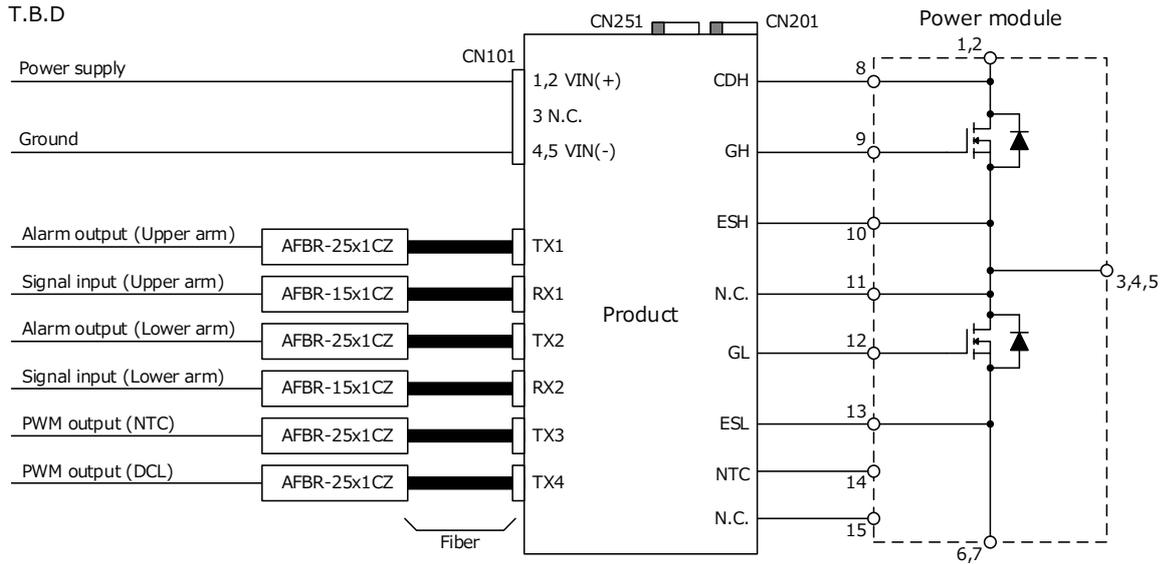
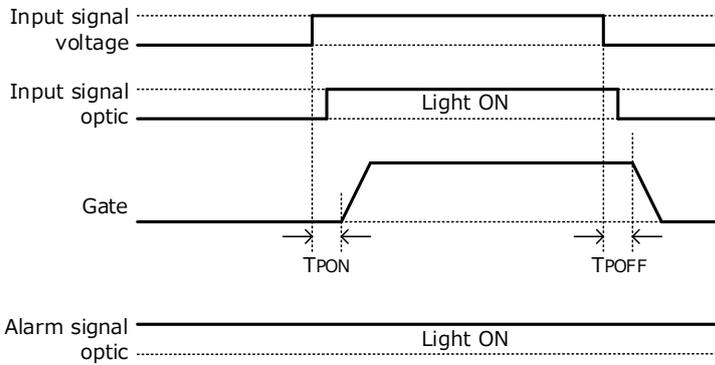


■ Circuit Image

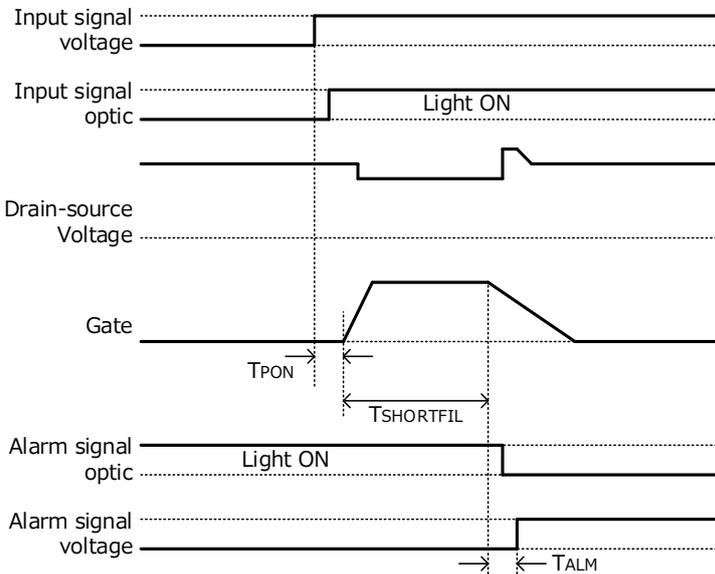


■ I/O sequence

<Nominal>



<Desaturation protection>



■ Interface Description

- Connector CN101: 50556705x1 (Molex)

For power supply

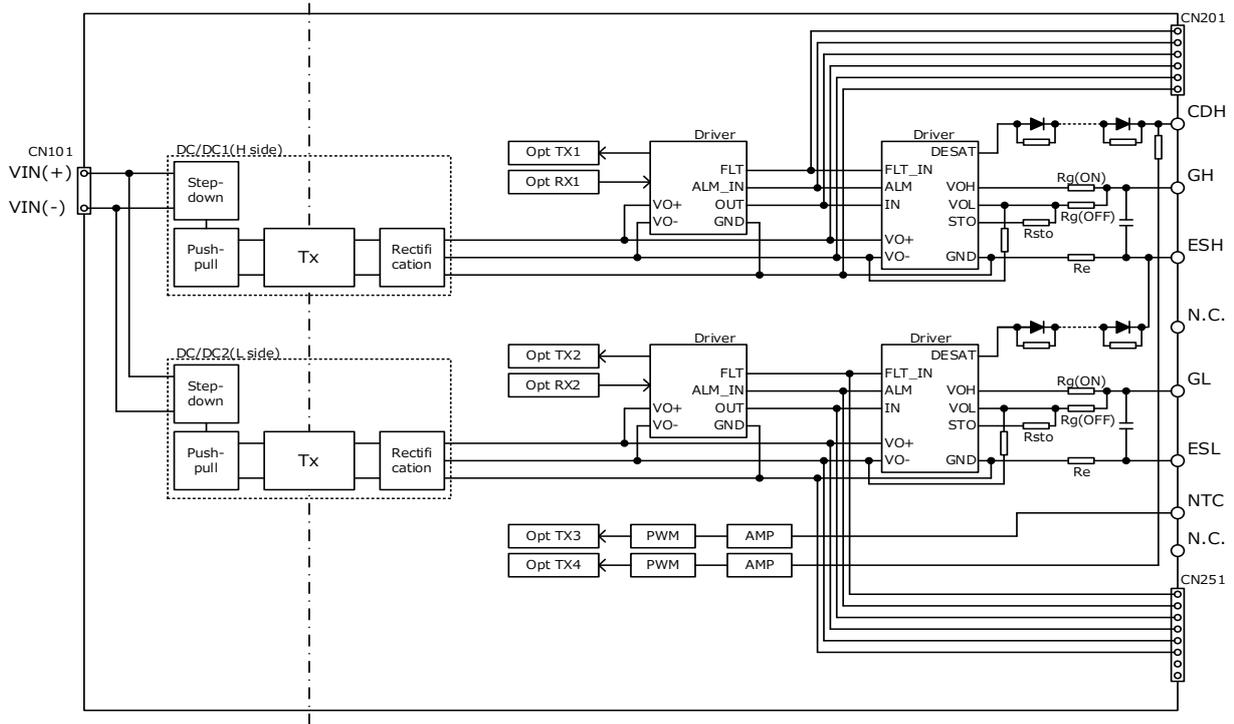
Pin No.	Name	Function
1	VIN(+)	Power supply for DC/DC converter(+)
2	VIN(+)	Power supply for DC/DC converter(+)
3	N.C.	Not used
4	VIN(-)	Power supply for DC/DC converter(-)
5	VIN(-)	Power supply for DC/DC converter(-)

※Reference receptacle : 2045320501 (Molex)

- Fiber optic receiver RX1: AFBR-2531CZ (Broadcom)
Upper arm side gate signal receiver. Recommended transmitter: AFBR-15x1CZ (Broadcom)
- Fiber optic receiver RX2: AFBR-2531CZ (Broadcom)
Lower arm side gate signal receiver. Recommended transmitter: AFBR-15x1CZ (Broadcom)
- Fiber optic transmitter TX1: AFBR-1531CZ (Broadcom)
Upper arm side alarm signal transmitter. Recommended receiver: AFBR-25x1CZ (Broadcom)
- Fiber optic transmitter TX2: AFBR-1531CZ (Broadcom)
Lower arm side alarm signal transmitter. Recommended receiver: AFBR-25x1CZ (Broadcom)
- Fiber optic transmitter TX3: AFBR-1531CZ (Broadcom)
Transmitter that outputs the measured temperature of the NTC thermistor by PWM.
Recommended receiver: AFBR-25x1CZ (Broadcom)
- Fiber optic transmitter TX4: AFBR-1531CZ (Broadcom)
Transmitter that outputs the measured DC-link voltage by PWM.
Recommended receiver: AFBR-25x1CZ (Broadcom)
- Connector CN201: Number of circuits = 6
Connector connection from master unit to slave unit for gate driver channel 1 (Upper arm)
- Connector CN251: Number of circuits = 8
Connector connection from master unit to slave unit for gate driver channel 2 (Lower arm)
- Connection on the power module

Pin No.	Name	CH	Function	Pin No.	Name	CH	Function
8	CDH	1(U)	Collector connection, Upper arm	12	GL	2(L)	Gate connection, Lower arm
9	GH	1(U)	Gate connection, Upper arm	13	ESL	2(L)	Emitter connection, Low arm
10	ESH	1(U)	Emitter connection, Upper arm	14	NTC	2(L)	Thermistor connection
11	N.C.	-	Only fixing the printed circuit board	15	N.C.	-	Only fixing the printed circuit board

Internal Block Diagram



■ Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Conditions · Note	
Input voltage for DC/DC converter	V _{IN}	-0.3	28	Vdc	Between VIN(+) to VIN(-)	
Maximum output power per CH	P _{out}	-	6.4	W	T.B.D, Including gate driver internal loss	
Maximum gate current	I _{GPEAK}	-	43	A	Excluding gate resistor	
Switching frequency	F _{SW}	-	T.B.D	kHz	See the permissible frequency curve	
DC-link voltage	Steady-state	0	2200	V		
	< 60sec	0	2500	V		
Operating temperature range	Ambient(VIN<=18V)	T _{OP}	-40	85	°C	MP target
	Ambient(VIN>18V)	T _{OP}	-40	75	°C	
	Component surface		-40	120	°C	
Operating humidity	RH _{OP}	20	95	%RH	No condensation	
Storage temperature range	T _{STG}	-40	90	°C		
Storage humidity	RH _{STG}	5	95	%RH	No condensation	

■ Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions · Note
Target Device Drain-source voltage	V _{DSMAX}	-	3300	V	
Input voltage range for DC/DC converter	V _{IN}	14.25	25.2	Vdc	T.B.D
Driver circuit number	N	-	2	-	
SiC parallel number	N	-	6	-	MP target
Maximum gate charge	Q _G	-	14000	nC	*1, T.B.D
Switching frequency (Qg=***nC)	F _{SW}	-	T.B.D	kHz	

*1 If the gate charge exceeds the allowable value, the gate voltage at turn-on and turn-off will drop, which may affect the switching performance of the SiC.

If you are considering using it under conditions other than the recommended conditions, please contact us.

■ I/O Condition Table

No.	Status	Input					Output			
		OUT(H)	C1(H)	C2(L)	RX1	RX2	TX1	TX2	G1(H)	G2(L)
1	V _{OUT} UVLO	UVLO	X	X	X	X	H	H	L	L
2	G-E short	○	X	X	X	X	H	H	SD	SD
3	Normal operation	○	L	L	-	L	L	L	-	L
4		○	L	L	-	H	L	L	-	H
5		○	L	L	L	-	L	L	L	-
6		○	L	L	H	-	L	L	H	-
7	Short circuit detection (L)	○	-	H	-	L	-	L	-	L
8		○	-	H	-	H	-	H	-	L
9	Short circuit detection (H)	○	H	-	L	-	L	-	L	-
10		○	H	-	H	-	H	-	L	-

G-E short : Gate-Emitter short ○ : OUT(H) > UVLO, X : Don't care

SD : Shut down (Gate-Emitter short)

RX1,2:

Status L: The transmitting side has without current.

Status H: The transmitting side is with current.

TX1,2:

Status L: With optical signal.

Status H: Without optical signal.

■ Permissible frequency curve

Internal gate resistor of SiC = **Ω

*The permissible frequency curve changes with the ratio of the SiC internal gate resistance to the gate resistance. Therefore, as the internal resistance of the SiC decreases, the allowable frequency also decreases.

Total gate charge (Qg) vs permissible frequency curve

T.B.D

■ Electrical Specification (Vin=Vcc=15V, Ta=25°C, Unless otherwise specified)

Item	Symbol	Min	Typ	Max	Unit	Conditions · Note	
Power supply							
Start-up voltage	V _{START}	-	-	13	V	T.B.D	
Standby power	P _{STBY}	-	2.5	-	W	Without load, T.B.D	
Input current	I _{IN}	-	0.39	-	A	Fsw=5kHz, Test load : 0.68Ω/560nF T.B.D	
Gate output							
Gate turn on voltage	V _{GEON}	14	15	16	V	Without load, T.B.D	
Gate turn off voltage	V _{GEOFF}	-6.2	-5.2	-4.2	V	With load, T.B.D	
	V _{GEOFF}	-6.7	-5.2	-4.2	V	Without load, T.B.D	
Gate resistor	Rg(ON)	-	3.3	-	Ω	T.B.D	
	Rg(OFF)	-	1.0	-			
Emitter resistor	Re	-	0.1	-	Ω	T.B.D	
Auxiliary gate capacitor	Cge	-	OPEN	-	nF	T.B.D	
Delay time	Turn ON time	t _{PON}	-	130	-	ns	T.B.D
	Turn OFF time	t _{POFF}	-	130	-	ns	T.B.D
Optic fiber							
Transmitter peak output power	Pt	-	-6	-	dBm	AFBR-15x1CZ, I _F =10mA, T.B.D	

■ Protection

Item	Symbol	Min	Typ	Max	Unit	Conditions · Note
DC/DC converter						
Overload protection	-	8	-	-	W	Auto recovery, MP target *
Overheat protection	-	T.B.D	-	-	°C	Auto recovery, Internal temperature
Gate driver						
Output voltage(H) UVLO OFF voltage	V _{UVLOOFFH}	-	13.5	-	V	
Output voltage(H) UVLO ON voltage	V _{UVLOOHL}	-	12.5	-	V	
Short circuit detection voltage	V _{SD}	-	8.7	-	V	T.B.D
Short circuit detection filter time	t _{SHORTFIL}	-	1.4	-	us	10% to 90% of VGST.B.D
Alarm signal output time	t _{ALM}	-	0.1	-	us	T.B.D
Restart time	t _{RESTART}	-	25	-	ms	T.B.D
Soft turn-off resistance	R _{STO}	-	12	-	Ω	T.B.D

■ Insulation

Item	Specification	Conditions · Note
Between Input-Output		
Dielectric withstand voltage	AC10.8kV	1min, Cutoff 2mA
Dielectric withstand voltage (Routine test)	AC10.8kV	10sec, Cutoff 2mA, T.B.D
Insulation resistance	100MΩ or more	DC500V
Partial discharge extinction voltage	4.95kV _{peak} or more	According to EN50178/IEC 60270
Common-mode transient immunity (CMTI)	70kV/us	
Minimum clearance distances	23.8mm	PCB: CTI PLC0, Case: CTI PLC0
	15.1mm *	
Minimum creepage distances	45.0mm	
	15.1mm *	
Between Output-Output		
Dielectric withstand voltage	AC6.7kV	1min, Cutoff 2mA
Dielectric withstand voltage (Routine test)	AC6.7kV	10sec, Cutoff 2mA, T.B.D
Partial discharge extinction voltage	3.96kV _{peak} or more	According to EN50178/IEC 60270
Minimum clearance distances	8mm	PCB: CTI PLC0, Case: CTI PLC0
Minimum creepage distances	22mm	

*The inside of the filling assumes PD1, TYPE2 protection or solid insulation

■ Storage Conditions

Item	Min	Max	Unit	Conditions · Note
Storage temperature	-25	60	°C	A packing state

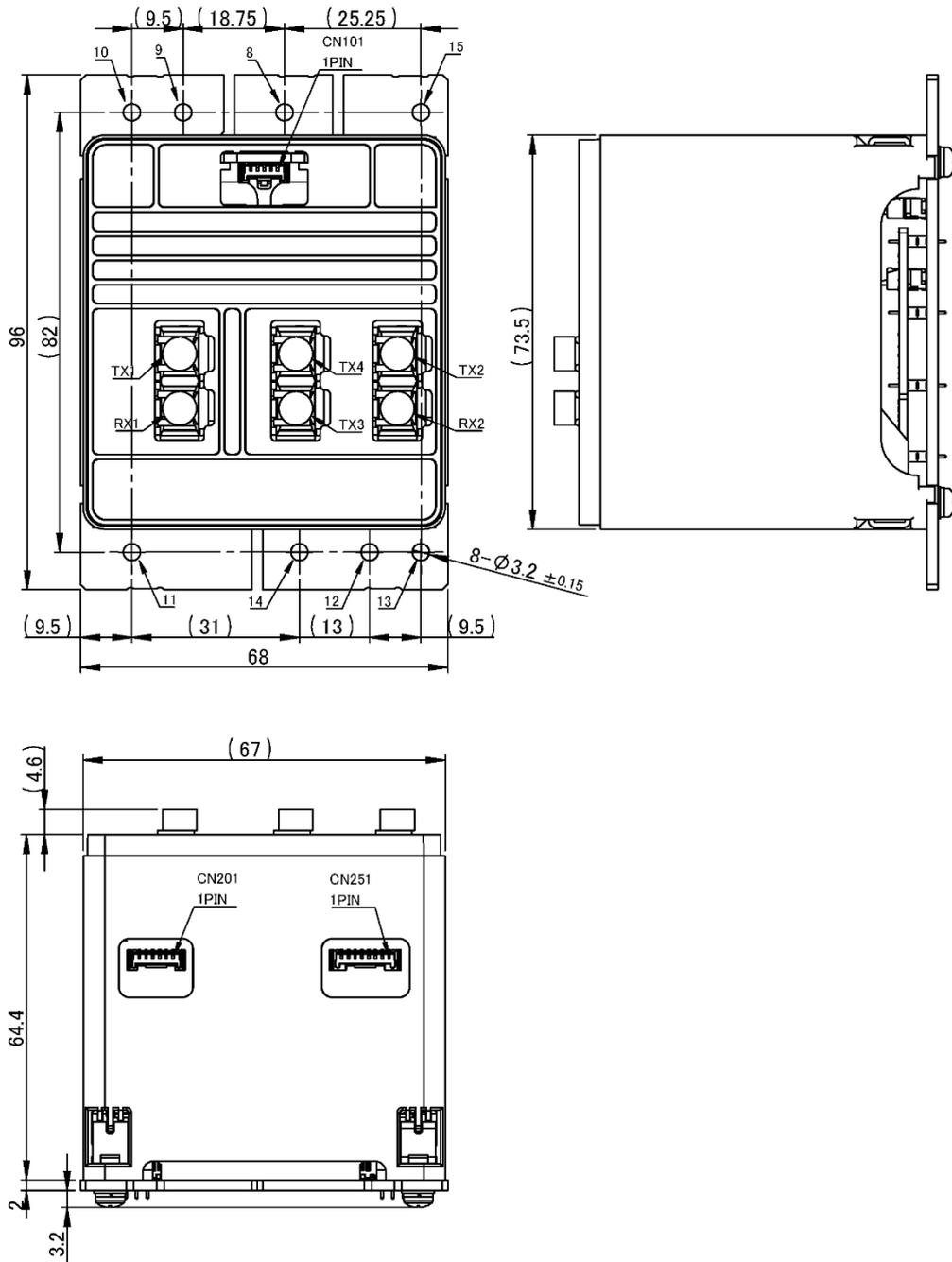
■ Usage Cautions

- Always mount fuse on the plus side of input for ensuring safety because the fuse is not built-in the product.
Please select the fuse considering conditions such as steady current, inrush current, and ambient temperature.
When using a fuse having large rated current or high capacity input electrolytic condenser, by combining another converter and input line and input electrolytic condenser, fuse may not blow off in the case of abnormality.
Do not combine high voltage line and fuse.

- Please do not apply excessive stress to this product when attaching to SiC power module.
Please follow the device manufacturer's instructions on how to install the SiC power module (type of screw used, material, tightening torque conditions, etc.).

- This product has DESAT protection for arm short circuit and load short circuit protection.
However, even if this protection works, the SiC may be damaged if abnormally high current occurs due to SiC's characteristics variations or the load short-circuit mode during parallel operation.
To ensure safety, be sure to check the short-circuit current at the unit in which this product is integrated, and evaluate whether it can protect under the condition that there is no damage to the SiC.

■ Outline Dimensional Drawing



Unit: mm

Note: 1. The dimensional tolerance without directions is ± 0.5 mm.

■ Product Weight

T.B.D g(typ)

■ Important Notice

- This information and product are subject to change without prior notice for the purpose of improvements, etc.
Ensure that you are in possession of the most up-to-date information when using this product.
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Depending on your usage environment or usage method, there is the possibility that this product will not perform sufficiently as shown in the specifications, or may malfunction.
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- This product is intended for use in consumer electronics (electric home appliances, business equipment, Information equipment, communication terminal equipment, measuring devices, and so on.) If considering use of this product in equipment or devices that require high reliability (medical devices, transportation equipment, traffic signal control equipment, fire and crime prevention equipment, aeronautics and space devices, nuclear power control, fuel control, in-vehicle equipment, safety devices, and so on), please consult a TAMURA sales representative in advance. Do not use this product for such applications without written permission from TAMURA Corporation.
- This product is intended for use in environments where consumer electronics are commonly used.
It is not designed for use in special environments such as listed below, and if such use is considered, you are to perform thorough safety and reliability checks at your own responsibility.
 - Use in liquids such as water, oil, chemical solutions, or organic solvents, and use in locations where the product will be exposed to such liquids.
 - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions.
 - Use in locations where corrosive gases such as salt air, C12, H2S, NH3, SO2, or NO2, are present.
 - Use in environments with strong static electricity or electromagnetic radiation.
 - Use that involves placing inflammable material next to the product.
 - Use of this product either sealed with a resin filling or coated with resin.
 - Use of water or a water soluble detergent for flux cleaning.
 - Use in locations where condensation is liable to occur.
- This product is not designed to resist radiation.
- This product is not designed to be connected in series or parallel.
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