

High Efficiency Thyristor

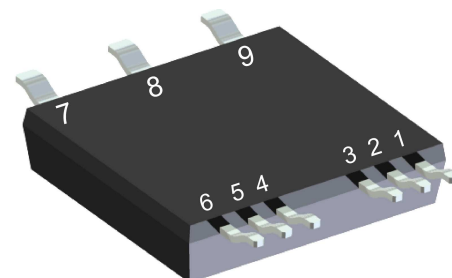
3~ Rectifier	
V_{RRM}	= 1200 V
I_{DAV}	= 90 A
I_{FSM}	= 350 A

SemiFast
 3~ Rectifier Bridge, half-controlled (high-side)

Part number

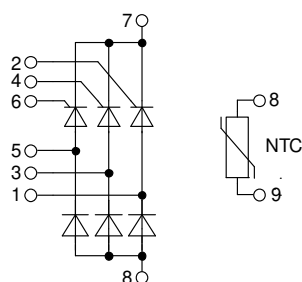
CLE90UH1200TLB

Marking on Product: CLE90UH1200TLB



Backside: isolated

 E72873



Features / Advantages:

- Thyristor for line and moderate frequencies
- Short turn-off time
- Planar passivated chip
- Long-term stability

Applications:

- Line rectifying 50/60 Hz
- Drives
- SMPS
- UPS

Package: SMPD

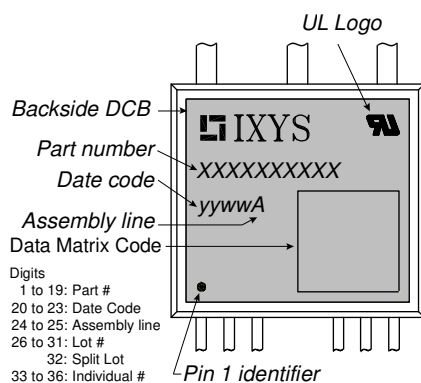
- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM/DSM}	max. non-repetitive reverse/forward blocking voltage	T _{VJ} = 25°C				1200	V
V _{RRM/DRM}	max. repetitive reverse/forward blocking voltage	T _{VJ} = 25°C				1200	V
I _{R/D}	reverse current, drain current	V _{R/D} = 1200 V	T _{VJ} = 25°C			10	μA
		V _{R/D} = 1200 V	T _{VJ} = 125°C			2	mA
V _T	forward voltage drop	I _T = 30 A	T _{VJ} = 25°C			1.30	V
		I _T = 90 A				1.80	V
		I _T = 30 A	T _{VJ} = 125°C			1.28	V
		I _T = 90 A				1.95	V
I _{DAV}	bridge output current	T _C = 90°C 120° sine	T _{VJ} = 150°C			90	A
V _{T0}	threshold voltage	T _{VJ} = 150°C				0.92	V
r _T	slope resistance					13	mΩ
R _{thJC}	thermal resistance junction to case					0.9	K/W
R _{thCH}	thermal resistance case to heatsink				0.40		K/W
P _{tot}	total power dissipation	T _C = 25°C				140	W
I _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	T _{VJ} = 45°C			350	A
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			380	A
		t = 10 ms; (50 Hz), sine	T _{VJ} = 150°C			300	A
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			320	A
I ² t	value for fusing	t = 10 ms; (50 Hz), sine	T _{VJ} = 45°C			615	A ² s
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			600	A ² s
		t = 10 ms; (50 Hz), sine	T _{VJ} = 150°C			450	A ² s
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			425	A ² s
C _J	junction capacitance	V _R = 400 V f = 1 MHz	T _{VJ} = 25°C		13		pF
P _{GM}	max. gate power dissipation	t _p = 30 μs	T _C = 150°C			10	W
		t _p = 300 μs				5	W
P _{GAV}	average gate power dissipation					0.5	W
(di/dt) _{cr}	critical rate of rise of current	T _{VJ} = 150°C; f = 50 Hz repetitive, I _T = 90 A				150	A/μs
		t _p = 200 μs; di _G /dt = 0.3 A/μs; I _G = 0.3 A; V = ⅔ V _{DRM} non-repet., I _T = 30 A				500	A/μs
(dv/dt) _{cr}	critical rate of rise of voltage	V = ⅔ V _{DRM} T _{VJ} = 150°C				500	V/μs
		R _{GK} = ∞; method 1 (linear voltage rise)					
V _{GT}	gate trigger voltage	V _D = 6 V	T _{VJ} = 25°C			1.4	V
			T _{VJ} = -40°C			1.7	V
I _{GT}	gate trigger current	V _D = 6 V	T _{VJ} = 25°C			30	mA
			T _{VJ} = -40°C			50	mA
V _{GD}	gate non-trigger voltage	V _D = ⅔ V _{DRM}	T _{VJ} = 150°C			0.2	V
I _{GD}	gate non-trigger current					1	mA
I _L	latching current	t _p = 10 μs	T _{VJ} = 25°C			90	mA
		I _G = 0.3 A; di _G /dt = 0.3 A/μs					
I _H	holding current	V _D = 6 V R _{GK} = ∞	T _{VJ} = 25°C			60	mA
t _{gd}	gate controlled delay time	V _D = ½ V _{DRM}	T _{VJ} = 25°C			2	μs
		I _G = 0.3 A; di _G /dt = 0.3 A/μs					
t _q	turn-off time	V _R = 100 V; I _T = 30 A; V = ⅔ V _{DRM} T _{VJ} = 125 °C di/dt = 10 A/μs dv/dt = 20 V/μs t _p = 200 μs			50		μs

Package SMPD				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal				100	A
T _{VJ}	virtual junction temperature			-55		150	°C
T _{op}	operation temperature			-55		125	°C
T _{stg}	storage temperature			-55		150	°C
Weight					8.5		g
F _C	mounting force with clip			40		130	N
d _{Spp/App}	creepage distance on surface striking distance through air	terminal to terminal		1.6			mm
d _{Spb/Apb}		terminal to backside		4.0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA	3000			V
		t = 1 minute		2500			V



Part description

C = Thyristor (SCR)
 L = High Efficiency Thyristor
 E = Semifast (up to 1200V)
 90 = Current Rating [A]
 UH = 3~ Rectifier Bridge, half-controlled (high-side)
 1200 = Reverse Voltage [V]
 T = Thermistor \ Temperature sensor
 LB = SMPD-B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CLE90UH1200TLB-TUB	CLE90UH1200TLB	Tube	20	517456
Alternative	CLE90UH1200TLB-TRR	CLE90UH1200TLB	Tape & Reel	200	517463

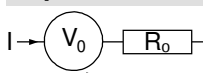
Temperature Sensor NTC

Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_{VJ} = 25^\circ$	4.75	5	5.25	k Ω
$B_{25/50}$	temperature coefficient			3375		K

Equivalent Circuits for Simulation

* on die level

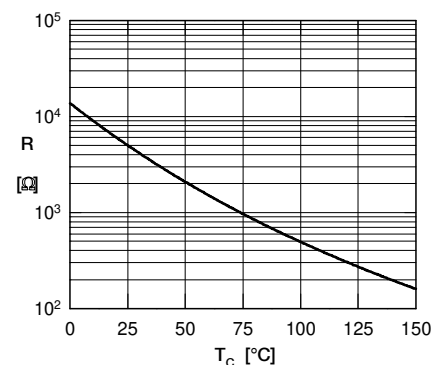
$T_{VJ} = 150^\circ\text{C}$

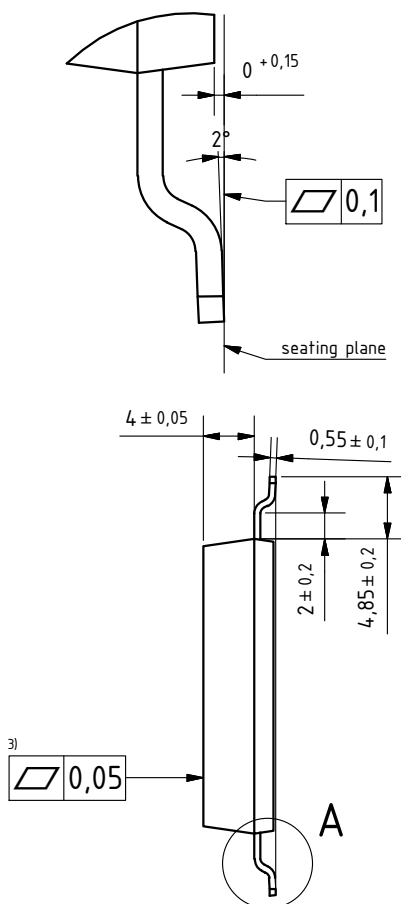
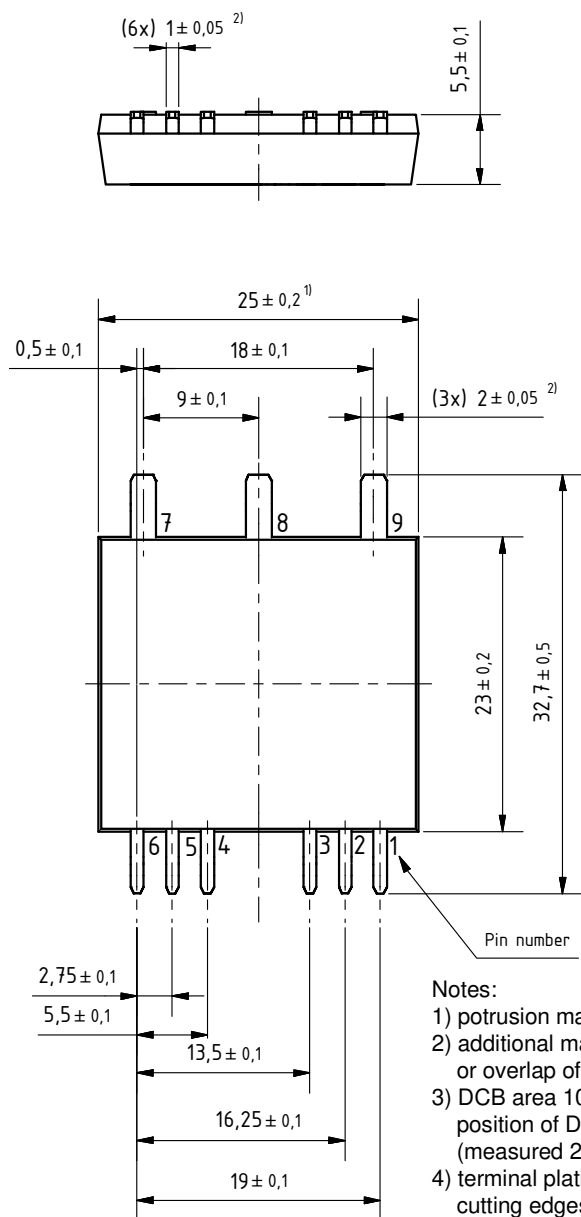


Thyristor

$V_{0\max}$ threshold voltage 0.92 V

$R_{0\max}$ slope resistance * 10.5 m Ω



Outlines SMPD
A (8 : 1)

Notes:

- 1) potrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignement or overlap of dam bar or bending compression
- 3) DCB area 10 to 50 μm convex;
position of DCB area in relation to plastic rim: $\pm 25 \mu\text{m}$
(measured 2 mm from Cu rim)
- 4) terminal plating: 0.2 - 1 μm Ni + 10 - 25 μm Sn (gal v.)
cutting edges may be partially free of plating

