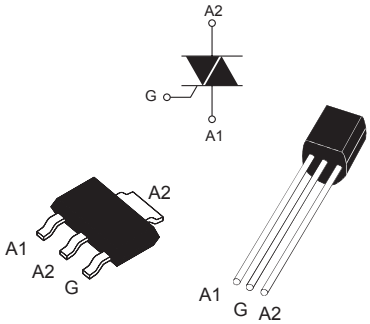
Features

- On-state rms current, $I_{T(RMS)}$ 1 A
- Repetitive peak off-state voltage, $V_{DRM/VRRM}$ 600 or 800 V
- Triggering gate current, $I_{GT\ (Q1)}$ 3 to 25 mA



SOT-223 **TO-92**

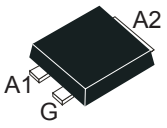
Applications

- AC switching
- Home appliances

Description

The Z01 series is suitable for general purpose AC switching applications. These devices are typically used in applications such as home appliances (electrovalve, pump, door lock, small lamp control), fan speed controllers,...

Different gate current sensitivities are available, allowing optimized performance when driven directly through microcontroller.



SMBflat-3L

Figure1. Ordering information scheme

Z 01 03 M A [BLANK] 1AA2

Triac series

Current
01 = 1 A

Sensitivity
03 = 3 mA
07 = 5 mA
09 = 10 mA
10 = 25 mA

Voltage
M = 600 V
N = 800 V

Package
A = TO-92
N = SOT-223
UF = SMBflat-3L

BLANK = Check Table 9. Ordering information

Packing mode
1AA2 = TO-92 bulk
2AL2 = TO-92 ammopack
5AL2 = TO-92 tape and reel
5AA4 = SOT-223 tape and reel 7”
6AA4 = SOT-223 tape and reel 13”
Blank = SMBflat-3L tape and reel 13”

1 Characteristics

Table 1. Absolute maximum ratings

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	SOT-223	T_{tab} = 90 °C	1	A
		TO-92	T_L = 50 °C		
		SMBflat-3L	T_{tab} = 107 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t_p = 20 ms	8	A
		F = 60 Hz	t_p = 16.7 ms	8.5	
I^2t	I^2t value for fusing	t_p = 10 ms		0.35	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 120 Hz	T_j = 125 °C	20	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	1	W
T_{stg}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C

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

Symbol	Parameters	Quadrant		Value				Unit
				Z01				
				03	07	09	10	
I_{GT}(1)	V_D = 12 V, R_L = 30 Ω	I - II - III	Max.	3	5	10	25	mA
		IV		5	7	10	25	
V_{GT}		All	Max.	1.3				V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	All	Min.	0.2				V
I_H(2)	I_T = 50 mA		Max.	7	10	10	25	mA
I_L	I_G = 1.2 I_{GT}	I - III - IV	Max.	7	10	15	25	mA
		II	Max.	15	20	25	50	
dV/dt(2)	V_D = 67 % V_{DRM} gate open, T_j = 110 °C		Min.	10	20	50	100	V/µs
(dV/dt)c(2)	(dI/dt)c = 0.44 A/ms, T_j = 110 °C		Min.	0.5	1	2	5	V/µs

1. *Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.*
2. *For both polarities of A2 referenced to A1*

Table 3. Static electrical characteristics

Symbol	Test conditions	T_j		Value	Unit
V_T(1)	I_{TM} = 1.4 A, t_p = 380 µs	25 °C	Max.	1.60	V
V_{TO}(1)	Threshold on-state voltage	125 °C	Max.	0.95	V
R_d	Dynamic resistance	125 °C	Max.	400	mΩ
I_{DRM}	V_{DRM} = V_{RRM}	25 °C	Max.	5	µA
I_{RRM}		125 °C		0.5	mA

1. *For both polarities of A2 referenced to A1*

Table 4. Thermal resistance

Symbol	Parameters		Max. value	Unit
$R_{th(j-t)}$	Max. junction to tab (AC)	SOT-223	25	°C/W
		SMBflat-3L	14	
$R_{th(j-l)}$	Max. junction to lead (AC)	TO-92	60	
$R_{th(j-a)}$	Junction to ambient (S(1) = 5 cm²)	SOT-223	60	
		SMBflat-3L	75	
	Junction to ambient	TO-92	150	

1. *Copper surface under tab.*

1.1 Characteristics (curves)

Figure 1. Maximum power dissipation versus on-state RMS current (full cycle)

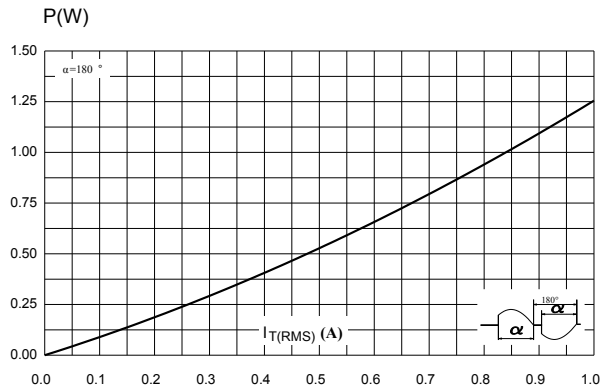


Figure 2. RMS on-state current versus lead (TO-92) or tab (SOT-223, SMBflat-3L) temperature (full cycle)

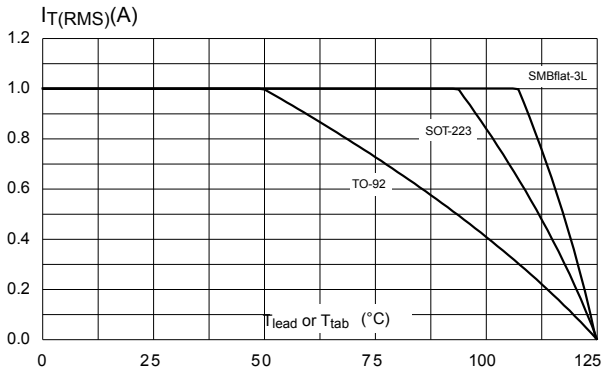


Figure 3. On-state rms current versus ambient temperature(free air convection full cycle)

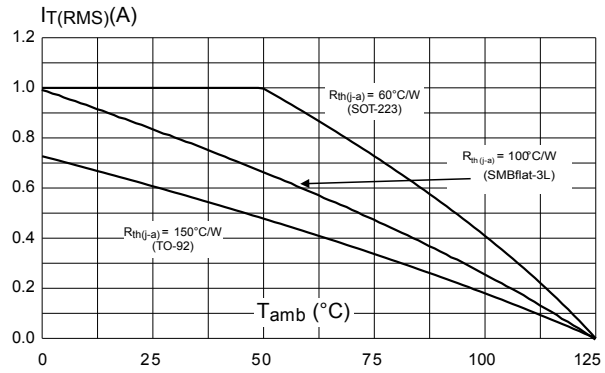


Figure 4. Relative variation of thermal impedance versus pulse duration ($Z_{th(j-a)}$)

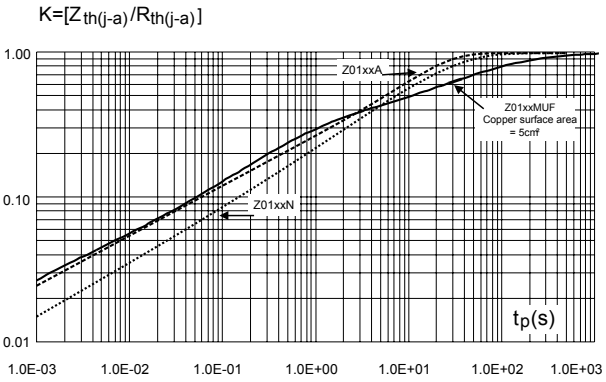


Figure 5. Relative variation of holding current and latching current versus junction temperature (typ. values)

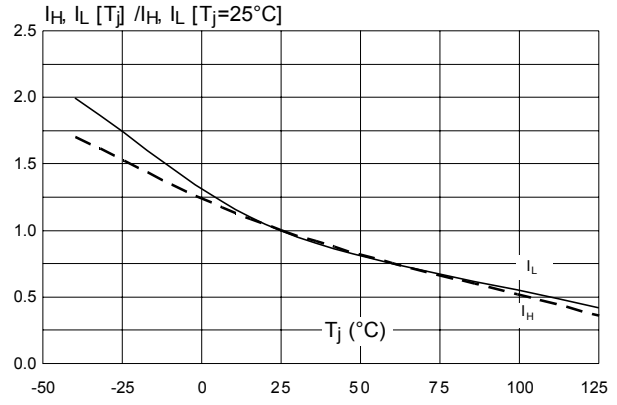


Figure 6. Relative variation of gate trigger current (I_{GT}) and voltage (V_{GT}) versus junction temperature

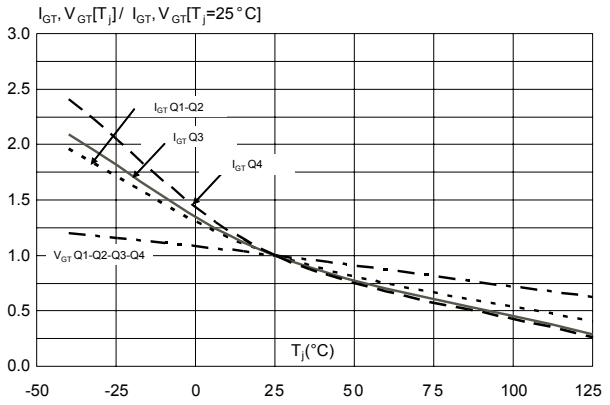


Figure 7. Surge peak on-state current versus number of cycles

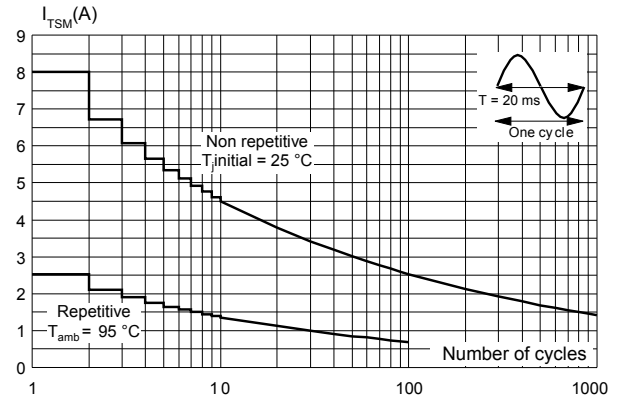


Figure 8. Non-repetitive surge peak on-state current and corresponding value of I^2t sinusoidal pulse width

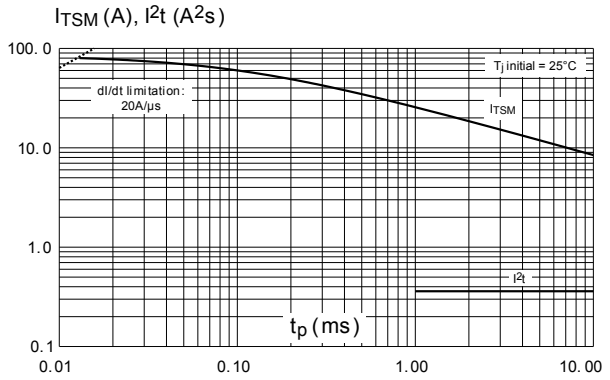


Figure 9. On-state characteristics (maximum values) (I_{TM} = f(V_{TM}))

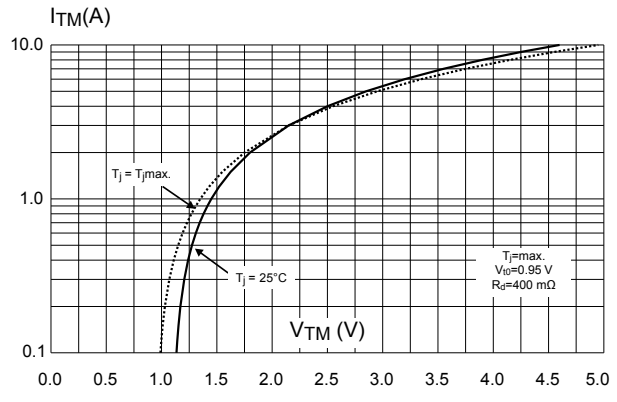


Figure 10. Relative variation of critical rate of decrease of main current (dI/dt) versus junction temperature

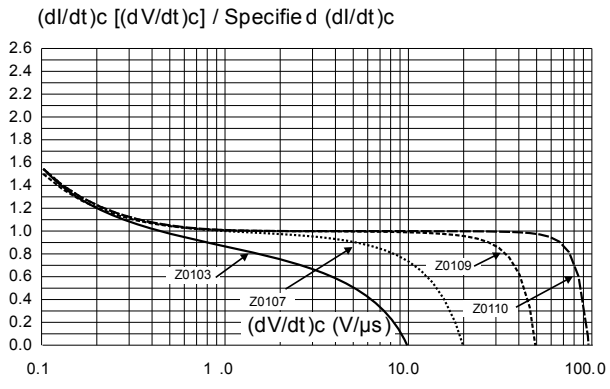


Figure 11. Relative variation of critical rate of decrease of main current (dI/dt) versus junction temperature

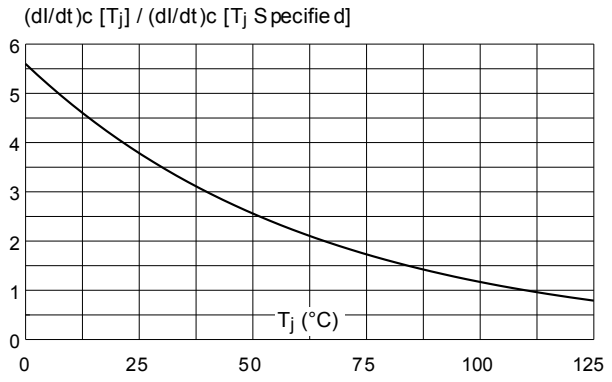


Figure 12. SOT-223 and SMBflat-3L thermal resistance junction to ambient versus copper surface under case

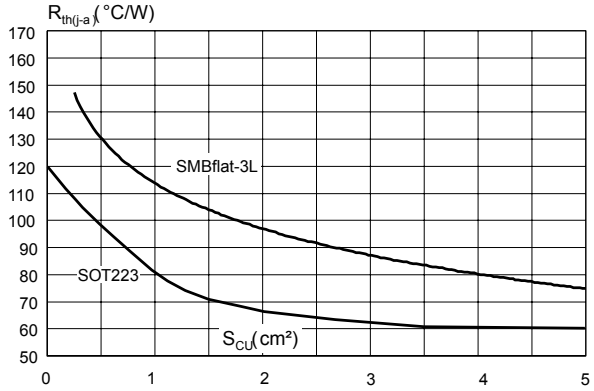


Figure 13. Relative variation of static dV/dt immunity versus junction temperature (gate open)

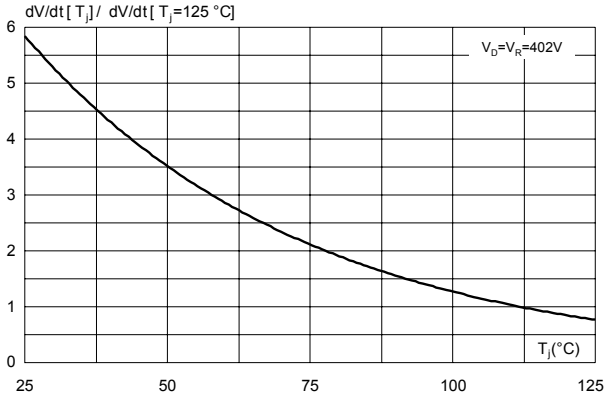


Figure15. SOT-223 package outline

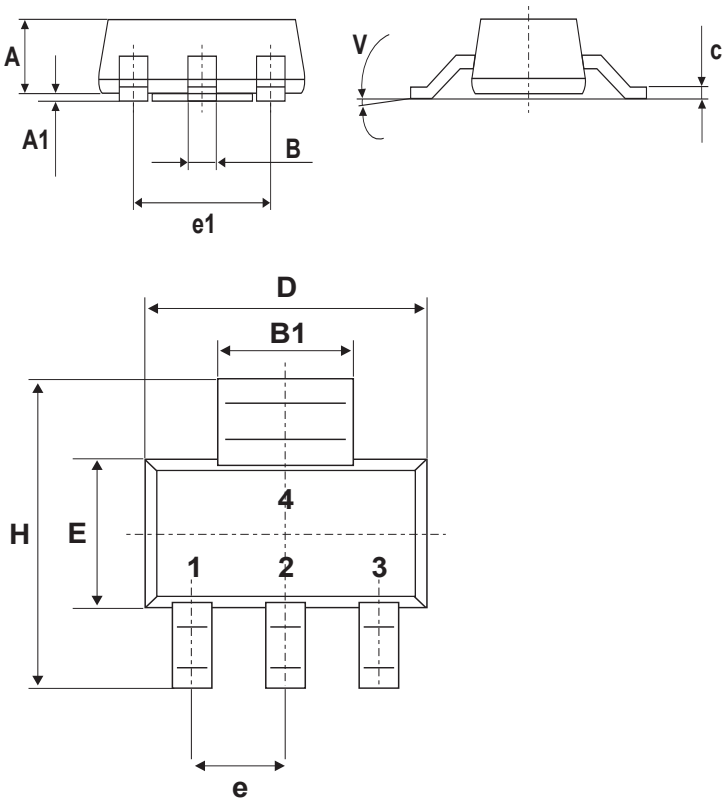


Table 5. SOT-223 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.0709
A1		0.02	0.10		0.0008	0.0039
B	0.60	0.70	0.85	0.024	0.0276	0.0335
B1	2.90	3.00	3.15	0.114	0.1181	0.1240
c	0.24	0.26	0.35	0.009	0.0102	0.0138
D	6.30	6.50	6.70	0.248	0.2559	0.2638
e		2.3			0.0906	
e1		4.6			0.1811	
E	3.30	3.50	3.70	0.130	0.1378	0.1457
H	6.70	7.00	7.30	0.264	0.2756	0.2874
V	10° max.					

1. *Inches only for reference*

Figure16. SOT-223 footprint (dimensions in mm)

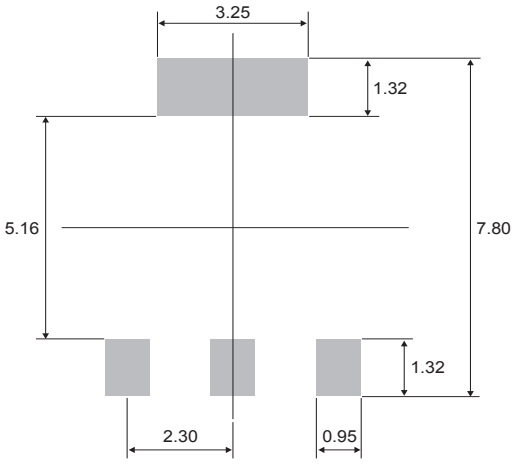


Figure17. TO-92 package outline

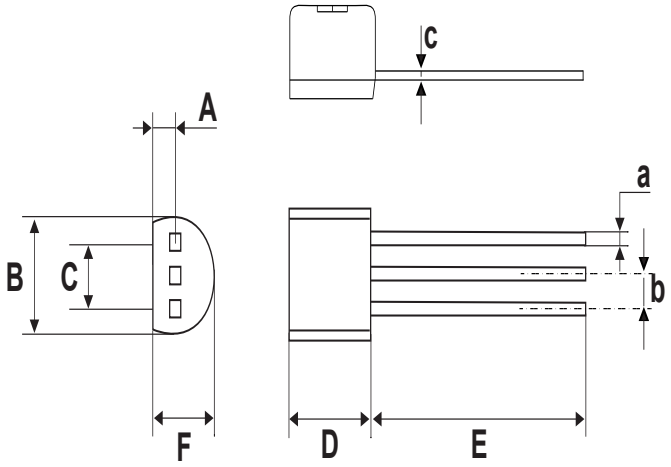


Table 6. TO-92 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.0531	
B			4.70			0.1850
C		2.54			0.1000	
D	4.40			0.1732		
E	12.70			0.5000		
F			3.70			0.1457
a			0.50			0.0197
b		1.27			0.500	
c			0.48			0.0189

1. *Inches dimensions given for information*

Figure18. SMBflat-3L package outline

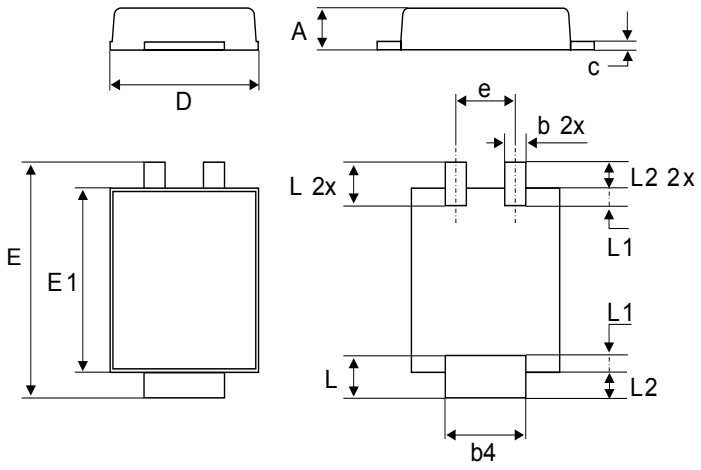


Table 7. SMBflat-3L mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.044
b	0.35		0.65	0.014		0.026
b4	1.95		2.20	0.070		0.087
c	0.15		0.40	0.005		0.016
D	3.30		3.95	0.129		0.156
E	5.10		5.60	0.200		0.221
E1	4.05		4.60	0.159		0.182
L	0.75		1.50	0.029		0.060
L1		0.40			0.016	
L2		0.60			0.024	
e		1.60			0.063	