

Six-Pack XPT IGBT

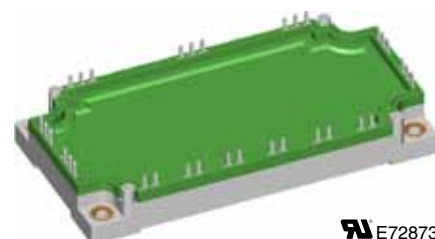
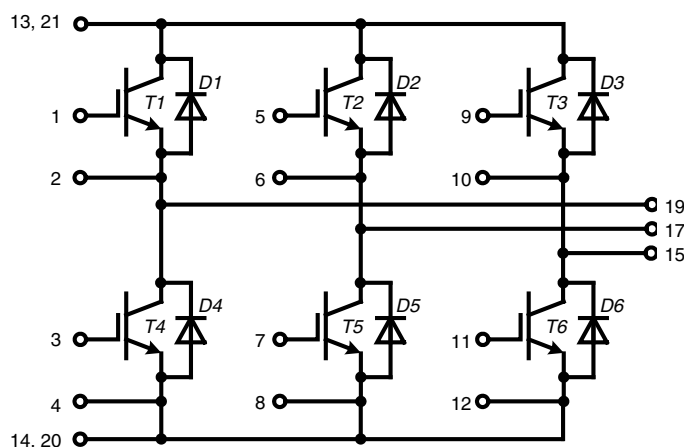
$$V_{CES} = 1200 \text{ V}$$

$$I_{C25} = 220 \text{ A}$$

$$V_{CE(sat)} = 1.8 \text{ V}$$

Part name (Marking on product)

MIXA151W1200EH



 E72873

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 @ $3 \times I_C$
 - 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
- Optimizes pin layout

Output Inverter T1 - T6

				Ratings		
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
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		1.8 2.1	2.1	V 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 T _{VJ} = 125°C	0.05 1.0	0.5	mA 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

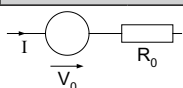
Output Inverter D1 - D6

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

 $T_C = 25^{\circ}\text{C}$ unless otherwise stated

Module
Ratings

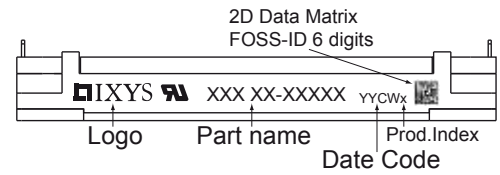
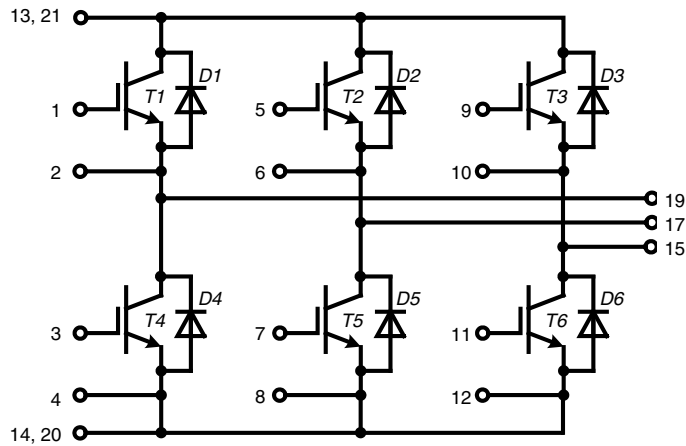
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
T_{VJ}	operating temperature		-40		125	°C
T_{VJM}	max. virtual junction temperature				150	°C
T_{stg}	storage temperature		-40		125	°C
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$			3000	V~
CTI	comparative tracking index				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

Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_0	IGBT	T1 - T6	$T_{VJ} = 150^\circ\text{C}$		1.1	V
R_0					13.8	mΩ
V_0	free wheeling diode	D1 - D6	$T_{VJ} = 150^\circ\text{C}$		1.25	V
R_0					8.5	mΩ

$T_C = 25^\circ\text{C}$ unless otherwise stated

Circuit Diagram

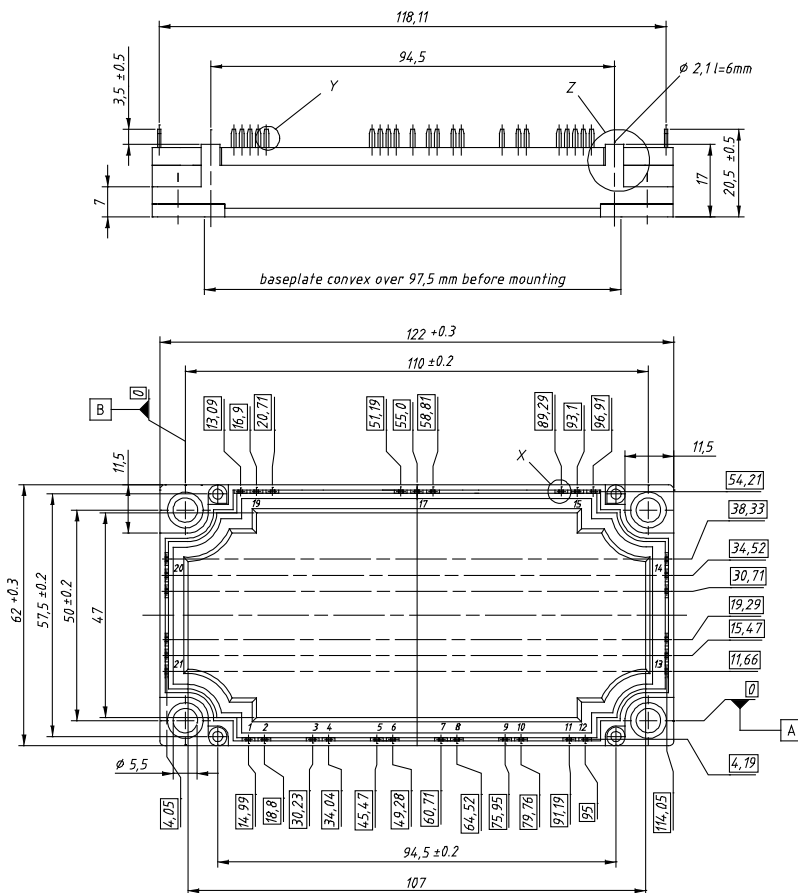


Part number

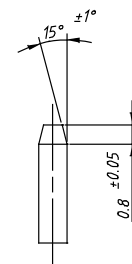
M = Module
I = IGBT
X = XPT
A = standard
151 = Current Rating [A]
W = Six-Pack
1200 = Reverse Voltage [V]
EH = E3-Pack

Outline Drawing

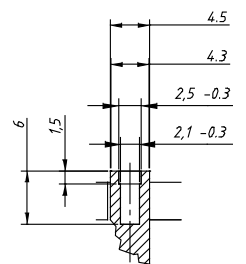
Dimensions in mm (1 mm = 0.0394")



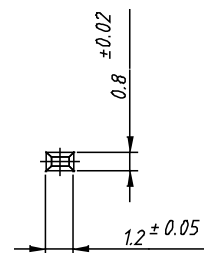
Detail Y



Detail Z



Detail X



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA151W1200EH	MIXA151W1200EH	Box	5	511598

Transistor T1 - T6

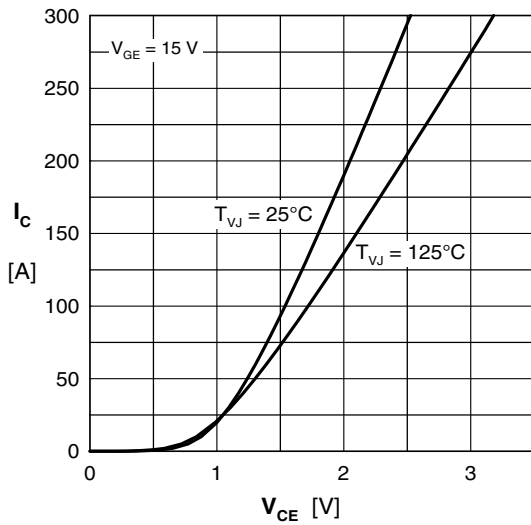


Fig. 1 Typ. output characteristics

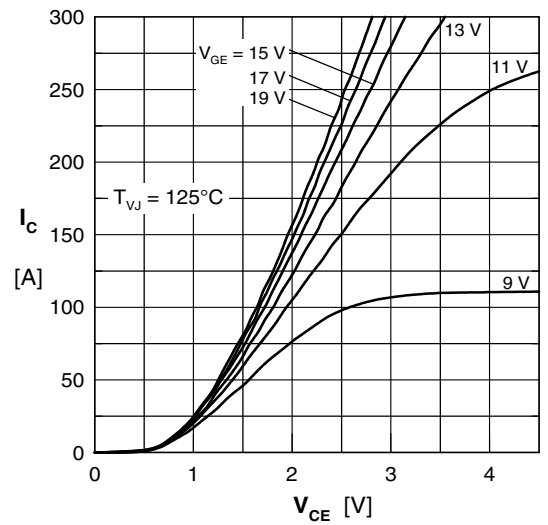


Fig. 2 Typ. output characteristics

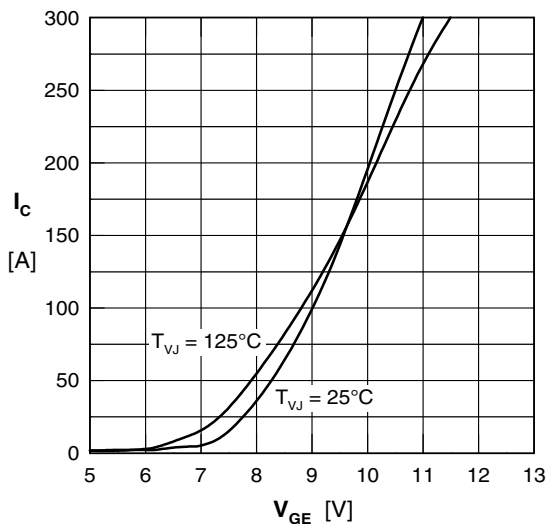


Fig. 3 Typ. transfer characteristics

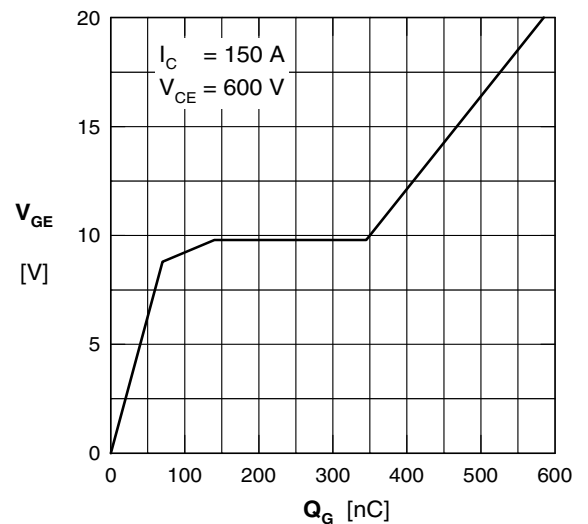


Fig. 4 Typ. turn-on gate charge

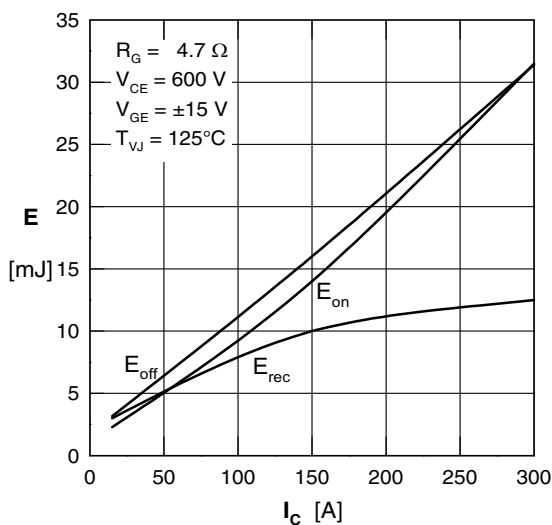


Fig. 5 Typ. switching energy vs. collector current

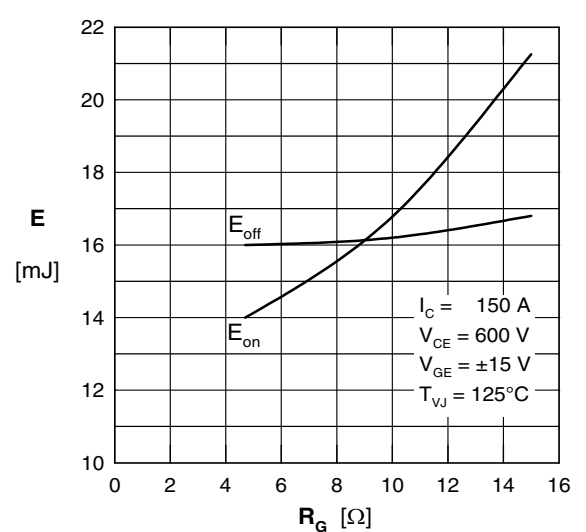


Fig. 6 Typ. switching energy vs. gate resistance

Inverter D1 - D6

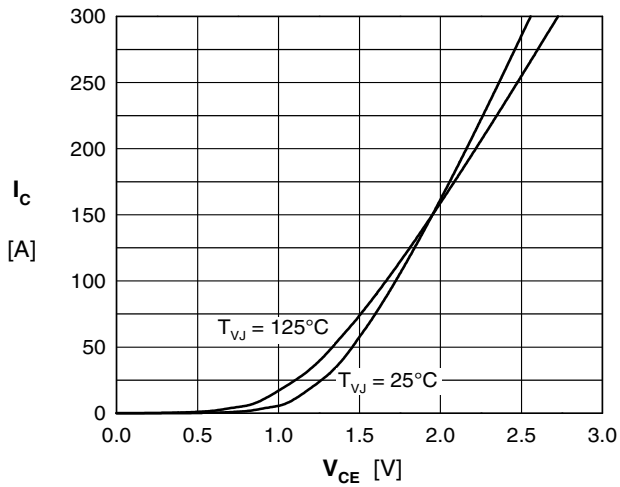


Fig. 7 Typical forward characteristics

Inverter Transistor & Diode

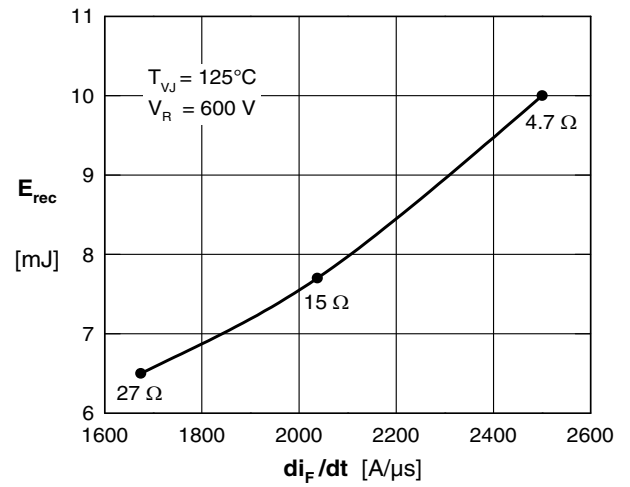


Fig. 8 Typ. recovery energy E_{rec} versus di_F/dt

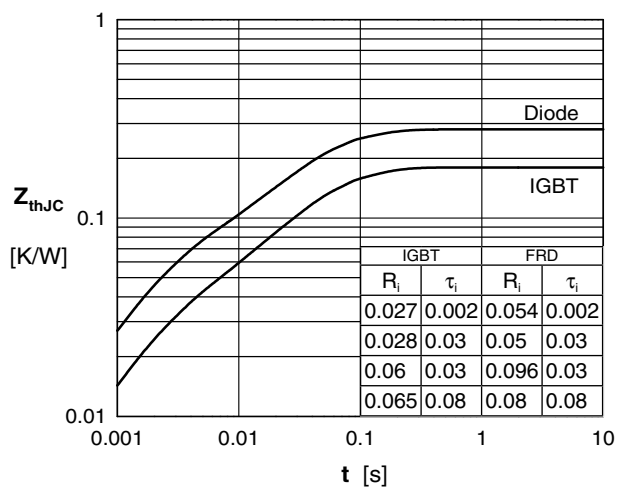


Fig. 9 Typ. transient thermal impedance