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Back to back SCR module

Table 1. Main features

Symbol	Value	Unit
$I_{T(RMS)}$	55 and 70	A
V_{DRM}/V_{RRM}	800 and 1200	V
I_{GT}	50	mA

Description

Packaged in ISOTOP modules, the MSS40 / MSS50 Series is based on two back-to-back SCR configurations, providing high noise immunity. They are suitable for high power applications such as solid state relays, heating control systems, welding equipment, motor control circuits...

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 (2500 V_{RMS}), complying with UL standards (File ref: E81734).

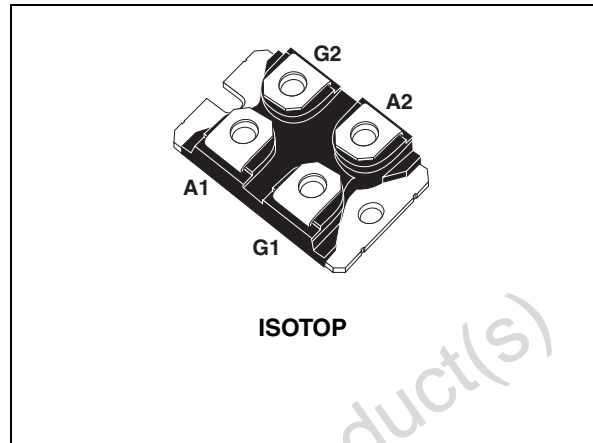
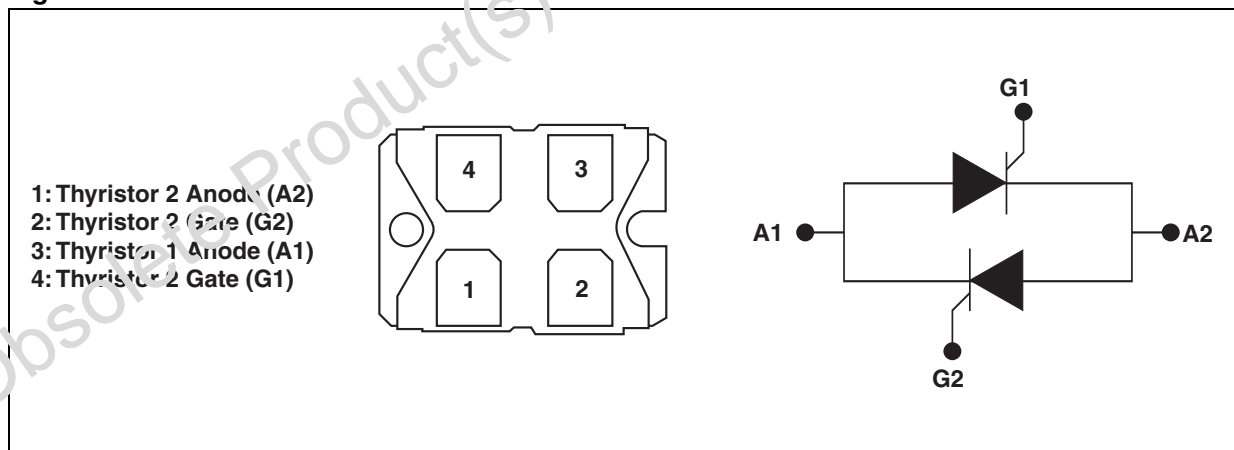


Table 2. Order codes

Part numbers	Marking
MSS40-1200	MSS40-1200
MSS50-800	MSS50-800
MSS50-1200	MSS50-1200

Figure 1. Pin connections



1 Characteristics

Table 3. Absolute ratings (limiting values)

Symbol	Parameter			Value		Unit	
				MSS40	MSS50		
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage			1200	800 1200	V	
$I_{T(RMS)}$	RMS on-state current		$T_c = 80^\circ C$	55		A	
			$T_c = 85^\circ C$		70		
I_{TSM}	Non repetitive surge peak on-state current		$t_p = 16.7\ ms$ $t_p = 20\ ms$	$T_j = 25^\circ C$	420	630	A
					400	600	
I^2t	I^2t Value for fusing		$t_p = 10\ ms$	$T_j = 25^\circ C$	800	1800	A ² s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\ ns$		F = 120 Hz	$T_j = 125^\circ C$	50		A/ μs
I_{GM}	Peak gate current		$t_p = 20\ \mu s$	$T_j = 125^\circ C$	4		A
$P_{G(AV)}$	Average gate power dissipation			$T_j = 125^\circ C$	1		W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range				- 40 to + 150 - 40 to + 125		$^\circ C$
V_{RGM}	Maximum peak reverse gate voltage				5		V

Table 4. Electrical characteristics ($T_j = 25^\circ C$, unless otherwise specified)

Symbol	Test Conditions			Value		Unit	
				MSS40	MSS50		
I_{GT}	$V_D = 12\ V$ $R_L = 33\ \Omega$			MIN.	5		mA
				MAX.	50		
V_{GT}				MAX.	1.3		V
V_{GD}	$V_D = V_{DRM}$	$R_L = 3.3\ k\Omega$	$T_j = 125^\circ C$	MIN.	0.2		V
I_H	$I_T = 500\ mA$ Gate open			MAX.	80		mA
I_L	$I_G = 1.2\ I_{GT}$			MAX.	120		mA
dV/dt	$V_D = 67\ \% V_{DRM}$ Gate open		$T_j = 125^\circ C$	MIN.	1000		V/ μs
V_{TM}	$I_{TM} = 80\ A$ $t_p = 380\ \mu s$		$T_j = 25^\circ C$	MAX.	1.7		V
	$I_{TM} = 100\ A$ $t_p = 380\ \mu s$					1.7	
V_{i0}	Threshold voltage			$T_j = 125^\circ C$	MAX. 0.85		V
R_d	Dynamic resistance			$T_j = 125^\circ C$	MAX. 11	7	m Ω
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$			$T_j = 25^\circ C$	MAX. 20		μA
				$T_j = 125^\circ C$	MAX. 10		mA

Table 5. Thermal reistances

Symbol	Parameter		Value	Unit	
$R_{th(j-c)}$	Junction to case (AC)		MSS40	0.6	$^\circ C/W$
			MSS50	0.45	

Figure 2. Maximum average power dissipation versus average on-state current

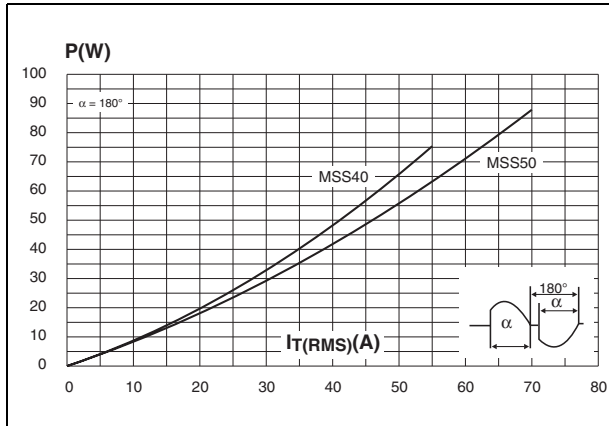


Figure 3. Average and DC on-state current versus case temperature

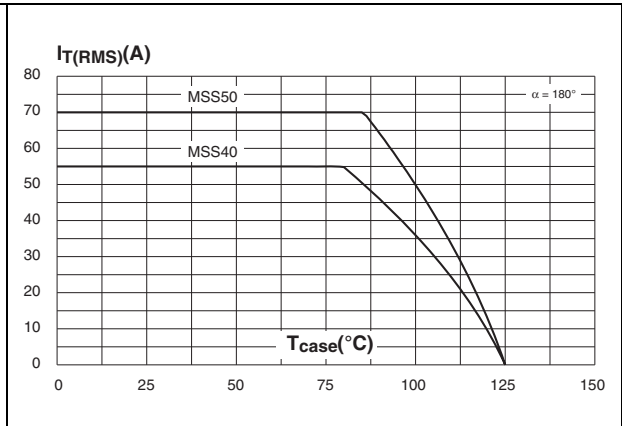


Figure 4. Relative variation of thermal impedance versus pulse duration

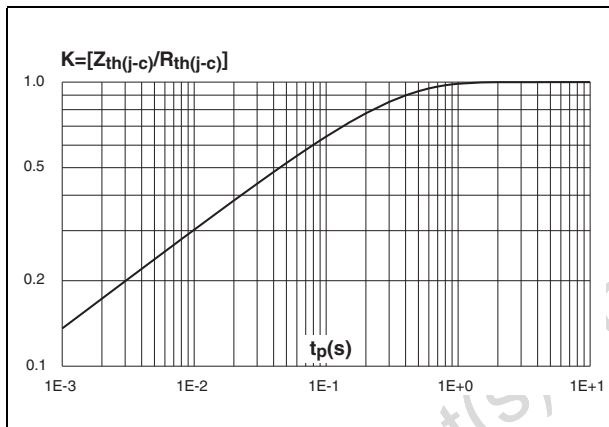


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

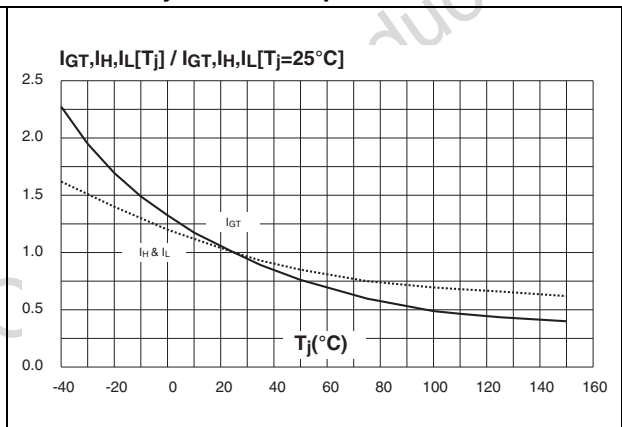


Figure 6. Surge peak on-state current versus number of cycles

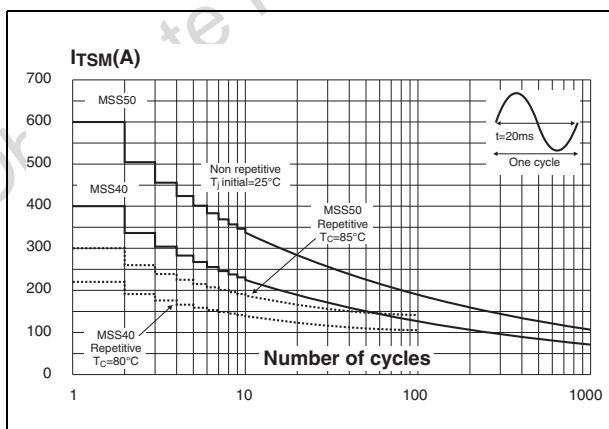


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10$ ms, and corresponding values of I^2t

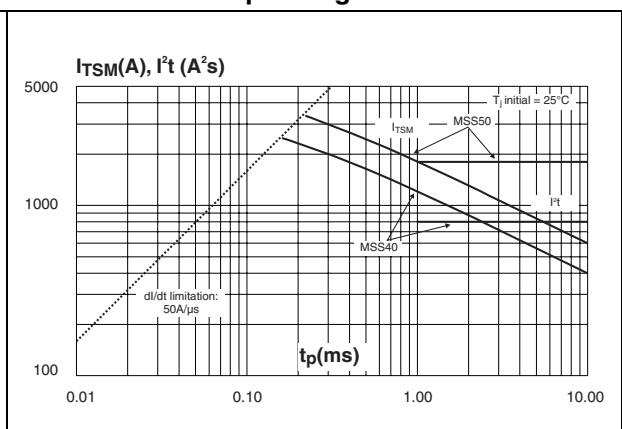


Figure 8. On-state characteristics (maximum values) (MSS40)

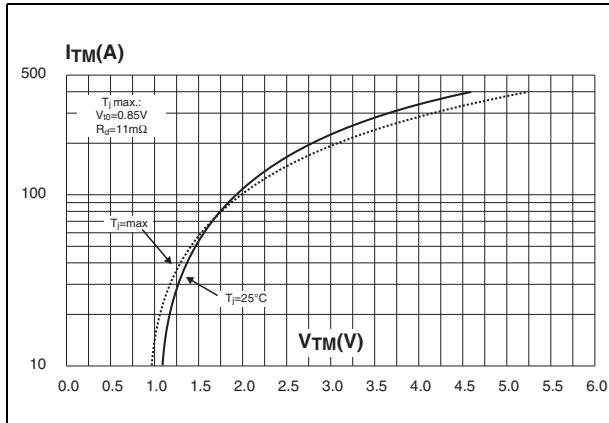
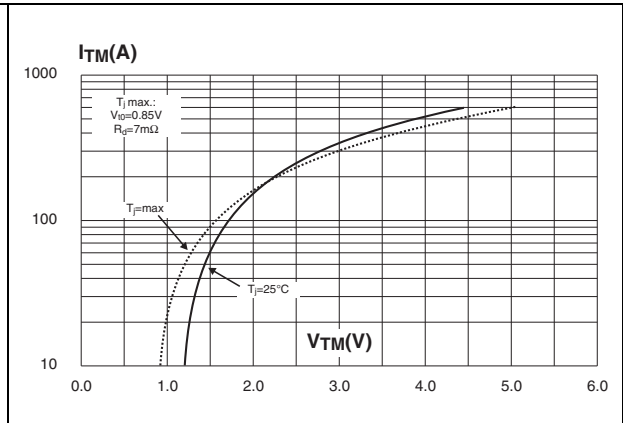


Figure 9. On-state characteristics (maximum values) (MSS50)



2 Ordering information scheme

Figure 10. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.9 Nm (max. 1.2 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.

Table 6. ISOTOP dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
B	7.8	8.20	0.307	0.323
C	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	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80 typ.		0.976 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

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

4 Ordering information

Table 7. Ordering information

Part number	Marking	Package	Weight	Base qty	Delivery mode
MSS40-1200	MSS40-1200	ISOTOP	27 g (without screws)	10 (with screws)	Tube
MSS50-800	MSS50-800				
MSS50-1200	MSS50-1200				

5 Revision history

Table 8. Revision history

Date	Revision	Changes
Sep-2000	3	Last release.
11-Jul-2007	4	Reformatted to current standards. Removed MSS40-800 product.

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