

# MDS35 / 50 / 80 Series

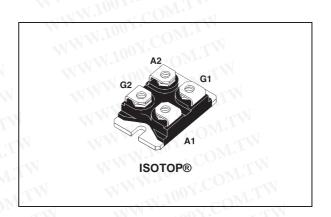
# DIODE / SCR MODULE

# **MAIN FEATURES:**

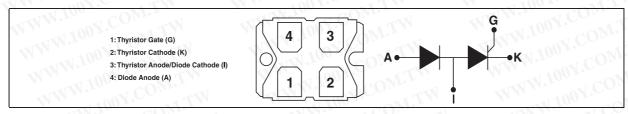
Symbol	Value	Unit	
I <sub>T(RMS)</sub>	50-70-85		
V <sub>DRM</sub> /V <sub>RRM</sub>	800 and 1200	V.	
I <sub>GT</sub>	50 and 100	mA	

# **DESCRIPTION**

Packaged in ISOTOP modules, the MDS Series is based on the half-bridge SCR-diode configuration. They are suitable for high power applications, using phase controlled bridges, such as soft-start circuits, welding equipment, motor speed controller. The compactness of the ISOTOP package allows high power density and optimized power bus connections. Thanks to their internal ceramic pad, they provide high voltage insulation (2500V RMS), complying with UL standards (File ref: E81734).



# **PIN CONNECTIONS**



# **ABSOLUTE RATINGS** (limiting values)

Cumbal	Parameter				Value		Unit
Symbol	Paramet	ery 1007.		35	50	80	Jonit
I <sub>T(RMS)</sub>	RMS on-state current				70	85	Α
I <sub>T(AV)</sub>	Average on-state current (Single phase-circuit, 180° conduction ar	ngle per device)	Tc = 85°C	25	35	55	A
I <sub>TSM</sub>	Non repetitive surge peak on-state	tp = 8.3 ms	T: 25°C	420	630	730	A
$I_{FSM}$	current (Tj initial = 25°C)	tp = 10 ms	Tj = 25°C	400	600	700	
l <sup>2</sup> t	I <sup>2</sup> t Value for fusing	tp = 10 ms	Tj = 25°C	800	1800	2450	A <sup>2</sup> s
dl/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , tr $\leq 100 \text{ ns}$ $F = 60 \text{ Hz}$ $Tj = 125^{\circ}\text{C}$				50		A/µs
$I_{GM}$	Peak gate current $tp = 20 \mu s$ $Tj = 125$		Tj = 125°C	- 1	4		A
P <sub>G(AV)</sub>	Average gate power dissipation Tj = 125°C		Tj = 125°C	Dir.	1		W
T <sub>stg</sub> T <sub>j</sub>	Storage junction temperature range Operating junction temperature range					150 125	°C
V <sub>RGM</sub>	Maximum peak reverse SCR gate voltage					N	V

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# **ELECTRICAL CHARACTERISTICS** (Tj = 25°C, unless otherwise specified) TWW.100Y.COM.TW

Symbol	Test Conditions		WWW.	MDS			Unit
7.	MANN TOOM	, I - 401	WWW	35	50	80	
I <sub>GT</sub>	W 100 1 CO	1.1	MIN.	1.100	5-011	10	mA
	$V_D = 12 \text{ V}$ $R_L = 30 \Omega$	M.TV	MAX.	W.100 5	50 00	100	
V <sub>GT</sub>	M.M. 100 X.C.	OM.TW	MAX.	VW.100	1.3	II.	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$	Tj = 125°C	MIN.	WW.100	0.2	LTV	V
COHLT.	I <sub>T</sub> = 500 mA Gate open	COM.TW	MAX.	WW.1	80	M.T.	mA
L.M.	I <sub>G</sub> = 1.2 I <sub>GT</sub>	COMIT	MAX.	NW.	120	$O_{M',I,A}$	mA
dV/dt	V <sub>D</sub> = 67% V <sub>DRM</sub> Gate open	Tj = 125°C	MIN.	TWW	1000	COMPL	V/µs
	I <sub>TM</sub> = 80 A tp = 380 μs	OX.	7/1	1.7	N. 100 3	$CO_{M',r}$	αŃ
$V_{TM}$	I <sub>TM</sub> = 110 A tp = 380 μs	Tj = 25°C	MAX.	-111	1.75	COM.	V
	I <sub>TM</sub> = 170 A tp = 380 μs	100 Y. CO?	V.I.A.	-	M.100	1.75	TVN
$V_{t0}$	Threshold voltage	Tj = 125°C	MAX.	- 1	0.85	CON	V
R <sub>d</sub>	Dynamic resistance	Tj = 125°C	MAX.	11	7.0	5.5	mΩ
I <sub>DRM</sub>	V <sub>DRM</sub> / V <sub>RRM</sub> RATED	Tj = 25°C	MAX.	KĪ	20	100 2 C	μA
I <sub>RRM</sub>	VDRM / VRRM TOTTED	Tj = 125°C	COMIT	-T	10	1.100	mA

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Symbol	Test Cond	MDS			Unit		
	100X.COM.T.Wiest Com	artions 100	Y.COM	35	50	80	V.CO
V <sub>F</sub>	I <sub>F</sub> = 80 A	MMNTA	COL	1.7	- 1	MAIN	V
	I <sub>F</sub> = 110 A	Tj = 25°C	MAX.	W.	1.7	N.M.M.T	OOY.CC
	I <sub>F</sub> = 170 A	WWW	.100 F	DIA -	-	1.7	100X.C
V <sub>t0</sub>	Threshold voltage	Tj = 125°C	MAX.	ONL	0.85	WWW	V
R <sub>d</sub>	Dynamic resistance	Tj = 125°C	MAX.	C 11	7.0	5.5	mΩ
I <sub>R</sub>	$V_R = V_{RRM}$	Tj = 25°C	MAX.	I.COM	20	WW	μA
	MAN TOO T COM'T	Tj = 125°C	MM. Inc	A COM	10	XX	mA

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## THERMAL RESISTANCES

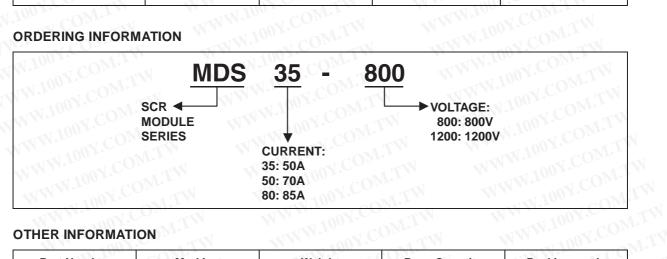
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Symbol	RESISTANCES	Parameter	N.COM.TW	Value	Uni
R <sub>th(j-c)</sub>	Junction to case (DC)	WWW.	MDS35	1.00	°C/V
	M. 1001. COW.	WWW.	MDS50	0.75	
	W 100 Y. O.M.	In h	MDS80	0.45	1

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### PRODUCT SELECTOR

Part Number	Volta	ge (xxx)	WWW. Louising V. C.	Package
	800 V	1200 V	Sensitivity	
MDS35-xxx	X	CO X	50 mA	COM
MDS50-xxx	X	COMX	50 mA	ISOTOP™
MDS80-xxx	X	X	150 mA	COM

### ORDERING INFORMATION



### OTHER INFORMATION

Part Number	Marking	Weight	Base Quantity	Packing mode
MDS35-xxx	MDS35-xxx	27.0 g	10	Tube
MSDS50-xxx	MDS50-xxx	27.0 g	10	Tube
MDS80-xxx	MDS80-xxx	27.0 g	CON 10	Tube

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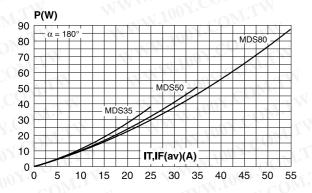
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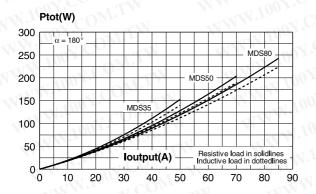
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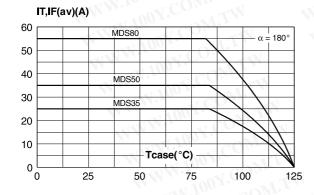
**Fig. 1-1:** Maximum average power dissipation versus average on-state current (thyristor or diode, sinusoïdal waveform).



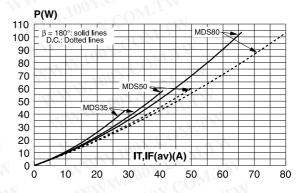
**Fig. 1-3:** Maximum total power dissipation versus output current on resistive or inductive load (Single phase bridge rectifier, two packages).



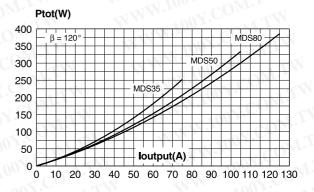
**Fig. 2-1:** Average on-state current versus case temperature (thyristor or diode, sinusoïdal waveform).



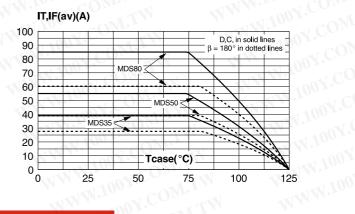
**Fig. 1-2:** Maximum average power dissipation versus average on-state current (thyristor or diode, rectangular waveform).



**Fig. 1-4:** Maximum total power dissipation versus output current (Three phase bridge rectifier, three packages).



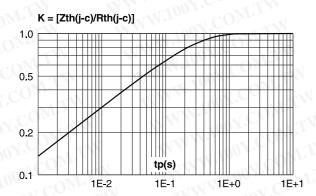
**Fig. 2-2:** Average on-state current versus case temperature (thyristor or diode, rectangular waveform).



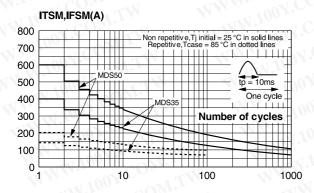
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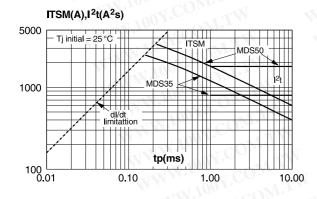
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



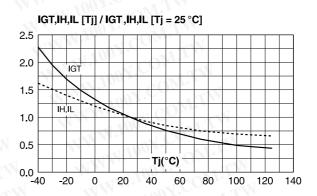
**Fig. 5-1:** Surge peak on-state current versus number of cycles (MDS35 and MDS50).



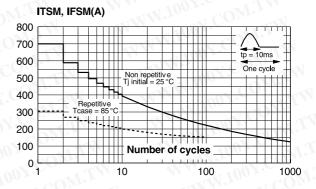
**Fig. 6-1:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms, and corresponding value of I<sup>2</sup>t (MDS35 and MDS50).



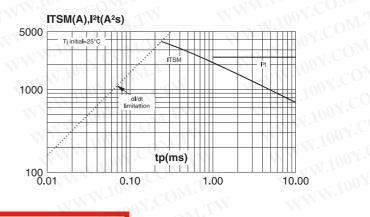
**Fig. 4:** Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).



**Fig. 5-2:** Surge peak on-state current versus number of cycles (MDS80).



**Fig. 6-2:** Non repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms, and corresponding value of I<sup>2</sup>t (MDS80).



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Fig. 7-1: On-state characteristics (thyristor or diode, maximum values) (MDS35).

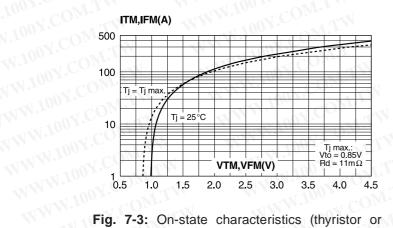
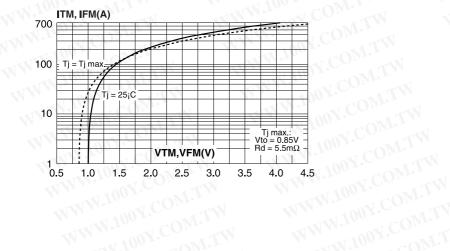


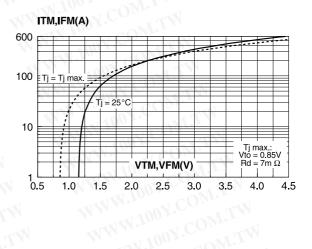
Fig. 7-3: On-state characteristics (thyristor or diode, maximum values) (MDS80).



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Fig. 7-2: On-state characteristics (thyristor or diode, maximum values) (MDS50).



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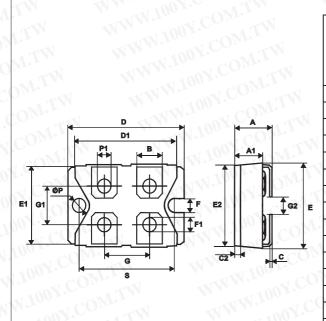
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## PACKAGE MECHANICAL DATA

ISOTOP™



	100		J1			
	DIMENSIONS					
REF.	Millin	neters	¶ Inc	hes		
	Min.	Max.	Min.	Max.		
Α	11.80	12.20	0.465	0.480		
A1	8.90	9.10	0.350	0.358		
В	7.8	8.20	0.307	0.323		
С	0.75	0.85	0.030	0.033		
C2	1.95	2.05	0.077	0.081		
D	37.80	38.20	1.488	1.504		
D1	31.50	31.70	1.240	1.248		
E E	25.15	25.50	0.990	1.004		
E1	23.85	24.15	0.939	0.951		
E2	24.80 typ.		0.97	6 typ.		
G	14.90	15.10	0.587	0.594		
G1	12.60	12.80	0.496	0.504		
G2	3.50	4.30	0.138	0.169		
F	4.10	4.30	0.161	0.169		
) F1	4.60	5.00	0.181	0.197		
P	4.00	4.30	0.157	0.69		
P1	4.00	4.40	0.157	0.173		
S	30.10	30.30	1.185	1.193		

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

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