

Six-Pack XPT IGBT

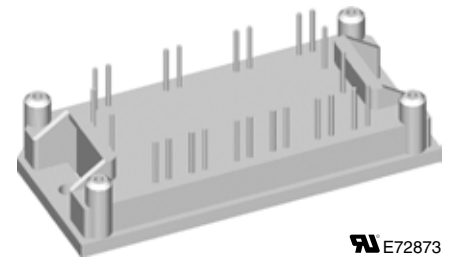
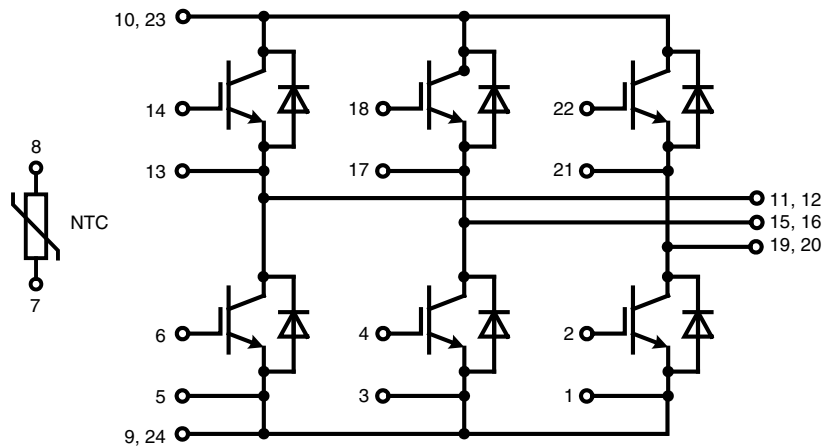
$$V_{CES} = 1200 \text{ V}$$

$$I_{C25} = 60 \text{ A}$$

$$V_{CE(sat)} = 1.8 \text{ V}$$

Part name (Marking on product)

MIXA40W1200TML



 E72873

Pin configuration see outlines.

Features:

- High level of integration
- Rugged XPT design (Xtreme light Punch Through) results in:
 - short circuit rated for 10 μ sec.
 - very low gate charge
 - square RBSOA @ 3x I_C
 - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- 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:

- E1 package
- Assembly height is 17.1 mm
- Insulated base plate
- Pins suitable for wave soldering and PCB mounting
- UL registered E72873

IGBT T1 - T6

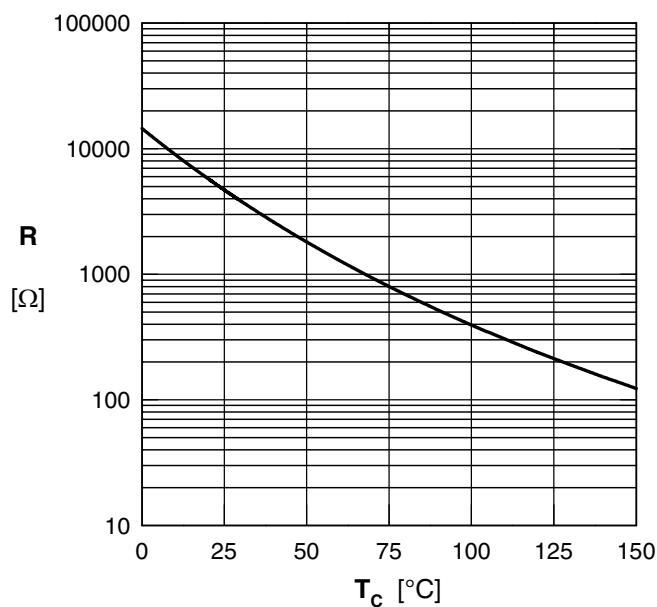
				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit	
V _{CES}	collector emitter voltage	T _{VJ} = 25°C			1200	V	
V _{GES}	max. DC gate voltage	continuous			±20	V	
V _{GEM}	max. transient collector gate voltage	transient			±30	V	
I _{C25}	collector current	T _C = 25°C			60	A	
I _{C80}		T _C = 80°C			40	A	
P _{tot}	total power dissipation	T _C = 25°C			195	W	
V _{CE(sat)}	collector emitter saturation voltage	I _C = 35 A; V _{GE} = 15 V	T _{VJ} = 25°C T _{VJ} = 125°C	1.8 2.1	2.1	V V	
V _{GE(th)}	gate emitter threshold voltage	I _C = 1.5 mA; V _{GE} = V _{CE}	T _{VJ} = 25°C	5.4	5.9	6.5	V
I _{CES}	collector emitter leakage current	V _{CE} = V _{CES} ; V _{GE} = 0 V	T _{VJ} = 25°C T _{VJ} = 125°C	0.02 0.3	0.15	mA 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 = 35 A		106		nC	
t _{d(on)}	turn-on delay time	inductive load V _{CE} = 600 V; I _C = 35 A V _{GE} = ±15 V; R _G = 27 Ω	T _{VJ} = 125°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			3.8		mJ	
E _{off}	turn-off energy per pulse			4.1		mJ	
RBSOA	reverse bias safe operating area	V _{GE} = ±15 V; R _G = 27 Ω; V _{CEK} = 1200 V T _{VJ} = 125°C			105	A	
I _{SC} (SCSOA)	short circuit safe operating area	V _{CE} = 900 V; V _{GE} = ±15 V; R _G = 27 Ω; t _p = 10 μs; non-repetitive	T _{VJ} = 125°C	140		A	
R _{thJC}	thermal resistance junction to case	(per IGBT)			0.64	K/W	
R _{thCH}	thermal resistance case to heatsink			0.21		K/W	

Diode D1 - D6

				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
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		μC
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)			1.2	K/W
R_{thCH}	thermal resistance case to heatsink			0.4		K/W

Temperature Sensor NTC

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

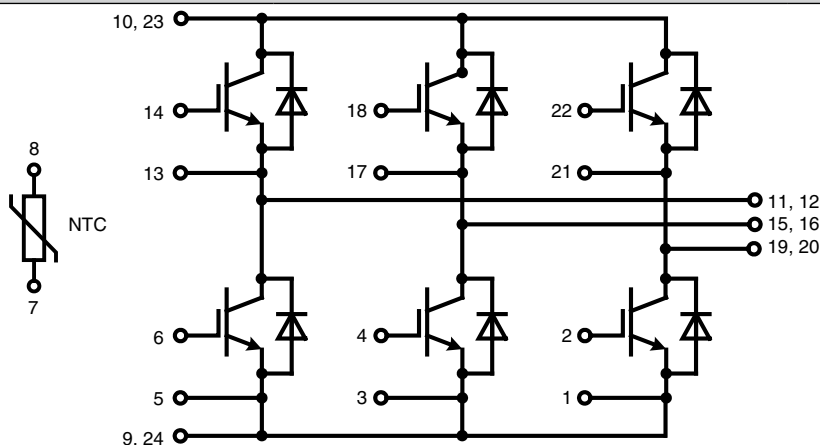


Typ. NTC resistance vs. temperature

Module

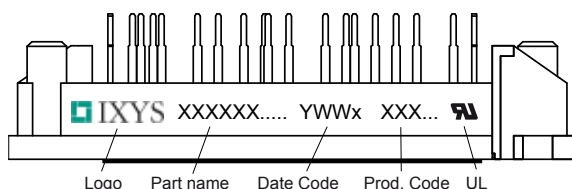
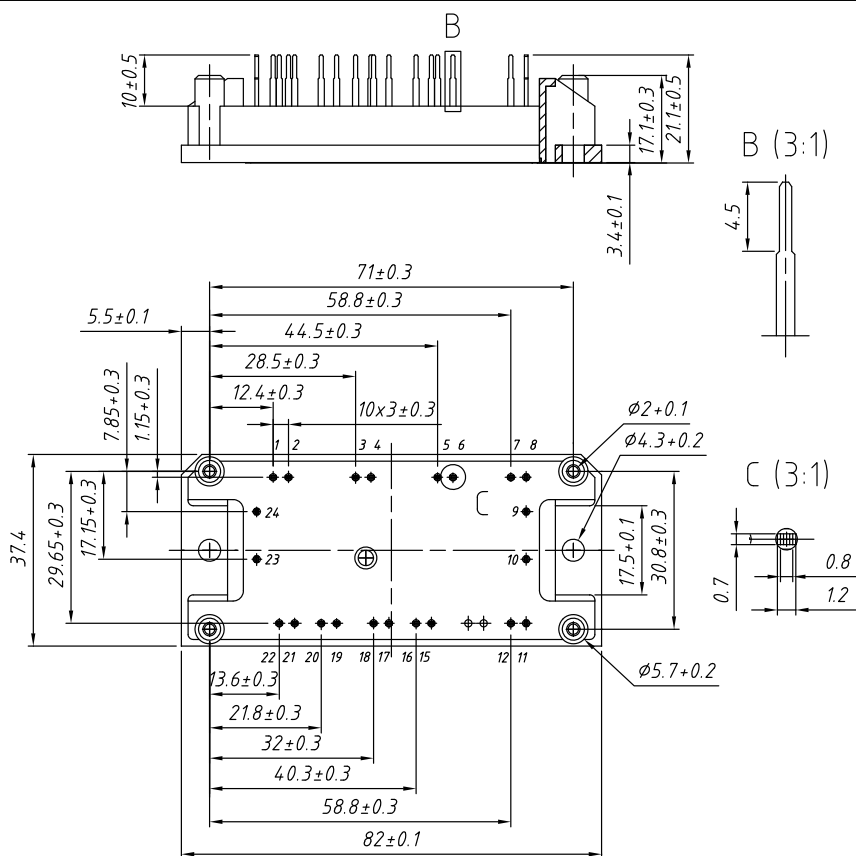
Symbol	Definitions	Conditions	Ratings			
			min.	typ.	max.	Unit
T_{VJ}	operating temperature		-40		125	°C
T_{VJM}	max. virtual junction temperature				150	°C
T_{stg}	storage temperature		-40		125	°C
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$			2500	V~
CTI	comparative tracking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

Circuit Diagram



Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Part number

M = Module
I = IGBT
X = XPT
A = standard
40 = Current Rating [A]
W = 6-Pack
1200 = Reverse Voltage [V]
T = NTC
ML = E1-Pack

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA 40 W 1200 TML	MIXA40W1200TML	Box	10	510628

IGBT T1 - T6

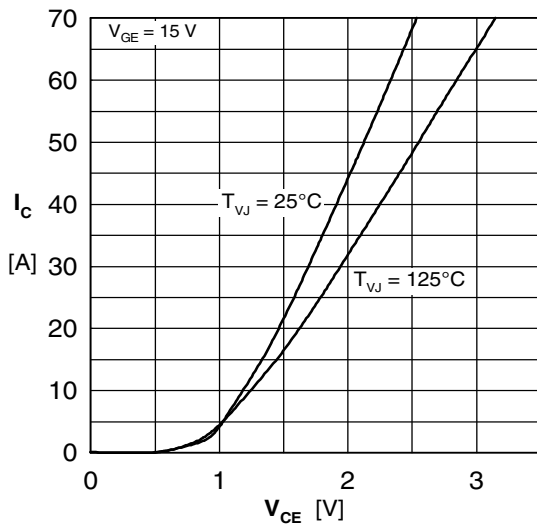


Fig. 1 Typ. output characteristics

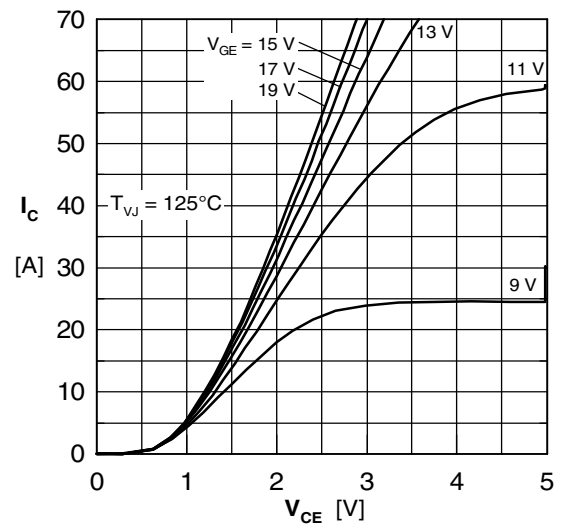


Fig. 2 Typ. output characteristics

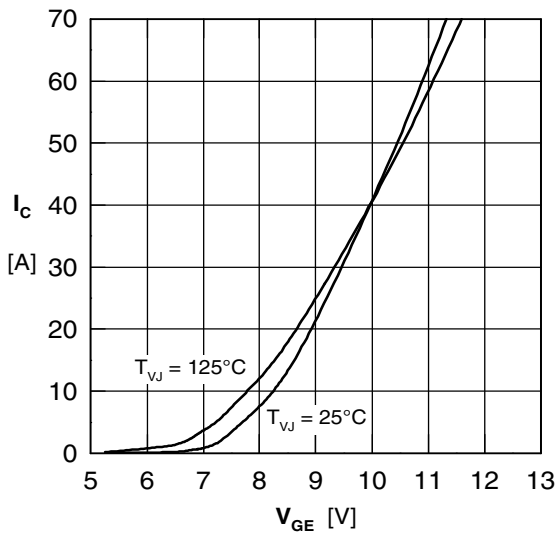


Fig. 3 Typ. transfer characteristics

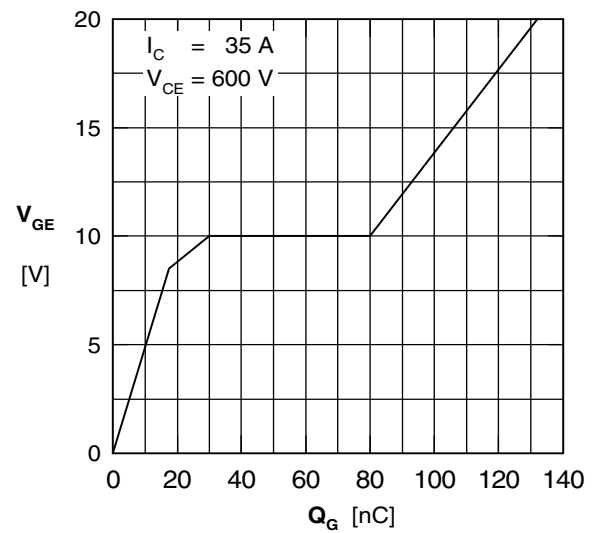


Fig. 4 Typ. turn-on gate charge

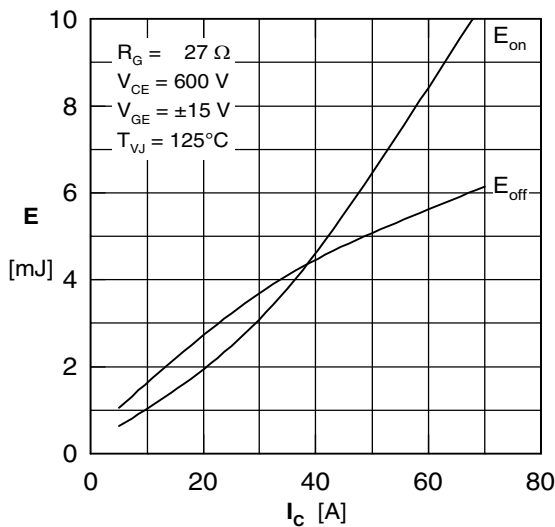


Fig. 5 Typ. switching energy vs. collector current

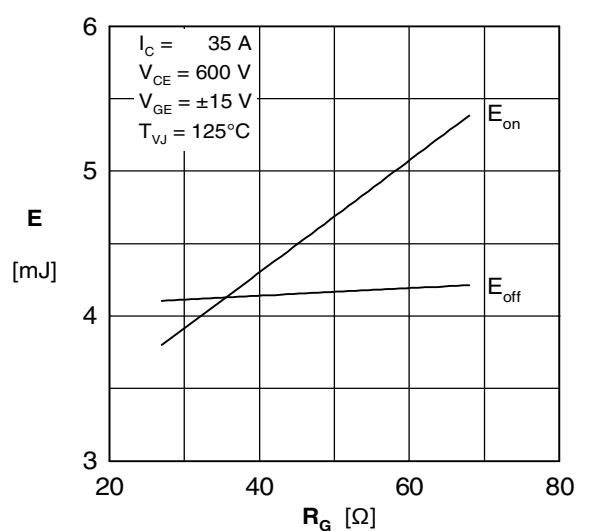


Fig. 6 Typ. switching energy vs. gate resistance

Diode D1 - D6

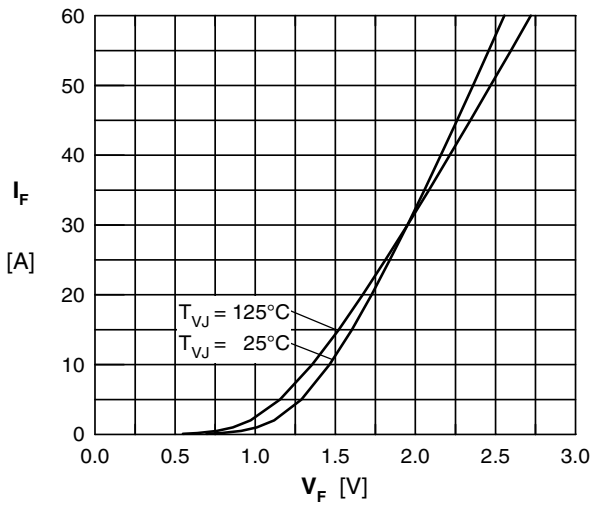


Fig. 7 Typ. Forward current versus V_F

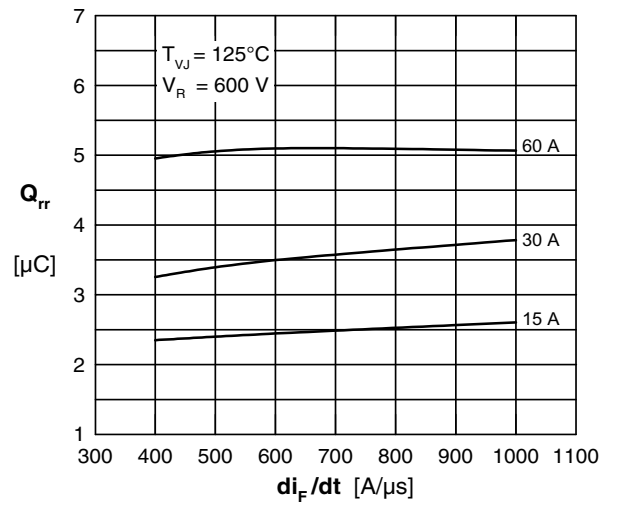


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

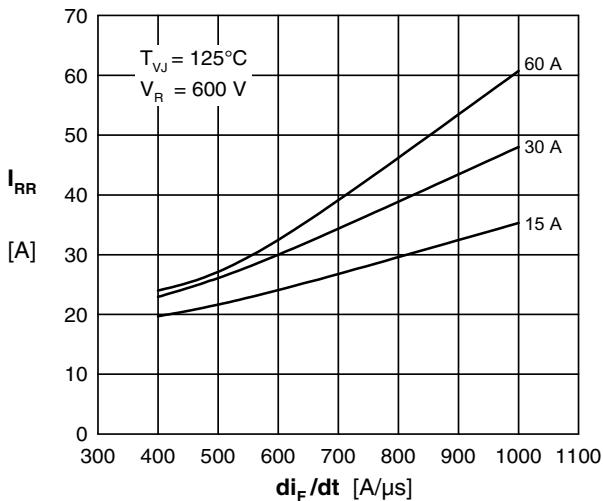


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

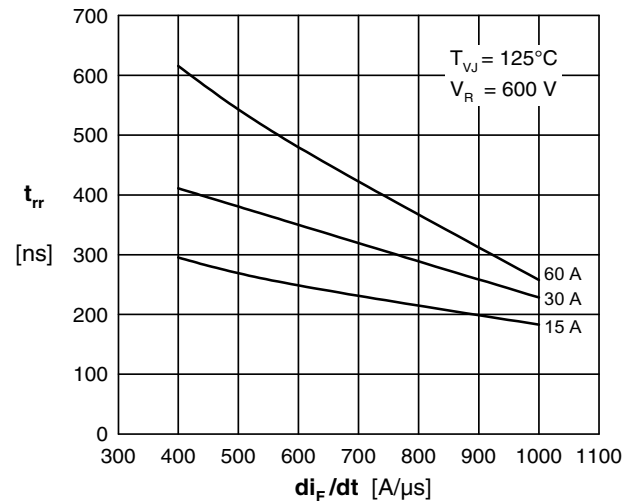


Fig. 10 Typ. recovery time t_{rr} versus di/dt

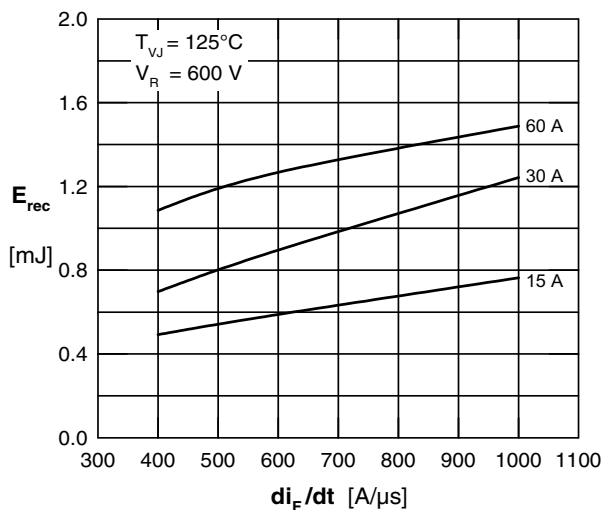


Fig. 11 Typ. recovery energy E_{rec} versus di/dt

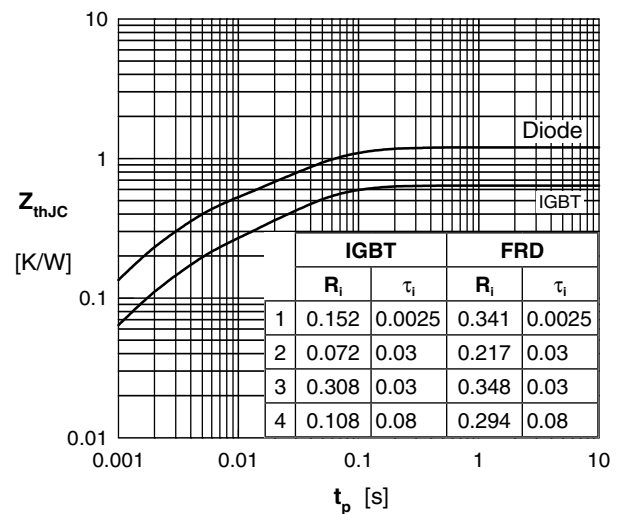


Fig. 12 Typ. transient thermal impedance

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