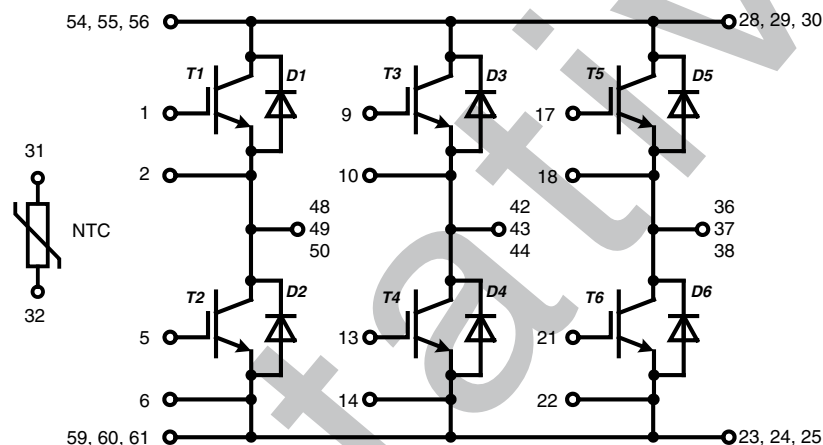
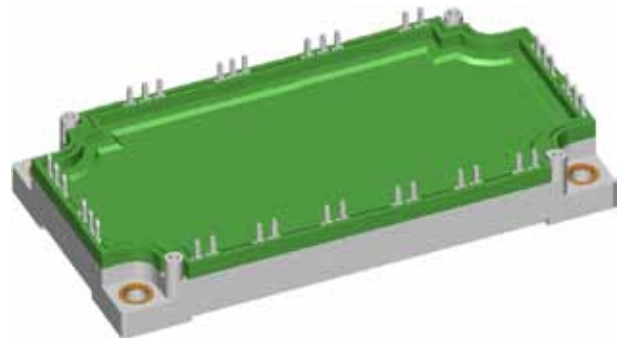


tentative

# X2PT IGBT Module

 $V_{CES} = 1200 \text{ V}$   
 $I_{C25} = 280 \text{ A}$   
 $V_{CE(sat)} = 1.7 \text{ V}$ 

6-Pack + NTC

**Part number**  
 MIXG180W1200TEH


E72873

**Features / Advantages:**

- X2PT - 2nd generation Xtreme light Punch Through
- $T_{vjm} = 175^{\circ}\text{C}$
- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged X2PT design results in:
  - short circuit rated for 10  $\mu\text{sec}$ .
  - very low gate charge
  - low EMI
  - square RBSOA @ 2x  $I_c$
- Low  $V_{CE(sat)}$  and low thermal resistance
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

**Applications:**

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

**Package: E3-Pack**

- Isolation Voltage: 4300 V~
- Industry standard outline
- RoHS compliant
- Base plate: Copper internally DCB isolated
- Advanced power cycling

**Option:**

- Phase Change Material printed on base plate

**Terms & Conditions of usage**

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you. Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you. Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

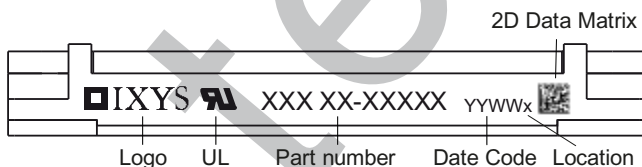
IXYS reserves the right to change limits, test conditions and dimensions.

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Inverter IGBT				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	
$V_{CES}$	collector emitter voltage				1200	V
$V_{GES}$	max. DC gate voltage		-20		+20	V
$V_{GEM}$	max. transient gate emitter voltage		-30		+30	V
$I_{C25}$	collector current	$T_C = 25^\circ\text{C}$			280	A
$I_{C80}$		$T_C = 80^\circ\text{C}$			210	A
$I_{C100}$		$T_C = 100^\circ\text{C}$			180	A
$P_{tot}$	total power dissipation	$T_C = 25^\circ\text{C}$			935	W
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 150\text{ A}; V_{GE} = 15\text{ V}$		1.7	2	V
				2		V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 6\text{ mA}; V_{GE} = V_{GE}$	5.5		7	V
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$		12	0.5	mA
						mA
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{ V}$			500	nA
$R_G$	internal gate resistance			2.5		$\Omega$
$C_{iss}$	input capacitance	$V_{CE} = 100\text{ V}; V_{GS} = 0\text{ V}; f = 1\text{ MHz}$		8.5		nF
$C_{oss}$	output capacitance					pF
$C_{rss}$	reverse transfer (Miller) capacitance					pF
$Q_g$	total gate charge	$V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 150\text{ A}$		520		nC
$Q_{gs}$	gate source charge					nC
$Q_{gd}$	gate drain (Miller) charge					nC
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{CE} = 600\text{ V}; I_C = 150\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 4.7\ \Omega$ (external)		90		ns
$t_r$	current rise time			60		ns
$t_{d(off)}$	turn-off delay time			280		ns
$t_f$	current fall time			80		ns
$E_{on}$	turn-on energy per pulse			11		mJ
$E_{off}$	turn-off energy per pulse			12		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				mJ	
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{CE} = 600\text{ V}; I_C = 150\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 4.7\ \Omega$ (external)		100		ns
$t_r$	current rise time			75		ns
$t_{d(off)}$	turn-off delay time			340		ns
$t_f$	current fall time			100		ns
$E_{on}$	turn-on energy per pulse			16		mJ
$E_{off}$	turn-off energy per pulse			16		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				mJ	
<b>RBSOA</b>	reverse bias safe operating area	$V_{GE} = \pm 15\text{ V}; R_G = 4.7\ \Omega$				
$I_{CM}$		$V_{CEmax} = 1200\text{ V}$			400	A
<b>SCSOA</b>	short circuit safe operating area	$V_{CEmax} = 1200\text{ V}$				
$t_{SC}$	short circuit duration	$V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V}$			10	$\mu\text{s}$
$I_{SC}$	short circuit duration	non-repetitive		600		A
$R_{thJC}$	thermal resistance junction to case	with heatsink compound; IXYS test setup		0.26	0.16	K/W
$R_{thJH}$	thermal resistance junction to heatsink					K/W

Inverter Diode				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	
$V_{RRM}$	max. repetitive reverse voltage				1200	V
$I_{F25}$	forward current				230	A
$I_{F80}$					170	A
$I_{F100}$					145	A
$V_F$	forward voltage	$I_F = 150$ A		1.9	2.2	V
$I_R$	reverse current * not applicable, see Ices at IGBT	$V_R = V_{RRM}$		*	*	mA
$Q_{RM}$	reverse recovery charge	$V_R = 600$ V $-di_F/dt = 2500$ A/ $\mu$ s $I_F = 150$ A				$\mu$ C
$I_{RM}$	max. reverse recovery current					A
$t_{rr}$	reverse recovery time					ns
$E_{rec}$	reverse recovery energy					mJ
$Q_{RM}$	reverse recovery charge	$V_R = 600$ V $-di_F/dt = 2500$ A/ $\mu$ s $I_F = 150$ A		20		$\mu$ C
$I_{RM}$	max. reverse recovery current			175		A
$t_{rr}$	reverse recovery time			350		ns
$E_{rec}$	reverse recovery energy			10		mJ
$R_{thJC}$	thermal resistance junction to case	with heatsink compound; IXYS test setup		0.40	0.25	K/W
$R_{thJH}$	thermal resistance junction to heatsink					K/W

Package E3-Pack		Ratings				
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			300	A
$T_{stg}$	storage temperature		-40		125	$^{\circ}$ C
$T_{op}$	operation temperature		-40		150	$^{\circ}$ C
$T_{VJ}$	virtual junction temperature		-40		175	$^{\circ}$ C
<b>Weight</b>					270	g
$M_D$	mounting torque		3		6	Nm
$d_{Spp}$	creepage distance on surface	terminal to terminal	6			mm
$d_{Spb}$		terminal to backside	12			mm
$d_{App}$	striking distance through air	terminal to terminal	6			mm
$d_{Apb}$		terminal to backside	12			mm
$V_{ISOL}$	isolation voltage	$t = 1$ second $t = 1$ minute      50 / 60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4300 3600			V V
$R_{pin-chip}$	resistance pin to chip	$V = V_{CEsat} + 2 \cdot R \cdot I_C$ resp. $V = V_F + 2 \cdot R \cdot I_F$		2.5		m $\Omega$
$C_P$	coupling capacity per switch	between shorted pins of switch and back side metallization				pF


**Part number**

- M = Module
- I = IGBT
- X = XPT IGBT
- G = Gen 2 / std
- 180 = Current Rating [A]
- W = 6-pack
- 1200 = Reverse Voltage [V]
- T = Thermistor
- EH = E3-Pack

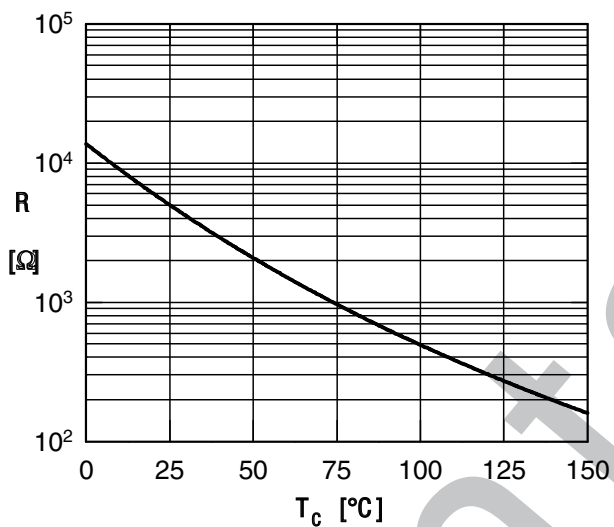
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXG180W1200TEH	MIXG180W1200TEH	Box	5	518150
with Phase Change Material	MIXG180W1200TEH -PC	MIXG180W1200TEH	Blister	12	

**Equivalent Circuits for Simulation** \*on die level

			IGBT	FW Diode	
$V_{0\ max}$	threshold voltage	$T_{VJ} = 125^{\circ}\text{C}$			V
$R_{0\ max}$	slope resistance *				m $\Omega$
$V_{0\ max}$	threshold voltage	$T_{VJ} = 175^{\circ}\text{C}$	1.2	1.2	V
$R_{0\ max}$	slope resistance *		7.7	6.0	m $\Omega$

**Temperature Sensor NTC**

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$R_{25}$	resistance	$T_{VJ} = 25^{\circ}\text{C}$	4.75	5.0	5.25	k $\Omega$
$B_{25/50}$	temperature coefficient			3375		K



Typ. NTC resistance vs. temperature