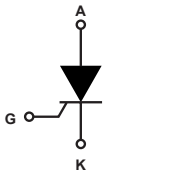
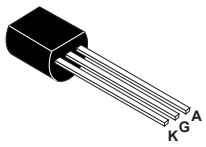
0.8 A 400 V high immunity sensitive SCR thyristor in TO-92

Features

- On-state rms current, $I_{T(RMS)}$ 0.8 A
- 125 °C max. T_j
- Low 0.2 mA gate current
- Repetitive peak off-state voltage, $V_{DRM/VRRM}$ 400 V
- ECOPACK2 compliant





TO-92

Applications

- Gate driver for large Thyristors
- Overvoltage crowbar protection
- Ground fault circuit interrupters
- Arc fault circuit interrupter
- Standby mode power supplies
- Residual current detector

Product status link
P0102DA

Product summary	
$I_{T(RMS)}$	0.8 A
V_{DRM}/V_{RRM}	400 V
I_{GT}	0.2 mA
$T_j$max.	125 °C

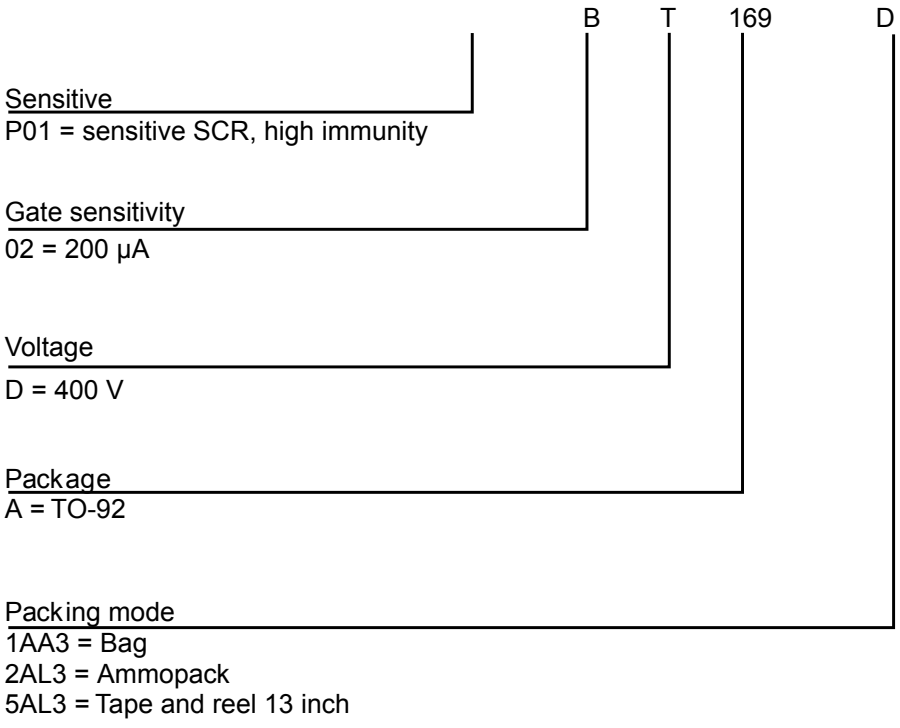
Description

Thanks to highly sensitive triggering levels, the 0.8 A P0102DA SCR thyristor is suitable for all applications where available gate current is limited.

This device offers a high blocking voltage of 400 V, ideal for applications like interrupters circuits.

The P0102DA is available in through-hole TO-92 package.

Figure 1. Ordering information scheme



1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	On-state RMS current (180° conduction angle)		T_L = 55 °C	0.8	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)			0.5	A
I_{TSM}	Non repetitive surge peak on-state current, T_j initial = 25 °C	t_p = 8.3 ms	T_j = 25 °C	8	A
		t_p = 10 ms		7	
I^2t	I^2t value for fusing	t_p = 10 ms	T_j = 25 °C	0.24	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 60 Hz	T_j = 25 °C	50	A/µs
V_{DRM} / V_{RRM}	Repetitive peak off-state voltage		T_j = 125 °C	400	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 range			-40 to +125	°C

Table 2. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Parameters		Value	Unit
I_{GT}	V_D = 12 V, R_L = 33 Ω	Max.	200	µA
V_{GT}		Max.	0.8	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, R_{GK} = 1 kΩ, T_j = 125 °C	Min.	0.1	V
V_{RG}	I_{RG} = 10 µA	Min.	8	
I_H	I_T = 50 mA, R_{GK} = 1 kΩ	Max.	5	mA
I_L	I_G = 1.2 I_{GT}, R_{GK} = 1 kΩ	Max.	6	mA
dV/dt	V_D = 67 % V_{DRM}, R_{GK} = 1 kΩ, T_j = 125 °C	Min.	75	V/µs

Table 3. Static electrical characteristics

Symbol	Test conditions	T_j		Value	Unit
V_T	I_{TM} = 1.6 A, t_p = 380 µs	25 °C	Max.	1.95	V
V_{TO}	Threshold on-state voltage	125 °C	Max.	0.95	V
R_d	Dynamic resistance	125 °C	Max.	600	mΩ
I_{DRM}	V_D = V_{DRM}	25 °C	Max.	1	µA
I_{RRM}	V_R = V_{RRM}	125 °C		0.1	mA

Table 4. Thermal resistance

Symbol	Parameters	Max. value	Unit
$R_{th(j-l)}$	Junction to lead (DC)	80	°C/W
$R_{th(j-a)}$	Junction to ambient (DC)	150	

1.1 Characteristics (curves)

Figure2. Maximum power dissipation versus on-state RMS current (full cycle)

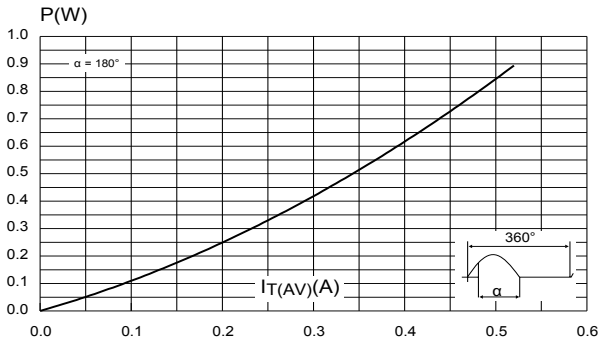


Figure3. Average and DC on-state current versus lead temperature

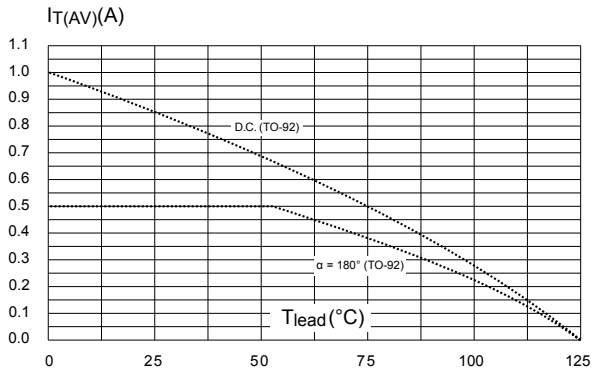


Figure 4. Average and DC on-state current versus ambient temperature

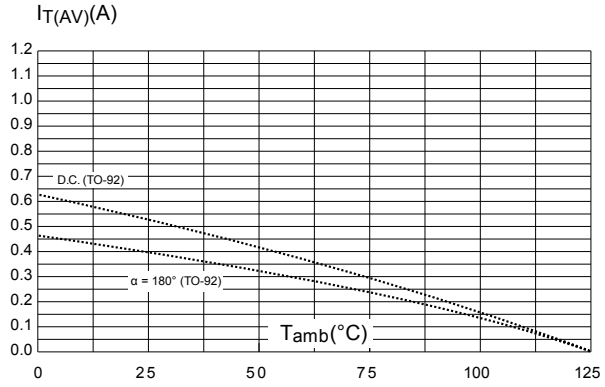


Figure5. Relative variation of thermal impedance versus pulse duration

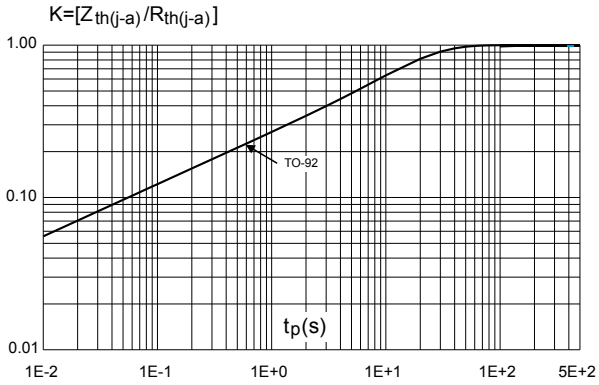


Figure6. Relative variation of holding current versus gate-cathode resistance

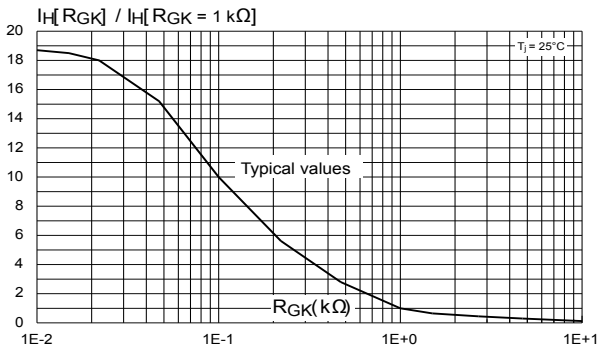


Figure7. Relative variation of gate voltage and gate, holding and latching current versus junction temperature

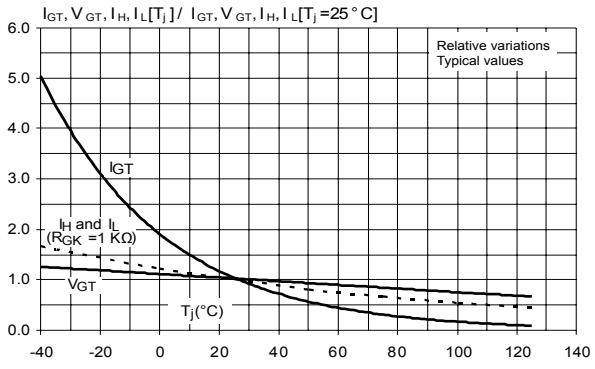


Figure8. Relative variation of static dV/dt immunity versus gate-cathode resistance

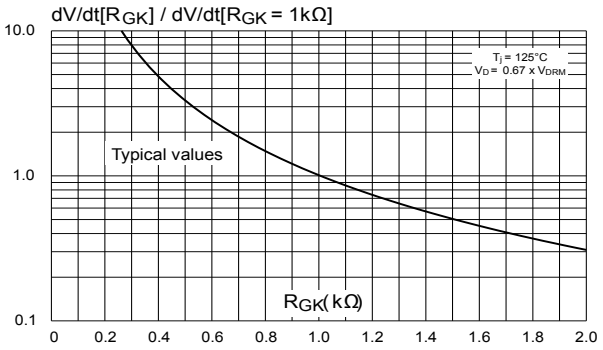


Figure9. Relative variation of dV/dt immunity versus gate-cathode capacitance

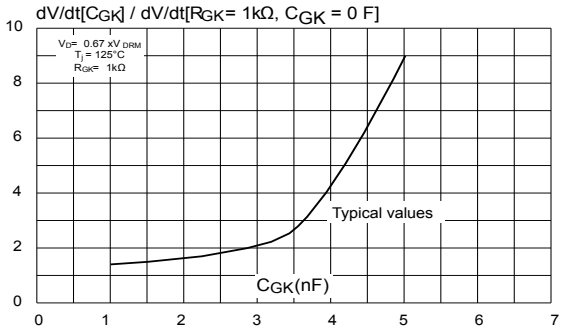


Figure10. Surge peak on-state current versus number of cycles

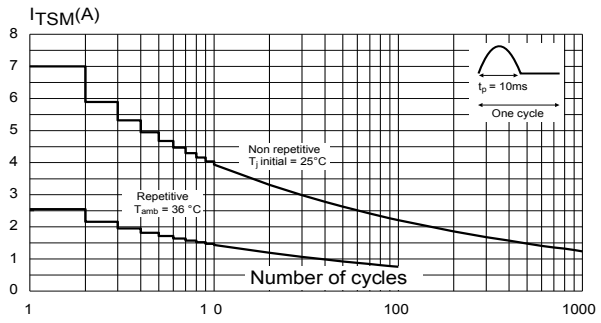


Figure 11. Non-repetitive surge peak on-state current for sinusoidal pulse (t_p< 10 ms)

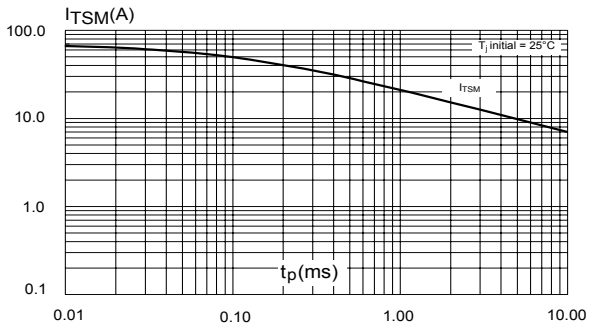


Figure12. On-state characteristics (maximum values)

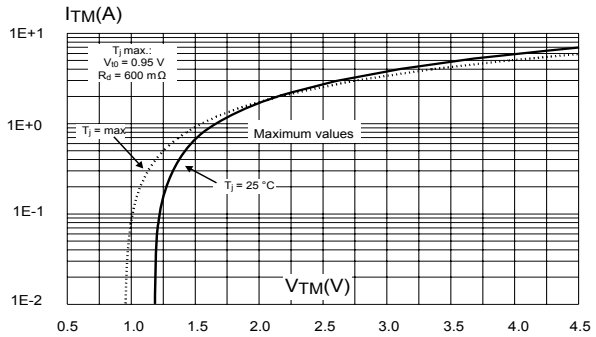


Figure 13. TO-92 package outline

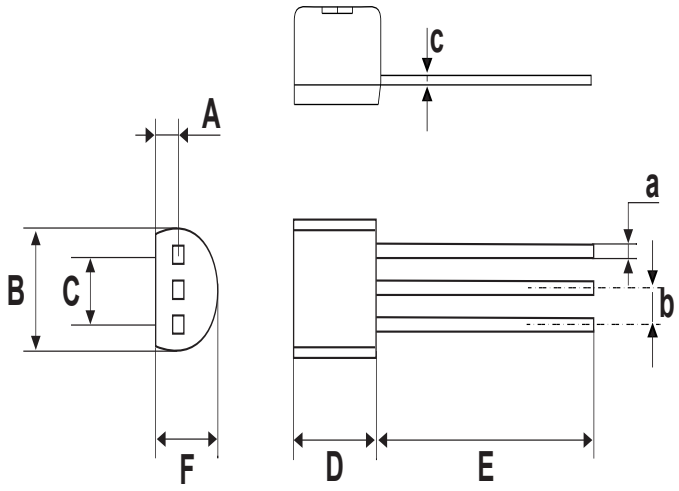


Table 5. TO-92 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.0531	
B			4.70			0.1850
C		2.54			0.1000	
D	4.40			0.1732		
E	12.70			0.5000		
F			3.70			0.1457
a			0.50			0.0197
b		1.27			0.0500	
c			0.48			0.0189

1. *Inches dimensions given for information*