

# IGBT Module

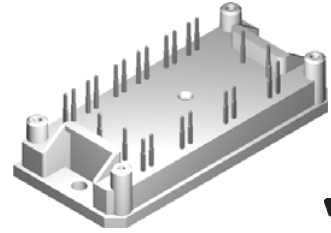
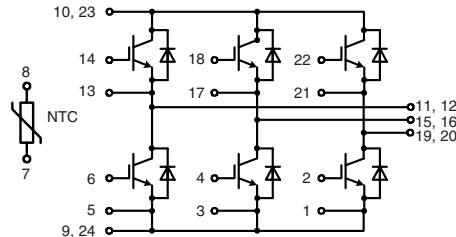
## Sixpack

Square RBSOA

$$I_{C25} = 60 \text{ A}$$

$$V_{CES} = 600 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 2.3 \text{ V}$$



### 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
$I_{C25}$	$T_C = 25^{\circ}\text{C}$	60	A
$I_{C80}$	$T_C = 80^{\circ}\text{C}$	41	A
$I_{CM}$	$V_{GE} = \pm 15 \text{ V}; R_G = 10 \Omega; T_{VJ} = 125^{\circ}\text{C}$	80	A
$V_{CEK}$	RBSOA; clamped inductive load; $L = 100 \mu\text{H}$	$V_{CES}$	
$P_{tot}$	$T_C = 25^{\circ}\text{C}$	180	W

### Features

- IGBTs
  - low saturation voltage
  - 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
- UL registered E72873

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 30 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.3 2.0	V V
$V_{GE(th)}$	$I_C = 0.25 \text{ mA}; V_{GE} = V_{CE}$	3		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	0.2 mA mA
$I_{GES}$	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			100 nA
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 400 \text{ V}; I_C = 30 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 3 \Omega$		20 20 130 80 0.6 0.5	ns ns ns ns mJ mJ
$C_{ies}$		$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$	2500	pF
$Q_{Gon}$		$V_{CE} = 300 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 30 \text{ A}$	95	nC
$R_{thJC}$ $R_{thCH}$		(per IGBT)	0.25	0.7 K/W K/W

### Typical Applications

- AC drives

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### Diodes

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	48	A
$I_{F80}$	$T_C = 80^\circ\text{C}$	33	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 30\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.2	2.6	V
$I_{RM}$ $t_{tr}$	$I_F = 30\text{ A}; di_F/dt = -400\text{ A}/\mu\text{s}; T_{VJ} = 100^\circ\text{C}$ $V_R = 300\text{ V}; V_{GE} = 0\text{ V}$	5		A
		65		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 k $\Omega$ K

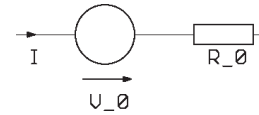
### Module

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$ $T_{VJM}$ $T_{stg}$	operating	-40...+125	$^\circ\text{C}$
		-40...+150	$^\circ\text{C}$
		-40...+125	$^\circ\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	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

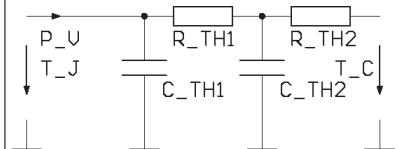
#### Conduction



IGBT (typ. at  $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.1\text{ V}; R_0 = 21.5\text{ m}\Omega$

Free Wheeling Diode (typ. at  $T_J = 125^\circ\text{C}$ )  
 $V_0 = 1.20\text{ V}; R_0 = 19\text{ m}\Omega$

#### Thermal Response



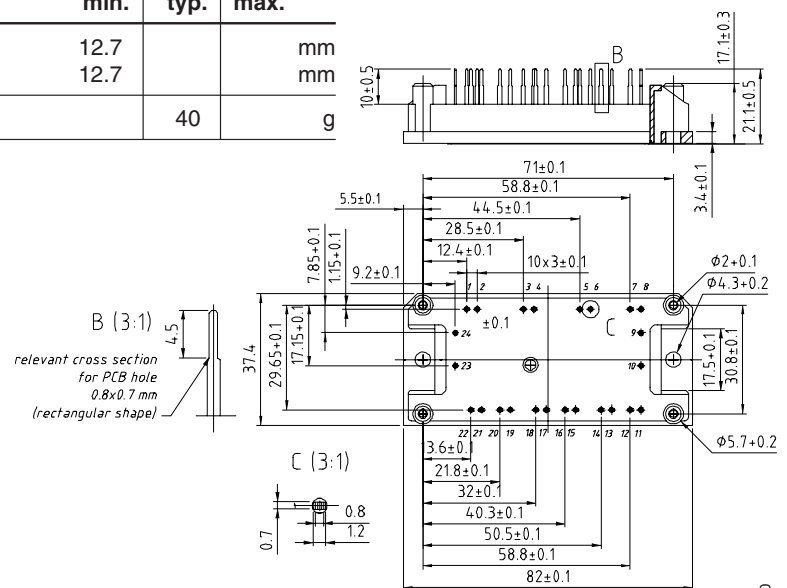
IGBT (typ.)

$C_{th1} = tbd\text{ J/K}; R_{th1} = tbd\text{ K/W}$   
 $C_{th2} = tbd\text{ J/K}; R_{th2} = tbd\text{ K/W}$

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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