



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

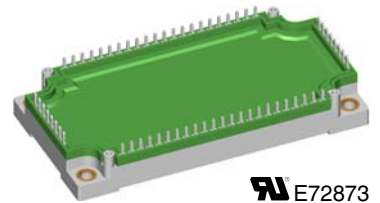
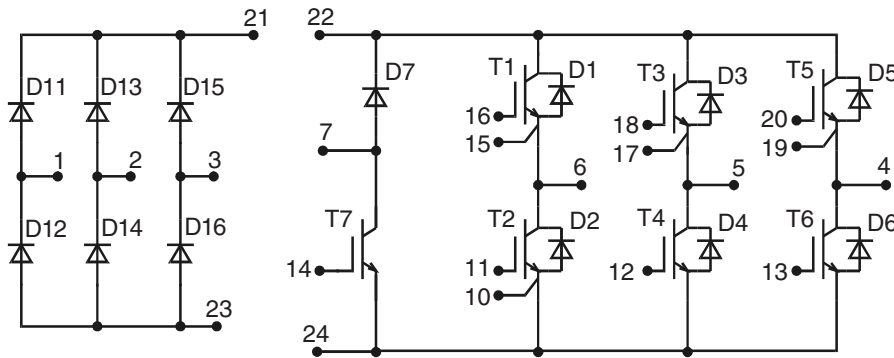
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



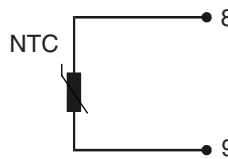
Converter - Brake - Inverter Module (CBI3)



E72873

See outline drawing for pin arrangement

Preliminary data



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

Input Rectifier D11 - D16

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

| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified) | | |
|------------|---|--|------------|------------------|
| | | min. | typ. | max. |
| V_F | $I_F = 50\text{ A}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | | 1.1 1.1 | 1.3 V V |
| I_R | $V_R = V_{RRM}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$ | | 0.8 | 0.05 mA 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

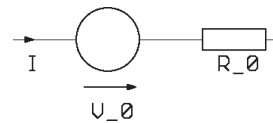
| Symbol | Conditions | Maximum Ratings | |
|--|--|--|---------------|
| V_{CES} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 1200 | V |
| V_{GES} | Continuous | ± 20 | V |
| I_{C25} | $T_C = 25^{\circ}\text{C}$ | 85 | A |
| I_{C80} | $T_C = 80^{\circ}\text{C}$ | 60 | A |
| RBSOA | $V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ 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} | $T_C = 25^{\circ}\text{C}$ | 350 | W |

| Symbol | Conditions | Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified) | | |
|--|--|--|------|----------|
| | | min. | typ. | max. |
| $V_{CE(sat)}$ | $I_C = 50\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | 2.2 2.5 | 2.6 | V V |
| $V_{GE(th)}$ | $I_C = 2\text{ mA}$; $V_{GE} = V_{CE}$ | 4.5 | 6.5 | V |
| I_{CES} | $V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$ | 3.1 | 3.7 | 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, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600\text{ V}$; $I_C = 50\text{ A}$ $V_{GE} = \pm 15\text{ V}$; $R_G = 22\ \Omega$ | 100 | | ns |
| | | 70 | | ns |
| | | 500 | | ns |
| | | 70 | | ns |
| | | 7.6 | | mJ |
| | | 5.6 | | mJ |
| C_{ies} | $V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$ | 3.3 | | nF |
| Q_{Gon} | $V_{CE} = 600\text{ V}$; $V_{GE} = 15\text{ V}$; $I_C = 50\text{ A}$ | 230 | | nC |
| R_{thJC} | (per IGBT) | | 0.35 | K/W |

Output Inverter D1 - D6

| Symbol | Conditions | Maximum Ratings | |
|-----------|----------------------------|-----------------|---|
| I_{F25} | $T_C = 25^{\circ}\text{C}$ | 110 | A |
| I_{F80} | $T_C = 80^{\circ}\text{C}$ | 70 | A |

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

Equivalent Circuits for Simulation
Conduction

 IGBT (typ. at $V_{GE} = 15\text{ V}$; $T_J = 125^{\circ}\text{C}$)
T1-T6

$$V_0 = 1.5\text{ V}; R_0 = 20\text{ m}\Omega$$

T7

$$V_0 = 1.5\text{ V}; R_0 = 40\text{ m}\Omega$$

 Diode (typ. at $T_J = 125^{\circ}\text{C}$)

D1-D6

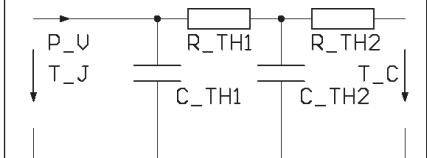
$$V_0 = 1.25\text{ V}; R_0 = 5.5\text{ m}\Omega$$

D7

$$V_0 = 1.3\text{ V}; R_0 = 30\text{ m}\Omega$$

D11-D16

$$V_0 = 0.85\text{ V}; R_0 = 5\text{ m}\Omega$$

Thermal Response


IGBT (typ.)

T1-T6

$$C_{th1} = 0.216\text{ J/K}; R_{th1} = 0.264\text{ K/W}$$

$$C_{th2} = 1.338\text{ J/K}; R_{th2} = 0.086\text{ K/W}$$

T7

$$C_{th1} = 0.134\text{ J/K}; R_{th1} = 0.424\text{ K/W}$$

$$C_{th2} = 0.986\text{ J/K}; R_{th2} = 0.126\text{ K/W}$$

Diode (typ.)

D1-D6

$$C_{th1} = 0.138\text{ J/K}; R_{th1} = 0.48\text{ K/W}$$

$$C_{th2} = 0.957\text{ J/K}; R_{th2} = 0.13\text{ K/W}$$

D7

$$C_{th1} = 0.038\text{ J/K}; R_{th1} = 1.725\text{ K/W}$$

$$C_{th2} = 0.439\text{ J/K}; R_{th2} = 0.375\text{ K/W}$$

D11-D16

$$C_{th1} = 0.086\text{ J/K}; R_{th1} = 0.738\text{ K/W}$$

$$C_{th2} = 0.621\text{ J/K}; R_{th2} = 0.202\text{ K/W}$$

Brake Chopper T7

| Symbol | Conditions | Maximum Ratings | |
|----------------------------|--|---|---------------|
| V_{CES} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 1200 | V |
| V_{GES} | Continuous | ± 20 | V |
| I_{C25} | $T_C = 25^{\circ}\text{C}$ | 50 | A |
| I_{C80} | $T_C = 80^{\circ}\text{C}$ | 35 | A |
| RBSOA | $V_{GE} = \pm 15\text{ V}$; $R_G = 47\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$ Clamped inductive load; $L = 100\ \mu\text{H}$ | $I_{CM} = 50$ $V_{CEK} \leq V_{CES}$ | 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} | $T_C = 25^{\circ}\text{C}$ | 225 | W |

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

Brake Chopper D7

| Symbol | Conditions | Maximum Ratings | |
|-----------|--|-----------------|---|
| V_{RRM} | $T_{VJ} = 25^{\circ}\text{C}$ to 150°C | 1200 | V |
| I_{F25} | $T_C = 25^{\circ}\text{C}$ | 25 | A |
| I_{F80} | $T_C = 80^{\circ}\text{C}$ | 16 | A |

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

IXYS reserves the right to change limits, test conditions and dimensions.

20070912a

Temperature Sensor NTC

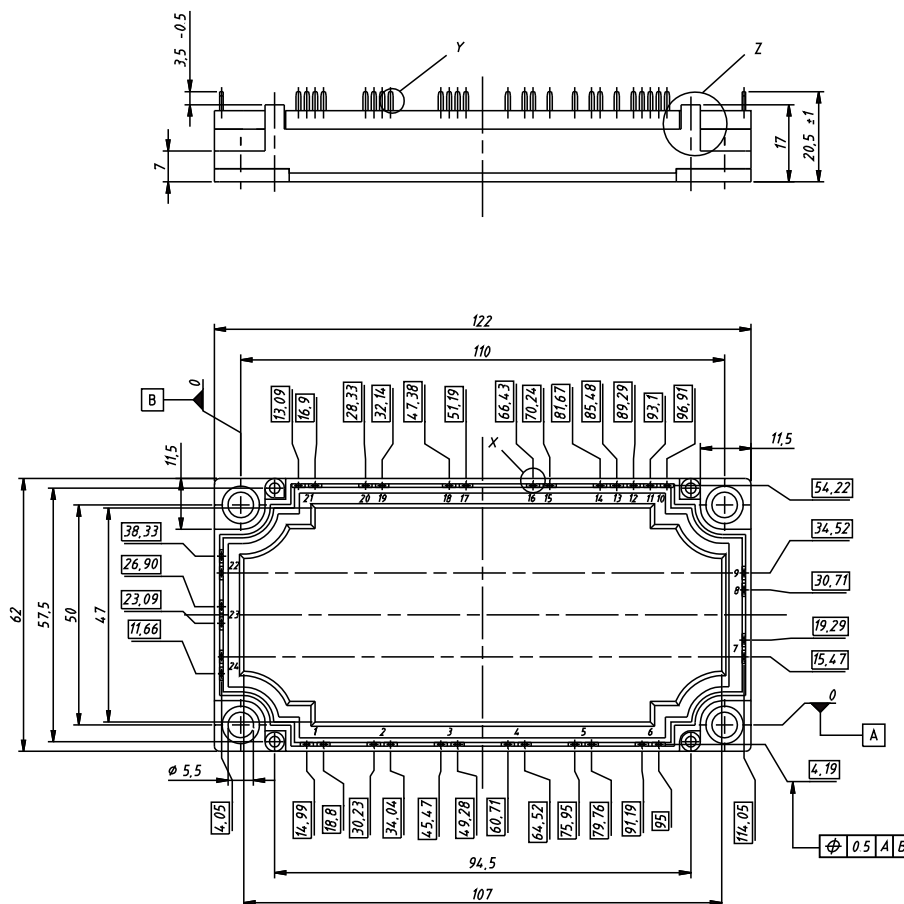
| Symbol | Conditions | Characteristic Values | | |
|-------------|--------------------------|-----------------------|------|-----------------|
| | | min. | typ. | max. |
| R_{25} | $T = 25^{\circ}\text{C}$ | 4.75 | 5.0 | 5.25 k Ω |
| $B_{25/50}$ | | | 3375 | K |

Module

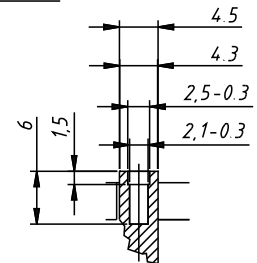
| Symbol | Conditions | Maximum Ratings | |
|------------|--|-----------------|--------------------|
| | | | |
| T_{VJ} | operating | -40...+125 | $^{\circ}\text{C}$ |
| T_{JM} | | +150 | $^{\circ}\text{C}$ |
| T_{stg} | | -40...+125 | $^{\circ}\text{C}$ |
| V_{ISOL} | $I_{ISOL} \leq 1 \text{ mA}; 50/60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

| Symbol | Conditions | Characteristic Values | | |
|----------------|------------------------------|-----------------------|------|------------|
| | | min. | typ. | max. |
| $R_{pin-chip}$ | | | 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 |

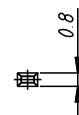
Dimensions in mm (1 mm = 0.0394")



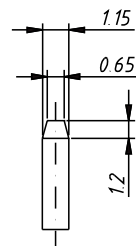
Detail Z



Detail X



Detail Y



IXYS reserves the right to change limits, test conditions and dimensions.

20070912a