

Features

- $I_{T(RMS)}$ up to 0.8 A
- V_{DRM}/V_{RRM} 400 and 600 V
- I_{GT} from 0.5 to 25 μ A

Description

Thanks to highly sensitive triggering levels, the MCR100-6 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, standby mode power supplies, smoke and alarm detectors.

Available in through-hole or surface-mount packages, the voltage capability of this series has been upgraded since its introduction and is now available up to 600 V.

1 Characteristics

Table 1. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)	TO-92 $T_I = 55\text{ °C}$	0.8 A
		SOT-223 $T_{amb} = 70\text{ °C}$	
$I_{T(AV)}$	Average on-state current (180° conduction angle)	TO-92 $T_I = 55\text{ °C}$	0.5 A
		SOT-223 $T_{amb} = 70\text{ °C}$	
I_{TSM}	Non repetitive surge peak on-state current	$t_p = 8.3\text{ ms}$ $T_j = 25\text{ °C}$	8 A
		$t_p = 10\text{ ms}$	7
I^2t	I^2t Value for fusing	$t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	0.24 A^2s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	$F = 60\text{ Hz}$ $T_j = 125\text{ °C}$	50 $A/\mu s$
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu s$ $T_j = 125\text{ °C}$	1 A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 125\text{ °C}$	0.1 W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range		- 40 to + 150 - 40 to + 125 $^{\circ}C$

Table 2. Electrical characteristics ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Symbol	Test conditions							Unit	
I_{GT}	$V_D = 12\text{ V}$ $R_L = 140\ \Omega$				Min.	4	15	0.5	μA
					Max.	25	50	5	
V_{GT}					Max.	0.8			V
V_{GD}	$V_D = V_{DRM}$	$R_L = 3.3\text{ k}\Omega$	$R_{GK} = 1\text{ k}\Omega$	$T_j = 125\text{ }^\circ\text{C}$	Min.	0.1			V
V_{RG}	$I_{RG} = 10\ \mu\text{A}$				Min.	8			V
I_H	$I_T = 50\text{ mA}$ $R_{GK} = 1\text{ k}\Omega$				Max.	5			mA
I_L	$I_G = 1\text{ mA}$ $R_{GK} = 1\text{ k}\Omega$				Max.	6			mA
dV/dt	$V_D = 67\% V_{DRM}$ $R_{GK} = 1\text{ k}\Omega$			$T_j = 125\text{ }^\circ\text{C}$	Min.	80	75	75	V/ μs
V_{TM}	$I_{TM} = 1.6\text{ A}$ $t_p = 380\ \mu\text{s}$			$T_j = 25\text{ }^\circ\text{C}$	Max.	1.95			V
V_{t0}	Threshold voltage			$T_j = 125\text{ }^\circ\text{C}$	Max.	0.95			V
R_d	Dynamic resistance			$T_j = 125\text{ }^\circ\text{C}$	Max.	600			m Ω
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM} = 400\text{ V}$ $R_{GK} = 1\text{ k}\Omega$			$T_j = 25\text{ }^\circ\text{C}$	Max.	1			μA
	$V_{DRM} = V_{RRM} = 600\text{ V}$ $R_{GK} = 1\text{ k}\Omega$					10			
	$V_{DRM} = V_{RRM}$ $R_{GK} = 1\text{ k}\Omega$			$T_j = 125\text{ }^\circ\text{C}$		100			

Table 3. Thermal resistance

Symbol	Parameter		Maximum	Unit
$R_{th(j-a)}$	Junction to case (DC)		TO-92	80 $^\circ\text{C/W}$
$R_{th(j-t)}$	Junction to tab (DC)		SOT-223	30 $^\circ\text{C/W}$
$R_{th(j-a)}$	Junction to ambient (DC)		TO-92	150 $^\circ\text{C/W}$
			$S^{(1)} = 5\text{ cm}^2$ SOT-223	60 $^\circ\text{C/W}$

1. S = Copper surface under tab.

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

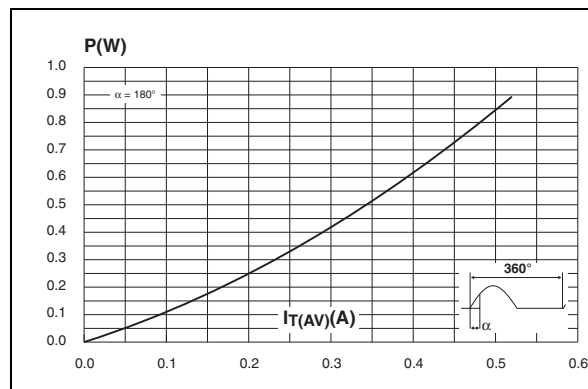


Figure2. Average and DC on-state current versus lead temperature

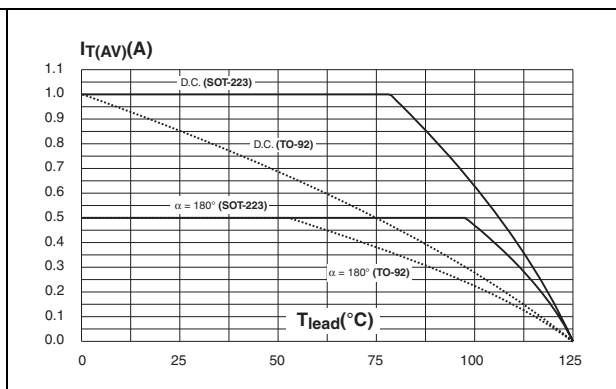


Figure3. Average and DC on-state current versus ambient temperature

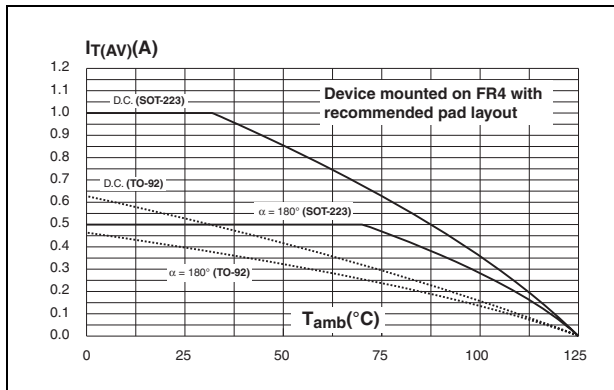


Figure4. Relative variation of thermal impedance junction to ambient versus pulse duration

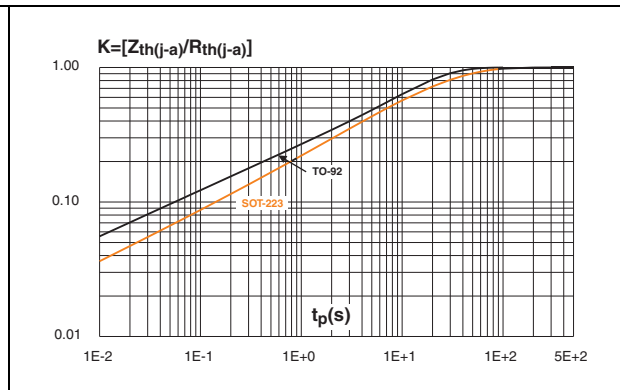


Figure5. Relative variation of gate trigger, holding and latching current versus junction temperature

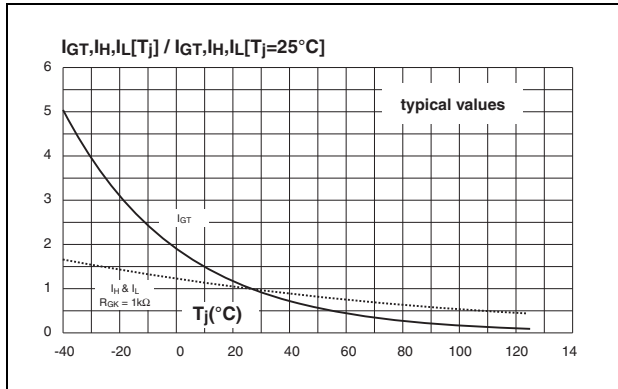


Figure6. Relative variation of holding current versus gate-cathode resistance (typical values)

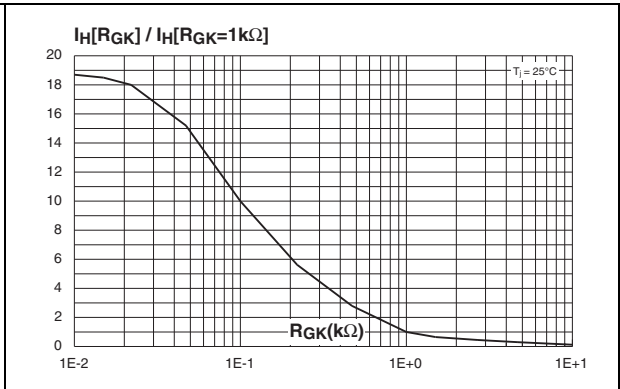


Figure7. Relative variation of dV/dt immunity versus gate-cathode resistance (typical values).

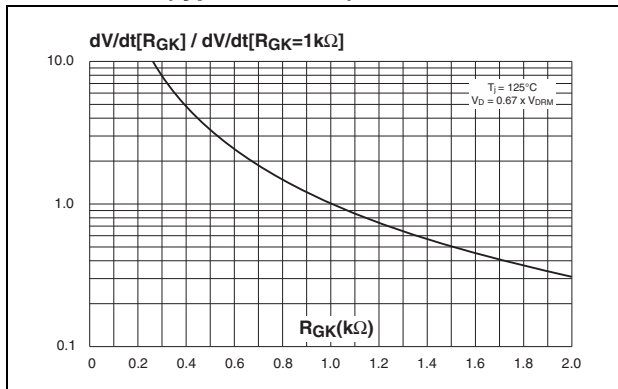


Figure8. Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)

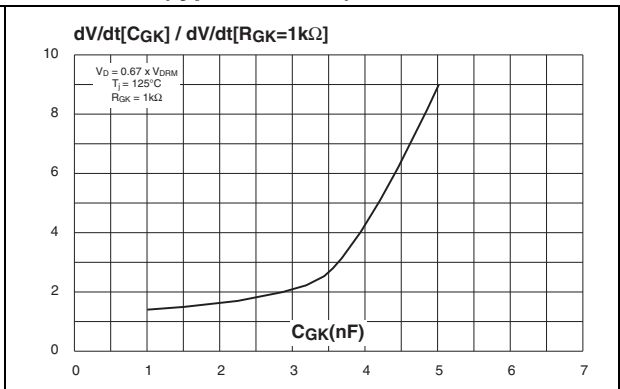


Figure9. Surge peak on-state current versus number of cycles

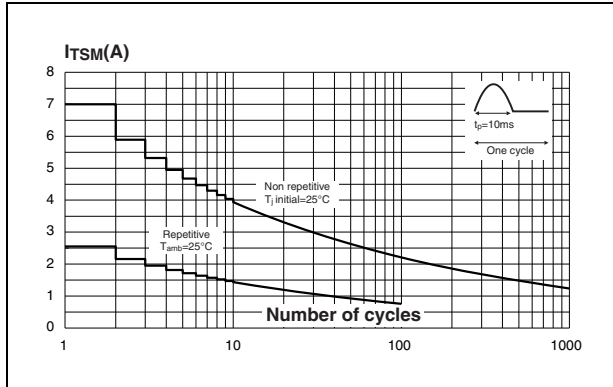


Figure10. Non-repetitive surge peak on-state current and corresponding value of I^2t

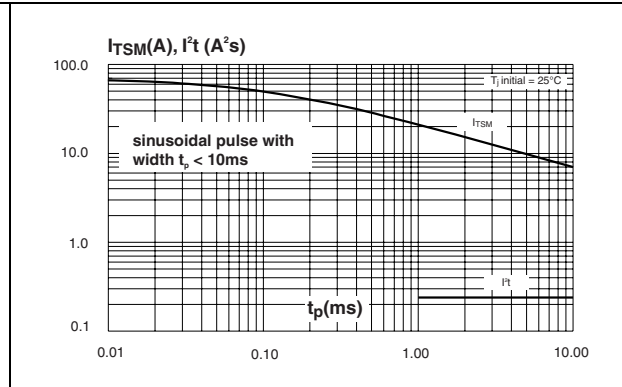


Figure11. On-state characteristics (maximum values)

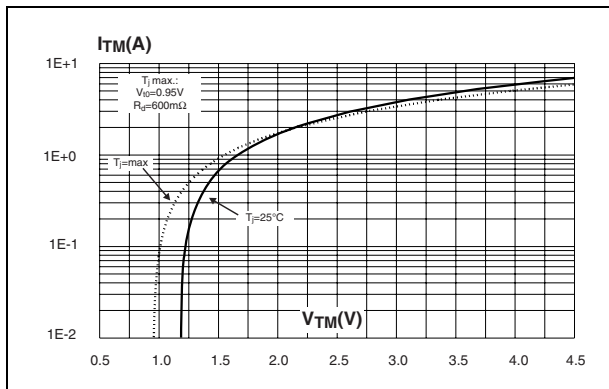


Figure12. Thermal resistance junction to ambient versus copper surface under tab

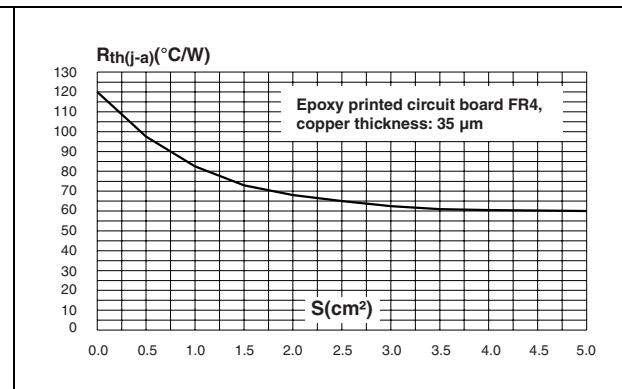


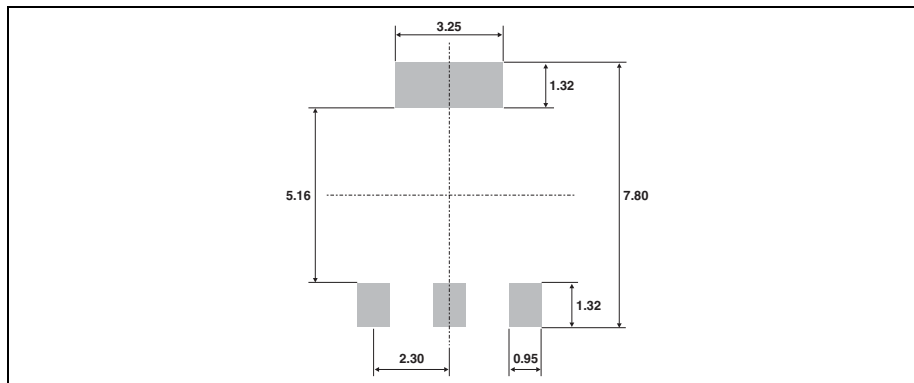
Table 4. TO-92 dimensions

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 5. SOT-23 dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.071
A1		0.02			0.001	
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.3			0.090	
e1		4.6			0.181	
E	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					

Figure 14. Footprint (dimensions in mm)



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