

# IGBT Module

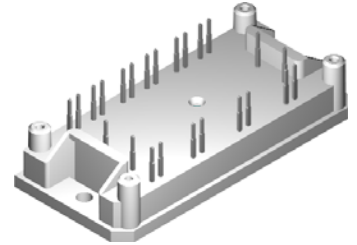
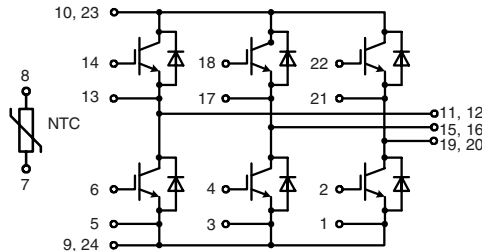
## Sixpack

Short Circuit SOA Capability  
Square RBSOA

$$I_{C25} = 51 \text{ A}$$

$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 2.4 \text{ V}$$



### IGBTs

Symbol	Conditions	Maximum Ratings	
$V_{CES}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V
$V_{GES}$		$\pm 20$	V
$I_{C25}$	$T_C = 25^{\circ}\text{C}$	51	A
$I_{C80}$	$T_C = 80^{\circ}\text{C}$	36	A
$I_{CM}$	$V_{GE} = \pm 15 \text{ V}; R_G = 39 \Omega; T_{VJ} = 125^{\circ}\text{C}$	70	A
$V_{CEK}$	RBSOA; clamped inductive load; $L = 100 \mu\text{H}$	$V_{CES}$	
$t_{SC}$	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 39 \Omega; T_{VJ} = 125^{\circ}\text{C}$ SCSOA; non-repetitive	10	$\mu\text{s}$
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	210	W

### Features

- NPT<sup>3</sup> 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

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 35 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.4	2.9	V
		2.8		V
$V_{GE(th)}$	$I_C = 1 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
$I_{CES}$	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.2		0.3 mA mA
$I_{GES}$	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			200 nA
$t_{d(on)}$	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 35 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 39 \Omega$		90	ns
$t_r$			50	ns
$t_{d(off)}$			440	ns
$t_f$			50	ns
$E_{on}$			5.4	mJ
$E_{off}$			2.6	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$	2000		pF
$Q_{Gon}$	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 35 \text{ A}$	150		nC
$R_{thJC}$	(per IGBT)			0.6 K/W
$R_{thCH}$		0.2		K/W

### Typical Applications

- AC drives
- power supplies with power factor correction

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

### Diodes

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	49	A
$I_{F80}$	$T_C = 80^\circ\text{C}$	32	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 35\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.6	2.9	V
$I_{RM}$ $t_{rr}$	$I_F = 35\text{ A}; di_F/dt = -600\text{ A}/\mu\text{s}; T_{VJ} = 100^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$	35		A
		150		ns
$R_{thJC}$ $R_{thCH}$	(per Diode)	0.3	0.9	K/W K/W

### Temperature Sensor NTC

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{25}$ $B_{25/85}$	$T = 25^\circ\text{C}$	4.45	4.7	5.0 kΩ K

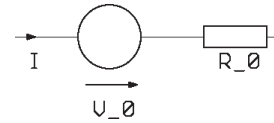
### Module

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$	operating	-40...+125	°C
$T_{VJM}$		-40...+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 (M4)	2.0 - 2.2	Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$d_s$ $d_A$	Creepage distance on surface Strike distance in air	12.7		mm mm
Weight		40		g

### Equivalent Circuits for Simulation

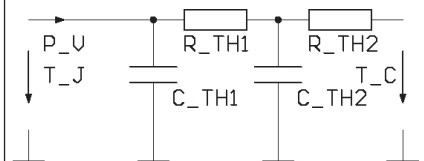
#### Conduction



IGBT (typ. at  $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$ )  
 $V_o = 1.0\text{ V}; R_o = 44\text{ m}\Omega$

Free Wheeling Diode (typ. at  $T_J = 125^\circ\text{C}$ )  
 $V_o = 1.5\text{ V}; R_o = 14\text{ m}\Omega$

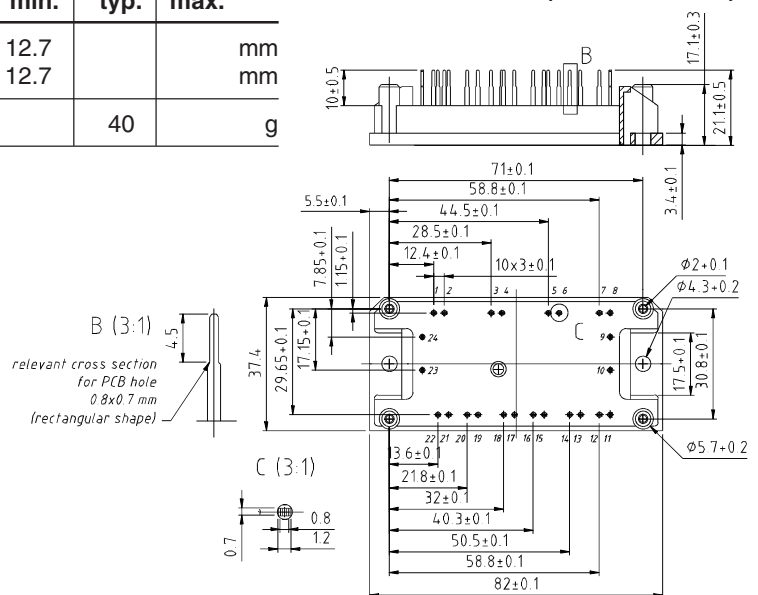
#### Thermal Response



IGBT (typ.)  
 $C_{th1} = tbd\text{ J/K}; R_{th1} = tbd\text{ K/W}$   
 $C_{th2} = tbd\text{ J/K}; R_{th2} = tbd\text{ K/W}$

Free Wheeling Diode (typ.)  
 $C_{th1} = tbd\text{ J/K}; R_{th1} = tbd\text{ K/W}$   
 $C_{th2} = tbd\text{ J/K}; R_{th2} = tbd\text{ K/W}$

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



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