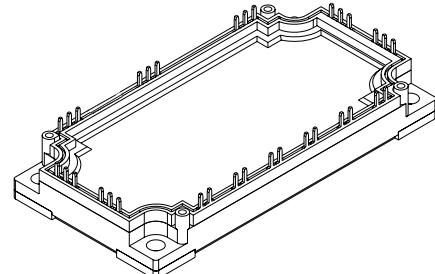
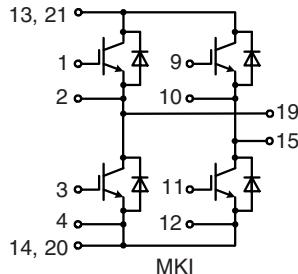


# IGBT Modules

## H Bridge

Short Circuit SOA Capability  
Square RBSOA

$I_{C25}$  = 125 A  
 $V_{CES}$  = 1200 V  
 $V_{CE(sat)\text{typ.}}$  = 3.3 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
$I_{C25}$	$T_C = 25^\circ\text{C}$	125		A
$I_{C80}$	$T_C = 80^\circ\text{C}$	85		A
$I_{CM}$	$V_{GE} = \pm 15 \text{ V}$ ; $R_G = 5.6 \Omega$ ; $T_{VJ} = 125^\circ\text{C}$	200		A
$V_{CEK}$	RBSOA; clamped inductive load; $L = 100 \mu\text{H}$		$V_{CES}$	
$t_{sc}$	$V_{CE} = 900 \text{ V}$ ; $V_{GE} = \pm 15 \text{ V}$ ; $R_G = 5.6 \Omega$ ; $T_{VJ} = 125^\circ\text{C}$ SCSOA; non-repetitive	10		$\mu\text{s}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	640		W

Symbol	Conditions	Characteristic Values		
		( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 100 \text{ A}$ ; $V_{GE} = 15 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	3.3 4.0	3.9 V	V
$V_{GE(th)}$	$I_C = 4 \text{ mA}$ ; $V_{GE} = V_{CE}$	4.5	6.5	V
$I_{CES}$	$V_{CE} = V_{CES}$ ; $V_{GE} = 0 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	4.0	1.3 mA mA	
$I_{GES}$	$V_{CE} = 0 \text{ V}$ ; $V_{GE} = \pm 20 \text{ V}$		600	nA
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	$\left. \begin{array}{l} \text{Inductive load, } T_{VJ} = 125^\circ\text{C} \\ V_{CE} = 600 \text{ V}; I_C = 100 \text{ A} \\ V_{GE} = \pm 15 \text{ V}; R_G = 5.6 \Omega \end{array} \right\}$	130 60 365 30 12.0 5.0	ns ns ns ns mJ mJ	
$C_{ies}$		6.5		nF
$Q_{Gon}$		1.1		$\mu\text{C}$
$R_{thJC}$			0.19	K/W

### Features

- Fast NPT 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

### Typical Applications

- motor control
  - . DC motor amature winding
  - . DC motor excitation winding
  - . synchronous motor excitation winding
- supply of transformer primary winding
- . power supplies
- . welding
- . X-ray
- . battery charger

**Diodes**

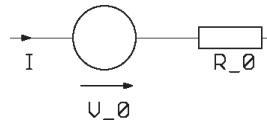
Symbol	Conditions	Maximum Ratings		
I <sub>F25</sub>	T <sub>C</sub> = 25°C	200	A	
I <sub>F80</sub>	T <sub>C</sub> = 80°C	130	A	

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V <sub>F</sub>	I <sub>F</sub> = 100 A; V <sub>GE</sub> = 0 V; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C	2.3 1.7	2.6 V	V
I <sub>RM</sub> t <sub>rr</sub>	I <sub>F</sub> = 120 A; di <sub>F</sub> /dt = -750 A/μs; T <sub>VJ</sub> = 125°C V <sub>R</sub> = 600 V; V <sub>GE</sub> = 0 V	82 200	A ns	
R <sub>thJC</sub>	(per diode)		0.3	K/W

**Module**

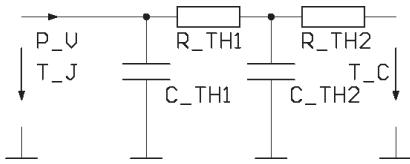
Symbol	Conditions	Maximum Ratings		
T <sub>VJ</sub>	operating	-40...+125	°C	
T <sub>JM</sub>		+150	°C	
T <sub>stg</sub>		-40...+125	°C	
V <sub>ISOL</sub>	I <sub>ISOL</sub> ≤ 1 mA; 50/60 Hz	2500	V~	
M <sub>d</sub>	Mounting torque (M5)	3 - 6	Nm	

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R <sub>pin-chip</sub>		1.8	mΩ	
d <sub>s</sub> d <sub>A</sub>	Creepage distance on surface Strike distance in air	10 10	mm mm	
R <sub>thCH</sub>	with heatsink compound	0.01	K/W	
Weight		300	g	

**Equivalent Circuits for Simulation****Conduction**

IGBT (typ. at V<sub>GE</sub> = 15 V; T<sub>J</sub> = 125°C)  
V<sub>0</sub> = 2.05 V; R<sub>0</sub> = 19.5 mΩ

Free Wheeling Diode (typ. at T<sub>J</sub> = 125°C)  
V<sub>0</sub> = 1.27 V; R<sub>0</sub> = 4.3 mΩ

**Thermal Response**

IGBT (typ.)  
C<sub>th1</sub> = 0.409 J/K; R<sub>th1</sub> = 0.14 K/W  
C<sub>th2</sub> = 2.203 J/K; R<sub>th2</sub> = 0.05 K/W

Free Wheeling Diode (typ.)  
C<sub>th1</sub> = 0.301 J/K; R<sub>th1</sub> = 0.24 K/W  
C<sub>th2</sub> = 2.005 J/K; R<sub>th2</sub> = 0.062 K/W

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