

# IGBT Module

## Sixpack

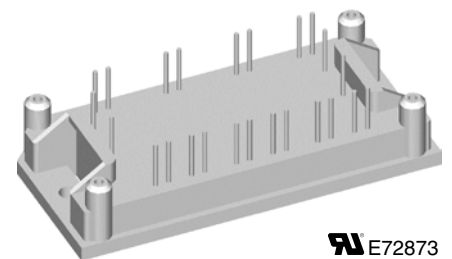
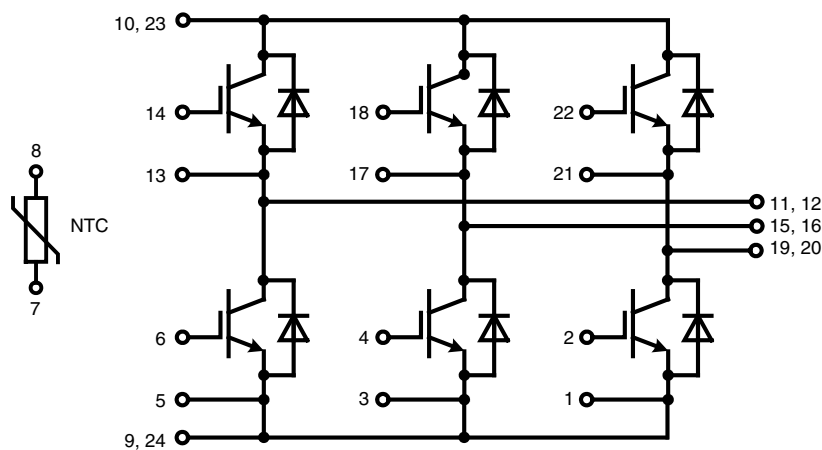
Short Circuit SOA Capability  
Square RBSOA

$$\begin{aligned} I_{C25} &= 80 \text{ A} \\ V_{CES} &= 1200 \text{ V} \\ V_{CE(sat) \text{ typ.}} &= 2.0 \text{ V} \end{aligned}$$

Preliminary data

**Part name** (Marking on product)

MWI 80-12T6K



**E72873**

Pin configuration see outlines.

### Features:

- Trench 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

### Application:

- AC drives
- UPS
- Welding

### Package:

- UL registered
- Industry standard E1-pack

**IGBTs**

| Symbol              | Definitions                           | Conditions                                                                                                                                      | min.                                                            | Ratings                                                         |            |     | Unit          |
|---------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|------------|-----|---------------|
|                     |                                       |                                                                                                                                                 |                                                                 | typ.                                                            | max.       |     |               |
| $V_{CES}$           | collector emitter voltage             | $T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$                                                                                          |                                                                 |                                                                 | 1200       |     | V             |
| $V_{GES}$           | max. DC gate voltage                  | continuous                                                                                                                                      |                                                                 |                                                                 | $\pm 20$   |     | V             |
| $V_{GEM}$           | max. transient collector gate voltage | transient                                                                                                                                       |                                                                 |                                                                 | $\pm 30$   |     | V             |
| $I_{C25}$           | collector current                     | $T_C = 25^{\circ}\text{C}$                                                                                                                      |                                                                 |                                                                 | 80         |     | A             |
| $I_{C80}$           |                                       | $T_C = 80^{\circ}\text{C}$                                                                                                                      |                                                                 |                                                                 | 56         |     | A             |
| $P_{tot}$           | total power dissipation               | $T_C = 25^{\circ}\text{C}$                                                                                                                      |                                                                 |                                                                 | 270        |     | W             |
| $V_{CE(sat)}$       | collector emitter saturation voltage  | $I_C = 50\text{ A}; V_{GE} = 15\text{ V}$                                                                                                       |                                                                 | $T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$ | 2.0<br>2.3 | 2.4 | V<br>V        |
| $V_{GE(th)}$        | gate emitter threshold voltage        | $I_C = 2\text{ mA}; V_{GE} = V_{CE}$                                                                                                            | $T_{VJ} = 25^{\circ}\text{C}$                                   | 4.5                                                             |            | 6.5 | V             |
| $I_{CES}$           | collector emitter leakage current     | $V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$                                                                                                         | $T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$ |                                                                 | 0.8        | 1   | mA<br>mA      |
| $I_{GES}$           | gate emitter leakage current          | $V_{CE} = 0\text{ V}; V_{GE} = \pm 20\text{ V}$                                                                                                 |                                                                 |                                                                 |            | 400 | nA            |
| $C_{ies}$           | input capacitance                     | $V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$                                                                                   |                                                                 | 3600                                                            |            |     | pF            |
| $Q_{G(on)}$         | total gate charge                     | $V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 50\text{ A}$                                                                                |                                                                 | 470                                                             |            |     | nC            |
| $t_{d(on)}$         | turn-on delay time                    | inductive load<br>$V_{CE} = 600\text{ V}; I_C = 50\text{ A}$<br>$V_{GE} = \pm 15\text{ V}; R_G = 18\ \Omega$                                    | $T_{VJ} = 125^{\circ}\text{C}$                                  | 90                                                              |            |     | ns            |
| $t_r$               | current rise time                     |                                                                                                                                                 |                                                                 | 50                                                              |            |     | ns            |
| $t_{d(off)}$        | turn-off delay time                   |                                                                                                                                                 |                                                                 | 520                                                             |            |     | ns            |
| $t_f$               | current fall time                     |                                                                                                                                                 |                                                                 | 90                                                              |            |     | ns            |
| $E_{on}$            | turn-on energy per pulse              |                                                                                                                                                 |                                                                 | 5                                                               |            |     | mJ            |
| $E_{off}$           | turn-off energy per pulse             |                                                                                                                                                 |                                                                 | 6.5                                                             |            |     | mJ            |
| $I_{CM}$            | reverse bias safe operating area      | RBSOA; $V_{GE} = \pm 15\text{ V}; R_G = 18\ \Omega$<br>$L = 100\ \mu\text{H}$ ; clamped induct. load<br>$V_{CEmax} = V_{CES} - L_S \cdot di/dt$ | $T_{VJ} = 125^{\circ}\text{C}$                                  | 100                                                             |            |     | A             |
| $t_{SC}$<br>(SCSOA) | short circuit safe operating area     | $V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V}; R_G = 18\ \Omega$ ; non-repetitive                                                            | $T_{VJ} = 125^{\circ}\text{C}$                                  | 10                                                              |            |     | $\mu\text{s}$ |
| $R_{thJC}$          | thermal resistance junction to case   | (per IGBT)                                                                                                                                      |                                                                 |                                                                 | 0.46       |     | K/W           |
| $R_{thCH}$          | thermal resistance case to heatsink   | (per IGBT)                                                                                                                                      |                                                                 | 0.2                                                             |            |     | K/W           |

**Diodes**

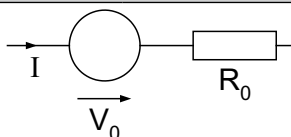
| Symbol     | Definitions                         | Conditions                                                                       | Maximum Ratings                                                 |            |      |        |
|------------|-------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------|------------|------|--------|
| $V_{RRM}$  | max. repetitive reverse voltage     |                                                                                  |                                                                 |            | 1200 | V      |
| $I_{F25}$  | forward current                     | $T_C = 25^{\circ}\text{C}$                                                       |                                                                 |            | 80   | A      |
| $I_{F80}$  |                                     | $T_C = 80^{\circ}\text{C}$                                                       |                                                                 |            | 51   | A      |
| Symbol     | Conditions                          | Characteristic Values                                                            |                                                                 |            |      |        |
|            |                                     |                                                                                  | min.                                                            | typ.       | max. |        |
| $V_F$      | forward voltage                     | $I_F = 50\text{ A}$                                                              | $T_{VJ} = 25^{\circ}\text{C}$<br>$T_{VJ} = 125^{\circ}\text{C}$ | 2.3<br>1.6 | 2.6  | V<br>V |
| $I_{RM}$   | max. reverse recovery current       | $V_R = 600\text{ V}; I_F = 50\text{ A}$<br>$di_F/dt = -600\text{ A}/\mu\text{s}$ | $T_{VJ} = 100^{\circ}\text{C}$                                  | 35         |      | A      |
| $t_{rr}$   | reverse recovery time               |                                                                                  |                                                                 | 200        |      | ns     |
| $R_{thJC}$ | thermal resistance junction to case | (per diode)                                                                      | $T_{VJ} = 25^{\circ}\text{C}$                                   |            | 0.65 | K/W    |
| $R_{thCH}$ | thermal resistance case to heatsink | (per diode)                                                                      |                                                                 | 0.25       |      | K/W    |

**Temperature Sensor NTC**

| Symbol                  | Definitions | Conditions                 | Ratings |             |      |                       |
|-------------------------|-------------|----------------------------|---------|-------------|------|-----------------------|
|                         |             |                            | min.    | typ.        | max. | Unit                  |
| $R_{25}$<br>$B_{25/85}$ | resistance  | $T_C = 25^{\circ}\text{C}$ | 4.45    | 4.7<br>3510 | 5.0  | $\text{k}\Omega$<br>K |

**Module**

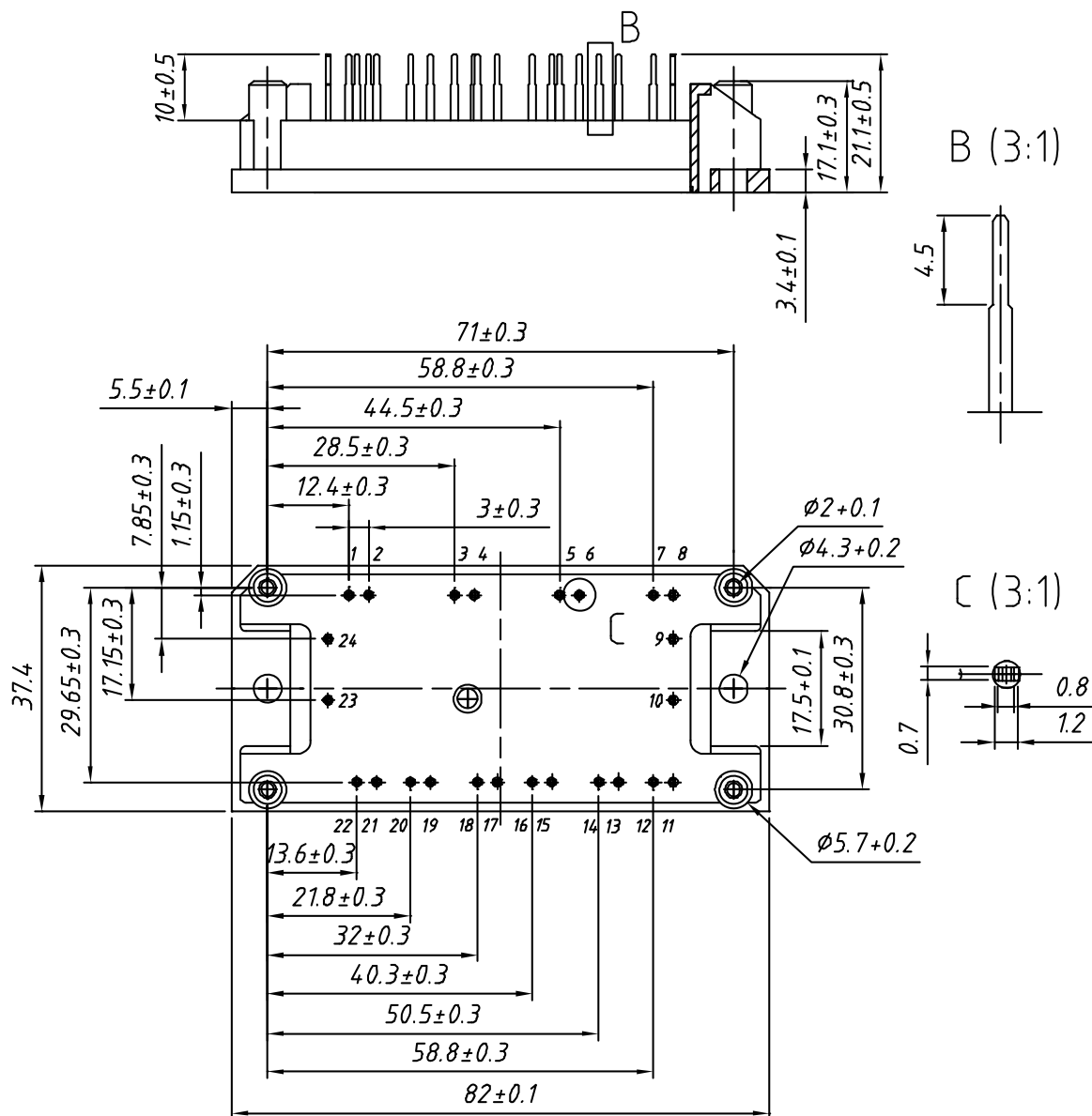
| Symbol     | Definitions                       | Conditions                                     | Ratings |      |      |                    |
|------------|-----------------------------------|------------------------------------------------|---------|------|------|--------------------|
|            |                                   |                                                | min.    | typ. | max. | Unit               |
| $T_{VJ}$   | operating temperature             |                                                | -40     |      | 125  | $^{\circ}\text{C}$ |
| $T_{VJM}$  | max. virtual junction temperature |                                                |         |      | 150  | $^{\circ}\text{C}$ |
| $T_{stg}$  | storage temperature               |                                                | -40     |      | 125  | $^{\circ}\text{C}$ |
| $V_{ISOL}$ | isolation voltage                 | $I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$ |         |      | 2500 | V~                 |
| $M_d$      | mounting torque                   | (M4)                                           | 2.0     |      | 2.2  | Nm                 |
| $d_s$      | creep distance on surface         |                                                | 12.7    |      |      | mm                 |
| $d_A$      | strike distance through air       |                                                | 12.7    |      |      | mm                 |
| Weight     |                                   |                                                |         | 40   |      | g                  |

**Equivalent Circuits for Simulation**

**Ratings**

| Symbol         | Definitions         | Conditions                     | min. | typ.       | max. | Unit                  |
|----------------|---------------------|--------------------------------|------|------------|------|-----------------------|
| $V_0$<br>$R_0$ | IGBT                | $T_{VJ} = 125^{\circ}\text{C}$ |      | tbd<br>tbd |      | V<br>$\text{m}\Omega$ |
| $V_0$<br>$R_0$ | free wheeling diode | $T_{VJ} = 125^{\circ}\text{C}$ |      | 1.5<br>6   |      | V<br>$\text{m}\Omega$ |

## Outline Drawing

Dimensions in mm (1 mm = 0.0394")



## Product Marking

| Ordering | Part Name    | Marking on Product | Delivering Mode | Base Qty | Ordering Code |
|----------|--------------|--------------------|-----------------|----------|---------------|
| Standard | MWI 80-12T6K | MWI80-12T6K        | Box             | 10       | 500 159       |

# AMEYA360

Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit [www.ameya360.com](http://www.ameya360.com)

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd  
Minhang District, Shanghai , China

➤ Sales :

Direct      +86 (21) 6401-6692  
Email        amall@ameya360.com  
QQ            800077892  
Skype        ameyasales1 ameyasales2

➤ Customer Service :

Email        service@ameya360.com

➤ Partnership :

Tel            +86 (21) 64016692-8333  
Email        mkt@ameya360.com