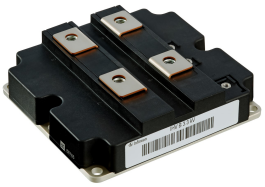
Final datasheet
IHM-B module with Emitter Controlled 4 diode

Features



- Electrical features
  - V_R = 3300 V
  - I_F = 1600 A, I_{FRM} = 3200 A
  - High DC stability
  - Low switching losses
- Mechanical features
  - AlSiC base plate for increased thermal cycling capability
  - Package with CTI > 600
  - IHM B housing
  - Isolated base plate

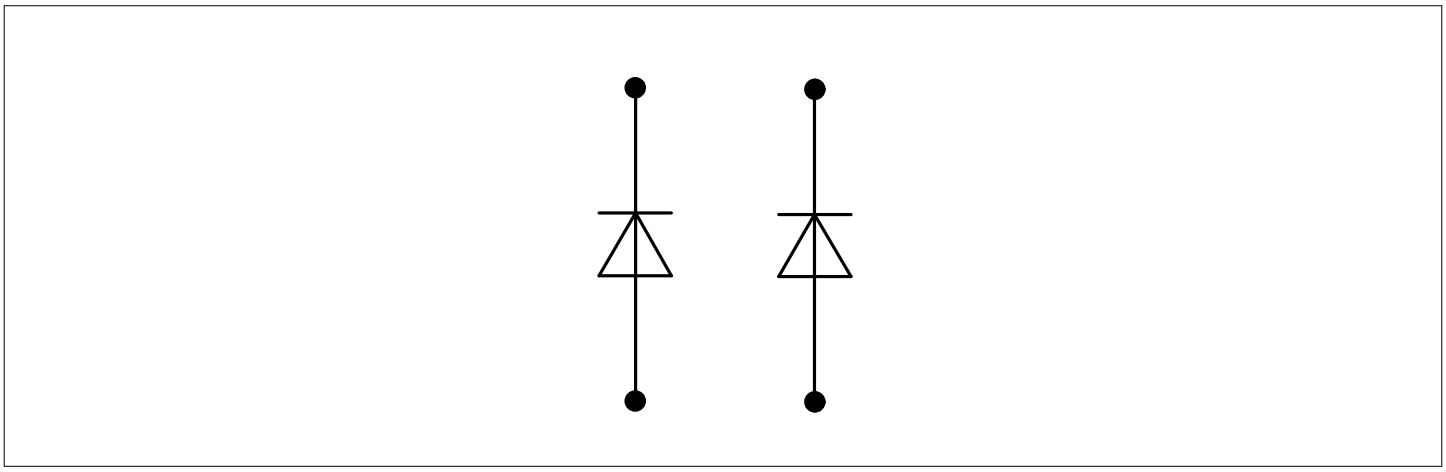
Potential applications

- Medium-voltage converters
- Motor drives
- Traction drives
- UPS systems
- Wind turbines

Product validation

- Qualified for industrial applications according to the relevant tests of IEC 60747, 60749 and 60068

Description



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1 Package

Table 1 Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, t = 1 min	6.0	kV
Partial discharge extinction voltage	V_{isol}	RMS, f = 50 Hz, Q_{PD} 10 pC	2.6	kV
DC stability	$V_{CE(D)}$	T_{vj} = 25 °C, 100 Fit	2100	V
Material of module baseplate			AlSiC	
Creepage distance	$d_{Creep\ nom}$	terminal to baseplate, nom.	32.2	mm
Clearance	$d_{Clear\ nom}$	terminal to baseplate, nom.	19.1	mm
Comparative tracking index	*CTI*		> 600	

Table 2 Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Stray inductance module	L_{sCE}				18		nH
Module lead resistance, terminals - chip	$R_{AA'+CC'}$	T_C = 25 °C, per switch			0.24		mΩ
Storage temperature	T_{stg}			-40		150	°C
Mounting torque for module mounting	*M*	- Mounting according to valid application note	M6, Screw	4.25		5.75	Nm
Terminal connection torque	*M*	- Mounting according to valid application note	M4, Screw	1.8		2.1	Nm
			M8, Screw	8		10	
Weight	*G*				800		g

2 Diode, D1 / D2

Table 3 Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
Repetitive peak reverse voltage	V_{RRM}		T_{vj} = -40 °C	3300	V
			T_{vj} = 150 °C	3300	
Continuous DC forward current	I_F			1600	A
Maximum RMS module DC-terminal current	I_{tRMS}		T_C = 80 °C, $T_{Terminal}$ = 105 °C	1200	A
Repetitive peak forward current	I_{FRM}	t_P = 1 ms		3200	A

(table continues...)

Table 3 (continued) Maximum rated values

Parameter	Symbol	Note or test condition		Values	Unit
I^2t - value	I^2t	t_P = 10 ms, V_R = 0 V	T_{vj} = 125 °C	630	kA²s
			T_{vj} = 150 °C	570	
Maximum power dissipation	P_{RQM}		T_{vj} = 150 °C	3600	kW
Minimum turn-on time	t_{onmin}			10	µs

Table 4 Characteristic values

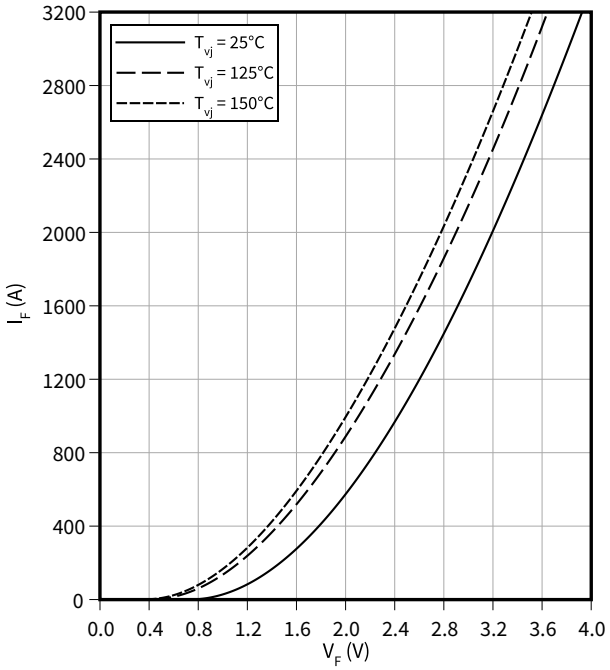
Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F = 1600 A, V_{GE} = 0 V	T_{vj} = 25 °C		2.90	3.30	V
			T_{vj} = 125 °C		2.60		
			T_{vj} = 150 °C		2.50	2.80	
Peak reverse recovery current	I_{RM}	V_{CC} = 1800 V, I_F = 1600 A, V_{GE} = -15 V, -di$_F$/dt = 4000 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		1150		A
			T_{vj} = 125 °C		1350		
			T_{vj} = 150 °C		1450		
Recovered charge	Q_r	V_{CC} = 1800 V, I_F = 1600 A, V_{GE} = -15 V, -di$_F$/dt = 4000 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		650		µC
			T_{vj} = 125 °C		1300		
			T_{vj} = 150 °C		1500		
Reverse recovery energy	E_{rec}	V_{CC} = 1800 V, I_F = 1600 A, V_{GE} = -15 V, -di$_F$/dt = 4000 A/µs (T_{vj} = 150 °C)	T_{vj} = 25 °C		650		mJ
			T_{vj} = 125 °C		1350		
			T_{vj} = 150 °C		1650		
Thermal resistance, junction to case	R_{thJC}	per diode				20.1	K/kW
Thermal resistance, case to heat sink	R_{thCH}	per diode			8.50		K/kW
Temperature under switching conditions	$T_{vj\,op}$			-40		150	°C

***Note**: Dynamic Data valid in conjunction with FZ1600R33HE4 module.*

3 Characteristics diagrams

Forward characteristic (typical), Diode, D1 / D2

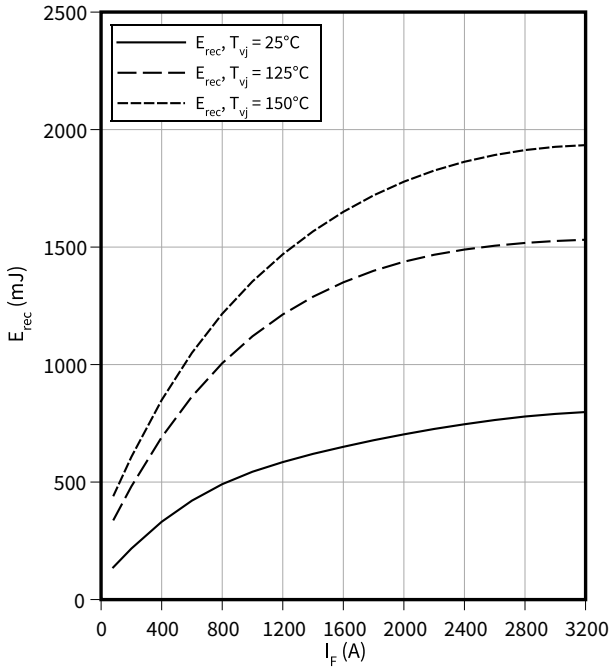
$I_F = f(V_F)$



Switching losses (typical), Diode, D1 / D2

$E_{rec} = f(I_F)$

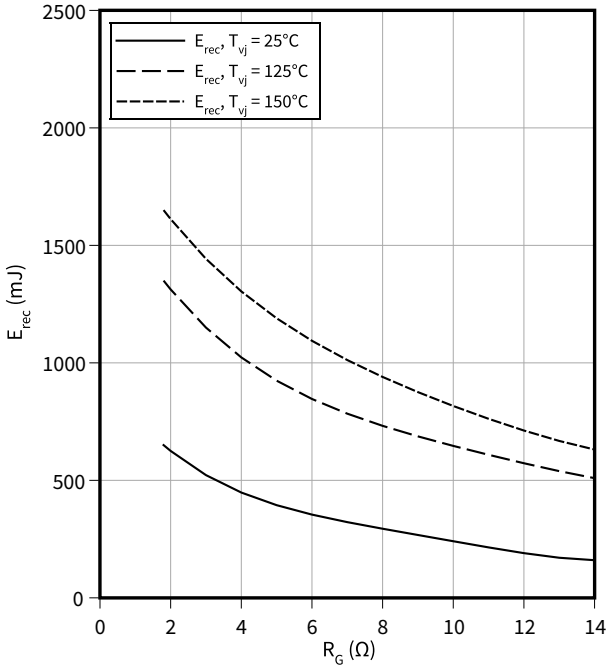
$R_{Gon} = R_{Gon}(IGBT)$, $V_{CC} = 1800$ V



Switching losses (typical), Diode, D1 / D2

$E_{rec} = f(R_G)$

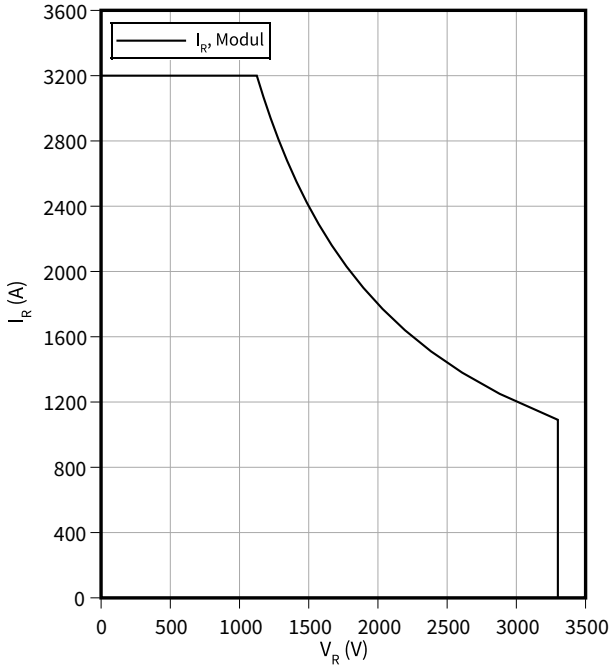
$I_F = 1600$ A, $V_{CC} = 1800$ V



Safe operating area (SOA), Diode, D1 / D2

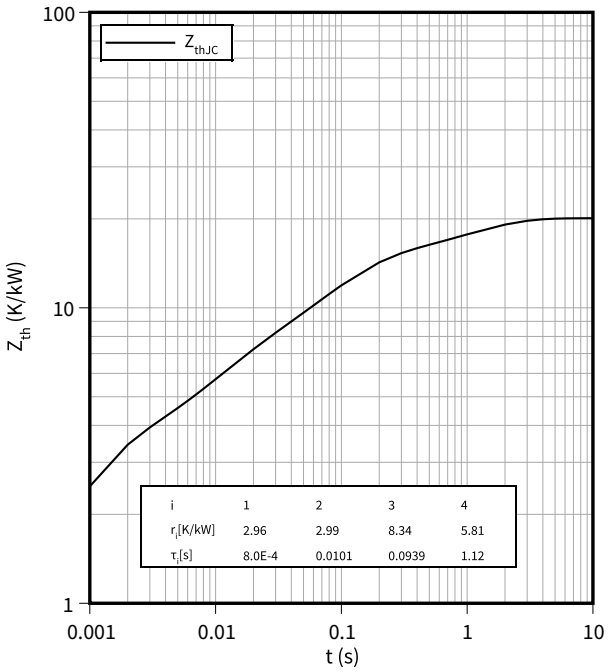
$I_R = f(V_R)$

$T_{vj} = 150$ °C



Transient thermal impedance, Diode, D1 / D2

$Z_{th} = f(t)$



4 Circuit diagram

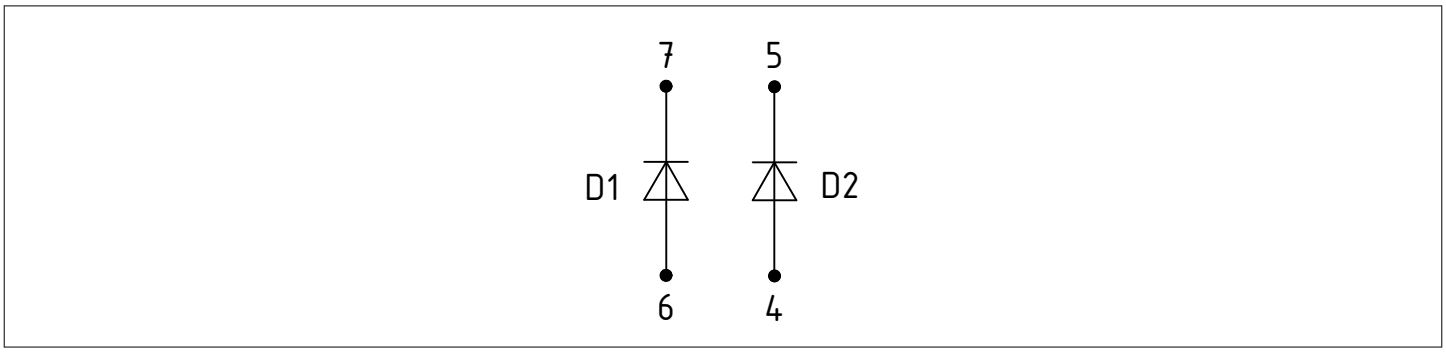


Figure 1

5 Package outlines

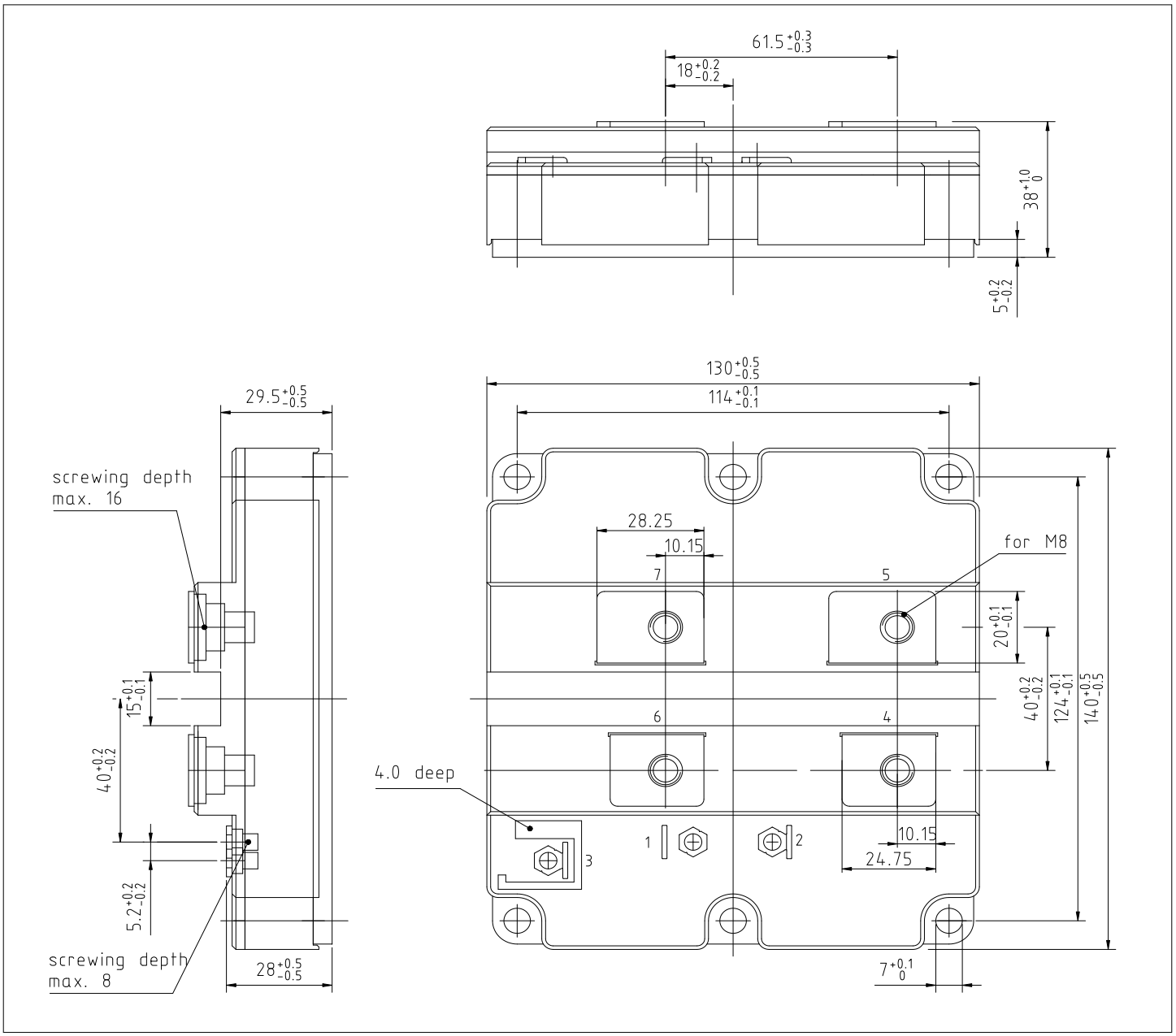


Figure 2

6 Module label code

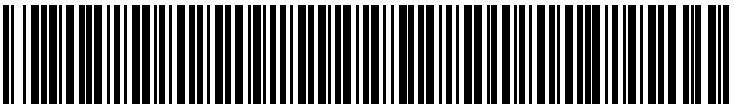
Module label code			
Code format	Data Matrix		Barcode Code128
Encoding	ASCII text		Code Set A
Symbol size	16x16		23 digits
Standard	IEC24720 and IEC16022		IEC8859-1
Code content	*Content* Module serial number Module material number Production order number Date code (production year) Date code (production week)	*Digit* 1 – 5 6 - 11 12 - 19 20 – 21 22 – 23	*Example* 71549 142846 55054991 15 30
Example	 7154914284655054991530	 7154914284655054991530	

Figure 3

Revision history

Document revision	Date of release	Description of changes
0.10	2023-11-24	Initial version
0.20	2024-02-28	Preliminary datasheet
1.00	2024-03-15	Final datasheet

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