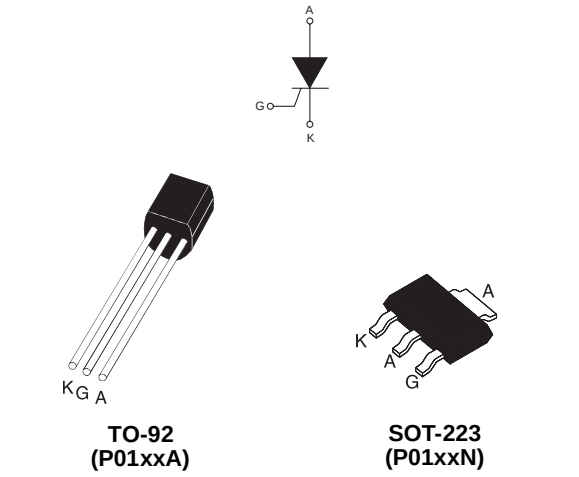
P01 Series

SENSITIVE

0.8A SCRs

MAIN FEATURES:

Symbol	Value	Unit
$I_{T(RMS)}$	0.8	A
V_{DRM}/V_{RRM}	400 and 600	V
I_{GT}	5 to 200	µA



TO-92 (P01xxA) **SOT-223 (P01xxN)**

DESCRIPTION

Thanks to highly sensitive triggering levels, the P01 SCR series is suitable for all applications where available gate current is limited, such as ground fault circuit interruptors, pilot circuits in solid state relays, stand-by mode power supplies, smoke and alarm detectors.
Available in through-hole or surface mount packages, the voltage capability of this series has been upgrated since its introduction, to reach 600 V.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)	TO-92	Tl = 55°C	0.8	A
		SOT-223	Tamb = 70°C		
$IT_{(AV)}$	Average on-state current (180° conduction angle)	TO-92	Tl = 55°C	0.5	A
		SOT-223	Tamb = 70°C		
I_{TSM}	Non repetitive surge peak on-state current	tp = 8.3 ms	Tj = 25°C	8	A
		tp = 10 ms		7	
I^2t	I^2t Value for fusing	tp = 10ms	Tj = 25°C	0.24	A^2S
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, tr ≤ 100 ns	F = 60 Hz	Tj = 125°C	50	A/µs
I_{GM}	Peak gate current	tp = 20 µs	Tj = 125°C	1	A
$P_{G(AV)}$	Average gate power dissipation		Tj = 125°C	0.1	W
T_{stg} Tj	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

ELECTRICAL CHARACTERISTICS (Tj = 25°C, unless otherwise specified)

Symbol	Test Conditions			P01xx			Unit
				02	11	18	
I_{GT}	V_D = 12 V R_L = 140 Ω		MIN.	-	4	0.5	µA
			MAX.	200	25	5	
V_{GT}			MAX.	0.8			V
V_{GD}	$V_D = V_{DRM}$ R_L = 3.3 kΩ R_{GK} = 1 kΩ	Tj = 125°C	MIN.	0.1			V
V_{RG}	I_{RG} = 10 µA		MIN.	8			V
I_H	I_T = 50 mA R_{GK} = 1 kΩ		MAX.	5			mA
I_L	I_G = 1 mA R_{GK} = 1 kΩ		MAX.	6			mA
dV/dt	V_D = 67 % V_{DRM} R_{GK} = 1 kΩ	Tj = 125°C	MIN.	75	80	75	V/µs
V_{TM}	I_{TM} = 1.6 A tp = 380 µs	Tj = 25°C	MAX.	1.95			V
V_{t0}	Threshold voltage	Tj = 125°C	MAX.	0.95			V
R_d	Dynamic resistance	Tj = 125°C	MAX.	600			mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$ = 400 V R_{GK} = 1 kΩ	Tj = 25°C	MAX.	1			µA
	$V_{DRM} = V_{RRM}$ = 600 V R_{GK} = 1 kΩ			10			µA
	$V_{DRM} = V_{RRM}$ R_{GK} = 1 kΩ	Tj = 125°C	MAX.	100			µA

THERMAL RESISTANCES

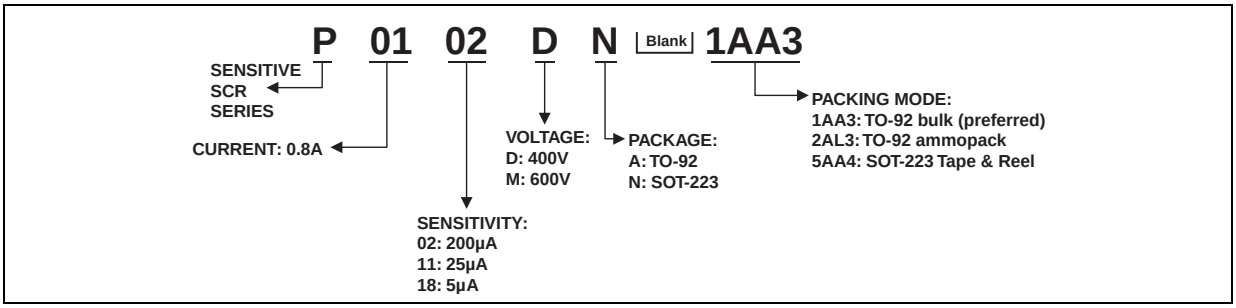
Symbol	Parameter			Value	Unit
$R_{th(j-i)}$	Junction to case (DC)		TO-92	80	°C/W
$R_{th(j-t)}$	Junction to tab (DC)		SOT-223	30	°C/W
$R_{th(j-a)}$	Junction to ambient		TO-92	150	
		S = 5 cm^2	SOT-223	60	

S = Copper surface under tab

PRODUCT SELECTOR

Part Number	Voltage		Sensitivity	Package
	400 V	600 V		
P0102DA	X		200 µA	TO-92
P0102DN	X		200 µA	SOT-223
P0102MA		X	200 µA	TO-92
P0102MN		X	200 µA	SOT-223
P0111DA	X		25 µA	TO-92
P0111DN	X		25 µA	SOT-223
P0111MA		X	25 µA	TO-92
P0111MN		X	25 µA	SOT-223
P0118DA	X		5 µA	TO-92
P0118DN	X		5 µA	SOT-223
P0118MA		X	5 µA	TO-92
P0118MN		X	5 µA	SOT-223

ORDERING INFORMATION



OTHER INFORMATION

Part Number	Marking	Weight	Base Quantity	Packing mode
P01xxyA 1AA3	P01xxyA	0.2 g	2500	Bulk
P01xxyA 2AL3	P01xxyA	0.2 g	2000	Ammopack
P0102yN 5AA4	P2y	0.12 g	1000	Tape & reel
P0111yN 5AA4	P1y	0.12 g	1000	Tape & reel
P0118yN 5AA4	P8y	0.12 g	1000	Tape & reel

Note: xx = sensitivity, y = voltage

Fig. 1: Maximum average power dissipation versus average on-state current.

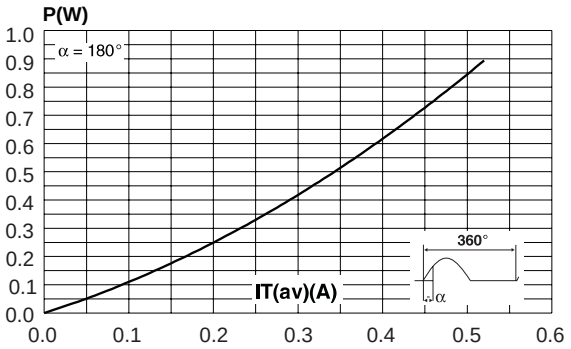


Fig. 2-1: Average and D.C. on-state current versus lead temperature.

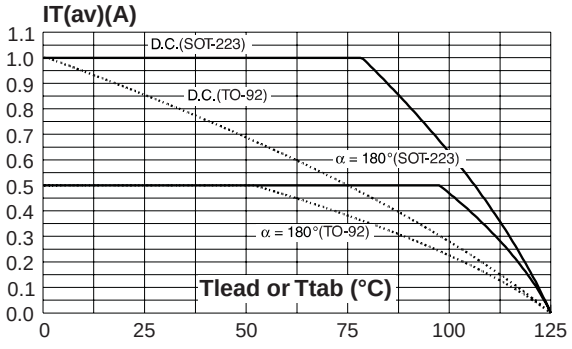


Fig. 2-2: Average and D.C. on-state current versus ambient temperature (device mounted on FR4 with recommended pad layout for SOT-223).

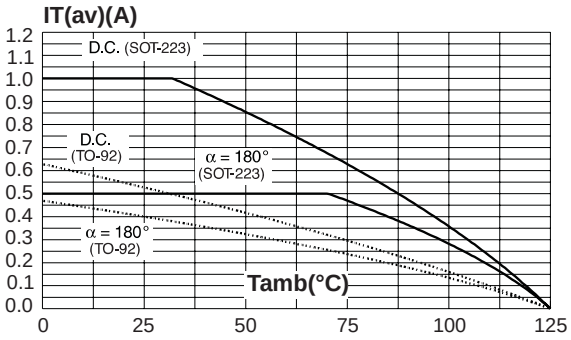


Fig. 3: Relative variation of thermal impedance junction to ambient versus pulse duration.

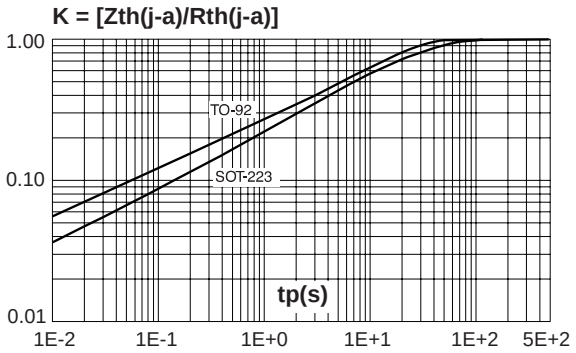


Fig. 4: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

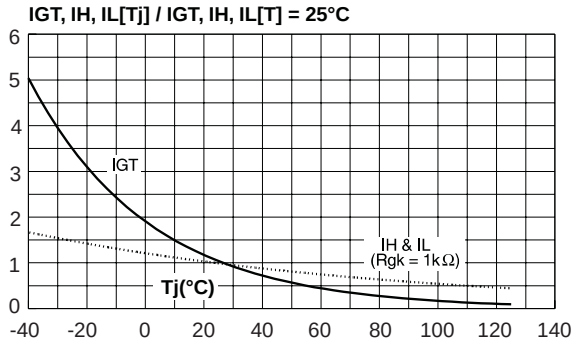


Fig. 5: Relative variation of holding current versus gate-cathode resistance (typical values).

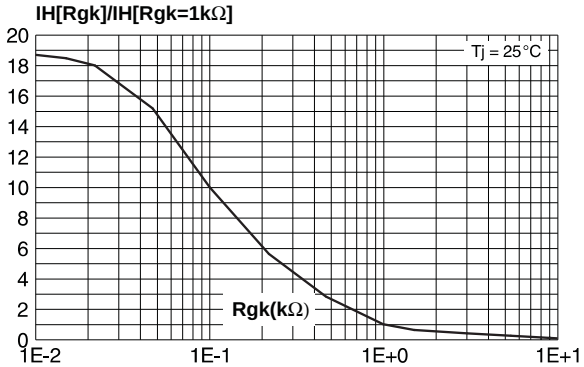


Fig. 6: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values).

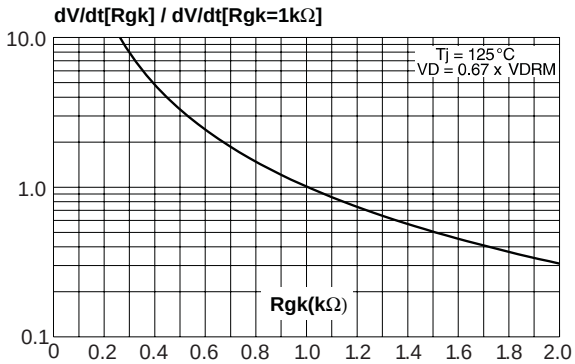


Fig. 7: Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values).

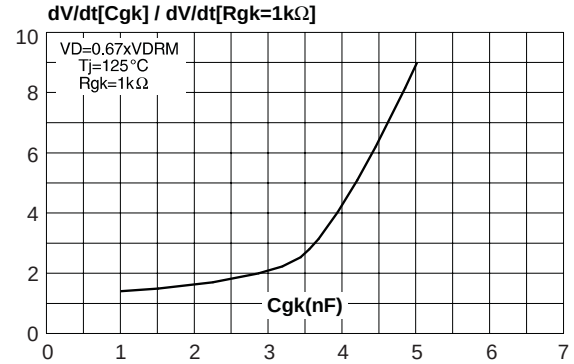


Fig. 8: Surge peak on-state current versus number of cycles.

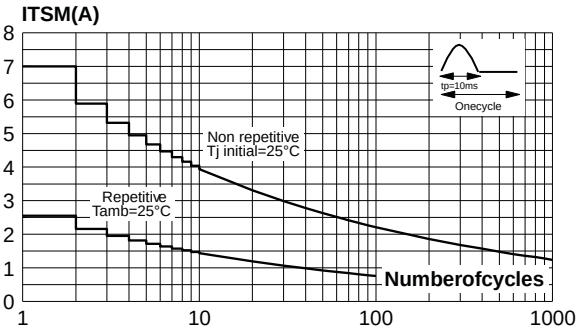


Fig. 9: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms, and corresponding value of I²t.

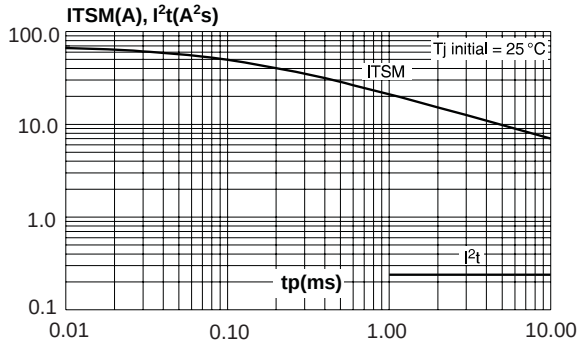


Fig. 10: On-state characteristics (maximum values).

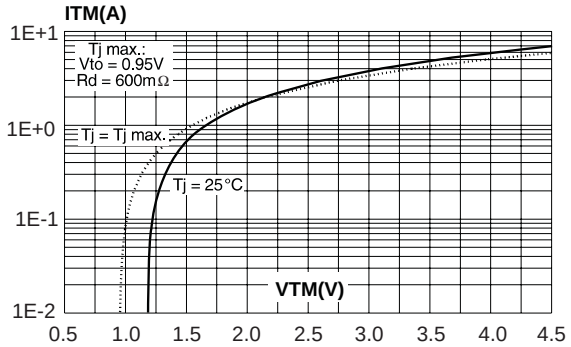
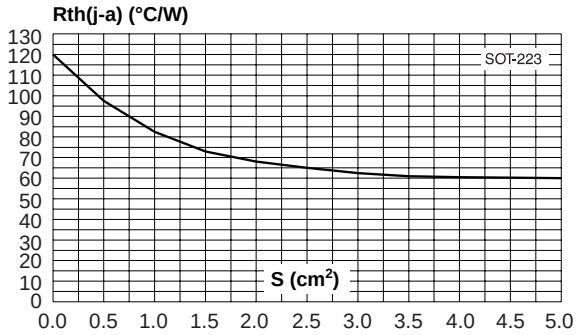
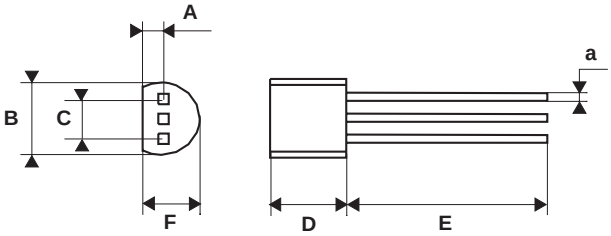


Fig. 11: SOT-223 Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 µm).



PACKAGE MECHANICAL DATA

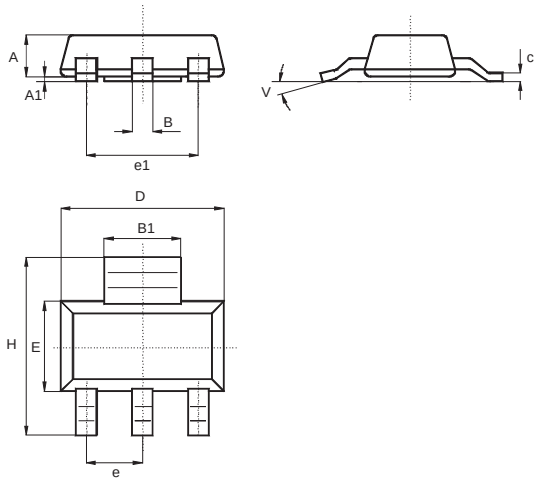
TO-92 (Plastic)



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.053	
B			4.70			0.185
C		2.54			0.100	
D	4.40			0.173		
E	12.70			0.500		
F			3.70			0.146
a			0.50			0.019

PACKAGE MECHANICAL DATA

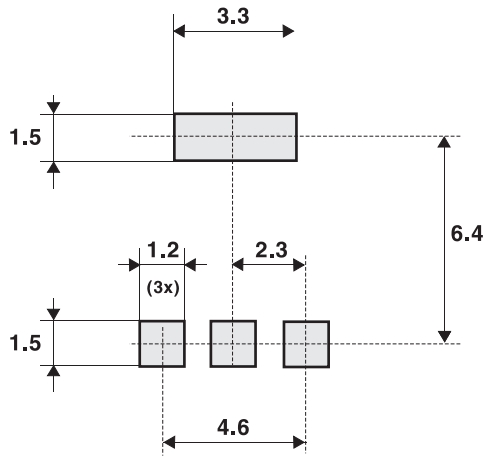
SOT-223 (Plastic)



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.071
A1	0.02		0.1	0.0008		0.004
B	0.60	0.70	0.85	0.024	0.027	0.034
B1	2.90	3.00	3.15	0.114	0.118	0.124
c	0.24	0.26	0.35	0.009	0.010	0.014
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.3			0.090	
e1		4.6			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V	10° max					

FOOTPRINT DIMENSIONS (in millimeters)

SOT-223 (Plastic)



Recommended soldering pattern SOT223

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