

High Efficiency Thyristor

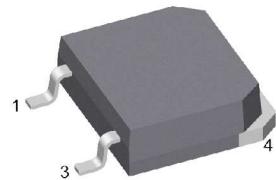
V_{RRM} = 1200 V
 I_{TAV} = 30 A
 V_T = 1.25 V

Three Quadrants operation: QI - QIII
1~ Triac

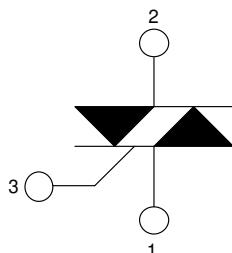
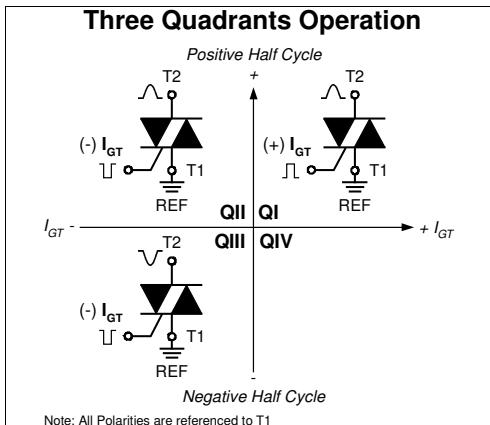
Part number

CLA60MT1200NTZ

Marking on Product: *CLA60MT1200NTZ*



Backside: anode/cathode



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-268AA (D3Pak-HV)

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

Disclaimer Notice

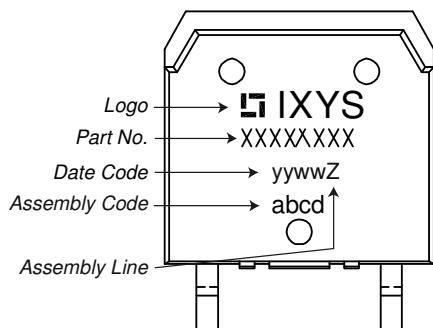
Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

Rectifier

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^\circ\text{C}$			1300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^\circ\text{C}$			1200	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1200 \text{ V}$ $V_{R/D} = 1200 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		10 2	μA mA
V_T	forward voltage drop	$I_T = 30 \text{ A}$	$T_{VJ} = 25^\circ\text{C}$		1.28	V
		$I_T = 60 \text{ A}$			1.56	V
		$I_T = 30 \text{ A}$ $I_T = 60 \text{ A}$	$T_{VJ} = 125^\circ\text{C}$		1.25 1.61	V
I_{TAV}	average forward current	$T_C = 120^\circ\text{C}$	$T_{VJ} = 150^\circ\text{C}$		30	A
I_{RMS}	RMS forward current per phase	180° sine			66	A
V_{T0}	threshold voltage	r_T slope resistance } for power loss calculation only	$T_{VJ} = 150^\circ\text{C}$		0.86	V
	slope resistance				12.5	$\text{m}\Omega$
R_{thJC}	thermal resistance junction to case				0.55	K/W
R_{thCH}	thermal resistance case to heatsink			0.2		K/W
P_{tot}	total power dissipation		$T_C = 25^\circ\text{C}$		230	W
I_{TSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 45^\circ\text{C}$		380	A
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 \text{ V}$		410	A
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 150^\circ\text{C}$		325	A
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 \text{ V}$		350	A
I^2t	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 45^\circ\text{C}$		720	A^2s
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 \text{ V}$		700	A^2s
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}$	$T_{VJ} = 150^\circ\text{C}$		530	A^2s
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{sine}$	$V_R = 0 \text{ V}$		510	A^2s
C_J	junction capacitance	$V_R = 400 \text{ V}$ $f = 1 \text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$	25		pF
P_{GM}	max. gate power dissipation	$t_p = 30 \mu\text{s}$	$T_C = 150^\circ\text{C}$		10	W
		$t_p = 300 \mu\text{s}$			5	W
P_{GAV}	average gate power dissipation				0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 150^\circ\text{C}; f = 50 \text{ Hz}$ repetitive, $I_T = 90 \text{ A}$			150	$\text{A}/\mu\text{s}$
		$t_p = 200 \mu\text{s}; di_G/dt = 0.3 \text{ A}/\mu\text{s};$				
		$I_G = 0.3 \text{ A}; V = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 30 \text{ A}$			500	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{VJ} = 150^\circ\text{C}$		500	$\text{V}/\mu\text{s}$
		$R_{GK} = \infty$; method 1 (linear voltage rise)				
V_{GT}	gate trigger voltage	$V_D = 6 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$		1.7	V
			$T_{VJ} = -40^\circ\text{C}$		1.9	V
I_{GT}	gate trigger current	$V_D = 6 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$		± 60	mA
			$T_{VJ} = -40^\circ\text{C}$		± 80	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 150^\circ\text{C}$		0.2	V
I_{GD}	gate non-trigger current				± 1	mA
I_L	latching current	$t_p = 10 \mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$		90	mA
		$I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$				
I_H	holding current	$V_D = 6 \text{ V}$ $R_{GK} = \infty$	$T_{VJ} = 25^\circ\text{C}$		60	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^\circ\text{C}$		2	μs
		$I_G = 0.3 \text{ A}; di_G/dt = 0.3 \text{ A}/\mu\text{s}$				
t_q	turn-off time	$V_R = 100 \text{ V}; I_T = 30 \text{ A}; V = \frac{2}{3} V_{DRM}$ $T_{VJ} = 125^\circ\text{C}$	$di/dt = 10 \text{ A}/\mu\text{s}$ $dv/dt = 20 \text{ V}/\mu\text{s}$ $t_p = 200 \mu\text{s}$	150		μs

Package TO-268AA (D3Pak-HV)

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
I_{RMS}	RMS current	per terminal			70	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				4		g
F_c	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	9.4			mm
$d_{Spb/Apb}$		terminal to backside	5.6			mm

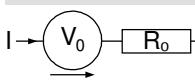
Product Marking

Part description

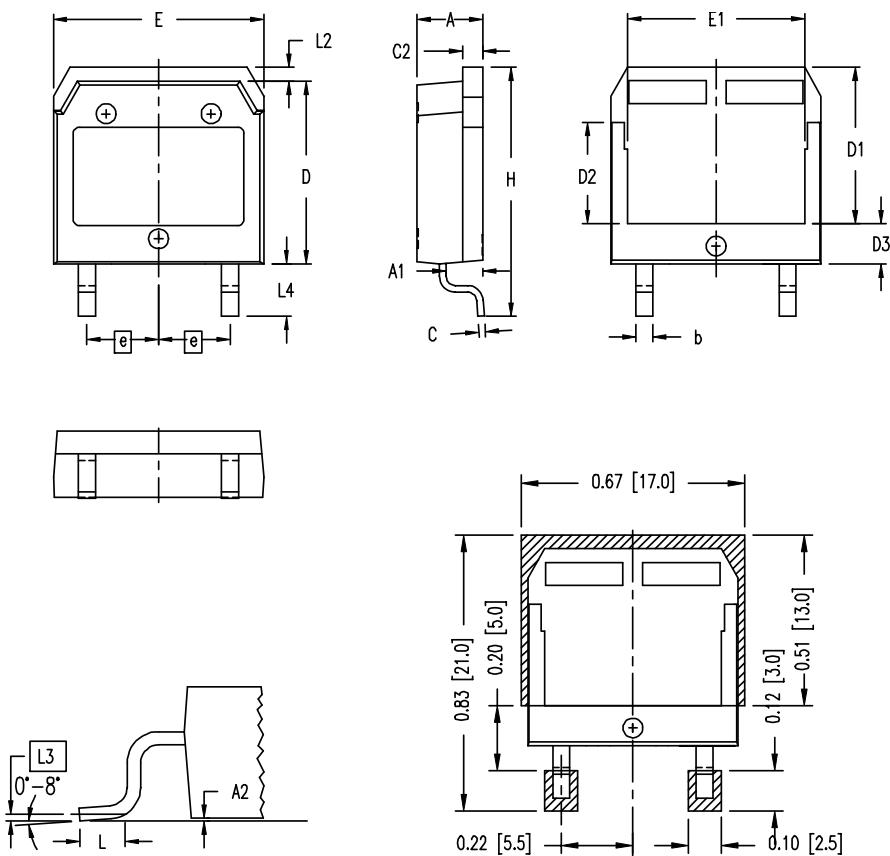
C = Thyristor (SCR)
 L = High Efficiency Thyristor
 A = (up to 1200V)
 60 = Current Rating [A]
 MT = 1~ Triac
 1200 = Reverse Voltage [V]
 N = Three Quadrants operation: QI - QIII
 TZ = TO-268AA (D3Pak) (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CLA60MT1200NTZ-TUB	CLA60MT1200NTZ	Tube	30	512767
Alternative	CLA60MT1200NTZ-TRL	CLA60MT1200NTZ	Tape & Reel	400	525122

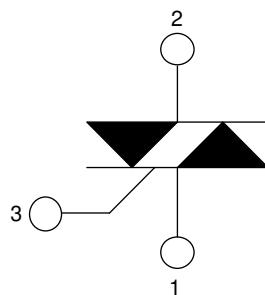
Similar Part	Package	Voltage class
CLA60MT1200NHB	TO-247AD (3)	1200
CLA60MT1200NHR	ISO247 (3)	1200

Equivalent Circuits for Simulation
** on die level*
 $T_{VJ} = 150^\circ\text{C}$

	Thyristor	
V_0		
$V_{0\ max}$	threshold voltage	0.86 V
$R_{0\ max}$	slope resistance *	10 mΩ

Outlines TO-268AA (D3Pak-HV)


Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.010
b	1.15	1.45	0.045	0.057
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	11.80	12.10	0.465	0.476
D2	7.50	7.80	0.295	0.307
D3	2.90	3.20	0.114	0.126
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.450	BSC	0.215	BSC
H	18.70	19.10	0.736	0.752
L	1.70	2.00	0.067	0.079
L2	1.00	1.15	0.039	0.045
L3	0.250	BSC	0.010	BSC
L4	3.80	4.10	0.150	0.161

RECOMMENDED MINIMUM FOOT PRINT


Thyristor

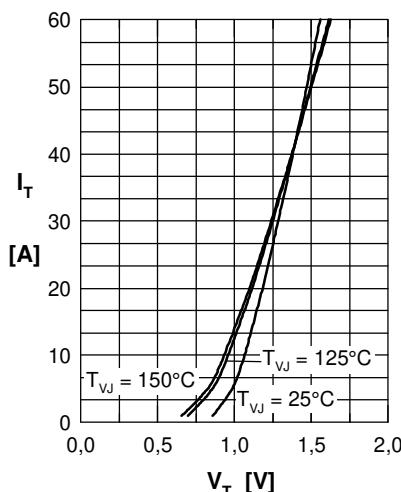


Fig. 1 Forward characteristics

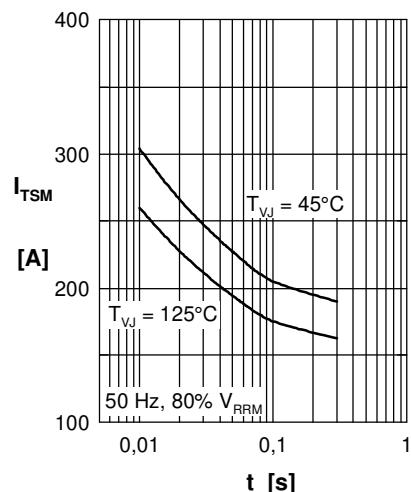


Fig. 2 Surge overload current
 I_{TSM} : crest value, t : duration

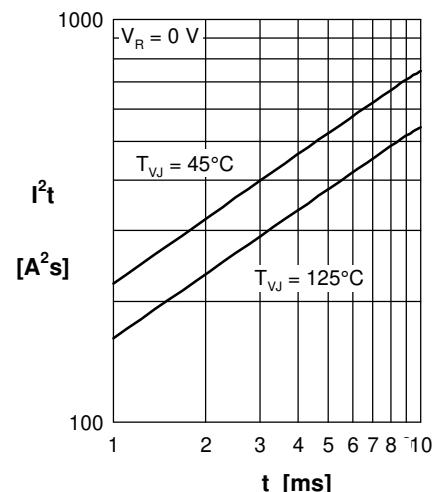


Fig. 3 I^2t versus time (1-10 s)

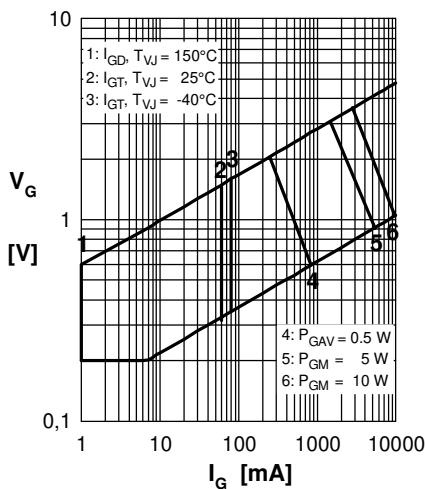


Fig. 4 Gate voltage & gate current

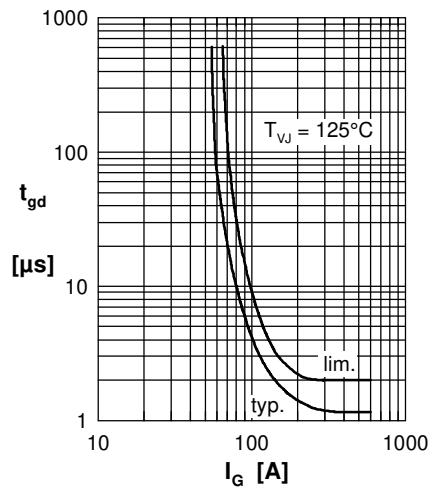


Fig. 5 Gate controlled delay time t_{gd}

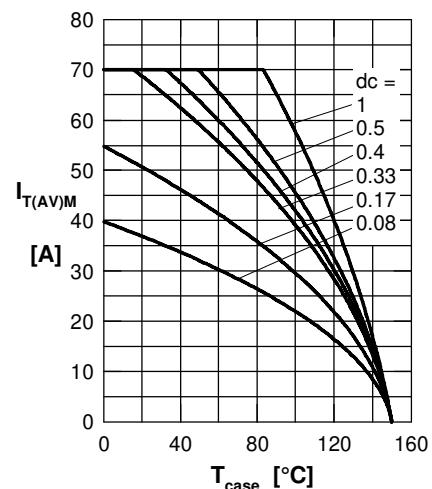


Fig. 6 Max. forward current at case temperature

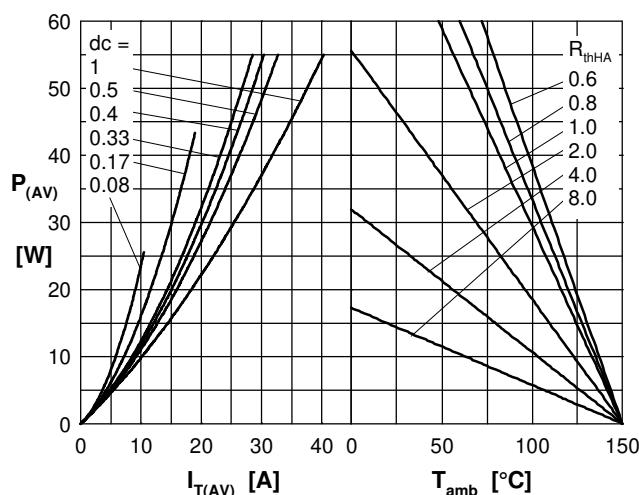


Fig. 7a Power dissipation versus direct output current
Fig. 7b and ambient temperature

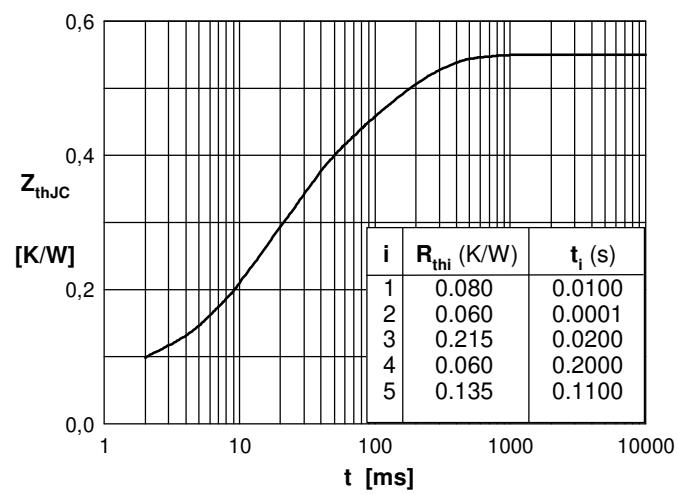


Fig. 7 Transient thermal impedance junction to case

ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибуторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибуторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помочь разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru