

BI-DIRECTIONAL TRIODE THYRISTOR**Features**

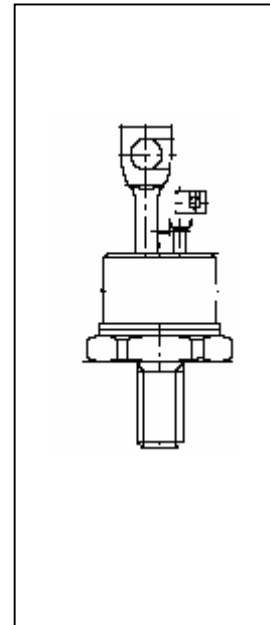
- Hermetic ceramic -metal seal
- high dv/dt
- tested according to IEC standards
- High surge capability
- Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling

50A**Typical Applications**

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

Major Ratings and Characteristics

Parameters	KS50A	Units
$I_{T(AV)}$	50	A
@ T_C	90	°C
$I_{T(RMS)}$	155	A
I_{TSM} @ 50Hz	2.7	A
@ 60Hz	2.83	A
$I^2 t$ @ 50Hz	36.4	KA ² s
@ 60Hz	33.2	KA ² s
V_{DRM} / V_{RRM}	400 to 1600	V
T_q typical	100	µs
T_J range	- 40 to 125	°C



ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{RRM}/V_{DRM} , maximum repetitive peak reverse voltage V	V_{RSM} , maximum non-repetitive peak rev. voltage V	I_{RRM}/I_{DRM} max. @ $T_J = T_J$ max. mA
KS50A	02	200	300	20
	06	600	700	
	10	1000	1100	
	12	1200	1300	
	15	1500	1600	

On-state Conduction

Parameter	KS50A	Units	Conditions
$I_{T(AV)}$ Maximum average on-state current @ Case temperature	50	A	180° conduction, half sine wave
	90	°C	
$I_{(RMS)}$ Maximum RMS on-state current	175	A	180° conduction, half sine wave @ $T_C = 80^\circ\text{C}$
I_{TSM} Maximum peak, one-cycle non-repetitive surge current	2700	A	t = 10ms No voltage
	2830		t = 8.3ms reapplied
	2270		t = 10ms 100% V_{RRM}
	2380		t = 8.3ms reapplied
$I^2 t$ Maximum $I^2 t$ for fusing	36.4	KA ² s	t = 10ms No voltage
	33.2		t = 8.3ms reapplied
	25.8		t = 10ms 100% V_{RRM}
	23.5		t = 8.3ms reapplied
$I^2 \sqrt{t}$ Maximum $I^2 \sqrt{t}$ for fusing	364	KA ² √s	t = 0.1 to 10ms, no voltage reapplied
V_{TM} Maximum on-state or forward	1.52	V	pk = 600A, $T_J = 25^\circ\text{C}$, t p = 10ms sine pulse
I_H Maximum holding current	600	mA	$T_J = 25^\circ\text{C}$, anode supply 12V resistive load
I_L Typical latching current	1000		

Switching

Parameter	KS50A	Units	Conditions
di/dt ax. non-repetitive rate of rise of turned-on current	500	A/μs	Gate drive 20V, 20Ω, tr ≤ 1μs $T_J = T_J$ max, anode voltage ≤ 80% V_{DRM}
td ical delay time	2.0	μs	Gate current 1A, dig/dt = 1A/μs $V_d = 0.67\% V_{DRM}$, $T_J = 25^\circ\text{C}$
Tq pical turn-off time	100	μs	$I_{TM} = 300\text{A}$, $T_J = T_J$ max, di/dt = 20A/μs, $V_R = 50\text{V}$ dv/dt = 20V/μs, Gate 0V 100Ω, t p = 500μs

Blocking

Parameter	KS50A	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} Max. peak reverse and off-state leakage current	20	mA	T _J = T _J max, rated V _{DRM} /V _{RRM} applied

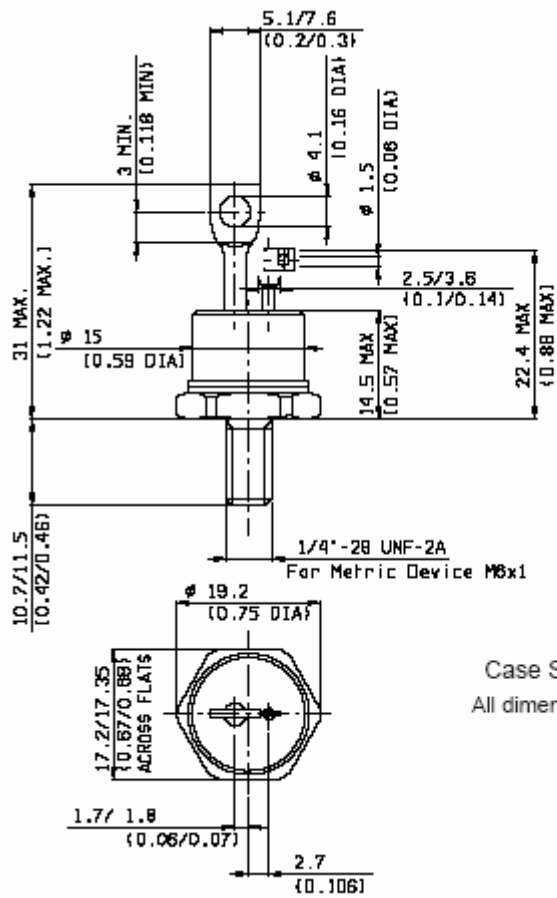
Triggering

Parameter	KS50A	Units	Conditions
P _{GM} Maximum peak gate power	5	W	T _J = T _J max, t _p ≤ 5ms
P _{G(AV)} Maximum average gate power	1.0		T _J = T _J max, f = 50Hz, d% = 50
I _{GM} Max. peak positive gate current	2.0	A	T _J = T _J max, t _p ≤ 5ms
+V _{GM} Maximum peak positive gate voltage	20	V	T _J = T _J max, t _p ≤ 5ms
-V _{GM} Maximum peak negative gate voltage	5.0		
I _{GT} DC gate current required to trigger	TYP.	MAX.	T _J = -40°C T _J = 25°C T _J = 125°C Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
	180	-	
	90	150	
V _{GT} DC gate voltage required to trigger	2.9	-	T _J = -40°C T _J = 25°C T _J = 125°C
	1.8	30	
	1.2	-	
I _{GD} DC gate current not to trigger	8	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	0.25	V	

Thermal and Mechanical Specification

Parameter	KS50A	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	0.195	K/W	DC operation
R _{thCS} Max. thermal resistance, case to heatsink	0.08		Mounting surface, smooth, flat and greased
T Mounting torque, ± 10%	15.5(137)	Nm	Non lubricated threads
	14(120)	(lbf-in)	Lubricated threads
wt Approximate weight	118	g	

Outline Table



Case Style TO-208AC (TO-65)
All dimensions in millimeters (inches)

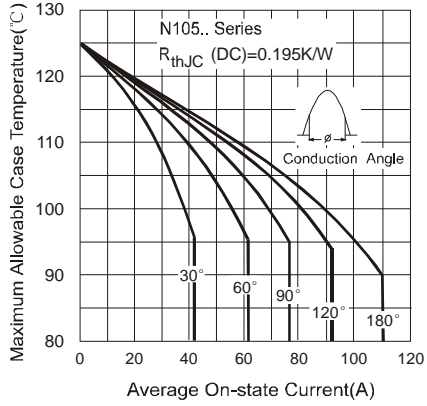


Fig.1-Current Ratings Characteristics

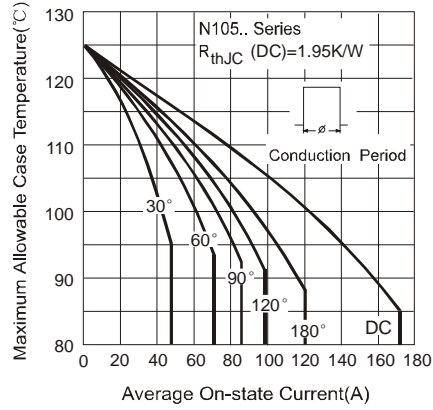


Fig.2-Current Ratings Characteristics

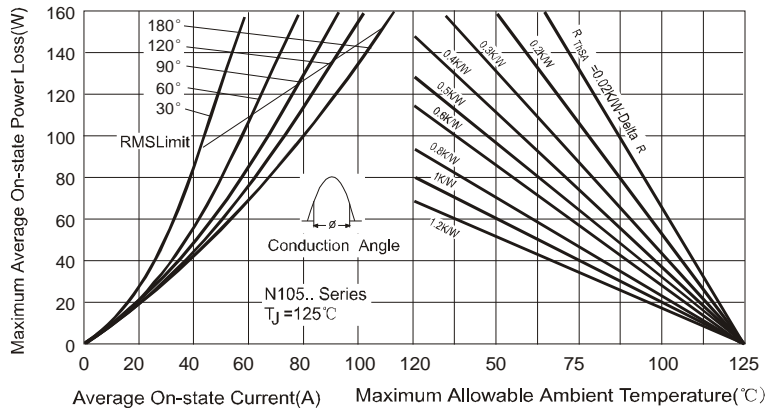


Fig.3-On-state Power Loss Characteristics

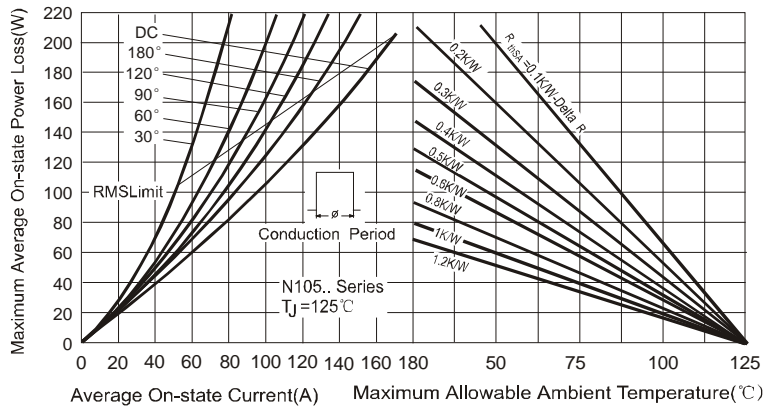


Fig.4-On-state Power Loss Characteristics

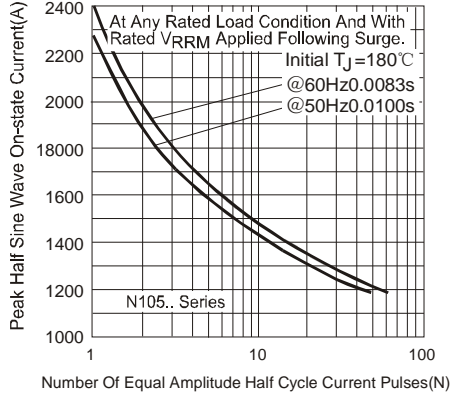


Fig.5-Maximum Non-Repetitive Surge Current

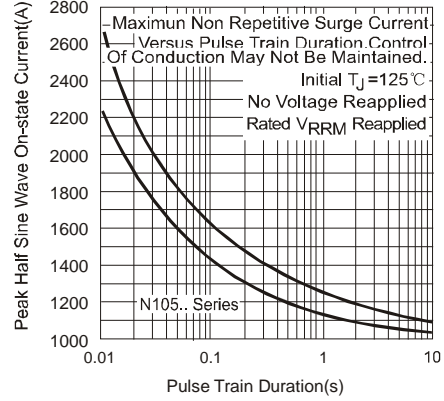


Fig.6-Maximum Non-Repetitive Surge Current

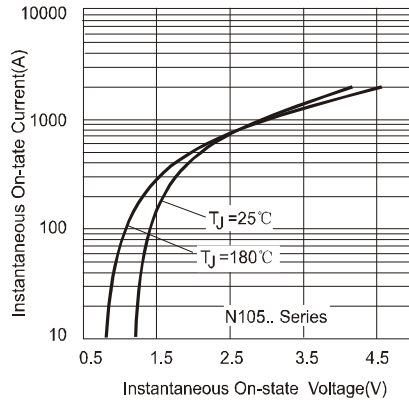


Fig.7-On-state Voltage Drop Characteristics

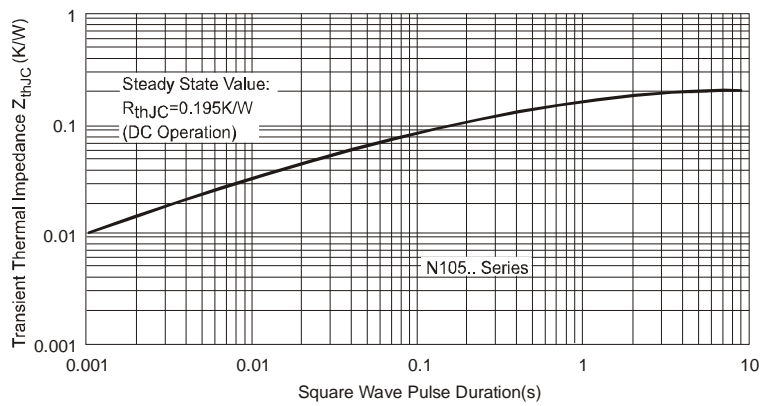


Fig.8-Thermal Impedance Z_{thJC} Characteristics