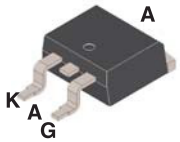
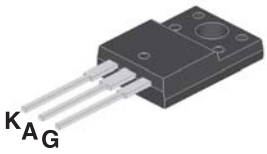
STANDARD & SENSITIVE 8A SCR

TO-252AA (DPAK)
(FS08xxxD)

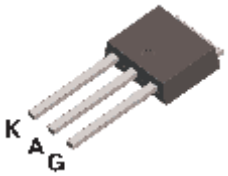


(FULLY ISOLATED CASE)

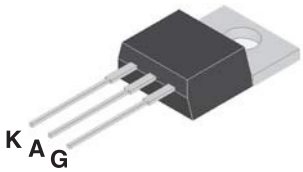
TO-220F
(FS08xxxW)

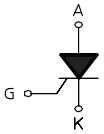


TO-251AA (IPAK)
(FS08xxxI)



TO-220AB
(FS08xxxH)





On-State Current	Gate Trigger Current
0.8 Amp	200 µA to 25mA

Off-Satate Voltage
400 V ÷ 800 V

FEATURES

- Glass/passivated die junctions
- Low thermal resistance
- High surge current capability
- Low forward voltage drop
- Component in accordance to RoHS 2011/65/EU and WEEE 2002/96/EC

RoHS COMPLIANT

MECHANICAL DATA

- **Case:** DPAK/ IPAK/ TO-220F/ TO-220AB. 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

The **standard** SCR FS0808 and FS0809 series is suitable for a wide range of applications, e.g., Overvoltage Crowbar protection, Motor Control circuits in Power Tools and domestic appliances, inrush current limiting circuits, capacitive discharge ignition and voltage regulation circuits.

The **sensitive gate** SCR FS0802 series is suitable for applications where the available gate current is limited, e.g., Ground Fault Interruptors, Solid State Relays, Stand-by mode power supllies, smoke and alarm detectors.

Maximun Ratings and Electrical Characteristics at 25 °C

SYMBOL	PARAMETER	CONDITIONS	Value	Unit
$I_{T(RMS)}$	On-State Current	180 º Conduction Angle, T_c = 110 ºC	8	A
$I_{T(AV)}$	Average On-State Current	180 º Conduction Angle, T_c = 110 ºC	5	A
I_{TSM}	Non-repetitive On-State Current	Half Cycle, 60 Hz	73	A
I_{TSM}	Non-repetitive On-State Current	Half Cycle, 50 Hz	70	A
I^2t	Fusing Current	tp = 10 ms, Half Cycle	24.5	A^2s
I_{GM}	Peak Gate Current	20 µs max.	4	A
P_{GM}	Peak Gate Dissipation	20 µs max.	5	W
$P_{G(AV)}$	Gate Dissipation	20 µs max.	1	W
T_j	Operating Temperature		(-40 to + 125)	ºC
T_{stg}	Storage Temperature		(-40 to + 150)	ºC
T_{sld}	Soldering Temperature	10s max.	260	ºC
V_{RGM}	Max. Peak Reverse Gate Voltage (For FS0808 and FS0809 only)		5	V

SYMBOL	PARAMETER	Voltage			Unit
		D	M	N	
V_{DRM} V_{RRM}	Repetitive Peak Off State Voltage	400	600	800	V

Electrical Characteristics at Tamb = 25 °C

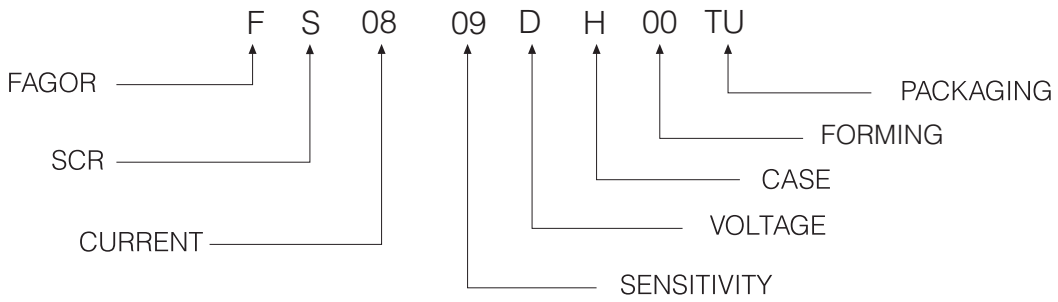
SYMBOL	PARAMETER	CONDITIONS			SG	STANDARD		Unit
					02	08	09	
I_{GT}	Gate Trigger Current	V_D = 12 V_{DC},	R_L = 140Ω	MAX	200	-	-	µA
			R_L = 33Ω	MIN	-	0.5	2	
				MAX	-	5	15	
V_{GT}	Gate Trigger Voltage	V_D = 12 V_{DC}	R_L = 140Ω	MAX	0.8	-		V
			R_L = 33Ω		-	1.3		
V_{GD}	Gate Non Trigger Voltage	V_D = V_{DRM}, R_L = 3.3kΩ, Tj= 125 ºC	R_{GK} = 220Ω Gate open	MIN	0.1 -	- 0.2		V
V_{RGM}	Reverse Gate Voltage	$I_{R G}$ = 10µA		MIN	8	-		V
I_H	Holding Current	I_T = 50 mA	R_{GK} = 1kΩ Gate open	MAX	5 -	- 25	- 40	mA
I_L	Latching Current	I_G = 1.2 I_{GT}	R_{GK} = 1kΩ Gate open	MAX	6 -	- 30	- 50	mA
dV / dt	Critical Rate of Voltage Rise	V_D = 0.67 x V_{DRM}, Tj= 125 ºc	R_{GK} =220kΩ Gate open	MIN	5 -	- 50	- 150	V/µs
dI / dt	Critical Rate of Current Rise	I_G =2 x I_{GT}, tr ≤ 100ns, f = 60Hz, Tj= 125 ºC		MIN	50			A/µs
V_{TM}	On-State Voltage	at I_T = 16 Amp, tp = 380 µs, Tj= 25 ºC		MAX	1.6			V
$V_{t(o)}$	Threshold Voltage	Tj= 125 ºC		MAX	0.85			V
r_d	Dynamic resistance	Tj= 125 ºC		MAX	46			mΩ
I_{DRM} / I_{RRM}	Off-State Leakage Current	V_{DRM} = V_{RRM}, R_{GK} = 220kΩ	Tj = 125 ºC	MAX	1	2		mA
			Tj = 25 ºC	MAX	5	5		µA

Thermal Resistance

SYMBOL	PARAMETER	CONDITIONS		Value	Unit
$R_{th(j-c)}$	Thermal Resistance Junction-Case for DC		DPAK, IPAK, TO-220AB	1.3	ºC/W
			TO-220F	4.6	
$R_{th(j-a)}$	Thermal Resistance Junction-Amb for DC	S = 0.5 cm^2	DPAK	70	ºC/W
			IPAK	100	
			TO-220F	60	
			TO-220AB	60	

S = Copper surface under tab

Part Number Information



Ordering information

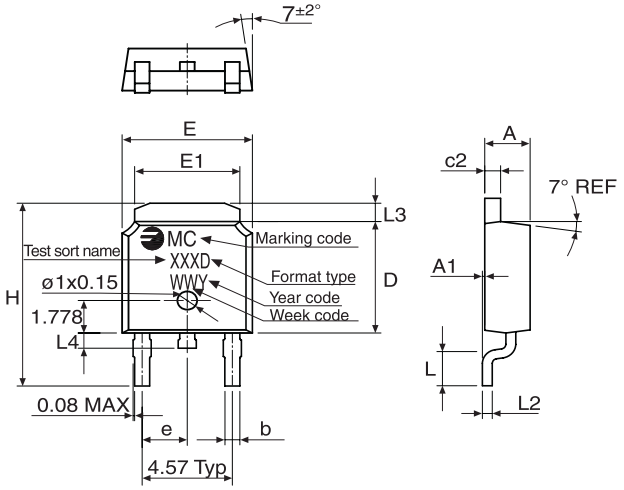
PREFERRED P/N	PACKAGE CODE	DELIVERY MODE	BASE QUANTITY	UNIT WEIGHT (g)
FS0809DD 00TR	TR	13 diameter tape and reel	2,500	0.30

PREFERRED P/N	PACKAGE CODE	DELIVERY MODE	BASE QUANTITY	UNIT WEIGHT (g)
FS0809DW 00TU	TU	TUBE	1,000	2.00

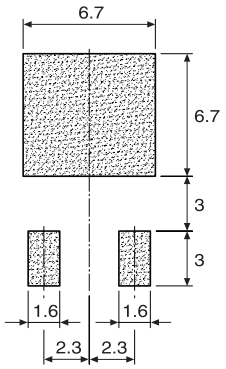
PREFERRED P/N	PACKAGE CODE	DELIVERY MODE	BASE QUANTITY	UNIT WEIGHT (g)
FS0809DI 00TU	TU	TUBE	4,000	0.40

PREFERRED P/N	PACKAGE CODE	DELIVERY MODE	BASE QUANTITY	UNIT WEIGHT (g)
FS0809DH 00TU	TU	TUBE	1000	2.30

Package Outline Dimensions: (mm) TO-252AA (DPAK)

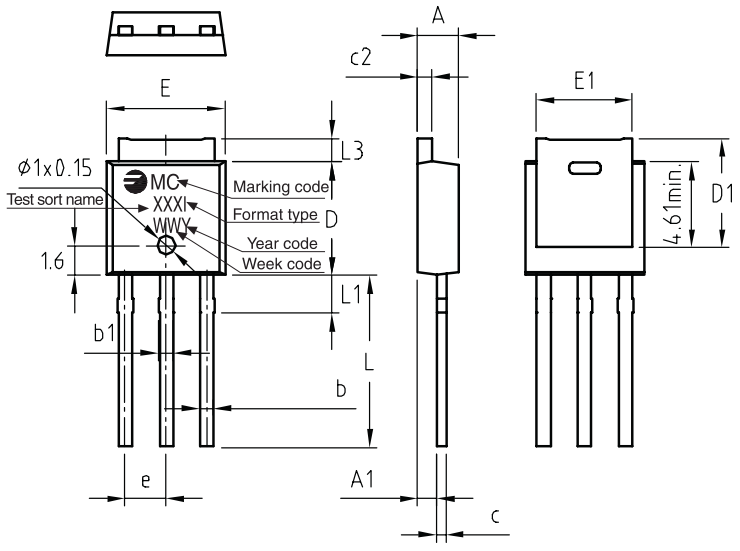


Mounting Pad Layout



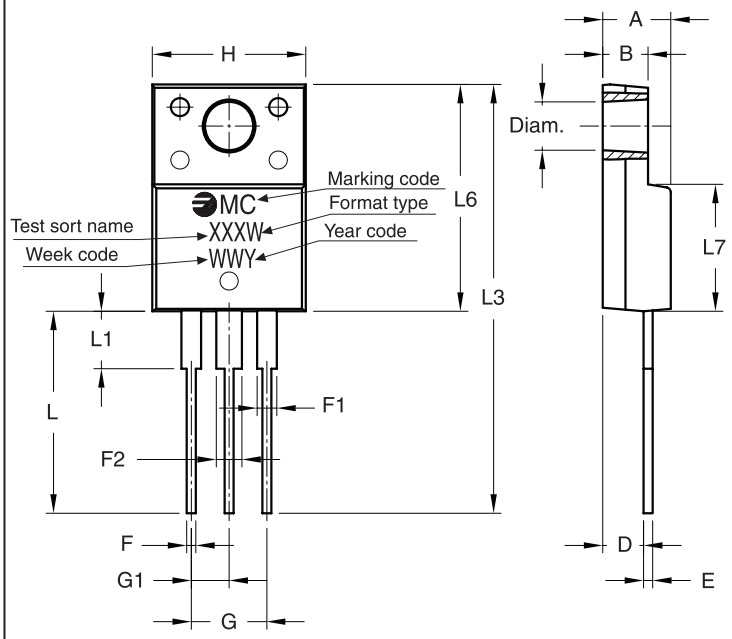
REF.	DIMENSIONS Milimeters		
	Min.	Nominal	Max.
A	2.18	2.3	2.39
A1	0	0.127	0.127
b	0.64	0.75	0.89
c2	0.46	0.51	0.56
D	5.97	6.1	6.22
E	6.47	6.6	6.73
E1	5.20	5.34	5.46
e		2.28BSC	
H	9.77	10.03	10.28
L	1.31	1.44	1.57
L2	0.46	0.51	0.56
L3	0.89	1.02	1.14
L4	0.51	0.76	1.02

Package Outline Dimensions: (mm) TO-251AA (IPAK)



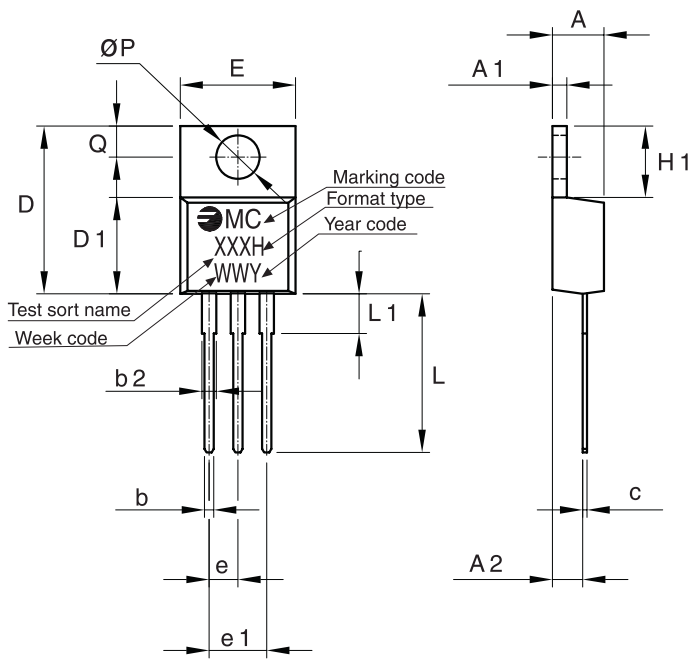
REF.	DIMENSIONS Milimeters		
	Min.	Nominal	Max.
A	2.19	2.30 ± 0.11	2.41
A1	0.89	1.08 ± 0.19	1.27
b	0.50	0.70 ± 0.20	0.90
b1	0.70	0.92 ± 0.22	1.14
c	0.43	0.51 ± 0.08	0.59
c2	0.43	0.62 ± 0.19	0.81
D	5.40	5.81 ± 0.41	6.22
D1	5.70	5.90 ± 0.20	6.10
E	6.35	6.54 ± 0.19	6.73
E1	5.20	5.33 ± 0.13	5.46
e	2.25	2.30 ± 0.05	2.35
L	7.50	8.58 ± 1.08	9.66
L1	1.90	2.10 ± 0.20	2.28
L3	0.89	1.27 ± 0.38	1.65

Package Outline Dimensions: (mm) TO-220F



REF.	DIMENSIONS Milimeters		
	Min.	Nominal	Max.
A	3.55	4.50	4.90
B	2.34	3.00	3.70
D	2.03	2.70	2.96
E	0.35	0.60	0.70
F	0.25	0.60	1.01
F1	0.70	1.30	1.78
F2	0.70	1.70	1.78
G	4.88	5.00	5.28
G1	2.34	2.50	2.74
H	9.65	10.15	10.67
L	12.70	13.35	14.73
L1	2.93	3.75	6.35
L3	26.90	28.35	31.20
L6	14.22	15.00	16.50
L7	8.30	8.40	9.59
Diam.	3.00	3.20	3.28

Package Outline Dimensions: (mm) TO-220AB



REF.	DIMENSIONS Milimeters	
	Min.	Max.
A	4.47	4.67
A1	1.17	1.37
A2	2.52	2.82
b	0.71	0.91
b2	1.17	1.37
c	0.31	0.53
D	14.65	15.35
D1	8.50	8.90
E	10.01	10.36
e	2.51	2.57
e1	4.98	5.18
H1	6.15	6.45
L	13.40	13.96
L1	3.56	3.96
P	3.735	3.935
Q	2.59	2.89

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

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

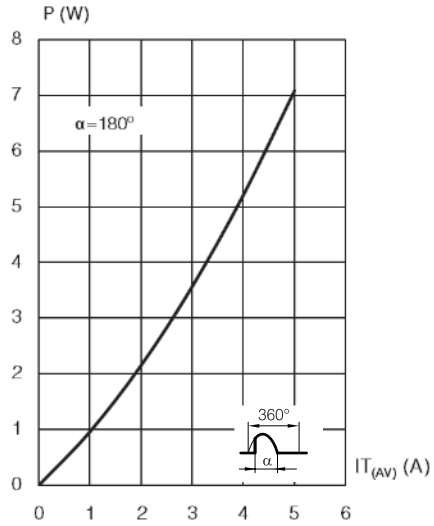


Fig. 2: Average and D.C. on-state current versus case temperature.

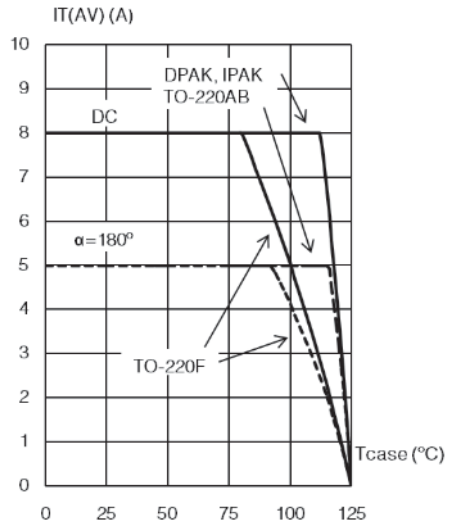


Fig. 3: Relative variation of thermal impedance junction to case versus pulse duration.

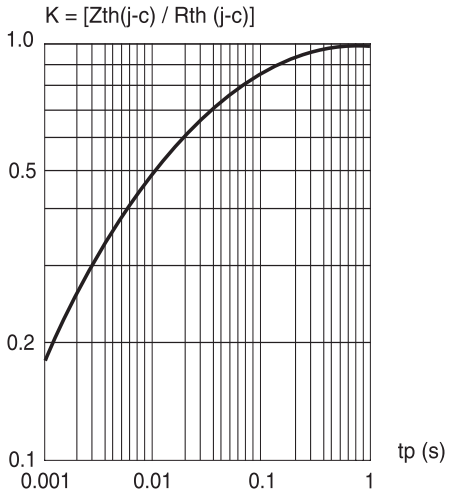
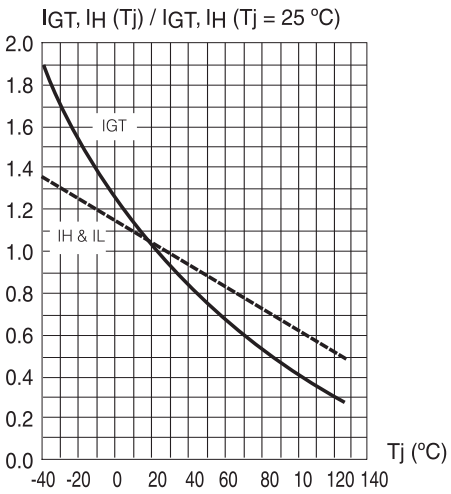


Fig. 4: Relative variation of gate trigger current, holding and latching current versus junction temperature for Sensitive Gate SCR (02).



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

Fig. 5: Relative variation of gate trigger current, holding and latching current versus junction temperature for Standard Gate SCRs (08,09).

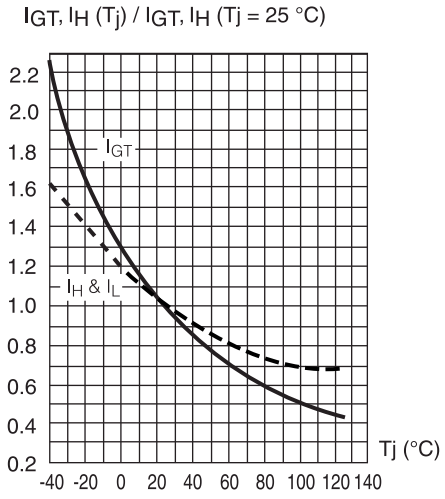


Fig. 6: Non repetitive surge peak on-state current versus number of cycles.

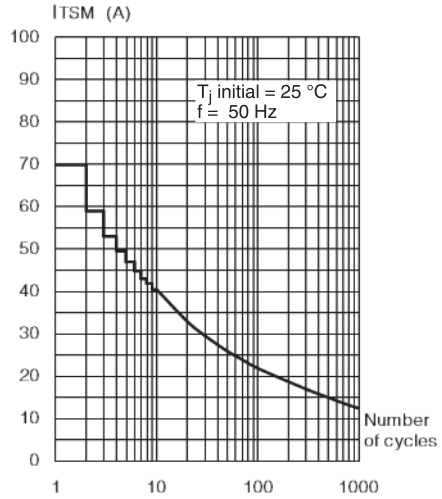


Fig. 7: Non repetitive surge peak on-state current for a sinusoidal pulse with width: tp < 10 ms, and corresponding value of I^2t.

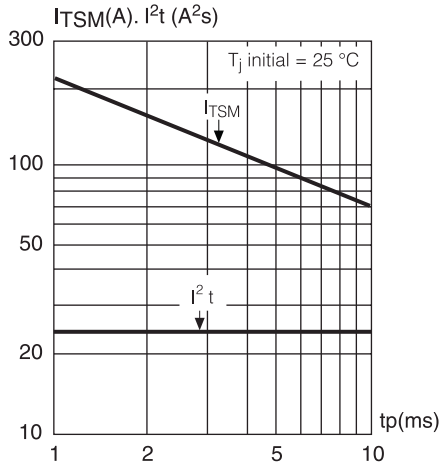
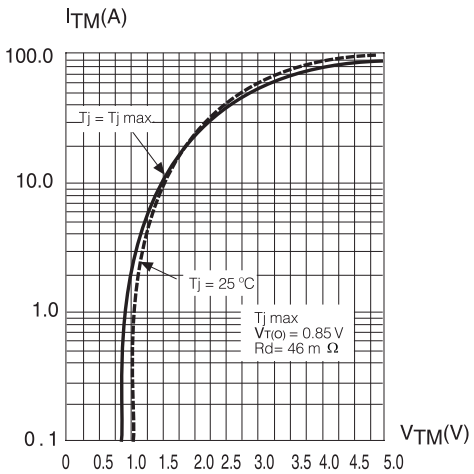


Fig. 8: On-state characteristics (maximum values).



Revision History

DATE	REVISION	DESCRIPTION OF CHANGES
21-Jan-2015	0	Original Data Sheet
12-Feb-2020	1	Update Product Features

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

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