XPT IGBT Module

preliminary

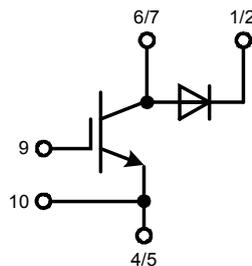|		
V_{CES}	=	1200 V
I_{C25}	=	220 A
$V_{CE(sat)}$	=	1.8 V

Boost Chopper

Part number

MIXA150R1200VA
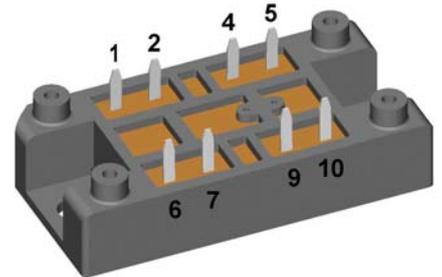
Backside: isolated

E72873

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 @ 3x 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
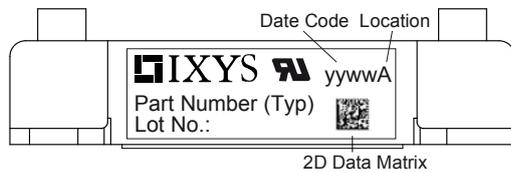● Inductive heating, cookers
● Pumps, Fans

Package: V1-A-Pack

● Isolation Voltage: 3600 V~
● Industry standard outline
● RoHS compliant
● Soldering pins for PCB mounting
● Height: 17 mm
● Base plate: DCB ceramic
● Reduced weight
● Advanced power cycling

IXYS reserves the right to change limits, conditions and dimensions.

Data according to IEC 60747and per semiconductor unless otherwise specified

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preliminary

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 gate emitter voltage					±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	$I_C = 150A; V_{GE} = 15 V$	$T_{VJ} = 25°C$		1.8	2.1	V
			$T_{VJ} = 125°C$		2.1		V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 6mA; V_{GE} = V_{CE}$	$T_{VJ} = 25°C$	5.4	5.9	6.5	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 V$	$T_{VJ} = 25°C$			0.5	mA
			$T_{VJ} = 125°C$		1		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				70		ns
t_r	current rise time				40		ns
$t_{d(off)}$	turn-off delay time	inductive load $\quad T_{VJ} = 125°C$			250		ns
t_f	current fall time	$V_{CE} = 600V; I_C = 150A$			100		ns
E_{on}	turn-on energy per pulse	$V_{GE} = ±15 V; R_G = 4.7 Ω$			14		mJ
E_{off}	turn-off energy per pulse				16		mJ
RBSOA	reverse bias safe operating area	$V_{GE} = ±15 V; R_G = 4.7 Ω \quad T_{VJ} = 125°C$					
I_{CM}		$V_{CEmax} = 1200V$				450	A
SCSOA	short circuit safe operating area	$V_{CEmax} = 1200 V$					
t_{SC}	short circuit duration	$V_{CE} = 900 V; V_{GE} = ±15 V \quad T_{VJ} = 125°C$				10	µs
I_{SC}	short circuit current	$R_G = 4.7 Ω$; non-repetitive			600		A
R_{thJC}	thermal resistance junction to case					0.18	K/W
R_{thCH}	thermal resistance case to heatsink				0.20		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		$T_C = 25°C$			190	A
I_{F80}			$T_C = 80°C$			130	A
V_F	forward voltage	$I_F = 150A$	$T_{VJ} = 25°C$			2.20	V
			$T_{VJ} = 125°C$		1.95		V
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25°C$			0.3	mA
			$T_{VJ} = 125°C$		0.8		mA
Q_{rr}	reverse recovery charge	$V_R = 600 V$			20		µC
I_{RM}	max. reverse recovery current	$-di_F/dt = 2500 A/µs \quad T_{VJ} = 125°C$			175		A
t_{rr}	reverse recovery time	$I_F = 150A; V_{GE} = 0 V$			350		ns
E_{rec}	reverse recovery energy				10		mJ
R_{thJC}	thermal resistance junction to case					0.28	K/W
R_{thCH}	thermal resistance case to heatsink				0.20		K/W

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MIXA150R1200VA

Package	V1-A-Pack		Ratings			

Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{stg}	storage temperature		-40		125	°C
T_{VJ}	virtual junction temperature		-40		150	°C
Weight				37		g
M_D	mounting torque		2		2.5	Nm
$d_{Spp/App}$	creepage distance on surface | striking distance through air	terminal to terminal	6.0			mm
$d_{Spb/Apb}$		terminal to backside	12.0			mm
V_{ISOL}	isolation voltage	t = 1 second	3600			V
		t = 1 minute 50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3000			V

Date Code   Location

IXYS 🅄🅛 yywwA
Part Number (Typ)
Lot No.:

2D Data Matrix

Part number

M = Module
I = IGBT
X = XPT IGBT
A = Gen 1 / std
150 = Current Rating [A]
R = Boost Chopper
1200 = Reverse Voltage [V]
VA = V1-A-Pack

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA150R1200VA	MIXA150R1200VA	Box	10	511595

Equivalent Circuits for Simulation   *on die level* T_{VJ} = 150 °C
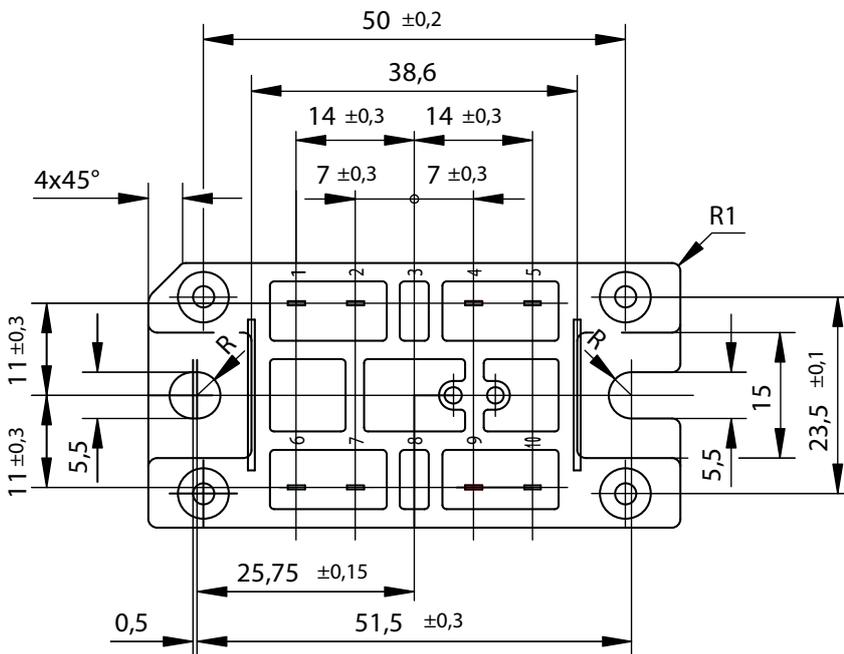
		IGBT	Diode	
V_{0max}	threshold voltage	1.1	1.25	V
R_{0max}	slope resistance *	9.2	5.7	mΩ

I → V_0 — R_0

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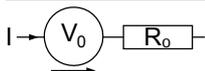
Outlines   V1-A-Pack

Detail "X"   M 2:1

Detail "Y"   M 5:1

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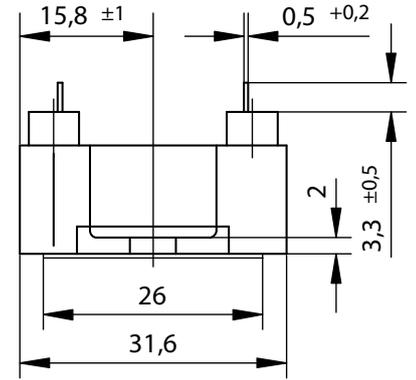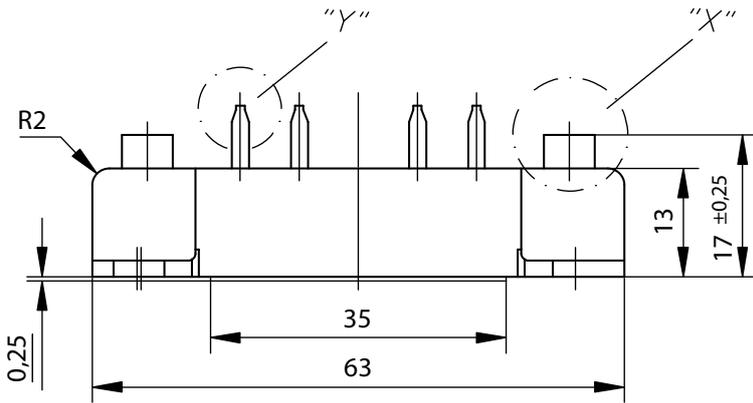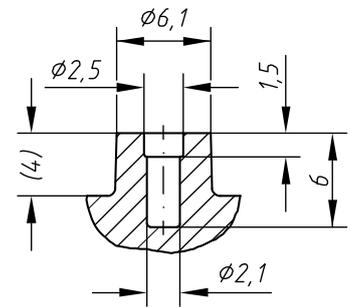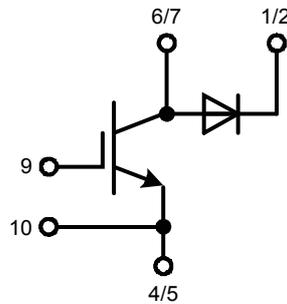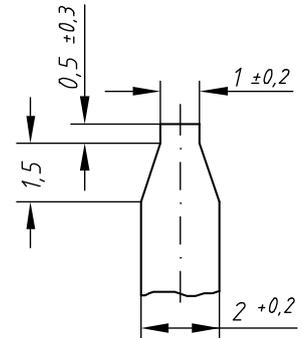
IGBT

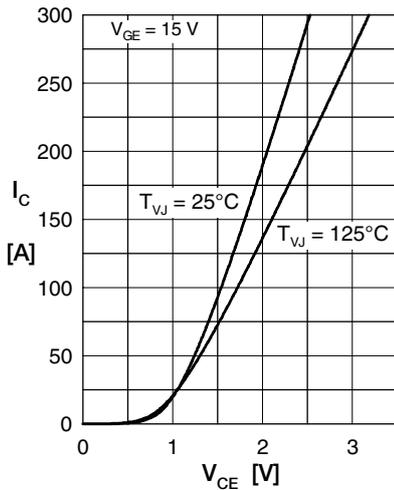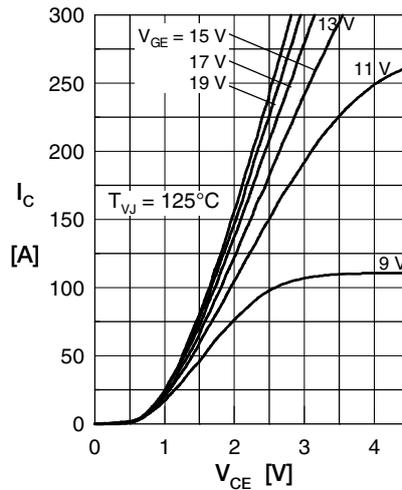

Fig. 1 Typ. output characteristics
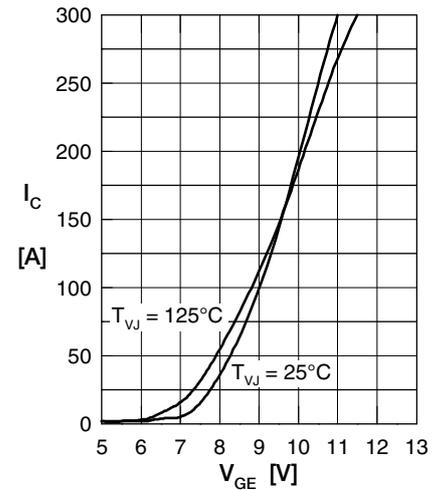

Fig. 2 Typ. output characteristics

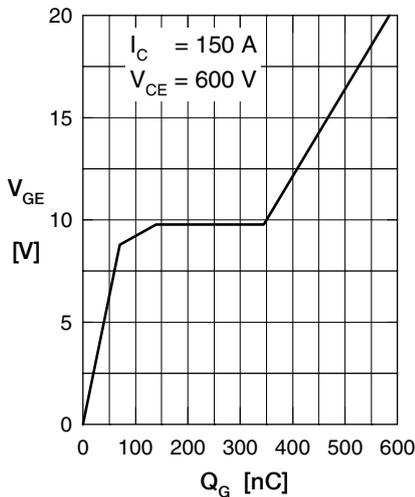Fig. 3 Typ. tranfer characteristics

Fig. 4 Typ. turn-on gate charge
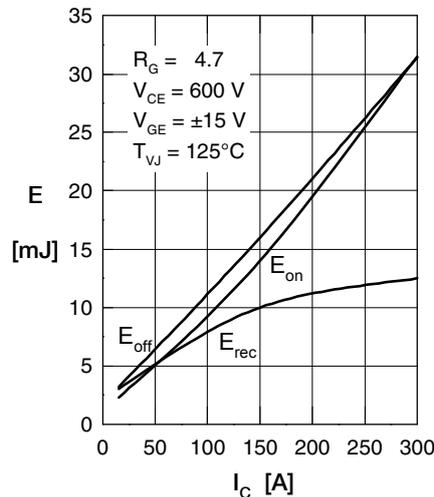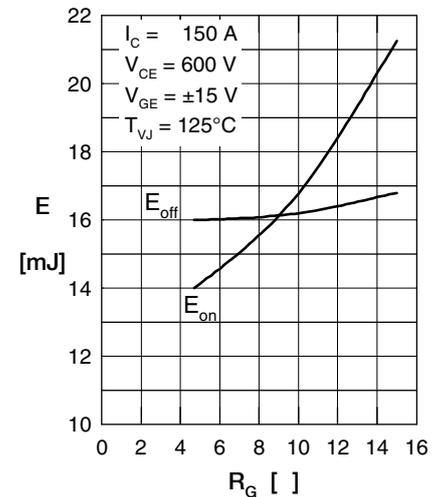

Fig. 5 Typ. switching energy versus collector current
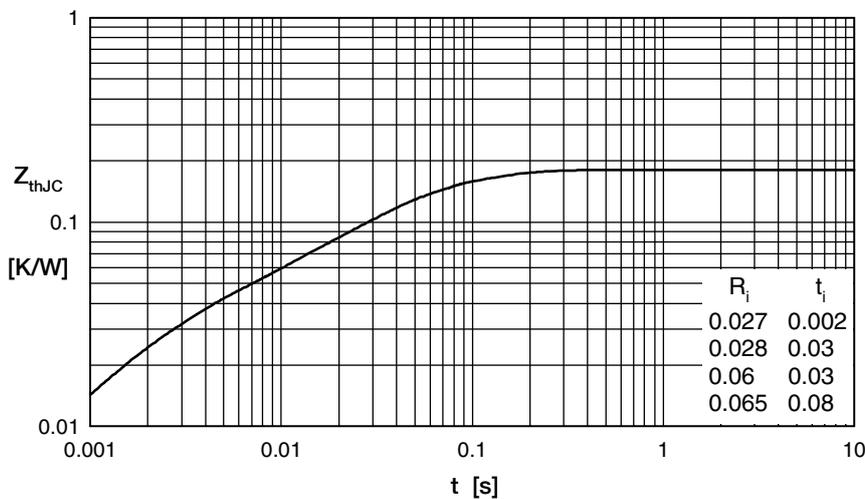

Fig. 6 Typ. switching energy versus gate resistance

R_i	t_i
0.027	0.002
0.028	0.03
0.06	0.03
0.065	0.08

Fig. 7 Typ. transient thermal impedance

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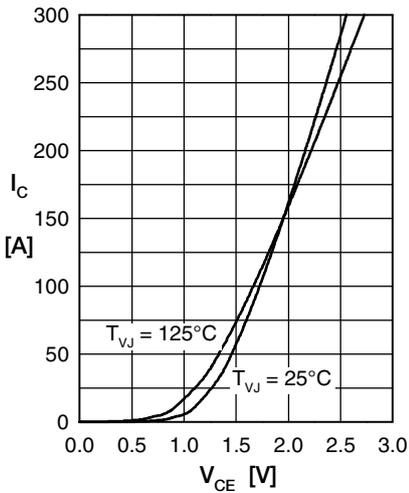
Diode

Fig. 1 Typ. Forward current versus V_F

Fig. 2 Typ. reverse recovery charge Q_{rr} versus di/dt
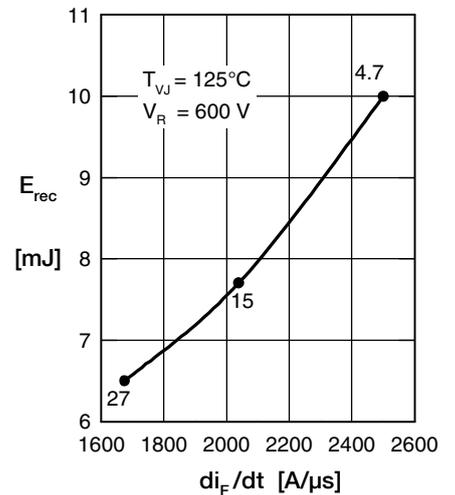
Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

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

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

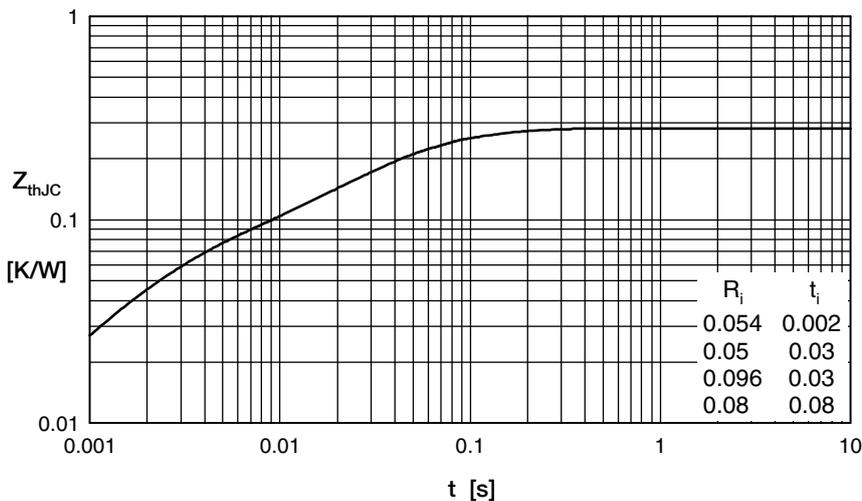| R_i	t_i
0.054	0.002
0.05	0.03
0.096	0.03
0.08	0.08

Fig. 7 Transient thermal impedance junction to case

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