

High Efficiency Thyristor

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

$$I_{TAV} = 30 \text{ A}$$

$$V_T = 1,25 \text{ V}$$

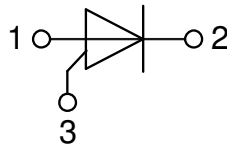
Single Anode Gated Thyristor

Part number

CLB30I1200HB



Backside: cathode



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: TO-247

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

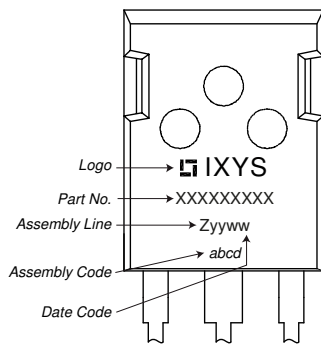
- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Thyristor				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1300	V	
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
I_{RD}	reverse current, drain current	$V_{R/D} = 1200 V$	$T_{VJ} = 25^{\circ}C$		10	μA	
		$V_{R/D} = 1200 V$	$T_{VJ} = 125^{\circ}C$		2	mA	
V_T	forward voltage drop	$I_T = 30 A$	$T_{VJ} = 25^{\circ}C$		1,28	V	
		$I_T = 60 A$			1,56	V	
		$I_T = 30 A$	$T_{VJ} = 125^{\circ}C$		1,25	V	
		$I_T = 60 A$			1,61	V	
I_{TAV}	average forward current	$T_C = 120^{\circ}C$	$T_{VJ} = 150^{\circ}C$		30	A	
$I_{T(RMS)}$	RMS forward current	180° sine			47	A	
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		0,86	V	
r_T	slope resistance				12,5	m Ω	
R_{thJC}	thermal resistance junction to case				0,5	K/W	
R_{thCH}	thermal resistance case to heatsink			0,25		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		250	W	
I_{TSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		300	A	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		325	A	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		255	A	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		275	A	
I^2t	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		450	A ² s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		440	A ² s	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		325	A ² s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		315	A ² s	
C_J	junction capacitance	$V_R = 400 V \quad f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		13	pF	
P_{GM}	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 150^{\circ}C$		10	W	
		$t_p = 300 \mu s$			5	W	
P_{GAV}	average gate power dissipation				0,5	W	
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 150^{\circ}C; f = 50 \text{ Hz}$	repetitive, $I_T = 90 A$		150	A/ μs	
		$t_p = 200 \mu s; di_G/dt = 0,3 A/\mu s;$ $I_G = 0,3 A; V = \frac{2}{3} V_{DRM}$	non-repet., $I_T = 30 A$		500	A/ μs	
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty; \text{ method 1 (linear voltage rise)}$	$T_{VJ} = 150^{\circ}C$		500	V/ μs	
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		1,3	V	
			$T_{VJ} = -40^{\circ}C$		1,6	V	
I_{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		28	mA	
			$T_{VJ} = -40^{\circ}C$		50	mA	
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 150^{\circ}C$		0,2	V	
I_{GD}	gate non-trigger current				1	mA	
I_L	latching current	$t_p = 10 \mu s$	$T_{VJ} = 25^{\circ}C$		90	mA	
		$I_G = 0,3 A; di_G/dt = 0,3 A/\mu s$					
I_H	holding current	$V_D = 6 V \quad R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		60	mA	
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$		2	μs	
		$I_G = 0,3 A; di_G/dt = 0,3 A/\mu s$					
t_q	turn-off time	$V_R = 100 V; I_T = 30 A; V = \frac{2}{3} V_{DRM}$ $di/dt = 10 A/\mu s \quad dv/dt = 20 V/\mu s \quad t_p = 200 \mu s$	$T_{VJ} = 125^{\circ}C$		150	μs	

Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			50	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				6		g
M_D	mounting torque		0,8		1,2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Part description

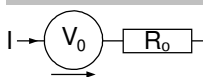
- C = Thyristor (SCR)
- L = High Efficiency Thyristor
- B = Anode gated (up to 1200V)
- 30 = Current Rating [A]
- I = Single Thyristor
- 1200 = Reverse Voltage [V]
- HB = TO-247AD (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CLB30I1200HB	CLB30I1200HB	Tube	30	513220

Equivalent Circuits for Simulation

* on die level

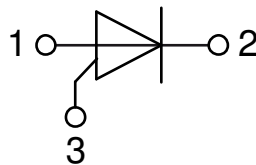
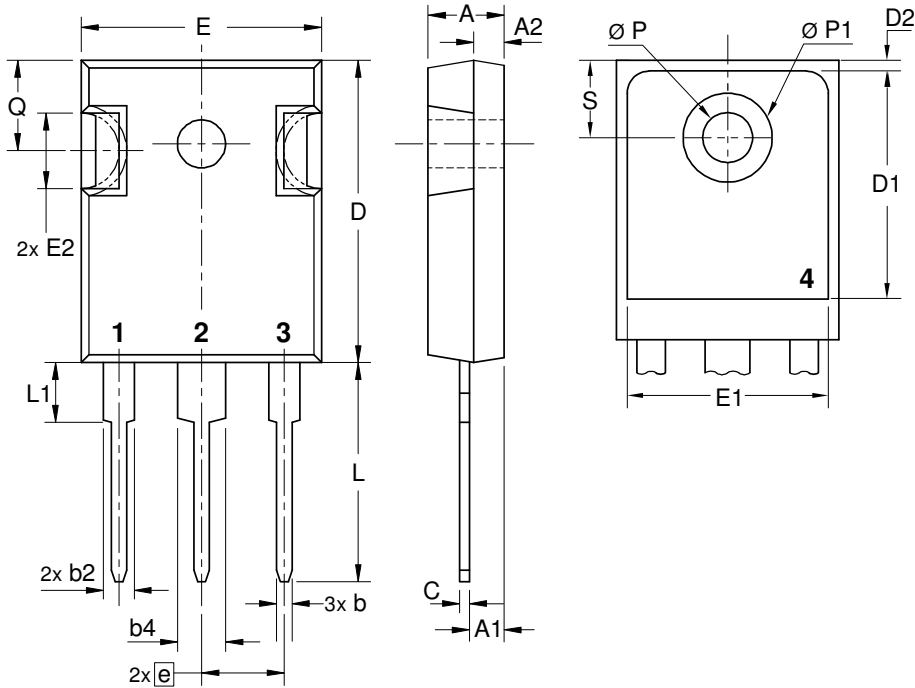
$T_{VJ} = 150\text{ °C}$



Thyristor

$V_{0\ max}$	threshold voltage	0,86	V
$R_{0\ max}$	slope resistance *	10	mΩ

Outlines TO-247



Thyristor

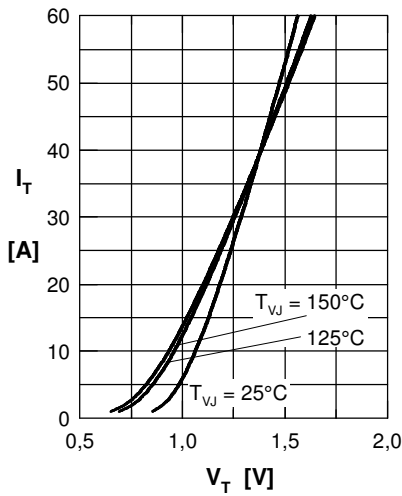


Fig. 1 Forward characteristics

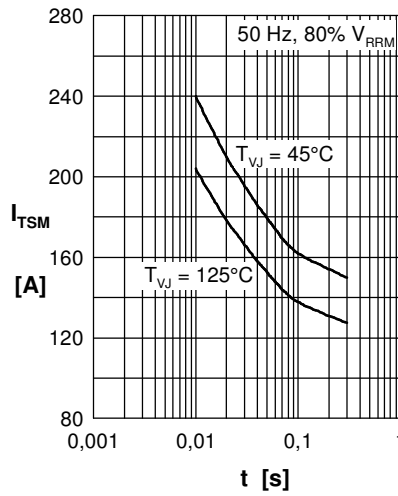


Fig. 2 Surge overload current
 I_{TSM} : crest value, t : duration

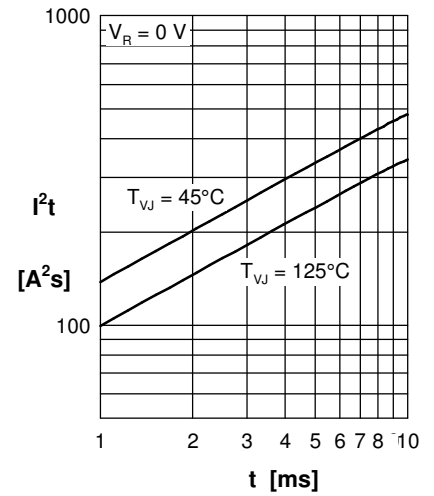


Fig. 3 I^2t versus time (1-10 s)

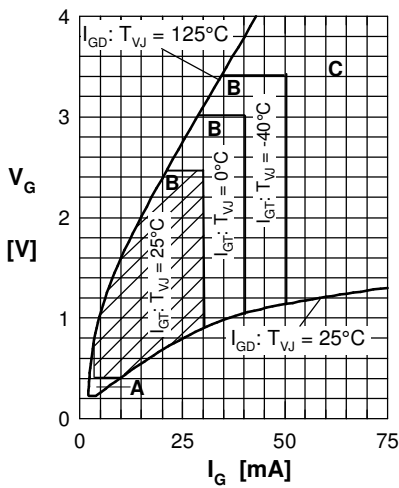


Fig. 4 Gate voltage & gate current
 Triggering: A = no; B = possible; C = safe

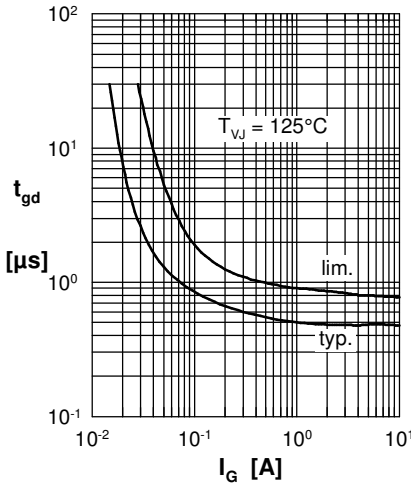


Fig. 5 Gate controlled delay time t_{gd}

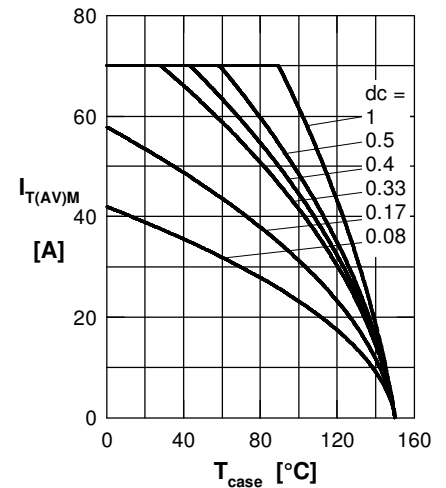


Fig. 6 Max. forward current at case temperature

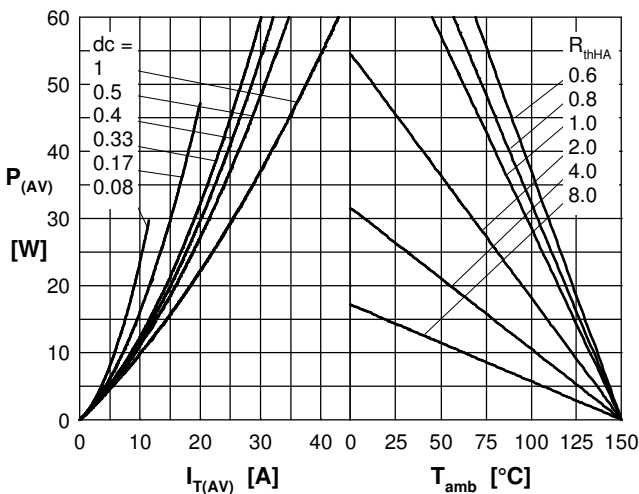


Fig. 7a Power dissipation versus direct output current
 Fig. 7b and ambient temperature

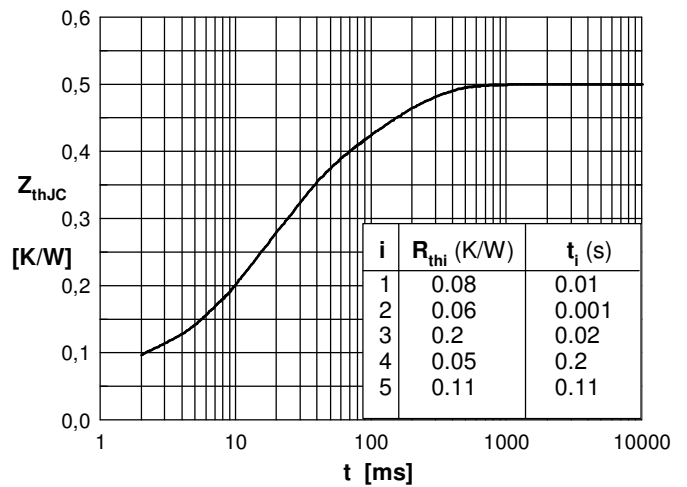


Fig. 7 Transient thermal impedance junction to case

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