

High Efficiency Thyristor

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

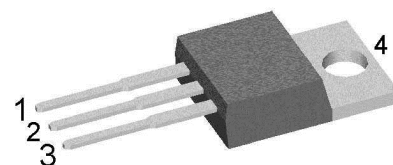
$$I_{TAV} = 20\text{ A}$$

$$V_T = 1.9\text{ V}$$

Fast
Single Thyristor

Part number

CLF20E1200PB



Backside: Terminal 2



Features / Advantages:

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

Applications:

- Softstart AC motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: TO-220

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

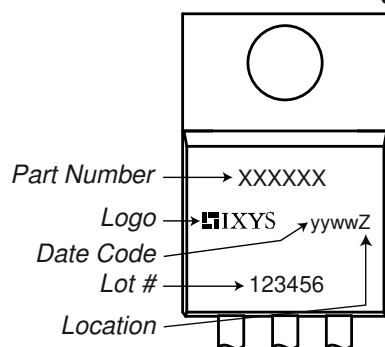
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM/DSM}	max. non-repetitive reverse/forward blocking voltage	T _{VJ} = 25°C				1200	V
V _{RRM/DRM}	max. repetitive reverse/forward blocking voltage	T _{VJ} = 25°C				1200	V
I _{R/D}	reverse current, drain current	V _{R/D} = 1200 V	T _{VJ} = 25°C			100	μA
		V _{R/D} = 1200 V	T _{VJ} = 125°C			0.5	mA
V _T	forward voltage drop	I _T = 20 A	T _{VJ} = 25°C			1.90	V
		I _T = 40 A				2.50	V
		I _T = 20 A	T _{VJ} = 125°C			1.90	V
		I _T = 40 A				2.68	V
I _{TAV}	average forward current	T _C = 85°C	T _{VJ} = 150°C			20	A
I _{T(RMS)}	RMS forward current	180° sine				31	A
V _{T0}	threshold voltage	for power loss calculation only		T _{VJ} = 150°C		1.07	V
r _T	slope resistance					42	mΩ
R _{thJC}	thermal resistance junction to case					1	K/W
R _{thCH}	thermal resistance case to heatsink				0.5		K/W
P _{tot}	total power dissipation	T _C = 25°C				125	W
I _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	T _{VJ} = 45°C			160	A
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			175	A
		t = 10 ms; (50 Hz), sine	T _{VJ} = 150°C			135	A
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			145	A
I ² t	value for fusing	t = 10 ms; (50 Hz), sine	T _{VJ} = 45°C			130	A ² s
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			125	A ² s
		t = 10 ms; (50 Hz), sine	T _{VJ} = 150°C			91	A ² s
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			87	A ² s
C _J	junction capacitance	V _R = 400 V f = 1 MHz	T _{VJ} = 25°C		2		pF
P _{GM}	max. gate power dissipation	t _p = 30 μs	T _C = 150°C			5	W
		t _p = 300 μs				2.5	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 = 60 A				100	A/μs
		t _p = 200 μs; di _G /dt = 0.15 A/μs; I _G = 0.15 A; V = ⅔ V _{DRM} non-repet., I _T = 20 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			1.5	V
			T _{VJ} = -40°C			2	V
I _{GT}	gate trigger current	V _D = 6 V	T _{VJ} = 25°C			40	mA
			T _{VJ} = -40°C			55	mA
V _{GD}	gate non-trigger voltage	V _D = ⅔ V _{DRM}	T _{VJ} = 70°C			0.2	V
I _{GD}	gate non-trigger current					3	mA
I _L	latching current	t _p = 10 μs	T _{VJ} = 25°C			150	mA
		I _G = 0.1 A; di _G /dt = 0.1 A/μs					
I _H	holding current	V _D = 6 V R _{GK} = ∞	T _{VJ} = 25°C			70	mA
t _{gd}	gate controlled delay time	V _D = ½ V _{DRM}	T _{VJ} = 25°C			2	μs
		I _G = 0.1 A; di _G /dt = 0.1 A/μs					
t _q	turn-off time	V _R = 10 V; I _T = 20 A; V = ⅔ V _{DRM} T _{VJ} = 125 °C di/dt = 20 A/μs dv/dt = 20 V/μs t _p = 300 μs			80		μs

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-55		150	°C
T_{op}	operation temperature		-55		125	°C
T_{stg}	storage temperature		-55		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking



Part description

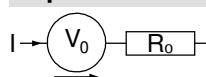
C = Thyristor (SCR)
 L = High Efficiency Thyristor
 F = Fast (up to 1200V)
 20 = Current Rating [A]
 E = Single Thyristor
 1200 = Reverse Voltage [V]
 PB = TO-220AB (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CLF20E1200PB	CLF20E1200PB	Tube	50	512710

Equivalent Circuits for Simulation

* on die level

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



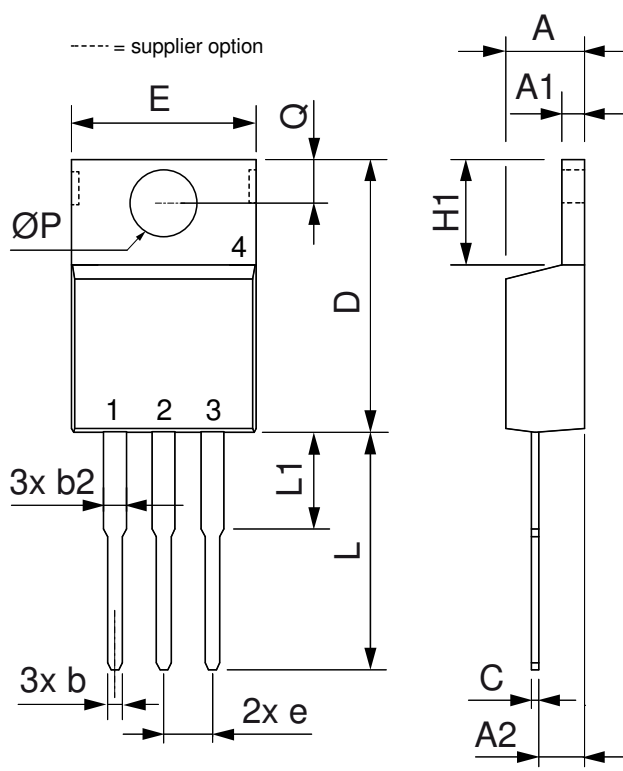
Thyristor

$V_{0\max}$ threshold voltage 1.07

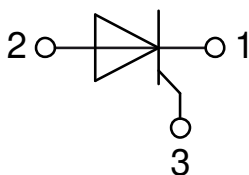
$R_{0\max}$ slope resistance *

V

mΩ

Outlines TO-220


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	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
C	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
e	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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