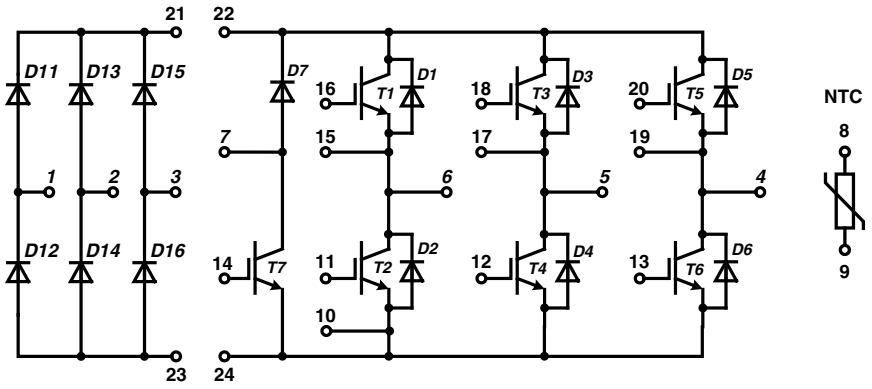
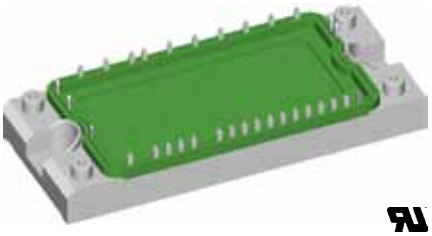
Converter - Brake - Inverter Module
XPT IGBT

Three Phase Rectifier	Brake Chopper	Three Phase Inverter
V_{RRM} = 1600 V	V_{CES} = 1200 V	V_{CES} = 1200 V
I_{DAVM} = 105 A	I_{C25} = 28 A	I_{C25} = 60 A
I_{FSM} = 320 A	$V_{CE(sat)}$ = 1.8 V	$V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIXA40WB1200TED





E 72873

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:

- "E2-Pack" standard outline
- Insulated copper base plate
- Soldering pins for PCB mounting
- Temperature sense included

Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		Ratings 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			60	A
I_{C80}			T_C = 80°C			40	A
P_{tot}	*total power dissipation*		T_C = 25°C			195	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 35 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 = 1.5 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			2.1	mA
			T_{VJ} = 125°C		0.2		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 = 35 A			106		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 35 A V_{GE} = ±15 V; R_G = 27 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*				3.8		mJ
E_{off}	*turn-off energy per pulse*				4.1		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 27 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			105	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 = 27 Ω; non-repetitive			140		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.64	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			44	A
I_{F80}			T_C = 80°C			29	A
V_F	*forward voltage*	I_F = 30 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 = -600 A/µs I_F = 30 A; V_{GE} = 0 V	T_{VJ} = 125°C		3.5		µC
I_{RM}	*max. reverse recovery current*				30		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				0.9		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.2	K/W

T_C = 25°C unless otherwise stated

Brake T7

Symbol	Definitions	Conditions		Ratings 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			28	A
I_{C80}			T_C = 80°C			20	A
P_{tot}	*total power dissipation*		T_C = 25°C			100	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 16 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 = 0.6 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			0.1	mA
			T_{VJ} = 125°C		0.1		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 = 15 A			48		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 15 A V_{GE} = ±15 V; R_G = 56 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*				1.6		mJ
E_{off}	*turn-off energy per pulse*				1.7		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 56 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			45	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 = 56 Ω; non-repetitive			60		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				1.26	K/W

Brake Chopper D7

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			12	A
I_{F80}			T_C = 80°C			8	A
V_F	*forward voltage*	I_F = 10 A; V_{GE} = 0 V	T_{VJ} = 25°C		2.5	2.9	V
			T_{VJ} = 125°C		2.6		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			0.5	mA
			T_{VJ} = 125°C		0.5		mA
Q_{rr}	*reverse recovery charge*	V_R = 600 V di_F/dt = 200 A/µs I_F = 5 A; V_{GE} = 0 V	T_{VJ} = 125°C		0.6		µC
I_{RM}	*max. reverse recovery current*				6		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				0.2		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				3.4	K/W

T_C = 25°C unless otherwise stated

Input Rectifier Bridge D11 - D16

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1600	V
I_{FAV}	*average forward current*	sine 180°	T_C = 80°C			37	A
I_{DAVM}	*max. average DC output current*	rect.; d = $^1/_3$	T_C = 80°C			105	A
I_{FSM}	*max. forward surge current*	t = 10 ms; sine 50 Hz	T_{VJ} = 25°C			320	A
			T_{VJ} = 125°C			280	A
I^2t	*I^2t value for fusing*	t = 10 ms; sine 50 Hz	T_{VJ} = 25°C			510	A^2s
			T_{VJ} = 125°C			390	A^2s
P_{tot}	*total power dissipation*		T_C = 25°C			114	W
V_F	*forward voltage*	I_F = 50 A	T_{VJ} = 25°C		1.34	1.7	V
			T_{VJ} = 125°C		1.34		V
I_R	*reverse current*	$V_R = V_{RRM}$	T_{VJ} = 25°C			0.02	mA
			T_{VJ} = 125°C		0.2		mA
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.1	K/W

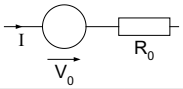
Temperature Sensor NTC

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

Module

Symbol	Definitions	Conditions	Ratings 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 mA; 50/60 Hz			2500	V~
CTI	*comparative tracking index*				-	
M_d	*mounting torque (M5)*		3		6	Nm
d_S	*creep distance on surface*		6			mm
d_A	*strike distance through air*		6			mm
$R_{pin\text{-}chip}$	*resistance pin to chip*			5		mΩ
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound		0.02		K/W
Weight				180		g

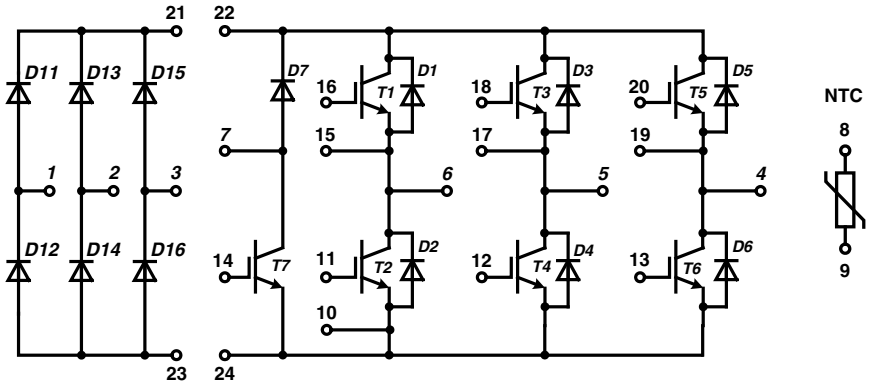
Equivalent Circuits for Simulation



Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_0	*rectifier diode*	D8 - D13	T_{VJ} = 150°C			0.88	V
R_0						9	mΩ
V_0	*IGBT*	T1 - T6	T_{VJ} = 150°C			1.1	V
R_0						40	mΩ
V_0	*free wheeling diode*	D1 - D6	T_{VJ} = 150°C			1.2	V
R_0						27	mΩ
V_0	*IGBT*	T7	T_{VJ} = 150°C			1.1	V
R_0						86	mΩ
V_0	*free wheeling diode*	D7	T_{VJ} = 150°C			1.15	V
R_0						170	mΩ

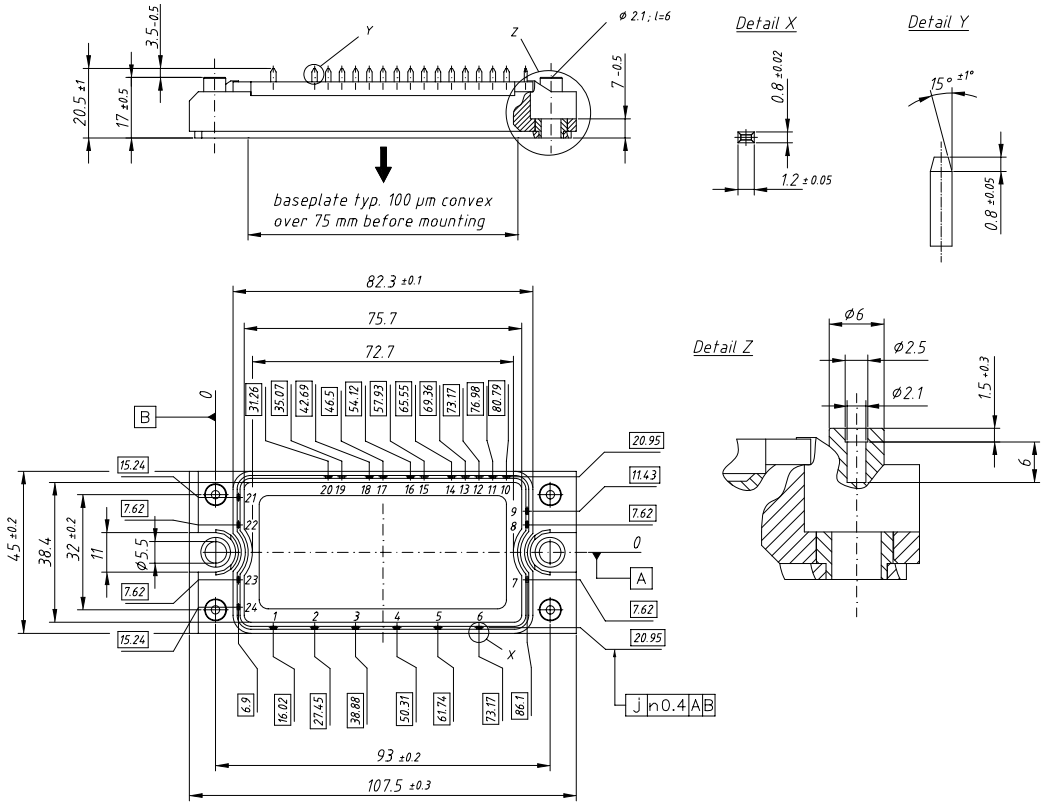
T_C = 25°C unless otherwise stated

Circuit Diagram

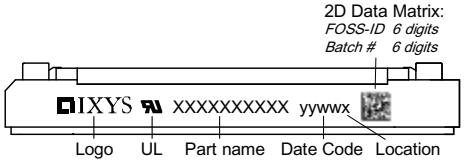


Outline Drawing

Dimensions in mm (1 mm = 0.0394“)



Product Marking



Part number

M = Module
I = IGBT
X = XPT
A = Standard
40 = Current Rating [A]
WB = 6-Pack + 3~ Rectifier Bridge & Brake Unit
1200 = Reverse Voltage [V]
T = NTC
ED = E2-Pack

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA40WB1200 TED	MIXA40WB1200TED	Box	6	507497

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

20110916e

Inverter T1 - T6

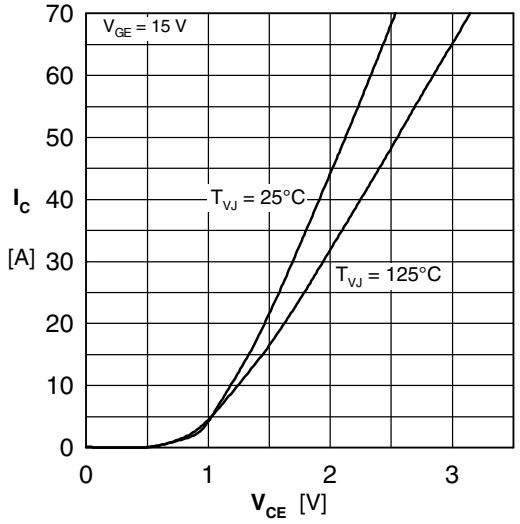


Fig. 1 Typ. output characteristics

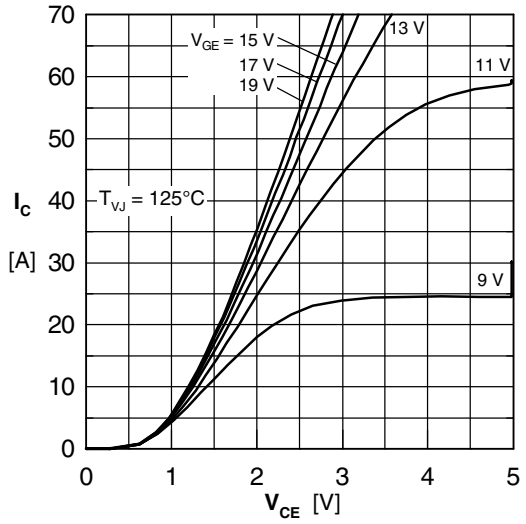


Fig. 2 Typ. output characteristics

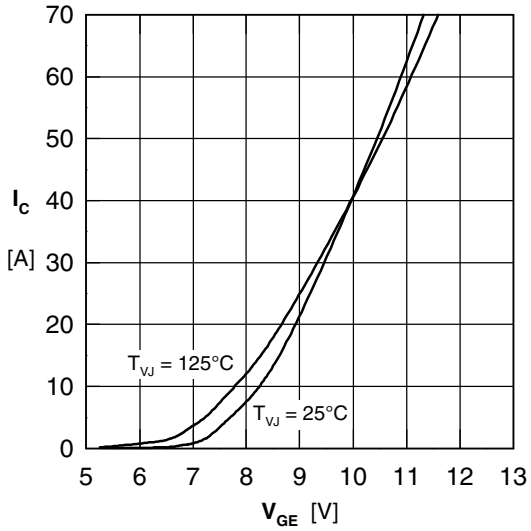


Fig. 3 Typ. tranfer characteristics

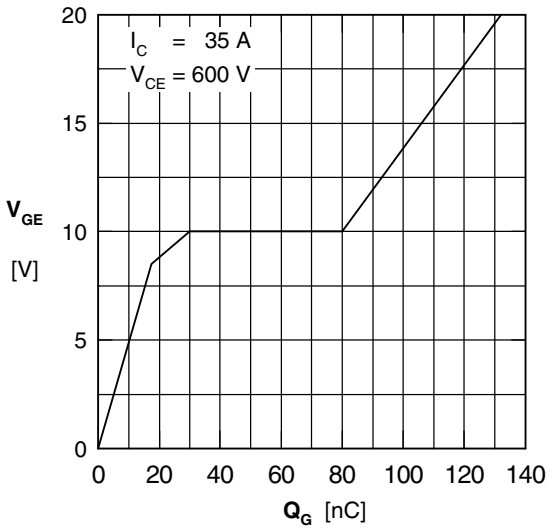


Fig. 4 Typ. turn-on gate charge

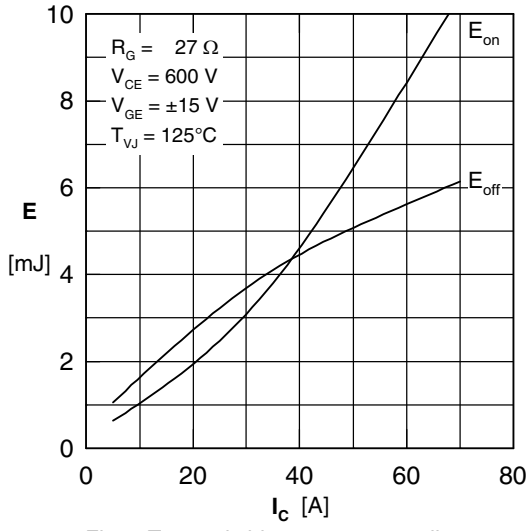


Fig. 5 Typ. switching energy vs. collector current

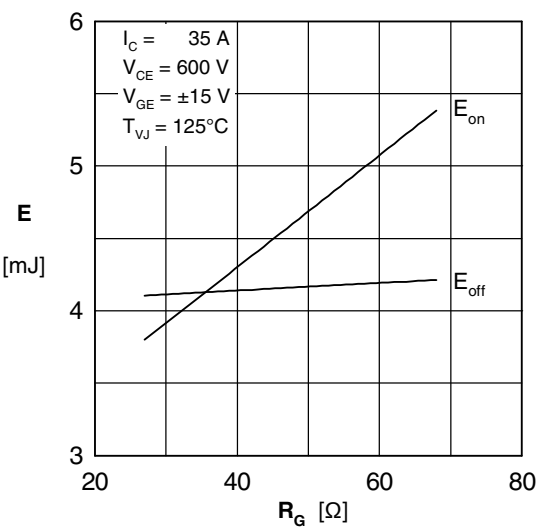


Fig. 6 Typ. switching energy vs. gate resistance

Inverter D1 - D6

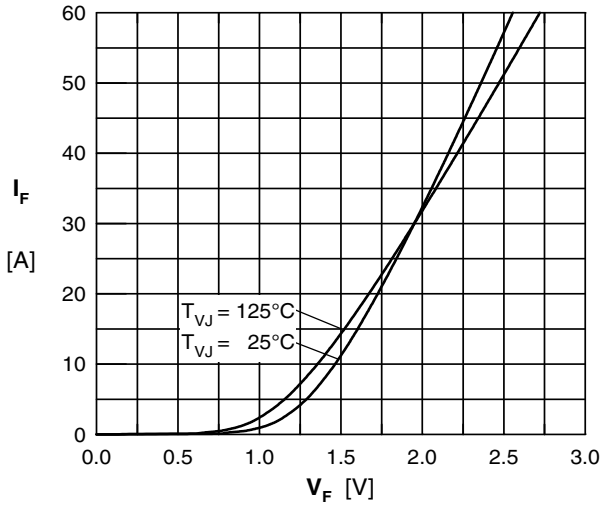


Fig. 7 Typ. Forward current versus V_F

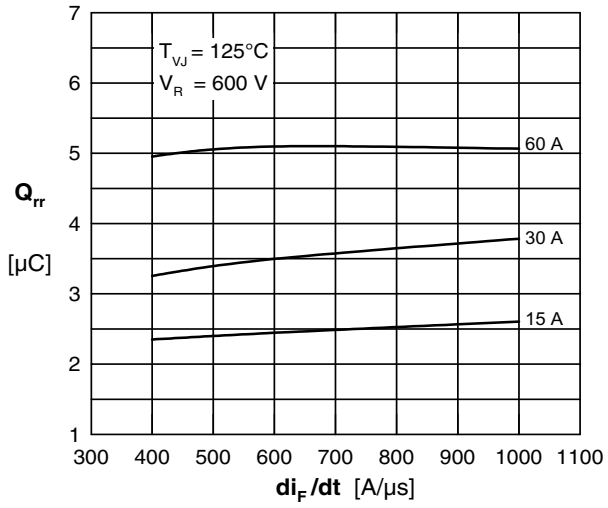


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

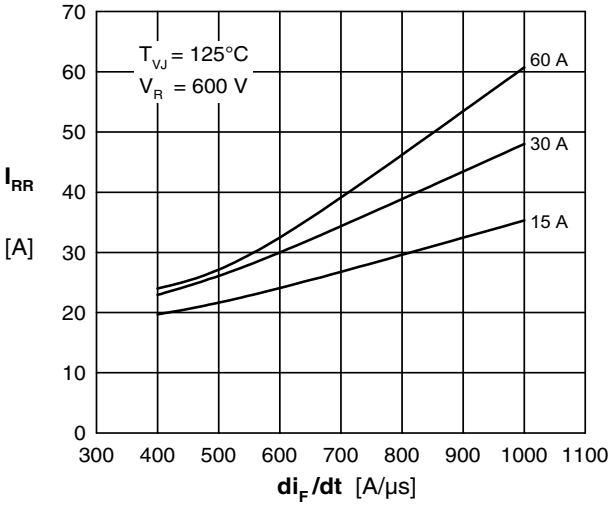


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

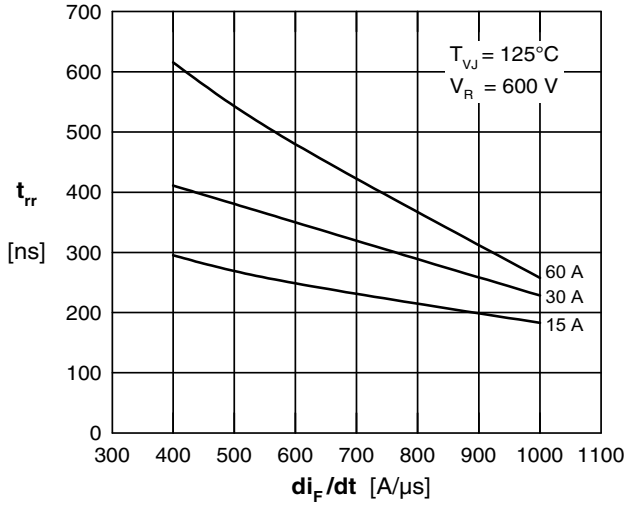


Fig. 10 Typ. recovery time t_{rr} versus di/dt

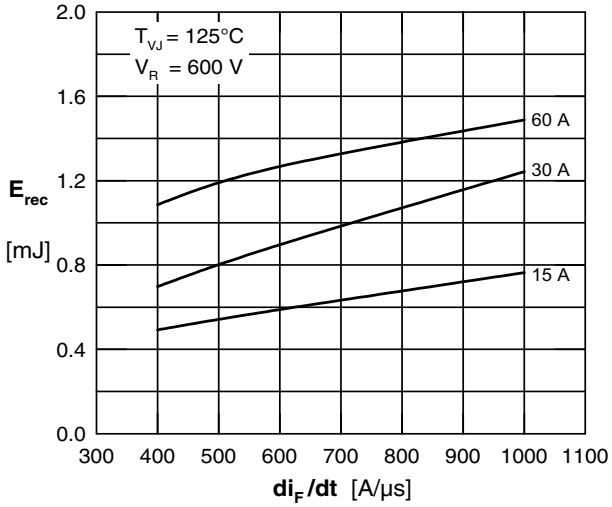
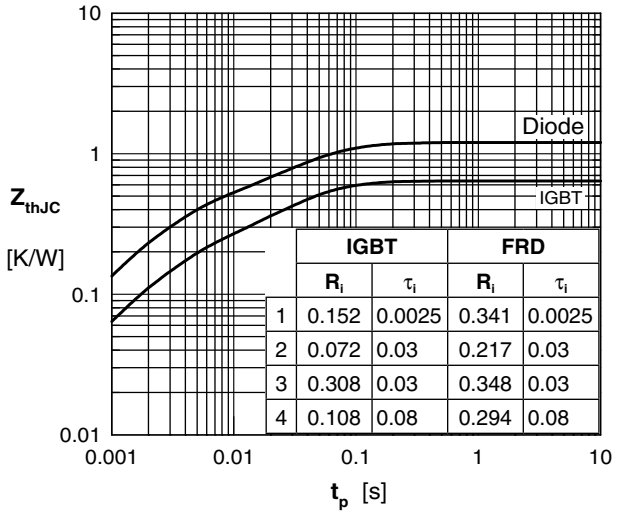


Fig. 5 Typ. recovery energy E_{rec} versus di/dt



	IGBT		FRD	
	R_i	τ_i	R_i	τ_i
1	0.152	0.0025	0.341	0.0025
2	0.072	0.03	0.217	0.03
3	0.308	0.03	0.348	0.03
4	0.108	0.08	0.294	0.08

Fig. 12 Typ. transient thermal impedance

Brake T7 & D7

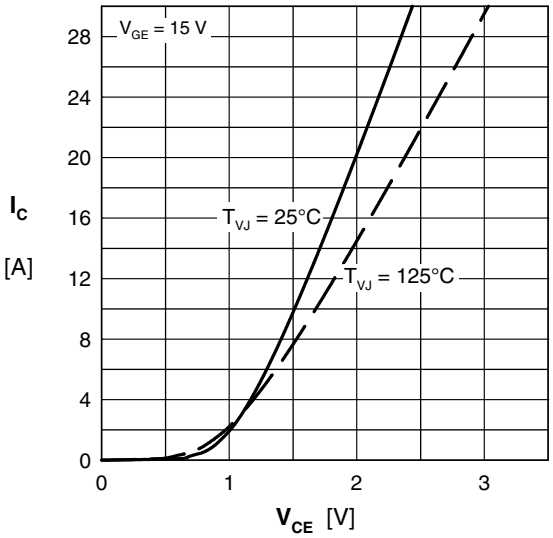


Fig. 13 Typ. output characteristics

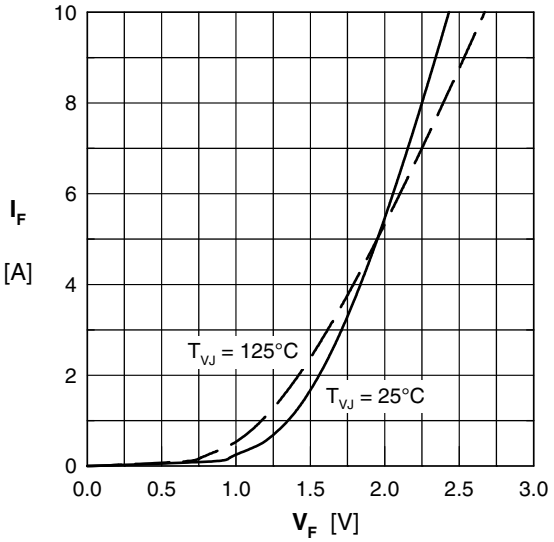
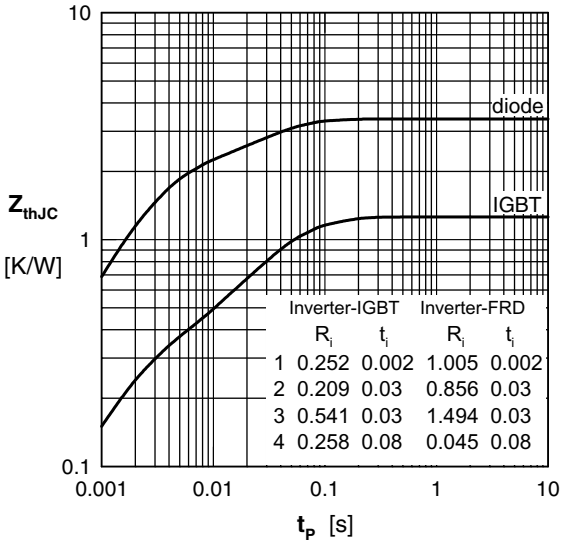


Fig. 14 Typ. forward characteristics



	Inverter-IGBT		Inverter-FRD	
	R_i	t_i	R_i	t_i
1	0.252	0.002	1.005	0.002
2	0.209	0.03	0.856	0.03
3	0.541	0.03	1.494	0.03
4	0.258	0.08	0.045	0.08

Fig. 15 Typ. transient thermal impedance

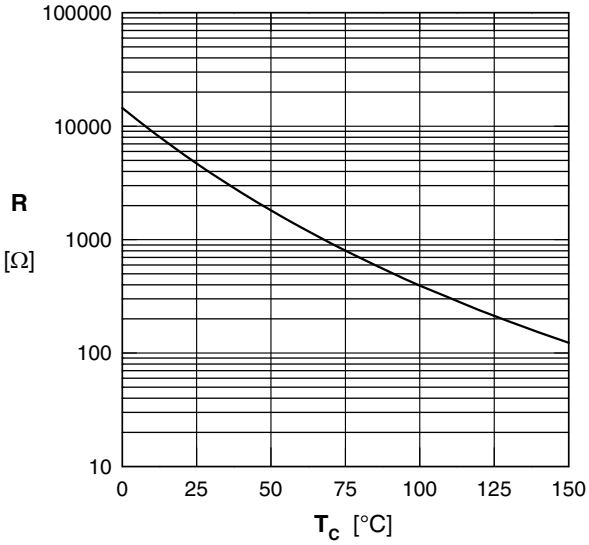


Fig.16 Typ. NTC resistance vs. temperature

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

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