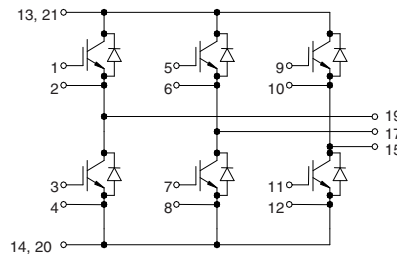


# IGBT Modules

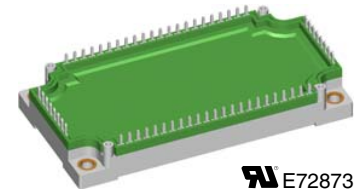
## Sixpack

Short Circuit SOA Capability  
Square RBSOA

Preliminary data



$I_{C25} = 170 \text{ A}$   
 $V_{CES} = 600 \text{ V}$   
 $V_{CE(sat) \text{ typ.}} = 2.0 \text{ V}$



**E72873**

See outline drawing for pin arrangement

IGBTs			
Symbol	Conditions	Maximum Ratings	
$V_{CES}$	$T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{GES}$		$\pm 20$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	170	A
$I_{C80}$	$T_C = 80^\circ\text{C}$	115	A
<b>RBSOA</b>	$V_{GE} = \pm 15 \text{ V}; R_G = 1.5 \Omega; T_{VJ} = 125^\circ\text{C}$ Clamped inductive load; $L = 100 \mu\text{H}$	$I_{CM} = 300$ $V_{CEK} \leq V_{CES}$	A
<b>t<sub>SC</sub></b> <b>(SCSOA)</b>	$V_{CE} = V_{CES}; V_{GE} = \pm 15 \text{ V}; R_G = 1.5 \Omega; T_{VJ} = 125^\circ\text{C}$ non-repetitive	10	$\mu\text{s}$
<b>P<sub>tot</sub></b>	$T_C = 25^\circ\text{C}$	515	W

### Features

- €NPT IGBT technology
- €low saturation voltage
- €low switching losses
- €switching frequency up to 30 kHz
- €square RBSOA, no latch up
- €high short circuit capability
- €positive temperature coefficient for easy paralleling
- €MOS input, voltage controlled
- €ultra fast free wheeling diodes
- €solderable pins for PCB mounting
- €package with copper base plate

### Advantages

- €space savings
- €reduced protection circuits
- €package designed for wave soldering

### Typical Applications

- €AC motor control
- €AC servo and robot drives
- €power supplies

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 150 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.0 2.3	V V
$V_{GE(th)}$	$I_C = 3 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
$I_{CES}$	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		1.1	1.5 mA mA
$I_{GES}$	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			400 nA
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	Inductive load, $T_{VJ} = 125^\circ\text{C}$ $V_{CE} = 300 \text{ V}; I_C = 150 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 1.5 \Omega$		125	ns
			30	ns
			225	ns
			35	ns
			2.3	mJ
			4.6	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		6.5	nF
$Q_{Gon}$	$V_{CE} = 300 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 150 \text{ A}$		520	nC
$R_{thJC}$	(per IGBT)			0.24 K/W

### Diodes

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	210	A
$I_{F80}$	$T_C = 80^\circ\text{C}$	130	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 150\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	1.9	2.0	V
$I_{RM}$ $t_{tr}$	$I_F = 150\text{ A}; di_F/dt = -750\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V}$	37		A
		100		ns
$R_{thJC}$	(per diode)			0.41 K/W

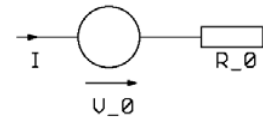
### Module

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$	operating	-40...+125	$^\circ\text{C}$
$T_{JM}$		+150	$^\circ\text{C}$
$T_{sig}$		-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.
$R_{pin-chip}$			1.8	m $\Omega$
$d_S$	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

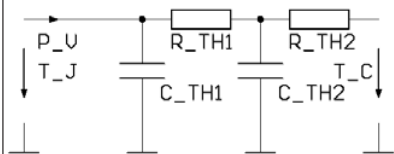
#### Conduction



IGBT (typ. at  $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.1\text{ V}; R_0 = 8\text{ m}\Omega$

Free Wheeling Diode (typ. at  $T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.1\text{ V}; R_0 = 2.25\text{ m}\Omega$

#### Thermal Response



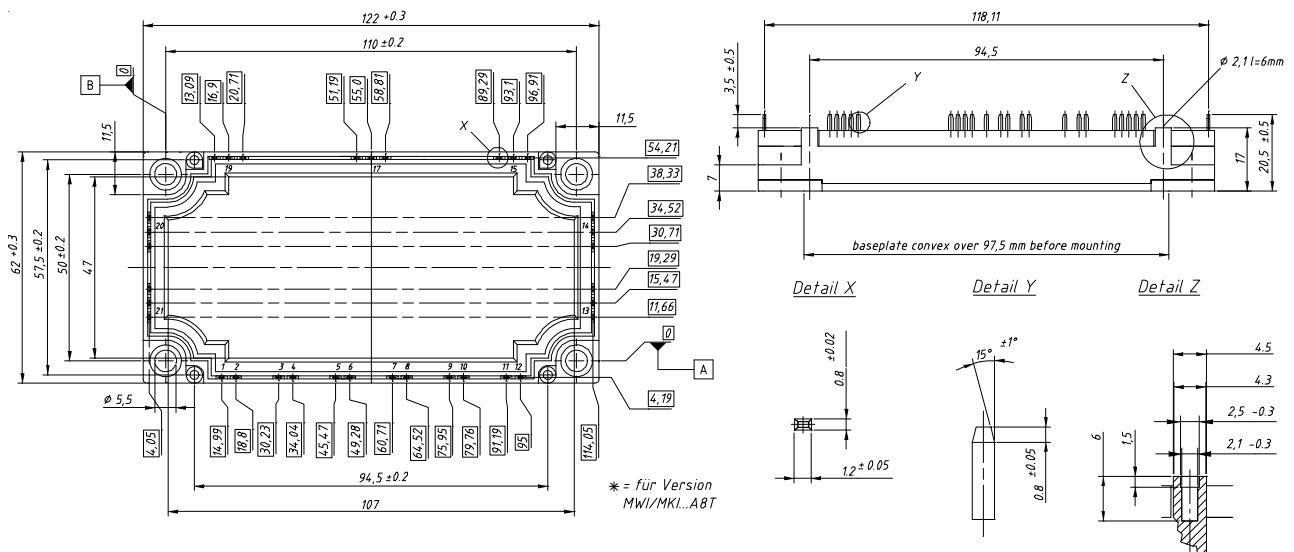
IGBT (typ.)

$C_{th1} = 0.295\text{ J/K}; R_{th1} = 0.176\text{ K/W}$   
 $C_{th2} = 1.750\text{ J/K}; R_{th2} = 0.064\text{ K/W}$

Free Wheeling Diode (typ.)

$C_{th1} = 0.21\text{ J/K}; R_{th1} = 0.317\text{ K/W}$   
 $C_{th2} = 1.28\text{ J/K}; R_{th2} = 0.093\text{ K/W}$

Dimensions in mm (1 mm = 0.0394")



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

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