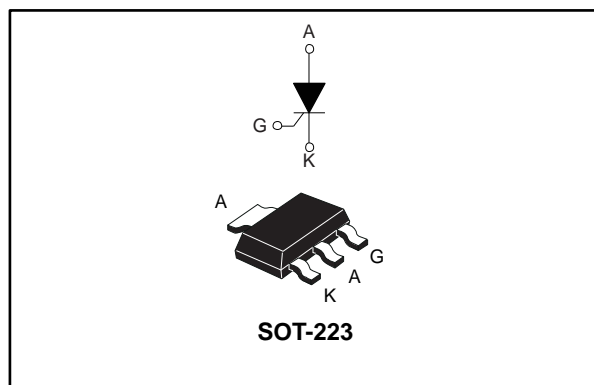


Sensitive 0.8 A SCR thyristor

Datasheet - production data



Description

Thanks to highly sensitive triggering levels, the 0.8 A P0102MN 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}	0.2	mA
$T_j \text{ max.}$	125	°C

Features

- $I_{T(RMS)}$ 0.8 A
- 125 °C max T_j
- Low 0.2 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
- 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)		0.8	A	
$I_{T(AV)}$	Average on-state current (180 ° conduction angle)				
I_{TSM}	Non repetitive surge peak on-state current (T_j initial = 25 °C)		$t_p = 8.3\text{ ms}$	8	
			$t_p = 10\text{ ms}$	7	
I^2t	I^2t value for fusing		$t_p = 10\text{ ms}$	A^2s	
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	$f = 60\text{ Hz}$	$T_j = 125\text{ °C}$	50	$A/\mu s$
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage		$T_j = 125\text{ °C}$	600	V
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu s$	$T_j = 125\text{ °C}$	1	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ °C}$	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}	$V_D = 12\text{ V}$, $R_L = 140\text{ }\Omega$		Max.	200	μA
V_{GT}			Max.	0.8	V
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$, $R_{GK} = 1000\text{ }\Omega$	$T_j = 125\text{ °C}$	Min.	0.1	V
V_{RG}	$I_{RG} = 10\text{ }\mu A$		Min.	8	V
I_H	$I_T = 50\text{ mA}$, $R_{GK} = 1000\text{ }\Omega$		Max.	5	mA
I_L	$I_G = 1\text{ mA}$, $R_{GK} = 1000\text{ }\Omega$		Max.	6	mA
dV/dt	$V_D = 67\% V_{DRM}$, $R_{GK} = 1000\text{ }\Omega$	$T_j = 125\text{ °C}$	Min.	75	$V/\mu s$

Table 4: Static characteristics

Symbol	Test conditions		Value	Unit	
V_{TM}	$I_{TM} = 1.6\text{ A}$, $t_p = 380\text{ }\mu s$	$T_j = 25\text{ °C}$	Max.	1.95	V
V_{TO}	Threshold voltage		Max.	0.95	
R_D	Dynamic resistance		Max.	600	$m\Omega$
I_{DRM}/I_{RRM}	$V_D = V_{DRM}$; $V_R = V_{RRM}$, $R_{GK} = 1000\text{ }\Omega$		$T_j = 25\text{ °C}$	Max.	10
			$T_j = 125\text{ °C}$	Max.	100

Table 5: Thermal parameters

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

Notes:

⁽¹⁾S = copper surface under tab.

1.1 Characteristics (curves)

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

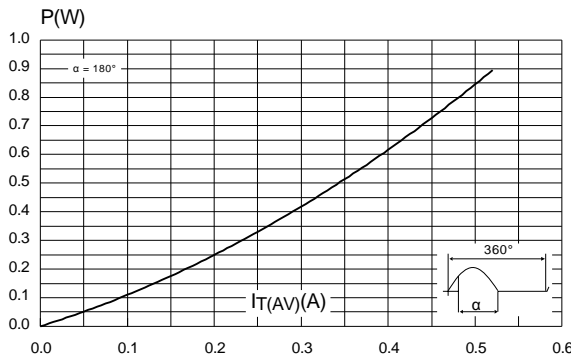


Figure 2: Average and DC on-state current versus case temperature

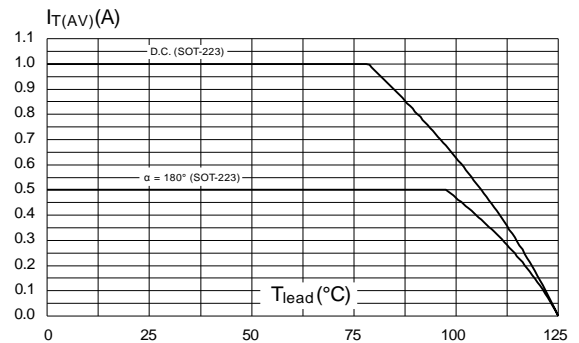


Figure 3: Average and DC on-state current versus ambient temperature

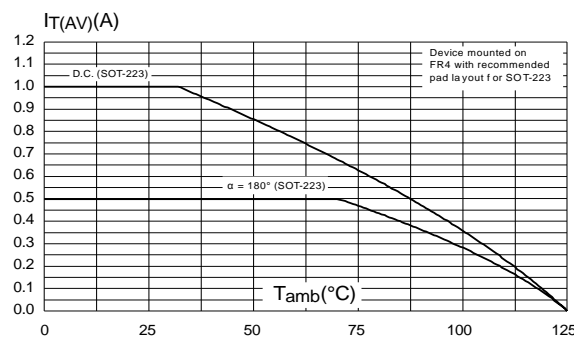


Figure 4: Relative variation of thermal impedance versus pulse duration

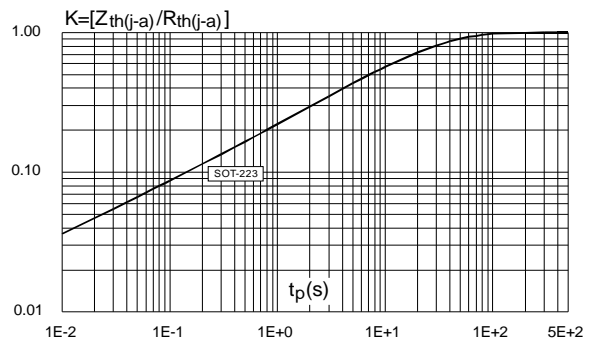


Figure 5: Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

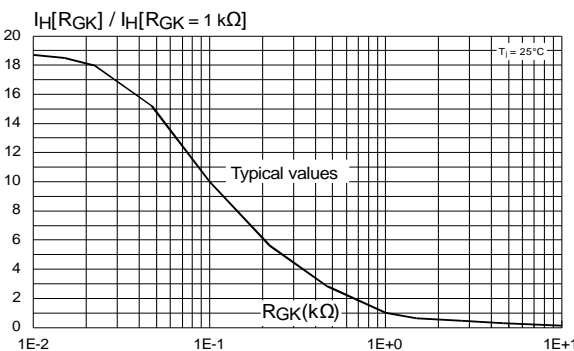
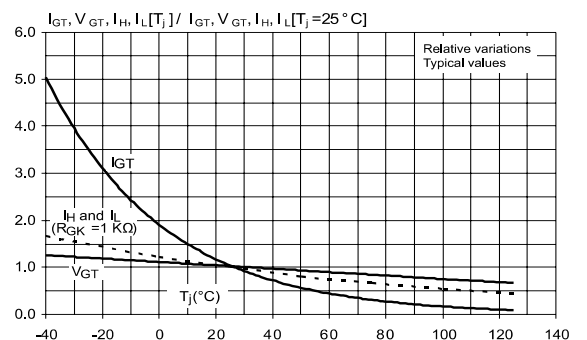
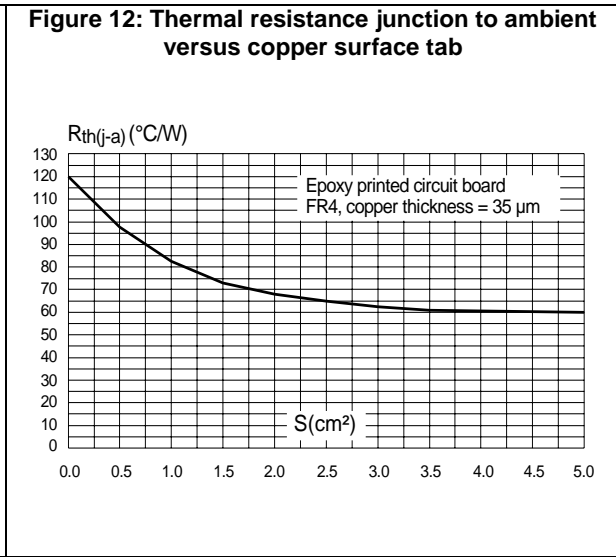
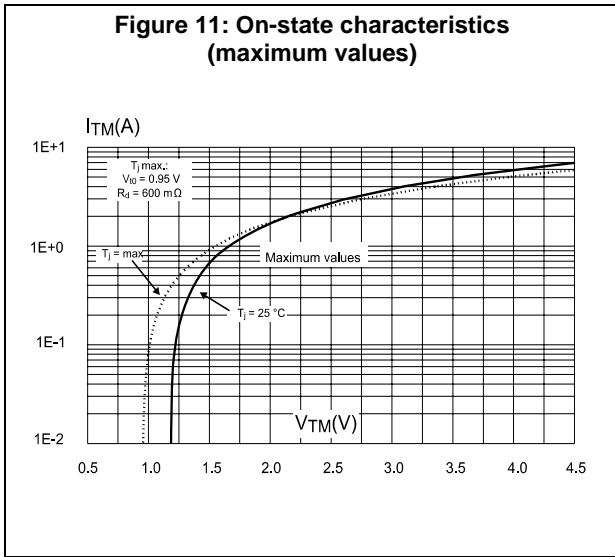
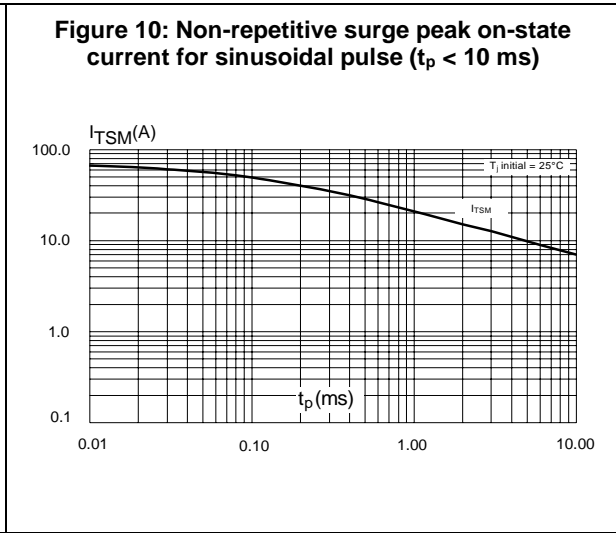
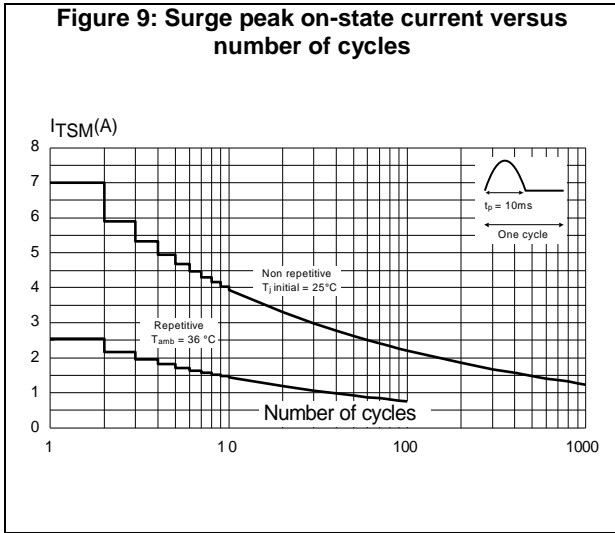
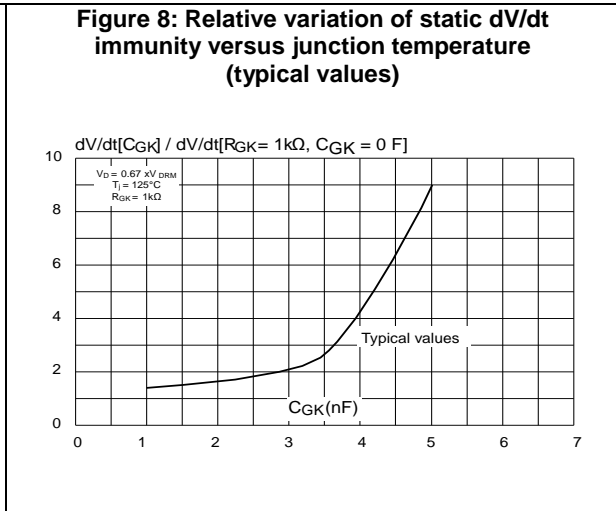
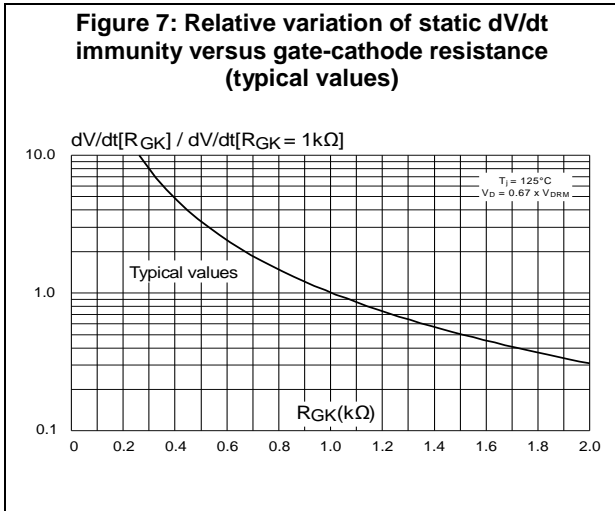


Figure 6: Relative variation of holding and latching current versus junction temperature (typical values)





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

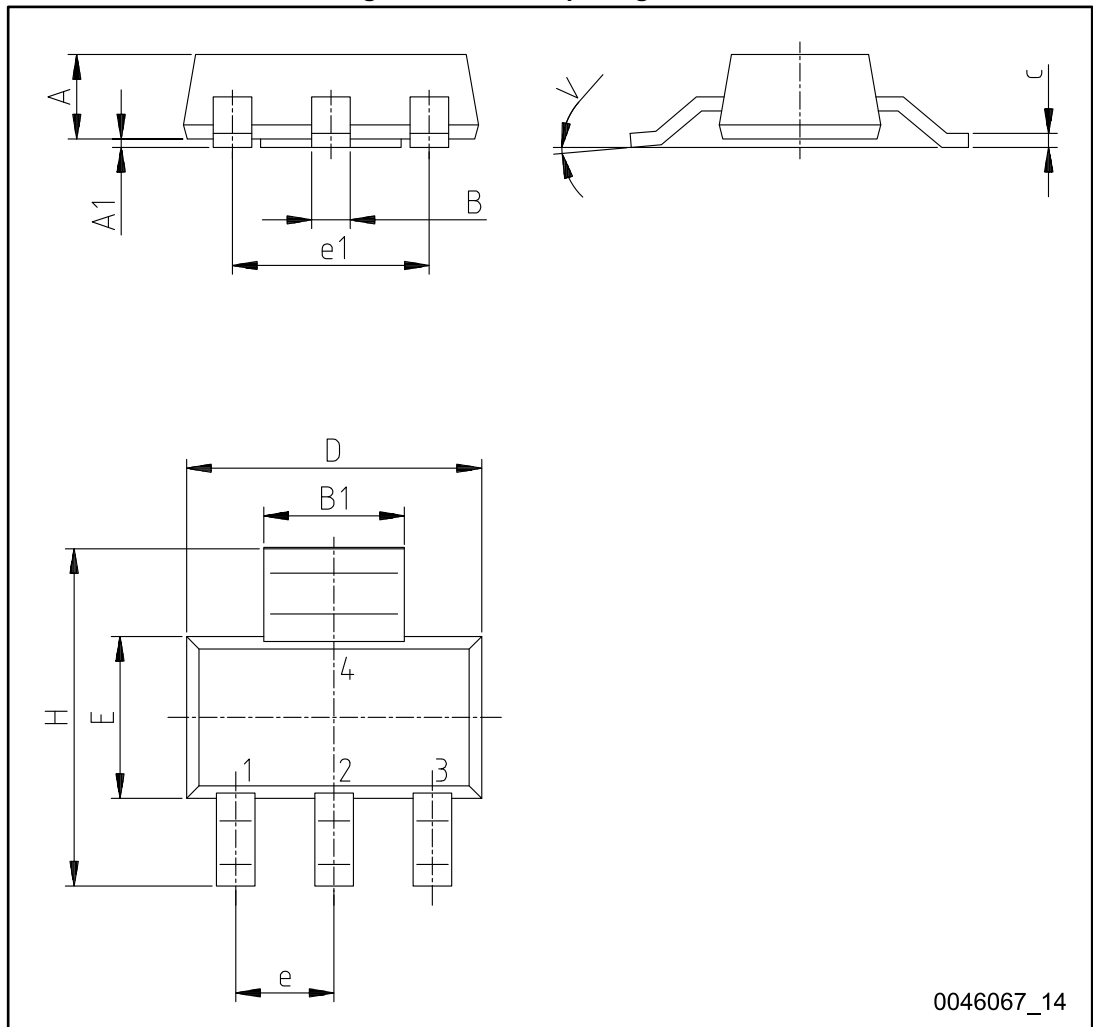


Table 6: SOT-223 package mechanical data

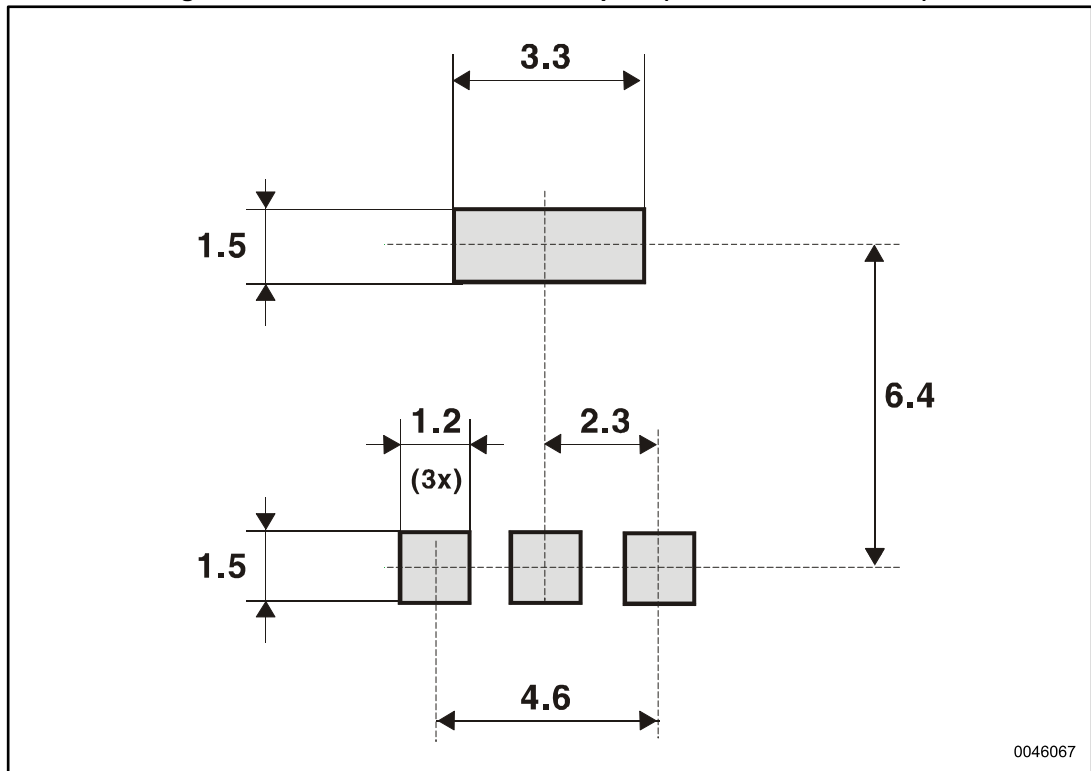
Dim.	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.8			0.0709
A1	0.02		0.1	0.0008		0.0039
B	0.6	0.7	0.85	0.0236	0.0276	0.0335
B1	2.9	3	3.15	0.1142	0.1181	0.1240
c	0.24	0.26	0.35	0.0094	0.0102	0.0138
D ⁽²⁾	6.3	6.5	6.7	0.2480	0.2559	0.2638
e		2.3			0.0906	
e1		4.6			0.1811	
E	3.3	3.5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

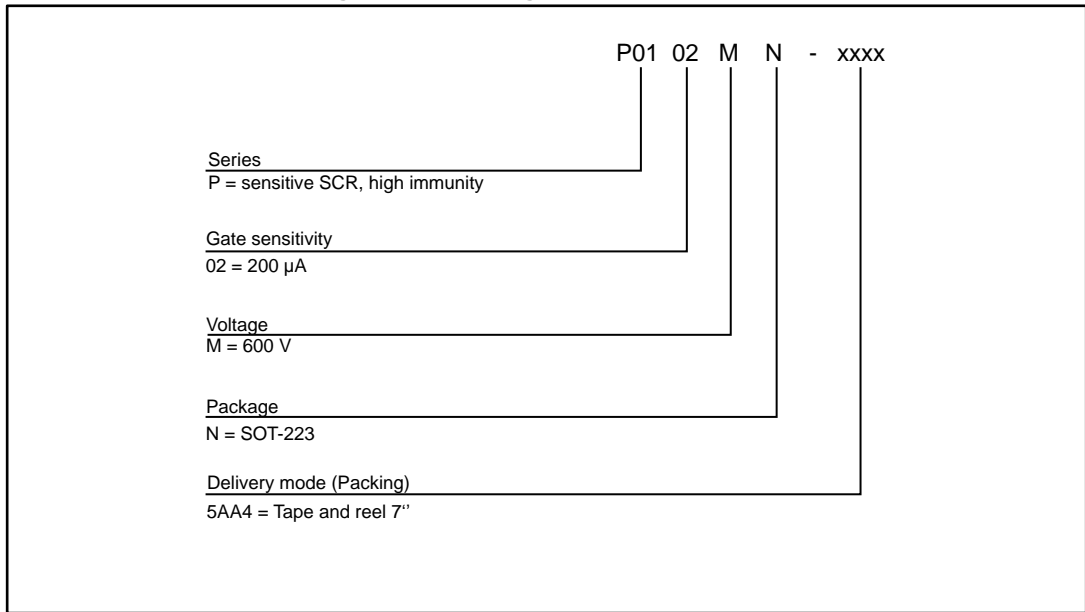


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
P0102MN 5AA4	P2M	SOT-223	0.12 g	1000	Tape and reel 7"

4 Revision history

Table 8: Document revision history

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

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