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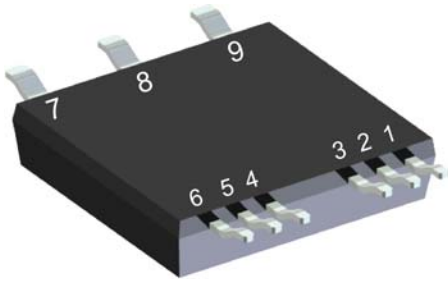
XPT IGBT

V_{CES} = 2x 1200 V
I_{C25} = 28 A
$V_{CE(sat)}$ = 1.8 V

ISOPLUS™
Surface Mount Power Device
Phase leg SCR / IGBT

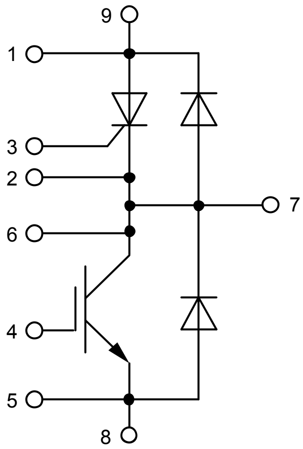
Part number

IXA20PT1200LB



Backside: isolated

E326641



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
- Thyristor

Applications:

- Phaseleg
  - buck-boost chopper
- Full bridge
  - power supplies
  - induction heating
  - four quadrant DC drives
  - controlled rectifier
- Three phase bridge
  - AC drives
  - controlled rectifier

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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Symbol	Definition	Conditions		min.	typ.	max.	Unit
IGBT							
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*					tbd	V
I_{C25}	*collector current*		T_C = 25°C			28	A
I_{C80}			T_C = 80°C			20	A
P_{tot}	*total power dissipation*		T_C = 25°C			100	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 15A; 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	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*					1.25	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.40		K/W

Symbol	Definition	Conditions		min.	typ.	max.	Unit
Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			32	A
I_{F80}			T_C = 80°C			22	A
V_F	*forward voltage*	I_F = 20A	T_{VJ} = 25°C			2.24	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*					1.5	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.5		K/W

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Thyristor

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	*max. non-repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1300	V
$V_{RRM/DRM}$	*max. repetitive reverse/forward blocking voltage*		T_{VJ} = 25°C			1200	V
$I_{R/D}$	*reverse current, drain current*	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			50	µA
		$V_{R/D}$ = 1200 V	T_{VJ} = 125°C			5	mA
V_T	*forward voltage drop*	I_T = 15 A	T_{VJ} = 25°C			1.42	V
		I_T = 30 A				1.77	V
		I_T = 15 A	T_{VJ} = 125°C			1.37	V
		I_T = 30 A				1.86	V
I_{TAV}	*average forward current*	T_C = 80°C	T_{VJ} = 150°C			18	A
$I_{T(RMS)}$	*RMS forward current*	180 sine				28	A
V_{T0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 150°C			0.87	V
r_T	*slope resistance*					32.9	mΩ
R_{thJC}	*thermal resistance junction to case*					1.7	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.57		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			74	W
I_{TSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			200	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			215	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			170	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			185	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			200	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			190	A²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			145	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			140	A²s
C_J	*junction capacitance*	V_R = 0 V f = 1 MHz	T_{VJ} = 25°C		0		pF
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 150°C			10	W
		t_P = 300 µs				5	W
P_{GAV}	*average gate power dissipation*					0.5	W
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 125°C; f = 50 Hz	repetitive, I_T = 20 A			100	A/µs
		t_P = 200 µs; di_G/dt = 0.3 A/µs;					
		I_G = 0.3 A; V_D = ⅔ V_{DRM}	non-repet., I_T = 20 A			500	A/µs
$(dv/dt)_{cr}$	*critical rate of rise of voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			500	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	*gate trigger voltage*	V_D = 6 V	T_{VJ} = 25°C			1.5	V
			T_{VJ} = -40°C			2.5	V
I_{GT}	*gate trigger current*	V_D = 6 V	T_{VJ} = 25°C			25	mA
			T_{VJ} = -40°C			50	mA
V_{GD}	*gate non-trigger voltage*	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			0.2	V
I_{GD}	*gate non-trigger current*					4	mA
I_L	*latching current*	t_p = 10 µs	T_{VJ} = 25°C			75	mA
		I_G = 0.3 A; di_G/dt = 0.3 A/µs					
I_H	*holding current*	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			50	mA
t_{gd}	*gate controlled delay time*	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0.3 A; di_G/dt = 0.3 A/µs					
t_q	*turn-off time*	V_R = 100 V; I_T = 20 A; V_D = ⅔ V_{DRM}	T_{VJ} = 150°C		40		µs
		di/dt = 10 A/µs; dv/dt = 20 V/µs; t_p = 200 µs					

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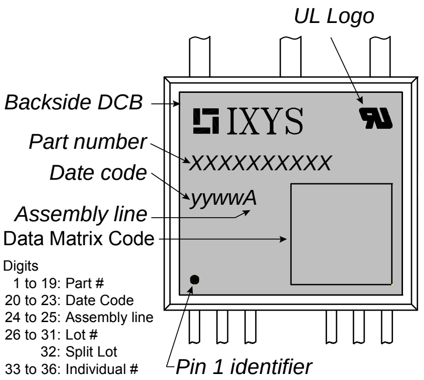
Package SMPD				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				100	A
T_{stg}	*storage temperature*			-55		150	°C
T_{VJ}	*virtual junction temperature*			-55		150	°C
Weight					8.5		g
F_C	*mounting force with clip*			40		130	N
$d_{Spp/App}$	*creepage 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



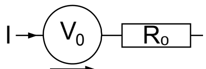
Part number

- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 20 = Current Rating [A]
- PT = Phase leg SCR / IGBT
- 1200 = Reverse Voltage [V]
- LB = SMPD-B

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA20PT1200LB	IXA20PT1200LB	Blister	45	
			Tape & Reel	200	

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C



		Thyristor	IGBT	Diode	
$V_{0\,max}$	*threshold voltage*	0.87	1.1	1.2	V
$R_{0\,max}$	*slope resistance **	32.9	90	45	mΩ

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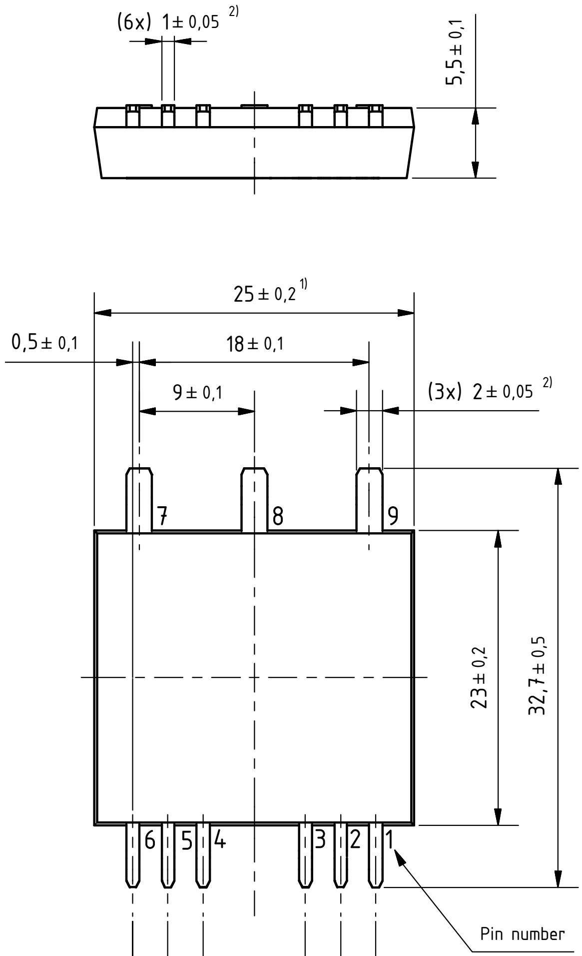
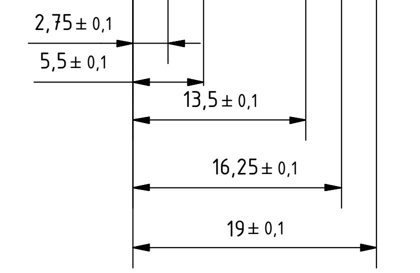
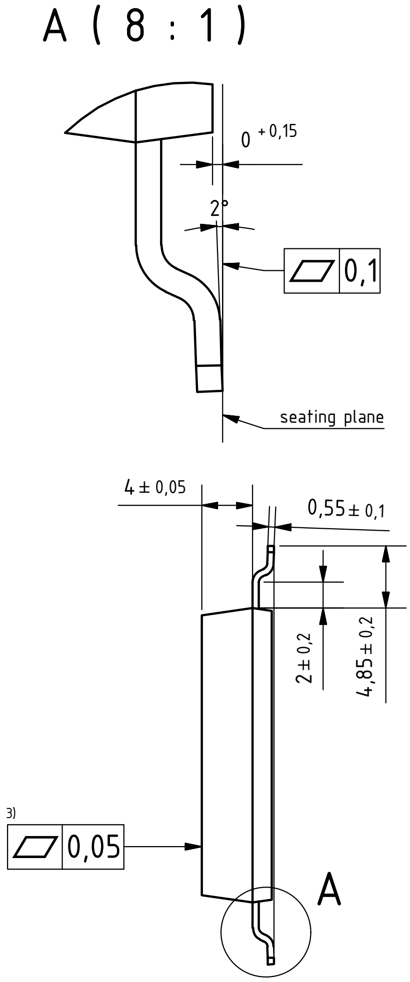
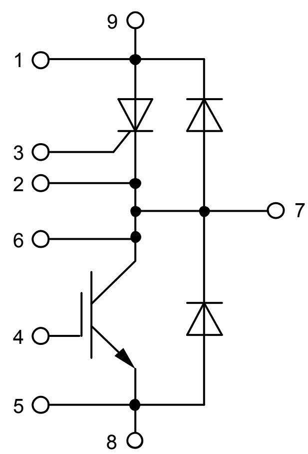
Outlines SMPD







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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