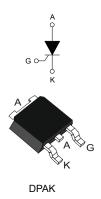


4 A Sensitive gate SCR in DPAK package



Features

- 4 A Triac
- Sensitive SCR: I_{GT} = 200 μA
- V_{DRM} / V_{RRM} = 600 V and V_{DSM} / V_{RSM} = 750 V
- 125 $^{\circ}$ C maximum junction temperature T_{j}
- DPAK SMD package
- · Halogen-free molding, lead-free plating
- ECOPACK2 compliant

Application

- Actuators
- Ignitors
- Inrush current limiting circuits

Description

The X04 series is 4 A SCR housed in compact SMD DPAK package. This highly sensitive device is suited to home appliances or power tools and industrial systems and drives loads up to 4 A.

Product status link X0402MB

Product summary			
I _{T(RMS)}	4 A		
V_{DSM}/V_{RSM}	750 V		
I _{GT}	200 μΑ		
T _j max.	125 °C		



1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter	Value	Unit	
I _{T(RMS)}	RMS on-state current (full sine wave)	T _c = 114 °C	4	А
I _{T AV}	RMS on-state average current (full sine wave)	T _c = 114 °C	2.5	А
I	Non repetitive surge peak on-state current (full cycle,	t = 8.3 ms	33	Α
I _{TSM}	T_j initial = 25 °C)	t = 10 ms	30	A
I ² t	I ² t value for fusing	t _p = 10 ms	9	A ² s
dl/dt	Critical rate of rise of on-state current, I_G = 2 x I_{GT} , tr I_g = 125 °C I_g = 125 °C		50	A/µs
V _{DRM} /V _{RRM}	Repetitive peak off-state voltage T _j = 125 °C		600	V
V _{DSM} /V _{RSM}	Non Repetitive peak off-state voltage, 10 ms	750	V	
I _{GM}	Maximum peak gate current $t_p = 20 \mu s$, $T_i = 125 ^{\circ} C$		1.2	Α
P_{GM}	Maximum gate power dissipation	0.5	W	
T _{stg}	Storage temperature range	-40 to +125	°C	
Tj	Operating junction temperature range	-40 to +125	°C	
T _L	Maximum lead temperature for soldering during 10 s	260	°C	

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

Symbol	Test conditions			Value	Unit
I _{GT} ⁽¹⁾	V _D = 12 V, R _I = 140 Ω		Max.	200	μΑ
V _{GT}	VD = 12 V, INC = 140 12	V _D = 12 V, R _L = 140 Ω		0.8	V
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3 \text{ k}\Omega$ $T_j = 125 \text{ °C}$		Min.	0.1	V
V_{RGM}	I _{RG} = 10 μA		Max.	8	V
IL	$I_G = 1.2 \times I_{GT}$		Max.	6	mA
I _H (2)	I _T = 500 mA, gate open		Max.	5	mA
dV/dt (2)	$V_D = 67 \% V_{DRM}$, $R_{GK} = 1 k\Omega$ $T_j = 110 °C$		Min.	10	V/µs

- 1. For both polarities of OUT pin referenced to COM pin.
- 2. For both polarities of A2 referenced to A1.

Table 3. Static characteristics

Symbol	Test conditions	Tj		Value	Unit
V _{TM} ⁽¹⁾	I _{TM} = 8 A, t _p = 380 μs	25 °C	Max.	1.8	V
V _{TO} ⁽¹⁾	Threshold voltage	125 °C	Max.	0.85	V
R _D ⁽¹⁾	Dynamic resistance	125 °C	Max.	100	mΩ
I _{DRM} /I _{RRM} V	$V_D = V_{DRM}$; $V_R = V_{RRM}$; $R_{GK} = 1 \text{ k}\Omega$	25 °C	Max.	5	μΑ
		125°C	IVIAX.	1	mA

1. For both polarities of A2 referenced to A1.

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Table 4. Thermal resistance

Symbol	Parameter	Value	Unit	
R _{th(j-c)}	Junction to case	3	°C/W	
R _{th(j-a)}	Junction to ambient: S _{CU} = 0.5 cm ²	Тур.	70	°C/W

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1.1 Characteristics (curves)

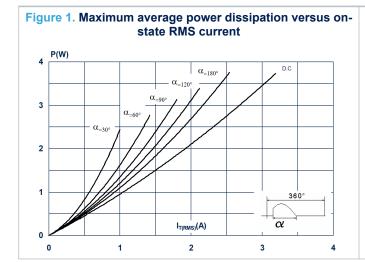


Figure 2. Average and DC on-state current versus case temperature $\begin{bmatrix} 1_{T(AY)}(A) \\ 4 \\ 3 \\ 2 \\ 1 \\ \alpha_{=30^{\circ}} \end{bmatrix}$

Figure 3. On-state RMS current versus ambient temperature (full cycle)

2.0

1.5

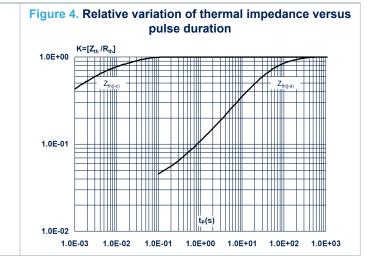
α=180°

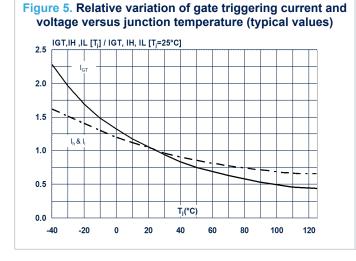
1.0

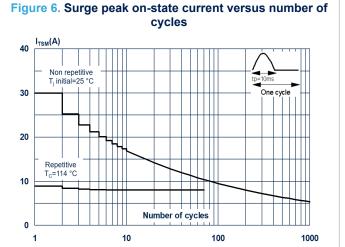
0.5

0.0

25 50 75 100 125 150







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Figure 7. Non repetitive surge peak on-state current for a sinusoidal pulse with width $t_{\rm p}$ < 10 ms and corresponding value of l^2t

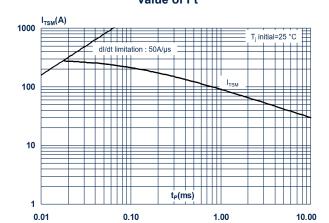


Figure 8. On-state characteristics (maximum values)

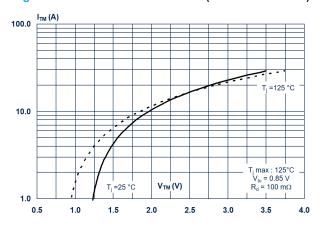


Figure 9. Relative variation of static dV/dt immunity versus gate-to-cathode resistance (typical values)

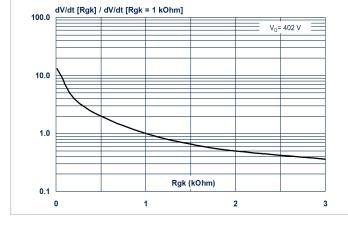


Figure 10. Relative variation of static dV/dt immunity versus gate-to-cathode capacitance (typical values)

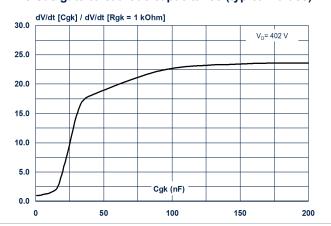


Figure 11. Relative variation of static dV/dt immunity versus junction temperature

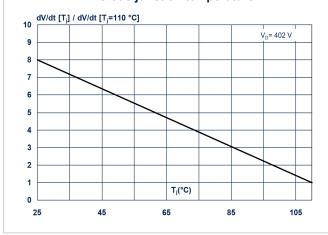
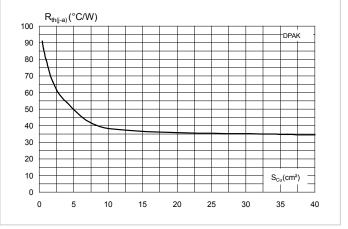


Figure 12. Thermal resistance junction to ambient versus copper surface under tab (typical values)



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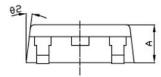
2 Package information

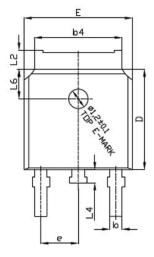
To meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

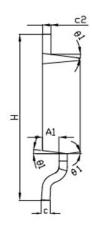
2.1 DPAK package information

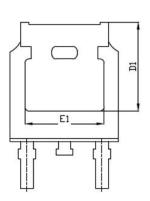
- Molding compouned resin is halogen free and meets UL94 flammability standard, level V0
- · Lead-free package leads plating

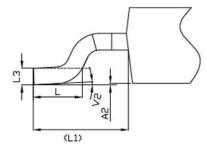
Figure 13. DPAK package outline











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Table 5. DPAK package mechanical data

	Dimensions					
Ref.	Millimeters		Inches ⁽¹⁾			
	Min.	Тур.	Max.	Min.	Тур.	Max.
А	2.20	2.30	2.38	0.0866	0.0906	0.0937
A1	0.90	1.01	1.10	0.0354	0.0398	0.0433
A2	0.00		0.10	0.0000		0.0039
b	0.72		0.85	0.0283		0.335
b4	5.13	5.33	5.46	0.2020	0.2098	0.2150
С	0.47		0.60	0.0185		0.0236
c2	0.47		0.60	0.0185		0.0236
D	6.00	6.10	6.20	0.2362	0.2402	0.2441
D1	5.15	5.40	5.65	0.2028	0.2126	0.2224
Е	6.50	6.60	6.70	0.2550	0.2598	0.2638
E1	4.70	4.85	5.00	0.1850	0.1909	0.1969
е	2.186	2.286	2.386	0.0860	0.0900	0.0940
Н	9.80	10.10	10.40	0.3858	0.3976	0.4094
L	1.40	1.50	1.70	0.0551	0.0591	0.0669
L1		2.90 REF		0.1142 REF		
L2	0.90		1.25	0.0354		0.0492
L3		0.51 BSC			0.201 BSC	
L4	0.60	0.80	1.00	0.0236	0.0315	0.0394
L6	1.80 BSC		0.0709 BSC			
Θ1	5°	7°	9°	5°	7°	9°
Θ2	5°	7°	9°	5°	7°	9°
V2	0°		8°	0°		8°

^{1.} Dimensions in inches are given for reference only

Note:

This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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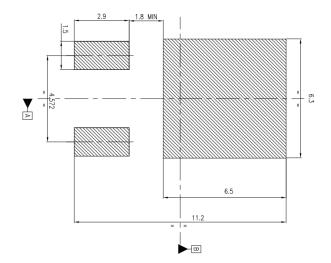


Figure 14. DPAK recommended footprint (dimensions are in mm)

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3 Ordering information

Figure 15. Ordering information scheme

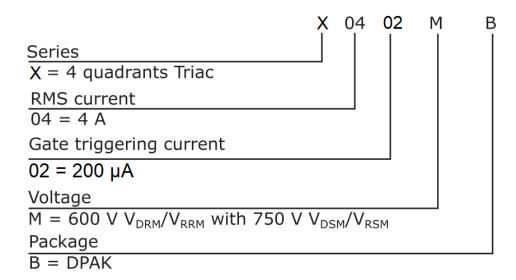


Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
X0402MB	X0402MB	DPAK	0.3 g	2500	Tape and reel

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Revision history

Table 7. Document revision history

Date	Revision	Changes
06-Sep-2022	1	Initial release.
09-Dec-2024	2	Updated Section Cover image.

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