# imall

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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832 Email & Skype: info@chipsmall.com Web: www.chipsmall.com Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



### CLA30MT1200NPB

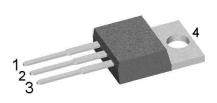
### **High Efficiency Thyristor**

$V_{\text{RRM}}$	=	1200 V
I <sub>tav</sub>	=	15 A
V <sub>T</sub>	=	1.35 V

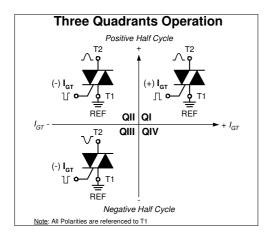
Three Quadrants operation: QI - QIII 1~ Triac

#### Part number

### CLA30MT1200NPB

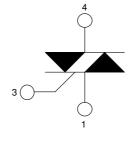






#### Features / Advantages:

- Triac for line frequency
- Three Quadrants Operation - QI - QIII
- Planar passivated chip
- Long-term stability
- of blocking currents and voltages



#### **Applications:**

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

#### Package: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- High creepage distance between terminals

20150827b

#### 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 assertion and applications and principles of the 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.

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

Data according to IEC 60747and per semiconductor unless otherwise specified

## LIXYS

## CLA30MT1200NPB

Rectifier		<b>A</b> 1111			Ratings		
Symbol	Definition	Conditions	T 0500	min.	typ.	max.	Uni
V <sub>RSM/DSM</sub>	max. non-repetitive reverse/forward	0 0	$T_{v_J} = 25^{\circ}C$			1300	```
V <sub>RRM/DRM</sub>	max. repetitive reverse/forward bloc		$T_{VJ} = 25^{\circ}C$			1200	\
R/D	reverse current, drain current	V <sub>R/D</sub> = 1200 V	$T_{VJ} = 25^{\circ}C$			10	μ/
		V <sub>R/D</sub> = 1200 V	$T_{VJ} = 125^{\circ}C$			1.5	m/
V <sub>T</sub>	forward voltage drop	$I_{T} = 15 A$	$T_{vJ} = 25^{\circ}C$			1.35	١
		$I_{T} = 30 \text{ A}$				1.68	١
		$I_{T} = 15 A$	$T_{vJ} = 125 ^{\circ}C$			1.35	١
		$I_{T} = 30 \text{ A}$				1.79	١
I <sub>tav</sub>	average forward current	T <sub>c</sub> = 120°C	$T_{vJ} = 150$ °C			15	1
	RMS forward current per phase	180° sine				33	1
V <sub>T0</sub>	threshold voltage		$T_{VJ} = 150 ^{\circ}\text{C}$			0.89	١
r <sub>T</sub>	slope resistance } for power los	s calculation only				30	m۵
R <sub>thJC</sub>	thermal resistance junction to case					0.95	K/W
<b>R</b> <sub>thCH</sub>	thermal resistance case to heatsink				0.50		K/W
P <sub>tot</sub>	total power dissipation		$T_c = 25^{\circ}C$			130	٧
I <sub>TSM</sub>	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{v,l} = 45^{\circ}C$			170	/
1.5	-	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			185	1
		t = 10 ms; (50 Hz), sine	T <sub>v.i</sub> = 150°C			145	1
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			155	1
l²t	value for fusing	t = 0,0 ms; (50 Hz), sine	$\frac{V_{\rm H}}{T_{\rm VJ}} = 45^{\circ}{\rm C}$			145	A <sup>2</sup>
	value for facing	t = 8,3  ms; (60  Hz),  sine	$V_{\rm R} = 0 V$			140	A <sup>2</sup>
		t = 0.0  ms; (00  Hz),  sine t = 10  ms; (50  Hz),  sine	$T_{V,I} = 150^{\circ}C$			105	A <sup>2</sup>
		t = 8,3  ms; (60  Hz),  sine				100	A-: A <sup>2</sup> :
^	junction capacitance		$\frac{V_{R} = 0 V}{T_{R} = 0 V}$		9	100	
C,		$V_{\rm R} = 400  \text{V}  \text{f} = 1  \text{MHz}$	$T_{\rm VJ} = 25^{\circ}C$		9	F	pl
Р <sub>GM</sub>	max. gate power dissipation	$t_{\rm P} = 30 \mu {\rm s}$	$T_{c} = 150 ^{\circ}C$			5	M
_		t <sub>P</sub> = 300 μs				1	W
P <sub>GAV</sub>	average gate power dissipation					0.2	V
(di/dt) <sub>cr</sub>	critical rate of rise of current	$T_{vJ} = 150 ^{\circ}C; f = 50 \text{Hz}$ re	•			150	A/μ
		$t_{P} = 200 \mu s; di_{G}/dt = 0.3 A/\mu s; -$					
			on-repet., $I_{T} = 15 \text{ A}$			500	A/μ
(dv/dt) <sub>cr</sub>	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{vJ} = 150$ °C			500	V/µ
		$R_{GK} = \infty$ ; method 1 (linear volta	ge rise)				1 1 1
V <sub>GT</sub>	gate trigger voltage	$V_{D} = 6 V$	$T_{vJ} = 25^{\circ}C$			1.3	١
			$T_{vJ} = -40 ^{\circ}\text{C}$			1.6	١
I <sub>GT</sub>	gate trigger current	$V_{D} = 6 V$	$T_{vJ} = 25^{\circ}C$			± 40	m/
			$T_{vJ} = -40 ^{\circ}\text{C}$			± 60	m/
V <sub>gd</sub>	gate non-trigger voltage	$V_{\rm D} = \frac{2}{3} V_{\rm DBM}$	T <sub>vJ</sub> = 150°C			0.2	١
I <sub>GD</sub>	gate non-trigger current	2 2				± 1	m/
<u>u</u>	latching current	t <sub>p</sub> = 10 μs	$T_{vJ} = 25 ^{\circ}C$			70	m/
	Ŭ	$I_{g} = 0.3 \text{ A}; \text{ di}_{g}/\text{dt} = 0.3 \text{ A}/\mu s$				. 3	
I <sub>H</sub>	holding current	$\frac{V_{\rm D}}{V_{\rm D}} = 6  V  R_{\rm GK} = \infty$	T <sub>vJ</sub> = 25°C			50	m/
	gate controlled delay time	$V_{\rm D} = \frac{1}{2} V_{\rm DRM}$	$T_{VJ} = 25 ^{\circ}\text{C}$			2	İ
t <sub>gd</sub>	gaio controlled delay lille					2	μ
	turn off time	$I_{\rm G} = 0.3 \text{A};  \text{di}_{\rm G}/\text{dt} = 0.3 \text{A}/\mu\text{s}$			150		
t <sub>q</sub>	turn-off time	$V_{R} = 100 \text{ V}; I_{T} = 15 \text{ A}; \text{ V} = \frac{2}{3}$	′3 V <sub>DRM</sub> I <sub>VJ</sub> = 125 °C		150		μ

 $\ensuremath{\mathsf{IXYS}}$  reserves the right to change limits, conditions and dimensions.

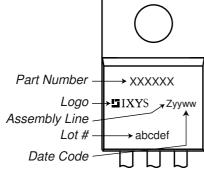
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### CLA30MT1200NPB

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I <sub>RMS</sub>	RMS current	per terminal			35	Α
T <sub>vJ</sub>	virtual junction temperature		-40		150	°C
T <sub>op</sub>	operation temperature		-40		125	°C
T <sub>stg</sub>	storage temperature		-40		150	°C
Weight				2		g
M <sub>D</sub>	mounting torque		0.4		0.6	Nm
F <sub>c</sub>	mounting force with clip		20		60	N





#### Part description

- C = Thyristor (SCR)
- L = High Efficiency Thyristor
- A = (up to 1200V) 30 = Current Rating [A]
- 30 = Current RatMT = 1~ Triac
- 1200 = Reverse Voltage [V]
- N = Three Quadrants operation: QI QIII
- PB = TO-220AB (3)

ſ	Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
	Standard	CLA30MT1200NPB	CLA30MT1200NPB	Tube	50	517031

Similar Part	Package	Voltage class
CLA30MT1200NPZ	TO-263AB (D2Pak) (2HV)	1200

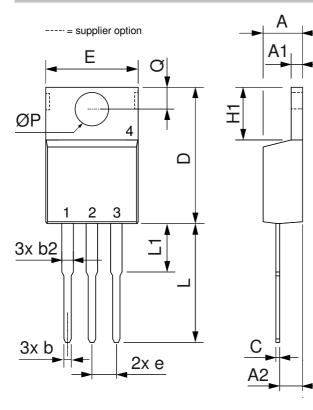
Equiva	alent Circuits for	Simulation	* on die level	T <sub>vj</sub> = 150 °C
	)[R	Thyristor		
V <sub>0 max</sub>	threshold voltage	0.89		V
$\mathbf{R}_{0 \text{ max}}$	slope resistance *	27		mΩ

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

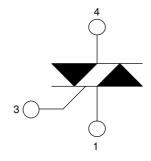
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## CLA30MT1200NPB

### Outlines TO-220



Dim.	Millimeter		Incl	nes
	Min.	Max.	Min.	Max.
Α	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
С	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
е	2.54	BSC	0.100	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



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### CLA30MT1200NPB

125

4 5

3

t [ms]

Fig. 3 I<sup>2</sup>t versus time (1-10 ms)

678910

dc = 1 0.5

0.4 0.33

0.17

0.08

1000

l<sup>2</sup>t

[A<sup>2</sup>s]

1

100

10

40

30

1

50 Hz, 80% V<sub>BB</sub>

= 45°C  $\mathsf{T}_{\mathsf{V},\mathsf{J}}$ 

0,1

t [s]

Fig. 2 Surge overload current

100

I<sub>G</sub> [mA]

1,0

0,8

0,6

0,4

0,2

0,0

<sup>0</sup>10

 $\mathbf{Z}_{\mathrm{thJC}}$ 

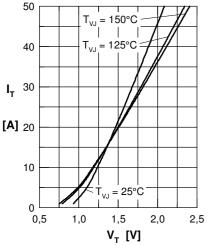
[K/W]

 $V_{R} = 0 V$ 

T = 45°C

2





140

120

100

80

60

1000

100

10

1

10

0,01

 $T_{VJ} = 125^{\circ}C$ 

I<sub>TSM</sub>

[A]

Fig. 1 Forward characteristics

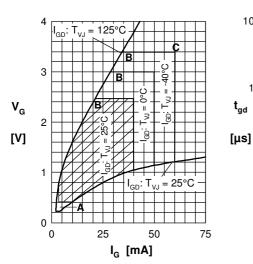


Fig. 4 Gate trigger characteristics

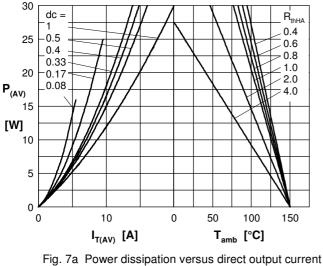
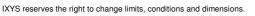
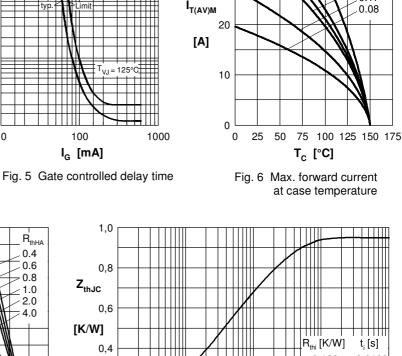


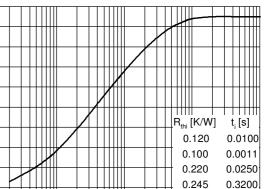
Fig. 7b and ambient temperature



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10<sup>1</sup>





10<sup>2</sup>

t [ms]

0.265

10<sup>3</sup>

0.0900

104

Fig. 8 Transient thermal impedance