

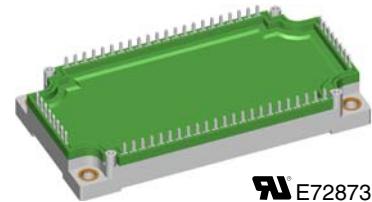
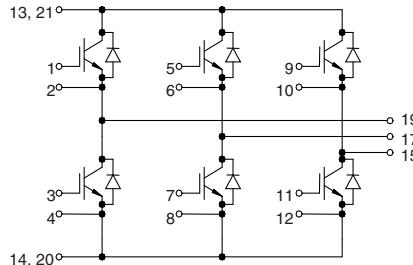
# IGBT Modules

## Sixpack

Short Circuit SOA Capability  
Square RBSOA

Preliminary data

$I_{C25}$  = 130 A  
 $V_{CES}$  = 600 V  
 $V_{CE(sat)}$  typ. = 2.0 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
$I_{C25}$	$T_C = 25^\circ\text{C}$	130		A
$I_{C80}$	$T_C = 80^\circ\text{C}$	88		A
<b>RBSOA</b>	$V_{GE} = \pm 15 \text{ V}$ ; $R_G = 2.2 \Omega$ ; $T_{VJ} = 125^\circ\text{C}$ Clamped inductive load; $L = 100 \mu\text{H}$	$I_{CM} = 200$ $V_{CEK} \leq V_{CES}$		A
$t_{sc}$ (SCSOA)	$V_{CE} = V_{CES}$ ; $V_{GE} = \pm 15 \text{ V}$ ; $R_G = 2.2 \Omega$ ; $T_{VJ} = 125^\circ\text{C}$ non-repetitive	10		$\mu\text{s}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	410		W

Symbol	Conditions	Characteristic Values		
		( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)	min.	typ.
$V_{CE(sat)}$	$I_C = 100 \text{ A}$ ; $V_{GE} = 15 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.0	2.5
			2.3	V
$V_{GE(th)}$	$I_C = 1.5 \text{ mA}$ ; $V_{GE} = V_{CE}$	4.5		6.5
$I_{CES}$	$V_{CE} = V_{CES}$ ; $V_{GE} = 0 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		0.9	1.2
$I_{GES}$	$V_{CE} = 0 \text{ V}$ ; $V_{GE} = \pm 20 \text{ V}$		400	nA
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	{ Inductive load, $T_{VJ} = 125^\circ\text{C}$ $V_{CE} = 300 \text{ V}$ ; $I_C = 100 \text{ A}$ $V_{GE} = \pm 15 \text{ V}$ ; $R_G = 2.2 \Omega$		25 11 150 30 1.0 2.9	ns ns ns ns mJ mJ
$C_{ies}$ $Q_{Gon}$	$V_{CE} = 25 \text{ V}$ ; $V_{GE} = 0 \text{ V}$ ; $f = 1 \text{ MHz}$ $V_{CE} = 300 \text{ V}$ ; $V_{GE} = 15 \text{ V}$ ; $I_C = 125 \text{ A}$		4.3 340	nF nC
$R_{thJC}$	(per IGBT)		0.3	K/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 parallelling
- €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

Djodes

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_c = 25^\circ\text{C}$	140	A
$I_{F80}$	$T_c = 80^\circ\text{C}$	88	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 100 \text{ A}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	1.9	2.1	V
		1.4		V
$I_{RM}$	$I_F = 60 \text{ A}; di_F/dt = -500 \text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$	28		A
$t_{rr}$	$V_R = 300 \text{ V}; V_{GE} = 0 \text{ V}$	100		ns
$R_{thJC}$	(per diode)	0.61	K/W	

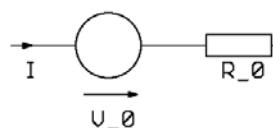
## Module

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

Symbol		Characteristic Values		
		min.	typ.	max.
$R_{\text{pin-chip}}$		1.8		$\text{m}\Omega$
$d_s$	Creepage distance on surface	10		mm
$d_A$	Strike distance in air	10		mm
$R_{\text{thCH}}$	with heatsink compound	0.01		K/W
Weight		300		g

## Equivalent Circuits for Simulation

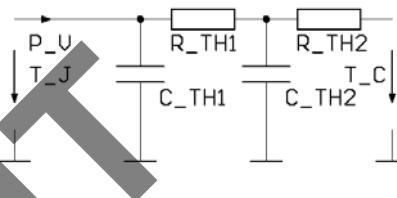
## Conduction



IGBT (typ. at  $V_{GE} = 15$  V;  $T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.1$  V;  $R_0 = 12$  mΩ

Free Wheeling Diode (typ. at  $T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.15 \text{ V}; R_0 = 2.5 \text{ m}\Omega$

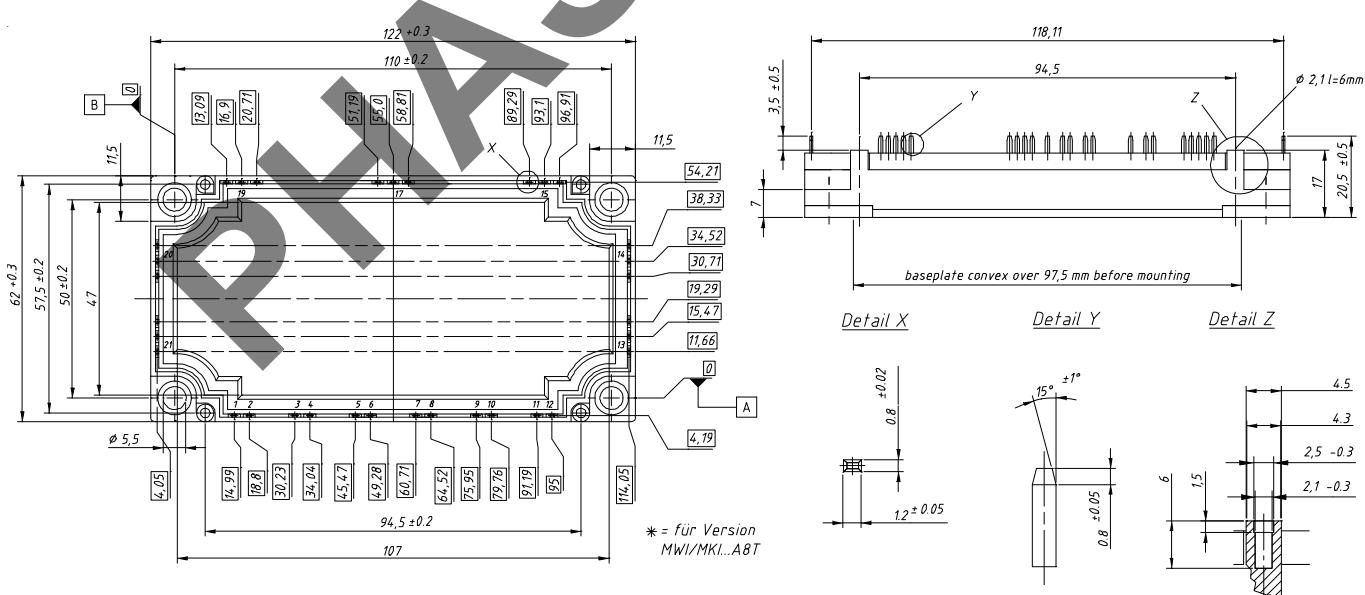
## Thermal Response



$$IGBT \text{ (typ.)} \\ C_{th1} = 0.232 \text{ J/K}; R_{th1} = 0.223 \text{ K/W}$$

$$\text{Free Wheeling Diode (typ.)}$$

Dimensions in mm (1 mm = 0.0394")



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

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