DISC TYPE THYRISTOR

400A

Features

- Center amplifying gate
- Metal case with ceramic insulator
- tested according to IEC standards

Typical Applications

- DC motor controls
- Controlled DC power supplies
- AC controllers

Major Ratings and Characteristics

Parameters		T400A 1K8V	Units
$I_{T(AV)}$		400	A
		65	°C
$I_{T(RMS)}$		640	A
	@ T_{hs}	25	°C
I_{TSM}	@ 50Hz	7850	A
	@ 60Hz	8220	A
I^2t	@ 50Hz	308	KA^2s
	@ 60Hz	281	KA^2s
V_{DRM} /V_{RRM}		1800	V
Tq	typical	200	µs
T_J	range	- 40 to 125	°C

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM}, maximum repetitive peak reverse voltage V	V_{RSM}, maximum non-repetitive peak rev. voltage V	I_{RRM} max. @ T_J = 125℃ mA
T400A	10	1000	1100	20
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	

On-state Conduction

Parameter		T400A	Units	Conditions		
$I_{T(AV)}$	Maximum average on-state current	400	A	180° conduction, half sine wave		
	@ Heatsink temperature	65	°C	Double side(single side)cooled		
$I_{(RMS)}$	Maximum RMS on-state current	640	A	DC@ 25°C heatsink temperature double side cooled		
I_{TSM},	Maximum peak, one-cycle non-repetitive surge current	7850	A	t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial T = T max.
		8220		t = 8.3ms		
		6600		t = 10ms	100% V_{RRM} reapplied	
		6900		t = 8.3ms		
I^2t	Maximum I^2t for fusing	308	KA^2s	t = 10ms	No voltage reapplied	
		281		t = 8.3ms		
		218		t = 10ms	100% V_{RRM} reapplied	
		200		t = 8.3ms		
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	3080	$KA^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied		
V_{TM}	Maximum on-state or forward	1.36	V	I_{pk} = 1050A, T_J = 125°C, t p = 10ms sine pulse		
I_H	Maximum holding current	600	mA	T_J = 25°C, anode supply 12V resistive load		
I_L	Typical latching current	1000				

Switching

	Parameter	T400A	Units	Conditions
di/dt	Maximum non repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, $t_r \leq$ 1μs T_J = T_J max, anode voltage ≤ 80% V_{DRM}
t_d	Typical delay time	1.0	μs	Gate current 1A, di_g/dt = 1A/μs V_d = 0.67% V_{DRM}, T_J = 25°C
Tq	Typical turn-off time	200	A/μs	I_{TM} = 300A, T_J = T_J max, di/dt = 20A/μs, V_R = 50V dv/dt = 20V/μs, Gate 0V 100Ω, t_p = 500μs

Blocking

	Parameter	T400A	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/µs	T_J = T_J max linear to 80% rated V_{DRM}
I_{DRM} I_{RRM}	Max. peak reverse and off-state leakage current	30	mA	T_J = T_J max, rated V_{DRM}/V_{RRM} applied

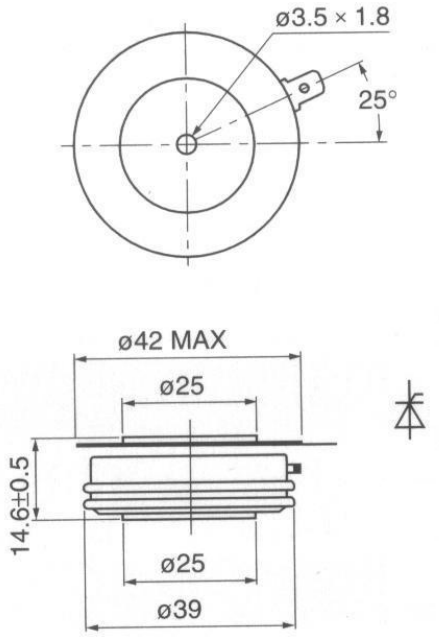
Triggering

	Parameter	T400A		Units	Conditions	
P_{GM}	Maximum peak gate power	10		W	T_J = T_J max, $t_p \leq$ 5ms	
$P_{G(AV)}$	Maximum average gate power	2.0			T_J = T_J max, f = 50Hz, d% = 50	
I_{GM}	Max. peak positive gate current	3.0		A	T_J = T_J max, $t_p \leq$ 5ms	
+V_{GM}	Maximum peak positive gate voltage	20		V	T_J = T_J max, $t_p \leq$ 5ms	
-V_{GM}	Maximum peak negative gate voltage	5.0				
I_{GT}	DC gate current required to trigger	TYP.	MAX.	mA		
		180	-		T_J =- 40°C	Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
		90	150		T_J = 25°C	
		40	-		T_J = 125°C	
V_{GT}	DC gate voltage required to trigger	2.9	-	V	T_J =- 40°C	
		1.8	30		T_J = 25°C	
		1.2	-		T_J = 125°C	
I_{GD}	DC gate current not to trigger	10		mA	T_J = T_J max	Max. gate current/ voltage not to trigger is the max. value which will not trigger any unit with rated V anode-to-cathode applied
V_{GD}	DC gate voltage not to trigger	0.30		V		

Thermal and Mechanical Specification

	Parameter	T400A	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	°C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJC}	Max. thermal resistance, junction to case	0.17	K/W	DC operation
		0.08		
R_{thCS}	Max. thermal resistance, case to heatsink	0.033		Mounting surface, smooth, flat and greased
		0.017		
T	Mounting torque, ± 10%	4900 (500)		
wt	Approximate weight	150	g	

Outline Table



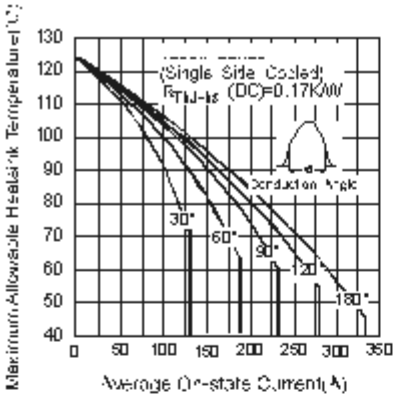


Fig.1 Current Ratings Characteristics

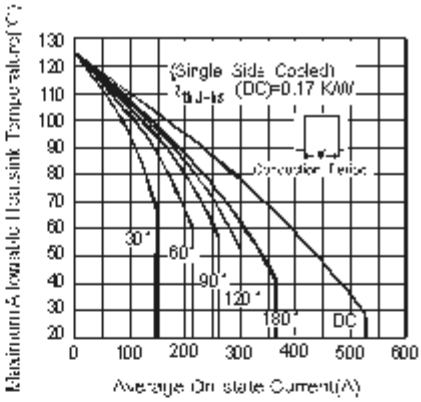


Fig.2-Current Ratings Characteristics

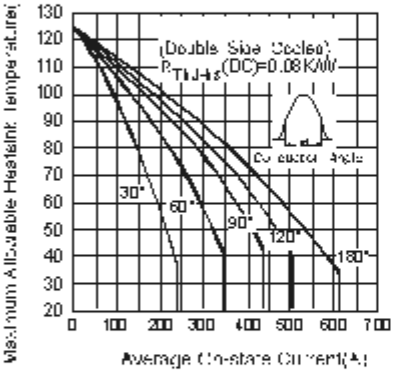


Fig.3-Current Ratings Characteristics

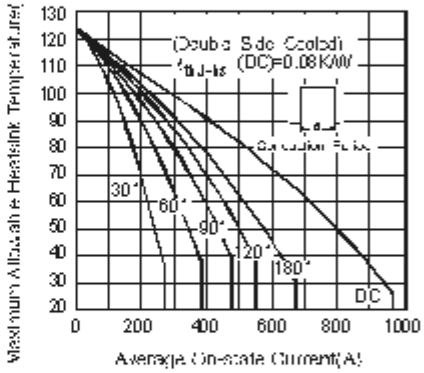


Fig.4-Current Ratings Characteristics

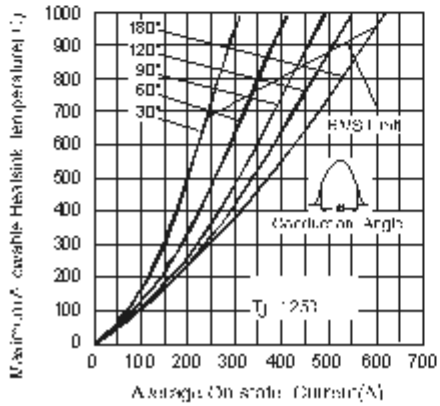


Fig.5-On-state Power Loss Characteristics

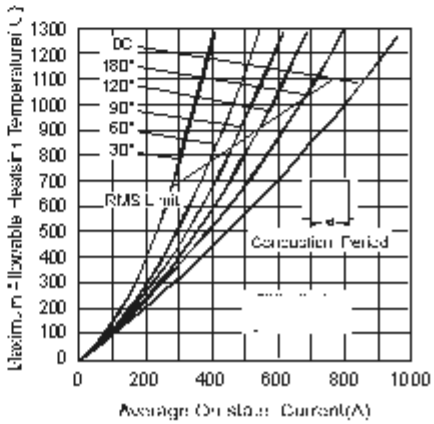


Fig.6-On-state Power Loss Characteristics

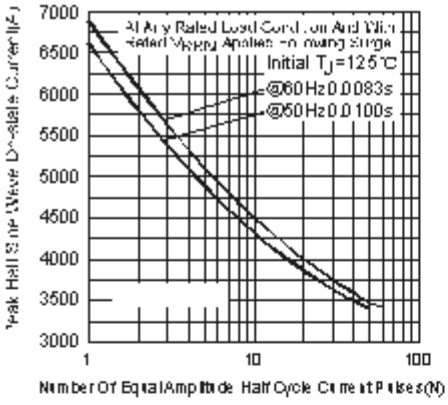


Fig.7-Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

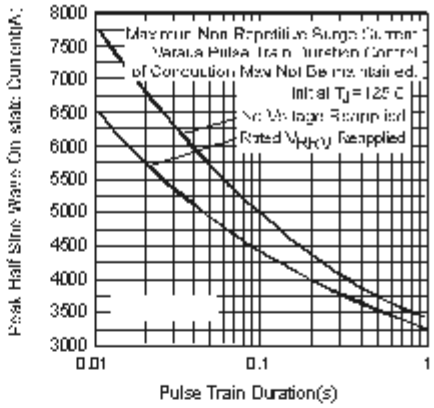


Fig.8-Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

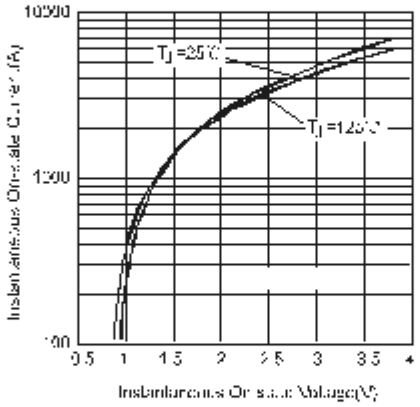


Fig.9-On-state Voltage Drop Characteristics

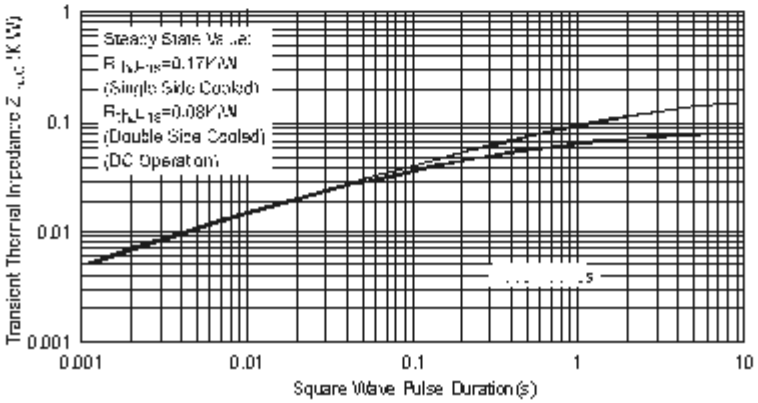


Fig.10-Thermal Impedance Z_{thJC} Characteristics