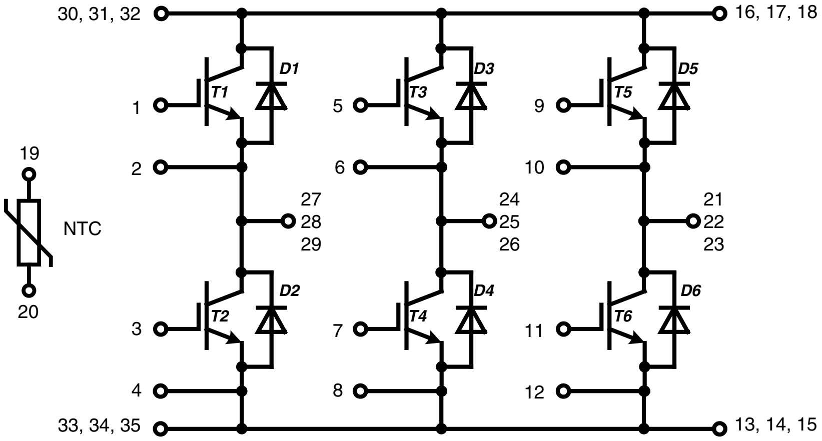
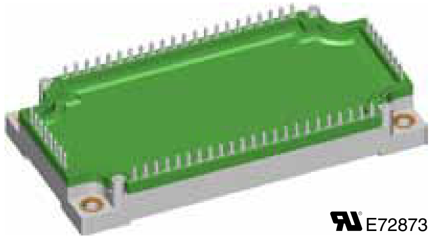
Six-Pack
XPT IGBT

$V_{CES} = 1200\ V$
$I_{C25} = 220\ A$
$V_{CE(sat)} = 1.8\ V$

Part name (Marking on product)

MIXA150W1200TEH





E72873

Pin configuration see outlines.

Features:

- 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
  - square RBSOA @ 3x I_C
  - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Application:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies

Package:

- "E3-Pack" standard outline
- Insulated copper base plate
- Soldering pins for PCB mounting
- Temperature sense included
- Optimizes pin layout

Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
				Ratings			
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*	continuous				±20	V
V_{GEM}	*max. transient collector gate voltage*	transient				±30	V
I_{C25}	*collector current*		T_C = 25°C			220	A
I_{C80}			T_C = 80°C			150	A
P_{tot}	*total power dissipation*		T_C = 25°C			695	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 150 A; 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 = 6 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	6.0	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C		0.05	0.5	mA
			T_{VJ} = 125°C		1.0		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 = 150 A			470		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 150 A V_{GE} = ±15 V; R_G = 4.7 Ω	T_{VJ} = 125°C		70		ns
t_r	*current rise time*				40		ns
$t_{d(off)}$	*turn-off delay time*				250		ns
t_f	*current fall time*				100		ns
E_{on}	*turn-on energy per pulse*				14		mJ
E_{off}	*turn-off energy per pulse*				16		mJ
E_{rec}	*diode turn-off energy per pulse*				10		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 4.7 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			450	A
SCSOA	*short circuit safe operating area*						
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 = 4.7 Ω; non-repetitive			600		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.18	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
				Ratings			
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			190	A
I_{F80}			T_C = 80°C			130	A
V_F	*forward voltage*	I_F = 150 A; V_{GE} = 0 V	T_{VJ} = 25°C		1.95	2.2	V
			T_{VJ} = 125°C		1.95		V
Q_{rr}	*reverse recovery charge*	V_R = 600 V di_F/dt = -2500 A/µs I_F = 150 A; V_{GE} = 0 V	T_{VJ} = 125°C		20		µC
I_{RM}	*max. reverse recovery current*				175		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				10		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				0.28	K/W

T_C = 25°C unless otherwise stated

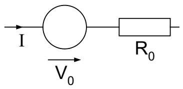
Temperature Sensor NTC

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
				Ratings		
R_{25}	*resistance*	T_C = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$				3375		K

Module

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
				Ratings		
T_{VJ}	*operating temperature*		-40		125	°C
T_{VJM}	*max. virtual junction temperature*				150	°C
T_{stg}	*storage temperature*		-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq 1$ mA; 50/60 Hz			3000	V~
CTI	*comparative tracking index*				200	
M_d	*mounting torque (M5)*		3		6	Nm
d_S	*creep distance on surface*		10			mm
d_A	*strike distance through air*		7.5			mm
$R_{pin-chip}$	*resistance pin to chip*			2.5		mΩ
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound		0.02		K/W
Weight				300		g

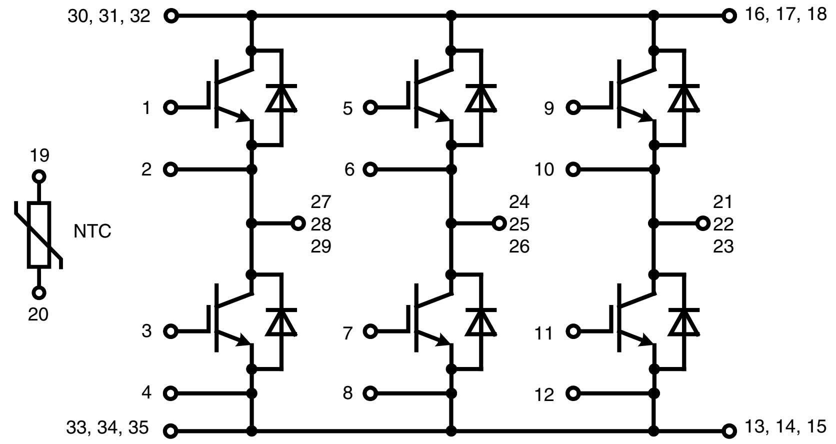
Equivalent Circuits for Simulation

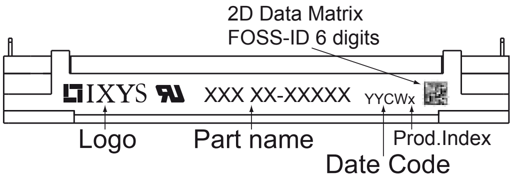


Symbol	Definitions	Conditions		min.	typ.	max.	Unit
					Ratings		
V_0	*IGBT*	T1 - T6	T_{VJ} = 150°C			1.1	V
R_0						9.2	mΩ
V_0	*free wheeling diode*	D1 - D6	T_{VJ} = 150°C			1.25	V
R_0						5.7	mΩ

T_C = 25°C unless otherwise stated

Circuit Diagram



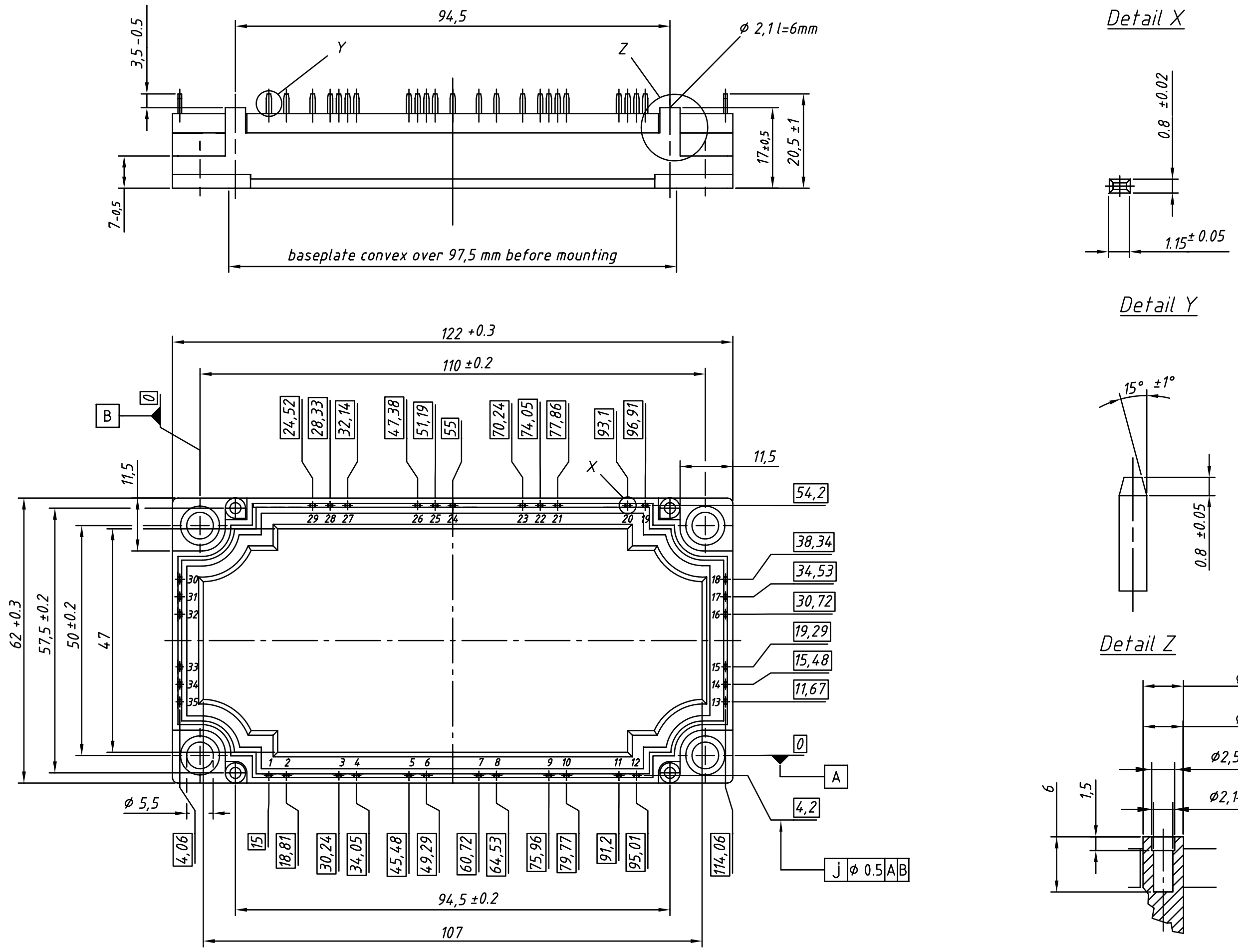


Part number

M = Module
I = IGBT
X = XPT
A = standard
150 = Current Rating [A]
W = Six-Pack
1200 = Reverse Voltage [V]
T = NTC
EH = E3-Pack

Outline Drawing

Dimensions in mm (1 mm = 0.0394“)



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA150W1200 TEH	MIXA150W1200TEH	Box	5	509654

Transistor T1 - T6

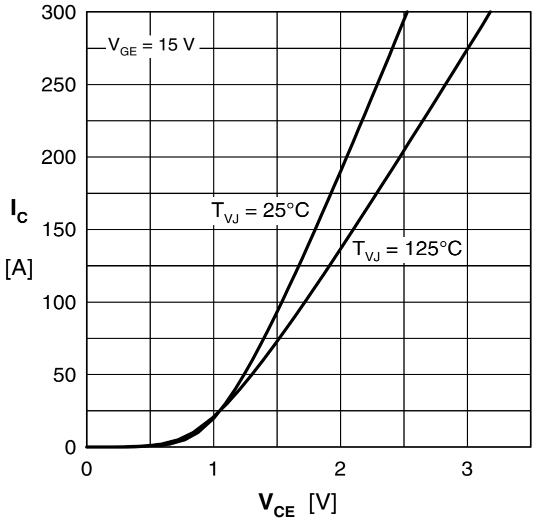


Fig. 1 Typ. output characteristics

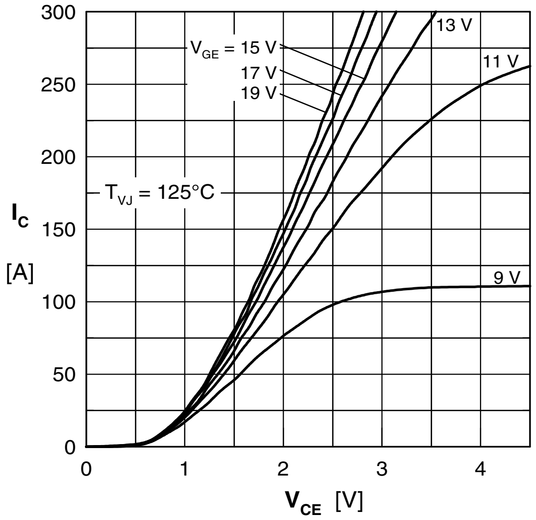


Fig. 2 Typ. output characteristics

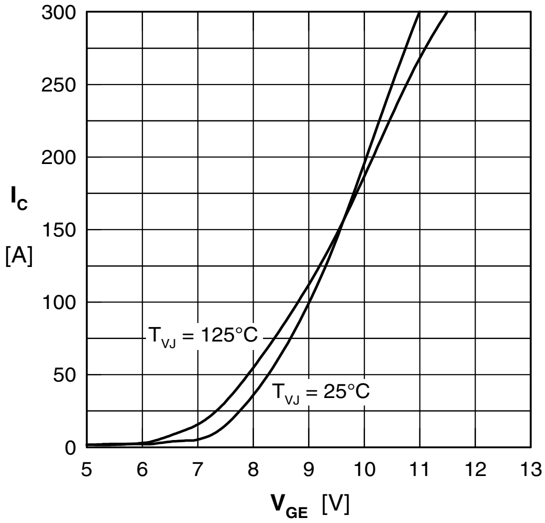


Fig. 3 Typ. tranfer characteristics

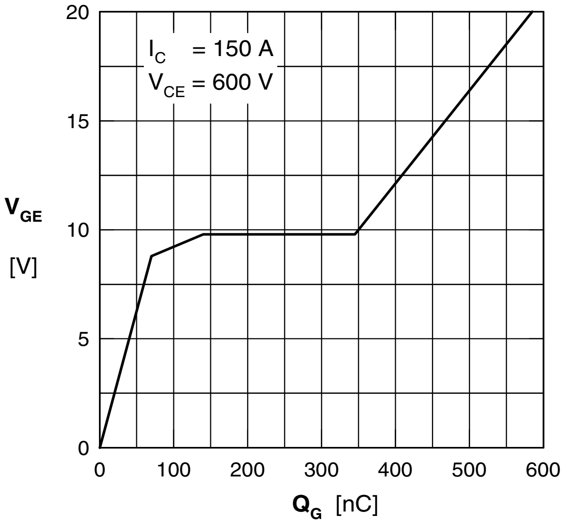


Fig. 4 Typ. turn-on gate charge

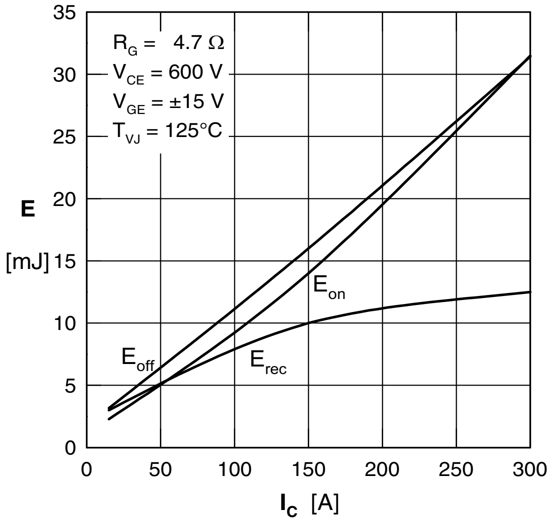


Fig. 5 Typ. switching energy vs. collector current

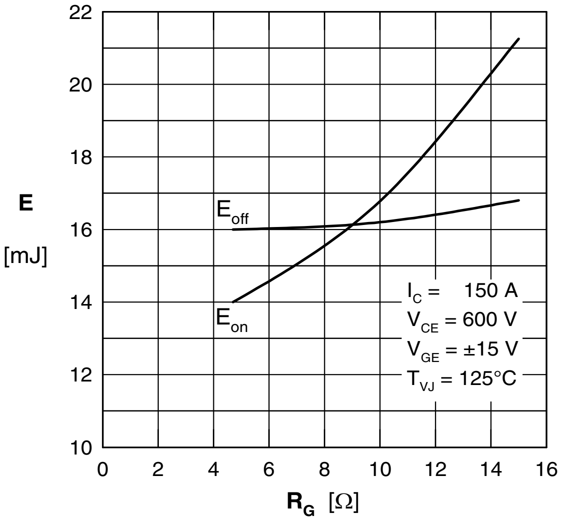


Fig. 6 Typ. switching energy vs. gate resistance

Inverter D1 - D6

Inverter Transistor & Diode

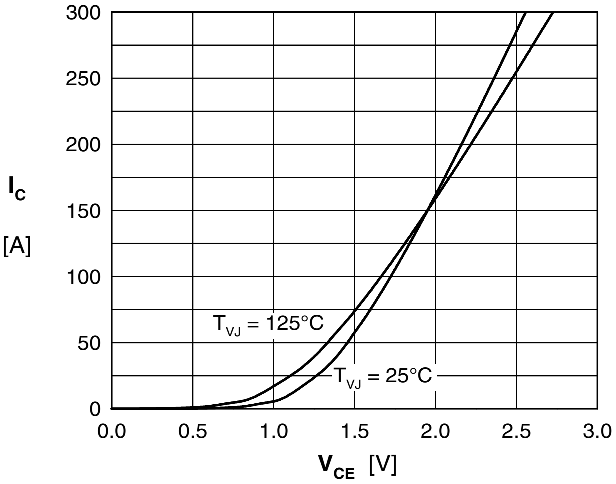


Fig.7 Typical forward characteristics

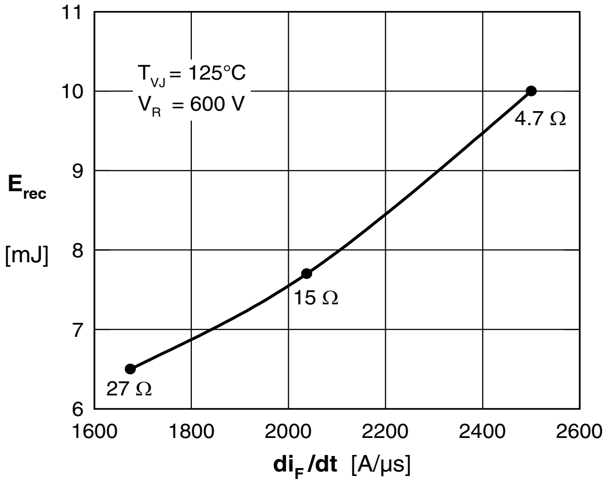
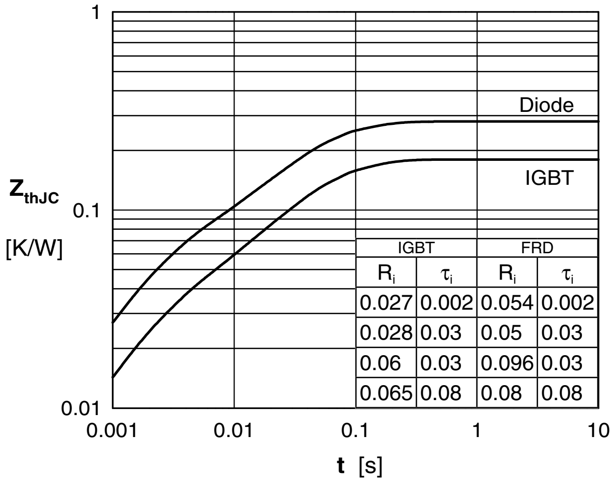


Fig. 8 Typ. recovery energy E_{rec} versus di_F/dt

NTC



IGBT		FRD	
R_i	τ_i	R_i	τ_i
0.027	0.002	0.054	0.002
0.028	0.03	0.05	0.03
0.06	0.03	0.096	0.03
0.065	0.08	0.08	0.08

Fig. 9 Typ. transient thermal impedance

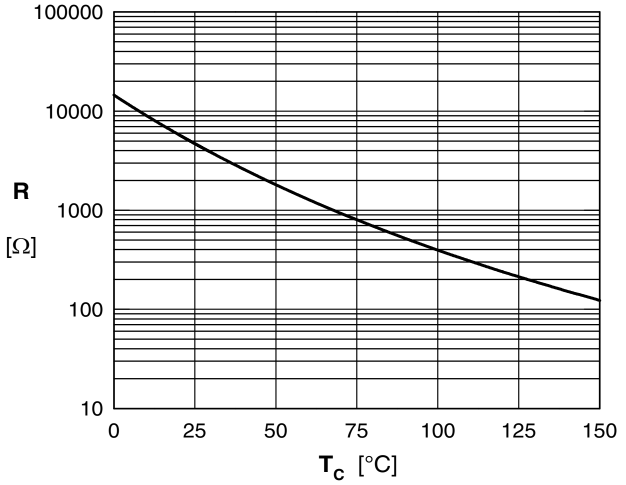


Fig. 10 Typ. NTC resistance vs. temperature