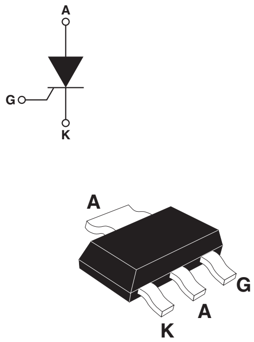
0.8 A sensitive gate SCR



TO-92 SOT-223

Table 1. Device summary

$I_{T(RMS)}$	0.8 A
V_{DRM} / V_{RRM}	600 V
I_{GT}	30 to 200 µA

Features

- $I_{T(RMS)}$ = 0.8 A
- V_{DRM}, V_{RRM} = 600 V
- I_{GT} = 30 to 200 µA

Applications

- Limited gate current topologies
- Ground fault circuit interrupters
- Overvoltage crowbar protection in power supplies
- Protection in electronic ballasts
- Capacitive discharge ignitions
- Ignitors (lighting, oven...)

Description

The MCR100-6 SCR can be used as on/off function in applications where topology does not offer high current for gate triggering.

This device is optimized in forward voltage drop and inrush current capabilities for reduced power losses and high reliability in harsh environments.

1 Characteristics

Table 1. Absolute ratings (limiting values, T_j = 25 °C unless otherwise specified)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (180 °Conduction angle)	TO-92	T_L = 83 °C	0.8	A
		SOT-223	T_c = 107 °C		
$IT_{(AV)}$	Average on-state current (180 °Conduction angle)	TO-92	T_L = 83 °C	0.5	A
		SOT-223	T_c = 107 °C		
I_{TSM}	Non repetitive surge peak on-state current	t_p = 8.3 ms	T_j = 25 °C	10	A
		t_p = 10 ms		9	
I^2t	I^2t Value for fusing	t_p = 10 ms	T_j = 25 °C	0.4	A^2s
di/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}, t_r ≤ 100 ns	F = 60 Hz	T_j = 125 °C	50	A/µs
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	

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

Symbol	Test conditions			Value	Unit
I_{GT}	V_D = 12 V, R_L = 140 Ω		MIN.	30	μA
			MAX.	200	
V_{GT}				0.8	V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3 kΩ, R_{GK} = 1 kΩ	T_j = 125 °C	MIN.	0.2	V
V_{RG}	I_{RG} = 10 μA		MIN.	5	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	T_j = 125 °C	MIN.	40	V/μs

Table 3. Static electrical characteristics

Symbol	Test conditions			Value	Unit
V_{TM}	I_{TM} = 1 A, t_p = 380 μs	T_j = 25 °C	MAX	1.35	V
V_{TO}	Threshold voltage	T_j = 125 °C		0.85	V
R_d	Dynamic resistance			245	mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$, R_{GK} = 1 kΩ	T_j = 25 °C		1	μA
		T_j = 125 °C		100	μA

Table4. Thermal resistances

Symbol	Parameter				Value	Unit
$R_{th(j-l)}$	Junction to leads (DC)		TO-92	Max.	70	°C/W
$R_{th(j-c)}$	Junction to case (DC)		SOT-223		30	
$R_{th(j-a)}$	Junction to ambient (DC)		TO-92		150	
		S = 5 cm^2	SOT-223		60	

Figure1. Maximum average power dissipation versus average on-state current

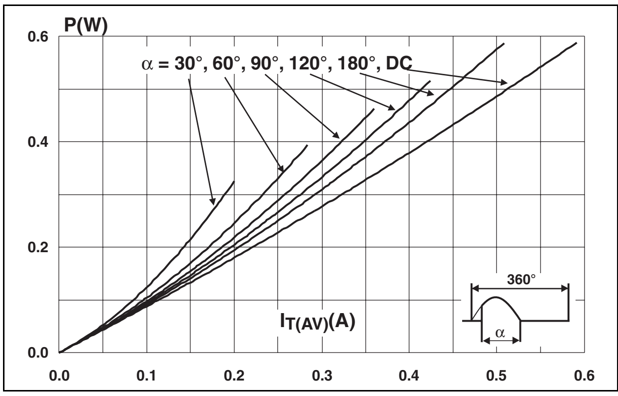


Figure2. Average and DC on-state current versus case temperature (SOT-223)

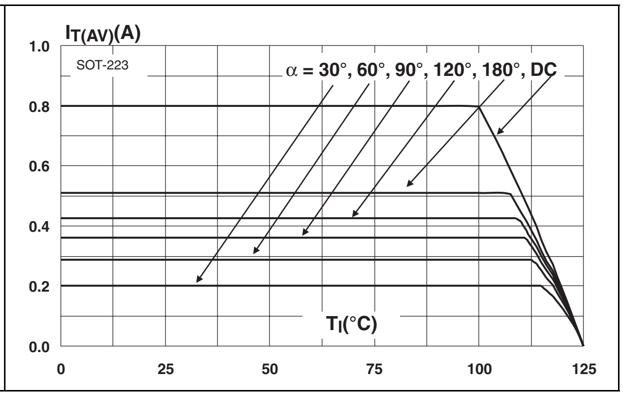


Figure3. Average and DC on-state current versus lead temperature (TO-92)

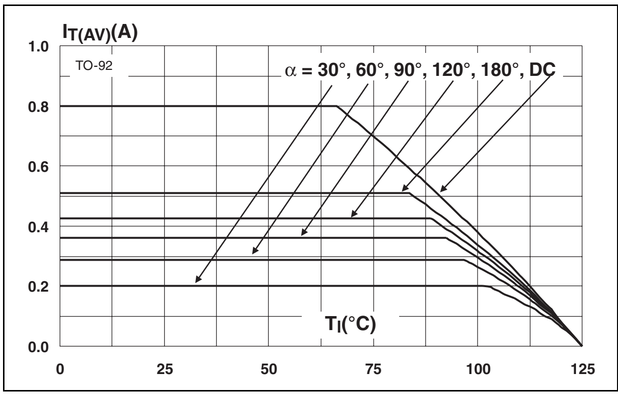


Figure4. Average and DC on-state current versus ambient temperature (free air convection)

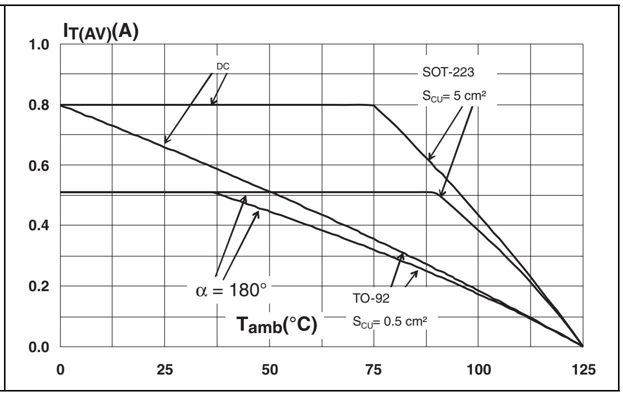


Figure5. Relative variation of thermal impedance junction to ambient versus pulse duration

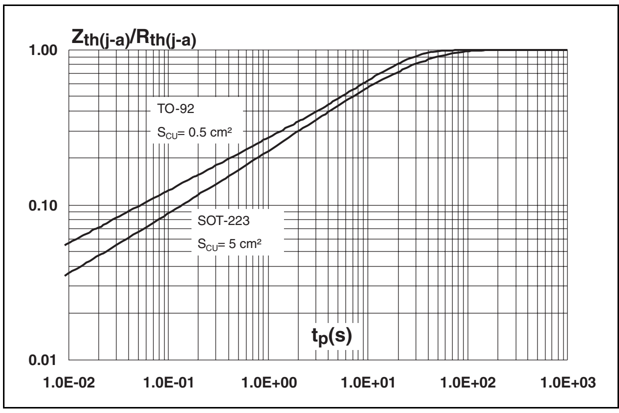


Figure6. Relative variation of gate trigger, holding and latching current versus junction temperature

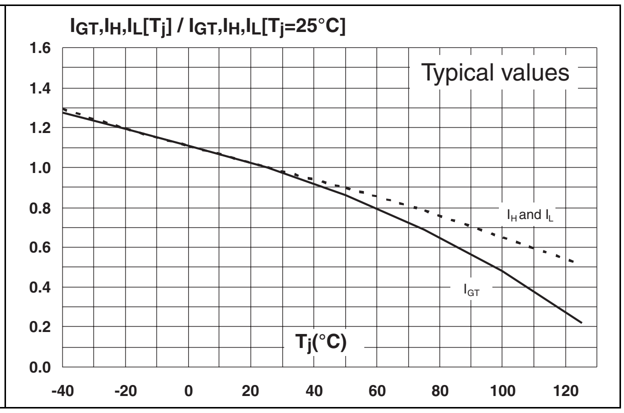


Figure7. Relative variation of holding current versus gate-cathode resistance (typical values)

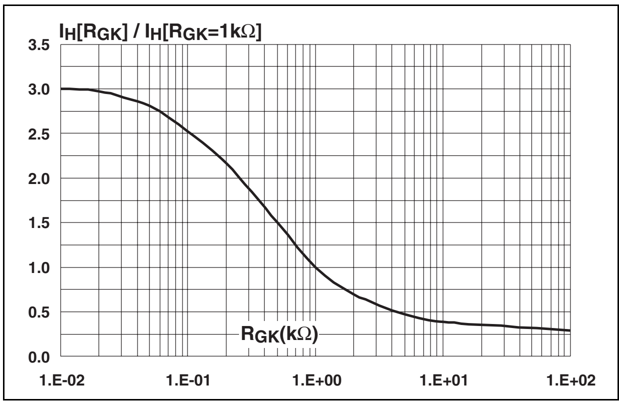


Figure8. Relative variation of dV/dt immunity versus gate-cathode resistance (typical values)

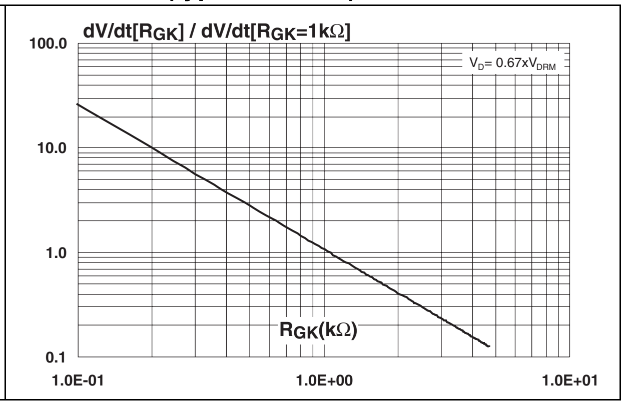


Figure9. Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)

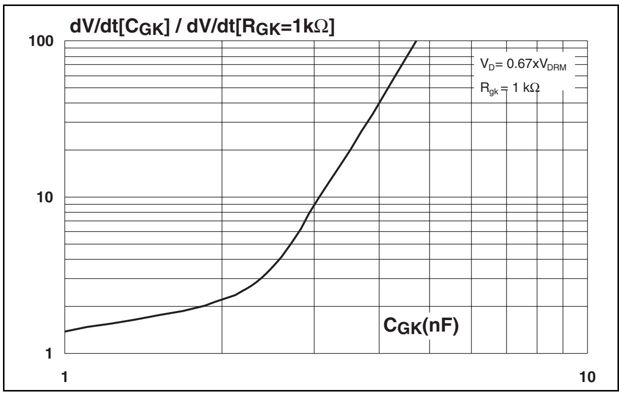


Figure10. Surge peak on-state current versus number of cycles

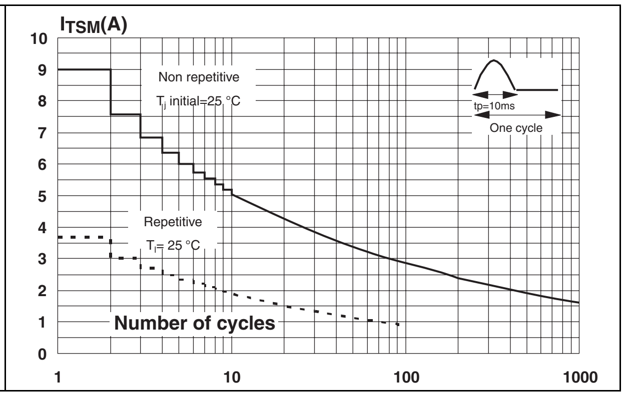


Figure11. Non repetitive surge peak on state current for a sinusoidal pulse and corresponding value of I^2T

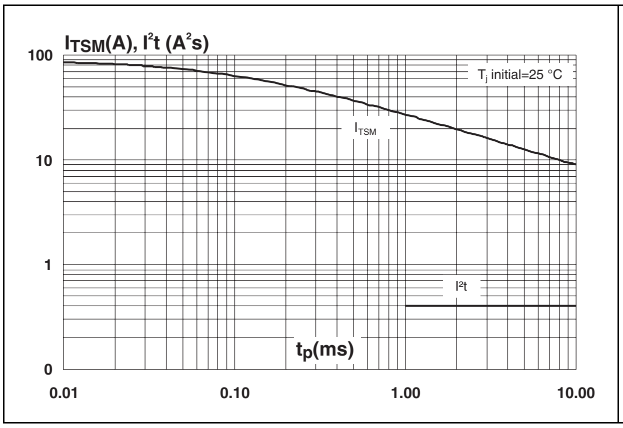


Figure12. On-state characteristics (maximum values)

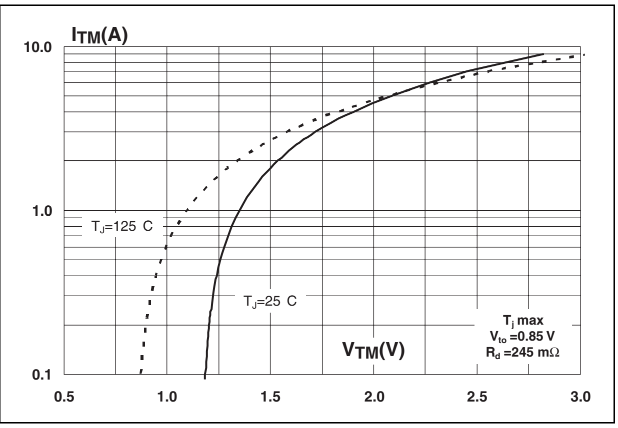
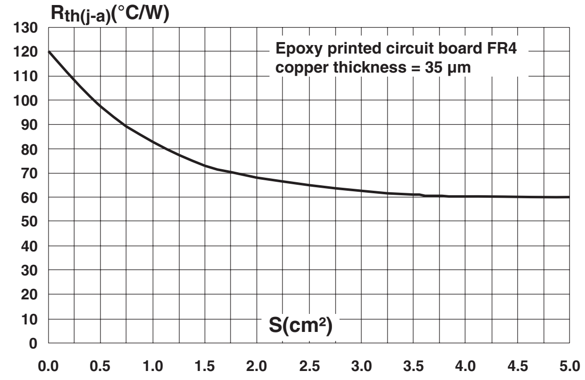
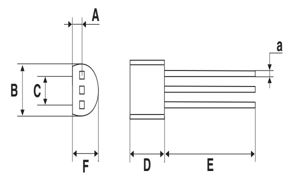


Figure13. Thermal resistance junction to ambient versus copper surface under tab (SOT-223)

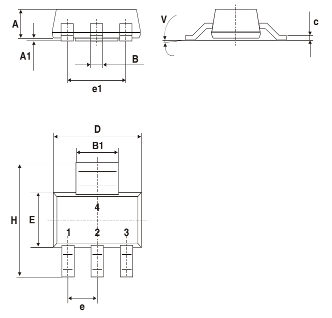


5. TO-92 (plastic) dimensions



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

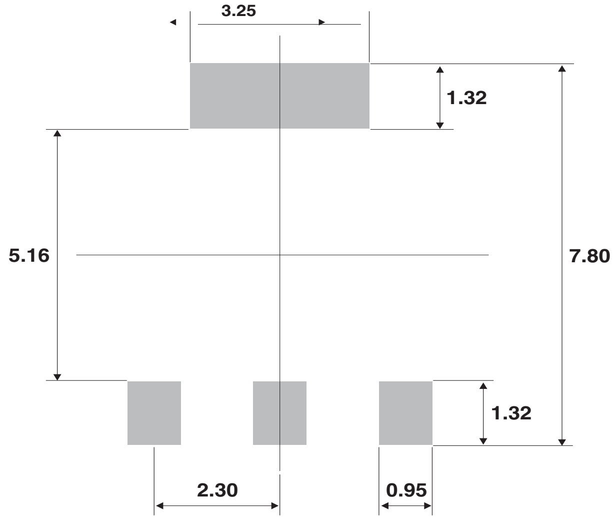
Table 6. SOT-223 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.071
A1		0.02	0.10		0.001	0.004
B	0.60	0.70	0.85	0.024	0.027	0.033
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(1)	6.30	6.50	6.70	0.248	0.256	0.264
e		2.3			0.090	
e1		4.6			0.181	
E(1)	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					

1. Do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm (0.006inches)

Figure 14. SOT-223 footprint



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