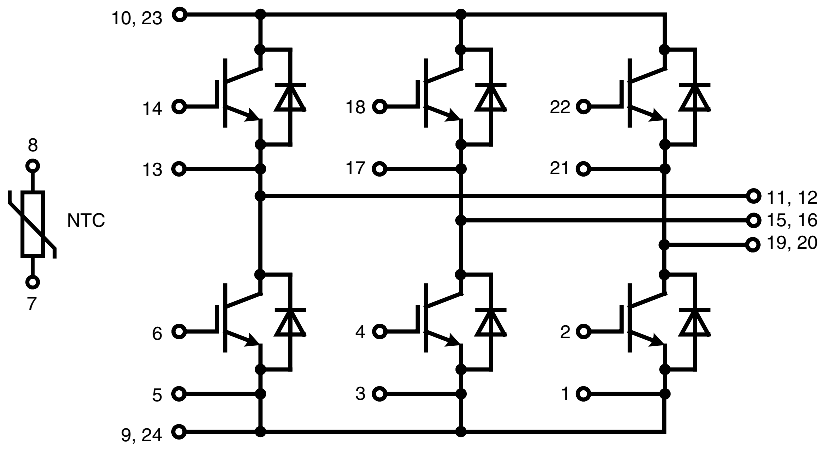
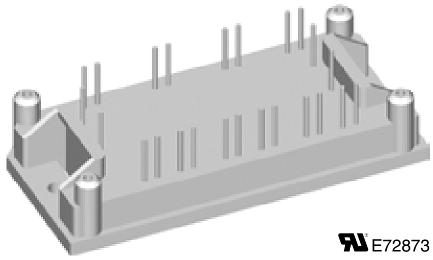
Six-Pack
XPT IGBT

V_{CES} = 1200 V
I_{C25} = 17 A
$V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIXA10W1200TML





Pin configuration see outlines.

Features:
- High level of integration
- 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 $V_{CE(sat)}$
- 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

Ouput Inverter T1 - T6

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			17 12	A A
P_{tot}	*total power dissipation*		T_C = 25°C			65	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 9 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 = 0.3 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 = 10 A			27		nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{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*	inductive load V_{CE} = 600 V; I_C = 10 A V_{GE} = ±15 V; R_G = 100 Ω	T_{VJ} = 125°C		70 40 250 100 1.1 1.1		ns ns ns ns mJ mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 100 Ω; V_{CEK} = 1200 V	T_{VJ} = 125°C			30	A
I_{SC} (SCSOA)	*short circuit safe operating area*	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 100 Ω; t_p = 10 µs; non-repetitive	T_{VJ} = 125°C		40		A
R_{thJC} R_{thCH}	*thermal resistance junction to case* *thermal resistance case to heatsink*	(per IGBT)			 0.7	2.0	K/W K/W

Output Inverter D1 - D6

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			19 13	A A
V_F	*forward voltage*	I_F = 10 A; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.95 1.95	2.2	V V
Q_{rr} I_{RM} t_{rr} E_{rec}	*reverse recovery charge* *max. reverse recovery current* *reverse recovery time* *reverse recovery energy*	V_R = 600 V di_F/dt = -250 A/µs I_F = 10 A; V_{GE} = 0 V	T_{VJ} = 125°C		1.3 10.5 350 0.35		µC A ns mJ
R_{thJC} R_{thCH}	*thermal resistance junction to case* *thermal resistance case to heatsink*	(per diode)			 0.8	2.4	K/W K/W

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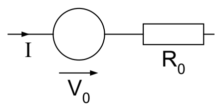
Module

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*	$I_{ISOL} \leq 1$ mA; 50/60 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

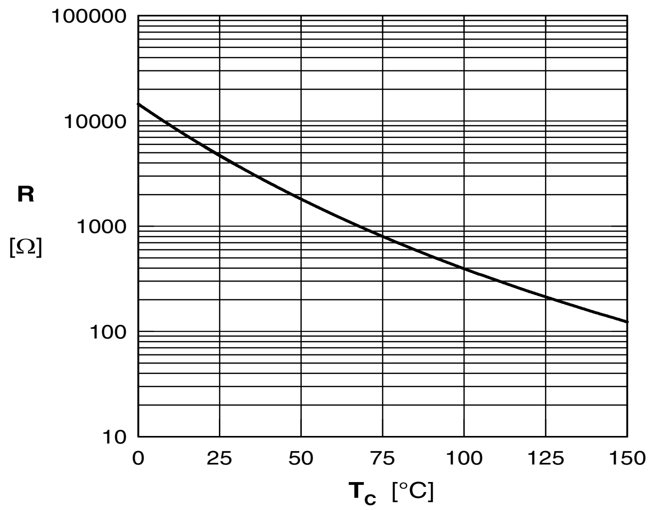
Temperature Sensor NTC

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
R_{25}	*resistance*	T_C = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$				3375		K

Equivalent Circuits for Simulation

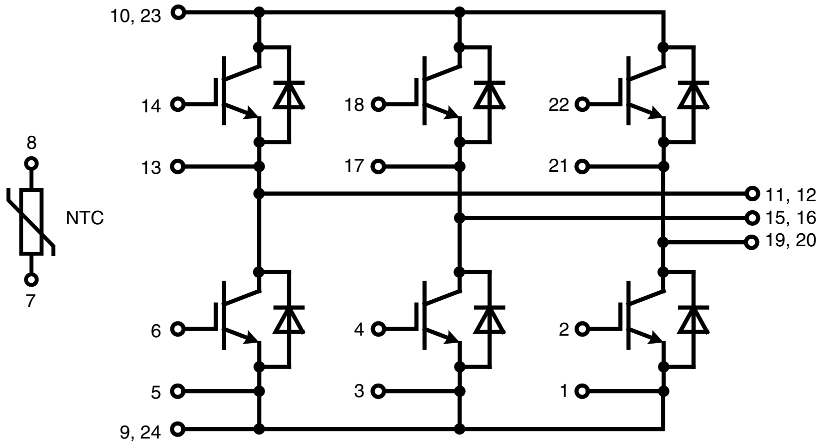


Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_0	*IGBT*	T_{VJ} = 150°C		1.1		V
R_0				153		mΩ
V_0	*Diode*	T_{VJ} = 150°C		1.25		V
R_0				85		mΩ



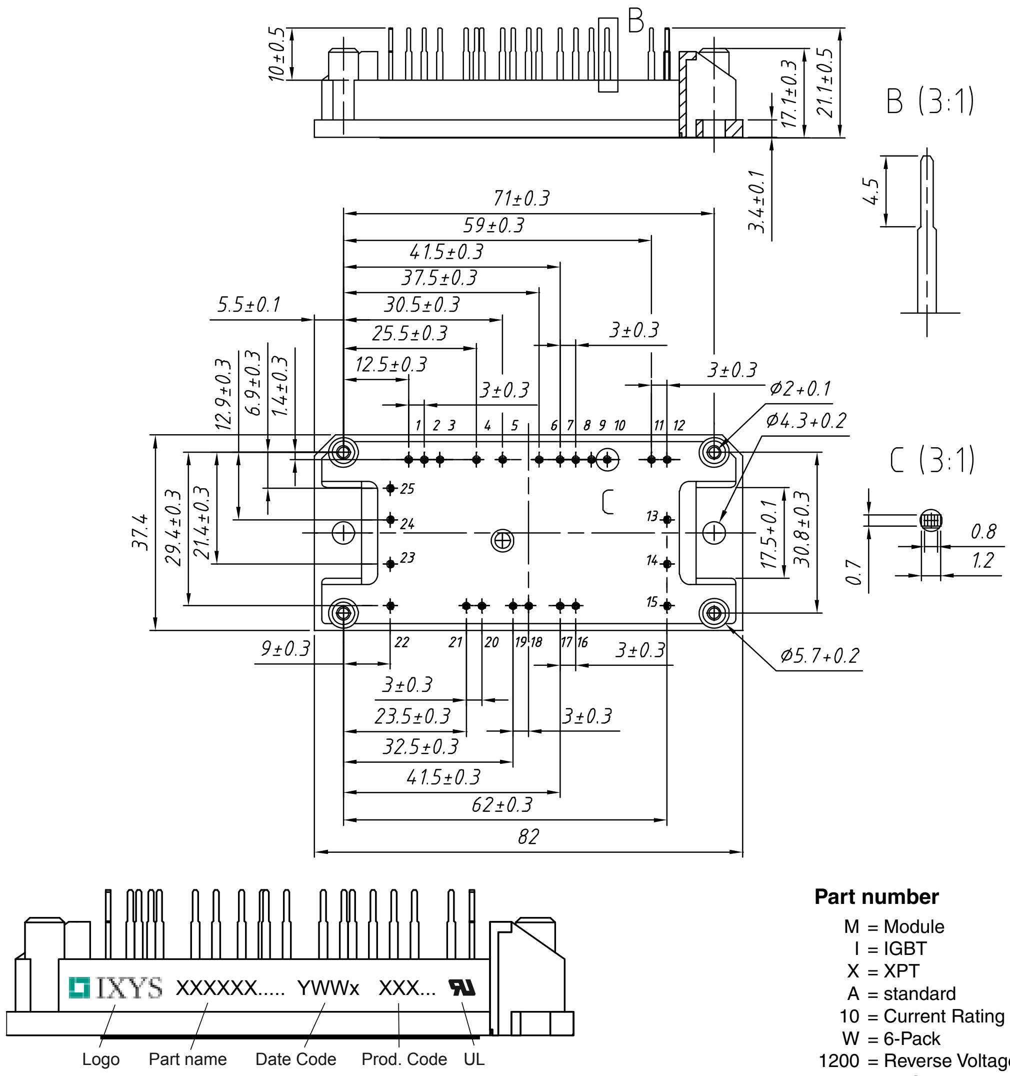
Typ. NTC resistance versus temperature

Circuit Diagram



Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Part number

M = Module
I = IGBT
X = XPT
A = standard
10 = 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 10 W 1200 TML	MIXA10W1200TML	Box	10	510155

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IGBT T1 - T6

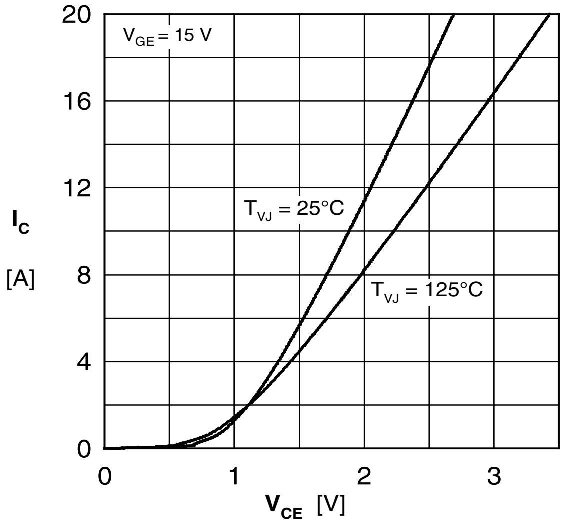

Fig. 1 Typ. output characteristics

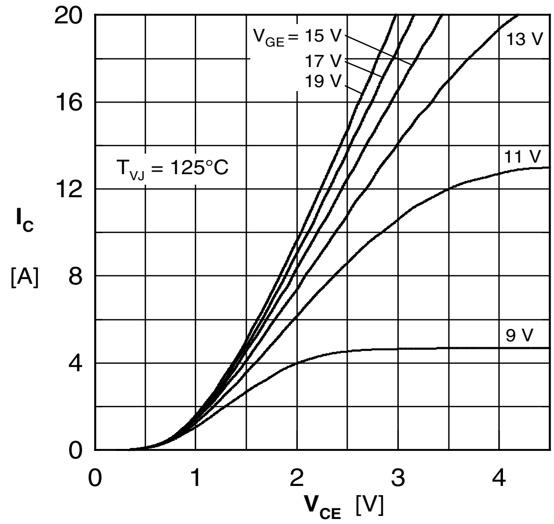

Fig. 2 Typ. output characteristics

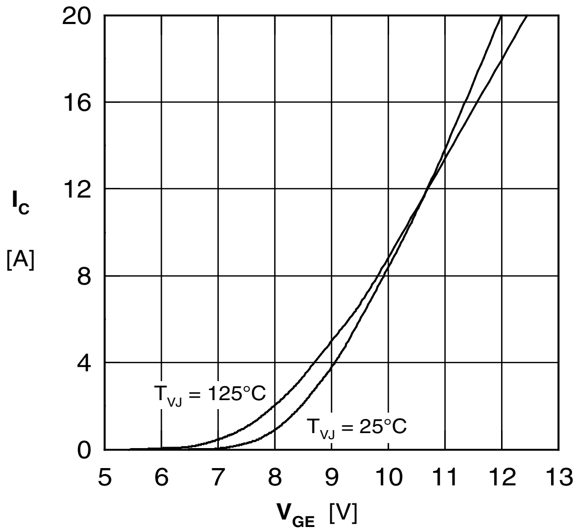

Fig. 3 Typ. tranfer characteristics

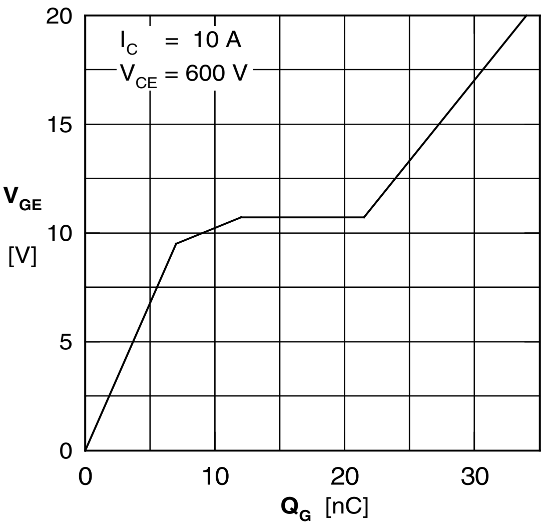

Fig. 4 Typ. turn-on gate charge

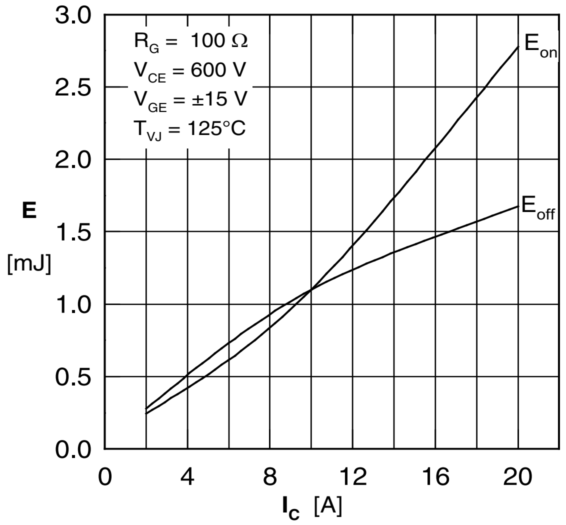

Fig. 5 Typ. switching energy vs. collector current

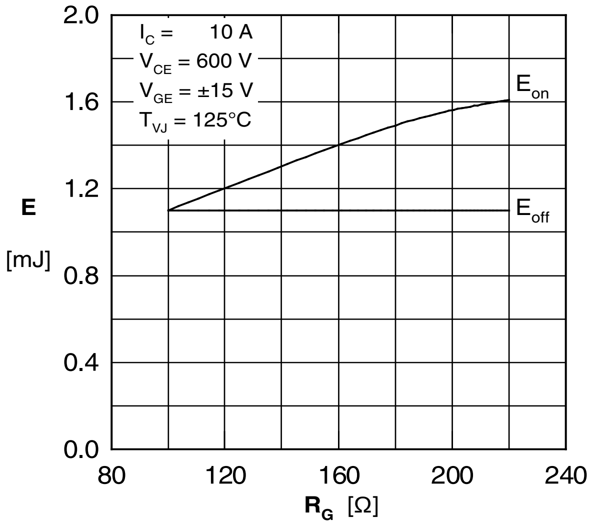

Fig. 6 Typ. switching energy vs. gate resistance

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Diode D1 - D6

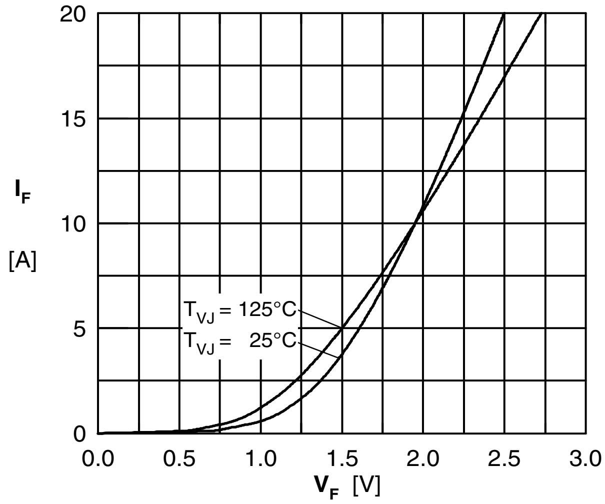


Fig. 7 Typ. forward characteristics

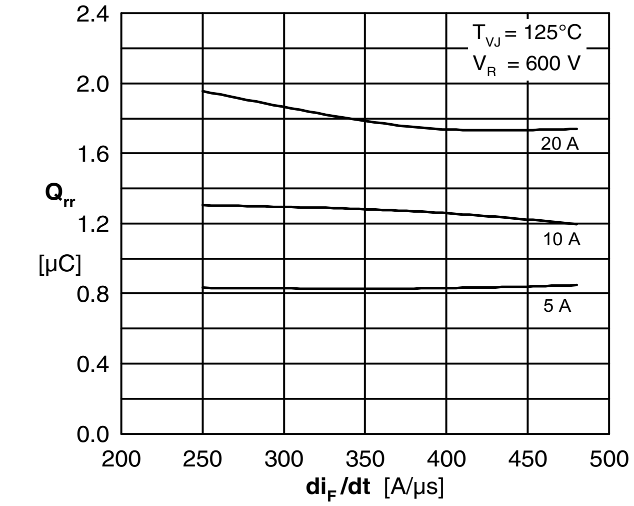


Fig. 8 Typical reverse recovery charge Q_{rr} versus. di_F/dt (125°C)

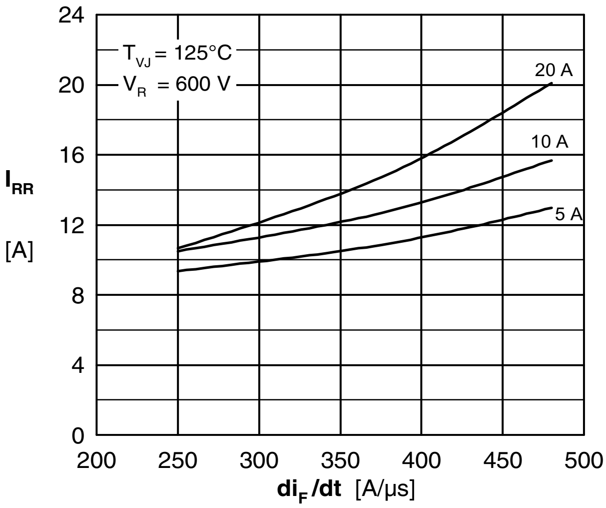


Fig. 9 Typical peak reverse current I_{RR} versus di_F/dt (125°C)

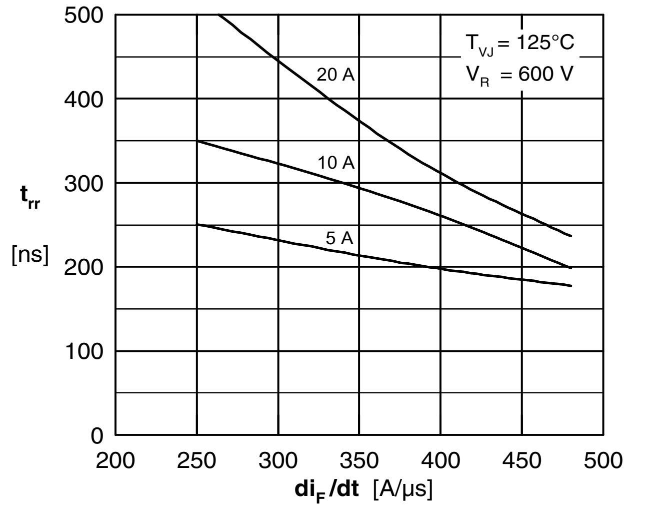


Fig. 10 Typ. recovery time t_{rr} vs. di/dt (125°C)

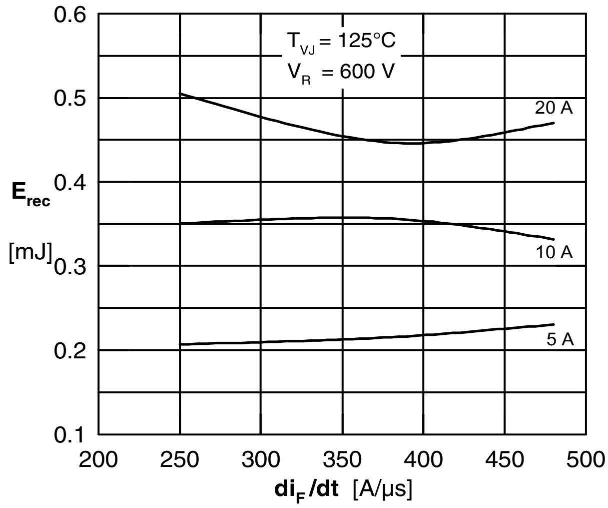
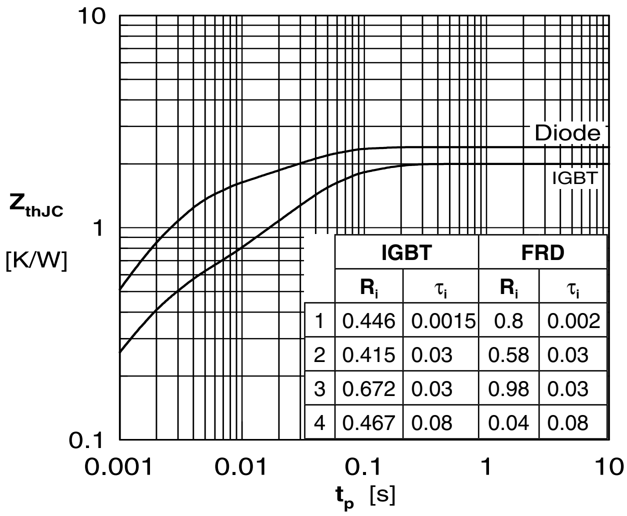


Fig. 11 Typ. recovery energy E_{rec} vs. di_F/dt (125°C)



	IGBT		FRD	
	R_i	τ_i	R_i	τ_i
1	0.446	0.0015	0.8	0.002
2	0.415	0.03	0.58	0.03
3	0.672	0.03	0.98	0.03
4	0.467	0.08	0.04	0.08

Fig. 12 Transient thermal impedance

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