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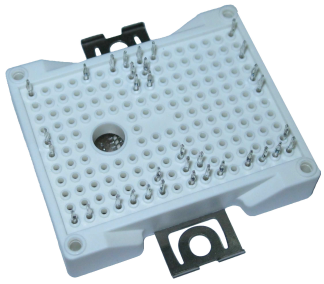
XPT IGBT Module

V_{CES} = 2x 650 V
I_{C25} = 75 A
$V_{CE(sat)}$ = 1,6 V

Phase leg with Multi Level

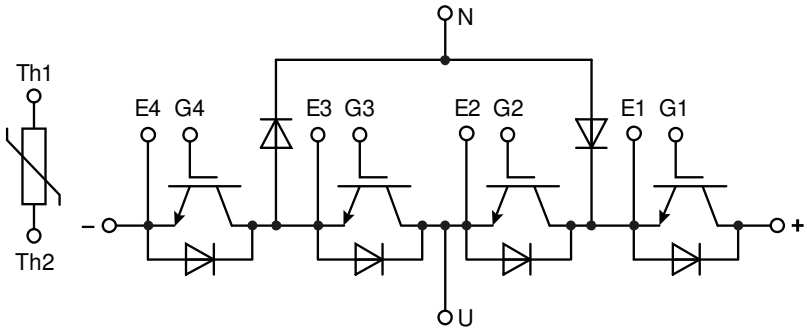
Part number

MIXA50PM650TMI



Backside: isolated

pending



Features / Advantages:

- High level of integration
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- Temperature sense included
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Applications:

- AC motro control
- AC servo and robot drives
- UPS
- Solar Inverter

Package: MiniPack2B

- Isolation Voltage: 3000 V~
- Compatible to EASY2B package
- Pins for pressfit connection
- With DCB base

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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			75	A
I_{C80}			T_C = 80°C			50	A
P_{tot}	*total power dissipation*		T_C = 25°C			188	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 50 A; V_{GE} = 15 V	T_{VJ} = 25°C		1,6	1,8	V
			T_{VJ} = 125°C		1,9		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 0,8 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	4	4,8	5,5	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} = 300 V; V_{GE} = 15 V; I_C = 50 A			70		nC
$t_{d(on)}$	*turn-on delay time*				70		ns
t_r	*current rise time*				50		ns
$t_{d(off)}$	*turn-off delay time*	inductive load	T_{VJ} = 125°C		100		ns
t_f	*current fall time*	V_{CE} = 300 V; I_C = 50 A			40		ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 15 Ω			1,2		mJ
E_{off}	*turn-off energy per pulse*				1,7		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 15 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEma} = 650 V				100	A
SCSOA	*short circuit safe operating area*	V_{CEma} = 650 V					
t_{SC}	*short circuit duration*	V_{CE} = 360 V; V_{GE} = ±15 V	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 15 Ω; non-repetitive			200		A
R_{thJC}	*thermal resistance junction to case*					0,8	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,27		K/W

Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			650	V
I_{F25}	*forward current*		T_C = 25°C			55	A
I_{F80}			T_C = 80°C			40	A
V_F	*forward voltage*	I_F = 50 A	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			0,1	mA
			T_{VJ} = 125°C		0,5		mA
Q_{rr}	*reverse recovery charge*				4,5		µC
I_{RM}	*max. reverse recovery current*	V_R = 300 V			45		A
t_{rr}	*reverse recovery time*	-di_F/dt = 900 A/µs	T_{VJ} = 125°C		150		ns
E_{rec}	*reverse recovery energy*	I_F = 50 A; V_{GE} = 0 V			1		mJ
R_{thJC}	*thermal resistance junction to case*					1,2	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,4		K/W

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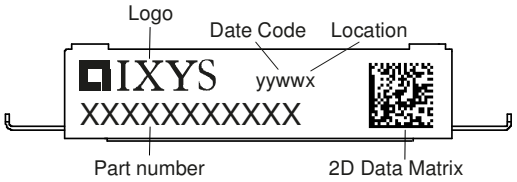
Package MiniPack2B				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal					A
T_{VJ}	*virtual junction temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					39		g
M_D	*mounting torque*			2		2,2	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	6,3	5,0			mm
$d_{Spb/Apb}$		*terminal to backside*	11,5	10,0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \le 1$ mA	3000			V
		t = 1 minute		2500			V
$R_{pin-chip}$	*resistance pin to chip*	$V = V_{CEsat} + 2 \cdot R \cdot I_C$ resp. $V = V_F + 2 \cdot R \cdot I_F$			6		mΩ
T_{vjm}	*max. virtual junction temperature*					175	°C



Part description

M = Module
I = IGBT
X = XPT IGBT
A = Gen 1 / std
50 = Current Rating [A]
PM = Phase leg with Multi Level
650 = Reverse Voltage [V]
T = Thermistor \ Temperature sensor
MI = MiniPack2B

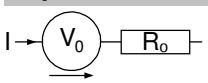
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA50PM650TMI	MIXA50PM650TMI	Box	20	512023

Temperature Sensor NTC

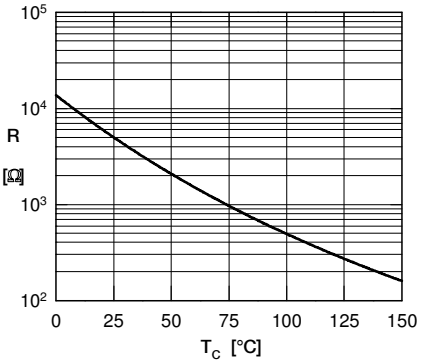
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	4,75	5	5,25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150 °C



		IGBT	Diode	
$V_{0\,max}$	*threshold voltage*	1,1	1,2	V
$R_{0\,max}$	*slope resistance **	21	18	mΩ



Typ. NTC resistance vs. temperature

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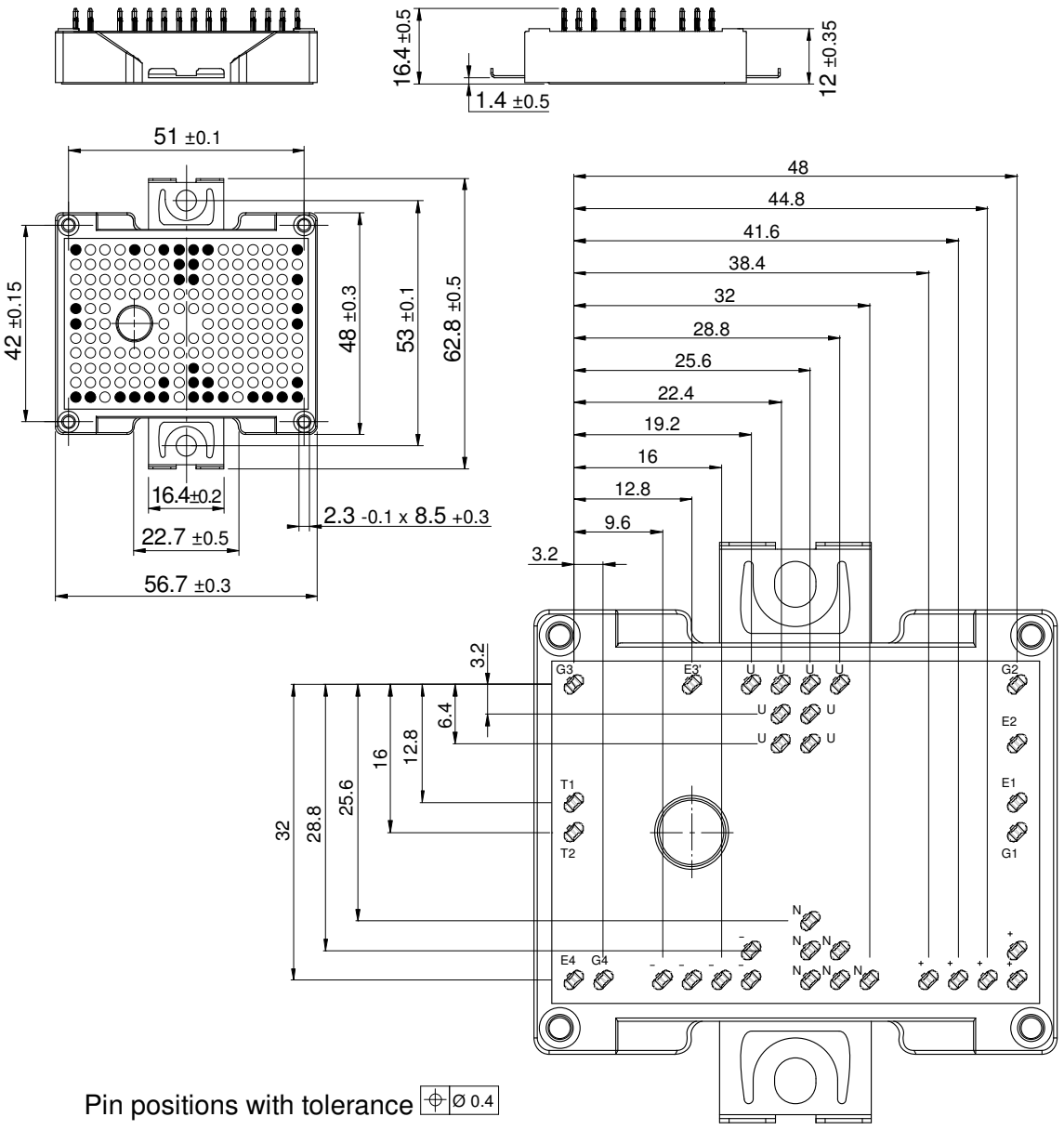
Outlines MiniPack2B



Pin positions with tolerance ⌖ Ø 0.4