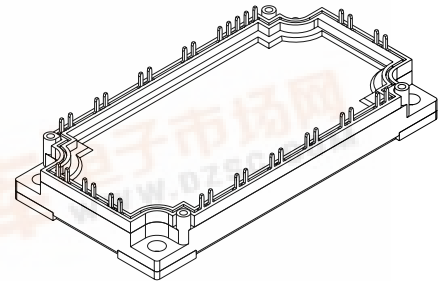
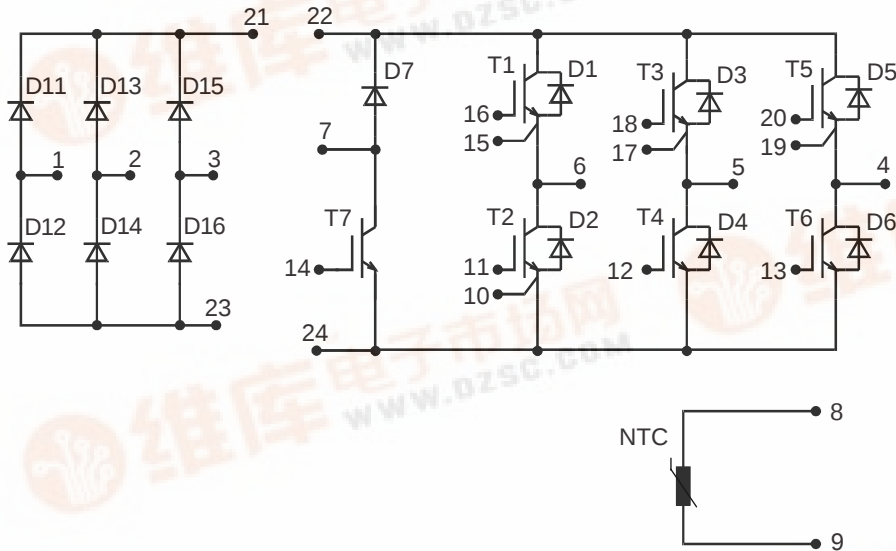


Converter - Brake - Inverter Module (CBI3)



Three Phase Rectifier	Brake Chopper	Three Phase Inverter
$V_{RRM} = 1600 \text{ V}$	$V_{CES} = 600 \text{ V}$	$V_{CES} = 600 \text{ V}$
$I_{FAVM} = 60 \text{ A}$	$I_{C25} = 35 \text{ A}$	$I_{C25} = 75 \text{ A}$
$I_{FSM} = 500 \text{ A}$	$V_{CE(sat)} = 2.1 \text{ V}$	$V_{CE(sat)} = 1.9 \text{ V}$

Input Rectifier D11 - D16

Symbol	Conditions	Maximum Ratings
V_{RRM}		1600 V
I_{FAV}	$T_C = 80^\circ\text{C}$; sine 180°	42 A
I_{DAVM}	$T_C = 80^\circ\text{C}$; rectangular; $d = 1/3$; bridge	120 A
I_{FSM}	$T_{VJ} = 25^\circ\text{C}$; $t = 10 \text{ ms}$; sine 50 Hz	500 A
P_{tot}	$T_C = 25^\circ\text{C}$	120 W

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 50 \text{ A}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		1.2 1.2	V V
I_R	$V_R = V_{RRM}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		0.6	0.02 mA mA
R_{thJC}	(per diode)			1.06 K/W

Application: AC motor drives with

- Input from single or three phase grid
- Three phase synchronous or asynchronous motor
- electric braking operation

Features

- High level of integration - only one power semiconductor module required for the whole drive
- NPT IGBT technology with low saturation voltage, low switching losses, high RBSOA and short circuit ruggedness
- Epitaxial free wheeling diodes with Hipertax and soft reverse recovery
- Industry standard package with insulated copper base plate and soldering pins for PCB mounting
- Temperature sense included

Output Inverter T1 - T6

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V
V_{GES}	Continuous	± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	75	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	50	A
RBSOA	$V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ Clamped inductive load; $L = 100\ \mu\text{H}$	$I_{CM} = 100$ $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	250	W

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 50\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.9 2.1		2.3 V V
$V_{GE(th)}$	$I_C = 1\text{ mA}$; $V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	0.7		0.8 mA mA
I_{GES}	$V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$			200 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300\text{ V}$; $I_C = 50\text{ A}$ $V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$	50 60 300 30		ns ns ns ns
		2.3 1.7		mJ mJ
C_{ies}		2.8		nF
Q_{Gon}		120		nC
R_{thJC}	(per IGBT)			0.5 K/W

Output Inverter D1 - D6

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^{\circ}\text{C}$	72	A
I_{F80}	$T_C = 80^{\circ}\text{C}$	45	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 50\text{ A}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.5 1.3		1.7 V V
I_{RM} t_{rr}	$I_F = 30\text{ A}$; $di_F/dt = -500\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 300\text{ V}$; $V_{GE} = 0\text{ V}$	25 90		A ns
R_{thJC}	(per diode)			1.19 K/W

Brake Chopper T7

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V
V_{GES}	Continuous	± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	35	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	25	A
RBSOA	$V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ Clamped inductive load; $L = 100\ \mu\text{H}$	$I_{CM} = 40$ $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ non-repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	125	W

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 25\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.1 2.4	2.6 V
$V_{GE(th)}$	$I_C = 0.5\text{ mA}$; $V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.3	0.5 mA mA
I_{GES}	$V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$			200 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 300\text{ V}$; $I_C = 25\text{ A}$ $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$		50 60 300 30 1.15 0.85	ns ns ns ns mJ mJ
C_{ies}			1.1	nF
Q_{Gon}			65	nC
R_{thJC}				1 K/W

Brake Chopper D7

Symbol	Conditions	Maximum Ratings		
V_{RRM}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	600	V	
I_{F25}	$T_C = 25^{\circ}\text{C}$	22	A	
I_{F80}	$T_C = 80^{\circ}\text{C}$	15	A	

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 25\text{ A}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.2 1.7	2.5	V V
I_R	$V_R = V_{RRM}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	0.07	0.06	mA mA
I_{RM} t_{rr}	$I_F = 10\text{ A}$; $di_F/dt = -400\text{ A}/\mu\text{s}$; $T_{VJ} = 125^{\circ}\text{C}$ $V_R = 300\text{ V}$	11 80		A ns
R_{thJC}				3.2

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R_{25}	$T = 25^{\circ}\text{C}$	4.75	5.0	5.25 k Ω
$B_{25/50}$			3375	K

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-40...+125	$^{\circ}\text{C}$
T_{JM}		+150	$^{\circ}\text{C}$
T_{stg}		-40...+125	$^{\circ}\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1 \text{ mA}$; 50/60 Hz	2500	V~
M_d	Mounting torque (M5)	3 - 6	Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{\text{pin-chip}}$			5	m Ω
d_s	Creepage distance on surface	6		mm
d_A	Strike distance in air	6		mm
R_{thCH}	with heatsink compound		0.01	K/W
Weight			300	g

