preliminary

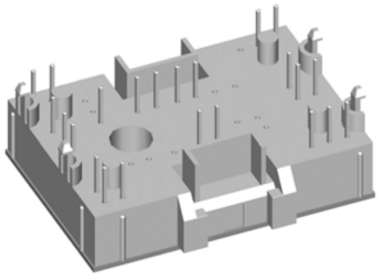
XPT IGBT Module

V_{CES} = 2x1200 V
I_{C25} = 155 A
$V_{CE(sat)}$ = 1.8 V

Phase leg + free wheeling Diodes + NTC

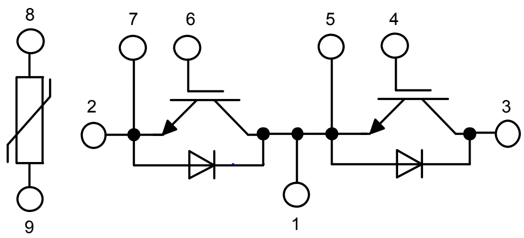
Part number

MIXA100PF1200TMH



Backside: isolated

E72873



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 motor drives
- Pumps, Fans
- Washing machines
- Air-conditioning system
- Inverter and power supplies

Package:

- Housing: MiniPack2
- "Mini" package
- Assembly height is 17 mm
- Insulated base plate
- Pins suitable for wave soldering and PCB mounting
- Assembly clips available
  - IXKU 5-505 screw clamp
  - IXRB 5-506 click clamp

IGBT

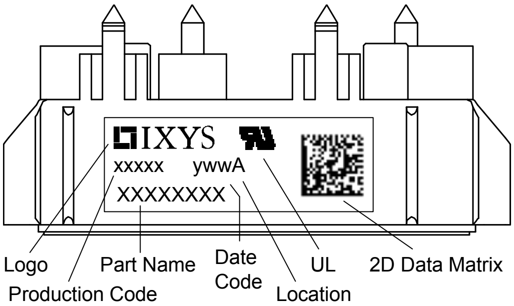
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient collector gate voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			155	A
I_{C80}			T_C = 80°C			108	A
P_{tot}	*total power dissipation*		T_C = 25°C			500	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 100A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.1	V
			T_{VJ} = 125°C		2.1		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 4 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			0.3	mA
			T_{VJ} = 125°C		0.6		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 100 A			295		nC
$t_{d(on)}$	*turn-on delay time*				70		ns
t_r	*current rise time*	inductive load	T_{VJ} = 125°C		40		ns
$t_{d(off)}$	*turn-off delay time*	V_{CE} = 600 V; I_C = 100 A			250		ns
t_f	*current fall time*	V_{GE} = ±15 V; R_G = 6.8 Ω			100		ns
E_{on}	*turn-on energy per pulse*				8.5		mJ
E_{off}	*turn-off energy per pulse*				11		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 6.8 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200 V				300	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 = 6.8 Ω; non-repetitive			400		A
R_{thJC}	*thermal resistance junction to case*					0.25	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.08		K/W

Diode

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			135	A
I_{F80}			T_C = 80°C			90	A
V_F	*forward voltage*	I_F = 100 A	T_{VJ} = 25°C			2.20	V
			T_{VJ} = 125°C		1.95		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*				12.5		µC
I_{RM}	*max. reverse recovery current*	V_R = 600 V			100		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 1600 A/µs	T_{VJ} = 125°C		350		ns
E_{rec}	*reverse recovery energy*	I_F = 100 A; V_{GE} = 0 V			4		mJ
R_{thJC}	*thermal resistance junction to case*					0.4	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.13		K/W

preliminary

Package MiniPack2				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					37		g
F_C	*mounting force with clip*			40		80	N
V_{ISOL}	*isolation voltage*	t = 1 second		3000			V
		t = 1 minute		2500			V
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal*	7.5	7.5			mm
$d_{Spb/Apb}$		*terminal to backside*	12.7	12.0			mm



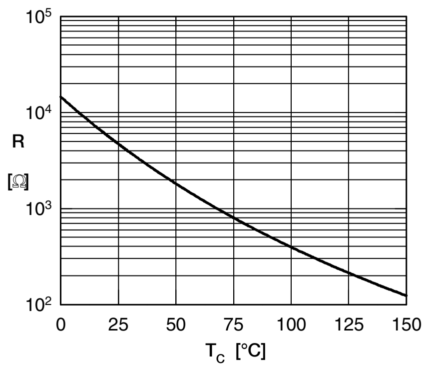
Part number

M = Module
I = IGBT
X = XPT IGBT
A = Gen 1 / std
100 = Current Rating [A]
PF = Phase leg + free wheeling Diodes
1200 = Reverse Voltage [V]
T = Thermistor \ Temperature sensor
MH = MiniPack2

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA100PF1200TMH	MIXA100PF1200TMH	Box	20	511931

Temperature Sensor NTC

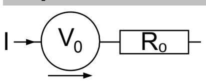
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	4.75	5	5.25	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature

Equivalent Circuits for Simulation

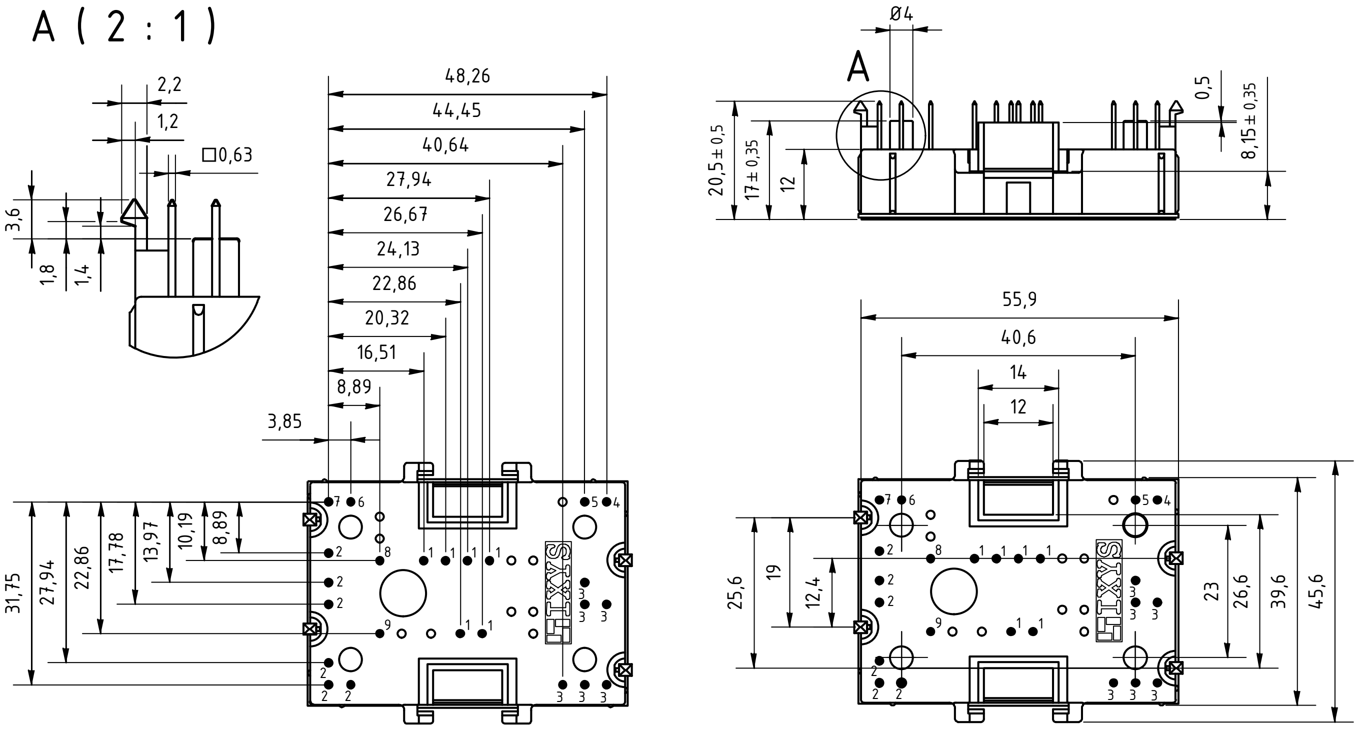
** on die level* T_{VJ} = 150°C



		IGBT	Diode	
$V_{0\,max}$	*threshold voltage*	1.1	1.25	V
$R_{0\,max}$	*slope resistance **	13.8	8.5	mΩ

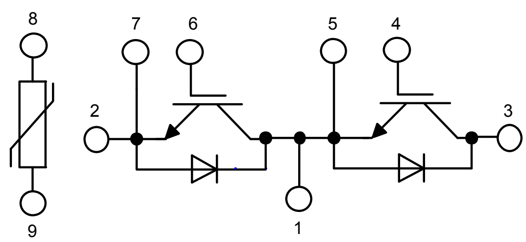
preliminary

Outlines MiniPack2



Bemerkungen:
1) Toleranz für Pin Positionen entsprechend ⌖ Ø 0,4
2) Vorgesehen für die Montage auf Leiterplatten mit einer Dicke von 1,6 ±0,2mm

Remarks:
1) Pin positions with tolerance ⌖ Ø 0.4
2) Mounting on PCB with thickness of 1.6 ±0.2mm



IGBT

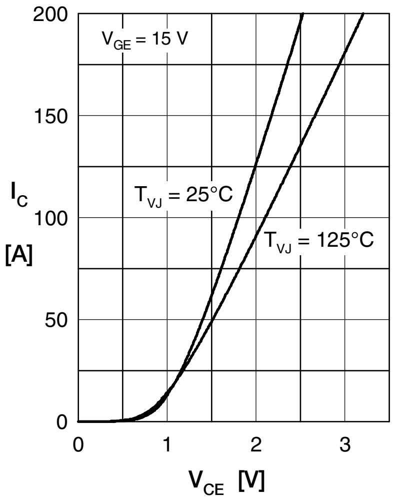


Fig. 1 Typ. output characteristics

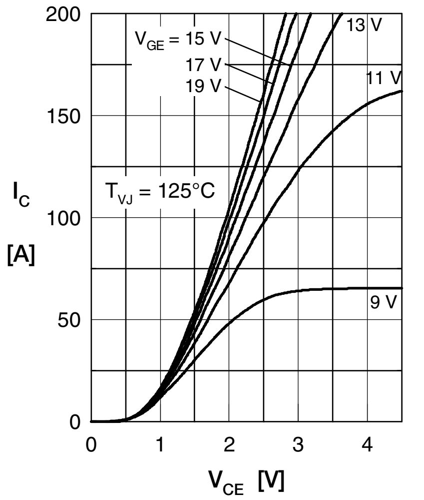


Fig. 2 Typ. output characteristics

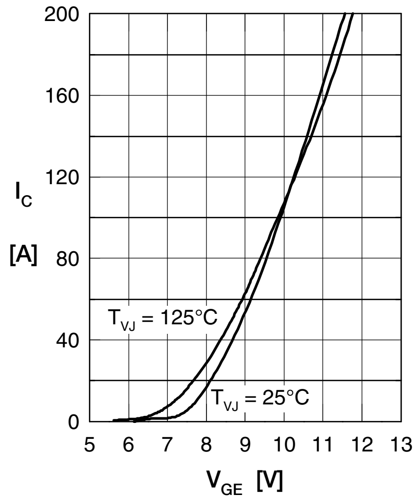


Fig. 3 Typ. tranfer characteristics

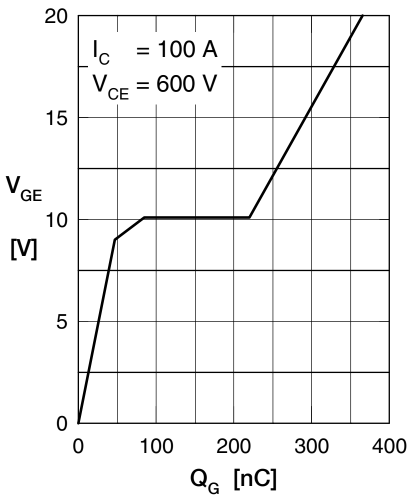


Fig. 4 Typ. turn-on gate charge

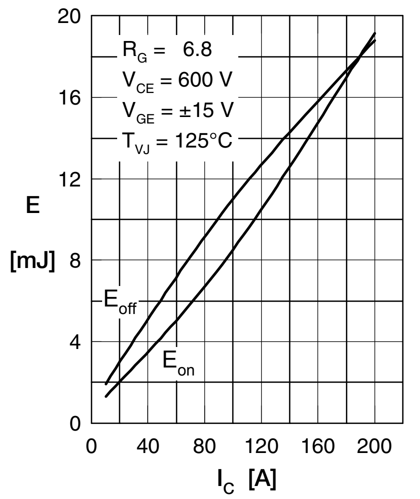


Fig. 5 Typ. switching energy vs. collector current

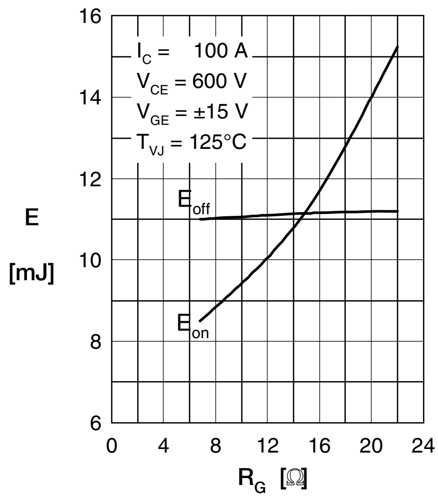


Fig. 6 Typ. switching energy vs. gate resistance

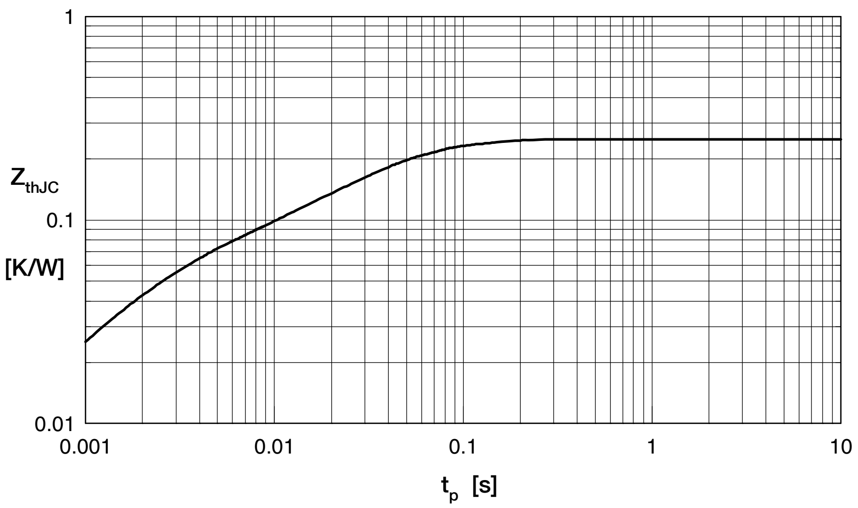


Fig. 7 Typ. transient thermal impedance junction to case

Diode

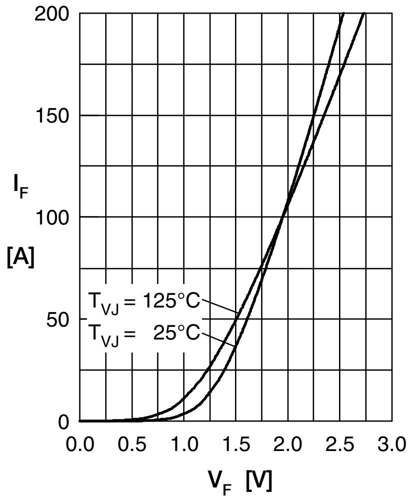


Fig. 1 Typ. Forward current versusV_F

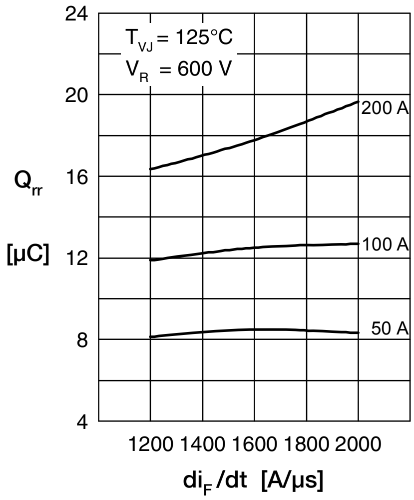


Fig. 2 Typ. reverse recov. charge Q_{rr} versus di/dt

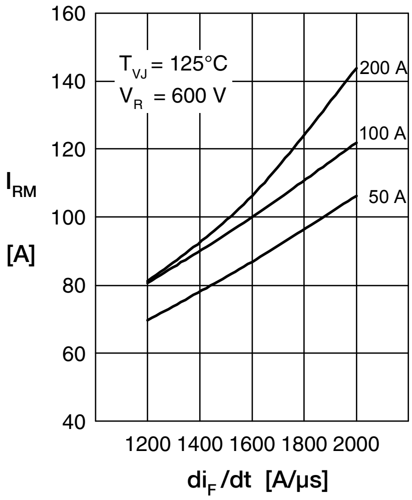


Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

Fig. 4 Dynamic parameters Q_{rr}, I_{RM} versusT_{VJ}

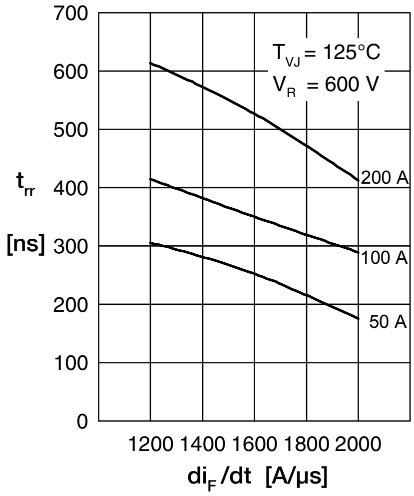


Fig. 5 Typ. recovery time t_{rr} versus di/dt

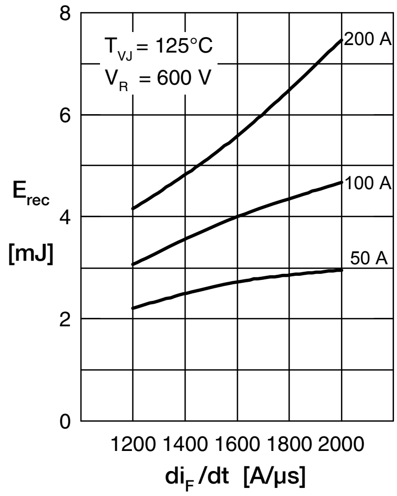


Fig. 6 Typ. recovery energy E_{rec} versus di/dt

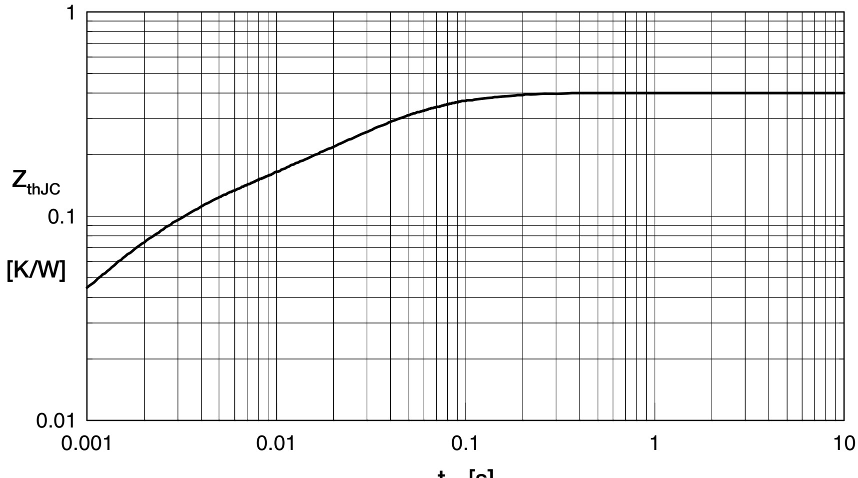


Fig. 7 Typ. transient thermal impedance junction to case