

tentative

XPT IGBT

$$V_{CES} = 2 \times 1200V$$

$$I_{C25} = 28A$$

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

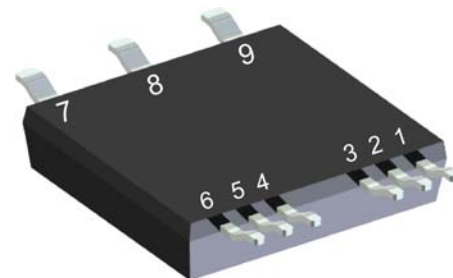
ISOPLUS™

Surface Mount Power Device

Phase leg SCR / IGBT

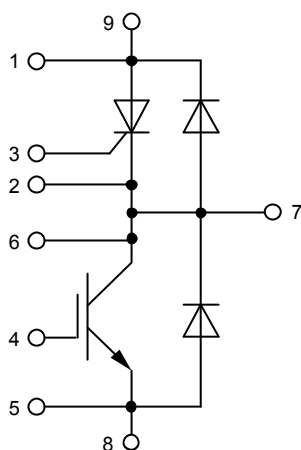
Part number

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

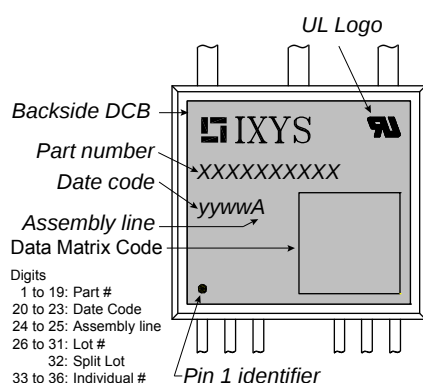
IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{CES}	collector emitter voltage	T _{VJ} = 25°C				1200	V
V _{GES}	max. DC gate voltage					±20	V
V _{GEM}	max. transient gate emitter voltage					tbd	V
I _{C25}	collector current	T _C = 25°C				28	A
I _{C80}		T _C = 80°C				20	A
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 T _{VJ} = 125°C		1.8 2	2.1	V 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 T _{VJ} = 125°C			0.1	mA 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 _{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 = 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
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 T _{VJ} = 125°C			2.24	V V
I _R	reverse current	V _R = V _{RRM}	T _{VJ} = 25°C T _{VJ} = 125°C			0.03	mA 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				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
I_{RD}	reverse current, drain current	$V_{R/D} = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			50	μA
		$V_{R/D} = 1200\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$			5	mA
V_T	forward voltage drop	$I_T = 15\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.42	V
		$I_T = 30\text{ A}$				1.77	V
		$I_T = 15\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1.37	V
		$I_T = 30\text{ A}$				1.86	V
I_{TAV}	average forward current	$T_C = 80^{\circ}\text{C}$	$T_{VJ} = 150^{\circ}\text{C}$			18	A
$I_{T(RMS)}$	RMS forward current	180 sine				28	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}\text{C}$			0.87	V
r_T	slope resistance					32.9	m Ω
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		$T_C = 25^{\circ}\text{C}$			74	W
I_{TSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			200	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			215	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			170	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			185	A
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			200	A ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			190	A ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			145	A ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			140	A ² s
C_j	junction capacitance	$V_R = 0\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		0		pF
P_{GM}	max. gate power dissipation	$t_p = 30\text{ }\mu\text{s}$	$T_C = 150^{\circ}\text{C}$			10	W
		$t_p = 300\text{ }\mu\text{s}$				5	W
P_{GAV}	average gate power dissipation					0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125^{\circ}\text{C}; f = 50\text{ Hz}$ repetitive, $I_T = 20\text{ A}$				100	A/ μs
		$t_p = 200\text{ }\mu\text{s}; di_G/dt = 0.3\text{ A}/\mu\text{s};$ $I_G = 0.3\text{ A}; V_D = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 20\text{ A}$				500	A/ μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = 125^{\circ}\text{C}$				500	V/ μs
		$R_{GK} = \infty$; method 1 (linear voltage rise)					
V_{GT}	gate trigger voltage	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			1.5	V
			$T_{VJ} = -40^{\circ}\text{C}$			2.5	V
I_{GT}	gate trigger current	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			25	mA
			$T_{VJ} = -40^{\circ}\text{C}$			50	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 125^{\circ}\text{C}$			0.2	V
I_{GD}	gate non-trigger current					4	mA
I_L	latching current	$t_p = 10\text{ }\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$			75	mA
		$I_G = 0.3\text{ A}; di_G/dt = 0.3\text{ A}/\mu\text{s}$					
I_H	holding current	$V_D = 6\text{ V}$ $R_{GK} = \infty$	$T_{VJ} = 25^{\circ}\text{C}$			50	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$ $T_{VJ} = 25^{\circ}\text{C}$				2	μs
		$I_G = 0.3\text{ A}; di_G/dt = 0.3\text{ A}/\mu\text{s}$					
t_q	turn-off time	$V_R = 100\text{ V}; I_T = 20\text{ A}; V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = 150^{\circ}\text{C}$ $di/dt = 10\text{ A}/\mu\text{s}; dv/dt = 20\text{ V}/\mu\text{s}; t_p = 200\text{ }\mu\text{s}$			40		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	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	

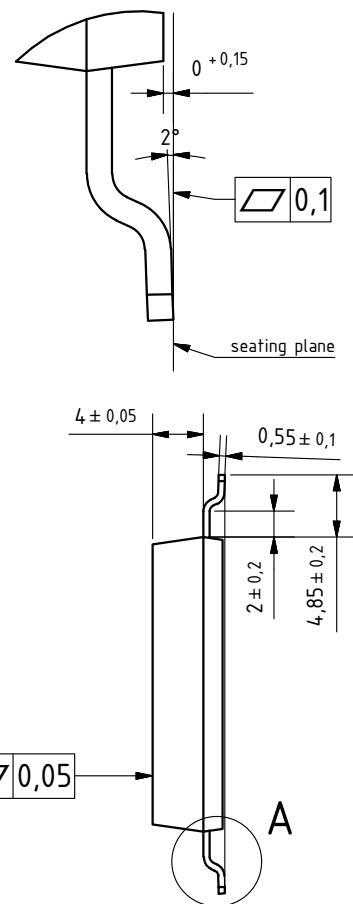
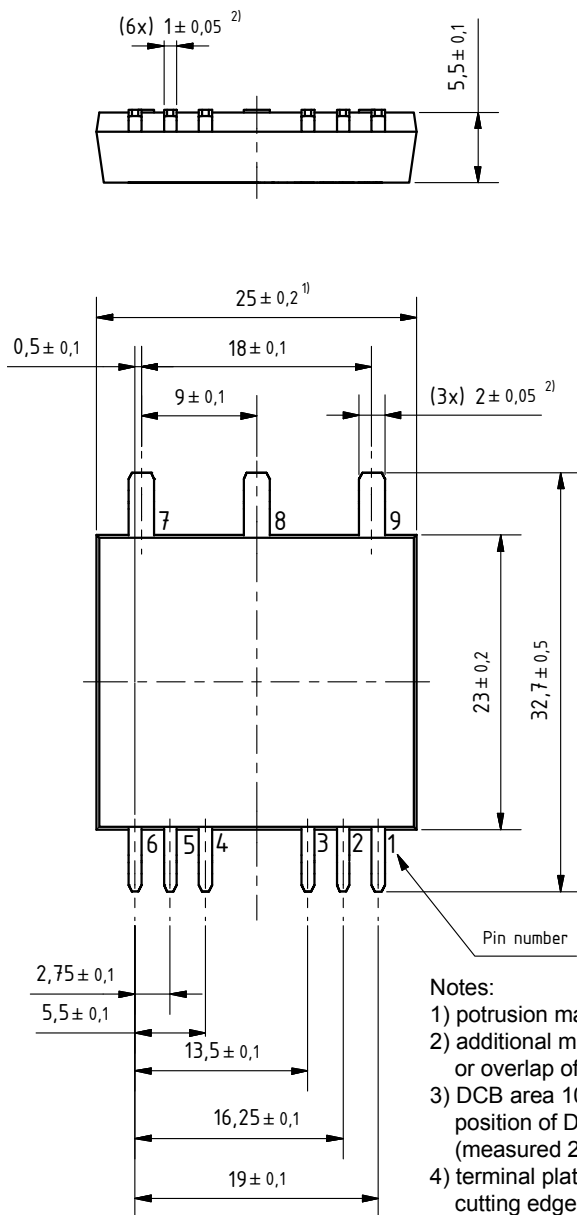
Equivalent Circuits for Simulation

* on die level

 $T_{vj} = 150^{\circ}\text{C}$

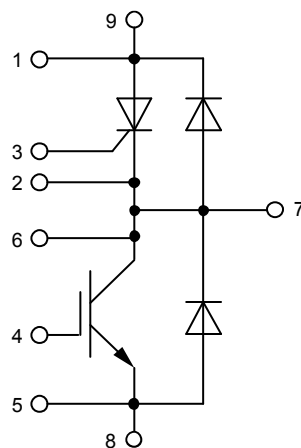
		Thyristor	IGBT	Diode	
$I \rightarrow V_0 \rightarrow R_0$					
$V_{0\max}$	threshold voltage	0.87	1.1	1.2	V
$R_{0\max}$	slope resistance *	32.9	90	45	mΩ

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





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