



advanced

High Efficiency Thyristor

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

$$I_{TAV} = 20\text{ A}$$

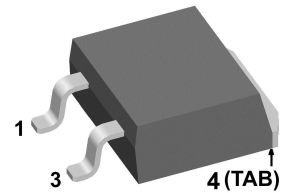
$$V_T = 1.4\text{ V}$$

Triode
Single Reverse Conducting Thyristor

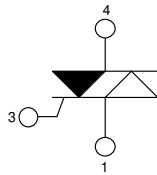
Part number

CLA20EF1200PZ

Marking on Product: CLA20EF1200PZ



Backside: anode



Features / Advantages:

- Thyristor for fast turn-on switching
- Integrated free wheeling diode
- Planar passivated chip
- Long-term stability

Applications:

- Ignition for HD lamps
- Capacity discharge

Package: TO-263 (D2Pak-HV)

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

Disclaimer Notice

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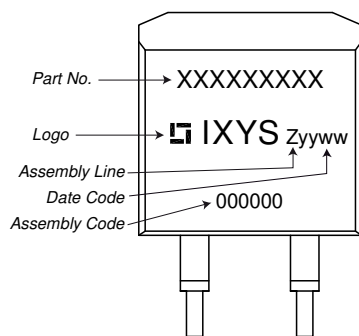


Thyristor				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{DSM}	max. non-repetitive forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1300	V	
V_{DRM}	max. repetitive forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
I_D	drain current	$V_D = 1200 V$	$T_{VJ} = 25^{\circ}C$		10	μA	
		$V_D = 1200 V$	$T_{VJ} = 125^{\circ}C$		1	mA	
V_T	forward voltage drop Note: reverse voltage drop $\sim 1.2 \times VT$	$I_T = 20 A$	$T_{VJ} = 25^{\circ}C$		1.40	V	
		$I_T = 40 A$			1.60	V	
		$I_T = 20 A$	$T_{VJ} = 125^{\circ}C$		1.40	V	
		$I_T = 40 A$			1.60	V	
I_{TAV}	average forward current	$T_C = 115^{\circ}C$ DC	$T_{VJ} = 150^{\circ}C$		20	A	
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		0.90	V	
r_T	slope resistance				25	m Ω	
R_{thJC}	thermal resistance junction to case				0.65	K/W	
R_{thCH}	thermal resistance case to heatsink			0.25		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		190	W	
I_{TSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		120	A	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		130	A	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		100	A	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		110	A	
I^2t	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		72	A ² s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		70	A ² s	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		50	A ² s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		50	A ² s	
C_J	junction capacitance	$V_R = 400 V \quad f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		6	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, $I_T = 60 A$			500	A/ μs	
		$t_p = 1 \mu s; di_G/dt = 0.5 A/\mu s; I_{TSA} = 600 A$ $I_G = 0.07 A; V = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 20 A$			1500	A/ μs	
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty$; 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	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		20	mA	
			$T_{VJ} = -40^{\circ}C$		35	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	$t_p = 10 \mu s$	$T_{VJ} = 25^{\circ}C$		30	mA	
		$I_G = 0.07 A; di_G/dt = 0.5 A/\mu s$					
I_H	holding current	$V_D = 6 V \quad R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		25	mA	
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$		2	μs	
		$I_G = 0.07 A; di_G/dt = 0.5 A/\mu s$					
t_q	turn-off time	$V_R = 0 V; I_T = 20 A; V = \frac{2}{3} V_{DRM}$ $di/dt = 10 A/\mu s \quad dv/dt = 20 V/\mu s \quad t_p = 200 \mu s$	$T_{VJ} = 125^{\circ}C$		150	μs	



Package TO-263 (D2Pak-HV)		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				1.5		g
F_C	mounting force with clip		20		60	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	4.2			mm
$d_{Spb/Apb}$		terminal to backside	4.7			mm

Product Marking



Part description

- C = Thyristor (SCR)
- L = High Efficiency Thyristor
- A = (up to 1200V)
- 20 = Current Rating [A]
- EF = Single Reverse Conducting Thyristor
- 1200 = Reverse Voltage [V]
- PZ = TO-263AB (D2Pak) (2HV)

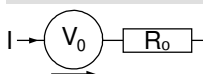
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CLA20EF1200PZ-TRL	CLA20EF1200PZ	Tape & Reel	800	522555
Alternative	CLA20EF1200PZ-TUB	CLA20EF1200PZ	Tube	50	523762

Similar Part	Package	Voltage class
CLA20EF1200PB	TO-220AB (3)	1200

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150\text{ °C}$

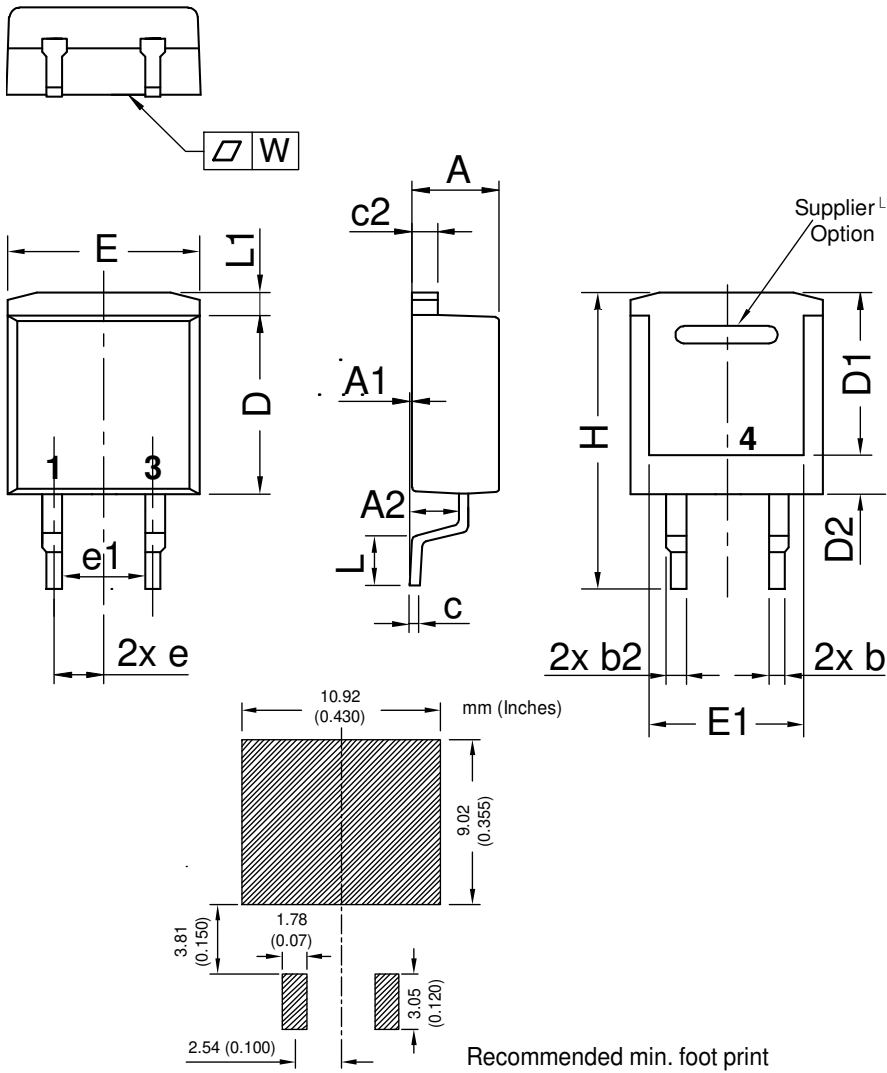


Thyristor

$V_{0\ max}$	threshold voltage	0.9	V
$R_{0\ max}$	slope resistance *	22	mΩ

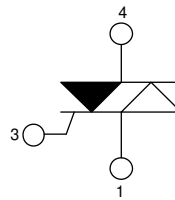


Outlines TO-263 (D2Pak-HV)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	8.50	0.245	0.335
e	2,54 BSC		0,100 BSC	
e1	4.28		0.169	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	1.02	1.68	0.040	0.066
W	typ. 0.02	0.040	typ. 0.0008	0.002

All dimensions conform with and/or within JEDEC standard.





Thyristor