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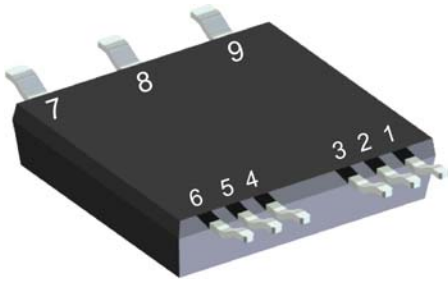
XPT IGBT

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

ISOPLUS™ Surface Mount Power Device
Boost Topology
XPT IGBT

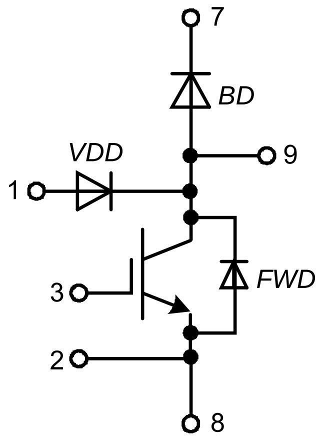
Part number

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

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

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
		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*	*for power loss calculation only*				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} = 125°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} = 125°C			1.80	V
V_{F0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 150°C			1.30	V
r_F	*slope resistance*	*for power loss calculation only*				390	mΩ
C_J	*junction capacitance*	V_R = 400V; f = 1 MHz	T_{VJ} = 25°C		tbd		pF
I_{RM}	*max. reverse recovery current*	V_R = 100 V; I_F = 1 A; -di/dt = 100 A/µs	T_{VJ} = 25°C		2.3		A
			T_{VJ} = 125°C		tbd		A
t_{rr}	*reverse recovery time*	V_R = 100 V; I_F = 1 A; -di/dt = 100 A/µs	T_{VJ} = 25°C		40		ns
			T_{VJ} = 125°C		tbd		ns

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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 collector gate 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	T_{VJ} = 125°C		70		ns
t_r	*current rise time*	V_{CE} = 600 V; I_C = 15 A			40		ns
$t_{d(off)}$	*turn-off delay time*	V_{GE} = ±15 V; R_G = 56 Ω			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	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200 V				45	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 1200 V					
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 = 56 Ω; non-repetitive			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			3		µC
I_{RM}	*max. reverse recovery current*	$-di_F/dt$ = 400 A/µs	T_{VJ} = 125°C		20		A
t_{rr}	*reverse recovery time*	I_F = 20 A; V_{GE} = 0 V			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

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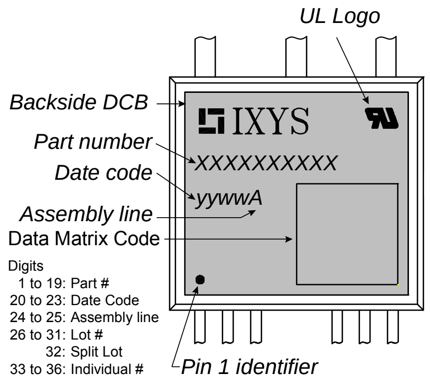
Package SMPD				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				100	A
T_{stg}	*storage temperature*			-55		150	°C
T_{VJ}	*virtual junction temperature*			-55		150	°C
Weight					8.5		g
F_C	*mounting force with clip*			40		130	N
V_{ISOL}	*isolation voltage*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



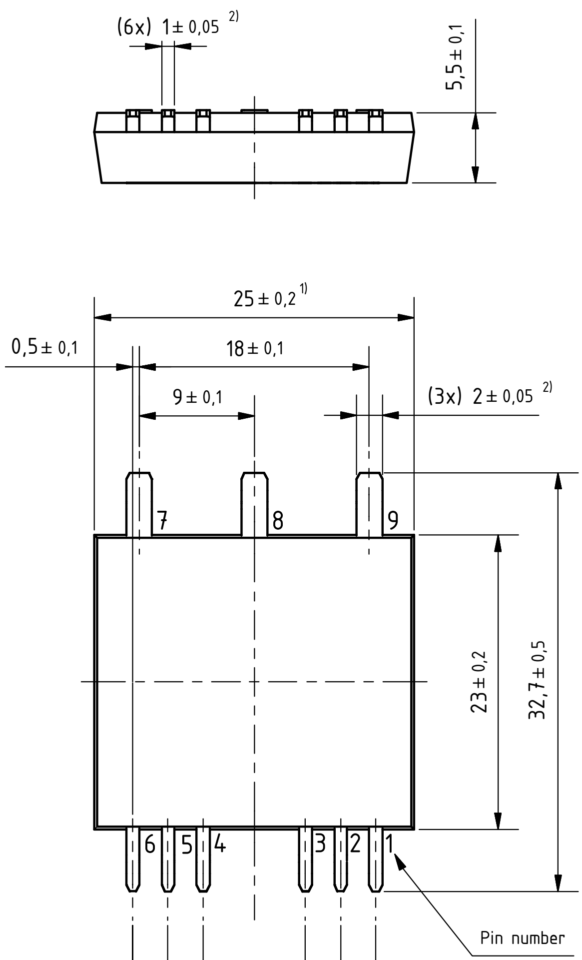
Part number

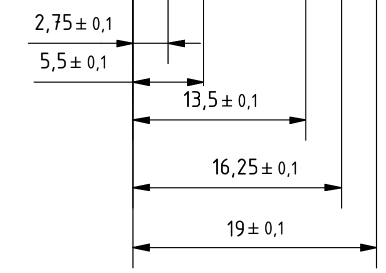
I = IGBT
X = XPT IGBT
A = Gen 1 / std
20 = Current Rating [A]
RG = boost configuration
1200 = Reverse Voltage [V]
D = IGBT
H = XPT IGBT
G = Gen 1 / std
LB = SMPD-B

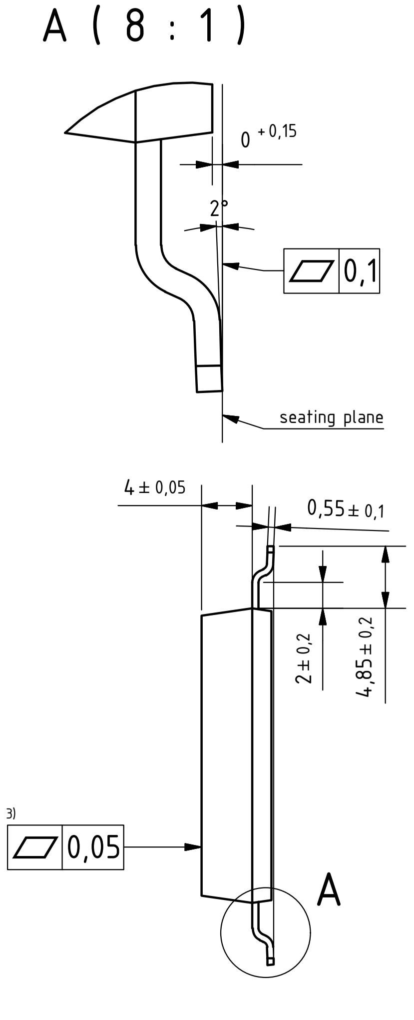
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA20RG1200DHGLB	IXA20RG1200DHGLB	Blister	45	512349
Alternative	IXA20RG1200DHGLB-TRR	IXA20RG1200DHGLB	Tape & Reel	200	512370

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

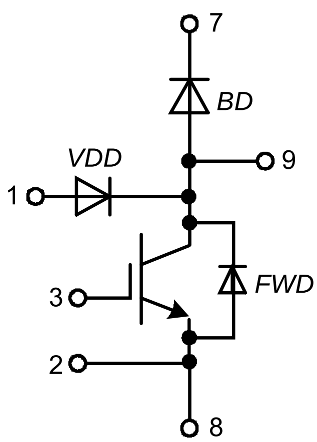
Outlines SMPD







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



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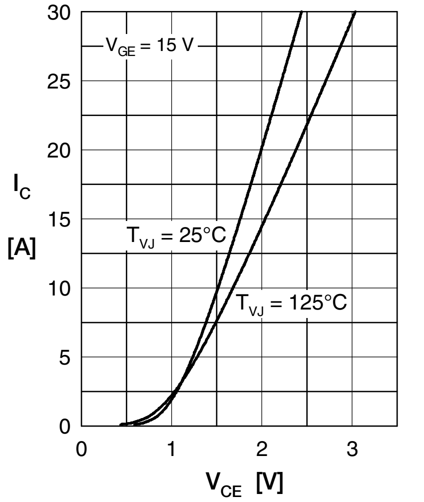

Fig. 1 Typ. output characteristics

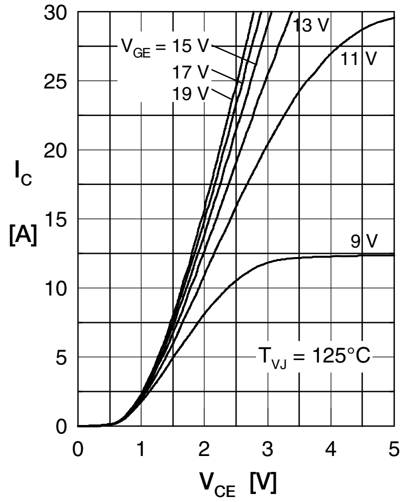

Fig. 2 Typ. output characteristics

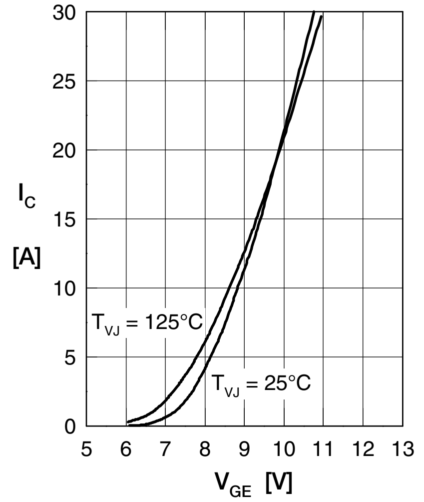

Fig. 3 Typ. tranfer characteristics

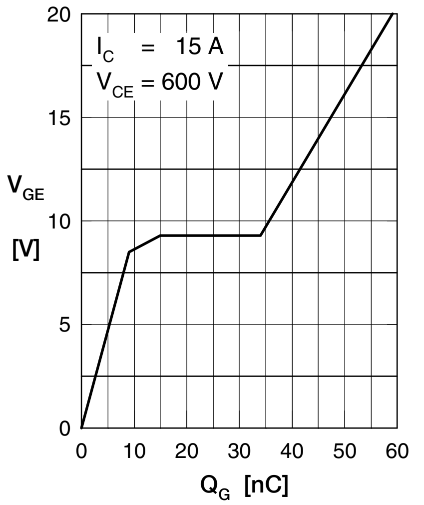

Fig. 4 Typ. turn-on gate charge

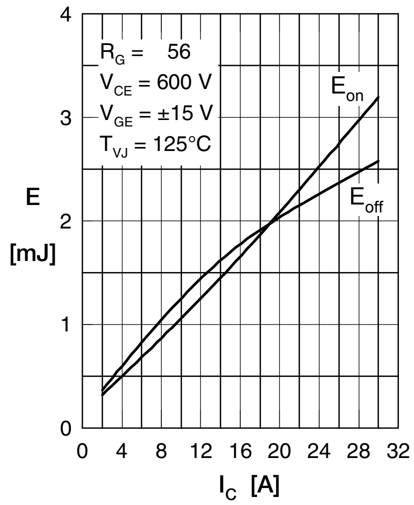

Fig. 5 Typ. switching energy versus collector current

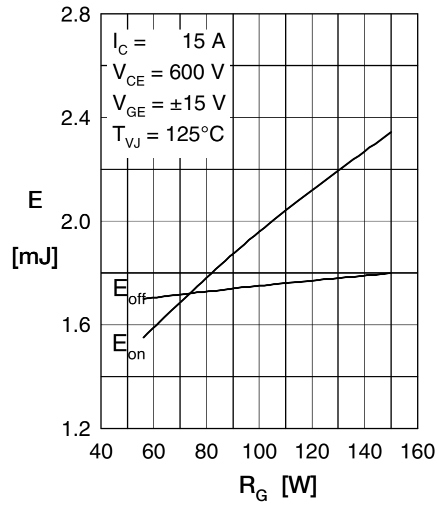

Fig. 6 Typ. switching energy versus gate resistance

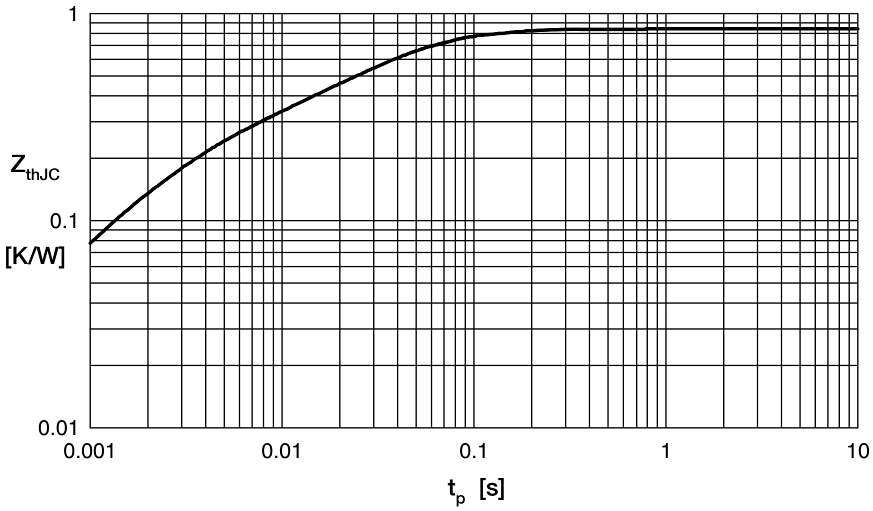

Fig. 7 Typ. transient thermal impedance junction to case

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Boost Diode BD

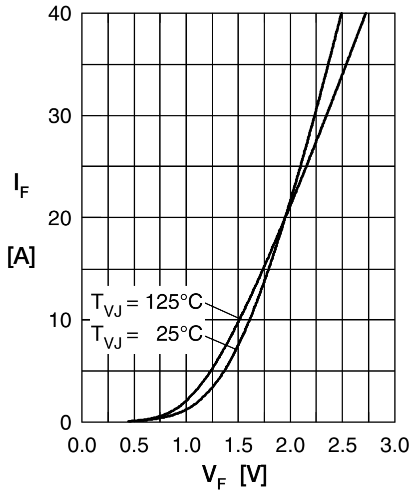

Fig. 1 Typ. Forward current versus V_F

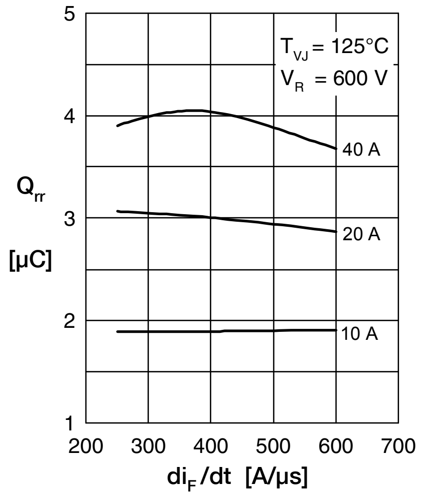

Fig. 2 Typ. reverse recov. charge Q_{rr} versus di/dt

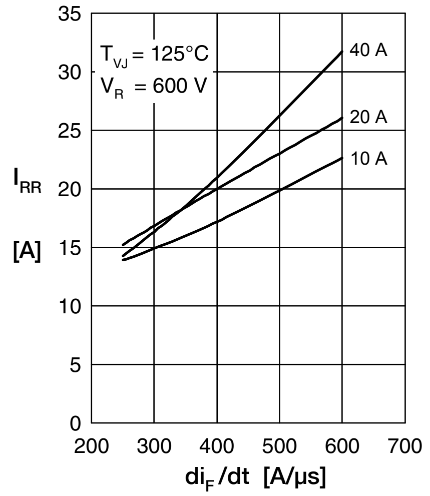

Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

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

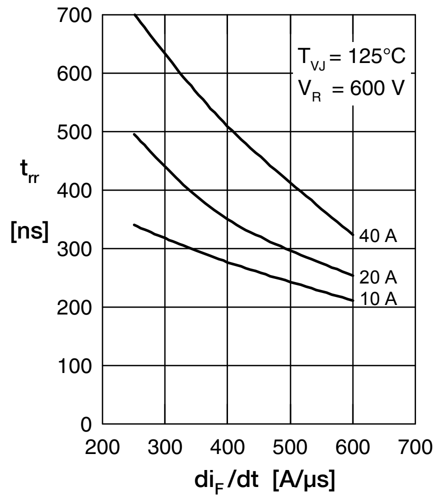

Fig. 5 Typ. recovery time t_{rr} versus di/dt

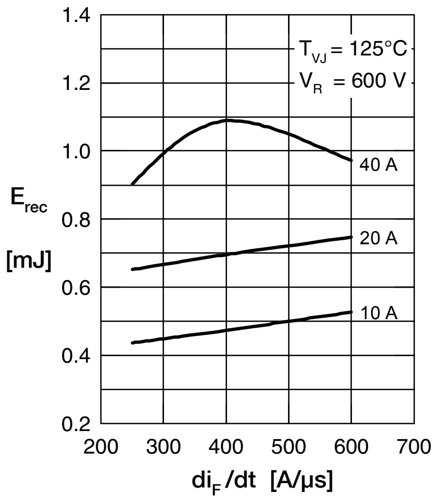

Fig. 6 Typ. recovery energy E_{rec} versus di/dt

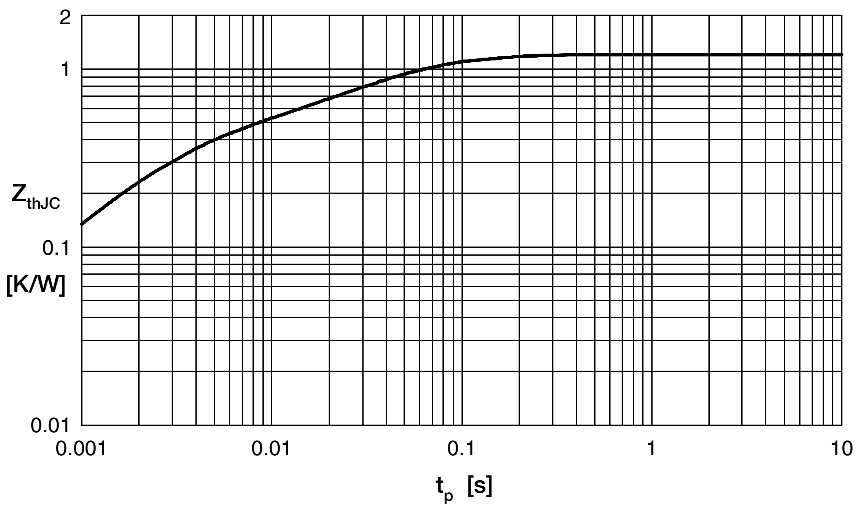

Fig. 7 Typ. transient thermal impedance junction to case