

Final datasheet**IHM-B module with Emitter Controlled 4 diode****Features**

- Electrical features
 - $V_R = 3300\text{ V}$
 - $I_F = 1600\text{ A}$, $I_{FRM} = 3200\text{ A}$
 - 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

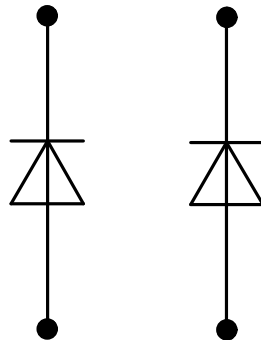
Description

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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	$t_p = 10 \text{ ms}, V_R = 0 \text{ V}$	$T_{vj} = 125 \text{ }^\circ\text{C}$	kA^2s
			$T_{vj} = 150 \text{ }^\circ\text{C}$	
Maximum power dissipation	P_{RQM}	$T_{vj} = 150 \text{ }^\circ\text{C}$	3600	kW
Minimum turn-on time	t_{onmin}		10	μs

Table 4 Characteristic values

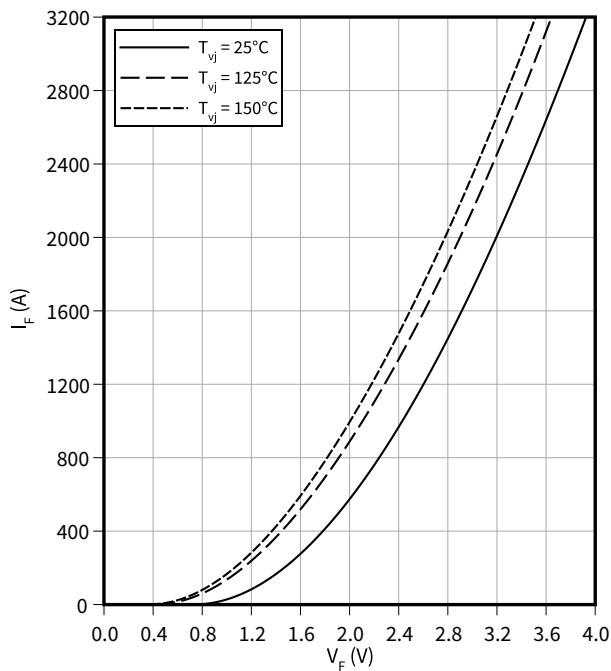
Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F = 1600 \text{ A}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$	2.90	3.30	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$	2.60		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	2.50	2.80	
Peak reverse recovery current	I_{RM}	$V_{CC} = 1800 \text{ V}, I_F = 1600 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4000 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$	1150		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$	1350		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	1450		
Recovered charge	Q_r	$V_{CC} = 1800 \text{ V}, I_F = 1600 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4000 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$	650		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$	1300		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	1500		
Reverse recovery energy	E_{rec}	$V_{CC} = 1800 \text{ V}, I_F = 1600 \text{ A}, V_{GE} = -15 \text{ V}, -di_F/dt = 4000 \text{ A}/\mu\text{s} (T_{vj} = 150 \text{ }^\circ\text{C})$	$T_{vj} = 25 \text{ }^\circ\text{C}$	650		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$	1350		
			$T_{vj} = 150 \text{ }^\circ\text{C}$	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	$^\circ\text{C}$

Note: Dynamic Data valid in conjunction with FZ1600R33HE4 module.

3 Characteristics diagrams

Forward characteristic (typical), Diode, D1 / D2

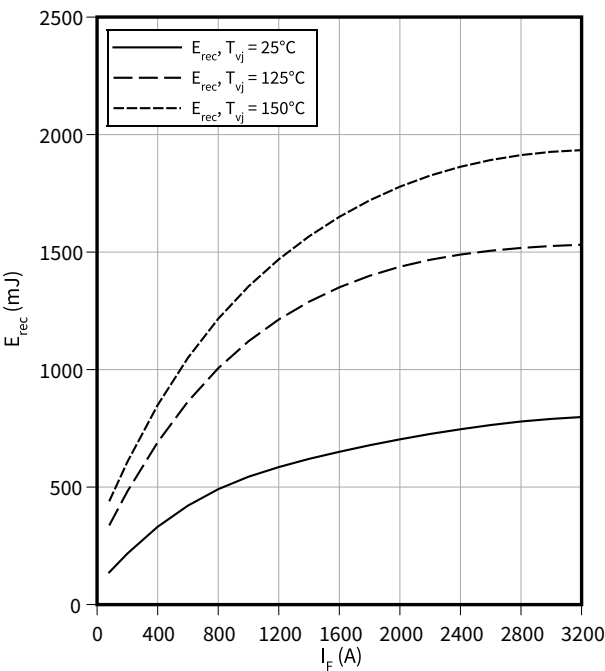
$I_F = f(V_F)$



Switching losses (typical), Diode, D1 / D2

$E_{rec} = f(I_F)$

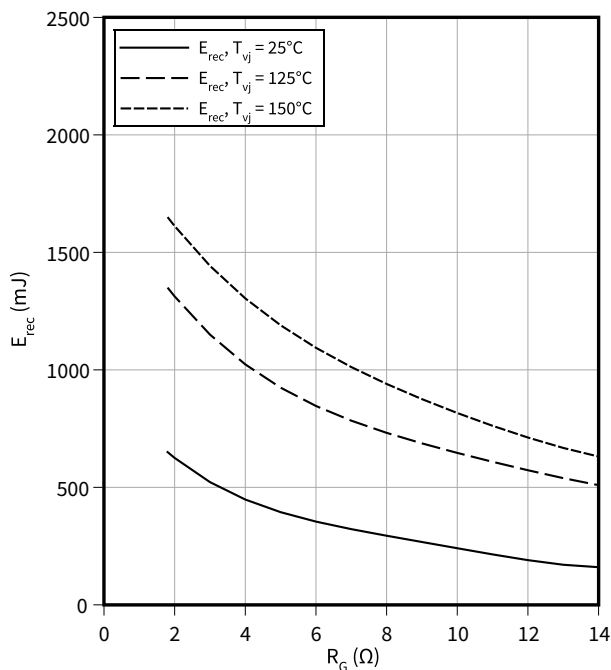
$R_{Gon} = R_{Gon}(IGBT)$, $V_{CC} = 1800$ V



Switching losses (typical), Diode, D1 / D2

$E_{rec} = f(R_G)$

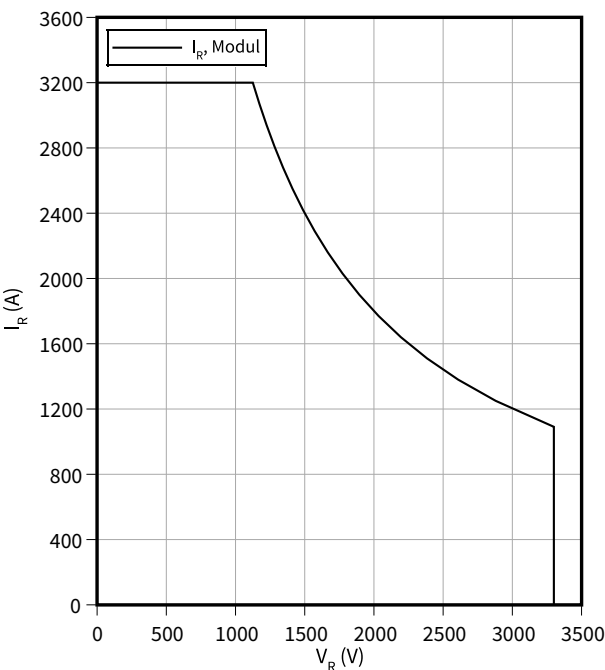
$I_F = 1600$ A, $V_{CC} = 1800$ V



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

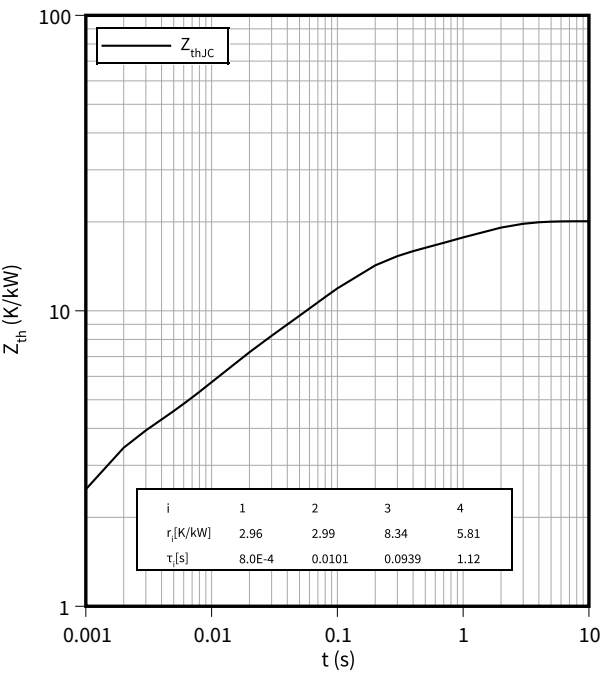
$I_R = f(V_R)$

$T_{vj} = 150^\circ\text{C}$



Transient thermal impedance, Diode, D1 / D2

$Z_{th} = f(t)$



4 **Circuit diagram**

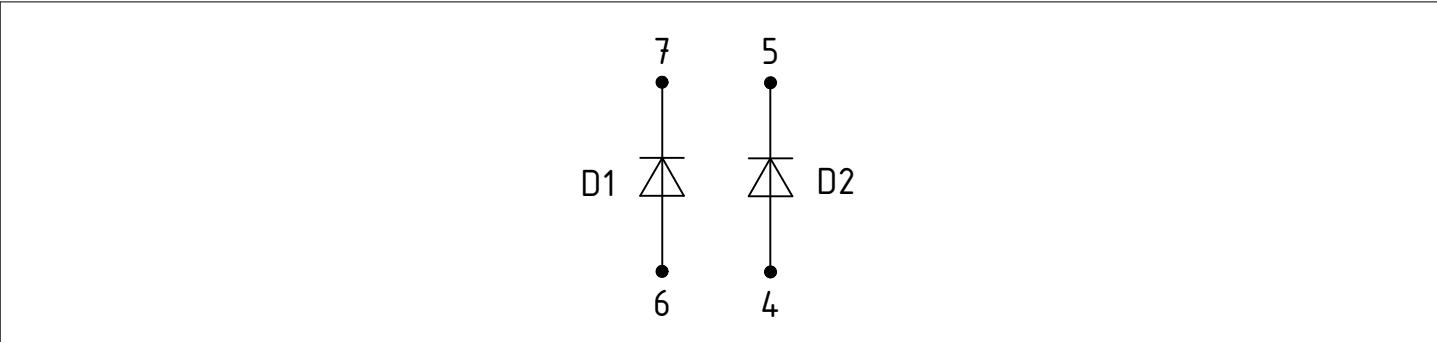


Figure 1

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	<i>Content</i>	<i>Digit</i>	<i>Example</i>
	Module serial number	1 – 5	71549
	Module material number	6 - 11	142846
	Production order number	12 - 19	55054991
	Date code (production year)	20 – 21	15
	Date code (production week)	22 – 23	30
Example			
	 71549142846550549911530	 71549142846550549911530	

Figure 3



Revision history

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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