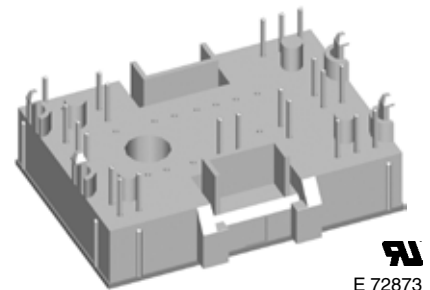
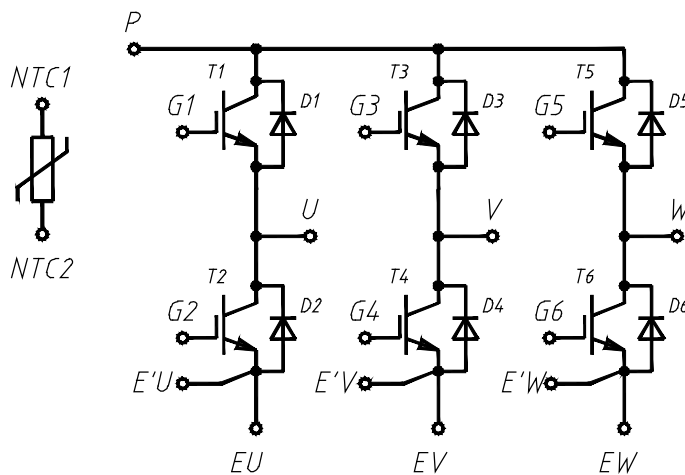


# Six-Pack XPT IGBT

$V_{CES} = 1200\text{ V}$   
 $I_{C25} = 43\text{ A}$   
 $V_{CE(sat)} = 1.8\text{ V}$

**Part name** (Marking on product)

MIXA30W1200TMH



Pin configuration see outlines.

**Features:**

- High level of integration - only one power semiconductor module required for the whole drive
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10  $\mu\text{sec}$ .
  - very low gate charge
  - square RBSOA @  $3 \times I_c$
  - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low  $V_{CE(sat)}$
- Temperature sense included
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

**Application:**

- AC motor drives
- Pumps, Fans
- Washing machines
- Air-conditioning system
- Inverter and power supplies

**Package:**

- "Mini" package
- Assembly height is 17 mm
- Insulated base plate
- Pins suitable for wave soldering and PCB mounting
- Assembly clips available
  - IXKU 5-505 screw clamp
  - IXRB 5-506 click clamp
- UL registered E72873

**Output Inverter T1 - T6**

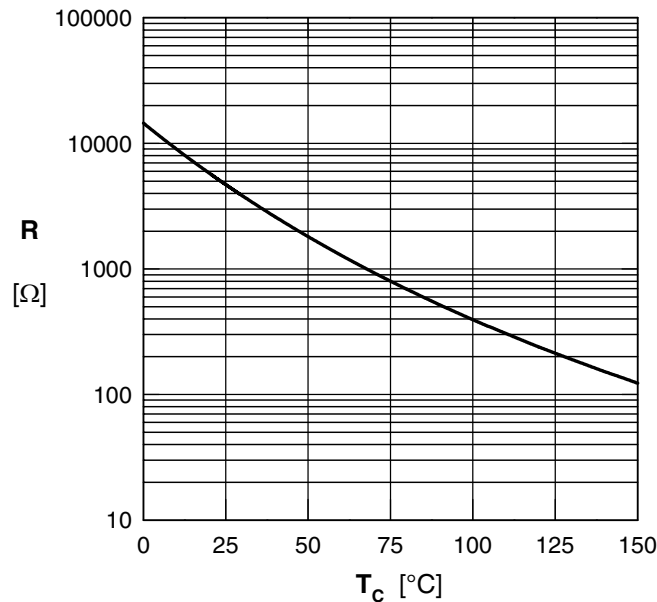
Symbol	Definitions	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{CES}$	collector emitter voltage		$T_{VJ} = 25^{\circ}\text{C}$		1200	V	
$V_{GES}$	max. DC gate voltage	continuous			$\pm 20$	V	
$V_{GEM}$	max. transient collector gate voltage	transient			$\pm 30$	V	
$I_{C25}$	collector current		$T_C = 25^{\circ}\text{C}$		43	A	
$I_{C80}$			$T_C = 80^{\circ}\text{C}$		30	A	
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}\text{C}$		150	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 25\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.8 2.1	2.1	V V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 1\text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	5.4	5.9	6.5	V
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	0.02 0.3	0.15	mA mA	
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{ V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 25\text{ A}$			76	nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{ V}; I_C = 25\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 39\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$		70	ns	
$t_r$	current rise time				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				2.5	mJ	
$E_{off}$	turn-off energy per pulse				3.0	mJ	
<b>RBSOA</b>	reverse bias safe operating area	$V_{GE} = \pm 15\text{ V}; R_G = 39\ \Omega; V_{CEK} = 1200\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		75	A	
<b><math>I_{SC}</math> (SCSOA)</b>	short circuit safe operating area	$V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V};$ $R_G = 39\ \Omega; t_p = 10\ \mu\text{s};$ non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$		100	A	
$R_{thJC}$	thermal resistance junction to case	(per IGBT)			0.24	0.84	K/W K/W
$R_{thCH}$	thermal resistance case to heatsink						

**Output Inverter D1 - D6**

Symbol	Definitions	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{RRM}$	max. repetitive reverse voltage		$T_{VJ} = 25^{\circ}\text{C}$		1200	V	
$I_{F25}$	forward current		$T_C = 25^{\circ}\text{C}$		44	A	
$I_{F80}$			$T_C = 80^{\circ}\text{C}$		29	A	
$V_F$	forward voltage	$I_F = 30\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.95 1.95	2.2	V V	
$Q_{rr}$	reverse recovery charge	$V_R = 600\text{ V}$ $di_F/dt = -600\text{ A}/\mu\text{s}$ $I_F = 30\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		3.5	$\mu\text{C}$	
$I_{RM}$	max. reverse recovery current				30	A	
$t_{rr}$	reverse recovery time				350	ns	
$E_{rec}$	reverse recovery energy				0.9	mJ	
$R_{thJC}$	thermal resistance junction to case	(per diode)			0.4	1.2	K/W K/W
$R_{thCH}$	thermal resistance case to heatsink						

**Temperature Sensor NTC**

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
$R_{25}$	resistance	$T_C = 25^\circ\text{C}$	4.75	5.0	5.25	k $\Omega$
$B_{25/50}$				3375		K

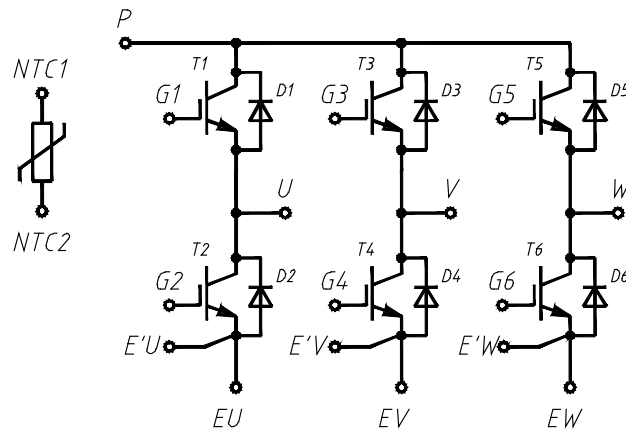


Typ. NTC resistance vs. temperature

**Module**

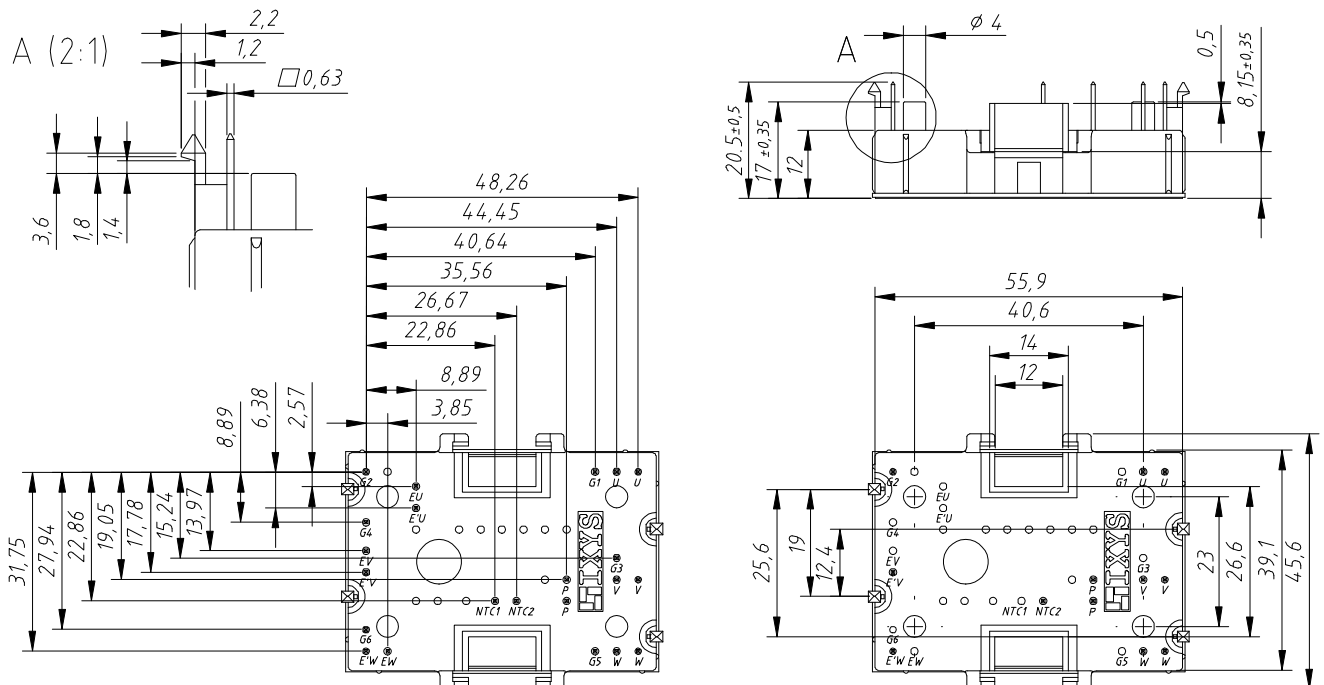
Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
$T_{VJ}$	operating temperature		-40		125	°C
$T_{VJM}$	max. virtual junction temperature				150	°C
$T_{stg}$	storage temperature		-40		125	°C
$V_{ISOL}$	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$			2500	V~
CTI	comparative tracking index				-	
$F_C$	mounting force		40		80	N
$d_S$	creep distance on surface		12.7			mm
$d_A$	strike distance through air		12			mm
<b>Weight</b>				35		g

## Circuit Diagram



## Outline Drawing

Dimensions in mm (1 mm = 0.0394")

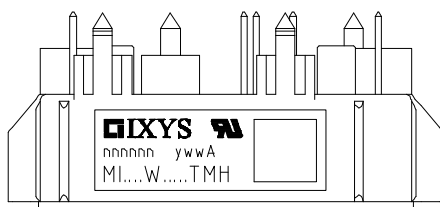


### Bemerkungen:

- 1) Toleranz für Pin Positionen entsprechend  $\pm 0,4$
- 2) Vorgesehen für die Montage auf Leiterplatten mit einer Dicke von  $16 \pm 0,2$  mm

### Remarks:

- 1.) pin positions with tolerance  $\pm 0,4$
- 2) mounting on PCB with thickness of  $16 \pm 0,2$  mm



### Part number

- M = Module
- I = IGBT
- X = XPT
- A = standard
- 30 = Current Rating [A]
- W = 6-Pack
- 1200 = Reverse Voltage [V]
- T = NTC
- MH = MiniPack2

Ordering	Part Number	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA 30 W 1200 TMH	MIXA30W1200TMH	Box	20	470414

## IGBT T1 - T6

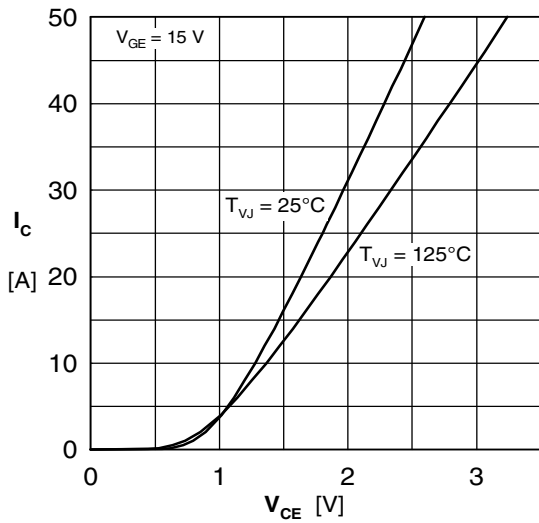


Fig. 1 Typ. output characteristics

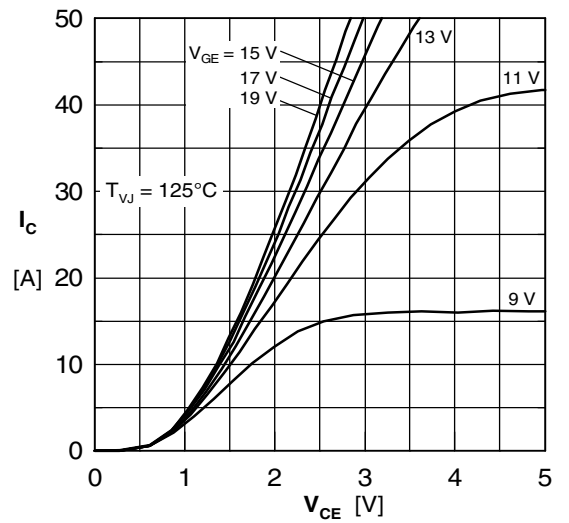


Fig. 2 Typ. output characteristics

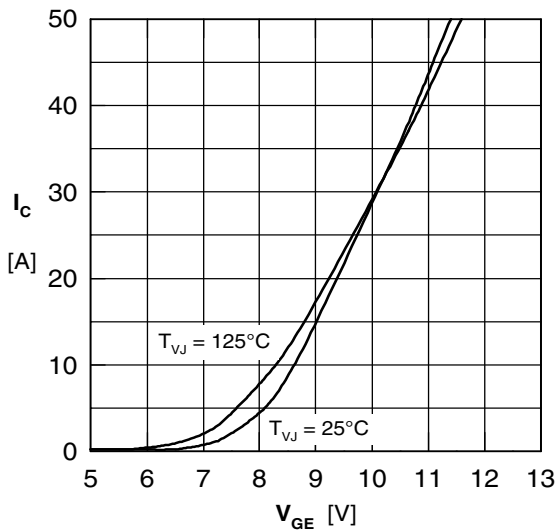


Fig. 3 Typ. transfer characteristics

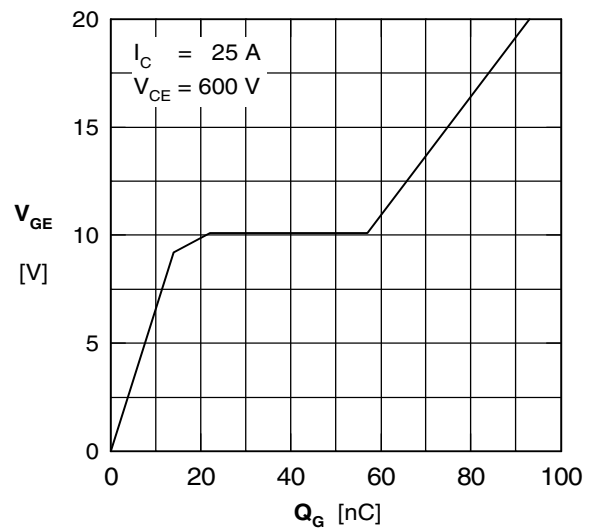


Fig. 4 Typ. turn-on gate charge

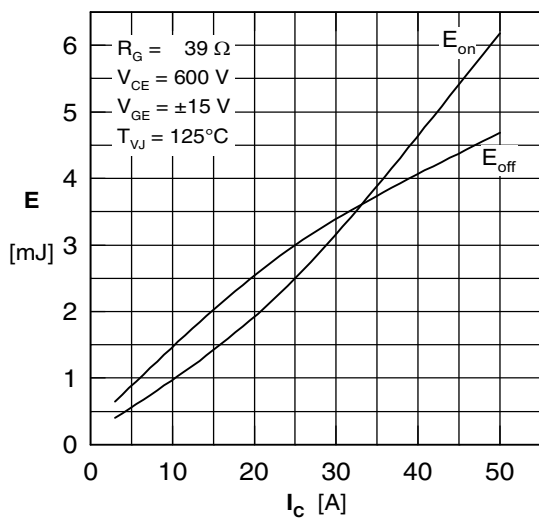


Fig. 5 Typ. switching energy vs. collector current

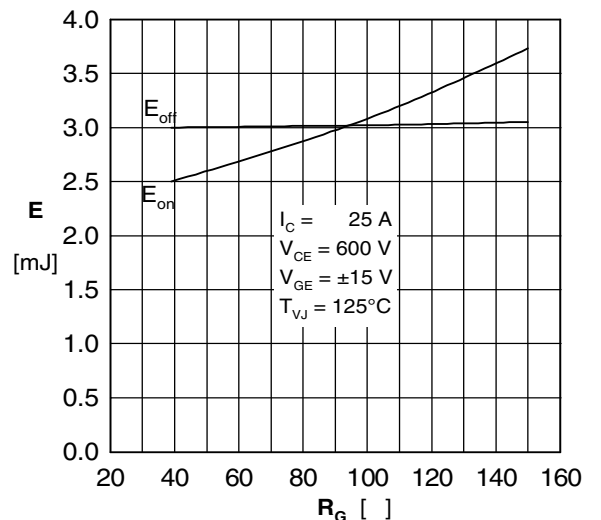


Fig. 6 Typ. switching energy vs. gate resistance

## Diode D1 - D6

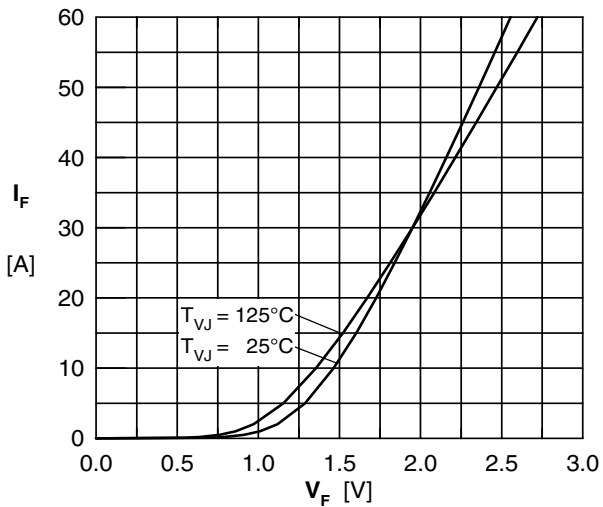


Fig. 7 Typ. Forward current versus  $V_F$

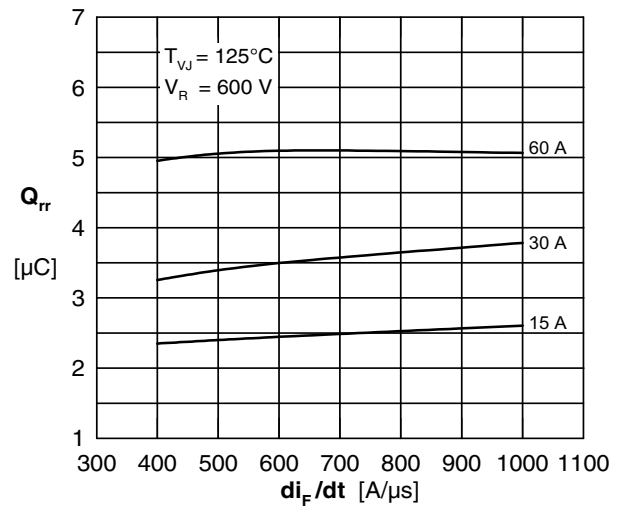


Fig. 8 Typ. reverse recov. charge  $Q_{rr}$  vs.  $di/dt$

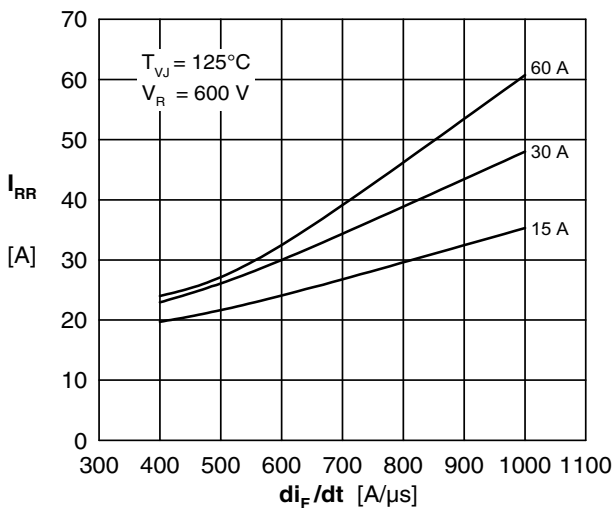


Fig. 9 Typ. peak reverse current  $I_{RM}$  vs.  $di/dt$

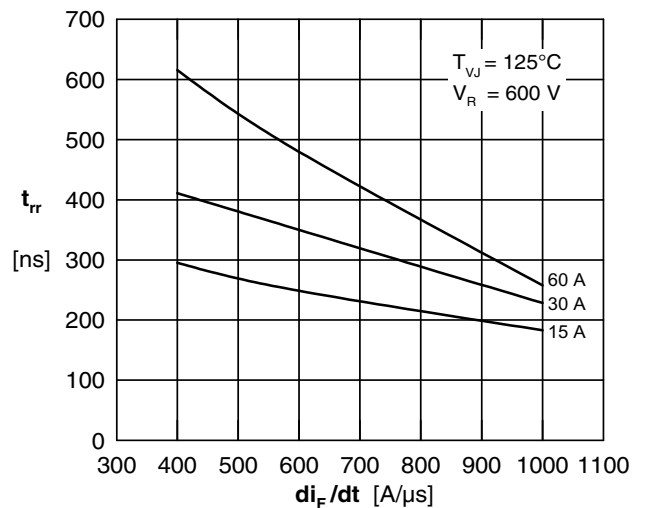


Fig. 10 Typ. recovery time  $t_{rr}$  versus  $di/dt$

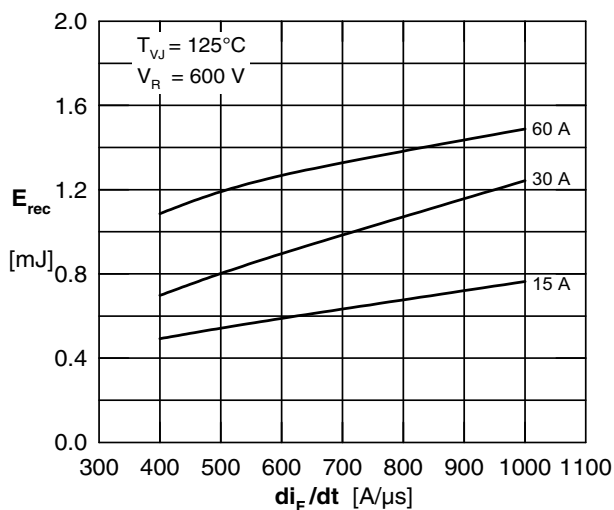


Fig. 11 Typ. recovery energy  $E_{rec}$  versus  $di/dt$

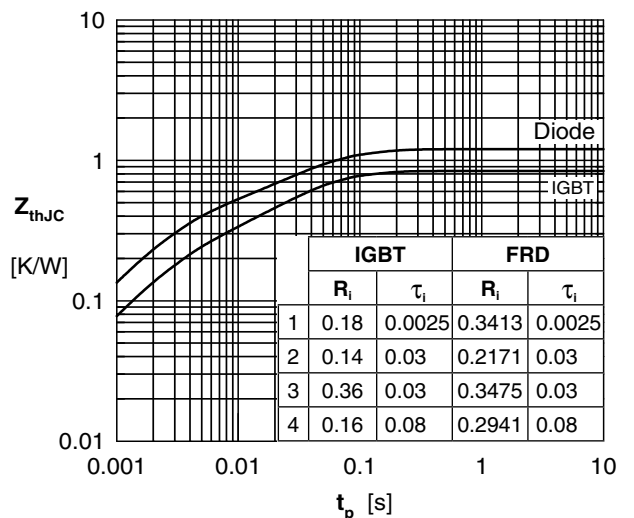


Fig. 12 Typ. transient thermal impedance