IGBT Module
H Bridge

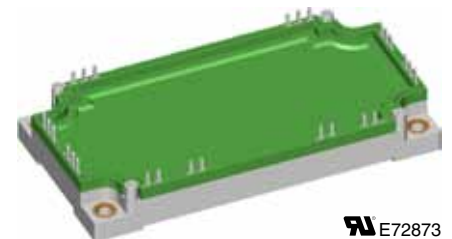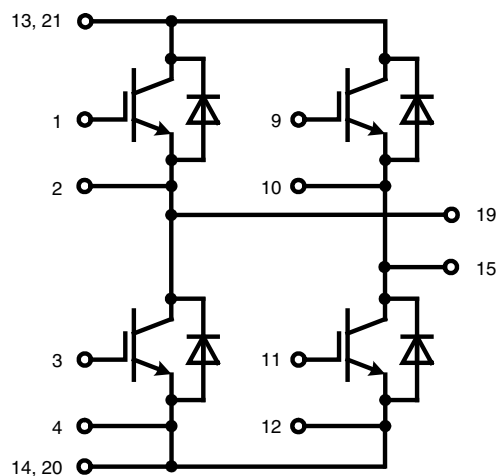$$V_{CES} = 1200 \text{ V}$$
$$I_{C25} = 120 \text{ A}$$
$$V_{CE(sat)} = 1.8 \text{ V}$$

Part name (Marking on product)

MIXA81H1200EH

Features:

- 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 µsec.
  - very low gate charge
  - square RBSOA @ 3x I_C
  - low EMI
- 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

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
- Optimizes pin layout

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Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
						Ratings	
V_{CES}	collector emitter voltage		$T_{VJ} = 25°C$			1200	V
V_{GES}	max. DC gate voltage	continuous				±20	V
V_{GEM}	max. transient collector gate voltage	transient				±30	V
I_{C25}	collector current		$T_C = 25°C$			120	A
I_{C80}			$T_C = 80°C$			84	A
P_{tot}	total power dissipation		$T_C = 25°C$			390	W
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 77 A; V_{GE} = 15 V$	$T_{VJ} = 25°C$		1.8	2.1	V
			$T_{VJ} = 125°C$		2.1		V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 3 mA; V_{GE} = V_{CE}$	$T_{VJ} = 25°C$	5.4	6.0	6.5	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 V$	$T_{VJ} = 25°C$		0.03	0.2	mA
			$T_{VJ} = 125°C$		0.6		mA
I_{GES}	gate emitter leakage current	$V_{GE} = ±20 V$				500	nA
$Q_{G(on)}$	total gate charge	$V_{CE} = 600 V; V_{GE} = 15 V; I_C = 75 A$			230		nC
$t_{d(on)}$	turn-on delay time				70		ns
t_r	current rise time				40		ns
$t_{d(off)}$	turn-off delay time	inductive load	$T_{VJ} = 125°C$		250		ns
t_f	current fall time	$V_{CE} = 600 V; I_C = 75 A$			100		ns
E_{on}	turn-on energy per pulse	$V_{GE} = ±15 V; R_G = 10 Ω$			6.8		mJ
E_{off}	turn-off energy per pulse				8.3		mJ
RBSOA	reverse bias safe operating area	$V_{GE} = ±15 V; R_G = 10 Ω;$	$T_{VJ} = 125°C$ $V_{CEK} = 1200 V$			225	A
SCSOA	short circuit safe operating area						
t_{SC}	short circuit duration	$V_{CE} = 900 V; V_{GE} = ±15 V;$	$T_{VJ} = 125°C$			10	µs
I_{SC}	short circuit current	$R_G = 10 Ω$; non-repetitive		300			A
R_{thJC}	thermal resistance junction to case	(per IGBT)				0.32	K/W

Output Inverter D1 - D6

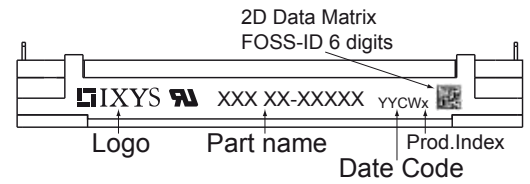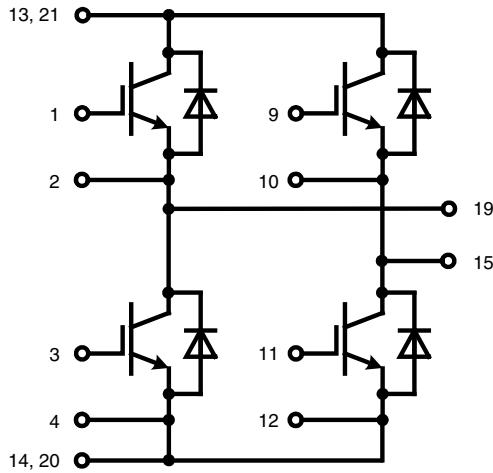| Symbol	Definitions	Conditions		min.	typ.	max.	Unit
						Ratings	
V_{RRM}	max. repetitve reverse voltage		$T_{VJ} = 25°C$			1200	V
I_{F25}	forward current		$T_C = 25°C$			135	A
I_{F80}			$T_C = 80°C$			90	A
V_F	forward voltage	$I_F = 100 A; V_{GE} = 0 V$	$T_{VJ} = 25°C$		1.95	2.2	V
			$T_{VJ} = 125°C$		1.95		V
Q_{rr}	reverse recovery charge	$V_R = 600 V$			12.5		µC
I_{RM}	max. reverse recovery current	$di_F/dt = -1600 A/µs$	$T_{VJ} = 125°C$		100		A
t_{rr}	reverse recovery time	$I_F = 100 A; V_{GE} = 0 V$			350		ns
E_{rec}	reverse recovery energy				4		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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MIXA81H1200EH

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			3000	V~
CTI	*comparative tracking index*				200	
M_d	*mounting torque (M5)*		3		6	Nm
d_S	*creep distance on surface*		10			mm
d_A	*strike distance through air*		7.5			mm
$R_{pin-chip}$	*resistance pin to chip*			2.5		mΩ
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound		0.02		K/W
Weight				300		g

Equivalent Circuits for Simulation
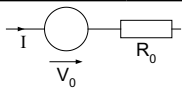
Symbol	Definitions	Conditions		min.	typ.	max.	Unit
						Ratings	
V_0	*IGBT*	T1 - T6	$T_{VJ} = 150°C$		1.1		V
R_0					17.9		mΩ
V_0	*free wheeling diode*	D1 - D6	$T_{VJ} = 150°C$		1.09		V
R_0					9.1		mΩ

$T_C = 25°C$ unless otherwise stated

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MIXA81H1200EH

Circuit Diagram

2D Data Matrix
FOSS-ID 6 digits

IXYS **Ru** XXX XX-XXXXX YYCWx

Logo   Part name   Prod.Index
Date Code

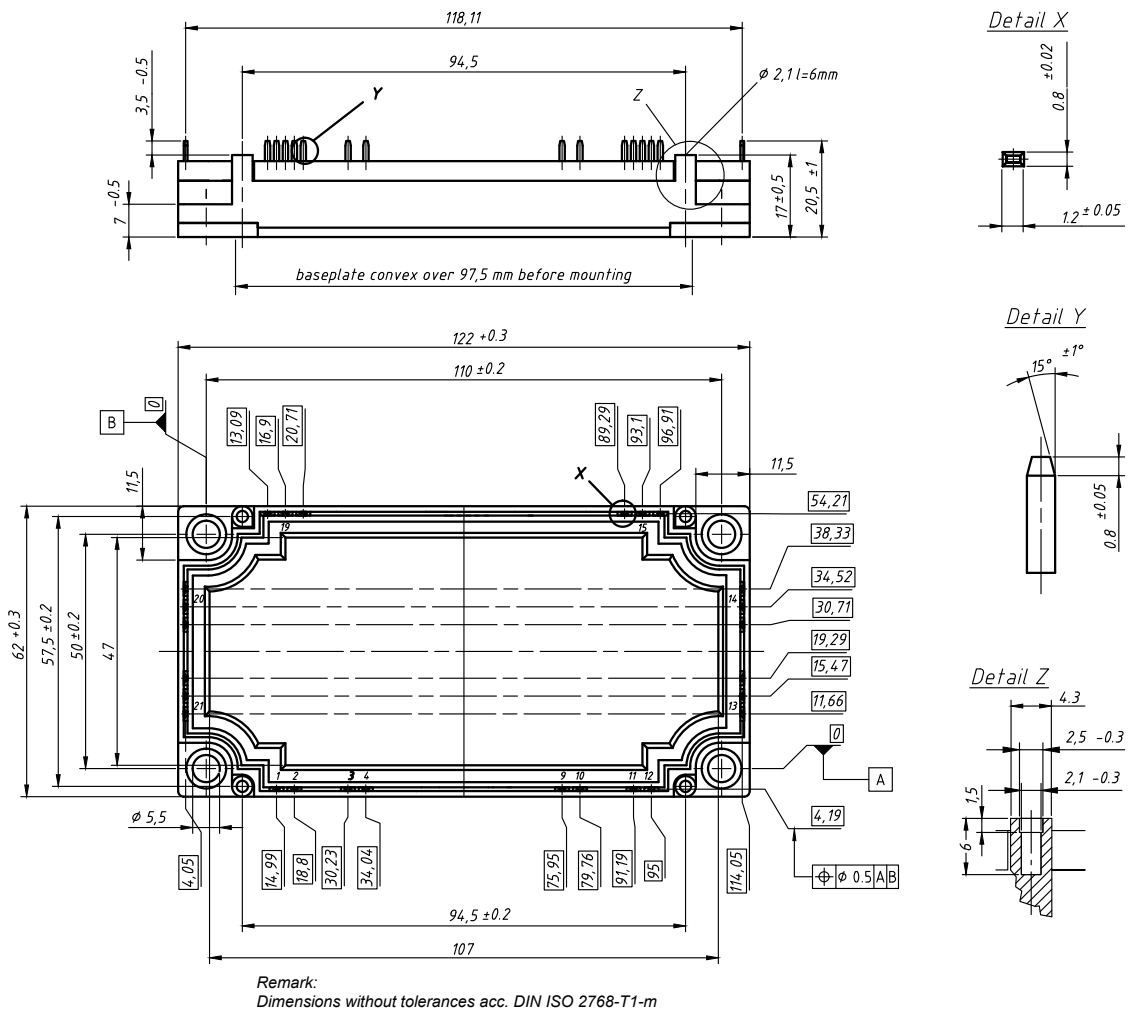**Part number**

M = Module
I = IGBT
X = XPT
A = standard
81 = Current Rating [A]
H = H~ Bridge
1200 = Reverse Voltage [V]
EH = E3-Pack

Outline Drawing

Dimensions in mm (1 mm = 0.0394")

baseplate convex over 97,5 mm before mounting

Detail X

Detail Y

Detail Z

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	MIXA 81 H 1200 EH	MIXA81H1200EH	Box	5	511053

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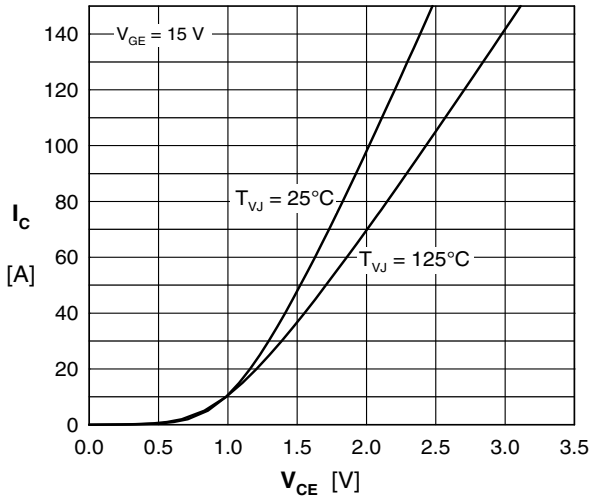
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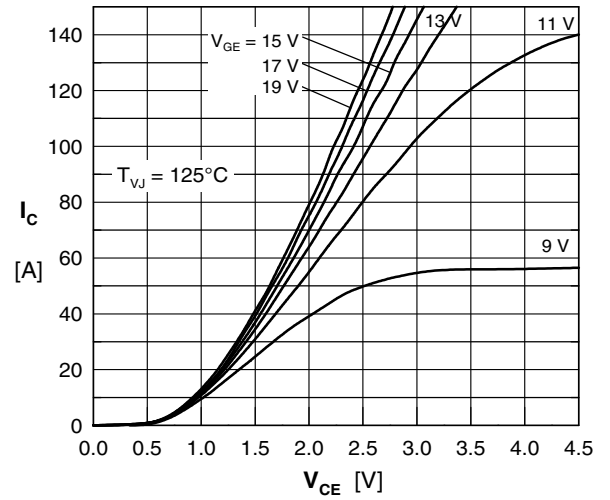**Transistor T1 - T6**

Fig. 1 Typ. output characteristics

Fig. 2 Typ. output characteristics

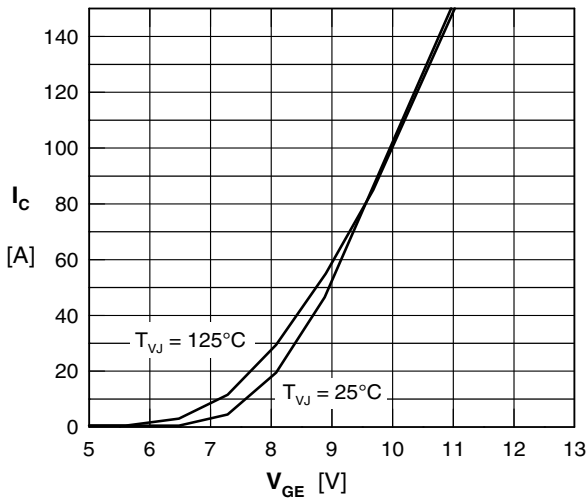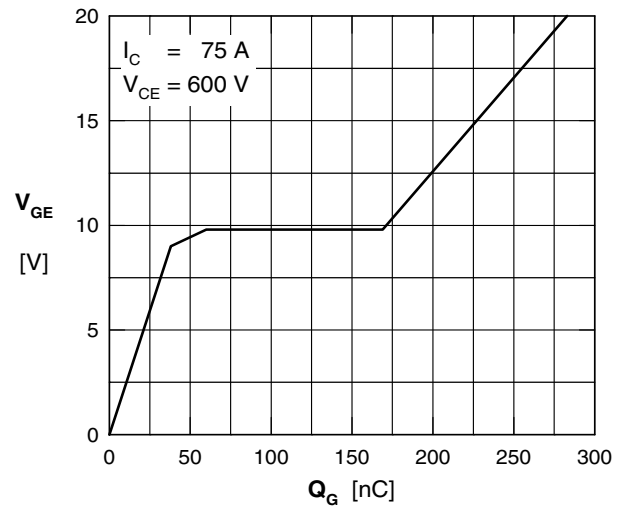

Fig. 3 Typ. tranfer characteristics

Fig. 4 Typ. turn-on gate charge
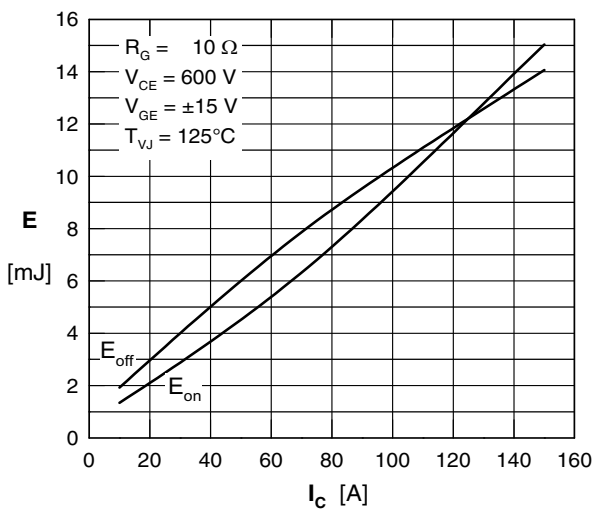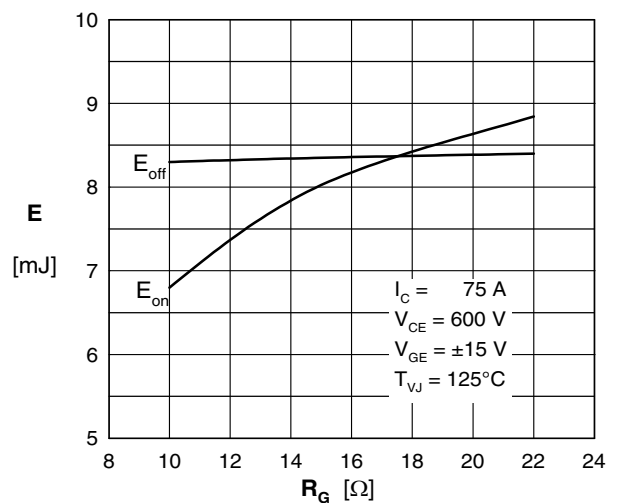

Fig. 5 Typ. switching energy vs. collector current

Fig. 6 Typ. switching energy vs. gate resistance

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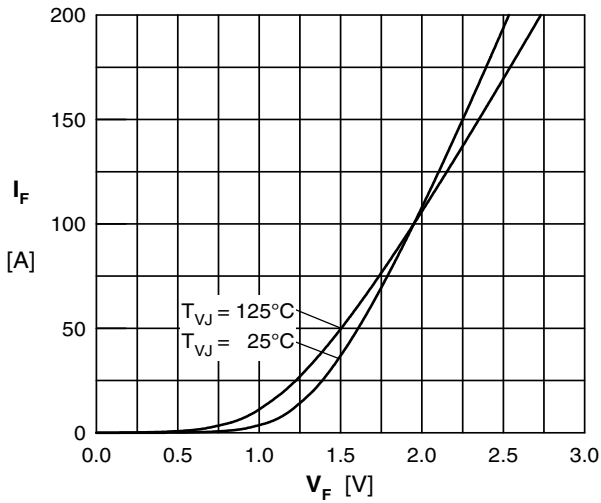
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Inverter D1 - D6
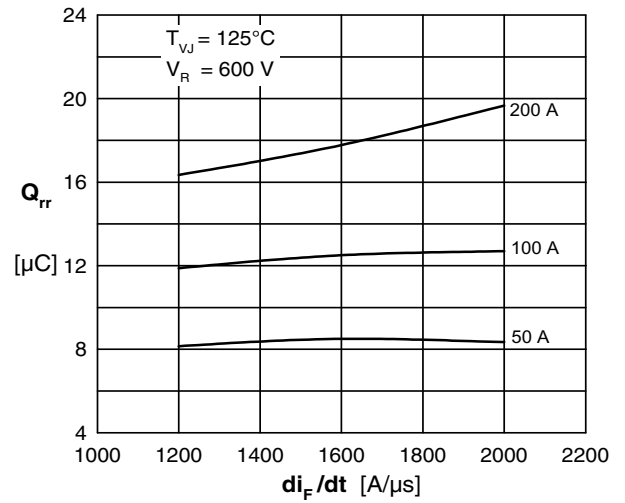

Fig. 7 Typ. Forward current versus V_F

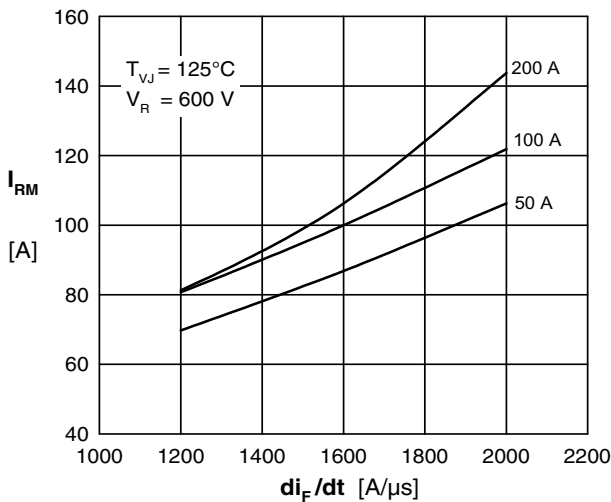Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

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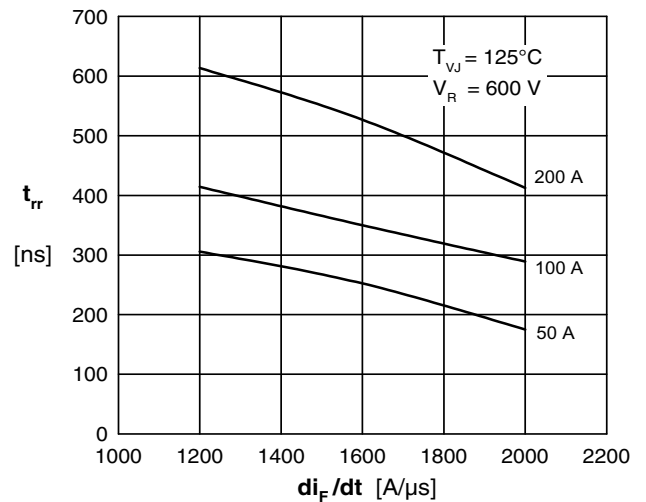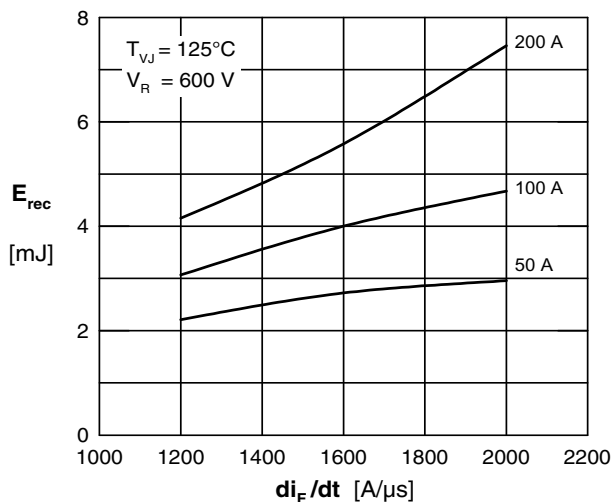

Fig. 10 Typ. recovery time t_{rr} versus di/dt

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

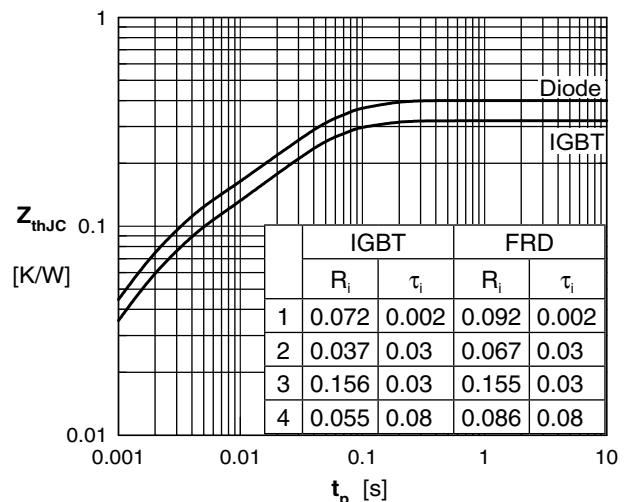|	IGBT		FRD	
	R_i	τ_i	R_i	τ_i
1	0.072	0.002	0.092	0.002
2	0.037	0.03	0.067	0.03
3	0.156	0.03	0.155	0.03
4	0.055	0.08	0.086	0.08

Fig. 12 Typ. transient thermal impedance

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