

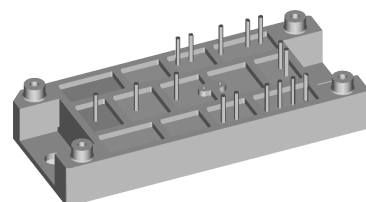
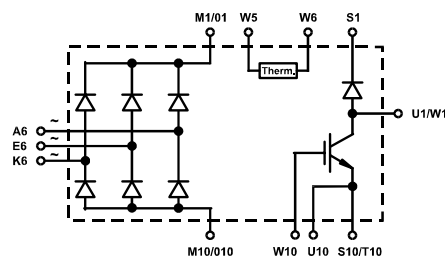
Three Phase Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

$$V_{RRM} = 1200/1600 \text{ V}$$

$$I_{dAVM} = 121/157 \text{ A}$$

Preliminary Data

V_{RRM}	Type	V_{RRM}	Type
V		V	
1200	VUB 120-12 NO1	1600	VUB 120-16 NO1
1200	VUB 160-12 NO1	1600	VUB 160-16 NO1



Symbol	Test Conditions	Maximum Ratings	
		VUB 120	VUB160
V_{RRM}	$T_C = 75^\circ\text{C}$, sinusoidal 120°	1200/1600	1200/1600 V
I_{dAVM}		121	157 A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$, $t = 10 \text{ ms}$, $V_R = 0 \text{ V}$	650	850 A
	$T_{VJ} = 150^\circ\text{C}$, $t = 10 \text{ ms}$, $V_R = 0 \text{ V}$	580	760 A
	$T_{VJ} = 45^\circ\text{C}$, $t = 10 \text{ ms}$, $V_R = 0 \text{ V}$	2110	3610 A
	$T_{VJ} = 150^\circ\text{C}$, $t = 10 \text{ ms}$, $V_R = 0 \text{ V}$	1680	2880 A
I^2t	$T_C = 25^\circ\text{C}$ per diode	130	160 W
P_{tot}			
V_{CES}		1200	1200 V
V_{GE}		± 20	± 20 V
I_{C25} I_{C75}	$T_C = 25^\circ\text{C}$, DC	100	150 A
	$T_C = 75^\circ\text{C}$, DC	71	106 A
	$T_C = 75^\circ\text{C}$, $d = 0.5$	56	85 A
I_{CM}	$t_p = \text{Pulse width limited by } T_{VJM}$	200	300 A
P_{tot}	$T_C = 25^\circ\text{C}$	400	600 W
V_{RRM}	$T_C = 75^\circ\text{C}$, rectangular $d = 0.5$	1200	V
I_{FAV}		25	A
I_{FRMS}		39	A
I_{FRM}		tbd	A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$, $t = 10 \text{ ms}$	200	A
	$T_{VJ} = 150^\circ\text{C}$, $t = 10 \text{ ms}$	180	A
P_{tot}	$T_C = 25^\circ\text{C}$	100	W
T_{VJ}		-40...+150	°C
T_{VJM}		150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	50/60 Hz $t = 1 \text{ min}$	3000	V~
	$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	3600	V~
	Mounting torque (M5) (10-32 unf)	2-2.5	Nm
		18-22	lb.in.
M_d	Creep distance on surface	12.7	mm
d_s		9.4	mm
d_A		50	m/s ²
a	Maximum allowable acceleration		
Weight	typ.	80	g

Features

- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Ultrafast diode
- Convenient package outline
- UL registered E 72873
- Case and potting UL94 V-0
- Thermistor

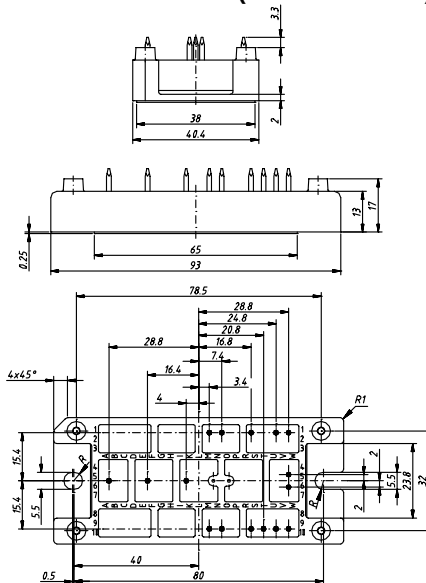
Applications

- Drive Inverters with brake system

Advantages

- 2 functions in one package
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

Dimensions in mm (1 mm = 0.0394")



Data according to IEC 60747

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

Symbol	Test Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
I_R	$V_R = V_{RRM}^1$ $T_{VJ} = 25^{\circ}\text{C}$ $V_R = V_{RRM}^1$ $T_{VJ} = 150^{\circ}\text{C}$			0.3 mA 5 mA
V_F	$I_F = 150\text{ A}$, $T_{VJ} = 25^{\circ}\text{C}$	VUB 120 VUB 160		1.59 V 1.49 V
V_{T0}	For power-loss calculations only	VUB 120 VUB 160		0.80 V 0.75 V
r_T	$T_{VJ} = 150^{\circ}\text{C}$	VUB 120 VUB 160		6.1 m Ω 4.6 m Ω
R_{thJC}	per diode	VUB 120 VUB 160		1.0 K/W 0.8 K/W
R_{thJH}		VUB 120 VUB 160		1.3 K/W 1.1 K/W
$V_{BR(CES)}$	$V_{GS} = 0\text{ V}$, $I_C = 3\text{ mA}$	1200		V
$V_{GE(th)}$	$I_C = 20\text{ mA}$	VUB 120 VUB 160	5 5	8 V 8 V
I_{CES}	$T_{VJ} = 25^{\circ}\text{C}$, $V_{CE} = 1200\text{ V}$ $T_{VJ} = 125^{\circ}\text{C}$, $V_{CE} = 0.8 \cdot V_{CES}$	VUB 120 VUB 160 VUB 120 VUB 160		0.8 mA 1.2 mA 3 mA 4.5 mA
V_{CEsat}	$V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$ $V_{GE} = 15\text{ V}$, $I_C = 75\text{ A}$	VUB 120 VUB 160		2.9 V 2.9 V
t_{SC} (SCSOA)	$V_{GE} = 15\text{ V}$, $V_{CE} = 720\text{ V}$, $T_{VJ} = 125^{\circ}\text{C}$, $R_G = 11\text{ }\Omega$, non repetitive $R_G = 7\text{ }\Omega$, non repetitive	VUB 120 VUB 160		10 μs 10 μs
RBSOA	$V_{GE} = 15\text{ V}$, $V_{CE} = 960\text{ V}$, $T_{VJ} = 125^{\circ}\text{C}$, Clamped Inductive load, $L = 100\text{ }\mu\text{H}$ $R_G = 11\text{ }\Omega$ $R_G = 7\text{ }\Omega$	VUB 120 VUB 160		100 A 150 A
C_{ies}	$V_{CE} = 25\text{ V}$, $f = 1\text{ MHz}$, $V_{GE} = 0\text{ V}$	VUB 120 VUB 160	9 13.5	nF nF
$t_{d(on)}$ $t_{d(off)}$ E_{on} E_{off}	$V_{CE} = 720\text{ V}$, $I_C = 50/75\text{ A}$ $V_{GE} = 15\text{ V}$, $R_G = 11/7\text{ }\Omega$ Inductive load; $L = 100\text{ }\mu\text{H}$ $T_{VJ} = 125^{\circ}\text{C}$	VUB 120 VUB 160 VUB 120 VUB 160	300 350 12 18 16 24	ns ns mJ mJ mJ mJ
R_{thJC}		VUB 120 VUB 160		0.32 K/W 0.21 K/W
R_{thJH}		VUB 120 VUB 160		0.45 K/W 0.30 K/W
I_R	$V_R = V_{RRM}^1$ $T_{VJ} = 25^{\circ}\text{C}$ $V_R = 0.8 \cdot V_{CES}^1$ $T_{VJ} = 125^{\circ}\text{C}$		4	0.75 mA 7 mA
V_F	$I_F = 30\text{ A}$, $T_{VJ} = 25^{\circ}\text{C}$			2.55 V
V_{T0}	For power-loss calculations only			1.65 V
r_T	$T_{VJ} = 150^{\circ}\text{C}$			18.2 m Ω
I_{RM}	$I_F = 30\text{ A}$, $-di_F/dt = 240\text{ A}/\mu\text{s}$, $V_R = 540\text{ V}$		16	18 A
t_{rr}	$I_F = 1\text{ A}$, $-di_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$		40	60 ns
R_{thJC}				1.2 K/W
R_{thJH}				1.6 K/W
R_{25}	NTC Siemens S 891/2,2/+9			2.2 k Ω

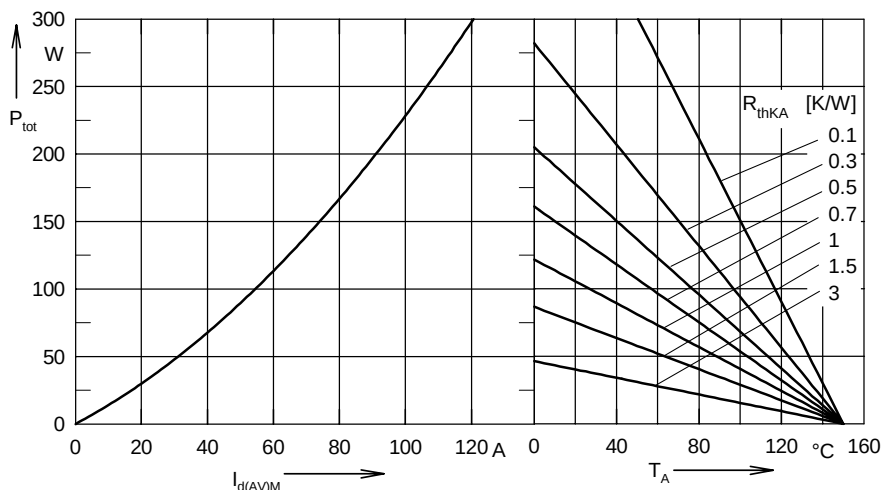


Fig. 1 Power dissipation versus direct output current and ambient temperature (Rectifier bridge)

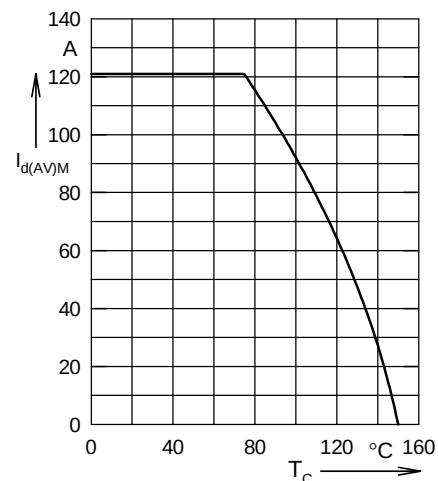


Fig. 2 Maximum forward current versus case temperature (Rectifier bridge)

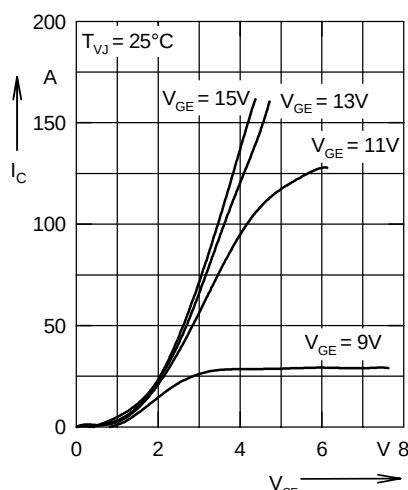


Fig. 3 Output characteristics for braking (IGBT)

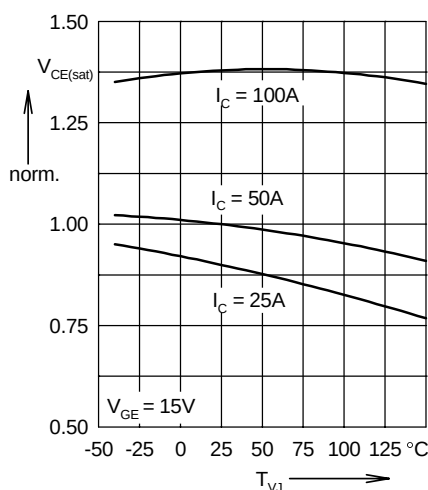


Fig. 4 Temperature dependence of output saturation voltage, normalized (IGBT)

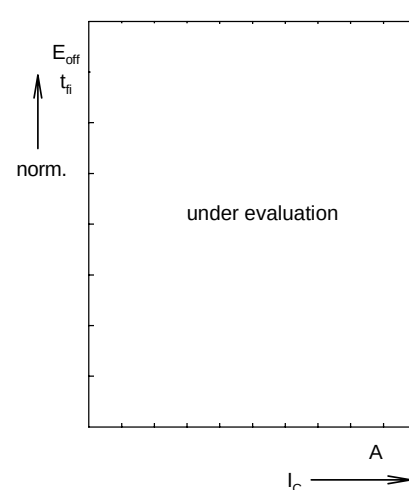


Fig. 5 Turn-off energy per pulse and fall time in collector current, normalized (IGBT)

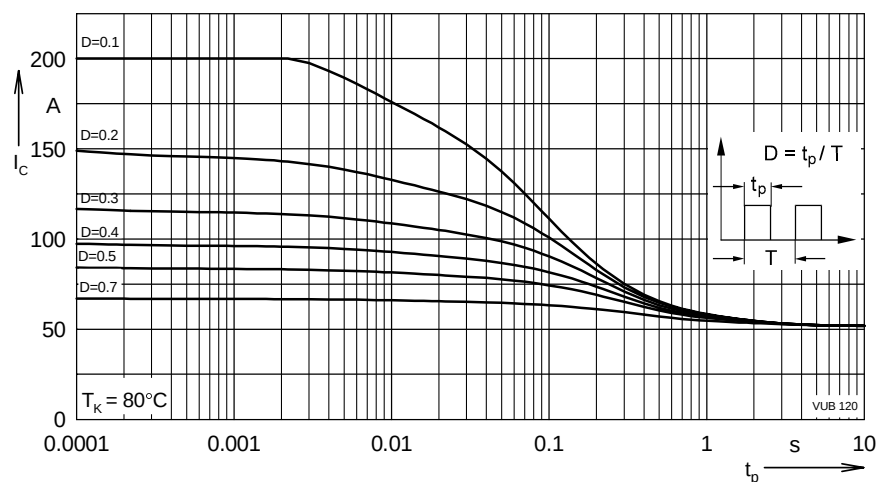


Fig. 6 Collector current dependence on pulse width and duty cycle (IGBT)

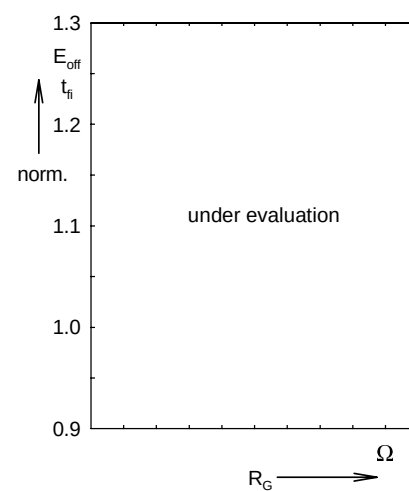


Fig. 7 Turn-off energy per pulse and fall time on R_G (IGBT)

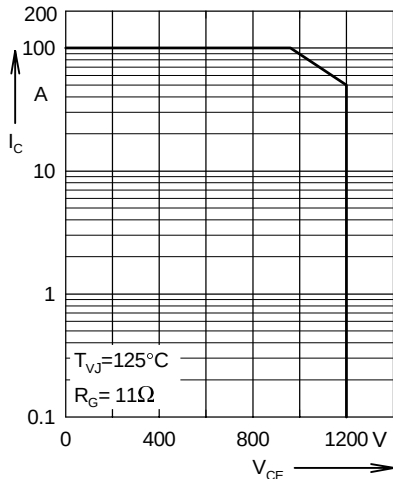


Fig. 8 Reverse biased safe operation area (IGBT)

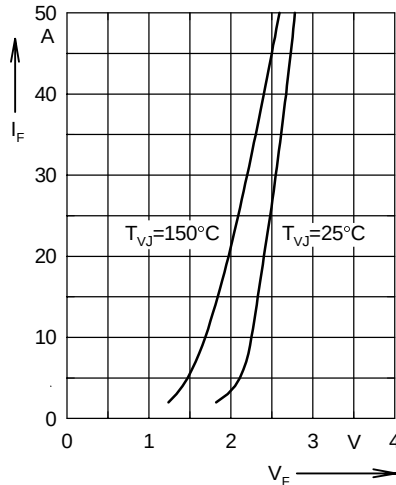


Fig. 9 Forward current versus voltage drop (Fast Diode)

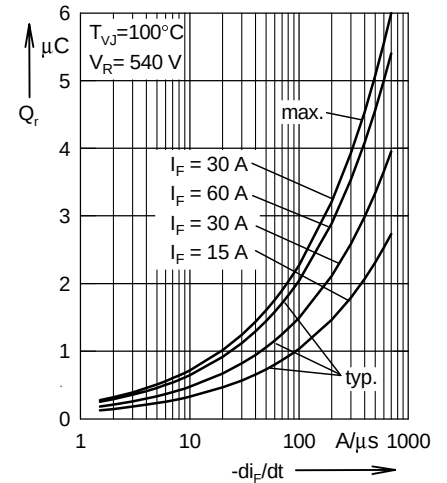
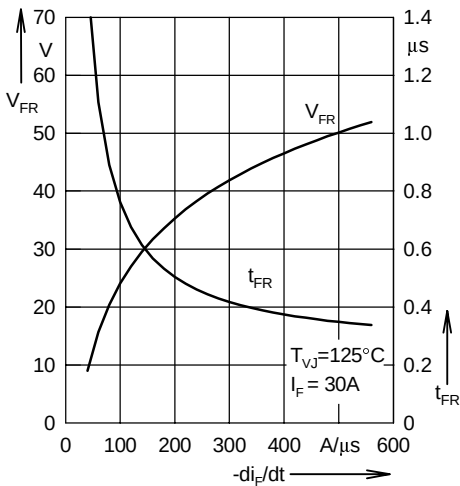
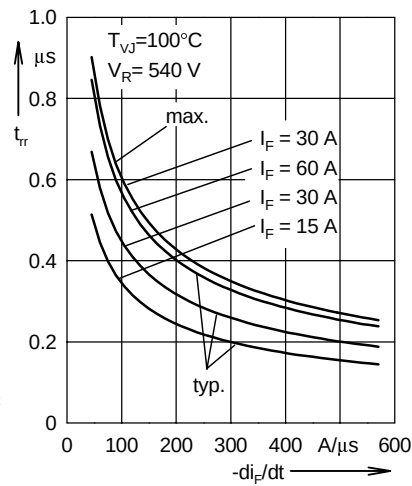
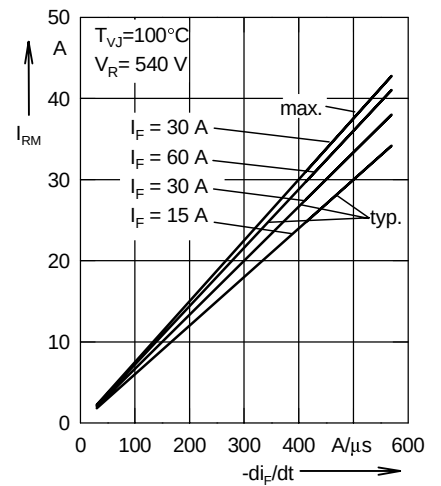
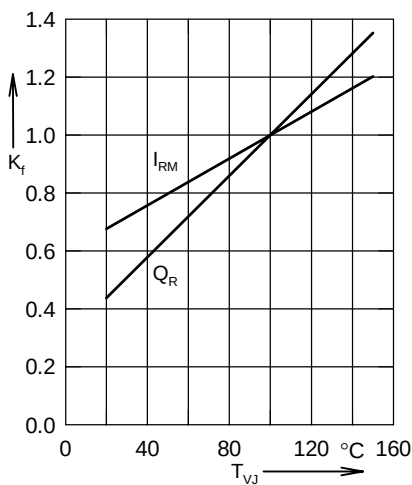
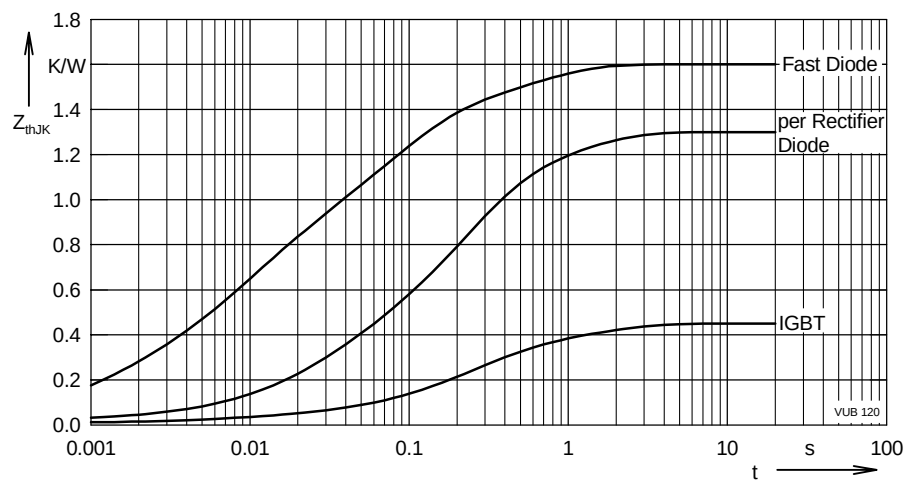
Fig. 10 Recovery charge versus $-di_F/dt$ (Fast Diode)Fig. 11 Peak forward voltage and recovery time versus $-di_F/dt$ (Fast Diode)Fig. 12 Recovery time versus $-di_F/dt$ (Fast Diode)Fig. 13 Peak reverse current versus $-di_F/dt$ (Fast Diode)

Fig. 14 Dynamic parameters versus junction temperature (Fast Diode)

Fig. 15 Transient thermal impedance junction to heatsink Z_{thJK}