

## DIODE / THYRISTOR MODULE

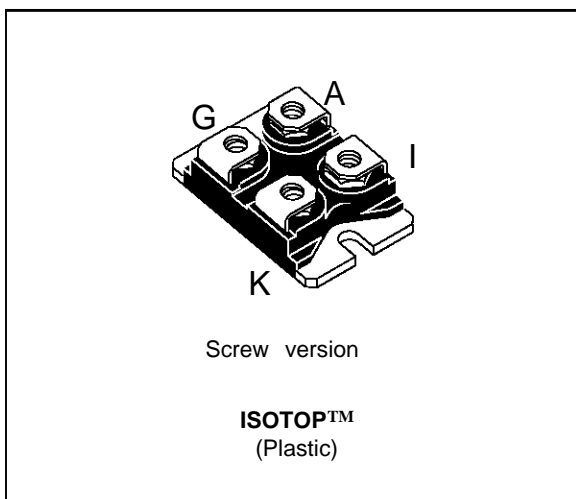
### FEATURES

- $V_{DRM} = V_{RRM}$  UP TO 1200 V
- $I_{T(AV)} = 25$  A
- HIGH SURGE CAPABILITY
- INSULATED PACKAGE :  
INSULATING VOLTAGE 2500 V(RMS)

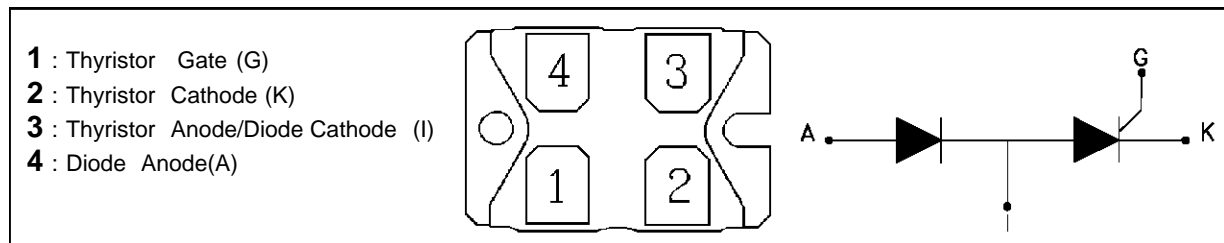
### DESCRIPTION

The MDS35 family are constituted of one rectifier diode and general purpose SCR. Suited for power supplies up to 400 Hz on resistive or inductive load.

The small volume ( $7\text{cm}^3$ ) and weight (29g) of the ISOTOP package are well adapted to new generation of medium size module market applications.



### PIN CONNECTIONS



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current		50	A
$I_{T(AV)}$	Average on-state current Single phase circuit, 180° conduction angle per device	$T_c = 85^\circ\text{C}$	25	A
$I_{TSM}$	Non repetitive surge peak on-state current ( $T_j$ initial = $25^\circ\text{C}$ )	$t_p = 8.3\text{ms}$	420	A
$I_{FSM}$		$t_p = 10\text{ms}$	400	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ms}$	800	$\text{A}^2\text{s}$
$di/dt$	Critical rate of rise of on-state current Gate supply : $I_G = 800\text{mA}$ - $di_G/dt = 1\text{A}/\mu\text{s}$		100	$\text{A}/\mu\text{s}$
$T_{stg}$	Storage temperature range		- 40 + 150	$^\circ\text{C}$
$T_j$	Operating junction temperature range		- 40 + 125	

Symbol	Parameter	MDS35			Unit
		-800	-1000	-1200	
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage $T_j = 125^\circ\text{C}$	800	1000	1200	V

## THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
Rth (j-c) DC	Junction to case for DC	1	°C/W
Rth (c-h)	Contact (case to heatsink) (4)	0.05	°C/W

(4) With contact grease utilisation

## GATE CHARACTERISTICS (maximum values)

 $P_{GM} = 50 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )     $P_G$  (AV)= 1 W     $I_{FGM} = 4 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )     $V_{RGM} = 5 \text{ V}$ .

## ELECTRICAL CHARACTERISTICS (SCR)

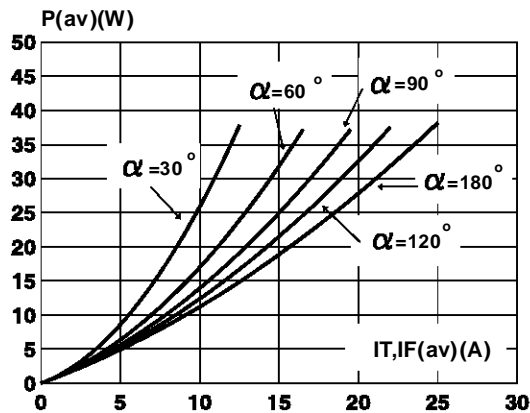
Symbol	Test Conditions		Value	Unit	
$I_{GT}$	$V_D=12\text{V}$ (DC) $R_L=33\Omega$	$T_j=25^\circ\text{C}$	MAX	50	mA
$V_{GT}$	$V_D=12\text{V}$ (DC) $R_L=33\Omega$	$T_j=25^\circ\text{C}$	MAX	1.5	V
$V_{GD}$	$V_D=V_{DRM}$ $R_L=3.3\text{k}\Omega$	$T_j=125^\circ\text{C}$	MIN	0.2	V
tgt	$V_D=V_{DRM}$ $I_G = 500\text{mA}$ $di_G/dt = 3\text{A}/\mu\text{s}$	$T_j=25^\circ\text{C}$	TYP	2	$\mu\text{s}$
$I_L$	$I_G=1.2 I_{GT}$	$T_j=25^\circ\text{C}$	TYP	60	mA
			MAX	120	
$I_H$	$I_T= 0.5\text{A}$ gate open	$T_j=25^\circ\text{C}$	TYP	40	mA
			MAX	80	
$V_{TM}$	$I_{TM}= 80\text{A}$ $t_p= 380\mu\text{s}$	$T_j=25^\circ\text{C}$	MAX	1.7	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM}$ Rated $V_{RRM}$ Rated	$T_j=25^\circ\text{C}$	MAX	0.05	mA
		$T_j=125^\circ\text{C}$	MAX	10	
tq	$I_T= 80\text{A}$ $V_R=75\text{V}$ $V_D=67\%V_{DRM}$ $di/dt=30\text{A}/\mu\text{s}$ $dV/dt=20\text{V}/\mu\text{s}$ Gate open	$T_j=125^\circ\text{C}$	TYP	100	$\mu\text{s}$
dV/dt *	Linear slope up to $V_D=67\%V_{DRM}$ gate open	$T_j=125^\circ\text{C}$	MIN	500	V/ $\mu\text{s}$

\* For higher guaranteed values, please consult us.

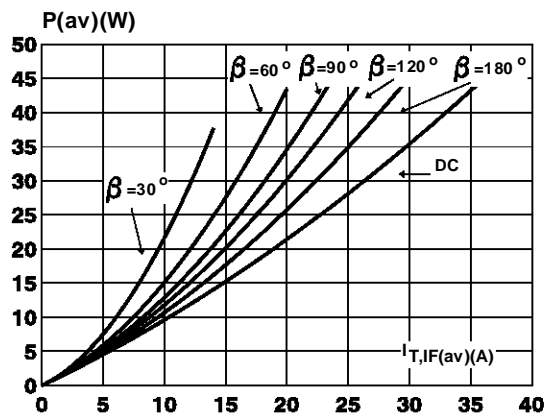
## ELECTRICAL CHARACTERISTICS (DIODE)

Symbol	Test Conditions		Value	Unit	
$V_F$	$I_F=80\text{A}$	$T_j=25^\circ\text{C}$		1.7	V
$I_R$	$V_R=V_{RRM}$	$T_j=125^\circ\text{C}$		10	mA
		$T_j=25^\circ\text{C}$		50	$\mu\text{A}$

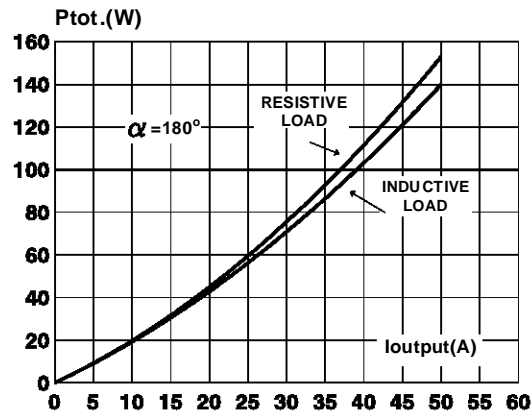
**Fig. 1 :** Maximum Average Power dissipation versus average on-state current.  
(Sinusoidal waveform : Thyristor or Diode)



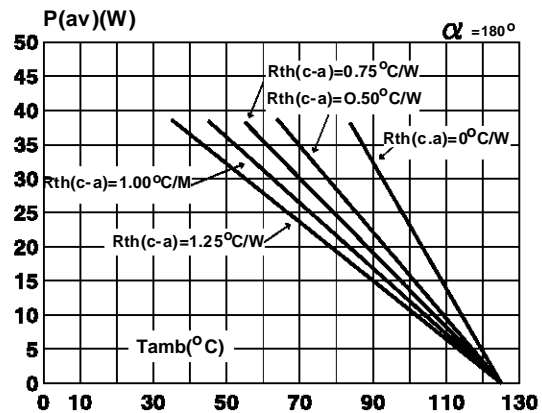
**Fig. 3 :** Maximum average power dissipation versus average on-state current.  
(Rectangular waveform : Thyristor or Diode)



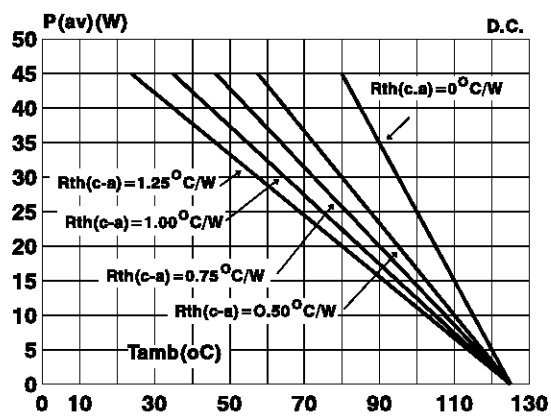
**Fig.5 :** Maximum total power dissipation versus output current on resistive or inductive load.  
(Single phase bridge rectifier : 2 packages MDS35)



**Fig. 2 :** Correlation between maximum average power dissipation and maximum allowable temperature ( $T_{amb}$ ) for different thermal resistances heatsink + contact.  
(Sinusoidal waveform : Thyristor or Diode)



**Fig.4 :** Correlation between maximum average power dissipation and maximum allowable temperature ( $T_{amb}$ ) for different thermal resistances heatsink + contact.  
(Rectangular waveform : Thyristor or Diode)



**Fig. 6 :** Correlation between maximum total average power dissipation and maximum ambient allowable temperature for different thermal resistances heatsink + contact.  
(Single phase bridge rectifier : 2 packages : MDS35)

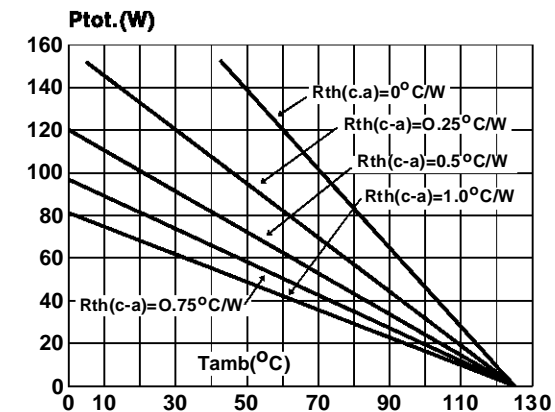


Fig. 7 : Maximum total power dissipation versus output current .  
(Three phase bridge rectifier : 3 packages : MDS35)

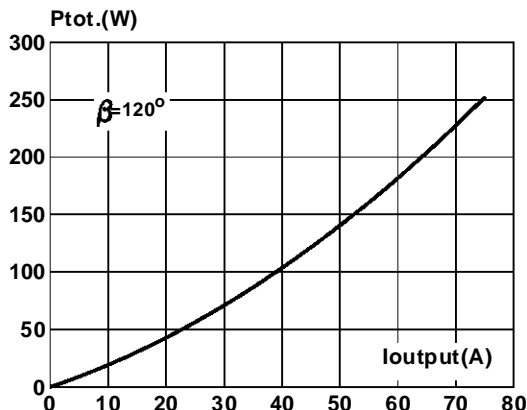


Fig. 9 : Average on-state current versus case temperature .  
(Sinusoidal waveform : Thyristor or Diode)

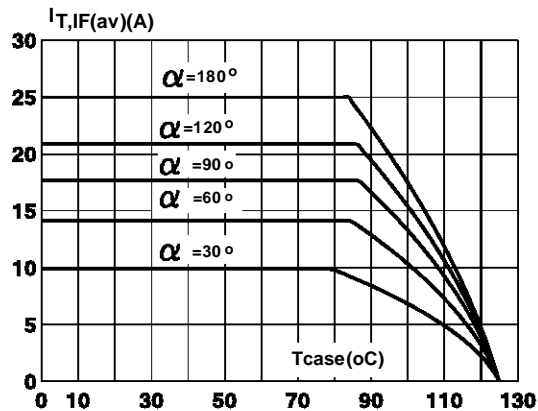


Fig. 11: Relative variation of thermal transient impedance junction to case versus pulse duration.

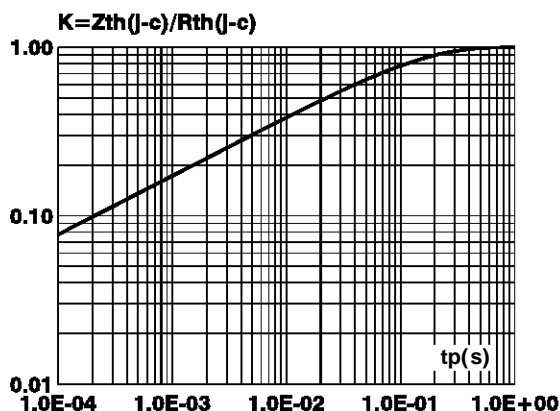


Fig.8 : Correlation between maximum average power dissipation and maximum allowable temperature (Tamb) for different thermal resistances heatsink + contact .  
(Three phase bridge rectifier : 3 packages : MDS35)

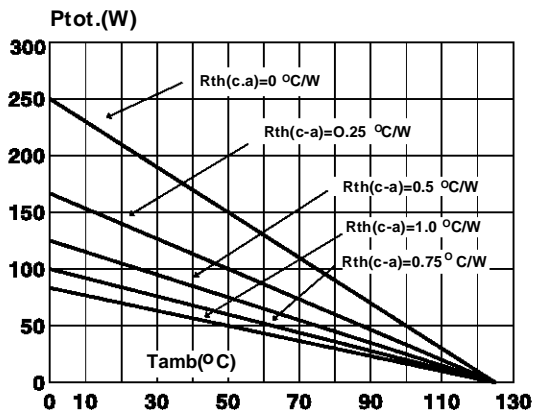


Fig. 10 : Average on-state current versus case temperature .  
(Rectangular waveform : Thyristor or Diode)

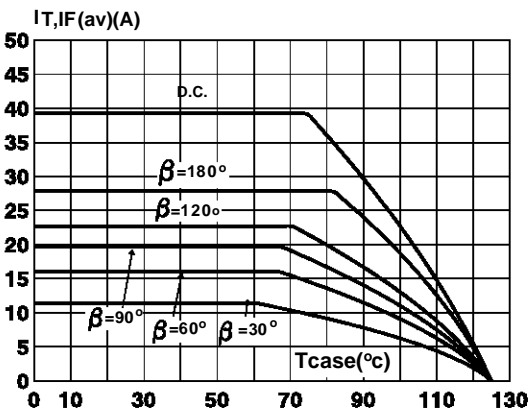
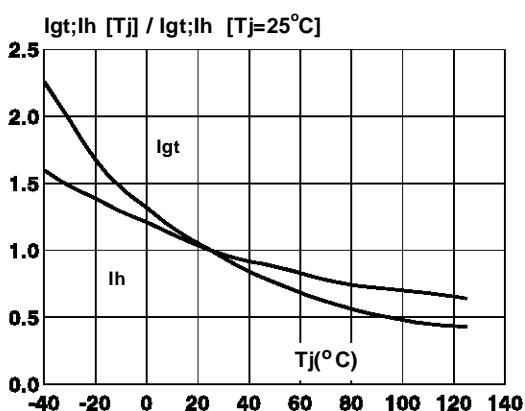
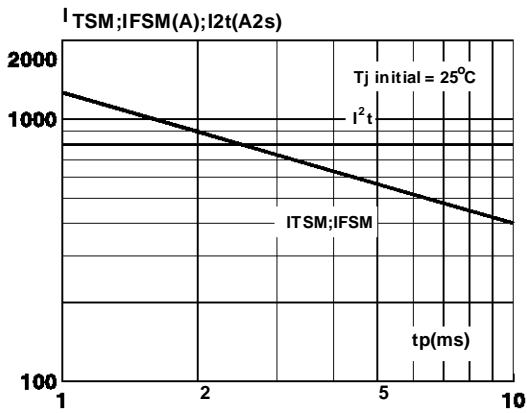


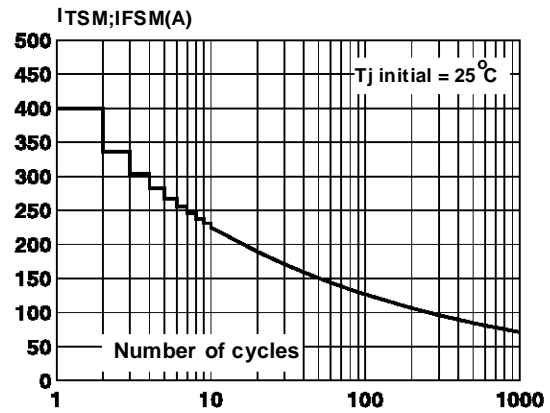
Fig.12 : Relative variation of gate trigger and holding current versus junction temperature.



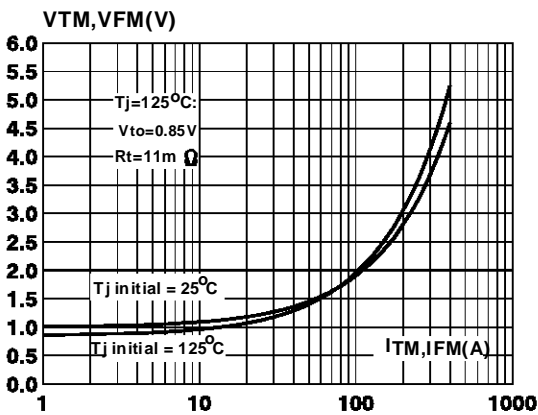
**Fig.13** : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t_p \leq 10$  ms and corresponding value of  $I^2t$ .  
(Thyristor or diode)



**Fig. 14** : Non repetitive surge peak on-state current versus number of cycles.  
(Thyristor or Diode)

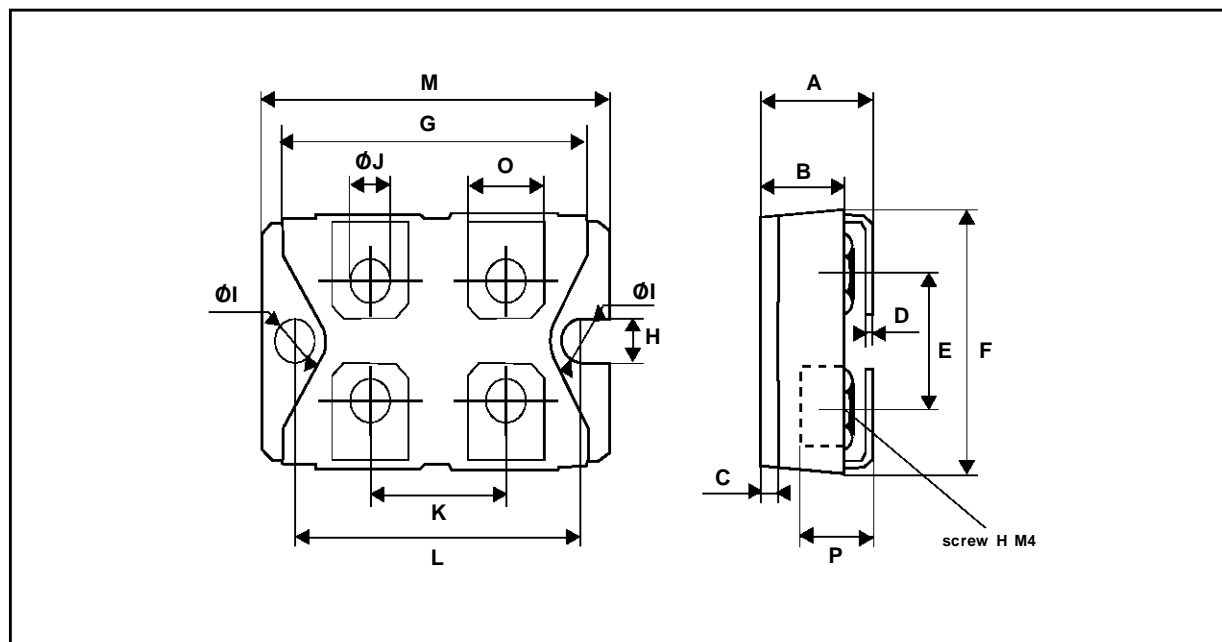


**Fig. 15** : On-state characteristics .  
(Maximum values)(Thyristor or Diode)



## PACKAGE MECHANICAL DATA

ISOTOP plastic : SCREW VERSION



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
B	8.90	9.10	0.350	0.358
C	1.95	2.05	0.077	0.081
D	0.75	0.85	0.029	0.034
E	12.60	12.80	0.496	0.504
F	25.10	25.50	0.988	1.004
G	31.50	31.70	1.240	1.248
H	4.00		0.157	
I	4.10	4.30	0.161	0.169
J	4.10	4.30	0.161	0.169
K	14.90	15.10	0.586	0.595
L	30.10	30.30	1.185	1.193
M	37.80	38.20	1.488	1.504
O	7.80	8.20	0.307	0.323
P	5.50		0.216	

Cooling method : C  
 Marking : Type number  
 Weight : 28 g. (without screws)  
 Electrical isolation : 2500V(RMS)  
 Capacitance : < 45 pF  
 Inductance : < 5 nH

- Recommended torque value : 1.3 N.m (Max 1.5 N.m) for the 6 x M4 screws. (2 x M4 screws recommended for mounting the package on the heatsink and the 4 screws given with the screw version).
- The screws supplied with the package are adapted for mounting on a board (or others types of terminals) with a thickness of 0.6 mm min and 2.2 mm max.

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