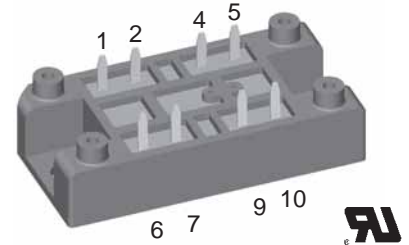
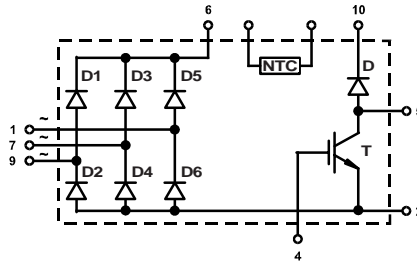


Three Phase Rectifier Bridge with Brake Chopper

$V_{RRM} = 1200/1600 \text{ V}$
 $I_{dAVM} = 110 \text{ A}$



Input Rectifier D1 - D6

Symbol	Conditions	Maximum Ratings	
V_{RRM}	VUB 72 -12 NO1	1200	V
	VUB 72 -16 NO1	1600	V
I_{FAV}	$T_C = 80^\circ\text{C}$; sine 180°	40	A
I_{dAVM}	$T_C = 80^\circ\text{C}$; rectangular; $d = 1/3$; bridge	110	A
I_{FSM}	$T_{VJ} = 25^\circ\text{C}$; $t = 10 \text{ ms}$; sine 50 Hz	530	A
P_{tot}	$T_C = 25^\circ\text{C}$	100	W

Features

- three phase mains rectifier
- brake chopper:
 - IGBT with low saturation voltage
 - HiPerFRED™ free wheeling diode
- module package:
 - high level of integration
 - solder terminals for PCB mounting
 - UL registered E72873
 - isolated DCB ceramic base plate
 - large creepage and strike distances
 - high reliability

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 25 \text{ A}$; $T_{VJ} = 25^\circ\text{C}$	1.0	1.1	V
		0.9		V
I_R	$V_R = V_{RRM}$; $T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$; $T_{VJ} = 125^\circ\text{C}$	0.4	0.02	mA
				mA
R_{thJC}	per diode		1.2	K/W
R_{thJH}	with heat transfer paste		1.42	K/W

Applications

- drives with
- mains input
 - DC link
 - inverter or chopper feeding the machine
 - motor and generator/brake operation

Chopper Diode D

Symbol	Conditions	Maximum Ratings	
V_{RRM}	$T_{VJ} = 25^\circ\text{C}$ to 150°C	1200	V
I_{F25}	DC; $T_C = 25^\circ\text{C}$	25	A
I_{F80}	DC; $T_C = 80^\circ\text{C}$	15	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 25 \text{ A}$; $T_{VJ} = 25^\circ\text{C}$	2.7	3.1	V
		2.0		V
I_R	$V_R = V_{RRM}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	0.1	0.1	mA
				mA
I_{RM}	$I_F = 15 \text{ A}$; $di_F/dt = -400 \text{ A}/\mu\text{s}$; $T_{VJ} = 125^\circ\text{C}$ $V_R = 600 \text{ V}$	16		A
t_{rr}		130		ns
R_{thJC}	with heat transfer paste		2.3	K/W
R_{thJH}			3.12	K/W

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

Chopper Transistor T

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C	1200	V
V_{GES}		± 20	V
I_{C25}	DC; $T_C = 25^{\circ}\text{C}$	50	A
I_{C80}	DC; $T_C = 80^{\circ}\text{C}$	35	A
I_{CM}	$V_{GE} = \pm 15\text{ V}$; $R_G = 39\ \Omega$; $T_{VJ} = 125^{\circ}\text{C}$	50	A
V_{CEK}	RBSOA; $L = 100\ \mu\text{H}$	V_{CES}	
t_{SC} (SCSOA)	$V_{GE} = \pm 15\text{ V}$; $V_{CE} = 900\text{ V}$; $T_{VJ} = 125^{\circ}\text{C}$ $R_G = 39\ \Omega$; non repetitive	10	μs

Symbol	Conditions ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)	Characteristic Values			
		min.	typ.	max.	
$V_{CE(sat)}$	$I_C = 25\text{ A}$; $V_{GE} = 15\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.9 2.1	2.4	V V	
$V_{GE(th)}$	$I_C = 1\text{ mA}$; $V_{GE} = V_{CE}$	4.5		6.5 V	
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0\text{ V}$; $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	0.1	0.1	mA mA	
I_{GES}	$V_{CE} = 0\text{ V}$; $V_{GE} = \pm 20\text{ V}$		200	nA	
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600\text{ V}$; $I_C = 25\text{ A}$ $V_{GE} = \pm 15\text{ V}$; $R_G = 39\ \Omega$		80	ns	
				50	ns
				440	ns
				50	ns
				3.8	mJ
				2.0	mJ
C_{ies}	$V_{CE} = 25\text{ V}$; $V_{GE} = 0\text{ V}$; $f = 1\text{ MHz}$	2.0		nF	
Q_{Gon}	$V_{CE} = 600\text{ V}$; $V_{GE} = 15\text{ V}$; $I_C = 35\text{ A}$	150		nC	
R_{thJC}			0.6	K/W	
R_{thJH}	with heat transfer paste, see mounting instructions		1.2	K/W	

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values typ.	
R_{25}	$T = 25^{\circ}\text{C}$	2.2	k Ω
$B_{25/100}$	$R(T) = R_{25} \cdot e^{B_{25/100} \left(\frac{1}{T} - \frac{1}{298\text{K}} \right)}$	100	K

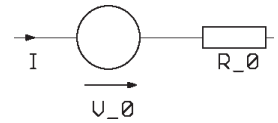
Module

Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin	100	A
T_{VJ}		-40...+150	$^{\circ}\text{C}$
T_{stg}		-40...+125	$^{\circ}\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}$; 50/60 Hz; $t = 1\text{ min}$	3600	V~
M_d	Mounting torque (M5)	2 - 2.5	Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
d_A, d_S		5		mm
Weight			35	g

Equivalent Circuits for Simulation

Conduction



D1 - D6

Diode (typ. at $T_J = 125^{\circ}\text{C}$)

$$V_0 = 0.85\text{ V}; R_0 = 7\text{ m}\Omega$$

T/D

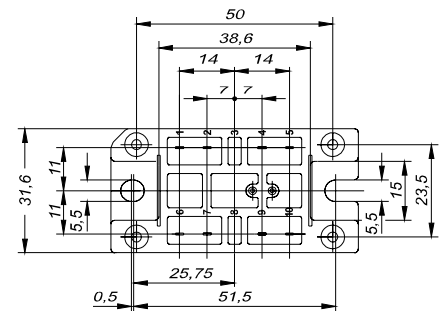
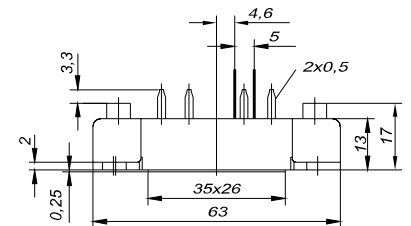
IGBT (typ. at $V_{GE} = 15\text{ V}$; $T_J = 125^{\circ}\text{C}$)

$$V_0 = 1.0\text{ V}; R_0 = 45\text{ m}\Omega$$

Free Wheeling Diode (typ. at $T_J = 125^{\circ}\text{C}$)

$$V_0 = 1.25\text{ V}; R_0 = 32\text{ m}\Omega$$

Dimensions in mm (1 mm = 0.0394")



Input Rectifier D1-D6

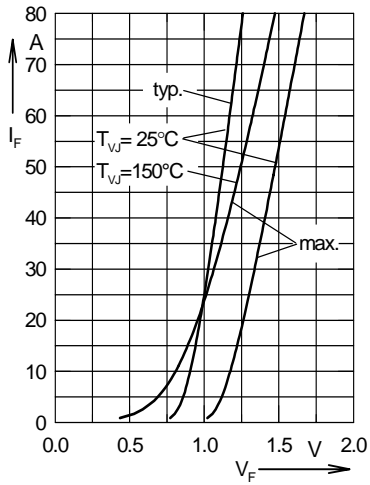


Fig. 1 Forward current versus voltage drop per rectifier diode

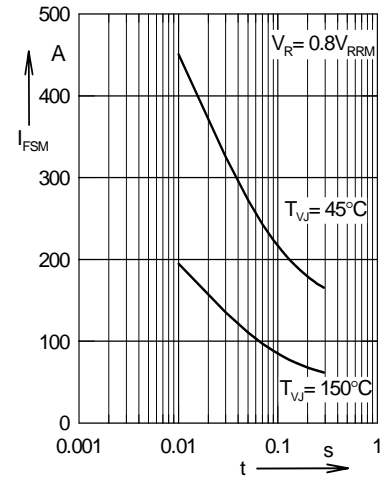


Fig. 2 Surge overload current per rectifier diode

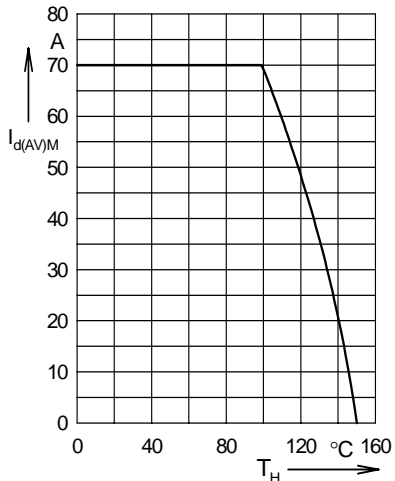


Fig. 3 Maximum forward current versus heatsink temperature (Rectifier bridge)

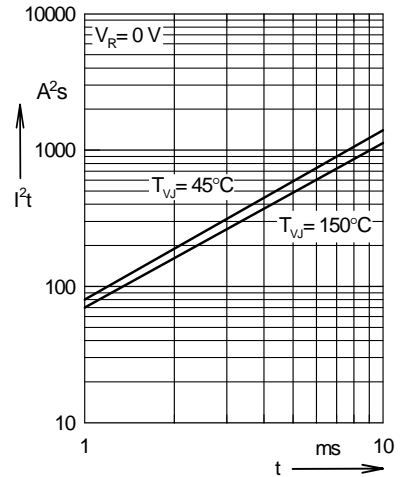


Fig. 4 I²t versus time per rectifier diode

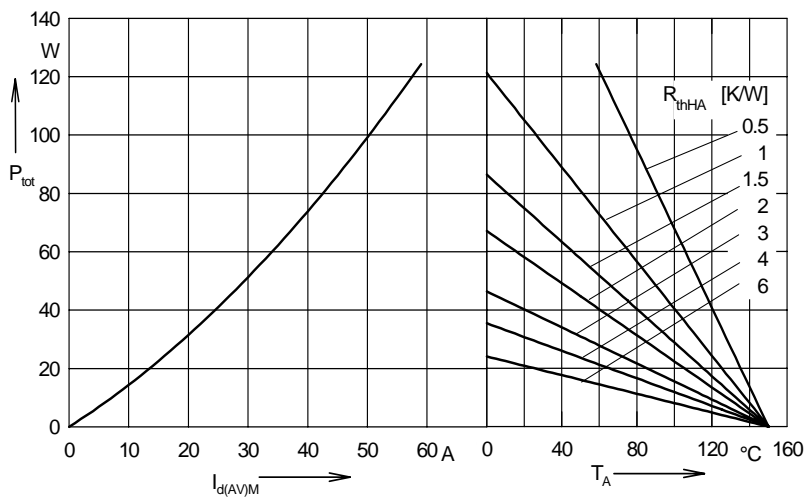


Fig. 5 Power dissipation versus direct output current and ambient temperature (Rectifier bridge)

Note:
transient thermal impedance
see next page

Chopper T - D

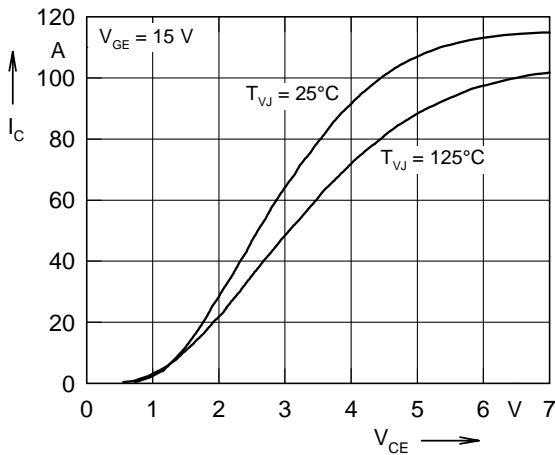


Fig. 6 Typ. IGBT output characteristics

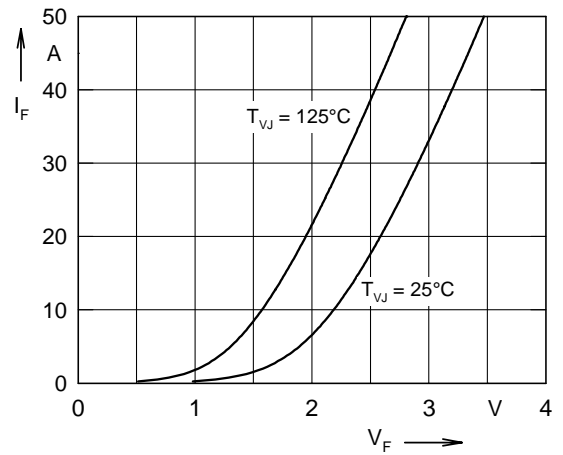


Fig. 7 Typ. forward characteristics of free wheeling diode

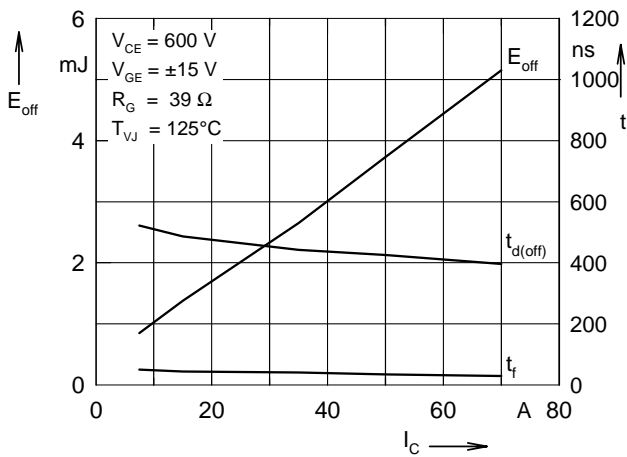


Fig. 8 Typ. IGBT turn off energy and switching times versus collector current

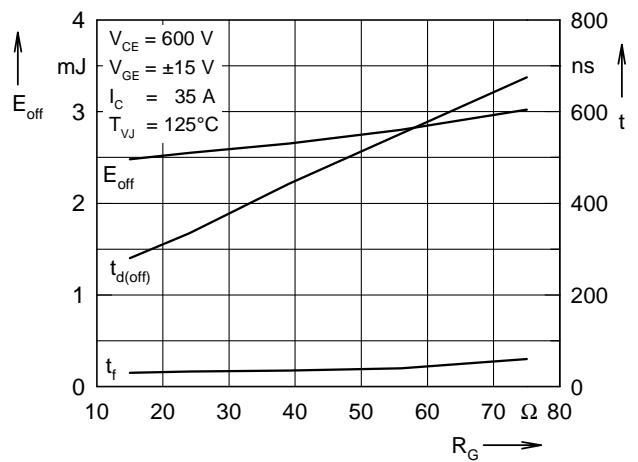


Fig. 9 Typ. IGBT turn off energy and switching times versus gate resistor

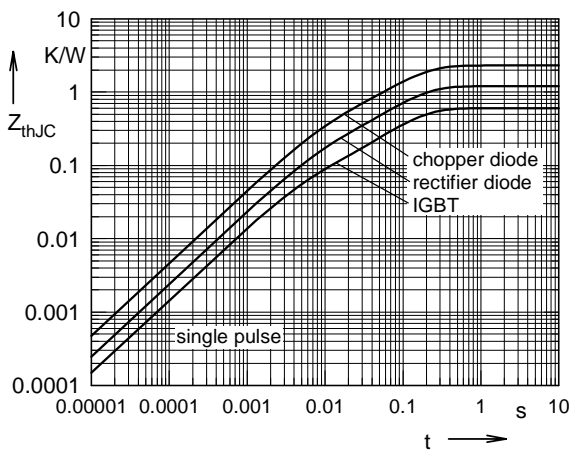


Fig. 10 Typ. transient thermal impedance

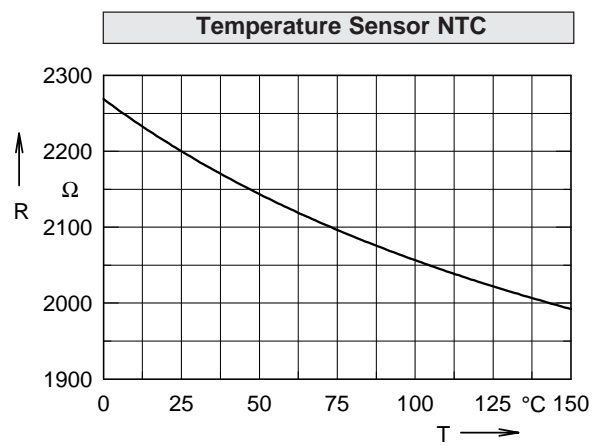


Fig. 11 Typ. thermistorresistance versus temperature