

XPT IGBT

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

$$I_{C25} = 32 \text{ A}$$

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

ISOPLUS™ Surface Mount Power Device

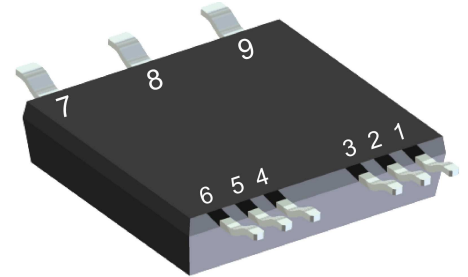
Boost Topology

Boost/Brake Chopper + free wheeling diode + Vcesat-Diode


Part number

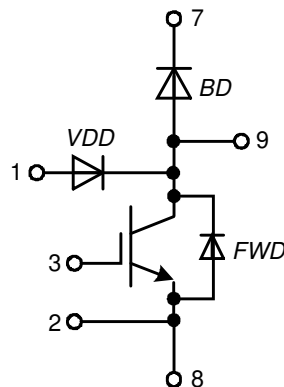
IXA20RG1200DHGLB

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	Ratings			
			min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
I_R	reverse current, drain current * not applicable, see Ices at IGBT	$V_R = 1200 V$	$T_{VJ} = 25^{\circ}C$		25	μA
		$V_R = 1200 V$	$T_{VJ} = 125^{\circ}C$		0.4	mA
V_F	forward voltage drop	$I_F = 20 A$	$T_{VJ} = 25^{\circ}C$		2.20	V
		$I_F = 40 A$				V
		$I_F = 20 A$	$T_{VJ} = 125^{\circ}C$		2.20	V
		$I_F = 40 A$				V
I_{FAV}	average forward current	$T_C = 80^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}C$		18	A
V_{F0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		1.29	V
r_F	slope resistance				41	m Ω
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		$T_C = 25^{\circ}C$		93	W
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		150	A
C_J	junction capacitance	$V_R = 400 V f = 1 MHz$	$T_{VJ} = 25^{\circ}C$	10		pF

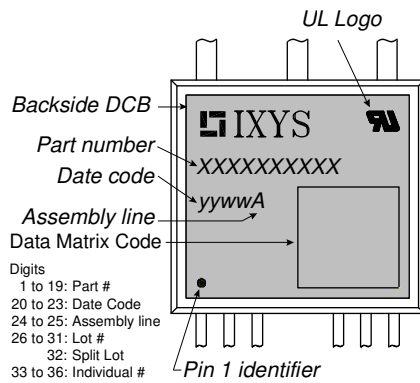
VCEsat Detection Diode VDD

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



Boost IGBT				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{CES}	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
V_{GES}	max. DC gate voltage				± 20	V	
V_{GEM}	max. transient gate emitter voltage				± 30	V	
I_{C25}	collector current	$T_C = 25^{\circ}\text{C}$			32	A	
I_{C80}		$T_C = 80^{\circ}\text{C}$			23	A	
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			125	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 15\text{A}; V_{GE} = 15\text{V}$		1.8	2.1	V	
				2		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.6\text{mA}; V_{GE} = V_{CE}$	5.4	5.9	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{V}$			0.1	mA	
					0.1	mA	
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20\text{V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{V}; V_{GE} = 15\text{V}; I_C = 15\text{A}$		48		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{V}; I_C = 15\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 56\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$		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	$V_{GE} = \pm 15\text{V}; R_G = 56\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$				
I_{CM}		$V_{CEmax} = 1200\text{V}$			45	A	
SCSOA	short circuit safe operating area	$V_{CEmax} = 1200\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$				
t_{SC}	short circuit duration	$V_{CE} = 900\text{V}; V_{GE} = \pm 15\text{V}$			10	μs	
I_{SC}	short circuit current	$R_G = 56\ \Omega$; 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							
V_{RRM}	max. repetitive reverse voltage		$T_{VJ} = 25^{\circ}\text{C}$		1200	V	
I_{F25}	forward current		$T_C = 25^{\circ}\text{C}$		27	A	
I_{F80}			$T_C = 80^{\circ}\text{C}$		18	A	
V_F	forward voltage	$I_F = 20\text{A}$	$T_{VJ} = 25^{\circ}\text{C}$		2.20	V	
			$T_{VJ} = 125^{\circ}\text{C}$	1.90		V	
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$		0.03	mA	
			$T_{VJ} = 125^{\circ}\text{C}$	0.12		mA	
Q_{rr}	reverse recovery charge	$V_R = 600\text{V}$ $-di_F/dt = 400\text{A}/\mu\text{s}$ $I_F = 20\text{A}; V_{GE} = 0\text{V}$	$T_{VJ} = 125^{\circ}\text{C}$		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	3000			V
		t = 1 minute	2500			V
		50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA				


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

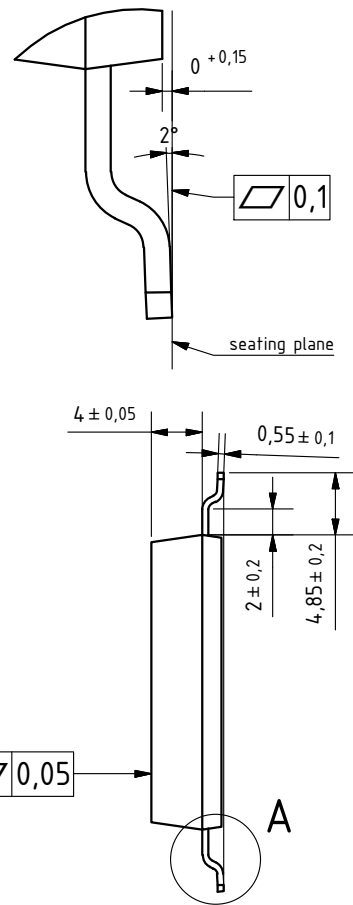
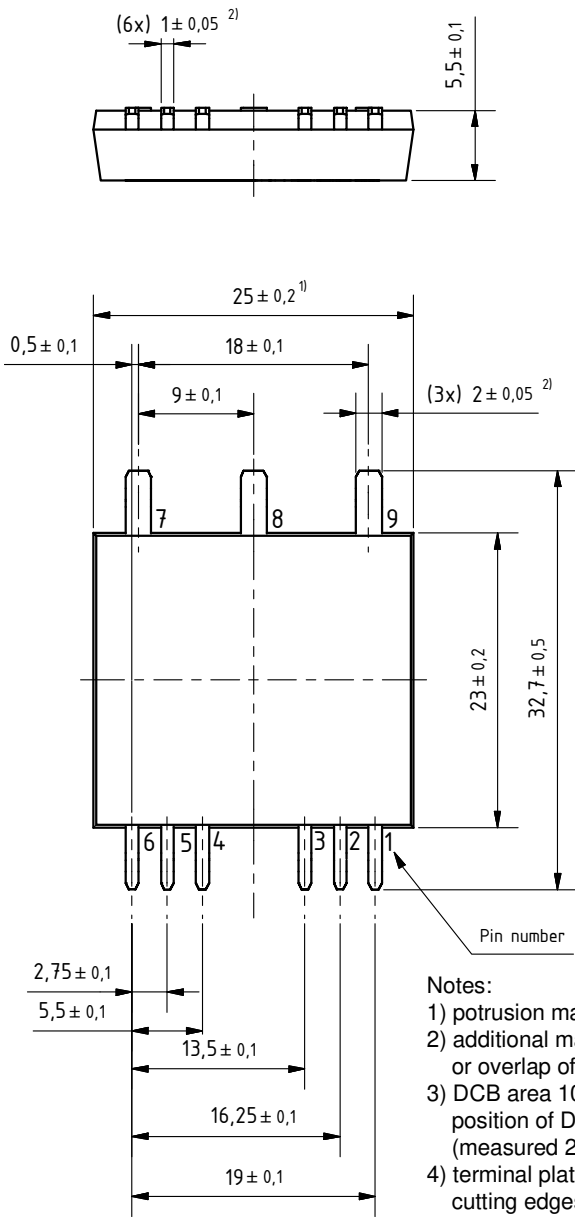
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA20RG1200DHGLB-TUB	IXA20RG1200DHGLB	Tube	20	516134
Alternative	IXA20RG1200DHGLB-TRR	IXA20RG1200DHGLB	Tape & Reel	200	523508

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



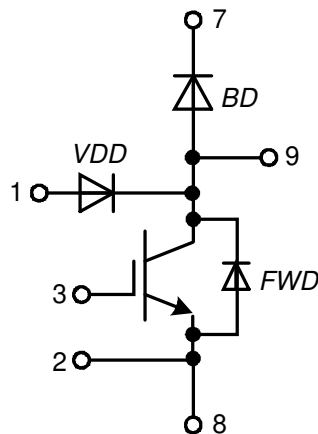
Outlines SMPD

A (8 : 1)



Notes:

- 1) protrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignment 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: $\pm 25 \mu\text{m}$ (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



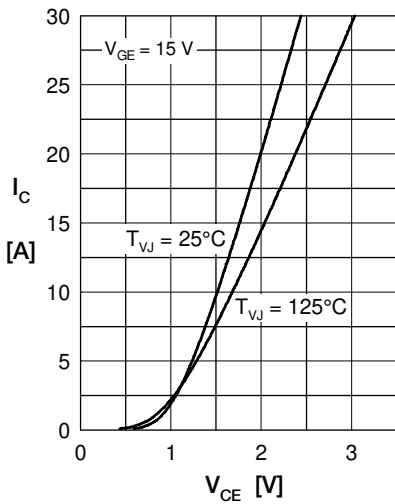
Boost IGBT


Fig. 1 Typ. output characteristics

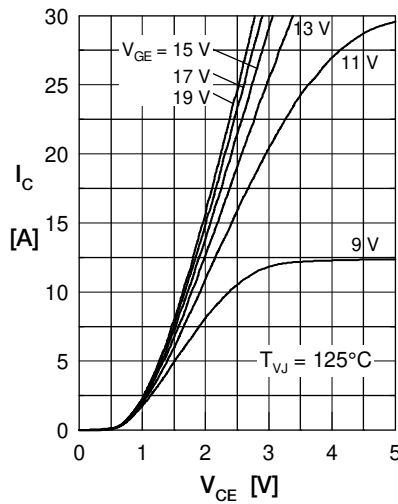


Fig. 2 Typ. output characteristics

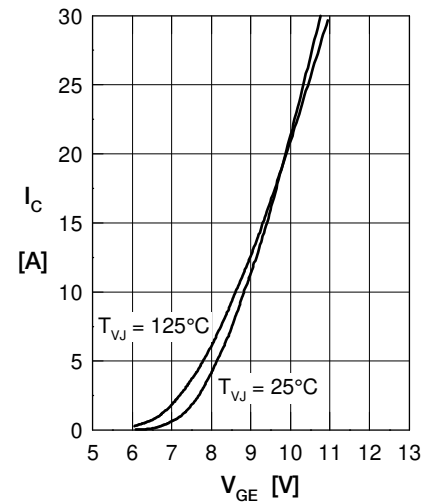


Fig. 3 Typ. transfer characteristics

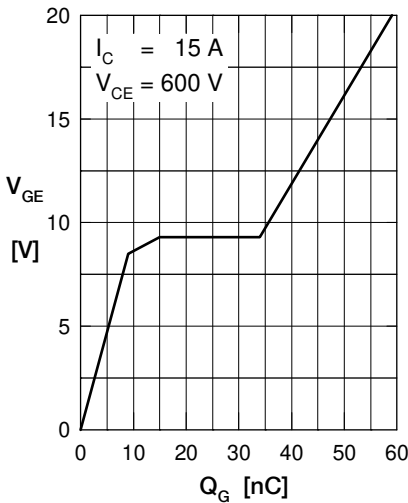


Fig. 4 Typ. turn-on gate charge

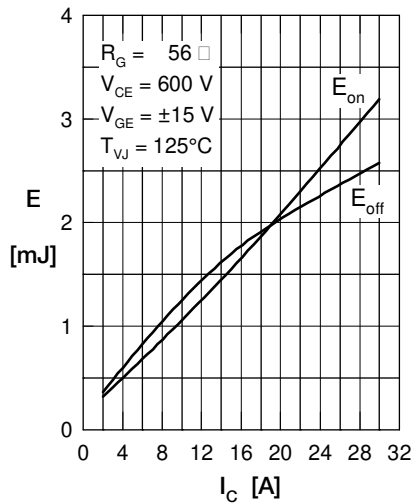


Fig. 5 Typ. switching energy versus collector current

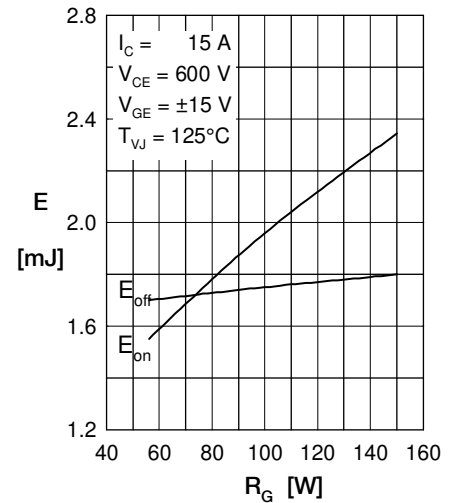


Fig. 6 Typ. switching energy versus gate resistance

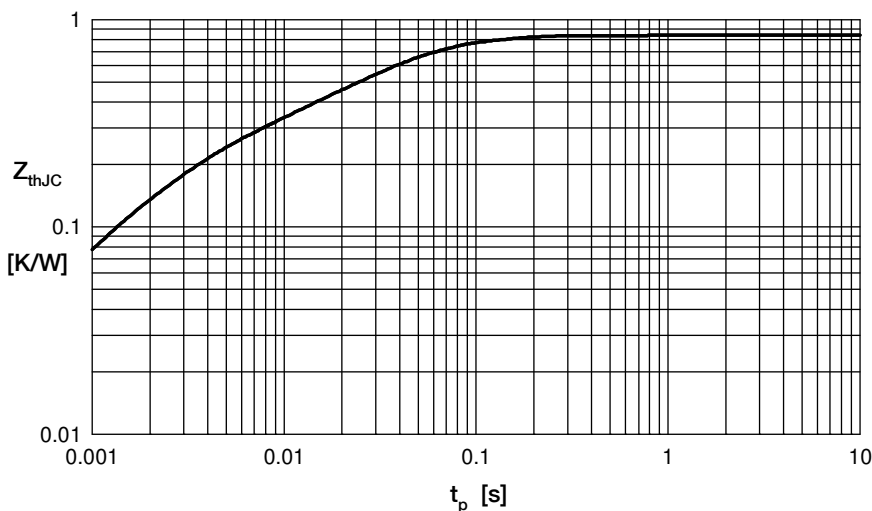


Fig. 7 Typ. transient thermal impedance junction to case

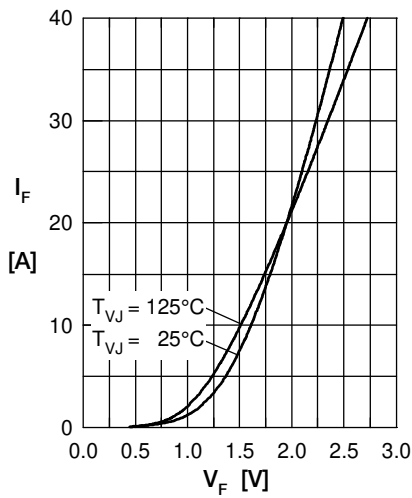
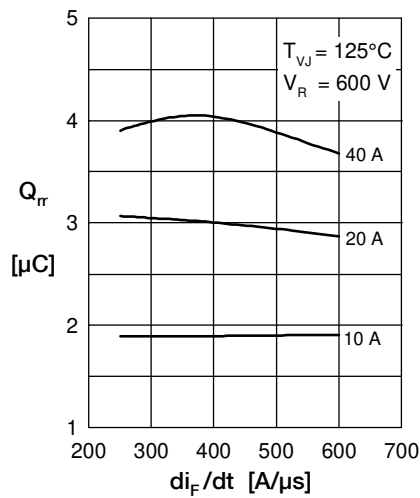
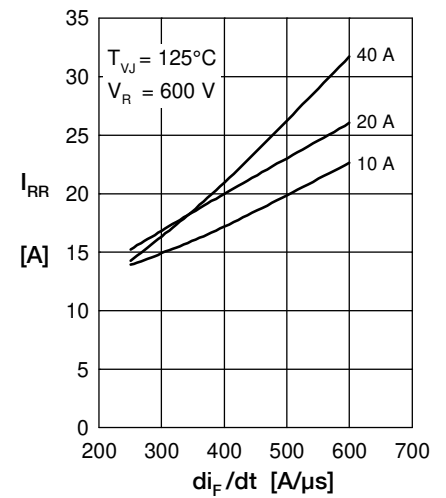
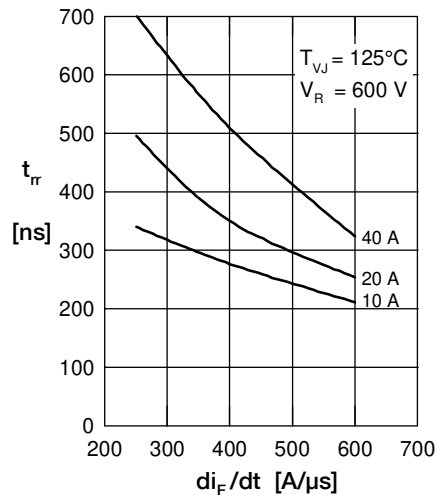
Boost Diode BD

 Fig. 1 Typ. Forward current versus V_F

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

 Fig. 3 Typ. peak reverse current I_{RRM} versus di_F/dt

 Fig. 4 Dynamic parameters Q_{rr} , I_{RRM} versus di_F/dt

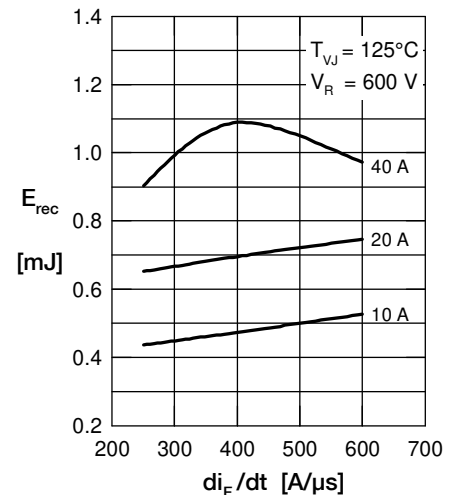
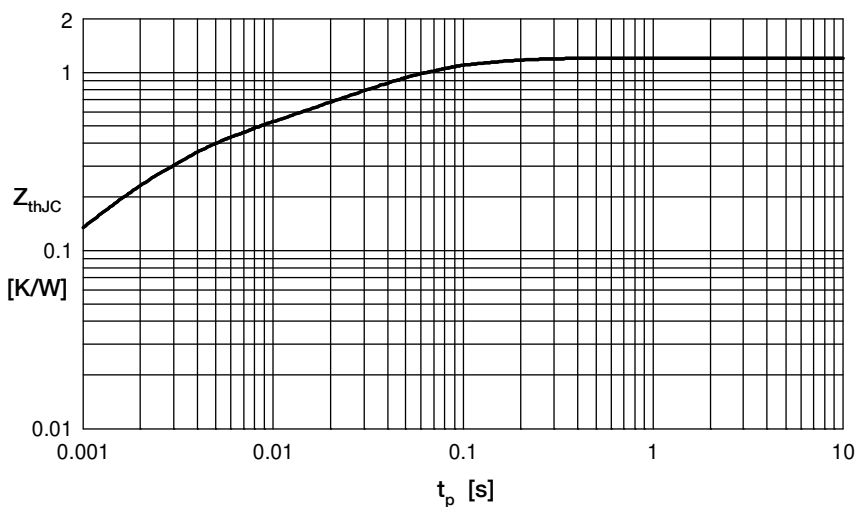
 Fig. 5 Typ. recovery time t_{rr} versus di_F/dt

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


Fig. 7 Typ. transient thermal impedance junction to case