

tentative

XPT IGBT

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

$$I_{C25} = 28A$$

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

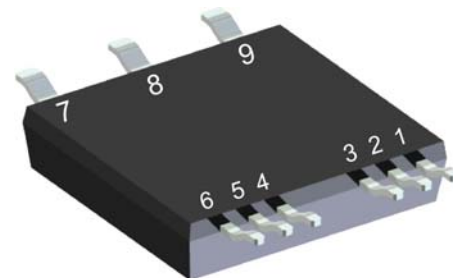
ISOPLUS™

Surface Mount Power Device

Phase leg SCR / IGBT

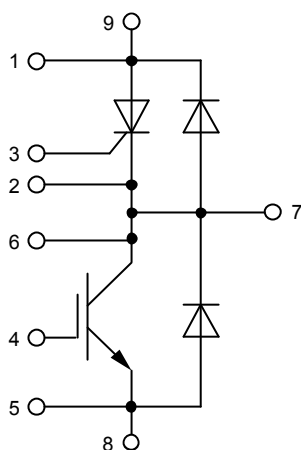
Part number

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

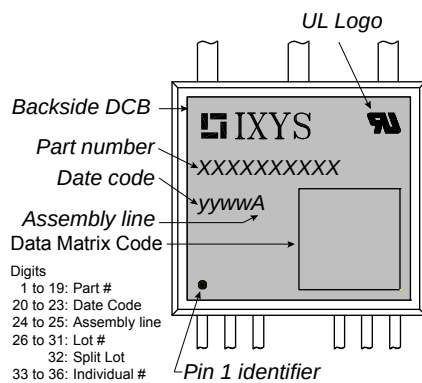
- Isolation Voltage: 3000V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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		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 _{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			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

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

tentative

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

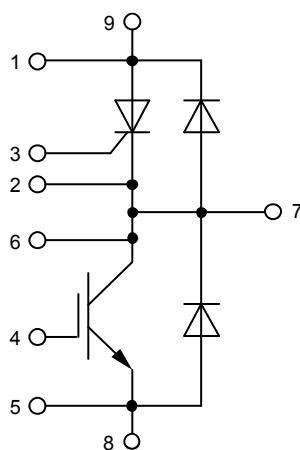
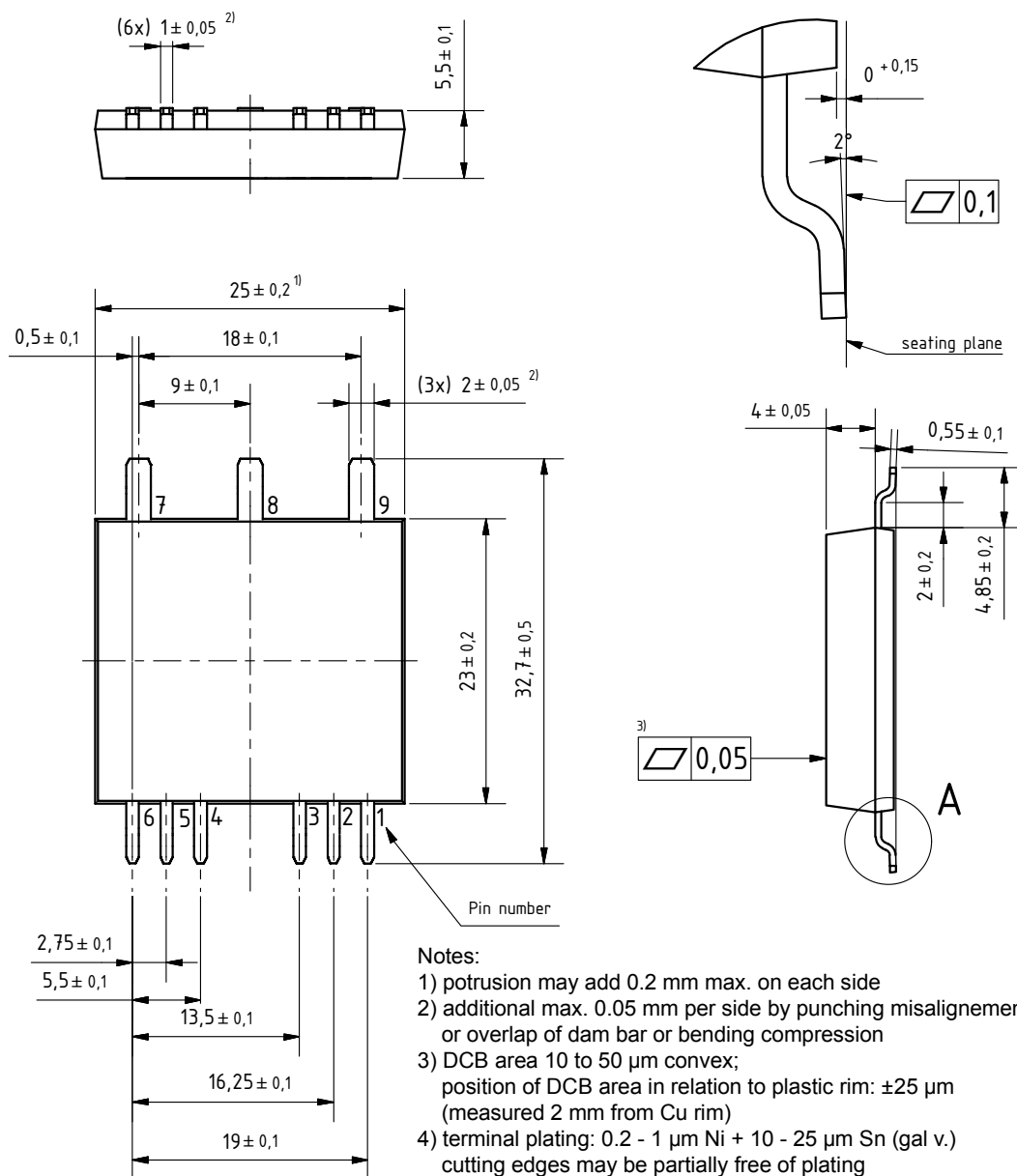
* on die level

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

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

Outlines SMPD

A (8 : 1)





Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.