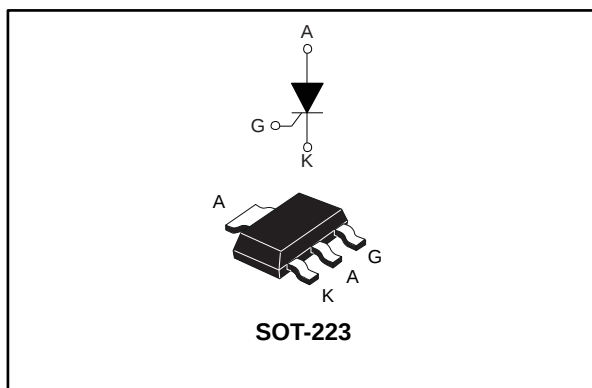


Sensitive 0.8 A SCR thyristor

Datasheet - production data



Description

Thanks to highly sensitive triggering levels, the 0.8 A P0111MN SCR thyristor is suitable for all applications where available gate current is limited. This device offers a high blocking voltage of 600 V, ideal for applications like interrupters circuits.

The surface mount SOT-223 package allows compact, SMD based designs for automated manufacturing.

Table 1: Device summary

Symbol	Value	Unit
$I_{T(RMS)}$	0.8	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	0.004 to 0.025	mA
$T_j \text{ max.}$	125	°C

Features

- $I_{T(RMS)}$ 0.8 A
- 125 °C max T_j
- Low 0.004 to 0.025 mA gate current
- 600 V V_{DRM}/V_{RRM}
- ECOPACK®2 compliant component

Applications

- Proximity sensors
- Gate driver for large thyristors
- Overvoltage crowbar protection
- Ground fault circuit interrupters
- Arc fault circuit interrupter
- Solid state relay pilot circuit
- Standby mode power supplies
- Residual current detector

1 Characteristics

Table 2: Absolute maximum ratings (limiting values), $T_j = 25\text{ °C}$ unless otherwise specified

Symbol	Parameter			Value	Unit
I _{T(RMS)}	RMS on-state current (180 ° conduction angle)		T _{amb} = 70 °C	0.8	A
I _{T(AV)}	Average on-state current (180 ° conduction angle)			0.5	
I _{TSM}	Non repetitive surge peak on-state current (T _j initial = 25 °C)		t _p = 8.3 ms	8	A
			t _p = 10 ms	7	
I ² t	I ² t value for fusing		t _p = 10 ms	0.24	A ² s
di/dt	Critical rate of rise of on-state current I _G = 2 x I _{GT} , t _r ≤ 100 ns	f = 60 Hz	T _j = 125 °C	50	A/μs
V _{DRM} /V _{RRM}	Repetitive peak off-state voltage		T _j = 125 °C	600	V
I _{GM}	Peak gate current	t _p = 20 μs	T _j = 125 °C	1	A
P _{G(AV)}	Average gate power dissipation		T _j = 125 °C	0.1	W
T _{stg}	Storage junction temperature range			-40 to +150	°C
T _j	Operating junction temperature			-40 to +125	°C

Table 3: Electrical characteristics ($T_j = 25\text{ °C}$ unless otherwise specified)

Symbol	Test conditions			Value	Unit
I _{GT}	V _D = 12 V, R _L = 140 Ω		Min. - Max.	0.004 to 0.025	mA
V _{GT}			Max.	0.8	V
V _{GD}	V _D = V _{DRM} , R _L = 3.3 kΩ, R _{GK} = 1000 Ω	T _j = 125 °C	Min.	0.1	V
V _{RG}	I _{RG} = 10 μA		Min.	8	V
I _H	I _T = 50 mA, R _{GK} = 1000 Ω		Max.	5	mA
I _L	I _G = 1.2 x I _{GT} , R _{GK} = 1000 Ω		Max.	6	mA
dV/dt	V _D = 67 % V _{DRM} , R _{GK} = 1000 Ω	T _j = 125 °C	Min.	80	V/μs

Table 4: Static characteristics

Symbol	Test conditions			Value	Unit
V _{TM}	I _{TM} = 1.6 A, t _p = 380 μs	T _j = 25 °C	Max.	1.95	V
V _{TO}	Threshold voltage	T _j = 125 °C	Max.	0.95	
R _D	Dynamic resistance	T _j = 125 °C	Max.	600	mΩ
I _{DRM} /I _{RRM}	V _D = V _{DRM} , V _R = V _{RRM} , R _{GK} = 1000 Ω	T _j = 25 °C	Max.	10	μA
		T _j = 125 °C		100	

Table 5: Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-t)}$	Junction to tab (DC)		30	
$R_{th(j-a)}$	Junction to ambient (DC)	$S^{(1)} = 5\text{ cm}^2$	60	°C/W

Notes: ⁽¹⁾S = copper surface under tab.

1.1 Characteristics (curves)

Figure 1: Maximum average power dissipation versus average on-state current

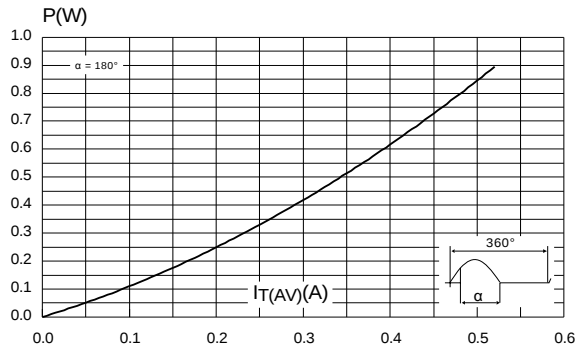


Figure 2: Average and DC on-state current versus case temperature

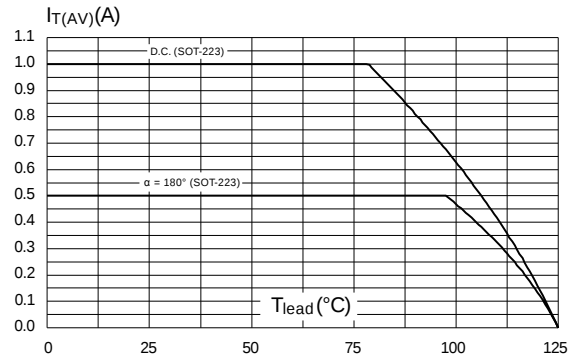


Figure 3: Average and DC on-state current versus ambient temperature

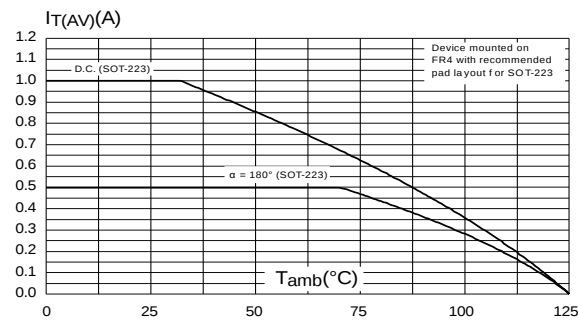


Figure 4: Relative variation of thermal impedance versus pulse duration

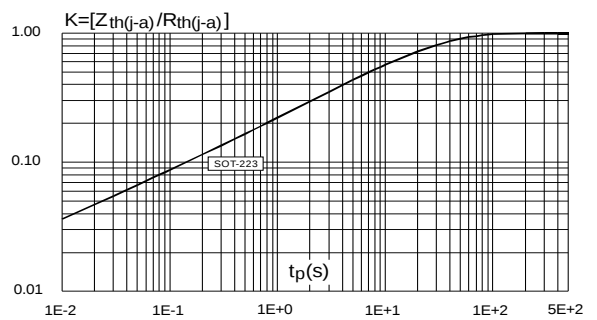


Figure 5: Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

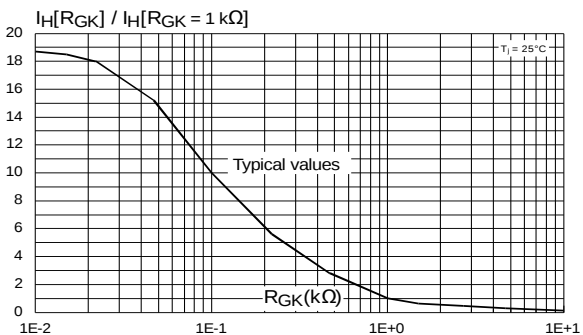


Figure 6: Relative variation of holding and latching current versus junction temperature (typical values)

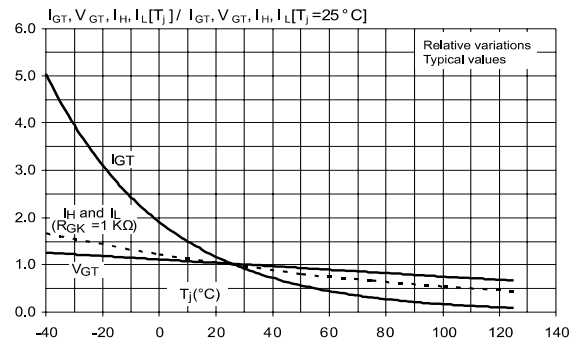


Figure 7: Relative variation of static dV/dt immunity versus gate-cathode resistance (typical values)

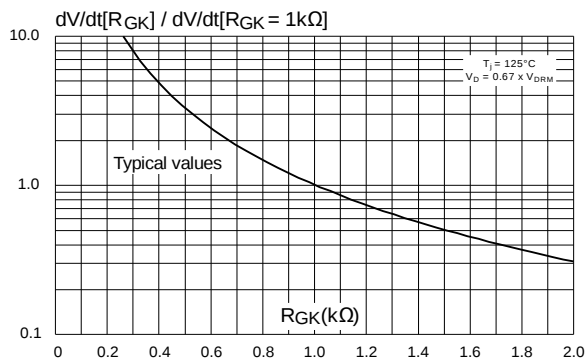


Figure 8: Relative variation of static dV/dt immunity versus junction temperature (typical values)

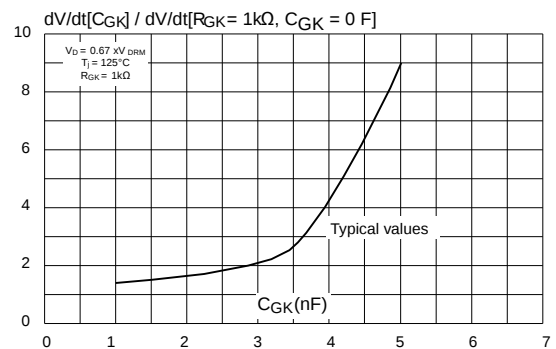


Figure 9: Surge peak on-state current versus number of cycles

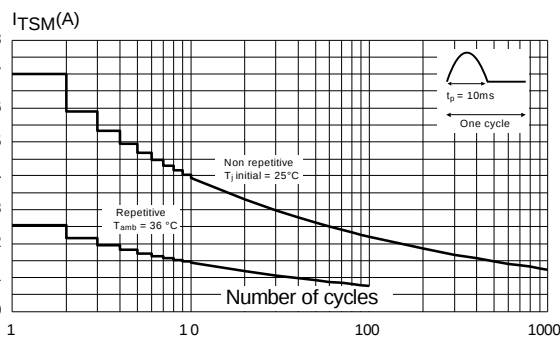


Figure 10: Non-repetitive surge peak on-state current for sinusoidal pulse ($t_p < 10\text{ ms}$)

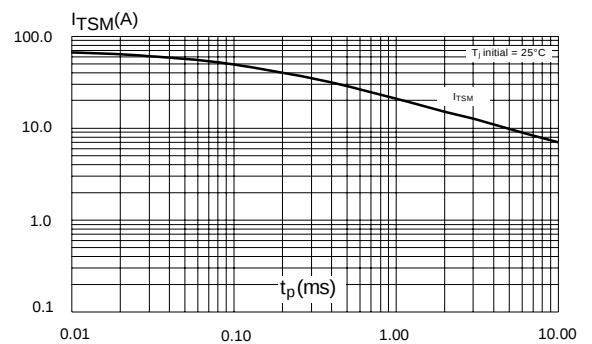


Figure 11: On-state characteristics (maximum values)

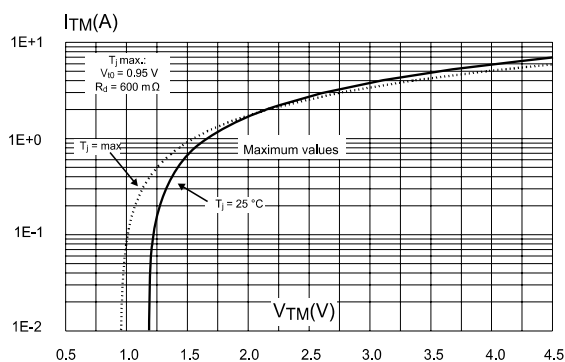
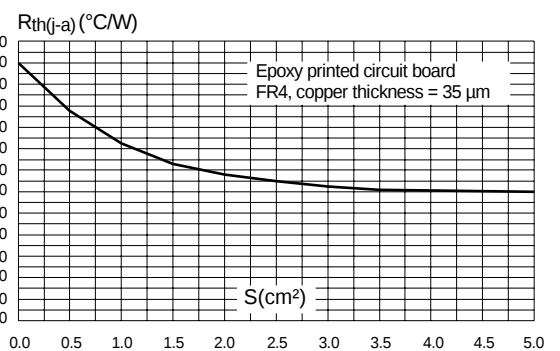


Figure 12: Thermal resistance junction to ambient versus copper surface tab



2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

- Lead-free package
- Halogen free molding resin
- Epoxy meets UL94, V0

2.1 SOT-223 package information

Figure 13: SOT-223 package outline

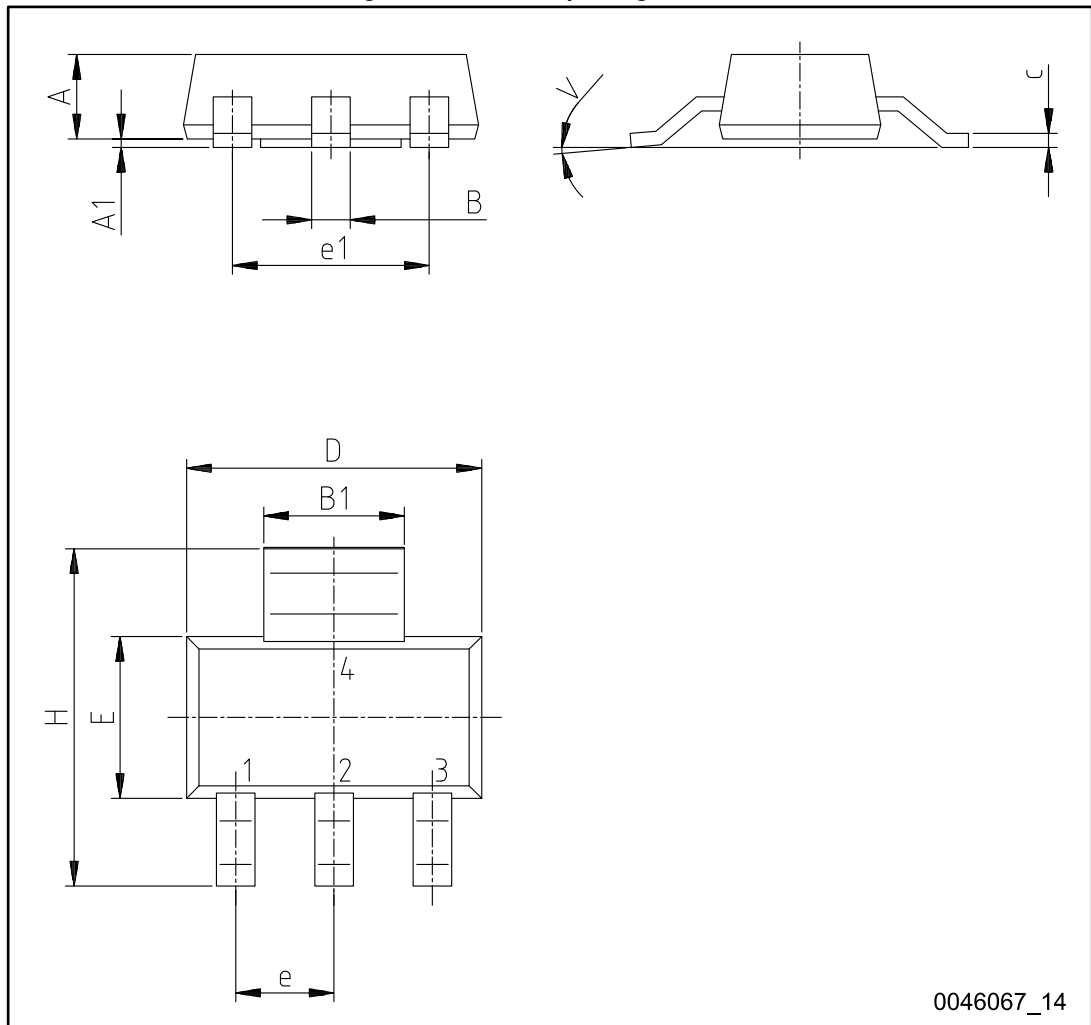
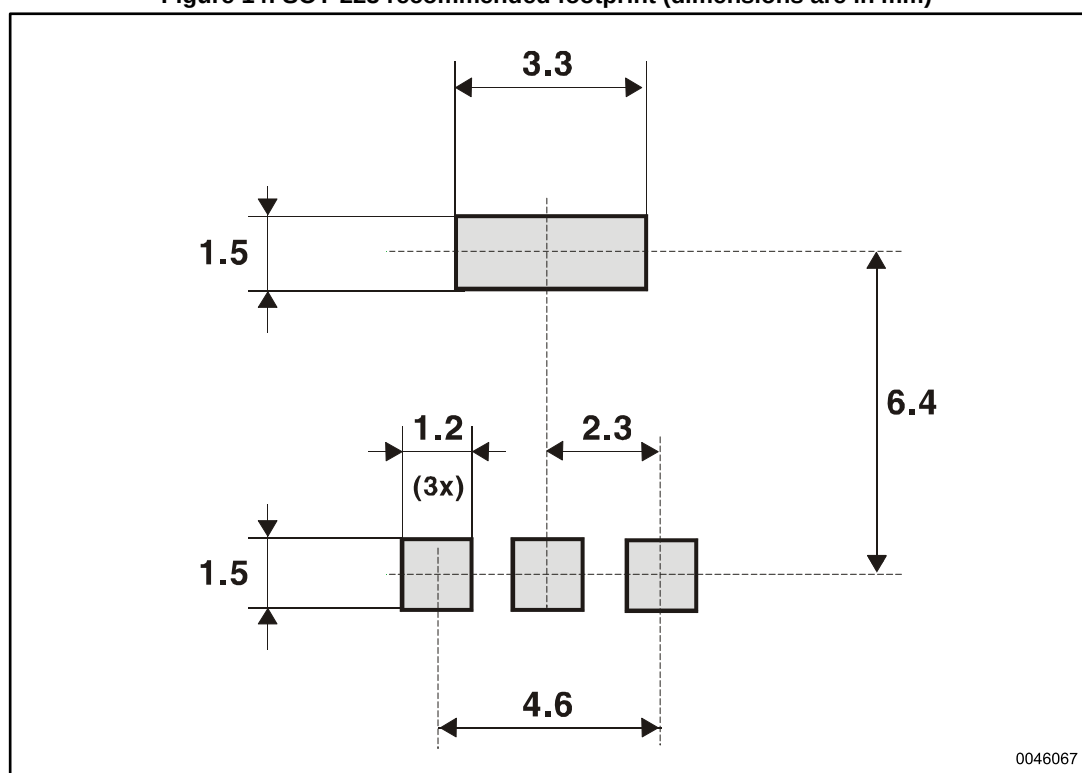


Table 6: SOT-223 package mechanical data

Dim.	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.8			0.0709
A1	0.02		0.1	0.0008		0.0039
B	0.6	0.7	0.85	0.0236	0.0276	0.0335
B1	2.9	3	3.15	0.1142	0.1181	0.1240
c	0.24	0.26	0.35	0.0094	0.0102	0.0138
D ⁽²⁾	6.3	6.5	6.7	0.2480	0.2559	0.2638
e		2.3			0.0906	
e1		4.6			0.1811	
E	3.3	3.5	3.7	0.1299	0.1378	0.1457
H	6.7	7.0	7.3	0.2638	0.2756	0.2874
V			10°			10°

Notes:⁽¹⁾Inches dimensions given only for reference⁽²⁾Does not include mold flash or protusions. Mold flash or protusions must not exceed 0.15 mm (0.006 inches)

Figure 14: SOT-223 recommended footprint (dimensions are in mm)



3 Ordering information

Figure 15: Ordering information scheme

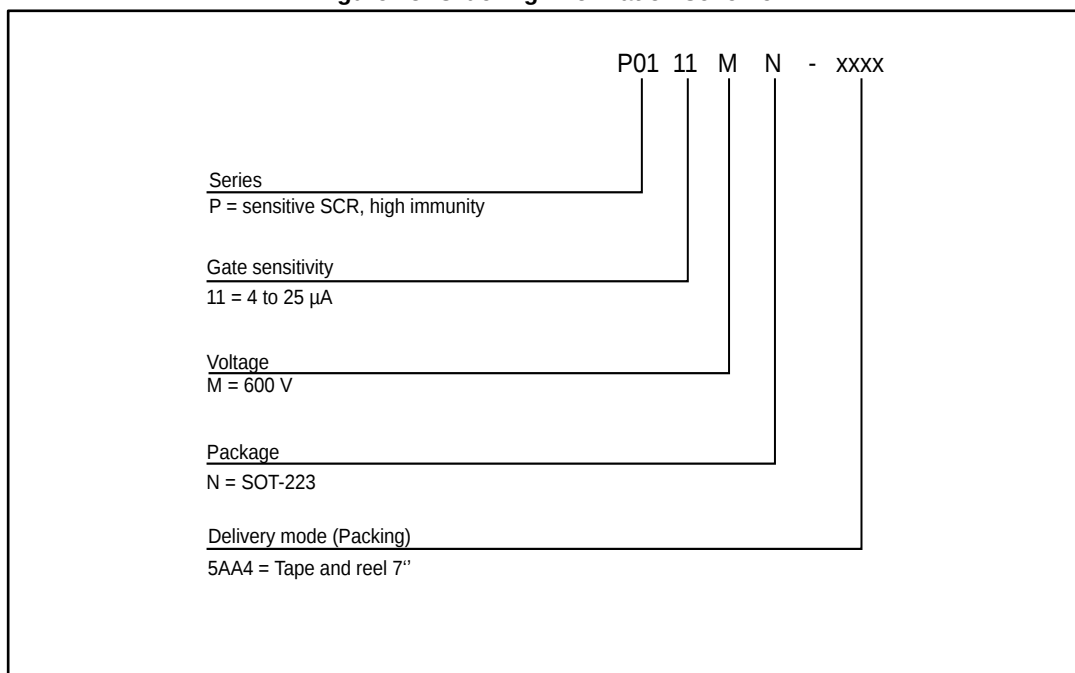


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
P0111MN 5AA4	P1M	SOT-223	0.12 g	1000	Tape and reel 7"

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
09-Oct-2017	1	Initial release.

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