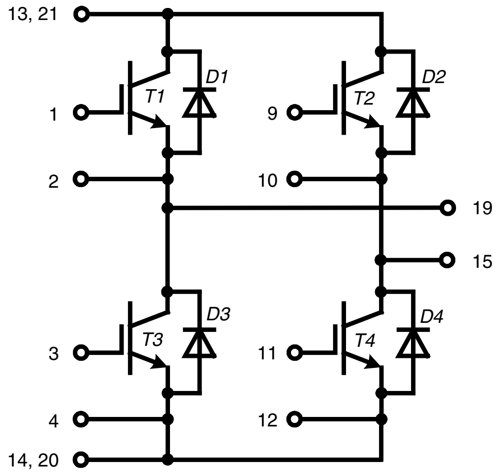
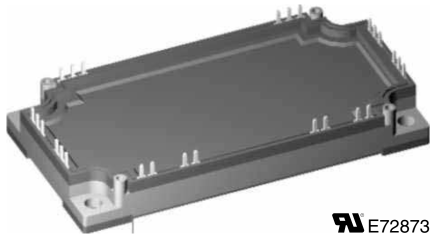
IGBT Module
H Bridge

V_{CES} = 1200 V
I_{C25} = 183 A
$V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIEB101H1200EH





E72873

Features:

- SPT+ IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- SONIC™ free wheeling diode
  - fast and soft reverse recovery
  - low operation forward voltage
- solderable pins for PCB mounting
- package with copper base plate

Application:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies

Package:

- "E3-Pack" standard outline
- Insulated copper base plate
- Soldering pins for PCB mounting

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

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Ouput Inverter T1 - T4

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES} V_{GEM}	*max. DC gate voltage* *max. transient collector gate voltage*	continuous transient				±20 ±30	V V
I_{C25} I_{C80}	*collector current*		T_C = 25°C T_C = 80°C			183 128	A A
P_{tot}	*total power dissipation*		T_C = 25°C			630	W
$V_{CE(sat)}$	*collector emitter saturation voltage* *(on chip level)* ①	I_C = 100 A; V_{GE} = 15 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.8 2.0	2.2 2.4	V V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 4 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5	6	7	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		 0.9	0.3 3	mA mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				200	nA
C_{ies}	*input capacitance*	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			7430		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 100 A			750		nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse* *reverse recovery losses at turn-off*	inductive load V_{CE} = 600 V; I_C = 100 A V_{GE} = ±15 V; R_G = 10 Ω L_S = 70 nH	T_{VJ} = 125°C		120 55 460 240 9.5 9.7 4.2		ns ns ns ns mJ mJ mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 10 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			200	A
SCSOA t_{SC}	*short circuit safe operating area* *short circuit duration* *short circuit current*	V_{CE} = 900 V; V_{GE} = ±10 V; R_G = 3.9 Ω; non-repetitive	T_{VJ} = 125°C			10	µs
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.2	K/W

Output Inverter D1 - D4

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25} I_{F80}	*forward current*		T_C = 25°C T_C = 80°C			135 90	A A
V_F	*forward voltage* *(on chip level)* ①	I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		2.00 1.95	2.20 2.25	V V
I_{rr} t_{rr} Q_{rr} E_{rec}	*max. reverse recovery current* *reverse recovery time*	inductive load V_{CE} = 600 V; I_C = 100 A V_{GE} = ±15 V; R_G = 10 Ω L_S = 70 nH	T_{VJ} = 125°C		120 330 12.5 4.2		A ns µC mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				0.4	K/W

T_C = 25°C unless otherwise stated

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Module

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
					Ratings		
T_{VJ}	*operating temperature*			-40		125	°C
T_{VJM}	*max. virtual junction temperature*					150	°C
T_{stg}	*storage temperature*			-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq 1$ mA; 50/60 Hz	t = 1 min			3000	V~
			t = 1 s			3600	V~
CTI	*comparative tracking index*					200	
M_d	*mounting torque (M5)*			3		6	Nm
$R_{pin\ to\ chip}$	*see ①*				1.8		mΩ
d_S	*creep distance on surface*			12.7			mm
d_A	*strike distance through air*			9.6			mm
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound			0.1		K/W
Weight					300		g

① $V_{CE} = V_{CE(sat)} + 2x\ R_{pin\ to\ chip} \cdot I_C$

$T_C = 25°C$ unless otherwise stated

Curves are measured on modul level except Fig. 14 to Fig. 17

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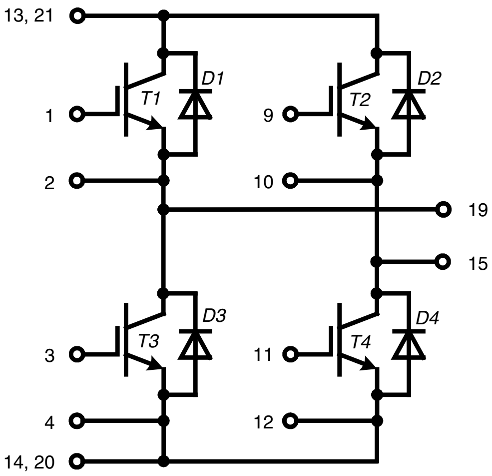
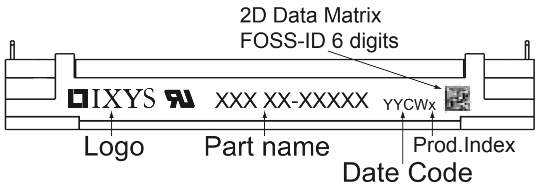
Circuit Diagram



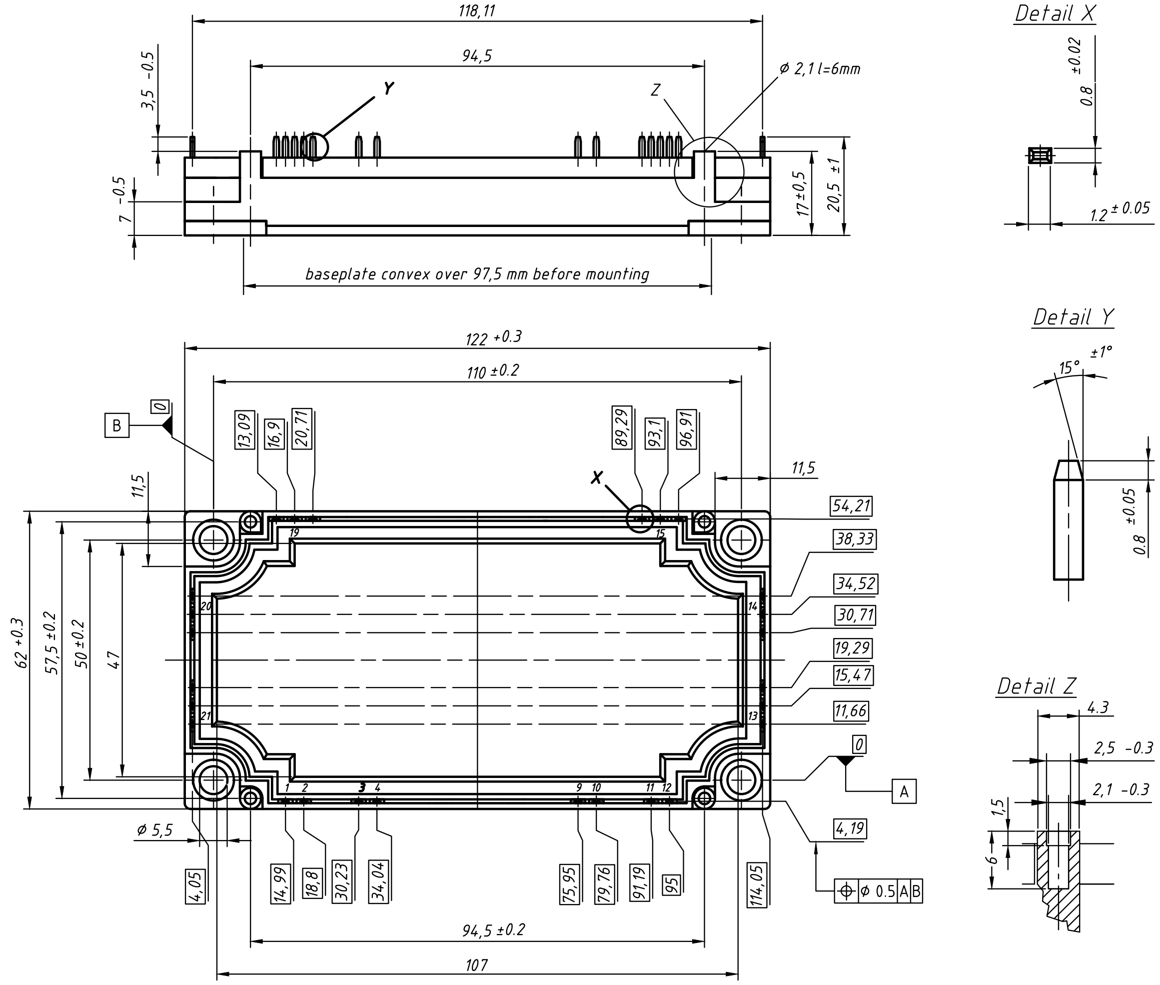


Part number

M = Module
I = IGBT
E = SPT
B = 2nd Generation
101 = Current Rating [A]
H = H~ Bridge
1200 = Reverse Voltage [V]
EH = E3-Pack

Outline Drawing

Dimensions in mm (1 mm = 0.0394“)



Remark:
Dimensions without tolerances acc. DIN ISO 2768-T1-m

Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIEB101H1200EH	MIEB101H1200EH	Box	5	510534

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Transistor T1 - T4

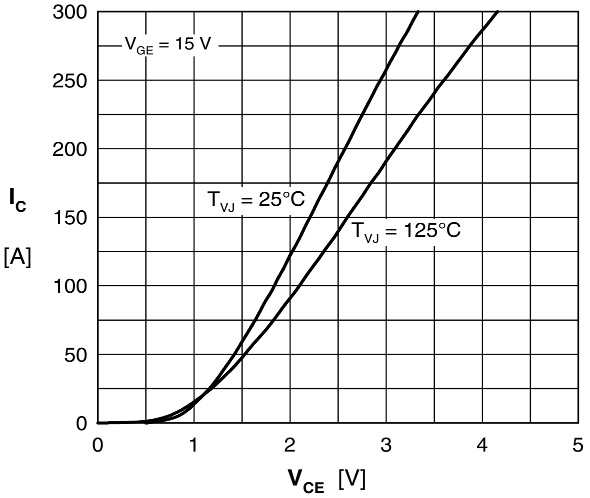

Fig. 1 Typ. output characteristics

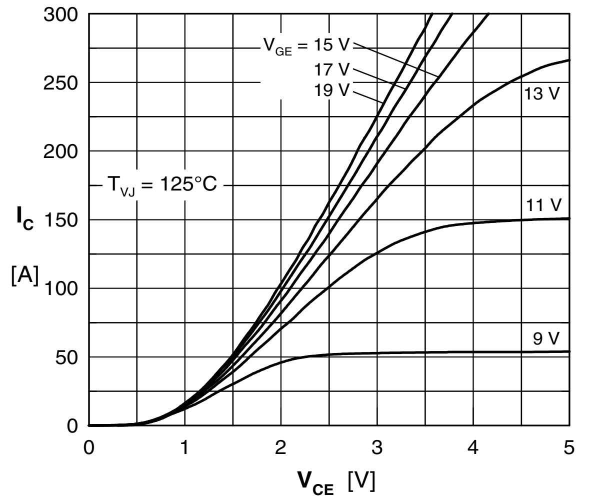

Fig. 2 Typ. output characteristics

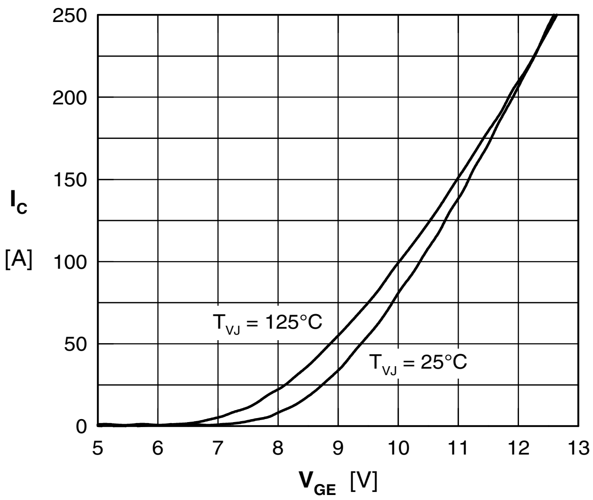

Fig. 3 Typ. transfer characteristics

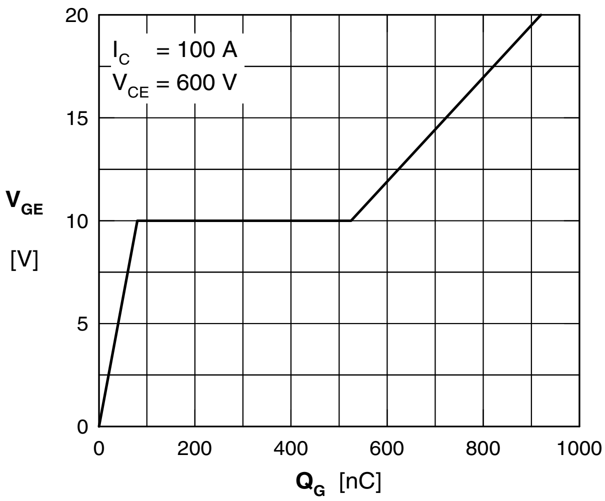

Fig. 4 Typ. turn-on gate charge

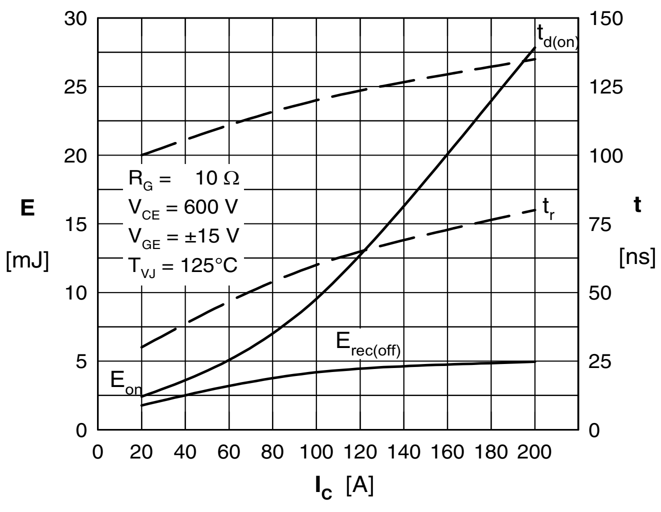

Fig. 5 Typ. turn-on energy & switching times versus collector current

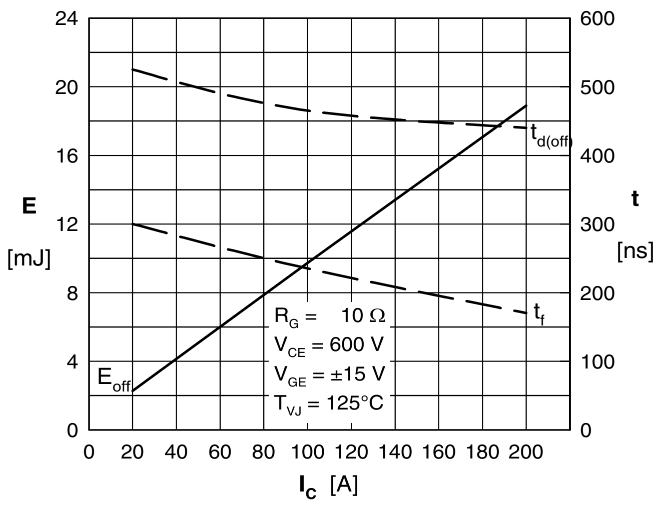

Fig. 6 Typ. turn-off energy & switching times versus collector current

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Transistor T1 - T4

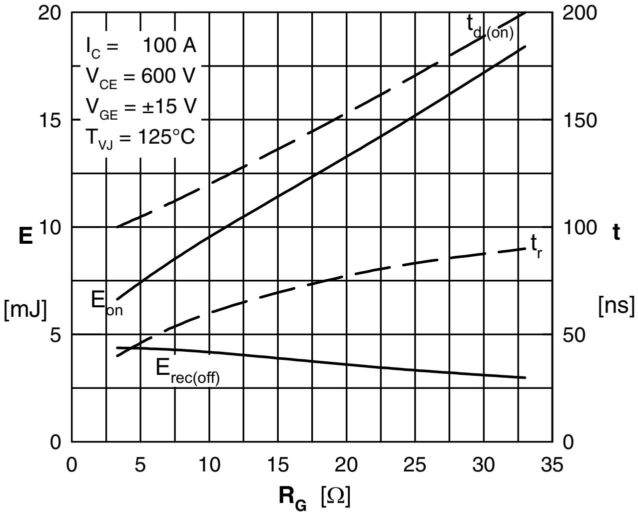

Fig. 7 Typ. turn-on energy and switching times versus gate resistor

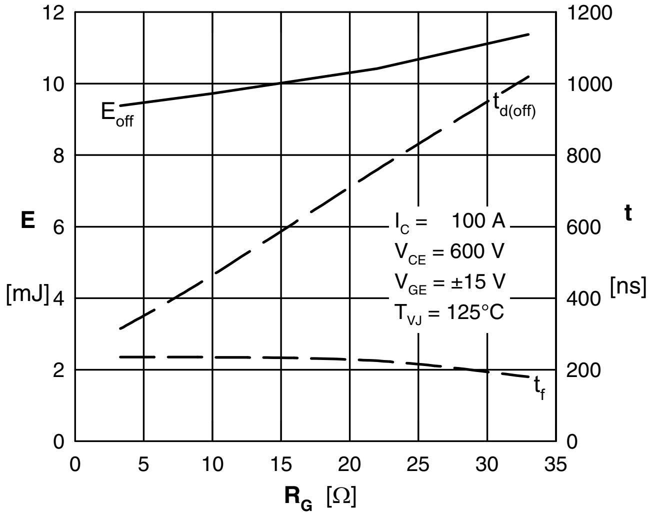

Fig. 8 Typ. turn-off energy and switching times versus gate resistor

Diode D1 - D4

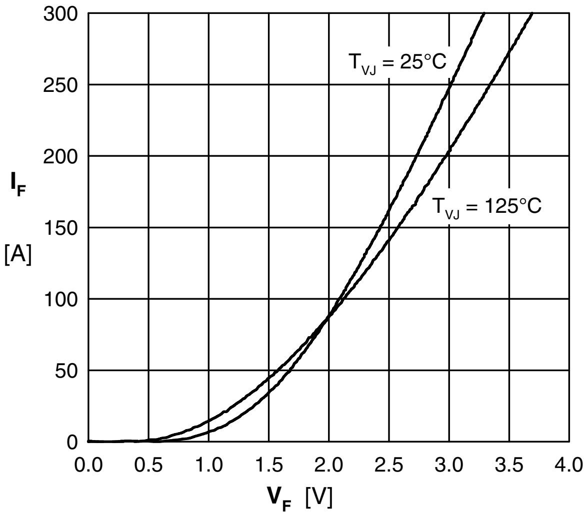

Fig. 9 Typ. forward characteristics

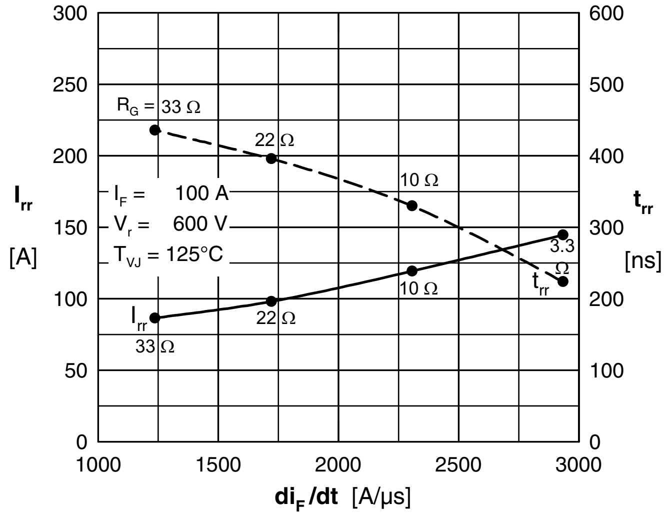

Fig. 10 Typ. reverse recovery characteristics

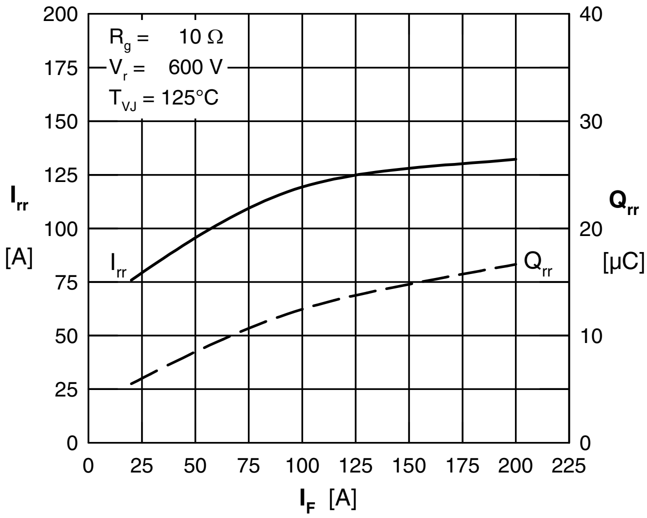

Fig. 11 Typ. reverse recovery characteristics

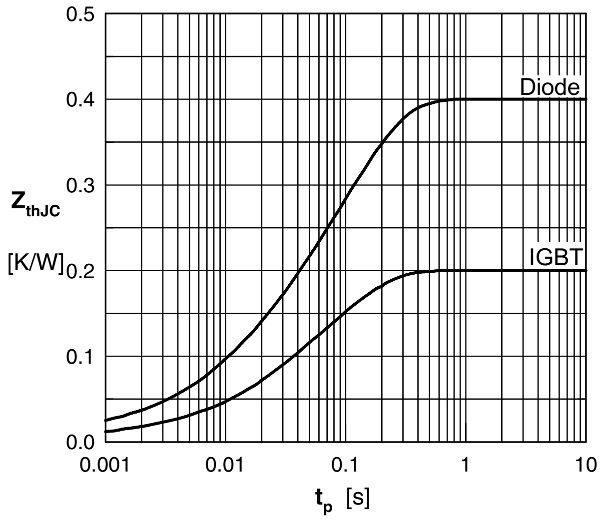

Fig. 12 Typ. transient thermal impedance

IGBT		FRD	
R_i	τ_i	R_i	τ_i
0.003	0.00001	0.015	0.0005
0.010	0.0014	0.04	0.006
0.057	0.021	0.09	0.025
0.130	0.1	0.255	0.125

Fig. 13 Thermal coefficients

Diode D1 - D4

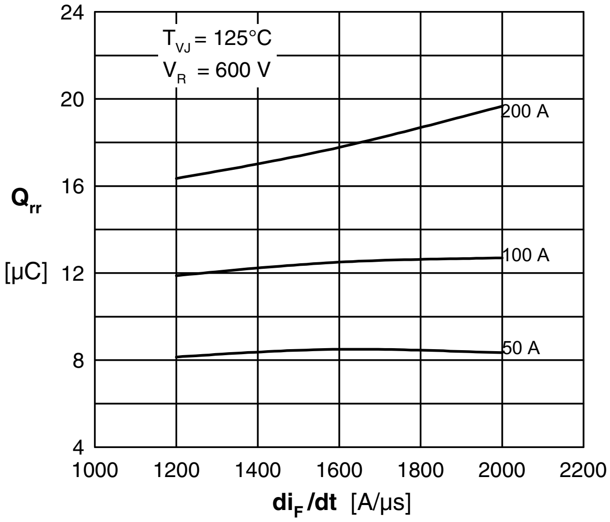

Fig. 14 Typ. reverse recov.charge Q_{rr} vs. di/dt

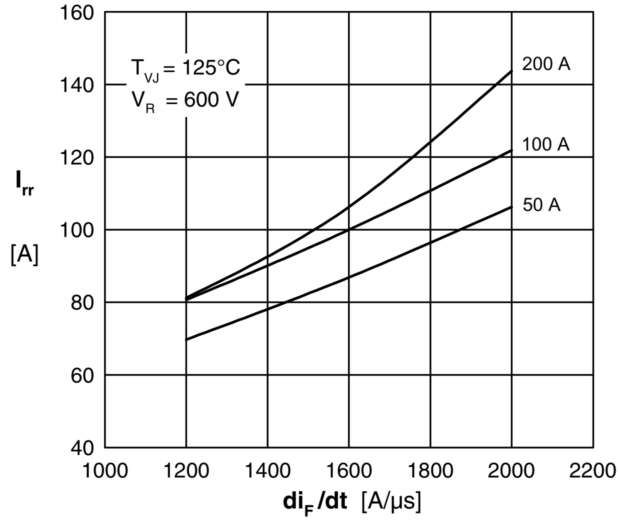

Fig. 15 Typ. peak reverse current I_{RM} vs. di/dt

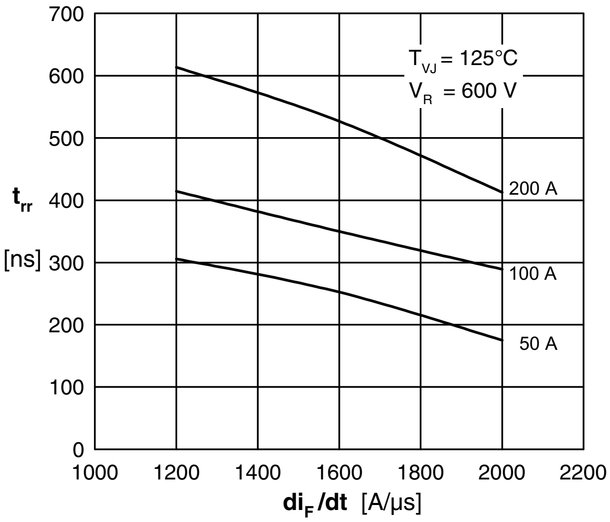

Fig. 16 Typ. recovery time t_{rr} versus di/dt

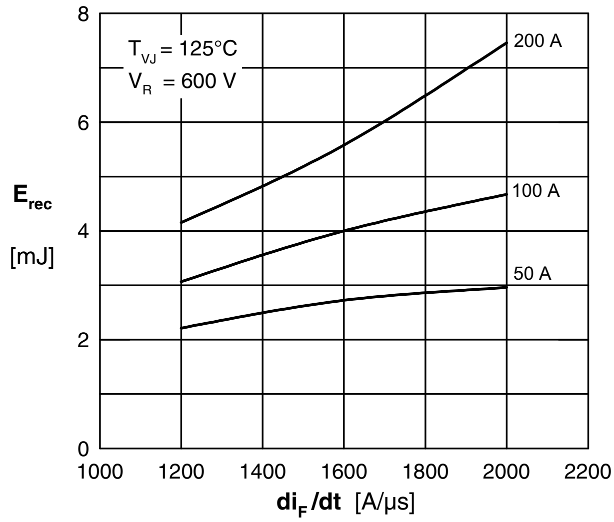

Fig. 17 Typ. recovery energy E_{rec} versus di/dt