

High Voltage Thyristor

preliminary

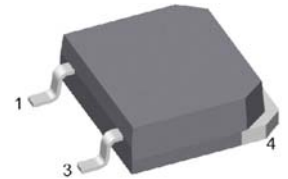
$$V_{RRM} = 2500 \text{ V}$$

$$I_{TAV} = 18 \text{ A}$$

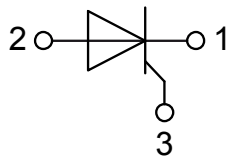
$$V_T = \text{V}$$

Single Thyristor

Part number

CS20-25moT1


Backside: anode



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

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

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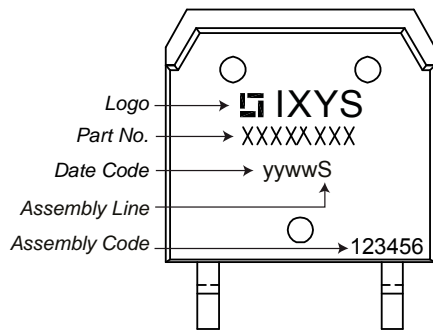
Thyristor				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1650	V	
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			2500	V	
I_{RD}	reverse current, drain current	$V_{R/D} = 2500 V$	$T_{VJ} = 25^{\circ}C$		50	μA	
		$V_{R/D} = 2500 V$	$T_{VJ} = 70^{\circ}C$		0,2	mA	
V_T	forward voltage drop	$I_T = 45 A$	$T_{VJ} = 25^{\circ}C$		3,00	V	
		$I_T = 90 A$				V	
		$I_T = 45 A$	$T_{VJ} = 125^{\circ}C$			V	
		$I_T = 90 A$				V	
I_{TAV}	average forward current	$T_C = 95^{\circ}C$	$T_{VJ} = 125^{\circ}C$		18	A	
$I_{T(RMS)}$	RMS forward current	180° sine			30	A	
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 125^{\circ}C$			V	
r_T	slope resistance					m Ω	
R_{thJC}	thermal resistance junction to case				0,8	K/W	
R_{thCH}	thermal resistance case to heatsink			0,15		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$			W	
I_{TSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		200	A	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		215	A	
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 125^{\circ}C$		170	A	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		185	A	
I^2t	value for fusing	$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 45^{\circ}C$		200	A ² s	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		190	A ² s	
		$t = 10 ms; (50 Hz), sine$	$T_{VJ} = 125^{\circ}C$		145	A ² s	
		$t = 8,3 ms; (60 Hz), sine$	$V_R = 0 V$		140	A ² s	
C_J	junction capacitance	$V_R = 700 V \quad f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		8	pF	
P_{GM}	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 125^{\circ}C$			W	
		$t_p = \mu s$				W	
P_{GAV}	average gate power dissipation					W	
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125^{\circ}C; f = 50 Hz$ repetitive, $I_T = 40 A$			100	A/ μs	
		$t_p = 200 \mu s; di_G/dt = 0,45 A/\mu s;$ $I_G = 0,45 A; V_D = \frac{2}{3} V_{DRM}$ non-repet., $I_T = 45 A$			150	A/ μs	
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V_D = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty; \text{method 1 (linear voltage rise)}$	$T_{VJ} = 125^{\circ}C$		5000	V/ μs	
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		2,5	V	
			$T_{VJ} = -40^{\circ}C$			V	
I_{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		250	mA	
			$T_{VJ} = -40^{\circ}C$			mA	
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 25^{\circ}C$		0,2	V	
I_{GD}	gate non-trigger current				5	mA	
I_L	latching current	$t_p = 10 \mu s$	$T_{VJ} = 25^{\circ}C$		700	mA	
		$I_G = 0,45 A; di_G/dt = 0,45 A/\mu s$					
I_H	holding current	$V_D = 6 V \quad R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		300	mA	
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$			μs	
		$I_G = A; di_G/dt = A/\mu s$					
t_q	turn-off time	$V_R = 10 V; I_T = 20 A; V_D = \frac{2}{3} V_{DRM}$ $di/dt = +01 A/\mu s \quad dv/dt = 20 V/\mu s \quad t_p = \mu s$	$T_{VJ} = 100^{\circ}C$		100	μs	



preliminary

Package TO-268AA (D3Pak-HV)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			70	A
T_{VJ}	virtual junction temperature		-40		125	°C
T_{op}	operation temperature		-40		100	°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

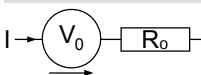
- C = Thyristor (SCR)
- N = High Voltage Thyristor
- A = (>= 2000V)
- 20 = Current Rating [A]
- E = Single Thyristor
- 2500 = Reverse Voltage [V]
- TZ = TO-268AA (D3Pak) (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard					

Equivalent Circuits for Simulation

* on die level

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



$V_{0\ max}$ threshold voltage

V

$R_{0\ max}$ slope resistance *

mΩ