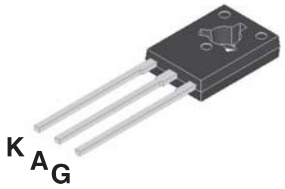
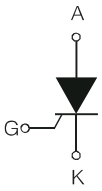
SENSITIVE GATE SCR

TO-225AA (TO-126)





On-State Current	Gate Trigger Current
4 Amp	< 200 µA

Off-State Voltage
400 V ÷ 800 V

FEATURES

- Glass/passivated die junctions
- Low current SCR
- Low thermal resistance
- High surge current capability
- Low forward voltage drop
- Solder dip 260°C, 10s
- Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC
- Meets MSL level 3, per J-STD-020, LF maximum peak of 260° C

Pb e3 **RoHS** COMPLIANT

MECHANICAL DATA

- **Case:** TO-225AA (TO-126). Epoxy meets UL 94V-0 flammability rating.
- **Polarity:** As marked on the body.
- **Terminals:** Matte tin plated leads, solderable per MIL-STD-750 Method 2026, J-STD-002 and JESD22-B102. Consumer grade, meets JESD 201 class 1A whisker test.

TYPICAL APPLICATIONS

Thanks to highly sensitive triggering levels, the FS04xxxK 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.

Maximun Ratings and Electrical Characteristics at 25°C

SYMBOL	PARAMETER	CONDITIONS	Value	Unit
$I_{T(RMS)}$	On-state Current	180 ° Conduction Angle, T_C = 115 °C	4	A
$I_{T(AV)}$	Average On-state Current	Half Cycle, Θ = 180 °, T_C = 115 °C	2.55	A
I_{TSM}	Non-repetitive On-State Current	Half Cycle, 60 Hz	22	A
I_{TSM}	Non-repetitive On-State Current	Halfl Cycle, 50 Hz	20	A
I^2t	Fusing Current	tp = 10 ms, Half Cycle	2	A^2s
I_{GM}	Peak Gate Current	20 µs max.	1.2	A
P_{GM}	Peak Gate Dissipation	20 µs max.	3	W
$P_{G(AV)}$	Gate Dissipation	20ms max.	0.2	W
T_j	Operating Temperature		(-40 to +125)	°C
T_{stg}	Storage Temperature		(-40 to +150)	°C
T_{sld}	Soldering Temperature	10s max.	260	°C

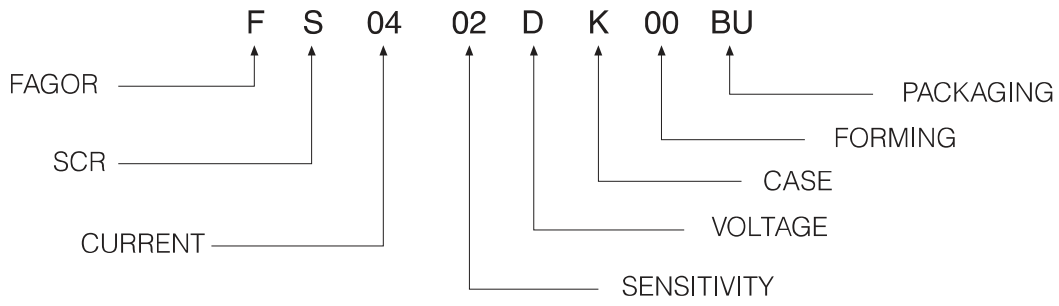
SYMBOL	PARAMETER	CONDITIONS	VOLTAGE			Unit
			D	M	N	
V_{DRM}/V_{RRM}	Repetitive Peak Off State Voltage	R_{GK} = 1 kΩ	400	600	800	V

SENSITIVE GATE SCR

Electrical Characteristics at Tamb = 25 °C

SYMBOL	PARAMETER	CONDITIONS		SENSITIVITY 01	SENSITIVITY 02	SENSITIVITY 04	Unit
I_{GT}	Gate Trigger Current	V_D = 12 V_{DC}, R_L = 140Ω. T_j = 25 °C	MIN MAX	1 20	 200	15 50	µA
V_{GT}	Gate Trigger Voltage	V_D = 12 V_{DC}, R_L = 140Ω, T_j = 25 °C	MAX	0.8			V
V_{GD}	Gate Non Trigger Voltage	V_D = V_{DRM}, R_L = 3.3kΩ R_{GK} = 220Ω T_j = 125 °C	MIN	0.2			V
V_{RGM}	Reverse Gate Voltage	I_{RG} = 10µA,	MIN	8			V
I_H	Holding Current	I_T = 50 mA, R_{GK} = 1kΩ T_j = 25 °C	MAX	5			mA
I_L	Latching Current	I_G = 1 mA, R_{GK} = 1 kΩ	MAX	6			mA
dV / dt	Critical Rate of Voltage Rise	V_D = 0.67 x V_{DRM}, R_{GK} = 1 kΩ, T_j = 125 °C	MIN	10	5	5	V/µs
dI / dt	Critical Rate of Current Rise	I_G = 2 x I_{GT} tr ≤ 100 ns, f = 60 Hz, T_j = 125 °C	MIN	50			A/µs
V_{TM}	On-state Voltage	at I_T = 4.0 Amp, tp = 380 µs, T_j = 25 °C	MAX	1.60			V
V_{t0}	Threshold Voltage	T_j = 125 °C	MAX	0.85			V
r_d	Dynamic resistance	T_j = 125 °C	MAX	90			mΩ
I_{DRM} / I_{RRM}	Off-State Leakage Current	V_D = V_{DRM}, R_{GK} = 1kΩ T_j = 125 °C V_R = V_{RRM}, T_j = 25 °C	MAX MAX	0.1 5			mA µA
$R_{th(j-c)}$	Thermal Resistance Junction-Case for DC	for AC 360 ° conduction angle		3			°C/W
$R_{th(j-a)}$	Thermal Resistance Junction-Amb for DC			75			°C/W

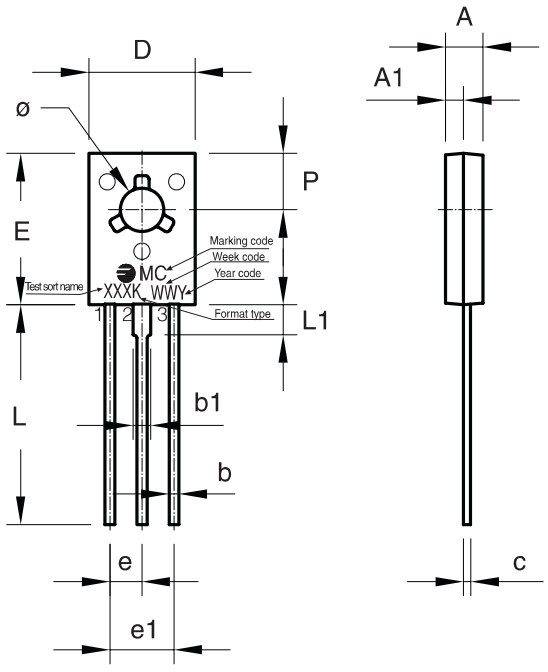
Part Number Information



Ordering information

PREFERRED P/N	PACKAGE CODE	DELIVERY MODE	BASE QUANTITY	UNIT WEIGHT (g)
FS0402DK 00BU	BU	BULK	3,000	0.70

Package Outline Dimensions: (mm) TO-225AA (TO-126)



REF.	DIMENSIONS Milimeters		
	Min.	Nominal	Max.
A	2.500		2.900
A1	1.100		1.500
b	0.660		0.860
b1	1.170		1.370
c	0.450		0.600
D	7.400		7.800
E	10.600		11.000
e		2.290	
e1	4.480		4.680
L	15.300		15.700
L1	2.100		2.300
P	3.900		4.100
Ø	3.000		3.200

Mounting Torque	0.67 N.m

Ratings and Characteristics (Ta 25 °C unless otherwise noted)

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

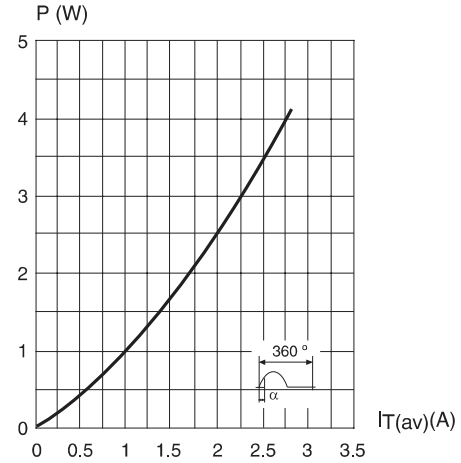


Fig. 2: Average and D.C. on-state current versus case temperature

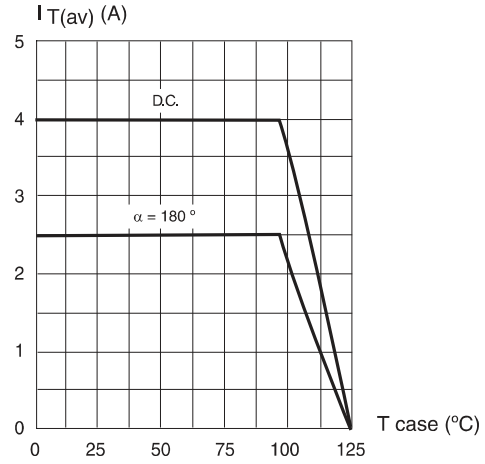


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration

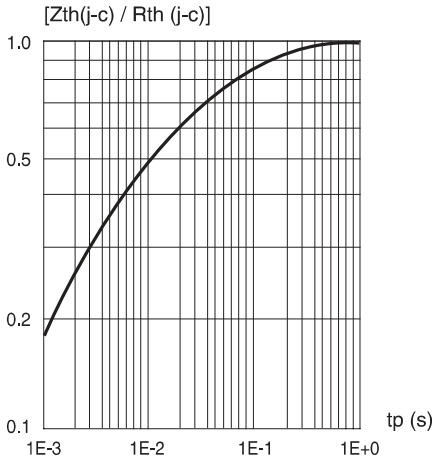


Fig. 4: Relative variation of gate trigger current, holding and latching current versus junction temperature

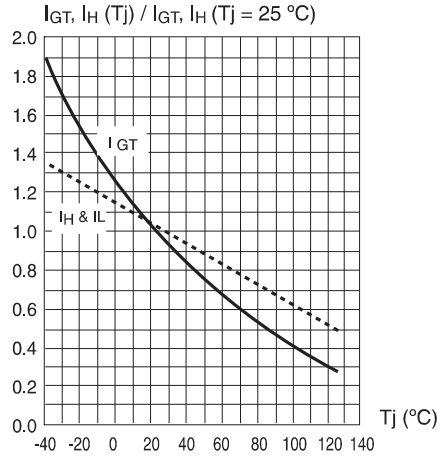


Fig. 5: Relative variation of holding current versus gate-cathode resistance (typical values).

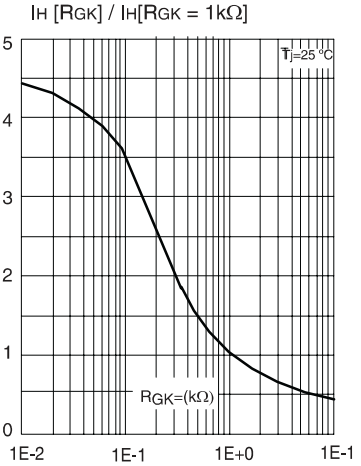


Fig. 6: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values).

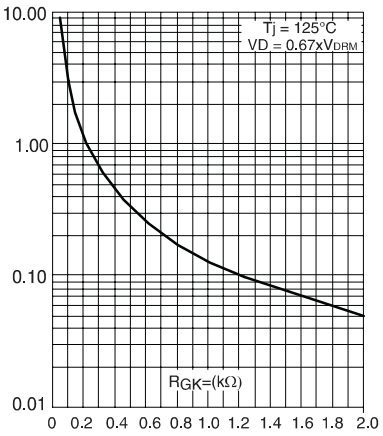


Fig. 7: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values).

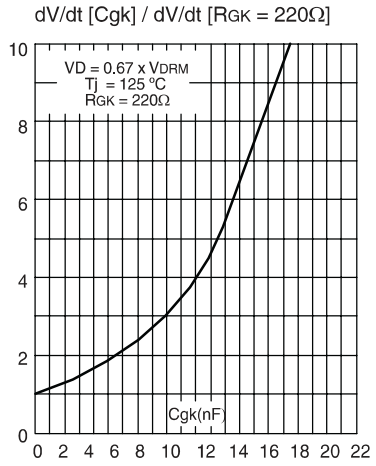


Fig. 8: Non repetitive surge peak on-state current versus number of cycles.

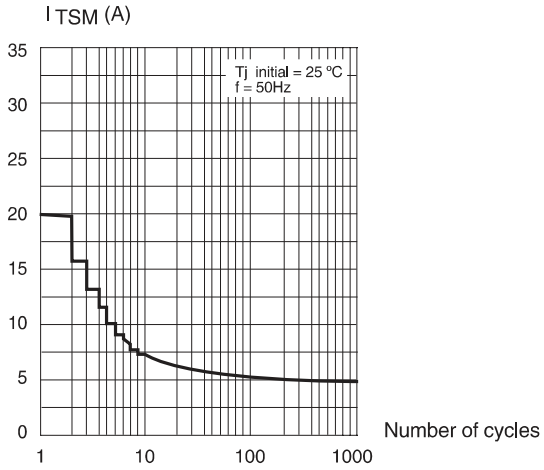


Fig.9: Non repetitive surge peak on-state current for a sinusoidal pulse with width: tp < 10 ms, and corresponding value of I^2t

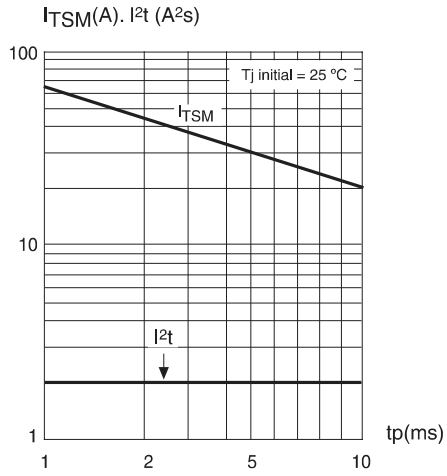
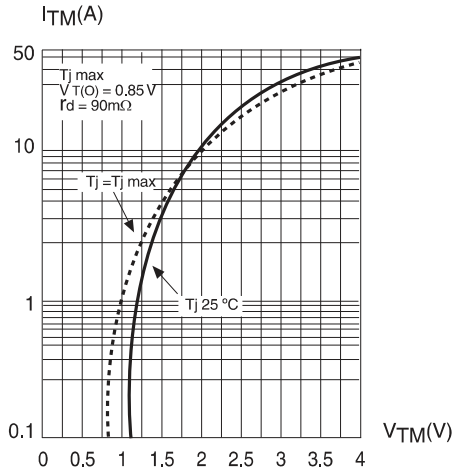


Fig. 10: On-state characteristics (maximum values)



Revision History

Date	Revision	Description of Changes
14-Jul-2011	0	Original Data Sheet
10-May-2013	1	200V and 700V eliminated

Disclaimer

All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

Fagor Electrónica, S.Coop., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Fagor"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Fagor makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Fagor disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Fagor's knowledge of typical requirements that are often placed on Fagor products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Fagor's terms and conditions of purchase, including but nos limited to the warranty expressed therein.

Except as expressly indicated in writing. Fagor products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Fagor product could result in personal injury or death. Customers using or selling Fagor products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Fagor and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attomeys fees, even if such claim alleges that Fagor or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Fagor personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Fagor, Product names and markings noted herein may be trademarks of their respective owners.