

# XPT IGBT Module

$$V_{CES} = 1200\text{ V}$$

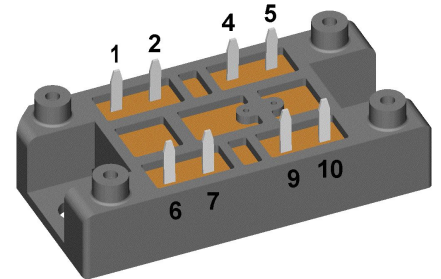
$$I_{C25} = 120\text{ A}$$

$$V_{CE(sat)} = 1,9\text{ V}$$

## Boost Chopper

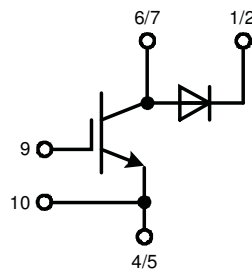
### Part number

**MIXA80R1200VA**



Backside: isolated

E72873



### Features / Advantages:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10  $\mu$ sec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x  $I_c$
- Thin wafer technology combined with the XPT design results in a competitive low  $V_{CE(sat)}$
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

### Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

### Package: V1-A-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

### Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

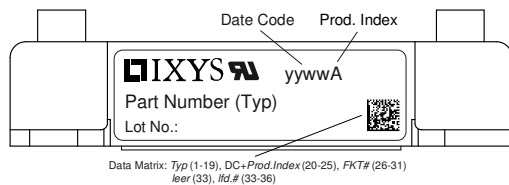
- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

IGBT				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{CES}$	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
$V_{GES}$	max. DC gate voltage				$\pm 20$	V	
$V_{GEM}$	max. transient gate emitter voltage				$\pm 30$	V	
$I_{C25}$	collector current	$T_C = 25^{\circ}\text{C}$			120	A	
$I_{C80}$		$T_C = 80^{\circ}\text{C}$			84	A	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			390	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 75\text{A}; V_{GE} = 15\text{V}$			1,9	V	
					2,2	V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 6\text{mA}; V_{GE} = V_{CE}$	5,4	5,9	6,5	V	
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{V}$			0,2	mA	
					0,6	mA	
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{V}; V_{GE} = 15\text{V}; I_C = 75\text{A}$		230		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{V}; I_C = 75\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 10\ \Omega$		70		ns	
$t_r$	current rise time		$T_{VJ} = 125^{\circ}\text{C}$		40		ns
$t_{d(off)}$	turn-off delay time				250		ns
$t_f$	current fall time				100		ns
$E_{on}$	turn-on energy per pulse				6,8		mJ
$E_{off}$	turn-off energy per pulse				8,3		mJ
<b>RBSOA</b>	reverse bias safe operating area	$V_{GE} = \pm 15\text{V}; R_G = 10\ \Omega$					
$I_{CM}$		$V_{CEma} = 1200\text{V}$			225	A	
<b>SCSOA</b>	short circuit safe operating area	$V_{CEma} = 1200\text{V}$					
$t_{SC}$	short circuit duration	$V_{CE} = 900\text{V}; V_{GE} = \pm 15\text{V}$			10	$\mu\text{s}$	
$I_{SC}$	short circuit current	$R_G = 10\ \Omega$ ; non-repetitive		300		A	
$R_{thJC}$	thermal resistance junction to case				0,32	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0,20		K/W	
<b>Diode</b>							
$V_{RRM}$	max. repetitive reverse voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
$I_{F25}$	forward current	$T_C = 25^{\circ}\text{C}$			135	A	
$I_{F80}$		$T_C = 80^{\circ}\text{C}$			90	A	
$V_F$	forward voltage	$I_F = 100\text{A}$			2,30	V	
					2,10	V	
$I_R$	reverse current	$V_R = V_{RRM}$			0,3	mA	
					0,8	mA	
$Q_{rr}$	reverse recovery charge	$V_R = 600\text{V}$ $-di_F/dt = 1600\text{A}/\mu\text{s}$ $I_F = 100\text{A}; V_{GE} = 0\text{V}$		12,5		$\mu\text{C}$	
$I_{RM}$	max. reverse recovery current		$T_{VJ} = 125^{\circ}\text{C}$		105		A
$t_{rr}$	reverse recovery time				350		ns
$E_{rec}$	reverse recovery energy				4		mJ
$R_{thJC}$	thermal resistance junction to case				0,4	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0,20		K/W	

Package V1-A-Pack				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$I_{RMS}$	RMS current	per terminal			100	A	
$T_{VJ}$	virtual junction temperature		-40		150	°C	
$T_{op}$	operation temperature		-40		125	°C	
$T_{stg}$	storage temperature		-40		125	°C	
<b>Weight</b>					37	g	
$M_D$	mounting torque		2		2,5	Nm	
$d_{Spp/APP}$	creepage distance on surface / striking distance through air	terminal to terminal	6,0			mm	
$d_{Spb/APb}$		terminal to backside	12,0			mm	
$V_{ISOL}$	isolation voltage	t = 1 second	3600			V	
		t = 1 minute	3000			V	



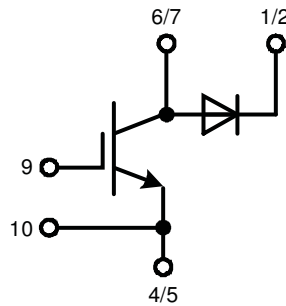
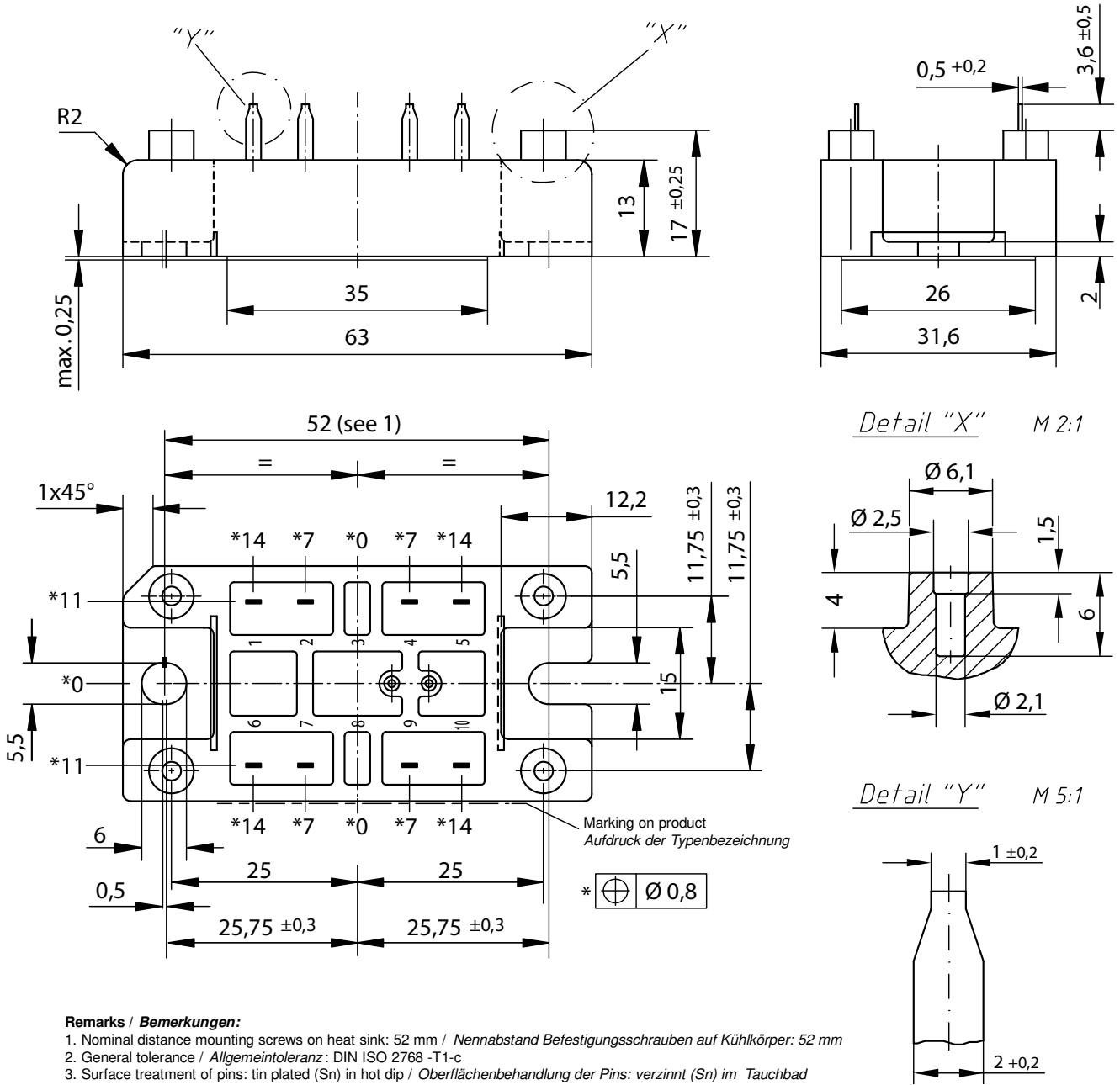
### Part description

- M = Module
- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 80 = Current Rating [A]
- R = Boost Chopper
- 1200 = Reverse Voltage [V]
- VA = V1-A-Pack

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA80R1200VA	MIXA80R1200VA	Blister	24	510585

Equivalent Circuits for Simulation		* on die level		$T_{VJ} = 150\text{ °C}$
		IGBT	Diode	
$V_{0\ max}$	threshold voltage	1,1	1,09	V
$R_{0\ max}$	slope resistance *	17,9	9,1	mΩ

## Outlines V1-A-Pack



**IGBT**

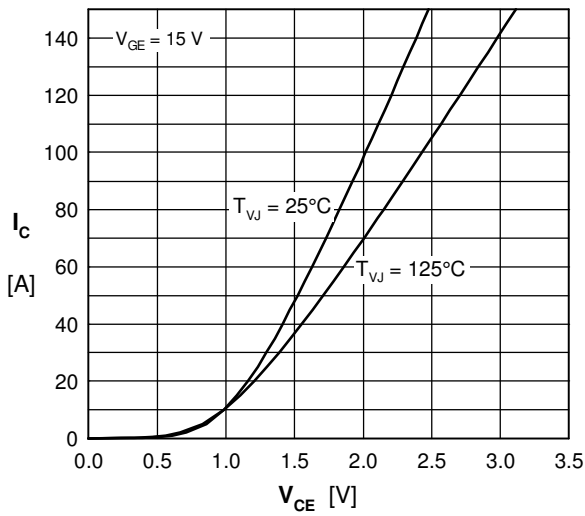


Fig. 1 Typ. output characteristics

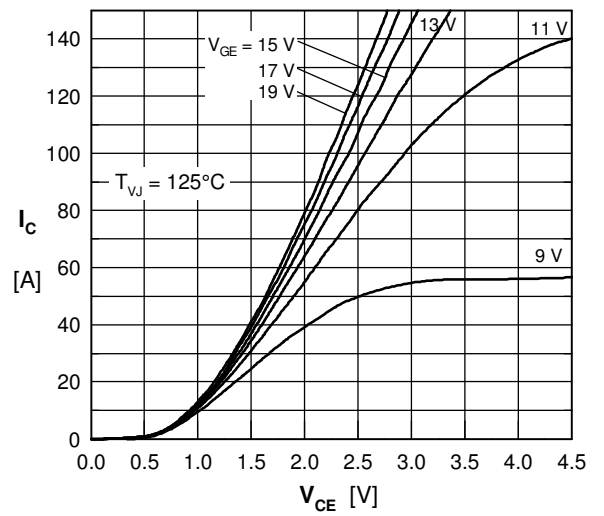


Fig. 2 Typ. output characteristics

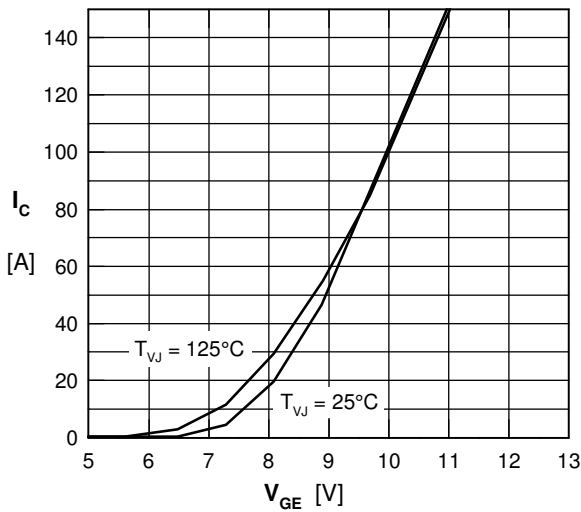


Fig. 3 Typ. transfer characteristics

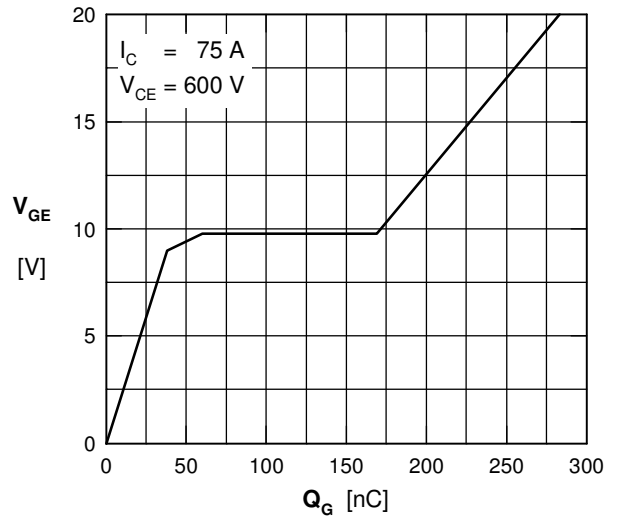


Fig. 4 Typ. turn-on gate charge

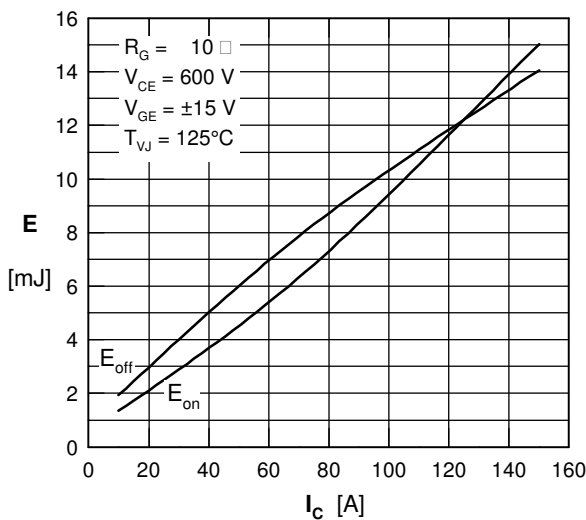


Fig. 5 Typ. switching energy vs. collector current

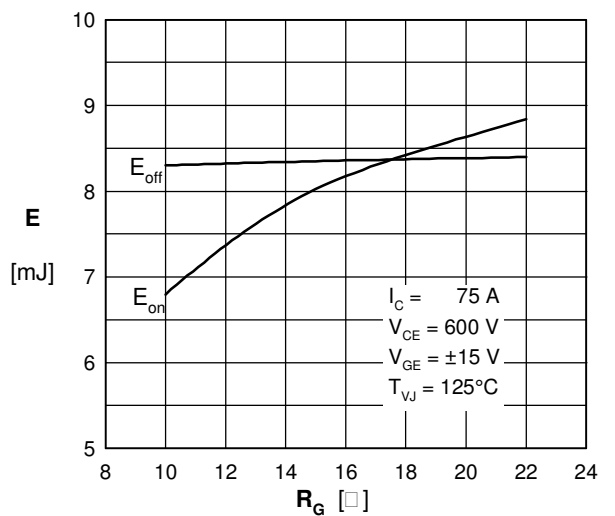


Fig. 6 Typ. switching energy vs. gate resistance

## Diode

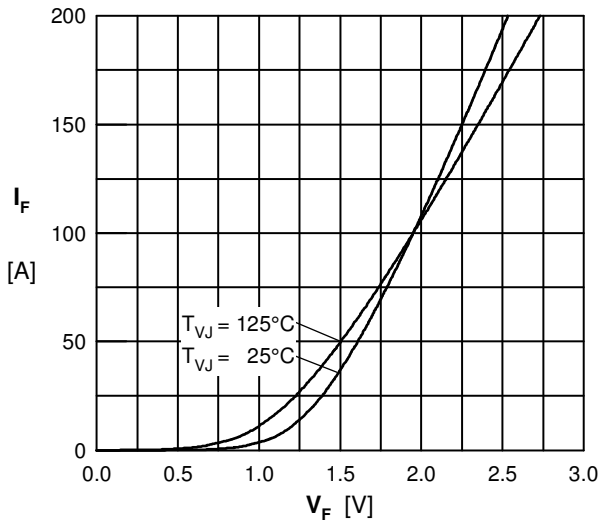


Fig. 7 Typ. Forward current versus  $V_F$

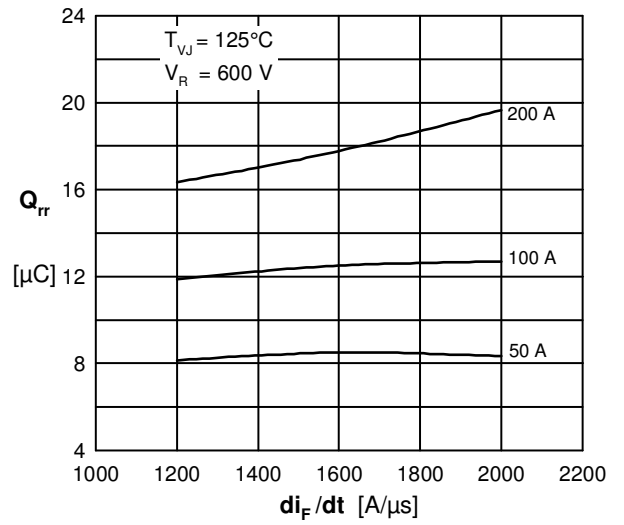


Fig. 8 Typ. reverse recov. charge  $Q_{rr}$  vs.  $di/dt$

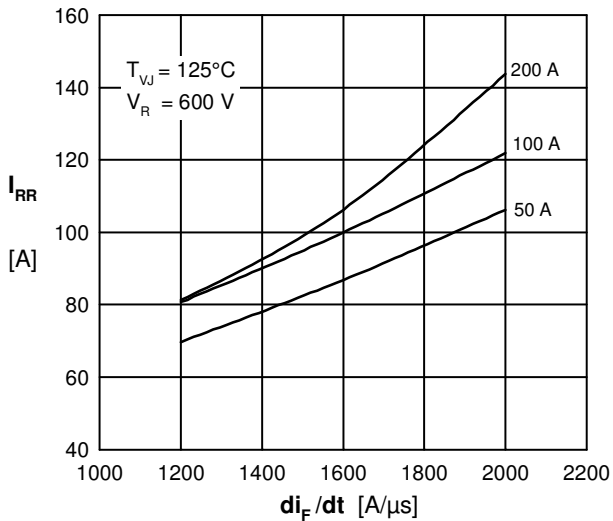


Fig. 9 Typ. peak reverse current  $I_{RM}$  vs.  $di/dt$

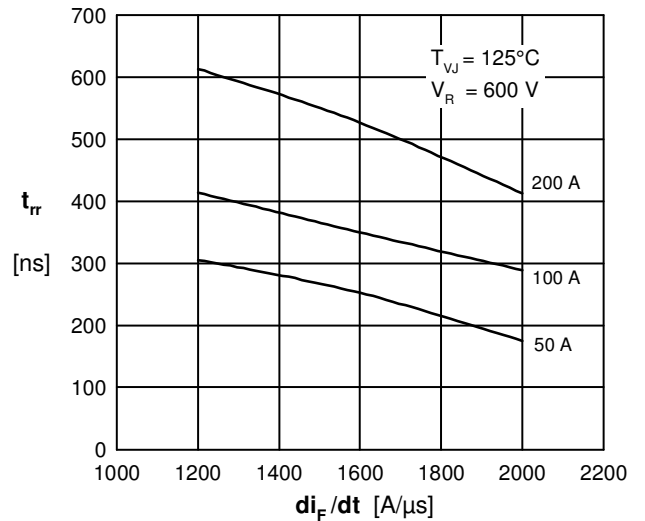


Fig. 10 Typ. recovery time  $t_{rr}$  versus  $di/dt$

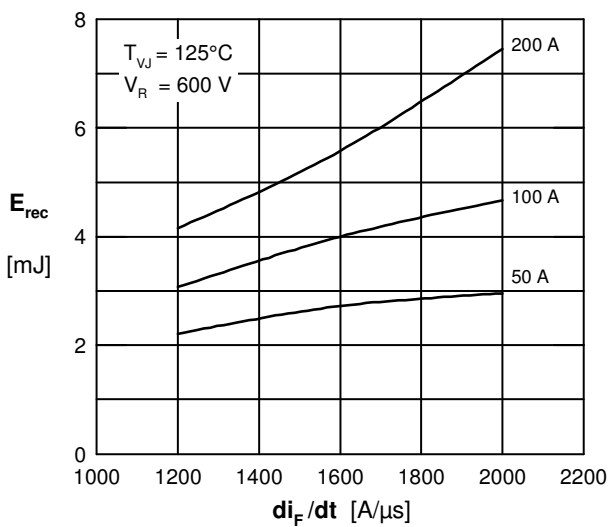


Fig. 11 Typ. recovery energy  $E_{rec}$  versus  $di/dt$

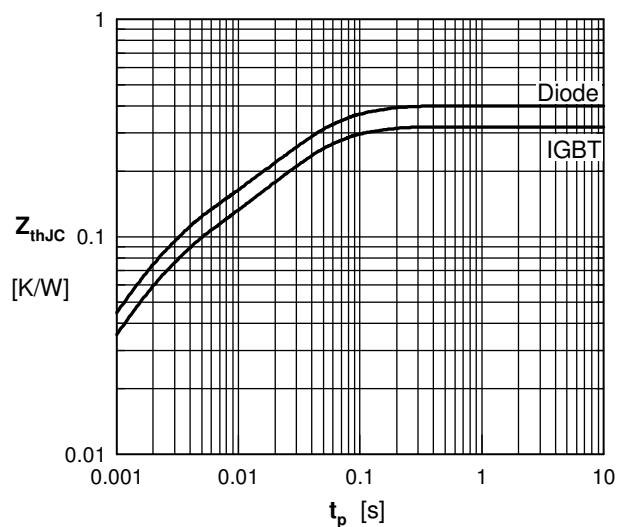


Fig. 12 Typ. transient thermal impedance

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