tentative

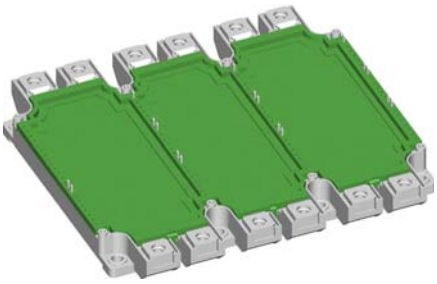
XPT IGBT Module

V_{CES} = 1200 V
I_{C25} = 650 A
$V_{CE(sat)}$ = 1.8 V

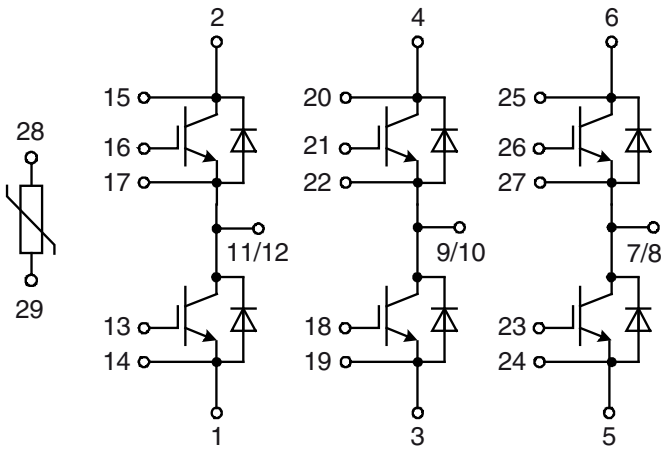
6-Pack + NTC

Part number

MIXA450W1200TFH



Backside: isolated



Features / Advantages:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 2 x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- 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: E9-Pack

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling

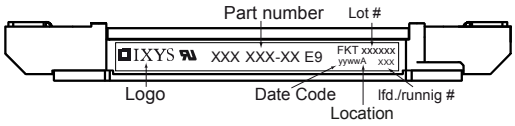
tentative

Inverter IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	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			650	A
I_{C80}			T_C = 80°C			450	A
P_{tot}	*total power dissipation*		T_C = 25°C			2200	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 450 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.15	V
			T_{VJ} = 125°C		2.15		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 18 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	5.9	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} = 125°C		6		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				1.5	µA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 450 A			1400		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 450 A V_{GE} = ±15 V; R_G = 1.6 Ω	T_{VJ} = 125°C		85		ns
t_r	*current rise time*				80		ns
$t_{d(off)}$	*turn-off delay time*				310		ns
t_f	*current fall time*				360		ns
E_{on}	*turn-on energy per pulse*				22		mJ
E_{off}	*turn-off energy per pulse*				68		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 1.6 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200 V				900	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} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 1.6 Ω; non-repetitive			1900		A
R_{thJC}	*thermal resistance junction to case*					0.06	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.03		K/W

Inverter Diode							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			380	A
I_{F80}			T_C = 80°C			265	A
V_F	*forward voltage*	I_F = 450 A	T_{VJ} = 25°C			2.30	V
			T_{VJ} = 125°C		2.00		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 = 600 V -di_F/dt = 5400 A/µs I_F = 450 A; V_{GE} = 0 V	T_{VJ} = 125°C		62		µC
I_{RM}	*max. reverse recovery current*				425		A
t_{rr}	*reverse recovery time*				360		ns
E_{rec}	*reverse recovery energy*				26		mJ
R_{thJC}	*thermal resistance junction to case*					0.095	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.04		K/W

tentative

Package E9-Pack				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal					A
T_{stg}	*storage temperature*			-40		125	°C
T_{VJ}	*virtual junction temperature*			-40		150	°C
Weight					835		g
M_D	*mounting torque*			3		6	Nm
M_T	*terminal torque*			3		6	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	12.7			mm
$d_{Spb/Apb}$			*terminal to backside*	10.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3000			V
		t = 1 minute		2500			V



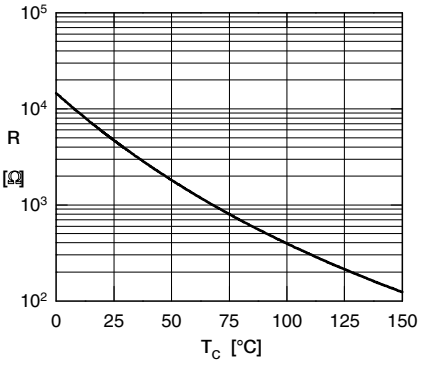
Part number

M = Module
I = IGBT
X = XPT IGBT
A = Gen 1 / std
450 = Current Rating [A]
W =
1200 = Reverse Voltage [V]
T = Thermistor \ Temperature sensor
FH = E9-Pack

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA450W1200TFH	MIXA450W1200TFH	Box	1	512285

Temperature Sensor NTC

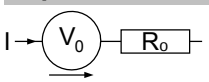
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	4.75	5	5.25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C



		Inverter IGBT	Inverter Diode	
$V_{0\,max}$	*threshold voltage*	1.1	1.25	V
$R_{0\,max}$	*slope resistance **	3.1	1.9	mΩ

tentative

Outlines E9-Pack