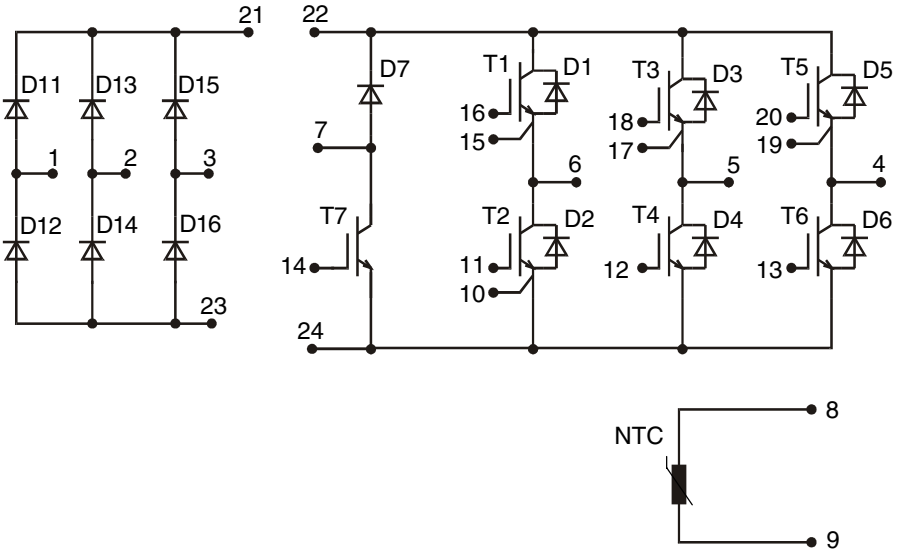
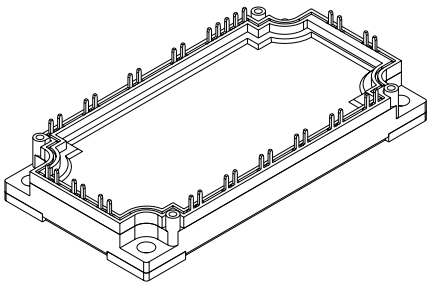
Converter - Brake - Inverter Module (CBI3)





Three Phase Rectifier	Brake Chopper	Three Phase Inverter
V_{RRM} = 1600 V	V_{CES} = 1200 V	V_{CES} = 1200 V
I_{FAVM} = 70 A	I_{C25} = 50 A	I_{C25} = 85 A
I_{FSM} = 700 A	$V_{CE(sat)}$ = 2.5 V	$V_{CE(sat)}$ = 2.2 V

Input Rectifier D11 - D16

Symbol	Conditions	Maximum Ratings	
V_{RRM}		1600	V
I_{FAV}	T_C = 80°C; sine 180°	50	A
I_{DAVM}	T_C = 80°C; rectangular; d = 1/3; bridge	140	A
I_{FSM}	T_{VJ} = 25°C; t = 10 ms; sine 50 Hz	700	A
P_{tot}	T_C = 25°C	135	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 50 A; T_{VJ} = 25°C		1.1	1.3	V
	T_{VJ} = 125°C		1.1		V
I_R	$V_R = V_{RRM}$; T_{VJ} = 25°C			0.05	mA
	T_{VJ} = 125°C		0.8		mA
R_{thJC}	(per diode)			0.94	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 Hiperfast 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°C to 150°C	1200	V
V_{GES}	Continuous	± 20	V
I_{C25}	T_C = 25°C	85	A
I_{C80}	T_C = 80°C	60	A
RBSOA	V_{GE} = ±15 V; R_G = 22 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 100 $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; V_{GE} = ±15 V; R_G = 22 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	350	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 50 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.2	2.6	V
	T_{VJ} = 125°C		2.5		V
$V_{GE(th)}$	I_C = 2 mA; $V_{GE} = V_{CE}$	4.5		6.5	V
I_{CES}	$V_{CE} = V_{CES}$; V_{GE} = 0 V; T_{VJ} = 25°C			3.7	mA
	T_{VJ} = 125°C		3.1		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		100		ns
t_r	V_{CE} = 600 V; I_C = 50 A		70		ns
$t_{d(off)}$	V_{GE} = ±15 V; R_G = 22 Ω		500		ns
t_f			70		ns
E_{on}			7.6		mJ
E_{off}			5.6		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		3.3		nF
Q_{Gon}	V_{CE}= 600 V; V_{GE} = 15 V; I_C = 50 A		230		nC
R_{thJC}	(per IGBT)			0.35	K/W

Output Inverter D1 - D6

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	110	A
I_{F80}	T_C = 80°C	70	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 50 A; V_{GE} = 0 V; T_{VJ} = 25°C		2.1	2.5	V
	T_{VJ} = 125°C		1.5		V
I_{RM}	I_F = 60 A; di_F/dt = -500 A/µs; T_{VJ} = 125°C		41		A
t_{rr}	V_R = 600 V; V_{GE} = 0 V		200		ns
R_{thJC}	(per diode)			0.61	K/W

Brake Chopper T7

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	1200	V
V_{GES}	Continuous	± 20	V
I_{C25}	T_C = 25°C	50	A
I_{C80}	T_C = 80°C	35	A
RBSOA	V_{GE} = ±15 V; R_G = 47 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 50 $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	V_{CE} = V_{CES}; V_{GE} = ±15 V; R_G = 47 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	225	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 35 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.5	3.1	V
	T_{VJ} = 125°C		2.9		V
$V_{GE(th)}$	I_C = 1 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.8	mA
	T_{VJ} = 125°C		0.8		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C V_{CE} = 600 V; I_C = 35 A V_{GE} = ±15 V; R_G = 47 Ω		100		ns
t_r			70		ns
$t_{d(off)}$			500		ns
t_f			70		ns
E_{on}			5.3		mJ
E_{off}			3.9		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MH z		1.6		nF
Q_{Gon}	V_{CE}= 600 V; V_{GE} = 15 V; I_C = 25 A		120		nC
R_{thJC}				0.55	K/W

Brake Chopper D7

Symbol	Conditions	Maximum Ratings	
V_{RRM}	T_{VJ} = 25°C to 150°C	1200	V
I_{F25}	T_C = 25°C	25	A
I_{F80}	T_C = 80°C	16	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 35 A; T_{VJ} = 25°C		3.0	3.4	V
	T_{VJ} = 125°C		2.3		V
I_R	V_R = V_{RRM}; T_{VJ} = 25°C			0.1	mA
	T_{VJ} = 125°C		0.1		mA
I_{RM}	I_F = 15 A; di_F/dt = -400 A/µs; T_{VJ} = 125°C		16		A
t_{rr}	V_R = 600 V		130		ns
R_{thJC}				2.1	K/W

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values min.	typ.	max.	
R_{25}	T = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$			3375		K

Module

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

Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin\text{-}chip}$			5		mΩ
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

Dimensions in mm (1 mm = 0.0394")