

XPT IGBT

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

$$I_{C25} = 61 \text{ A}$$

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

ISOPLUS™ Surface Mount Power Device

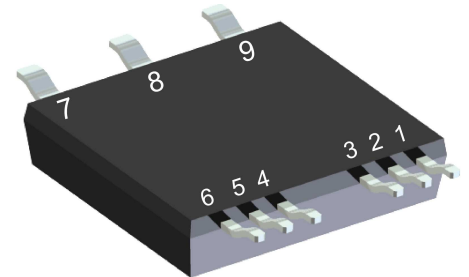
Boost Topology

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

Part number

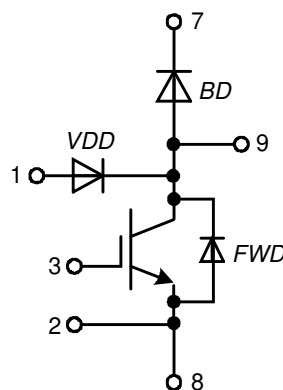
IXA40RG1200DHGLB

Marking on Product: IXA40RG1200DHGLB



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	$T_{VJ} = 25^{\circ}\text{C}$			1200	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V
I_R	reverse current, drain current	$V_R = 1200\text{ V}$			30	μA
	* not applicable, see Ices at IGBT	$V_R = 1200\text{ V}$			0.5	mA
V_F	forward voltage drop	$I_F = 30\text{ A}$			2.20	V
		$I_F = 60\text{ A}$				V
		$I_F = 30\text{ A}$			2.20	V
		$I_F = 60\text{ A}$				V
I_{FAV}	average forward current	$T_C = 80^{\circ}\text{C}$			25	A
		rectangular $d = 0.5$				
V_{F0}	threshold voltage	$T_{VJ} = 150^{\circ}\text{C}$			1.26	V
r_F	slope resistance				28	m Ω
R_{thJC}	thermal resistance junction to case				1	K/W
R_{thCH}	thermal resistance case to heatsink			0.30		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			125	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$			200	A
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$		13		pF

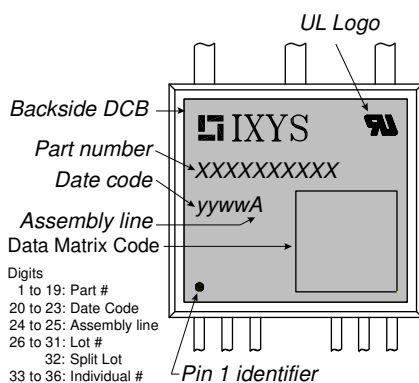
VCEsat Detection Diode VDD

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



Boost IGBT				Ratings			
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				61	A
I _{C80}		T _C = 80°C				43	A
P _{tot}	total power dissipation	T _C = 25°C				215	W
V _{CE(sat)}	collector emitter saturation voltage	I _C = 35A; V _{GE} = 15 V	T _{VJ} = 25°C		1.8	2.1	V
			T _{VJ} = 125°C		2.1		V
V _{GE(th)}	gate emitter threshold voltage	I _C = 1.5mA; 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 = 35 A			107		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	T _{VJ} = 125°C				
I _{CM}		V _{CEmax} = 1200 V				105	A
SCSOA	short circuit safe operating area	V _{CEmax} = 1200 V	T _{VJ} = 125°C				
t _{SC}	short circuit duration	V _{CE} = 900 V; V _{GE} = ±15 V				10	μs
I _{SC}	short circuit current	R _G = 27 Ω; non-repetitive			140		A
R _{thJC}	thermal resistance junction to case					0.58	K/W
R _{thCH}	thermal resistance case to heatsink				0.17		K/W
Boost Diode BD							
V _{RRM}	max. repetitive reverse voltage		T _{VJ} = 25°C			1200	V
I _{F25}	forward current		T _C = 25°C			48	A
I _{F80}			T _C = 80°C			32	A
V _F	forward voltage	I _F = 30A	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		0.15		mA
Q _{rr}	reverse recovery charge	V _R = 600 V -di _F /dt = 600 A/μs I _F = 30A; V _{GE} = 0 V	T _{VJ} = 125°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					1	K/W
R _{thCH}	thermal resistance case to heatsink				0.3		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



Part description

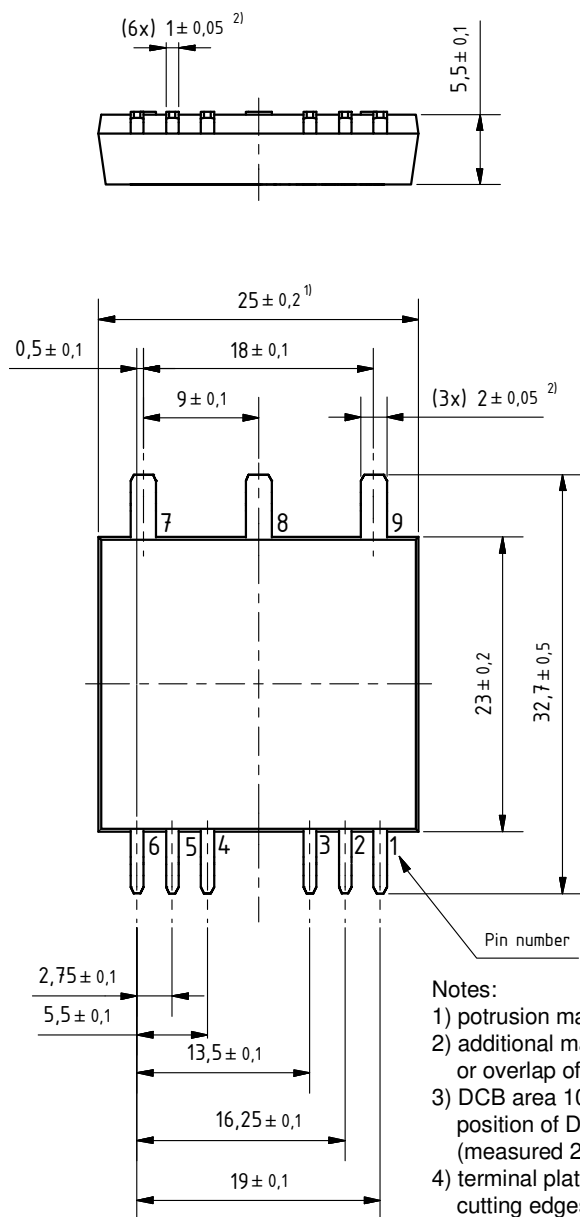
I = IGBT
 X = XPT IGBT
 A = Gen 1 / std
 40 = Current Rating [A]
 RG = Boost/Brake Chopper + free wheeling diode + Vcesat-Diode
 1200 = Reverse Voltage [V]
 D = Diode
 H = Sonic Fast Recovery Diode
 G = extreme fast
 LB = SMPD-B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA40RG1200DHGLB-TUB	IXA40RG1200DHGLB	Tube	20	516141
Alternative	IXA40RG1200DHGLB-TRR	IXA40RG1200DHGLB	Tape & Reel	200	523995

Similar Part	Package	Voltage class
IXA20RG1200DHGLB	SMPD-B	1200
IXA30RG1200DHGLB	SMPD-B	1200

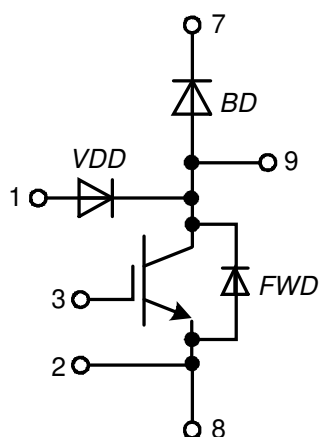
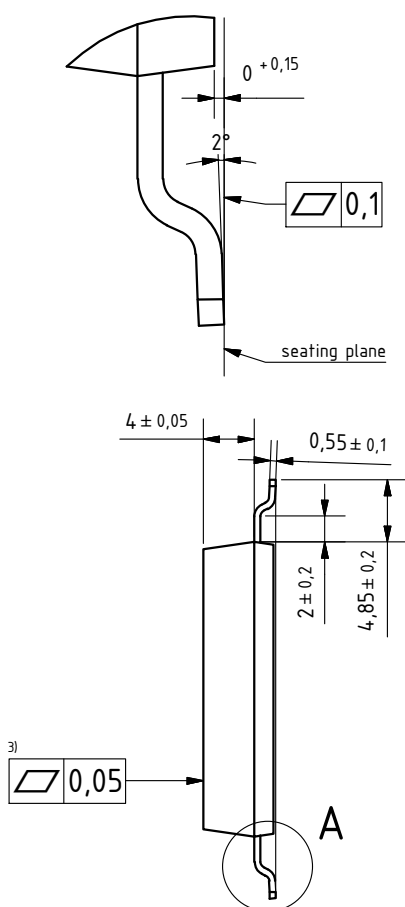
Outlines SMPD

A (8 : 1)



Notes:

- 1) potrusion 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



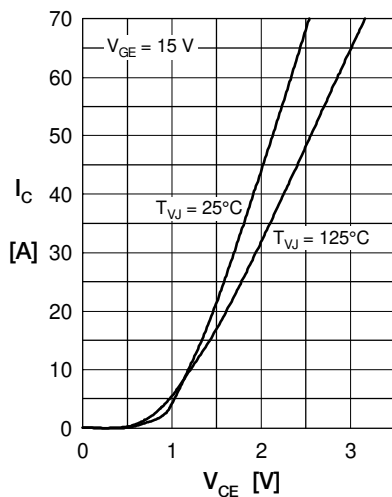
Boost IGBT


Fig. 1 Typ. output characteristics

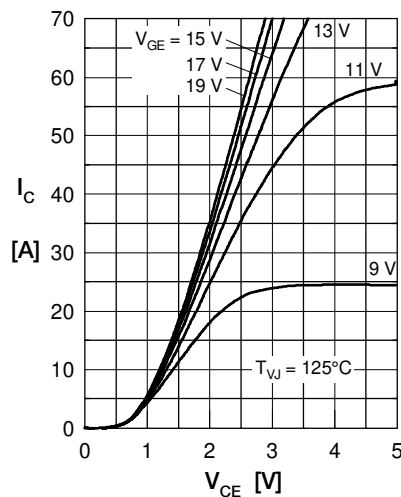


Fig. 2 Typ. output characteristics

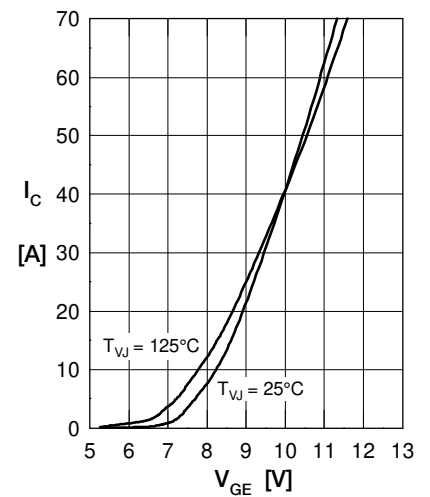


Fig. 3 Typ. transfer characteristics

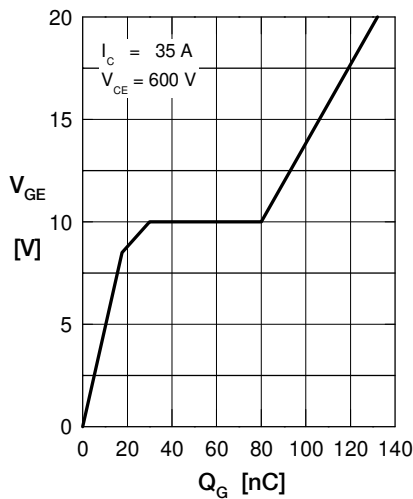


Fig. 4 Typ. turn-on gate charge

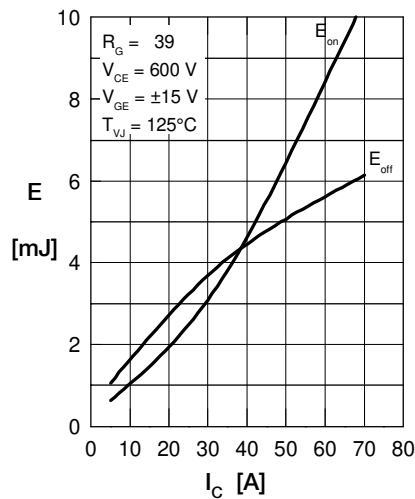


Fig. 5 Typ. switching energy versus collector current

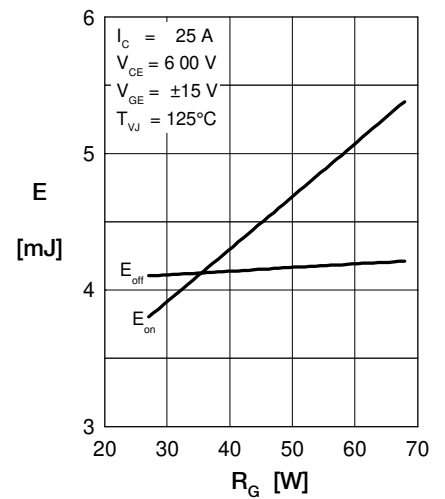


Fig. 6 Typ. switching energy versus gate resistance

Fig. 7 Typ. transient thermal impedance junction to case

Boost Diode BD

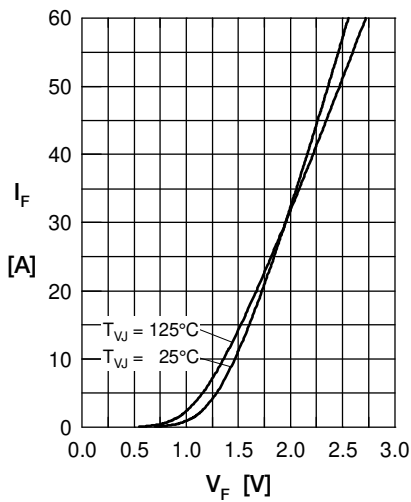


Fig. 1 Typ. Forward current versus V_F

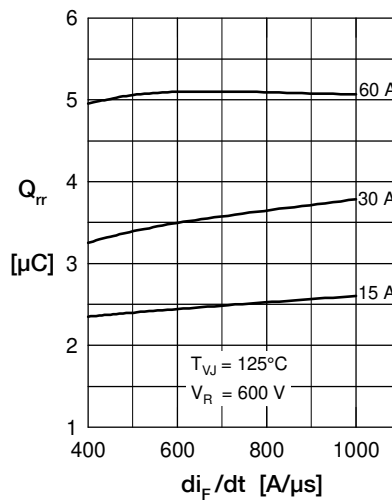


Fig. 2 Typ. reverse recov.charge Q_{rr} versus di/dt

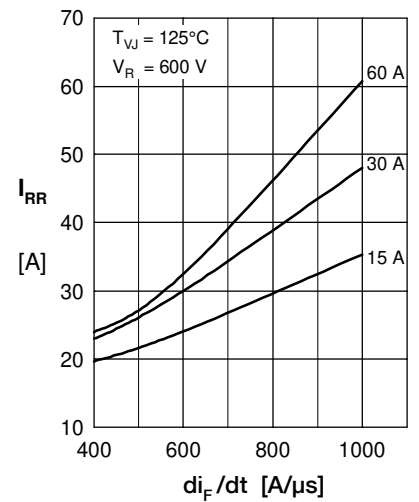


Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

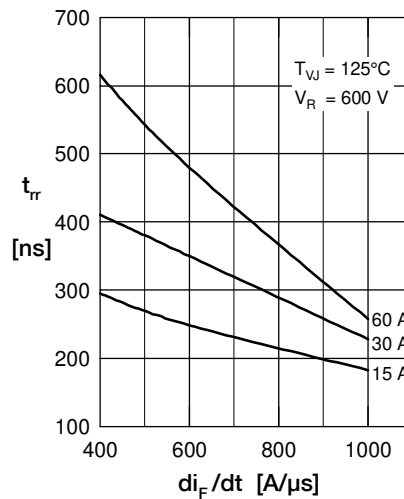


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus di/dt

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

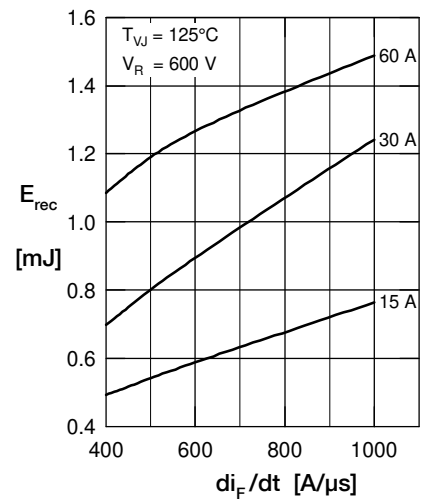


Fig. 6 Typ. recovery energy E_{rec} versus di/dt

Fig. 7 Typ. transient thermal impedance junction to case