version of this document is the official specification. Please use the translation version of this document as a reference to expedite understanding of the official version.
If these are any uncertainty in translation version of this document, official version takes priority.

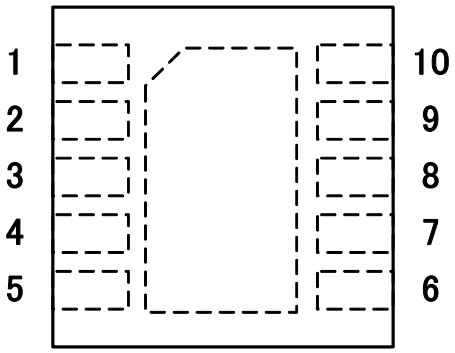
○Electrical characteristics (Ta=25°C, VCC=START=3.3 V, VBAT=3.6V, ADJ=1.0V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
[Overall device]						
VCC circuit current	IVCC	—	35	60	mA	Output during ON time
Circui current during standby operation	ISTB	—	—	1	uA	START=0V
[Standby control START pin]						
START pin high voltage	VSTH	2.0	—	—	V	
START pin low voltage	VSTL	—	—	0.4	V	
Input bias current	ISTART		24	40	uA	START=3.3V
[Transformer primary-side driver block]						
PVC pin leak current	IPVCL	—	—	1	uA	PVC=36V
PVC pin peak current 1	IPEAK1	0.35	0.6	0.85	A	ADJ=0V
PVC pin peak current 2	IPEAK2	1.0	1.1	1.2	A	ADJ=1V
PVC pin peak current 3	IPEAK3	1.95	2.05	2.15	A	ADJ=3V
PVC satulation voltage	VSAT	—	0.3	1	V	ISW=0.5A
[Charging control block]						
ADJ sink current	IADJ	—	2.5	10	uA	
Off time	TOFFMAX	—	10	30	uS	
[Transformer secondary-side detection block]						
Full charge detection voltage	VFULLTH	29.7	30	30.3	V	
FULL pin ON resistor	RFULLL	—	110	300	Ω	FULL=0.5V
FULL pin leak current	IFULLH	—	—	1	uA	FULL=3.3V
[Protection circuit block]						
UVLO detect voltage	VUVLOTH	—	—	2.25	V	VCC detection
[IGBT driver block]						
Output short high current	Ioso	70	140	—	mA	IGBT_IN=3.3V, IGBT_OUT=0V
Output short low current	Iosi	30	60	—	mA	IGBT_IN=0V, IGBT_OUT=3.3V
IGBT_IN input high voltage range	VIGBTH	2.0	—	—	V	
IGBT_IN input high voltage range	VIGBTL	—	—	0.4	V	
IGBT_IN sink current	IIGBT_IN	—	24	40	uA	IGBT_IN=3.3V

○Package (UNIT:mm)



○Pin Layout



TOP VIEW
Fig.1 Pin Layout

Pin No.	Pin Name	Function
1	PGND	Ground pin
2	IGBT_OUT	IGBT driver output pin
3	IGBT_IN	IGBT driver input pin
4	FULL	FULL charge detection flag pin
5	ADJ	primary-side current control pin
6	START	Standby pin
7	VCC	VCC pin
8	VC	Full charge detection pin
9	N/C	N/C
10	PVC	Power transistor output pin

○Block Diagram

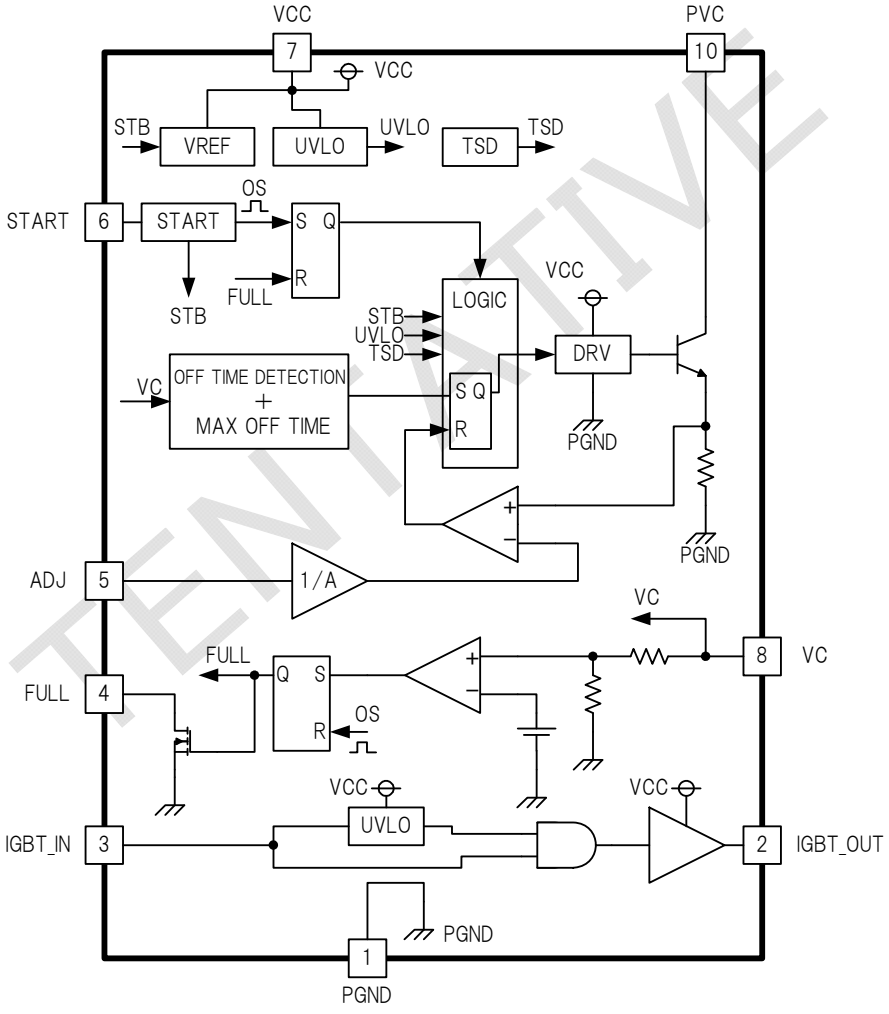


Fig.2 Block Diagram

○ Cautions on use

1. Absolute maximum ratings
   An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down the devices, thus making impossible to identify breaking mode, such as a short circuit or an open circuit. If any over rated values will expect to exceed the absolute maximum ratings, consider adding circuit protection devices, such as fuses.

2. PGND potential
   Ensure a minimum GND pin potential in all operating conditions. In addition, ensure that no pins other than the GND pin carry a voltage less than or equal to the GND pin, including during actual transient phenomena.

3. Thermal design
   Use a thermal design that allows for a sufficient margin in light of the power dissipation (Pd) in actual operating conditions.

4. Protect circuit
   The IC does not incorporate built-in malfunction protection such as overcurrent protection, short detection, or thermal shutdown circuitry. For this reason, the IC may be damaged if it is shorted or subjected to a load that exceeds the package power. The design of peripheral application circuits should reflect these potential risks.

5. Inter-pin shorts and mounting errors
   Use caution when positioning the IC for mounting on printed circuit boards. The IC may be damaged if there is any connection error or if positive and ground power supply terminals are reversed. The IC may also be damaged if pins are shorted together or are shorted to other circuit's power lines.

6. Common impedance
   The power supply and ground lines must be as short and thick as possible to reduce line impedance. Fluctuating voltage on the power ground line may damage the device.

7. Backside copper foil
   Connect to PGND pin for protection of malfunction.

8. Thermal shutdown
   there is a temperature protection circuit in the body ,for protect from heating damage, When thermal circuit moved, output is OFF condition. However it would be fixed automatically, If it return to regular temperature.

9. Voltage of START pin
   The threshold voltages of START pin are 2.0V. STB state is set below 0.4V while action state is set beyond 2.0V.The region between 0.4V and 2.0V is not recommended and may cause improper operation.

Notes

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