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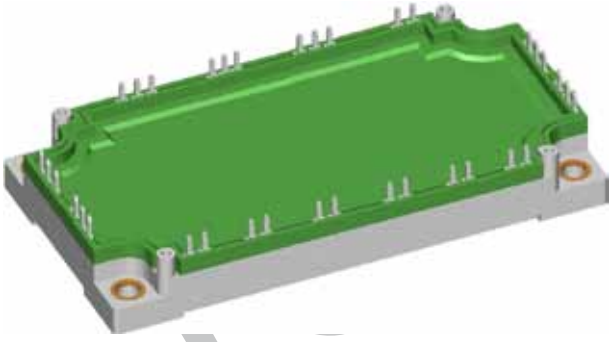
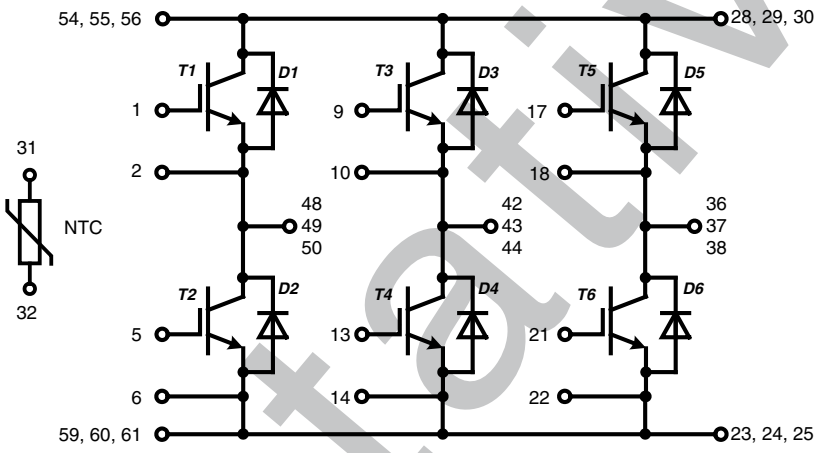
X2PT IGBT Module

V_{CES} = 1200 V
I_{C25} = 370 A
$V_{CE(sat)}$ = 1.7 V

6-Pack + NTC



Part number
MIXG240W1200TEH



E72873

Features / Advantages:

- X2PT - 2nd generation Xtreme light Punch Through
- Tvjm = 175°C
- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged X2PT design results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 2x Ic
- 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

Inverter IGBT				Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			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°C			370	A
I_{C80}			T_C = 80°C			280	A
I_{C100}			T_C = 100°C			240	A
P_{tot}	*total power dissipation*		T_C = 25°C			1250	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 200 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.7	2	V
			T_{VJ} = 150°C		2		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 8 mA; V_{GE} = V_{GE}	T_{VJ} = 25°C	5.5		7	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES} ; V_{GE} = 0 V	T_{VJ} = 25°C			0.2	mA
			T_{VJ} = 150°C		2		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
R_G	*internal gate resistance*				2.0		Ω
C_{iss}	*input capacitance*	V_{CE} = 100 V; V_{GS} = 0 V; f = 1 MHz			10.6		nF
C_{oss}	*output capacitance*						pF
C_{rss}	*reverse transfer (Miller) capacitance*						pF
Q_g	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 200 A			630		nC
Q_{gs}	*gate source charge*						nC
Q_{gd}	*gate drain (Miller) charge*						nC
$t_{d(on)}$	*urn-on delay time*	Inductive switching					ns
t_r	*current rise time*						ns
$t_{d(off)}$	*turn-off delay time*						ns
t_f	*current fall time*	V_{CE} = 600 V; I_C = 200 A	T_{VJ} = 25°C				ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 3.9 Ω (external)					mJ
E_{off}	*turn-off energy per pulse*						mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*						mJ
$t_{d(on)}$	*turn-on delay time*	Inductive switching			100		ns
t_r	*current rise time*				75		ns
$t_{d(off)}$	*turn-off delay time*				340		ns
t_f	*current fall time*	V_{CE} = 600 V; I_C = 200 A	T_{VJ} = 150°C		100		ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 3.9 Ω (external)			22		mJ
E_{off}	*turn-off energy per pulse*				21		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*						mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 3.9 Ω	T_{VJ} = 150°C				
I_{CM}		V_{CEmax} = 1200 V				400	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} = 150°C			10	µs
I_{SC}	*short circuit duration*	non-repetitive			900		A
R_{thJC}	*thermal resistance junction to case*					0.12	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heatsink compound; IXYS test setup			0.18		K/W

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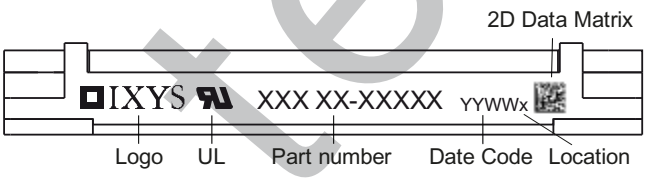
Inverter Diode				Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			275	A
I_{F80}			T_C = 80°C			205	A
I_{F100}			T_C = 100°C			175	A
V_F	*forward voltage*	I_F = 200 A	T_{VJ} = 25°C			2.2	V
			T_{VJ} = 150°C		1.9		V
I_R	*reverse current*	$V_R = V_{RRM}$	T_{VJ} = 25°C			*	mA
	* not applicable, see Ices at IGBT		T_{VJ} = 150°C		*		mA
Q_{RM}	*reverse recovery charge*	V_R = 600 V					µC
I_{RM}	*max. reverse recovery current*	$-di_F/dt$ = 3000 A/µs	T_{VJ} = 25°C				A
t_{rr}	*reverse recovery time*	I_F = 200 A					ns
E_{rec}	*reverse recovery energy*						mJ
Q_{RM}	*reverse recovery charge*	V_R = 600 V			24		µC
I_{RM}	*max. reverse recovery current*	$-di_F/dt$ = 3000 A/µs	T_{VJ} = 150°C		210		A
t_{rr}	*reverse recovery time*	I_F = 200 A			350		ns
E_{rec}	*reverse recovery energy*				12		mJ
R_{thJC}	*thermal resistance junction to case*					0.21	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heatsink compound; IXYS test setup			0.33		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	°C
T_{op}	*operation temperature*			-40		150	°C
T_{VJ}	*virtual junction temperature*			-40		175	°C
Weight					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	50 / 60 Hz, RMS; $I_{ISOL} \leq$ 1 mA	4300			V
		t = 1 minute		3600			V
$R_{pin\text{-}chip}$	*resistance pin to chip*	$V = V_{CEsat} + 2 \cdot R \cdot I_C$ resp. $V = V_F + 2 \cdot R \cdot I_F$					mΩ
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
240 = 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	MIXG240W1200TEH	MIXG240W1200TEH	Box	5	517094
with Phase Change Material	MIXG240W1200TEH -PC	MIXG240W1200TEH	Blister	12	

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

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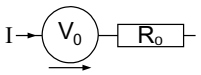
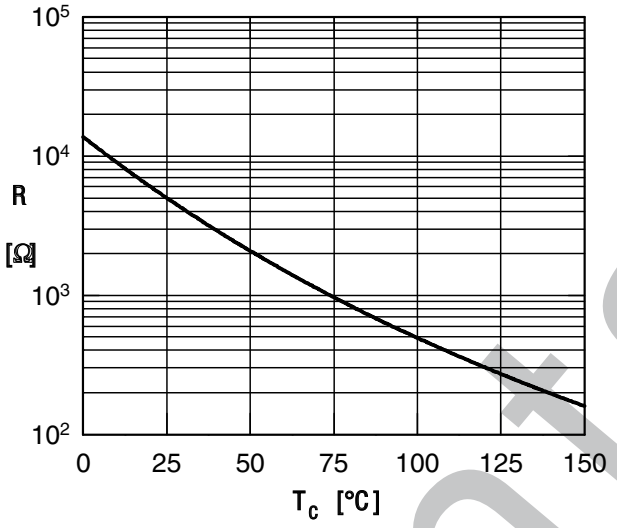
Equivalent Circuits for Simulation **on die level*



			IGBT	FW Diode	
$V_{0\ max}$	*threshold voltage*	T_{VJ} = 125°C			V
$R_{0\ max}$	*slope resistance **				mΩ
$V_{0\ max}$	*threshold voltage*	T_{VJ} = 175°C	1.2	1.2	V
$R_{0\ max}$	*slope resistance **		6.4	5.0	mΩ

Temperature Sensor NTC

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature