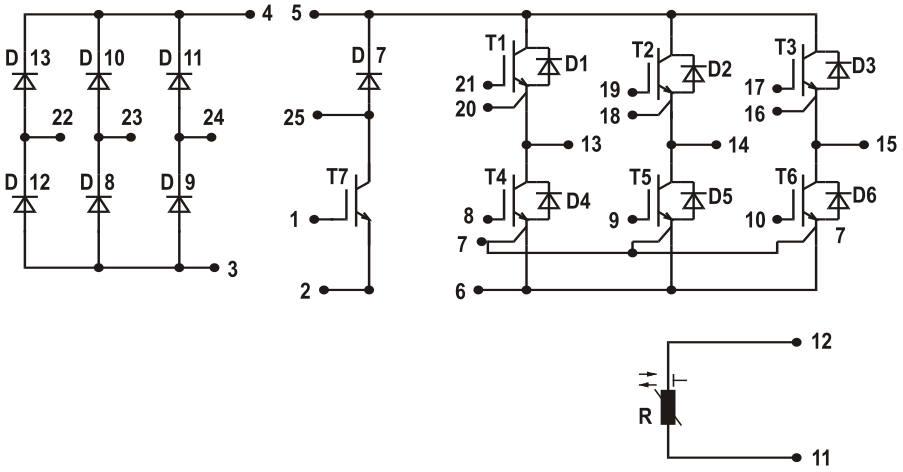
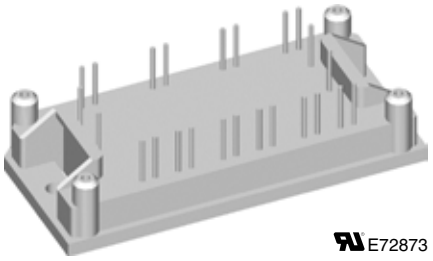
Converter - Brake - Inverter Module
XPT IGBT

Three Phase Rectifier	Brake Chopper	Three Phase Inverter
V_{RRM} = 1600 V	V_{CES} = 1200 V	V_{CES} = 1200 V
I_{DAVM25} = 150 A	I_{C25} = 17 A	I_{C25} = 28 A
I_{FSM} = 320 A	$V_{CE(sat)}$ = 1.8 V	$V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIXA20WB1200TML





Pin configuration see outlines.

Features:

- High level of integration - only one power semiconductor module required for the whole drive
- 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 $V_{CE(sat)}$
- Temperature sense included
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

Application:

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

Package:

- DCB based "E1-Pack"
- Assembly height is 17 mm
- Insulated base plate
- UL registered E72873

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			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	5.5	6.0	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C		0.02	0.2	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 = 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*				1.55		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; V_{CEK} = 1200 V	T_{VJ} = 125°C			45	A
I_{SC} **(SCSOA)**	*short circuit safe operating area*	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 56 Ω; t_p = 10 µs; non-repetitive	T_{VJ} = 125°C		60		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				1.26	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.42		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			33	A
I_{F80}			T_C = 80°C			22	A
V_F	*forward voltage*	I_F = 20 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 = -400 A/µs I_F = 20 A; V_{GE} = 0 V	T_{VJ} = 125°C		3		µC
I_{RM}	*max. reverse recovery current*				20		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				0.7		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.5	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.5		K/W

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			17	A
I_{C80}			T_C = 80°C			12	A
P_{tot}	*total power dissipation*		T_C = 25°C			63	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 9 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 = 0.3 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.5	6.0	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C		0.01	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 = 10 A			27		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 10 A V_{GE} = ±15 V; R_G = 100 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*				1.1		mJ
E_{off}	*turn-off energy per pulse*				1.1		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 100 Ω; V_{CEK} = 1200 V	T_{VJ} = 125°C			30	A
I_{SC} **(SCSOA)**	*short circuit safe operating area*	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 100 Ω; t_p = 10 µs; non-repetitive	T_{VJ} = 125°C		40		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				2.0	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.7		K/W

Brake Chopper D7

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 150°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			33	A
I_{F80}			T_C = 80°C			22	A
V_F	*forward voltage*	I_F = 20 A; V_{GE} = 0 V	T_{VJ} = 25°C		1.95	2.2	V
			T_{VJ} = 125°C		1.95		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C		0.01	0.1	mA
			T_{VJ} = 125°C		0.1		mA
Q_{rr}	*reverse recovery charge*	V_R = 600 V di_F/dt = 400 A/µs I_F = 20 A; V_{GE} = 0 V	T_{VJ} = 125°C		3		µC
I_{RM}	*max. reverse recovery current*				20		A
t_{rr}	*reverse recovery time*				350		ns
E_{rec}	*reverse recovery energy*				0.7		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.5	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.5		K/W

Input Rectifier Bridge D8 - D11

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			110	W
V_F	*forward voltage*	I_F = 50 A	T_{VJ} = 25°C		1.36	1.7	V
			T_{VJ} = 125°C		1.36		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
R_{thCH}	*thermal resistance case to heatsink*	(per diode)			0.36		K/W

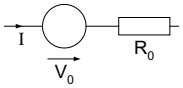
Temperature Sensor NTC

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
R_{25}	*resistance*		T_C = 25°C	4.45	4.7	5.0	kΩ
$B_{25/50}$					3510		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*	(M4)	2.0		2.2	Nm
d_S	*creep distance on surface*		12.7			mm
d_A	*strike distance through air*		7.6			mm
Weight				40		g

Equivalent Circuits for Simulation



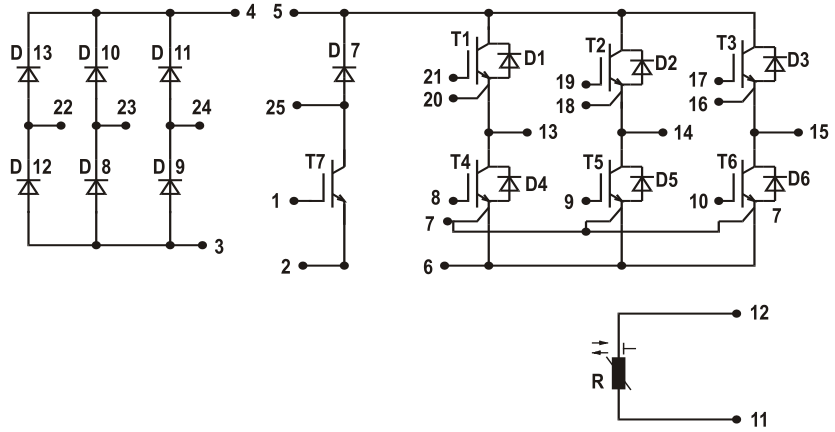
Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_0	*rectifier diode*	D8 - D13	T_{VJ} = 150°C			0.88	V
R_0						9.0	mΩ
V_0	*IGBT*	T1 - T6	T_{VJ} = 150°C			1.1	V
R_0						86.3	mΩ
V_0	*free wheeling diode*	D1 - D6	T_{VJ} = 150°C			1.19	V
R_0						40.0	mΩ
V_0	*IGBT*	T7	T_{VJ} = 150°C			1.1	V
R_0						153	mΩ
V_0	*free wheeling diode*	D7	T_{VJ} = 150°C			1.19	V
R_0						40	mΩ

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

T_C = 25°C unless otherwise stated

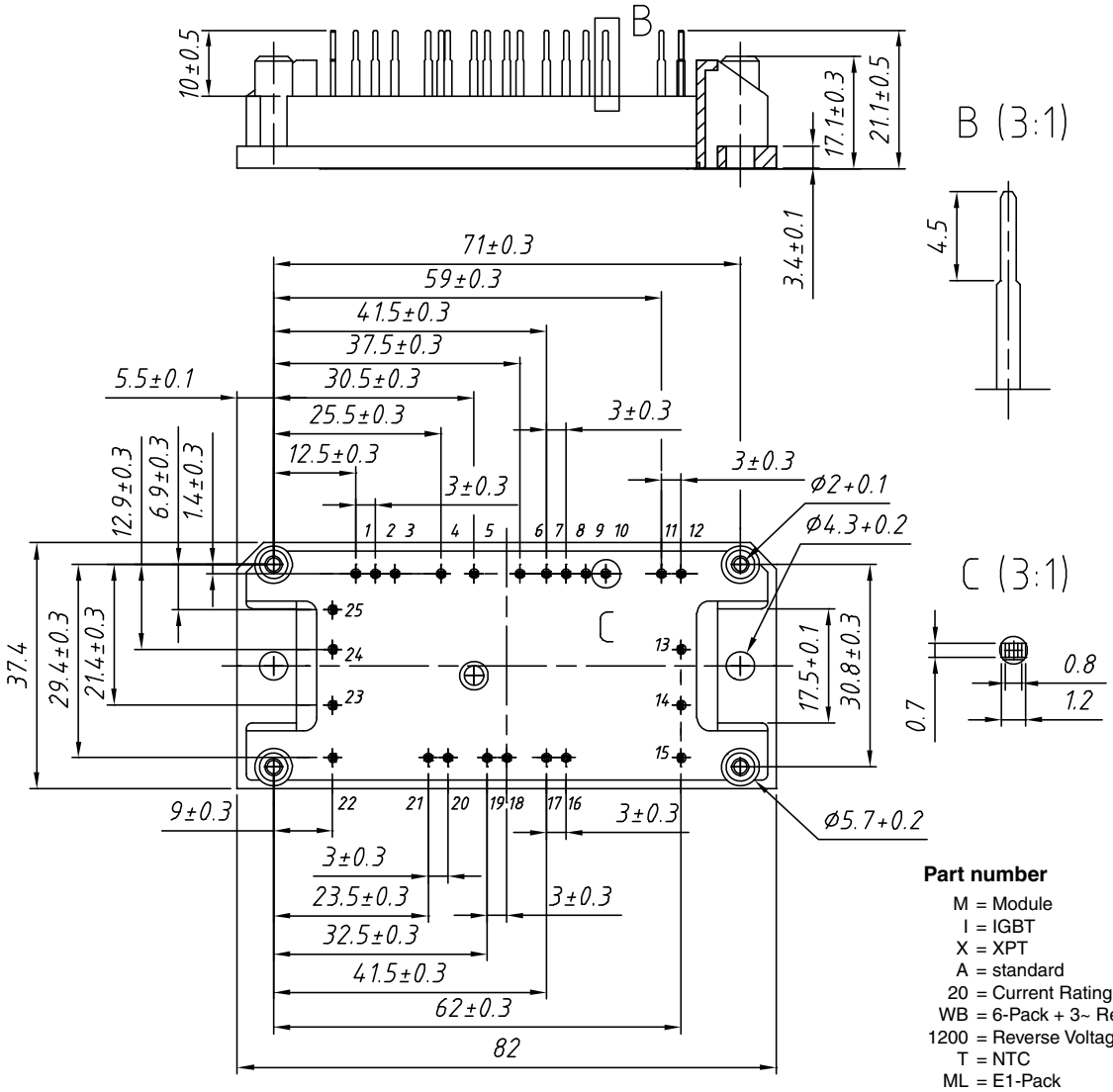
20101103c

Circuit Diagram



Outline Drawing

Dimensions in mm (1 mm = 0.0394“)



Part number

M = Module
I = IGBT
X = XPT
A = standard
20 = Current Rating [A]
WB = 6-Pack + 3~ Rectifier Bridge & Brake Unit
1200 = Reverse Voltage [V]
T = NTC
ML = E1-Pack

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIXA 20 WB 1200 TML	MIXA20WB1200TML	Box	10	508630

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

20101103c

IGBT T1 - T6

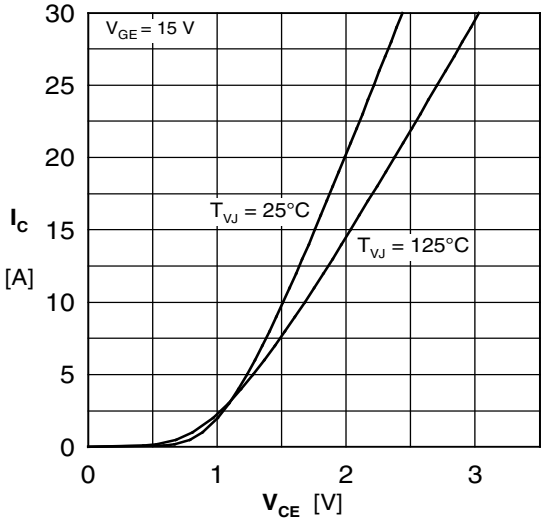


Fig. 1 Typ. output characteristics

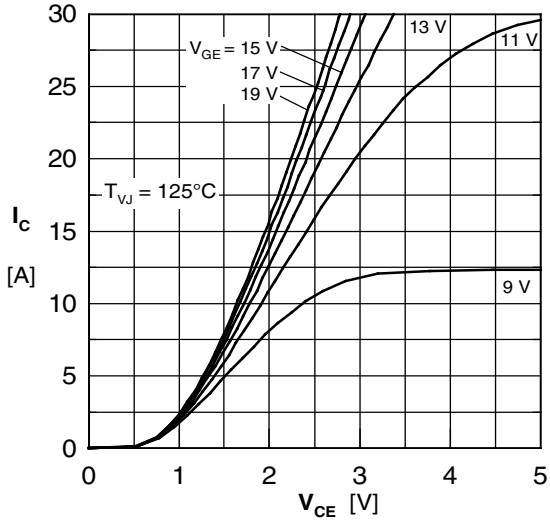


Fig. 2 Typ. output characteristics

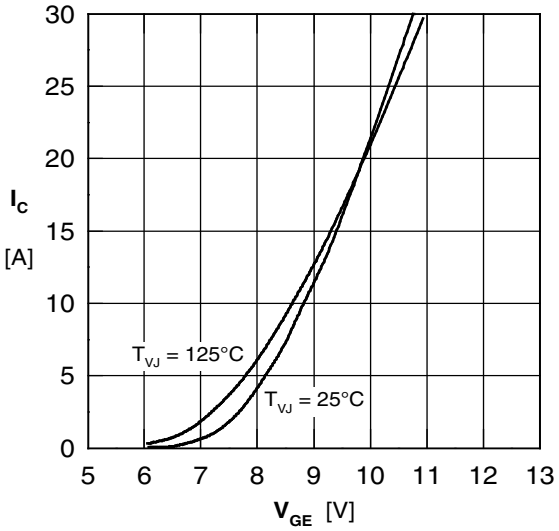


Fig. 3 Typ. tranfer characteristics

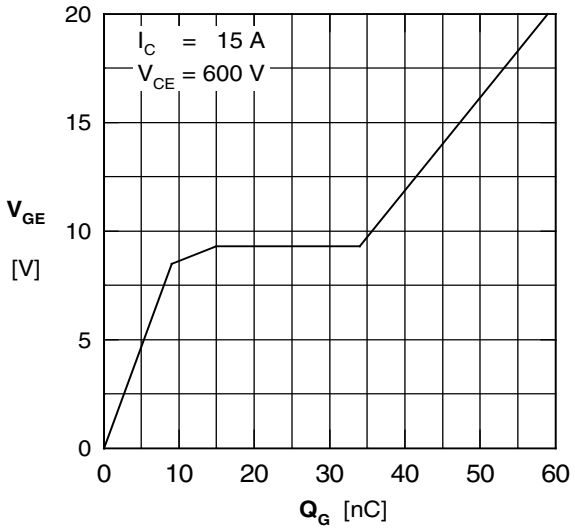


Fig. 4 Typ. turn-on gate charge

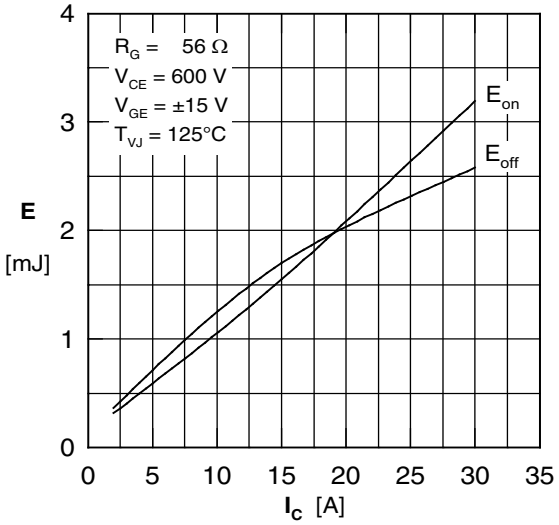


Fig. 5 Typ. switching energy vs. collector current

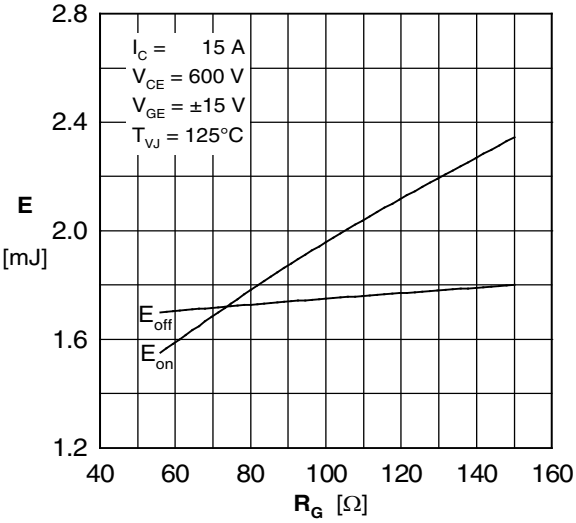


Fig. 6 Typ. switching energy vs. gate resistance

Diode D1 - D6

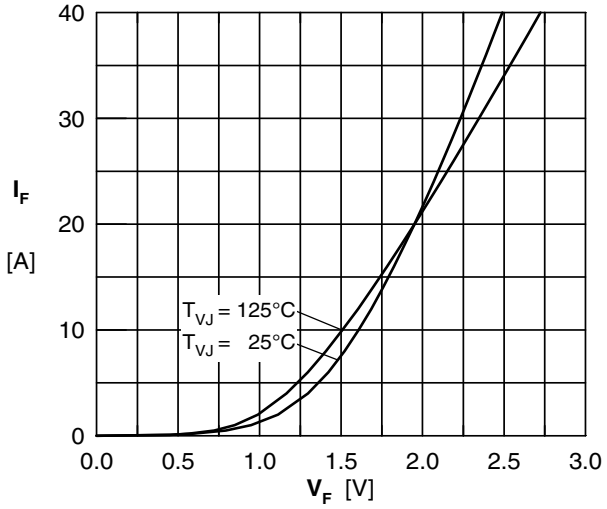


Fig. 7 Typ. Forward current versus V_F

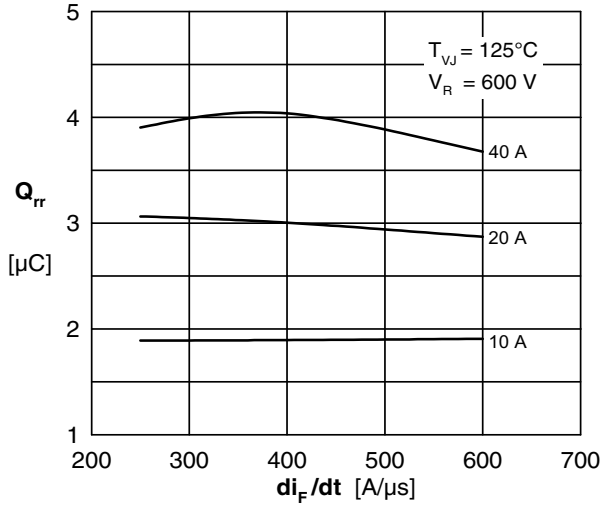


Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

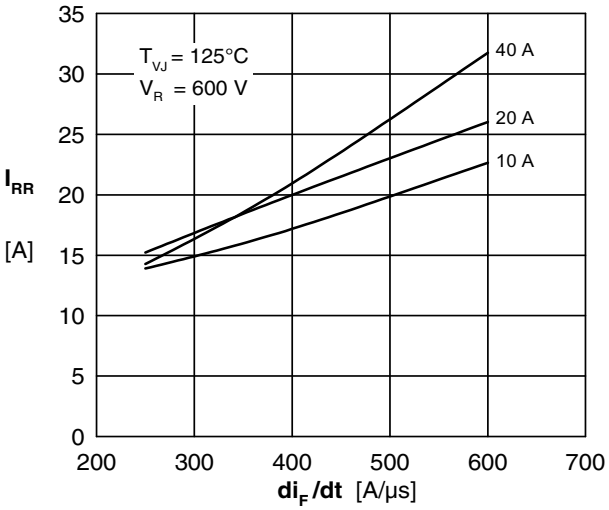


Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

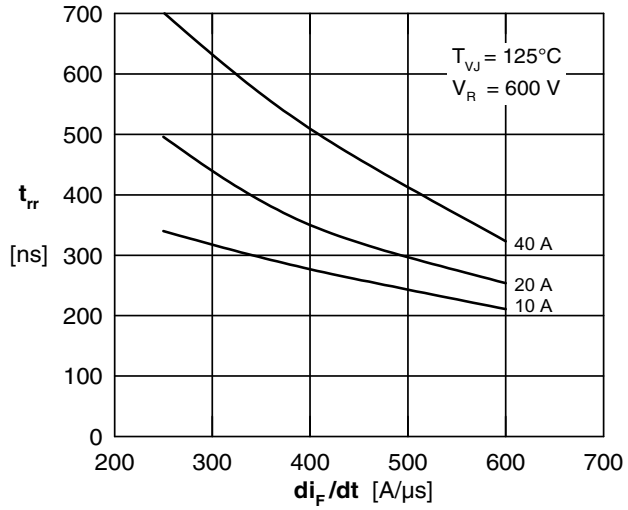


Fig. 10 Typ. recovery time t_{rr} versus di/dt

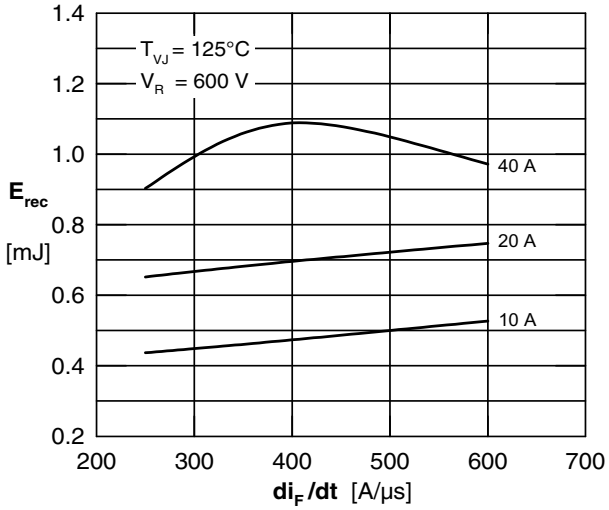
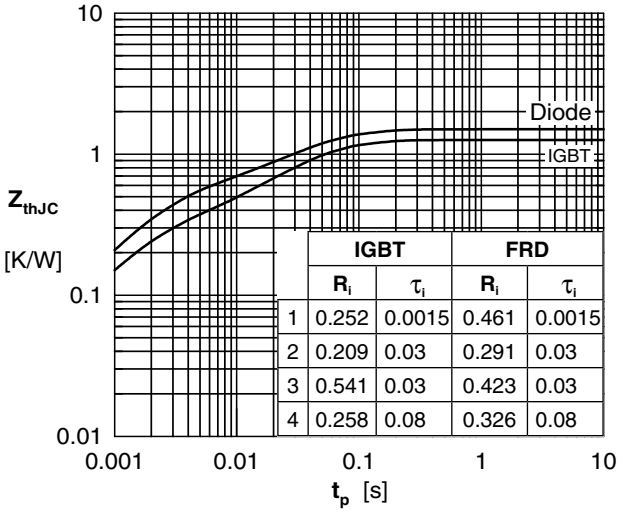


Fig. 11 Typ. recovery energy E_{rec} versus di/dt



	IGBT		FRD	
	R_i	τ_i	R_i	τ_i
1	0.252	0.0015	0.461	0.0015
2	0.209	0.03	0.291	0.03
3	0.541	0.03	0.423	0.03
4	0.258	0.08	0.326	0.08

Fig. 12 Typ. transient thermal impedance

NTC

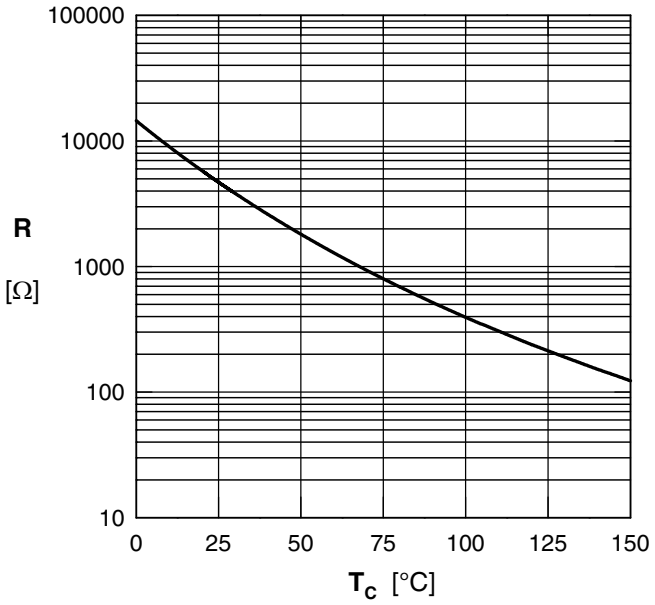


Fig. 13 Typ. thermistor resistance vs. temperature

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for IGBT Modules ***category:***

Click to view products by IXYS ***manufacturer:***

Other Similar products are found below :

F3L100R07W2E3_B11 F3L15R12W2H3_B27 F3L400R07ME4_B22 F3L400R12PT4_B26 F4-100R12KS4 F4-50R07W2H3_B51 F4-75R12KS4_B11 FB15R06W1E3 FB20R06W1E3_B11 FD1000R33HE3-K FD300R06KE3 FD300R12KE3 FD300R12KS4_B5 FD400R12KE3 FD400R33KF2C-K FD401R17KF6C_B2 FD-DF80R12W1H3_B52 FF100R12KS4 FF1200R17KE3_B2 FF150R12KE3G FF200R06KE3 FF200R06YE3 FF200R12KT3 FF200R12KT3_E FF200R12KT4 FF200R17KE3 FF300R06KE3_B2 FF300R12KE4_E FF300R12KS4HOSA1 FF300R12ME4_B11 FF300R12MS4 FF300R17ME4 FF450R12ME4P FF450R17IE4 FF600R12IE4V FF600R12IP4V FF800R17KP4_B2 FF900R12IE4V MIXA30W1200TED MIXA450PF1200TSF FP06R12W1T4_B3 FP100R07N3E4 FP100R07N3E4_B11 FP10R06W1E3_B11 FP10R12W1T4_B11 FP10R12YT3 FP10R12YT3_B4 FP150R07N3E4 FP15R12KT3 FP15R12W2T4