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!

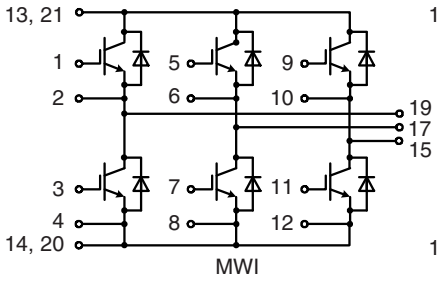

## Contact us

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

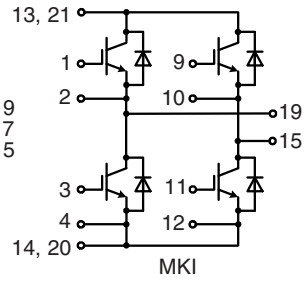
# IGBT Modules
## Sixpack, H Bridge

Short Circuit SOA Capability
Square RBSOA

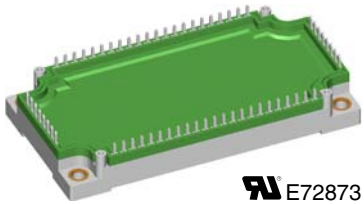
$I_{C25}$ = 165 A
$V_{CES}$ = 1200 V
$V_{CE(sat)\ typ.}$ = 2.0 V



MWI



MKI


E72873

See outline drawing for pin arrangement

### Features
- NPT³ IGBTs
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
  - short tail current for optimized performance also in resonant circuits
- HiPerFRED™ diode:
  - fast reverse recovery
  - low operating forward voltage
  - low leakage current
- Industry Standard Package
  - solderable pins for PCB mounting
  - isolated copper base plate

### Typical Applications
- MWI
  - AC drives
  - power supplies with power factor correction
- MKI
  - motor control
    . DC motor amature winding
    . DC motor excitation winding
    . synchronous motor excitation winding
  - supply of transformer primary winding
    . power supplies
    . welding
    . X-ray
    . battery charger

### IGBTs

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_{VJ}$ = 25°C to 150°C | 1200 | V |
| $V_{GES}$ | | ± 20 | V |
| $I_{C25}$ | $T_C$ = 25°C | 165 | A |
| $I_{C80}$ | $T_C$ = 80°C | 115 | A |
| $I_{CM}$ | $V_{GE}$ = ±15 V; $R_G$ = 12 Ω; $T_{VJ}$ = 125°C | 200 | A |
| $V_{CEK}$ | RBSOA; clamped inductive load; L = 100 µH | $V_{CES}$ | |
| $t_{SC}$ | $V_{CE}$ = 900 V; $V_{GE}$ = ±15 V; $R_G$ = 12 Ω; $T_{VJ}$ = 125°C<br>SCSOA; non-repetitive | 10 | µs |
| $P_{tot}$ | $T_C$ = 25°C | 640 | W |

| Symbol | Conditions | Characteristic Values ($T_{VJ}$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_{CE(sat)}$ | $I_C$ = 100 A; $V_{GE}$ = 15 V; $T_{VJ}$ = 25°C | | 2.0 | 2.5 | V |
| | $T_{VJ}$ = 125°C | | 2.3 | | V |
| $V_{GE(th)}$ | $I_C$ = 4 mA; $V_{GE}$ = $V_{CE}$ | 4.5 | | 6.5 | V |
| $I_{CES}$ | $V_{CE}$ = $V_{CES}$; $V_{GE}$ = 0 V; $T_{VJ}$ = 25°C | | | 1.4 | mA |
| | $T_{VJ}$ = 125°C | | 1.4 | | mA |
| $I_{GES}$ | $V_{CE}$ = 0 V; $V_{GE}$ = ± 20 V | | | 400 | nA |
| $t_{d(on)}$ | Inductive load, $T_{VJ}$ = 125°C | | 330 | | ns |
| $t_r$ | $V_{CE}$ = 600 V; $I_C$ = 100 A | | 15 | | ns |
| $t_{d(off)}$ | $V_{GE}$ = ±15 V; $R_G$ = 12 Ω | | 750 | | ns |
| $t_f$ | | | 45 | | ns |
| $E_{on}$ | | | 12 | | mJ |
| $E_{off}$ | | | 10 | | mJ |
| $C_{ies}$ | $V_{CE}$ = 25 V; $V_{GE}$ = 0 V; f = 1 MHz | | 7.4 | | nF |
| $Q_{Gon}$ | $V_{CE}$ = 600 V; $V_{GE}$ = 15 V; $I_C$ = 150 A | | 0.76 | | µC |
| $R_{thJC}$ | (per IGBT) | | | 0.19 | K/W |

## Diodes

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $I_{F25}$ | $T_C$ = 25°C | 200 | A |
| $I_{F80}$ | $T_C$ = 80°C | 130 | A |

| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_F$ | $I_F$ = 100 A; $V_{GE}$ = 0 V; $T_{VJ}$ = 25°C | | 2.3 | 2.6 | V |
| | $T_{VJ}$ = 125°C | | 1.7 | | V |
| $I_{RM}$ | $I_F$ = 120 A; $di_F/dt$ = -750 A/µs; $T_{VJ}$ = 125°C | | 58 | | A |
| $t_{rr}$ | $V_R$ = 600 V; $V_{GE}$ = 0 V | | 190 | | ns |
| $R_{thJC}$ | (per diode) | | | 0.3 | K/W |

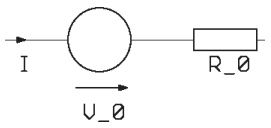
## Module

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

| Symbol | Conditions | Characteristic Values min. | typ. | max. | |
|---|---|---|---|---|---|
| $R_{pin-chip}$ | | | 1.8 | | mΩ |
| $d_S$ | Creepage distance on surface | 10 | | | mm |
| $d_A$ | Strike distance in air | 10 | | | mm |
| $R_{thCH}$ | with heatsink compound | | 0.01 | | K/W |
| **Weight** | | | 300 | | g |

### Equivalent Circuits for Simulation

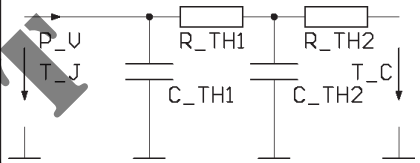
**Conduction**




IGBT (typ. at $V_{GE}$ = 15 V; $T_J$ = 125°C)
*$V_0$ = 0.95 V; $R_0$ = 14 mΩ*

Free Wheeling Diode (typ. at $T_J$ = 125°C)
*$V_0$ = 1.27V; $R_0$ = 4.3 mΩ*

**Thermal Response**

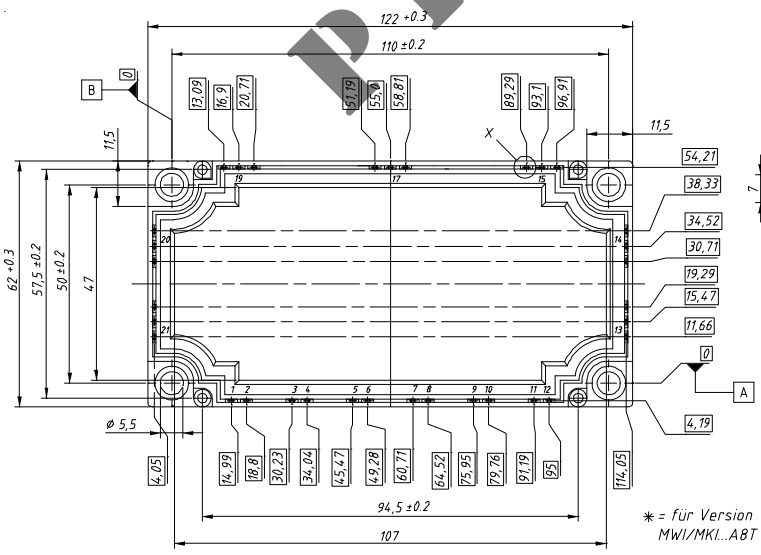



IGBT (typ.)
*$C_{th1}$ = 0.389 J/K; $R_{th1}$ = 0.139 K/W*
*$C_{th2}$ = 2.154 J/K; $R_{th2}$ = 0.051 K/W*

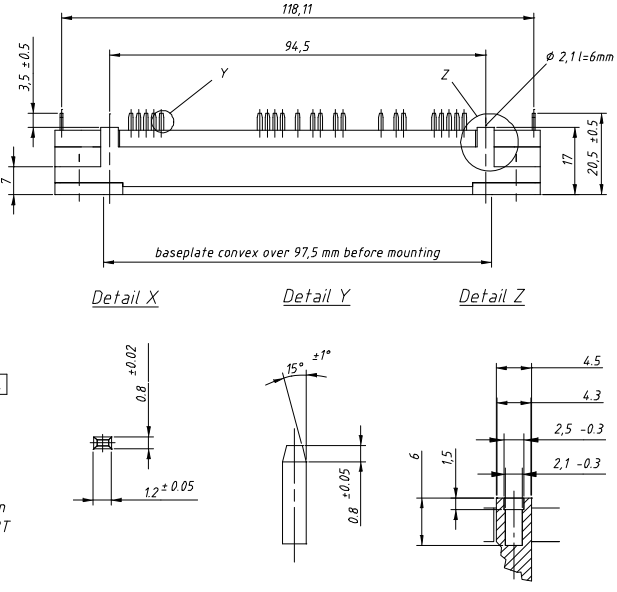
Free Wheeling Diode (typ.)
*$C_{th1}$ = 0.301 J/K; $R_{th1}$ = 0.24 K/W*
*$C_{th2}$ = 2.005 J/K; $R_{th2}$ = 0.062 K/W*



**Dimensions in mm (1 mm = 0.0394")**




pins 5, 6, 7, 8 and 17 for MWI only



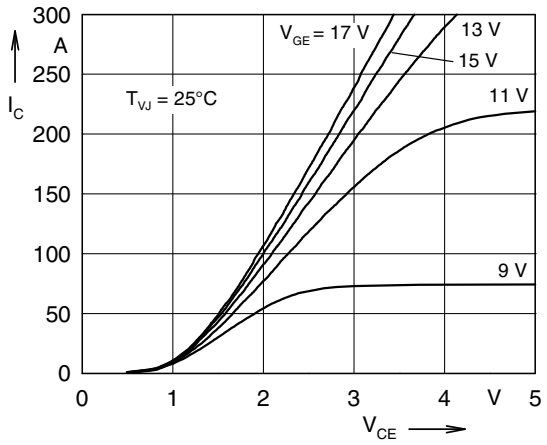



Fig. 1 Typ. output characteristics

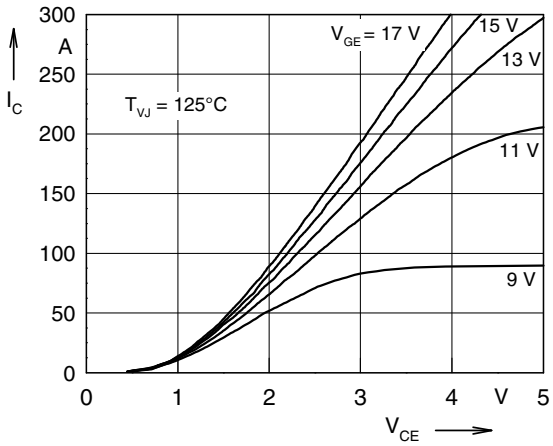



Fig. 2 Typ. output characteristics

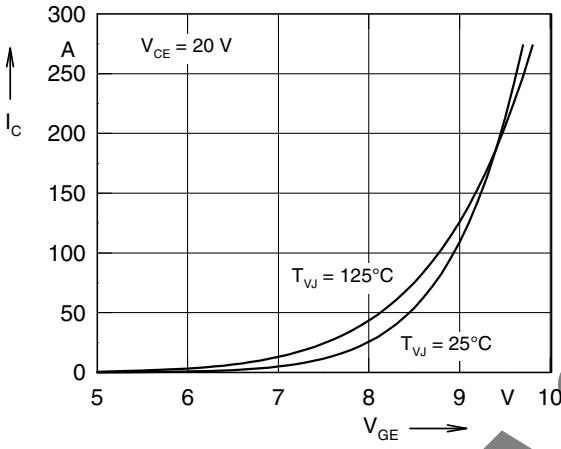



Fig. 3 Typ. transfer characteristics

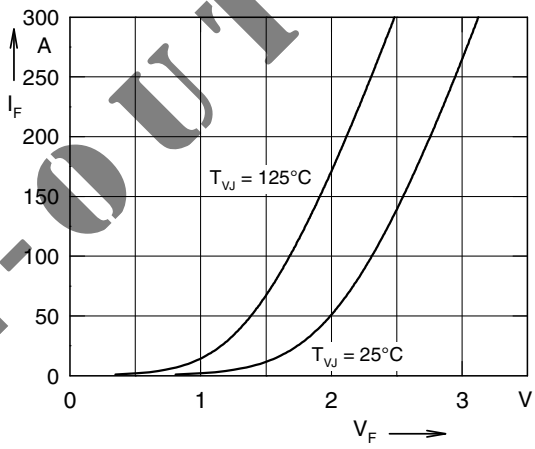



Fig. 4 Typ. forward characteristics of free wheeling diode

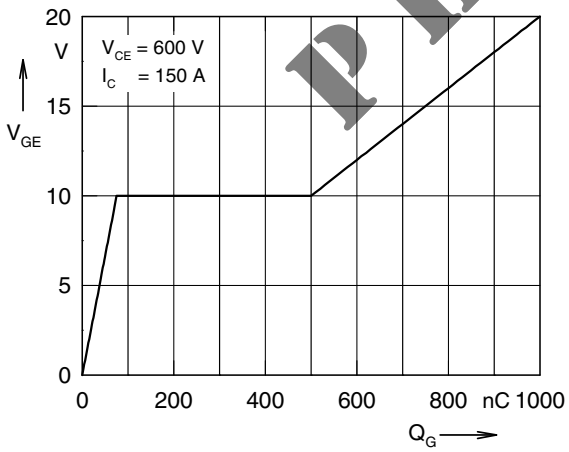



Fig. 5 Typ. turn on gate charge

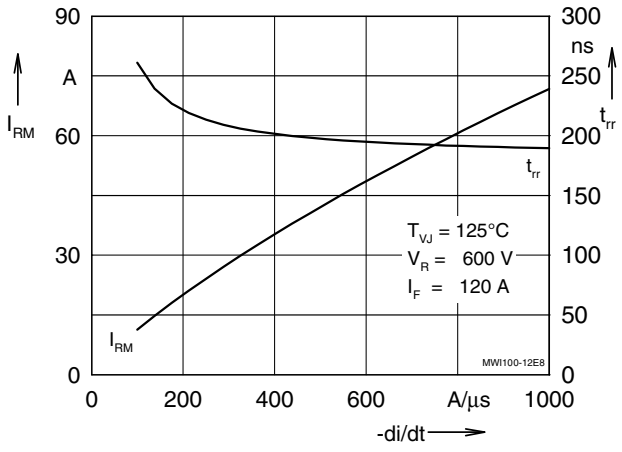



Fig. 6 Typ. turn off characteristics of free wheeling diode

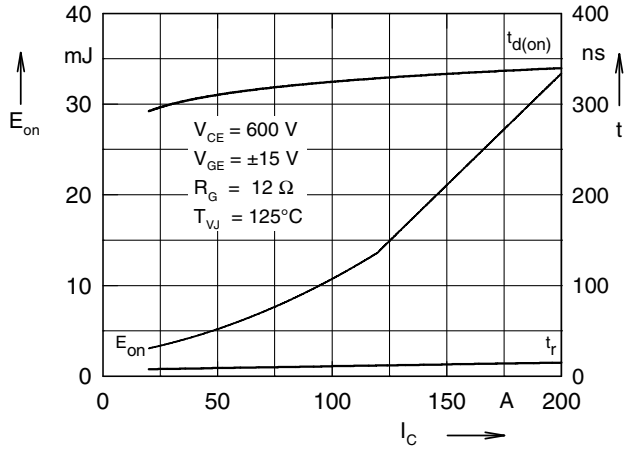



Fig. 7 Typ. turn on energy and switching times versus collector current

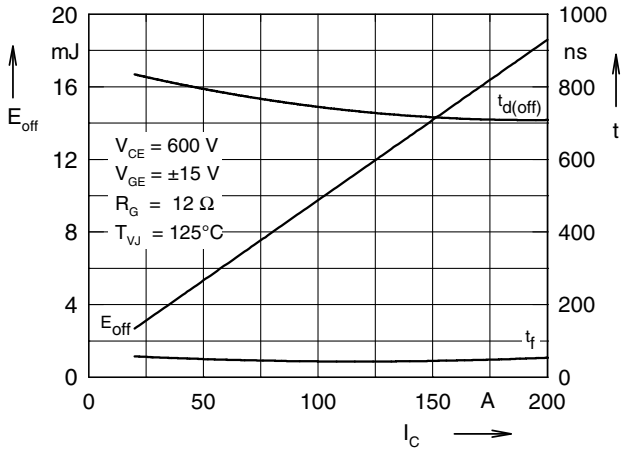



Fig. 8 Typ. turn off energy and switching times versus collector current

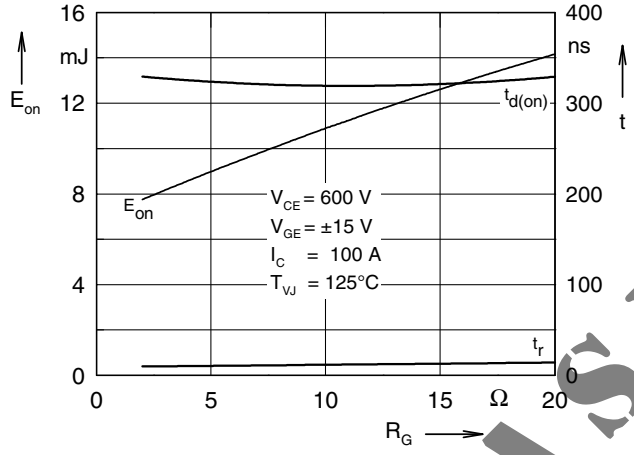



Fig. 9 Typ. turn on energy and switching times versus gate resistor

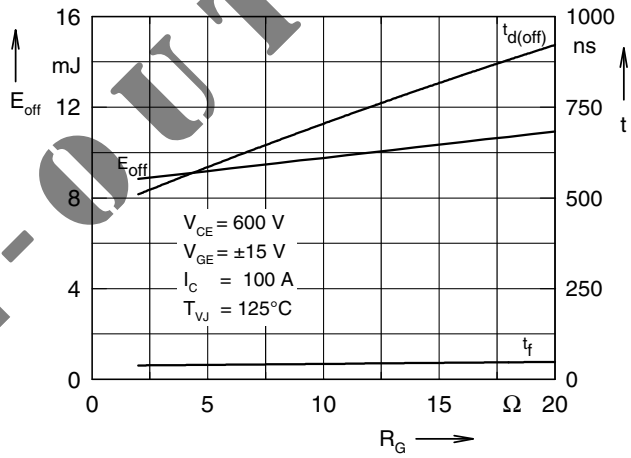



Fig.10 Typ. turn off energy and switching times versus gate resistor

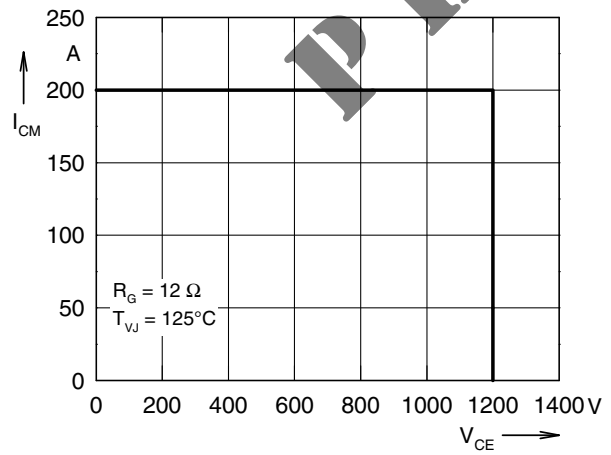



Fig. 11 Reverse biased safe operating area RBSOA

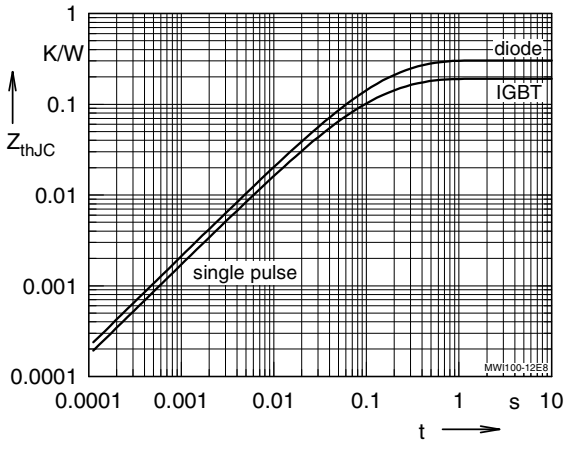



Fig. 12 Typ. transient thermal impedance