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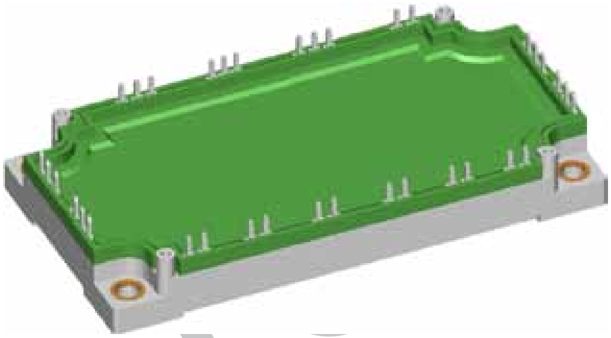
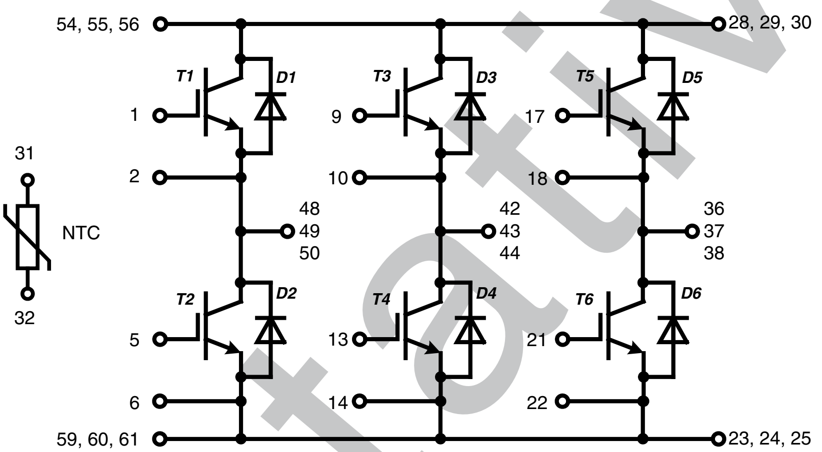
X2PT IGBT Module

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

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Inverter IGBT				Ratings		
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
V_{CES}	*collector emitter voltage*	T_{VJ} = 25°C			1200	V
V_{GES} V_{GEM}	*max. DC gate voltage* *max. transient gate emitter voltage*		-20 -30		+20 +30	V V
I_{C25} I_{C80} I_{C100}	*collector current*	T_C = 25°C T_C = 80°C T_C = 100°C			370 280 240	A A 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 T_{VJ} = 150°C		1.7 2	2	V 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 T_{VJ} = 150°C		 2	0.2	mA mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V			500	nA
R_G	*internal gate resistance*			2.0		Ω
C_{iss} C_{oss} C_{rss}	*input capacitance* *output capacitance* *reverse transfer (Miller) capacitance*	V_{CE} = 100 V; V_{GS} = 0 V; f = 1 MHz		10.6		nF pF pF
Q_g Q_{gs} Q_{gd}	*total gate charge* *gate source charge* *gate drain (Miller) charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 200 A		630		nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*urn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse* *reverse recovery losses at turn-off*	Inductive switching V_{CE} = 600 V; I_C = 200 A; T_{VJ} = 25°C V_{GE} = ±15 V; R_G = 3.9 Ω (external)				ns ns ns ns mJ mJ mJ
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse* *reverse recovery losses at turn-off*	Inductive switching V_{CE} = 600 V; I_C = 200 A; T_{VJ} = 150°C V_{GE} = ±15 V; R_G = 3.9 Ω (external)		100 75 340 100 22 21		ns ns ns ns mJ mJ mJ
RBSOA I_{CM}	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 3.9 Ω; T_{VJ} = 150°C V_{CEmax} = 1200 V			 400	 A
SCSOA t_{SC} I_{SC}	*short circuit safe operating area* *short circuit duration* *short circuit duration*	V_{CEmax} = 1200 V V_{CE} = 900 V; V_{GE} = ±15 V; T_{VJ} = 150°C non-repetitive		 900	 10	 µs A
R_{thJC} R_{thJH}	*thermal resistance junction to case* *thermal resistance junction to heatsink*	with heatsink compound; IXYS test setup		 0.18	0.12	K/W K/W

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

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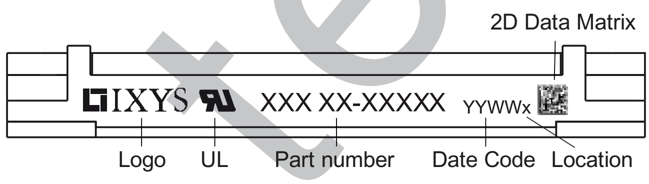
Inverter Diode				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25} I_{F80} I_{F100}	*forward current*		T_C = 25°C T_C = 80°C T_C = 100°C			275 205 175	A A A
V_F	*forward voltage*	I_F = 200 A	T_{VJ} = 25°C T_{VJ} = 150°C		 1.9	2.2 	V V
I_R	*reverse current* * not applicable, see Ices at IGBT	$V_R = V_{RRM}$	T_{VJ} = 25°C T_{VJ} = 150°C		 *	* 	mA mA
Q_{RM} I_{RM} t_{rr} E_{rec}	*reverse recovery charge* *max. reverse recovery current* *reverse recovery time* *reverse recovery energy*	V_R = 600 V $-di_F/dt$ = 3000 A/µs I_F = 200 A	T_{VJ} = 25°C				µC A ns mJ
Q_{RM} I_{RM} t_{rr} E_{rec}	*reverse recovery charge* *max. reverse recovery current* *reverse recovery time* *reverse recovery energy*	V_R = 600 V $-di_F/dt$ = 3000 A/µs I_F = 200 A	T_{VJ} = 150°C		24 210 350 12		µC A ns mJ
R_{thJC} R_{thJH}	*thermal resistance junction to case* *thermal resistance junction to heatsink*	 with heatsink compound; IXYS test setup			 0.33	0.21 	K/W K/W

Package	E3-Pack			Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				300	A
T_{stg} T_{op} T_{VJ}	*storage temperature* *operation temperature* *virtual junction temperature*			-40 -40 -40		125 150 175	°C °C °C
Weight					270		g
M_D	*mounting torque*			3		6	Nm
d_{Spp} d_{Spb}	*creepage distance on surface*		*terminal to terminal* *terminal to backside*	6 12			mm mm
d_{App} d_{Apb}	*striking distance through air*		*terminal to terminal* *terminal to backside*	6 12			mm 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. $V = V_F + 2 \cdot R \cdot I_F$					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	

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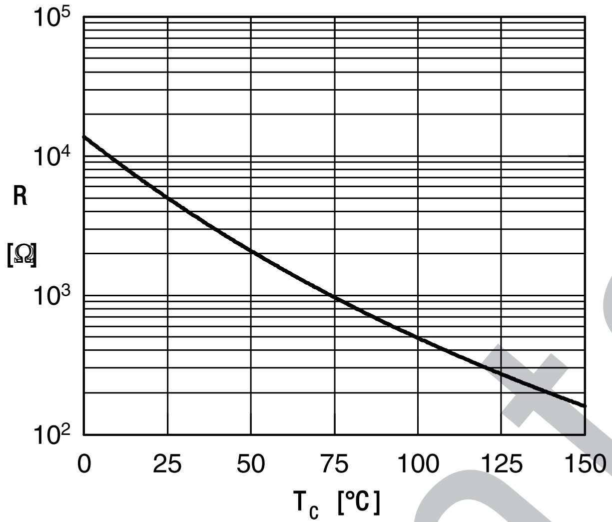
Equivalent Circuits for Simulation	*on die level		IGBT	FW Diode	
$V_{0\,max}$	*threshold voltage*	T_{VJ} = 125°C			V
$R_{0\,max}$	*slope resistance* *				mΩ
$V_{0\,max}$	*threshold voltage*	T_{VJ} = 175°C	1.2	1.2	V
$R_{0\,max}$	*slope resistance* *		6.4	5.0	mΩ

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

Outlines E3-Pack