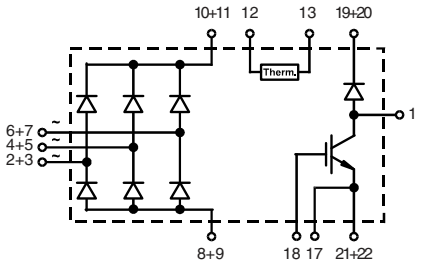
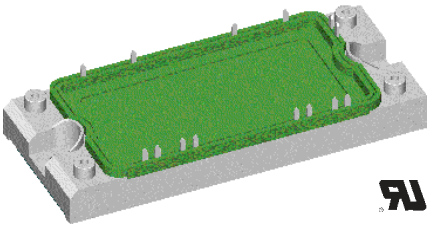
Three Phase Rectifier Bridge
with IGBT and Fast Recovery Diode for Braking System

V_{RRM} = 1600 V
I_{dAVM} = 116/145 A

V_{RRM} V	Type
1600	VUB 116-16 NO1
1600	VUB 145-16 NO1





Pin arrangement see outline drawing

Symbol		Conditions	Maximum Ratings VUB 116	VUB 145	
V_{RRM}	Rectifier Diodes		1600	1600	V
I_{dAVM}		T_C = 100°C, sinusoidal 120°	116	145	A
I_{FSM}		T_{VJ} = 45°C, t = 10 ms, V_R = 0 V	700	1100	A
		T_{VJ} = 150°C, t = 10 ms, V_R = 0 V	610	960	A
I^2t		T_{VJ} = 45°C, t = 10 ms, V_R = 0 V	2450	6050	A
		T_{VJ} = 150°C, t = 10 ms, V_R = 0 V	1860	4610	A
P_{tot}		T_C = 25°C per diode	190	250	W
V_{CES}	IGBT	T_{VJ} = 25°C to 150°C	1200	1200	V
V_{GE}		Continuous	± 20	± 20	V
I_{C25}		T_C = 25°C, DC	95	141	A
I_{C80}		T_C = 80°C, DC	67	100	A
I_{CM}		t_p = Pulse width limited by T_{VJM}	100	150	A
P_{tot}		T_C = 25°C	380	570	W
V_{RRM}	Fast Recovery Diode		1200		V
I_{FAV}		T_C = 80°C, rectangular d = 0.5	27		A
I_{FRMS}		T_C = 80°C, rectangular d = 0.5	38		A
I_{FRM}		T_C = 80°C, t_P = 10 µs, f = 5 kHz	tbd		A
I_{FSM}		T_{VJ} = 45°C, t = 10 ms	200		A
P_{tot}		T_C = 25°C	130		W
T_{VJ}	Module	Operating	-40...+125		°C
T_{JM}			150		°C
T_{stg}			-40...+125		°C
V_{ISOL}		50/60 Hz, t = 1 min	2500		V~
		I_{ISOL} ≤ 1 mA, t = 1 s	3000		V~
M_d		Mounting torque	2.7...3.3		Nm
d_S		Creep distance on surface	12.7		mm
d_A		Strike distance in air	9.6		mm
a		Maximum allowable acceleration	50		m/s^2
$R_{pin-chip}$			typ. 2		mΩ
Weight		typ.	180		g

Data according to IEC 60747

Features
- Soldering connections for PCB mounting
- Convenient package outline
- Thermistor
- UL registered, E 153432

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

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

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Symbol		Conditions		Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R	Rectifier Diodes	$V_R = V_{RRM}$, T_{VJ} = 25°C				0.1	mA
		$V_R = V_{RRM}$, T_{VJ} = 150°C				2	mA
V_F		I_F = 80 A, T_{VJ} = 25°C	VUB 116			1.43	V
		I_F = 150 A, T_{VJ} = 25°C	VUB 145			1.68	V
V_{T0}		for power-loss calculations only	VUB 116			0.85	V
			VUB 145			0.85	V
r_T		T_{VJ} = 150°C	VUB 116			7.1	mΩ
			VUB 145			5.9	mΩ
R_{thJC}		per diode	VUB 116			0.65	K/W
			VUB 145			0.5	K/W
R_{thCH}		per diode	VUB 116			0.1	K/W
			VUB 145			0.1	K/W
$V_{BR(CES)}$	IGBT	V_{GS} = 0 V, I_C = 0.1 mA		1200			V
$V_{GE(th)}$		I_C = 8 mA	VUB 116	4.5		6.45	V
		I_C = 3 mA	VUB 145	4.5		6.45	V
I_{CES}		T_{VJ} = 25°C, V_{CE} = 1200 V				0.1	mA
		T_{VJ} = 125°C, V_{CE} = 0,8 • V_{CES}				0.5	mA
V_{CEsat}		V_{GE} = 15 V, I_C = 100 A	VUB 116			3.5	V
		V_{GE} = 15 V, I_C = 150 A	VUB 145			3.7	V
t_{SC} (SCSOA)		V_{GE} = 15 V, V_{CE} = 720 V, T_{VJ} = 125°C,				10	µs
RBSOA		V_{GE} = 15 V, V_{CE} = 1200 V, T_{VJ} = 125°C, clamped inductive load, L = 100 µH					
		R_G = 22 Ω	VUB 116			100	A
		R_G = 15 Ω	VUB 145			150	A
C_{ies}		V_{CE} = 25 V, f = 1 MHz, V_{GE} = 0 V	VUB 116		3.8		nF
			VUB 145		5.7		nF
$t_{d(on)}$		V_{CE} = 720 V, I_C = 50/75 A V_{GE} = 15 V, R_G = 22/15 Ω Inductive load; L = 100 µH T_{VJ} = 125°C	VUB 116		150		ns
			VUB 145		80		ns
$t_{d(off)}$					680		ns
E_{on}			VUB 116		6		mJ
			VUB 145		9		mJ
E_{off}			VUB 116		4		mJ
			VUB 145		7.5		mJ
R_{thJC}			VUB 116			0.33	K/W
			VUB 145			0.22	K/W
R_{thJH}			VUB 116			0.66	K/W
			VUB 145			0.44	K/W
I_R	Fast Recovery Diode	$V_R = V_{RRM}$, T_{VJ} = 25°C				0.25	mA
		V_R = 1200 V, T_{VJ} = 125°C			1		mA
V_F		I_F = 30 A, T_{VJ} = 25°C				2.76	V
V_{T0}		For power-loss calculations only				1.3	V
r_T		T_{VJ} = 150°C				16	mΩ
I_{RM}		I_F = 50 A, -di_F/dt = 100 A/µs, V_R = 100 V			5.5	11	A
t_{rr}		I_F = 1 A, -di_F/dt = 200 A/µs, V_R = 30 V			40		ns
R_{thJC}						0.9	K/W
R_{thCH}						0.1	K/W
R_{25}	NTC			4.75	5.0	5.25	kΩ
$B_{25/50}$					3375		K

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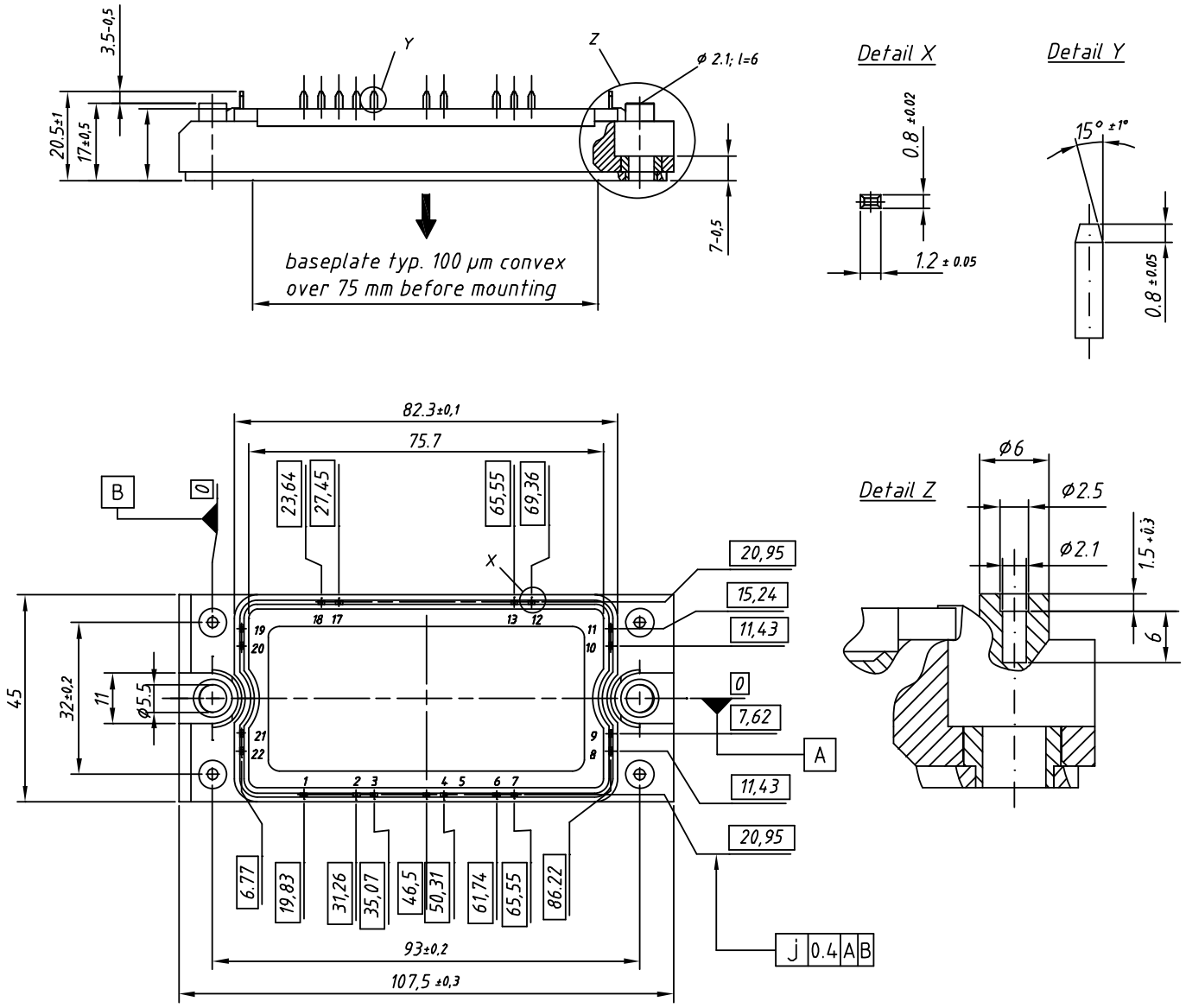
Dimensions in mm (1 mm = 0.0394")



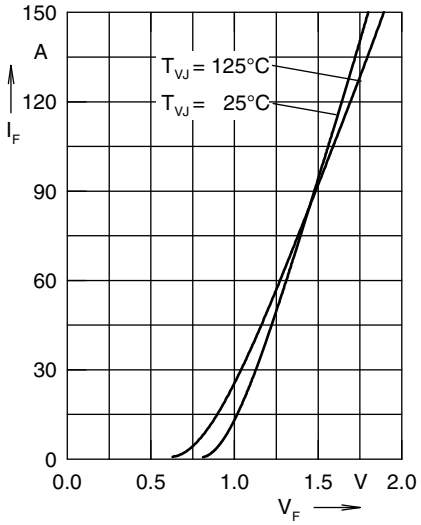


Fig. 1 Forward current vs. voltage drop per diode

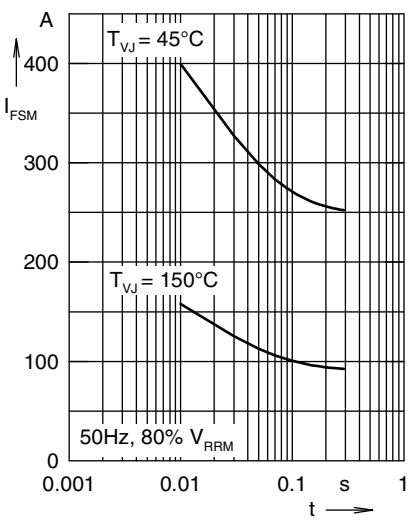


Fig. 2 Surge overload current

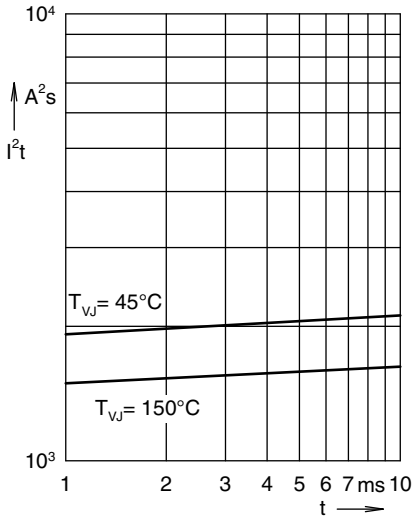


Fig. 3 I^2t versus time per diode

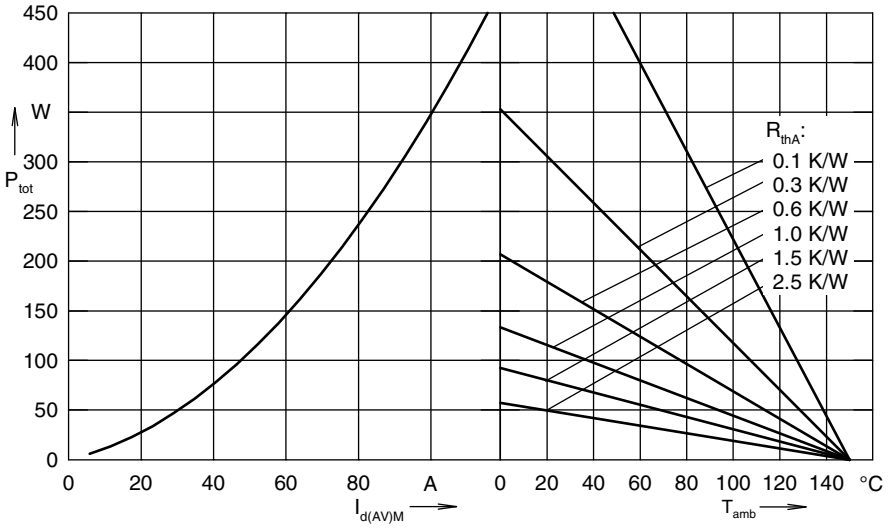


Fig. 4 Power dissipation versus direct output current and ambient temperature, sine 180°

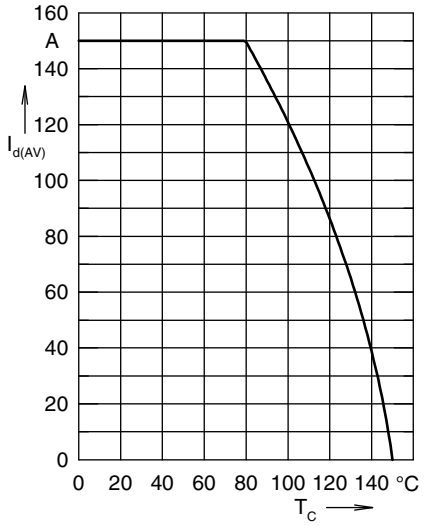


Fig. 5 Max. forward current vs. case temperature

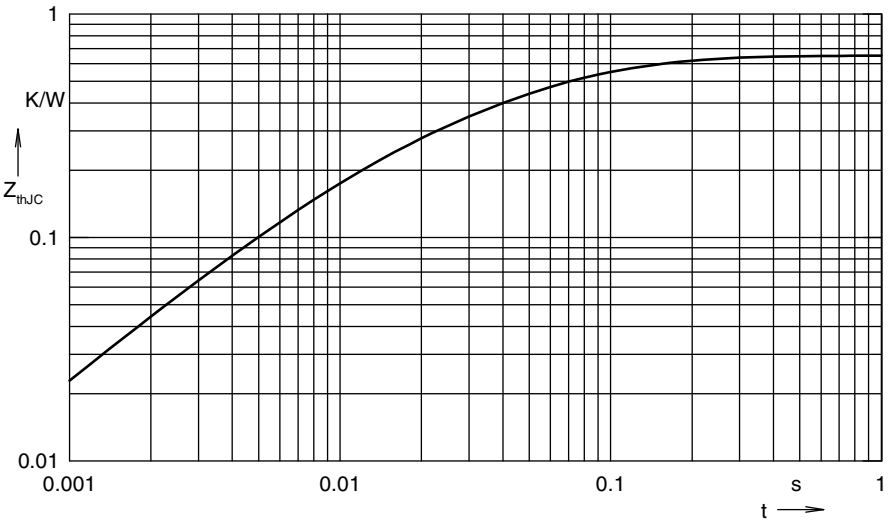


Fig. 6 Transient thermal impedance junction to case

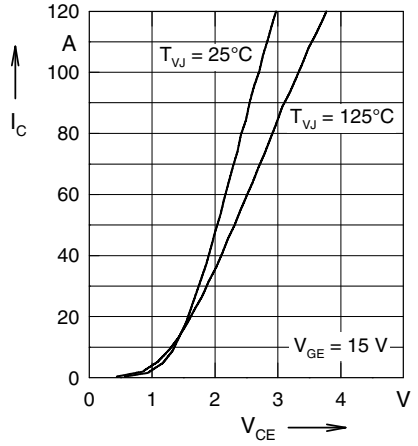


Fig. 7 Typ. output characteristics

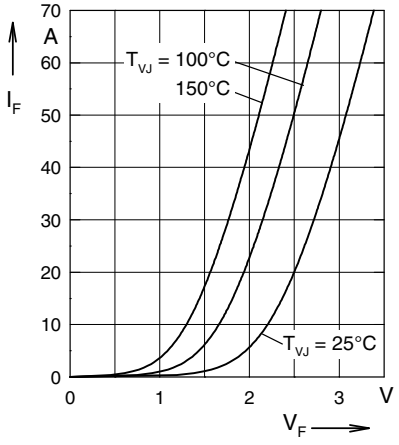


Fig. 8 Typ. forward characteristics of free wheeling diode

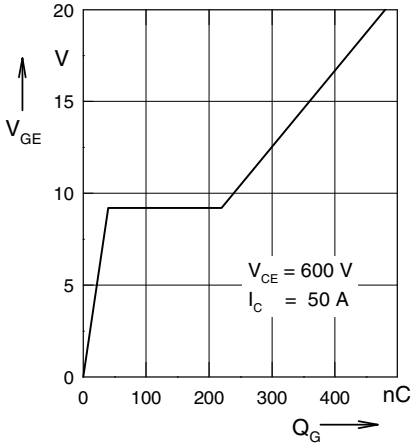


Fig. 9 Typ. turn on gate charge

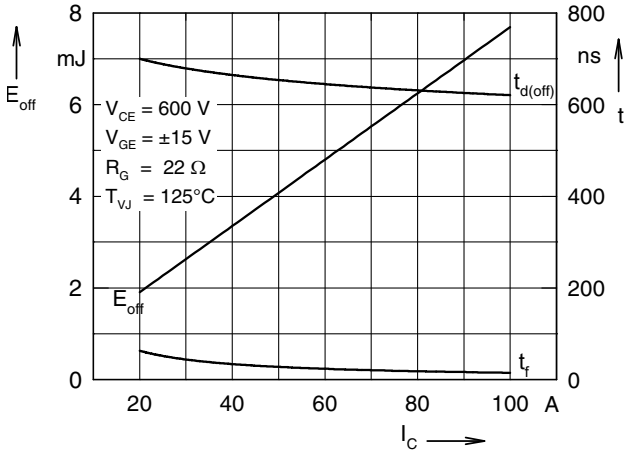


Fig. 10 Typ. turn off energy and switching times versus collector current

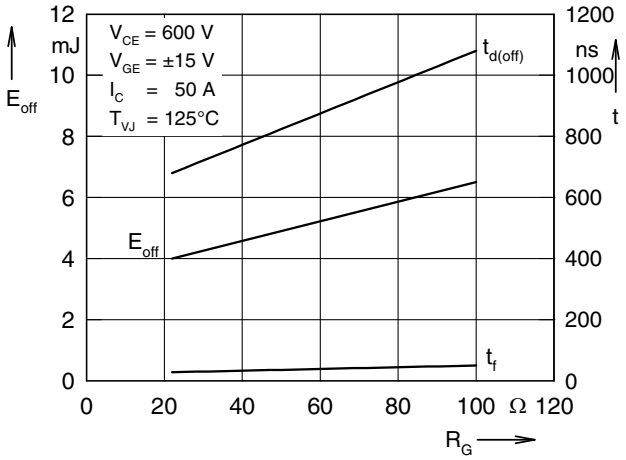


Fig. 11 Typ. turn off energy and switching times versus gate resistor

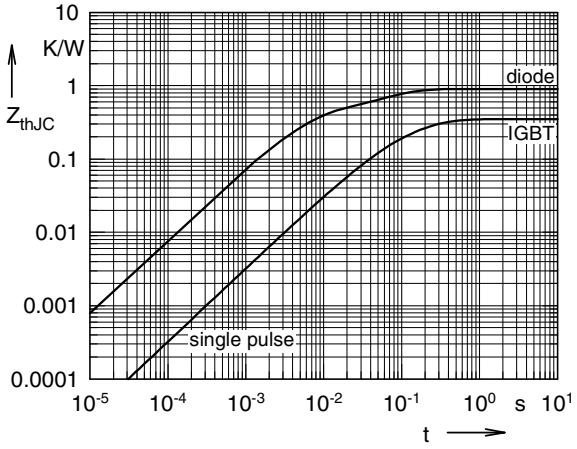


Fig. 12 Typ. transient thermal impedance

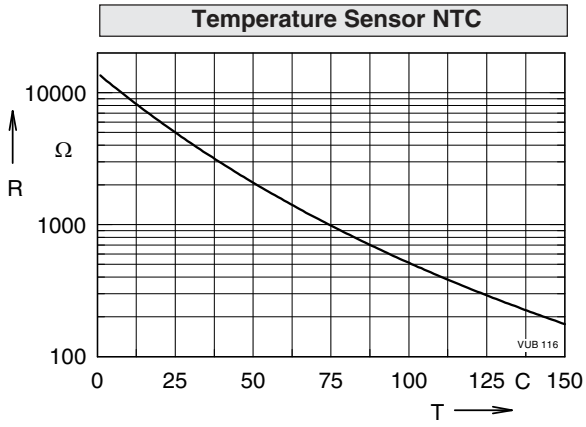
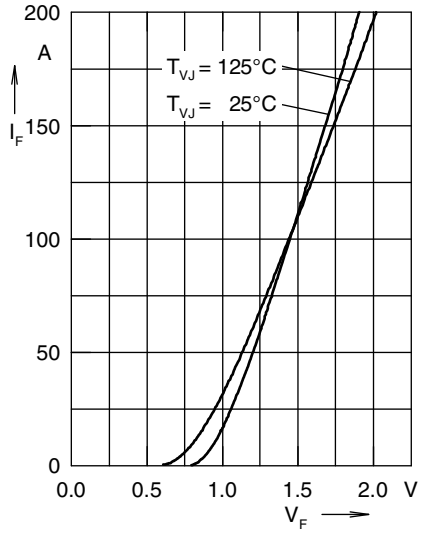


Fig. 13 Typ. thermistor resistance versus temperature



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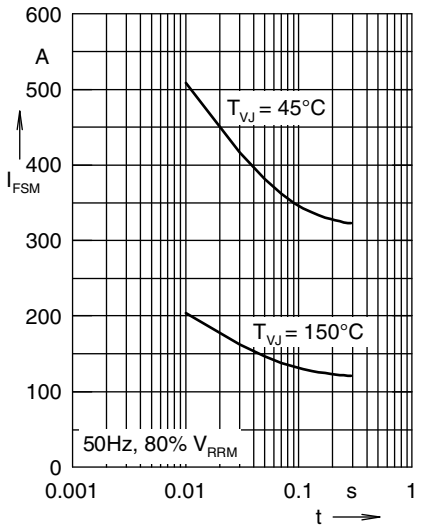

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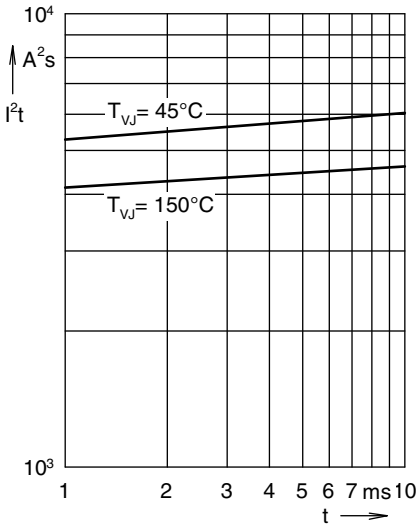

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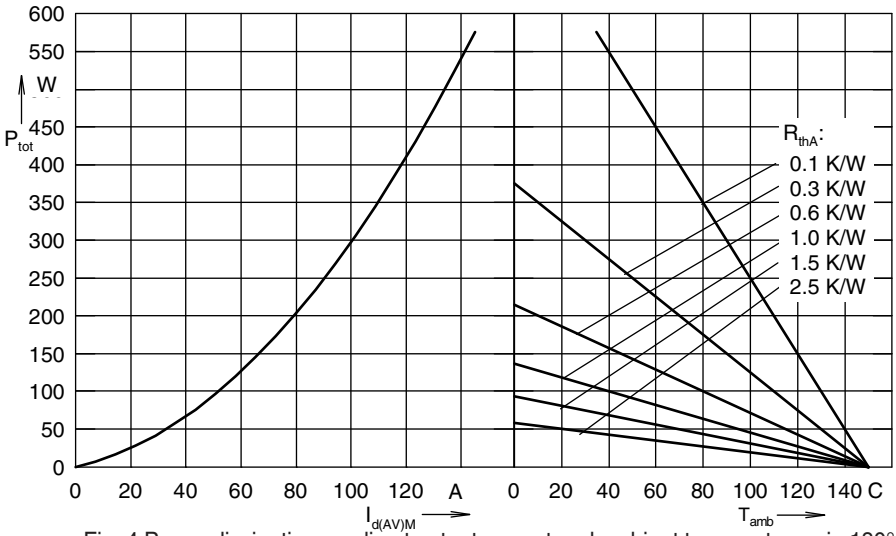
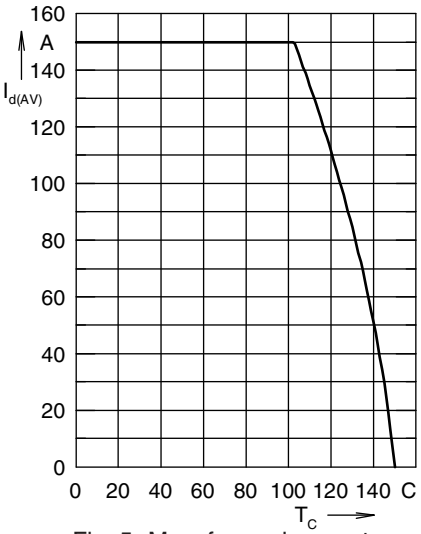


Fig. 4 Power dissipation vs. direct output current and ambient temperature, sin 180°



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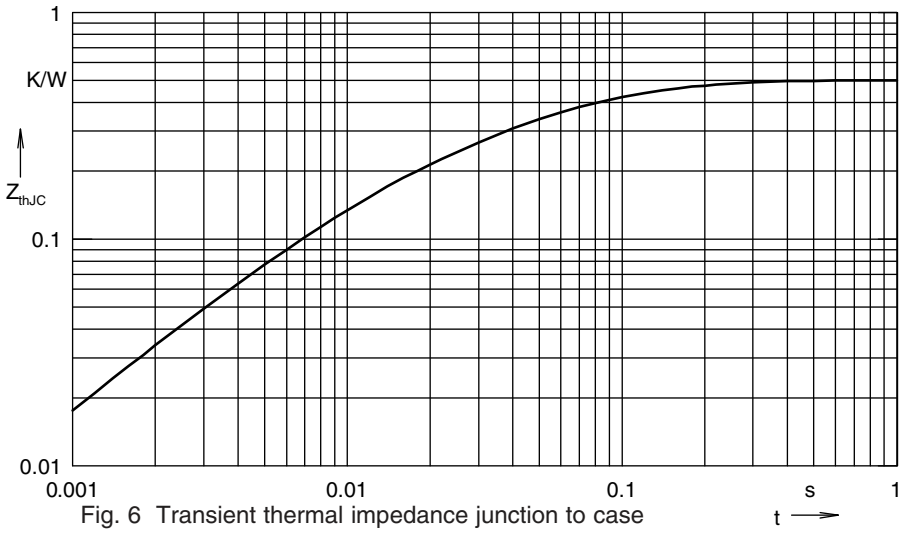

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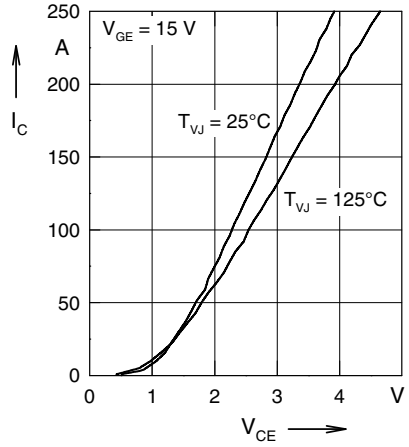
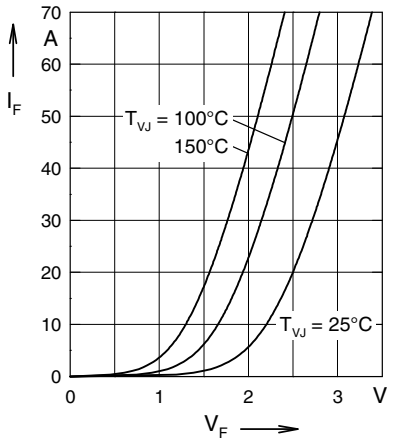


Fig. 7 Typ. output characteristics



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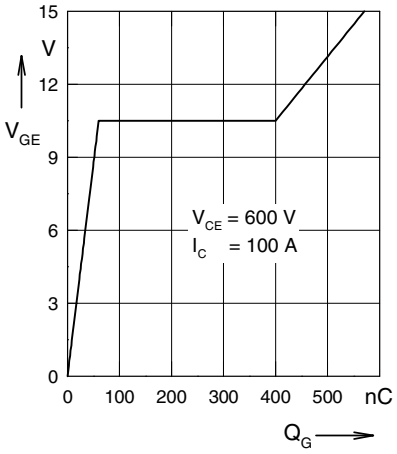

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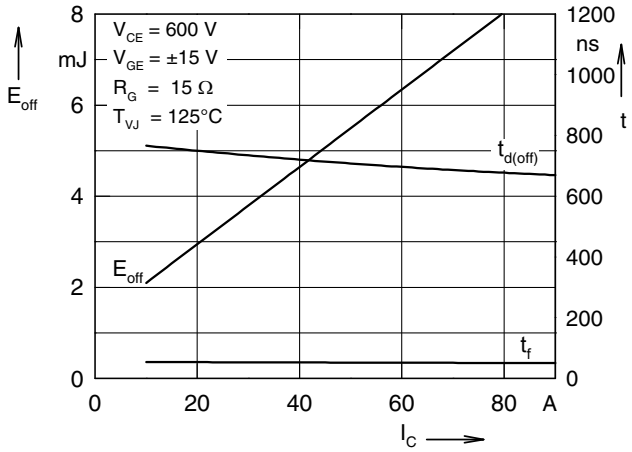

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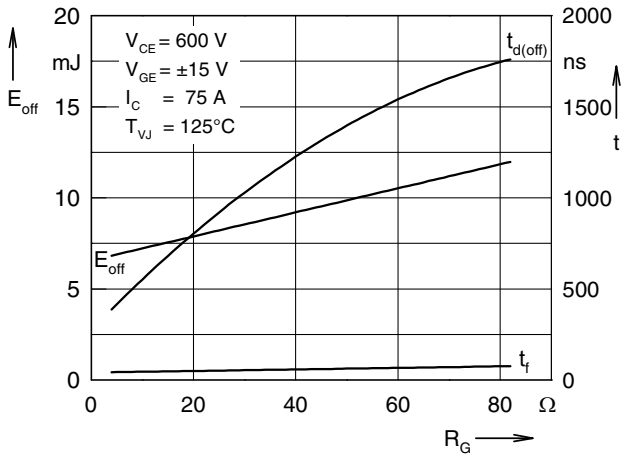

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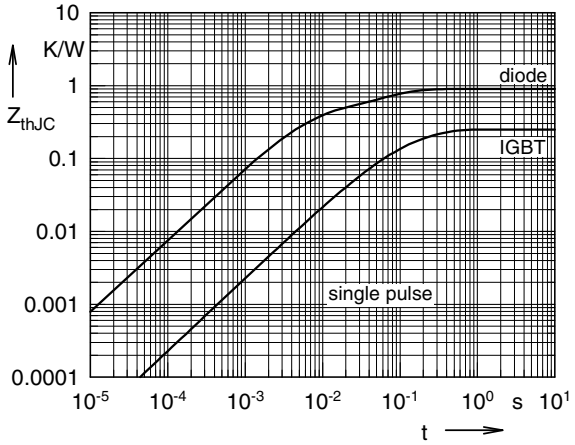

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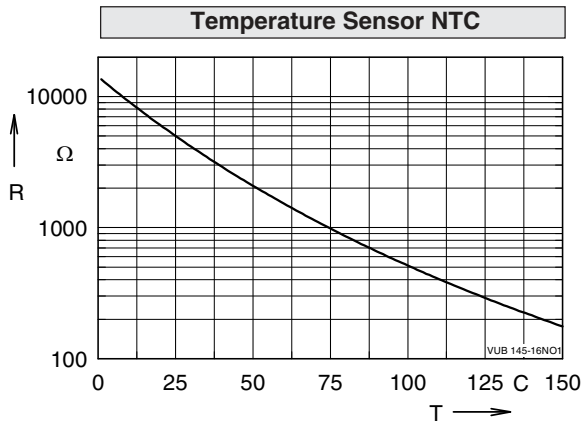

Fig. 13 Typ. thermistor resistance versus temperature