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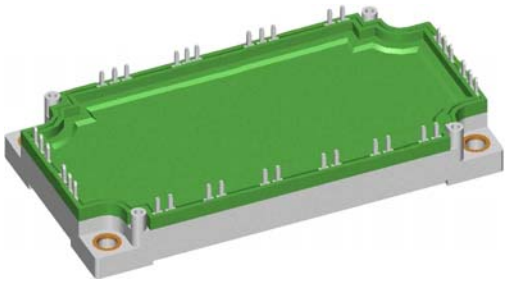
XPT IGBT Module

V_{CES} = 650V
I_{C25} = 280A
$V_{CE(sat)}$ = 1.5V

Trench IGBT
6-Pack + NTC

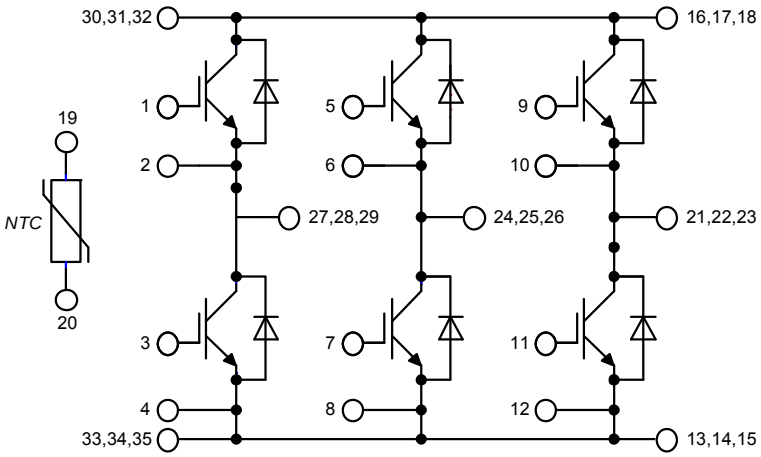
Part number

MIXD200W650TEH



Backside: isolated

E72873



Features / Advantages:

- High level of integration - only one power semiconductor module required for the whole drive
- Rugged Trench XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 2x Ic
- Trench XPT design
  - low VCEsat
  - low Eoff
- Temperature sense included
- 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: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling

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Inverter IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			650	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			280	A
I_{C80}			T_C = 80°C			210	A
P_{tot}	*total power dissipation*		T_C = 25°C			680	W
$V_{CE(sat)}$	*collector emitter saturation voltage on die level*	I_C = 200A; V_{GE} = 15 V	T_{VJ} = 25°C		1.5	1.7	V
			T_{VJ} = 150°C		1.75		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 3.2mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5	5.8	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			1	mA
			T_{VJ} = 150°C		3		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 300 V; V_{GE} = 15 V; I_C = 200 A			320		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 300 V; I_C = 200 A V_{GE} = ±15 V; R_G = 4.7 Ω	T_{VJ} = 150°C		25		ns
t_r	*current rise time*				45		ns
$t_{d(off)}$	*turn-off delay time*				120		ns
t_f	*current fall time*				40		ns
E_{on}	*turn-on energy per pulse*				3.5		mJ
E_{off}	*turn-off energy per pulse*				4.4		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 4.7 Ω	T_{VJ} = 150°C				
I_{CM}		V_{CEmax} = 650 V				400	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 650 V					
t_{SC}	*short circuit duration*	V_{CE} = 650 V; V_{GE} = ±15 V	T_{VJ} = 150°C			10	µs
I_{SC}	*short circuit current*	R_G = 4.7 Ω; non-repetitive			800		A
R_{thJC}	*thermal resistance junction to case*					0.22	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

Inverter Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			650	V
I_{F25}	*forward current*		T_C = 25°C			275	A
I_{F80}			T_C = 80°C			200	A
V_F	*forward voltage*	I_F = 250A	T_{VJ} = 25°C			2.00	V
			T_{VJ} = 125°C		1.80		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			*	mA
	* not applicable, see Ices value above		T_{VJ} = 125°C		*		mA
Q_{rr}	*reverse recovery charge*	V_R = 300 V -di_F/dt = 2500 A/µs I_F = 250A; V_{GE} = 0 V	T_{VJ} = 125°C		16		µC
I_{RM}	*max. reverse recovery current*				180		A
t_{rr}	*reverse recovery time*				150		ns
E_{rec}	*reverse recovery energy*				4.4		mJ
R_{thJC}	*thermal resistance junction to case*					0.25	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.10		K/W

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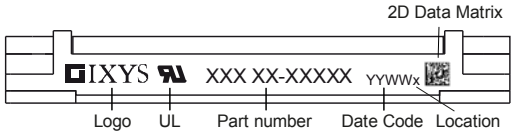
Package E3-Pack				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal				300	A
T_{VJ}	*virtual junction temperature*			-40		175	°C
T_{op}	*operation temperature*			-40		150	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					270		g
M_D	*mounting torque*			3		6	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	6.0			mm
$d_{Spb/Apb}$			*terminal to backside*	12.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V
$R_{pin-chip}$	*resistance pin to chip*	V = V_{CEsat} + 2·R·I_C resp. V = V_F + 2·R·I_F			2.5		mΩ



Part number

M = Module
I = IGBT
X = XPT IGBT
D = Trench 1 / std
200 = Current Rating [A]
W = 6-Pack
650 = Reverse Voltage [V]
T = Thermistor \ Temperature sensor
EH = E3-Pack

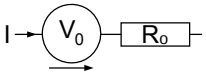
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXD200W650TEH	MIXD200W650TEH	Box	5	514658

Temperature Sensor NTC

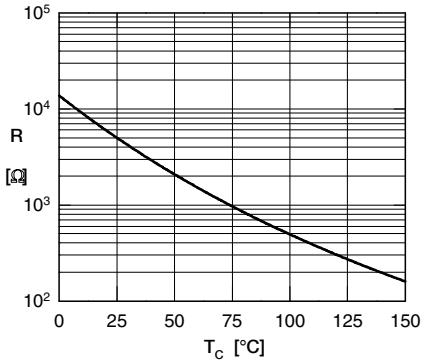
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	4.75	5	5.25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 175 °C



		Inverter IGBT	Inverter Diode	
$V_{0\,max}$	*threshold voltage*	0.8	1.2	V
$R_{0\,max}$	*slope resistance **	5.7	4	mΩ



Typ. NTC resistance vs. temperature

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Outlines E3-Pack