XPT IGBT

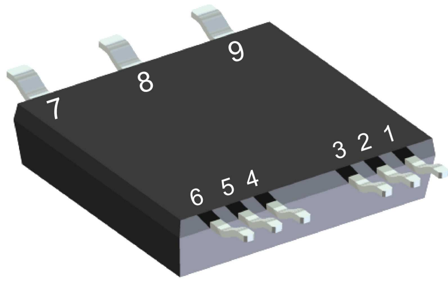
V_{CES}	=	1200 V
I_{C25}	=	32 A
$V_{CE(sat)}$	=	1.8 V

ISOPLUS™ Surface Mount Power Device
Boost Topology
Boost/Brake Chopper + free wheeling diode + Vcesat-Diode

Part number

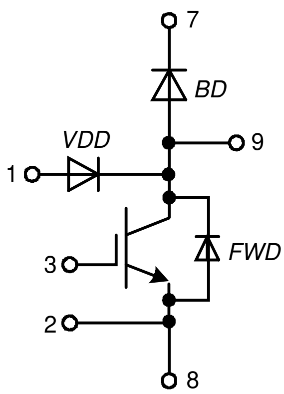
IXA20RG1200DHGLB

Marking on Product: IXA20RG1200DHGLB



Backside: isolated

E72873



Features / Advantages:

- XPT IGBT
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
  - short tail current for optimized performance in resonant circuits
- Sonic™ diode
  - fast reverse recovery
  - low operating forward voltage
  - low leakage current
  - low temperature dependency of reverse recovery
- Vcesat detection diode (VDD)
  - integrated into package
  - very fast diode

Applications:

- AC drives
  - brake chopper
- PFC
  - boost chopper
- Switched reluctance drives

Package: SMPD

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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Free Wheeling Diode FWD

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
I_R	*reverse current, drain current*	V_R = 1200 V	T_{VJ} = 25°C			25	µA
	* not applicable, see Ices at IGBT	V_R = 1200 V	T_{VJ} = 125°C			0.4	mA
V_F	*forward voltage drop*	I_F = 20 A	T_{VJ} = 25°C			2.20	V
		I_F = 40 A					V
		I_F = 20 A	T_{VJ} = 125°C			2.20	V
		I_F = 40 A					V
I_{FAV}	*average forward current*	T_C = 80°C; rectangular d = 0.5	T_{VJ} = 150°C			18	A
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			1.29	V
r_F	*slope resistance*					41	mΩ
R_{thJC}	*thermal resistance junction to case*					1.35	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.40		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			93	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			150	A
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		10		pF

VCEsat Detection Diode VDD

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
I_R	*reverse current, drain current*	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			2	µA
		$V_{R/D}$ = 1200 V	T_{VJ} = +02°C			0.03	mA
V_F	*forward voltage drop*	I_F = 1 A	T_{VJ} = 25°C			2.20	V
		I_F = 1 A	T_{VJ} = 12 °C			1.80	V
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			1.30	V
r_F	*slope resistance*					390	mΩ
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		tbd		pF
I_{RM}	*max. reverse recovery current*	V_R = +02 V; I_F = 1 A; -di/dt = +02 A/µs	T_{VJ} 25°C		2.3		A
			T_{VJ} 125°C		tbd		A
t_{rr}	*reverse recovery time*		T_{VJ} 25°C		40		ns
			T_{VJ} 125°C		tbd		ns

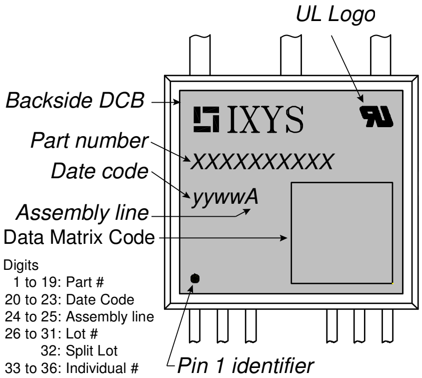
Boost IGBT

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			32	A
I_{C80}			T_C = 80°C			23	A
P_{tot}	*total power dissipation*		T_C = 25°C			125	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 15 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.1	V
			T_{VJ} = 125°C		2		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 0.6 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			0.1	mA
			T_{VJ} = 125°C		0.1		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 = 15 A			48		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 15 A V_{GE} = ±15 V; R_G = 56 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*				1.55		mJ
E_{off}	*turn-off energy per pulse*				1.7		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 56 Ω V_{CEmax} = 1200 V	T_{VJ} = 125°C				
I_{CM}						45	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 1200 V V_{CE} = 900 V; V_{GE} = ±15 V R_G = 56 Ω; non-repetitive	T_{VJ} = 125°C				
t_{SC}	*short circuit duration*					10	µs
I_{SC}	*short circuit current*				60		A
R_{thJC}	*thermal resistance junction to case*					1	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.30		K/W

Boost Diode BD

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			27	A
I_{F80}			T_C = 80°C			18	A
V_F	*forward voltage*	I_F = 20 A	T_{VJ} = 25°C			2.20	V
			T_{VJ} = 125°C		1.90		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			0.03	mA
			T_{VJ} = 125°C		0.12		mA
Q_{rr}	*reverse recovery charge*	V_R = 600 V $-di_F/dt$ = 400 A/µs I_F = 20 A; V_{GE} = 0 V	T_{VJ} = 125°C		3		µC
I_{RM}	*max. reverse recovery current*				20		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				0.7		mJ
R_{thJC}	*thermal resistance junction to case*					1.35	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.4		K/W

Package SMPD				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				100	A
T_{VJ}	*virtual junction temperature*			-55		150	°C
T_{op}	*operation temperature*			-55		125	°C
T_{stg}	*storage temperature*			-55		150	°C
Weight					8.5		g
F_C	*mounting force with clip*			40		130	N
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	1.6			mm
$d_{Spb/Apb}$			*terminal to backside*	4.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3000			V
		t = 1 minute		2500			V



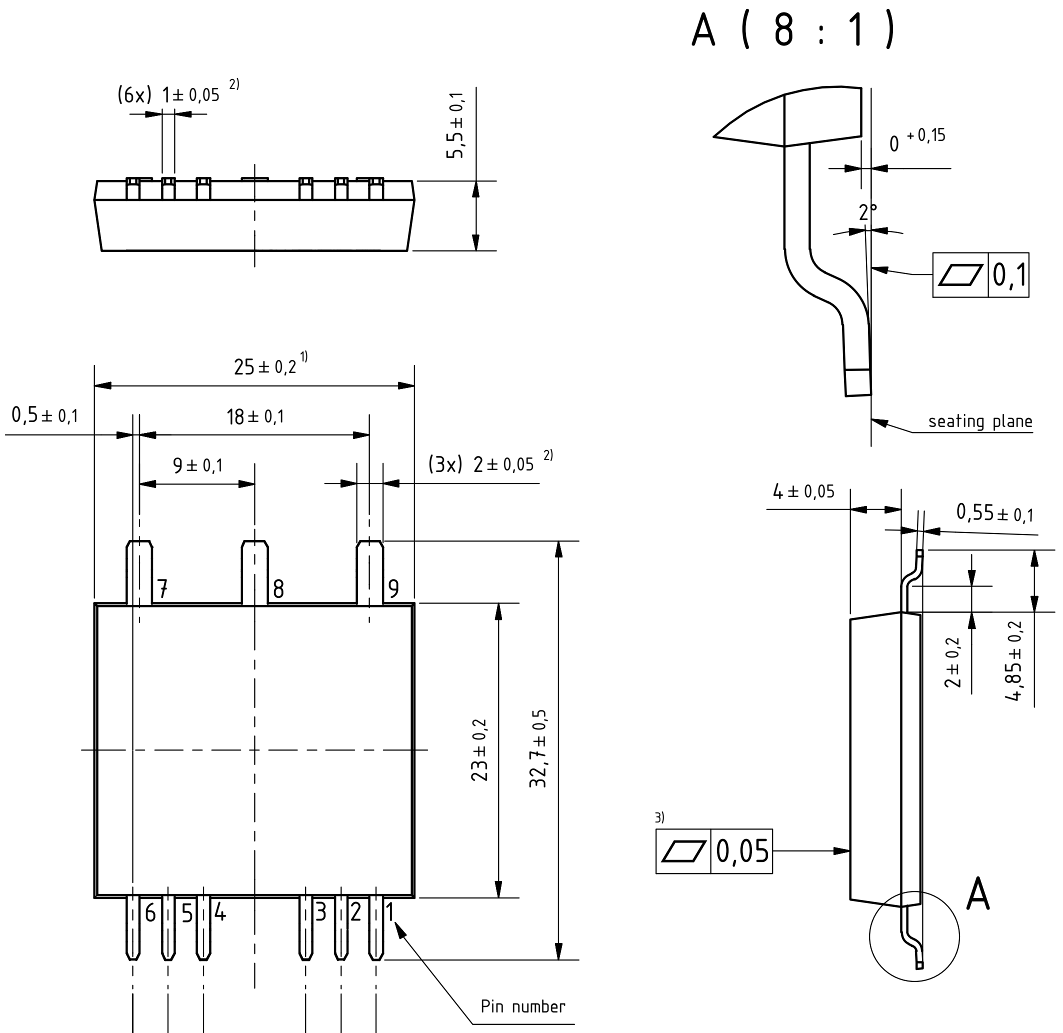
Part description

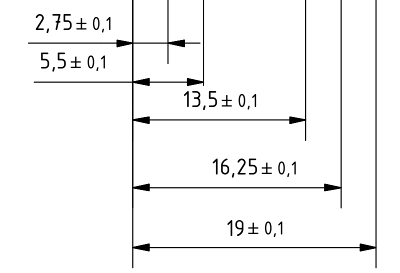
I = IGBT
X = XPT IGBT
A = Gen 1 / std
20 = Current Rating [A]
RG = Boost/Brake Chopper + free wheeling diode + Vcesat-Diode
1200 = Reverse Voltage [V]
D = Diode
H = Sonic Fast Recovery Diode
G = extreme fast
LB = SMPD-B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA20RG1200DHGLB-TUB	IXA20RG1200DHGLB	Tube	20	516134
Alternative	IXA20RG1200DHGLB-TRR	IXA20RG1200DHGLB	Tape & Reel	200	523508

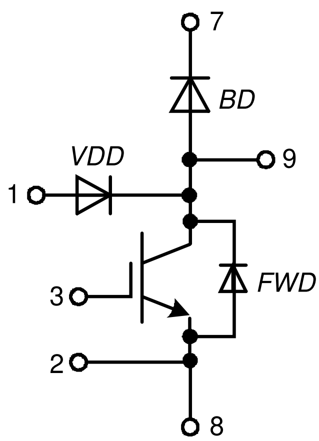
Similar Part	Package	Voltage class
IXA30RG1200DHGLB	SMPD-B	1200
IXA40RG1200DHGLB	SMPD-B	1200

Outlines SMPD





Notes:
1) potrusion may add 0.2 mm max. on each side
2) additional max. 0.05 mm per side by punching misalignement or overlap of dam bar or bending compression
3) DCB area 10 to 50 µm convex; position of DCB area in relation to plastic rim: ±25 µm (measured 2 mm from Cu rim)
4) terminal plating: 0.2 - 1 µm Ni + 10 - 25 µm Sn (gal v.) cutting edges may be partially free of plating



Boost IGBT

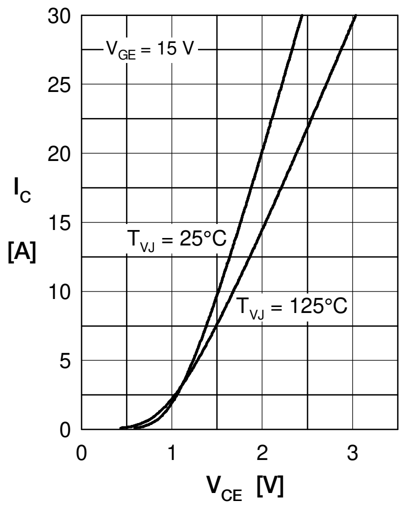


Fig. 1 Typ. output characteristics

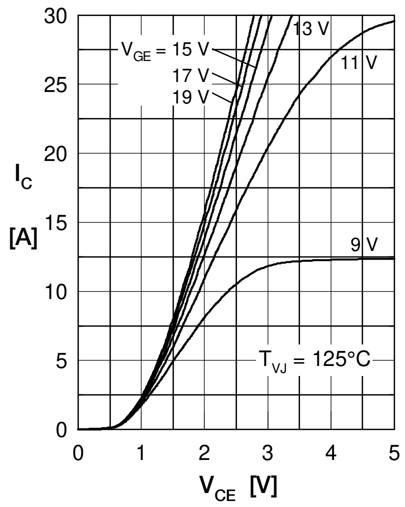


Fig. 2 Typ. output characteristics

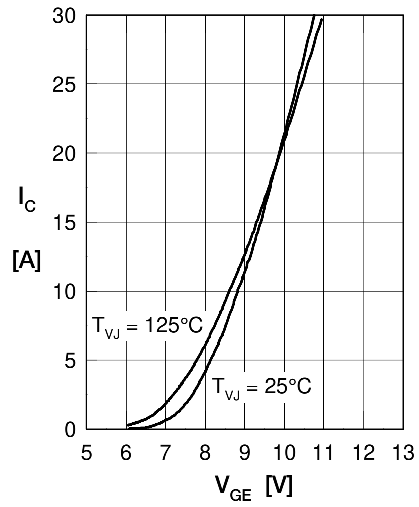


Fig. 3 Typ. tranfer characteristics

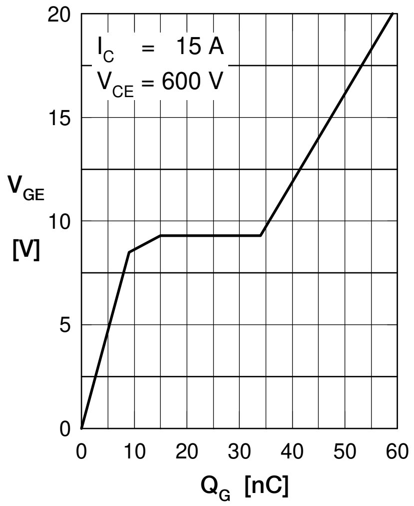


Fig. 4 Typ. turn-on gate charge

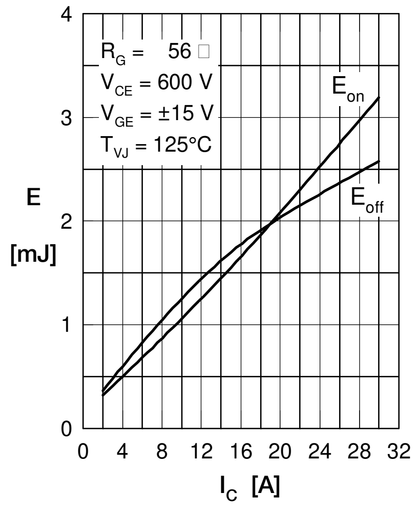


Fig. 5 Typ. switching energy
versus collector current

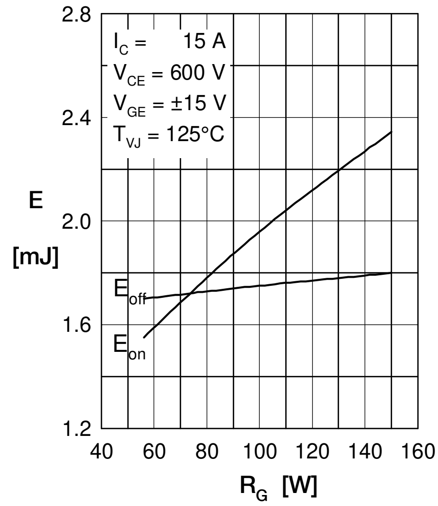


Fig. 6 Typ. switching energy
versus gate resistance

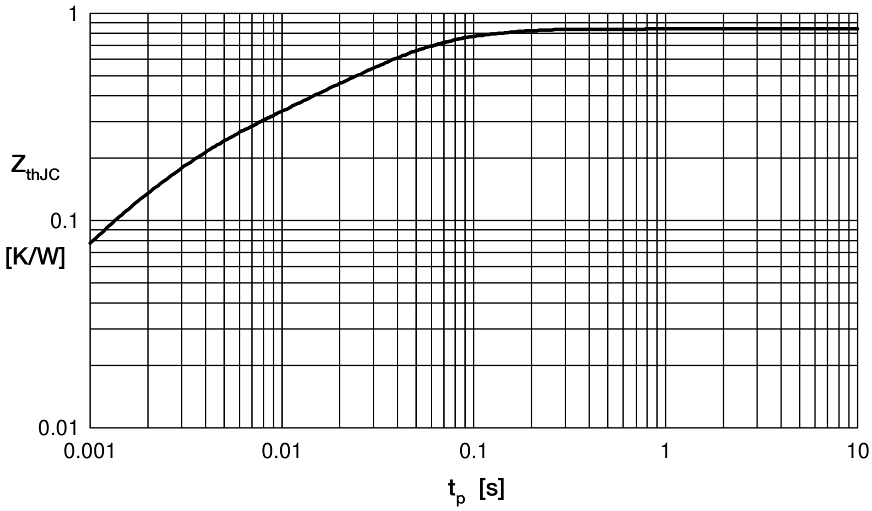


Fig. 7 Typ. transient thermal impedance junction to case

Boost Diode BD

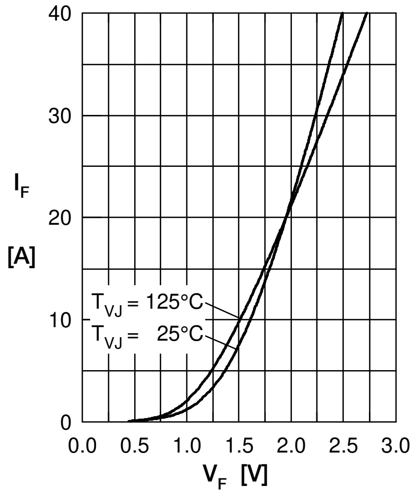


Fig. 1 Typ. Forward current versus V_F

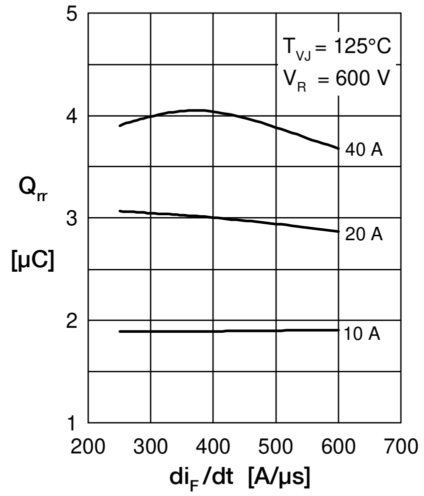


Fig. 2 Typ. reverse recov. charge Q_{rr} versus di/dt

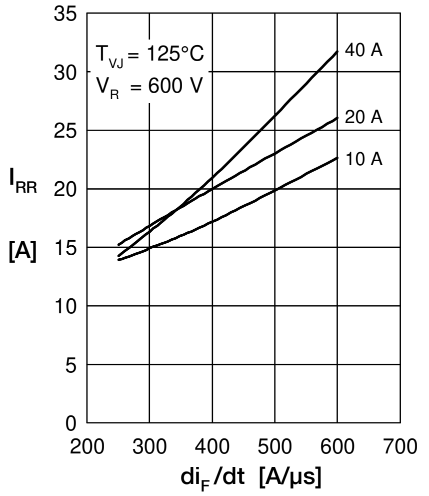


Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

Fig. 4 Dynamic parameters Q_{rr}, I_{RM} versus di/dt

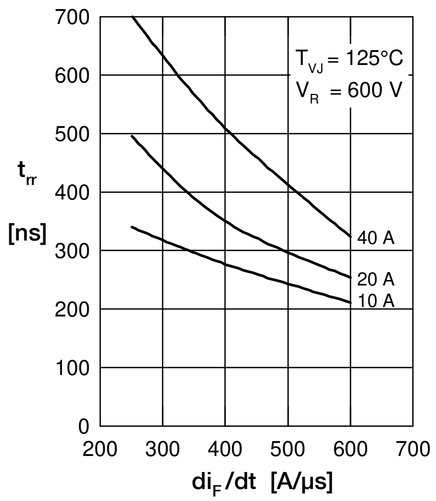


Fig. 5 Typ. recovery time t_{rr} versus di/dt

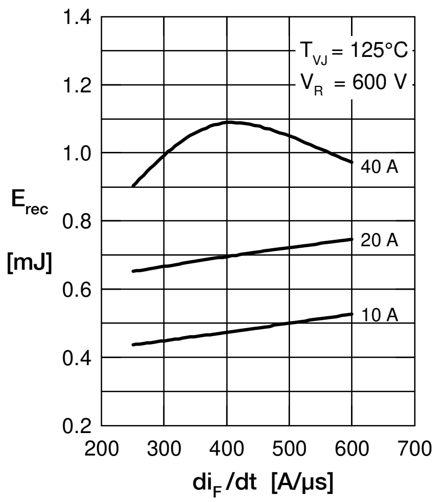


Fig. 6 Typ. recovery energy E_{rec} versus di/dt

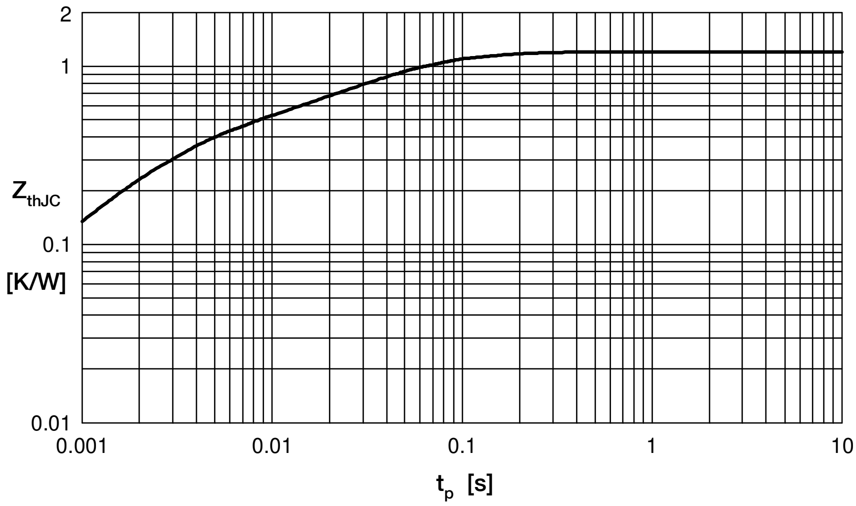


Fig. 7 Typ. transient thermal impedance junction to case