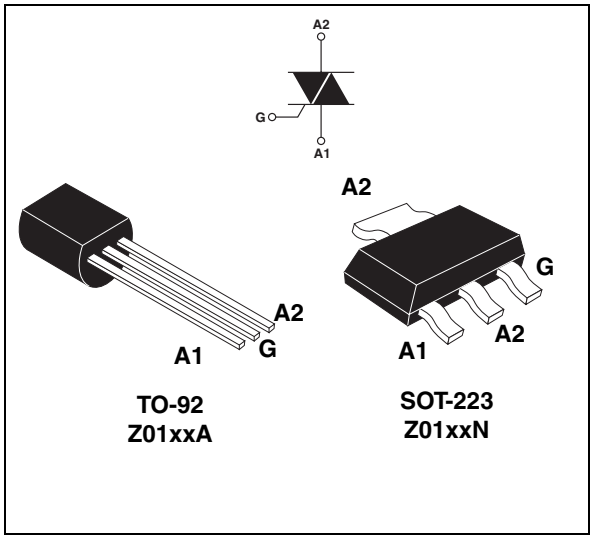
Z01

Standard 1A Triacs

Features

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



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 microcontrollers.

1 Characteristics

Table 1. Absolute maximum ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	SOT-223	T_{tab} = 90 °C	1	A
		TO-92	T_L = 50 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	8	A
		F = 60 Hz	t = 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} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

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

Symbol	Test conditions	Quadrant		Z01				Unit
				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		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 characteristics

Symbol	Test conditions			Value	Unit
V_{TM} (1)	I_{TM} = 1.4 A, t_p = 380 µs	T_j = 25 °C	MAX.	1.6	V
V_{to} (1)	Threshold voltage	T_j = 125 °C	MAX.	0.95	V
R_d (1)	Dynamic resistance	T_j = 125 °C	MAX.	400	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	MAX.	5	µA
		T_j = 125 °C		0.5	mA

1. For both polarities of A2 referenced to A1.

Table 4. Thermal resistances

Symbol	Parameter			Value	Unit
$R_{th(j-t)}$	Junction to tab (AC)		SOT-223	25	°C/W
$R_{th(j-l)}$	Junction to lead (AC)		TO-92	60	°C/W
$R_{th(j-a)}$	Junction to ambient	$S^{(1)}$ = 5 cm^2	SOT-223	60	°C/W
			TO-92	150	

1. S = copper surface under tab.

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

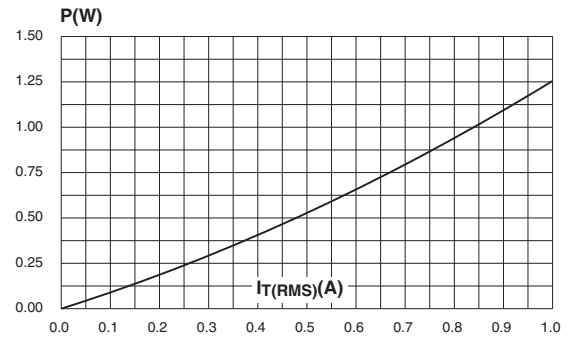


Figure 2. On-state rms current versus lead (TO-92) or tab (SOT-223) temperature (full cycle)

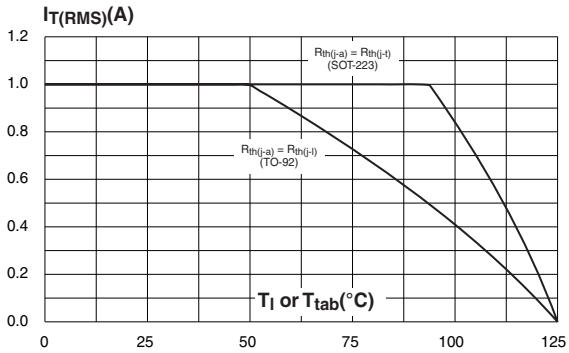


Figure 3. On-state rms current versus ambient temperature (full cycle)

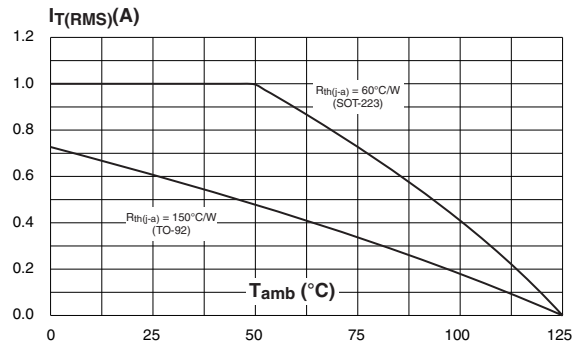


Figure 4. Relative variation of thermal impedance versus pulse duration

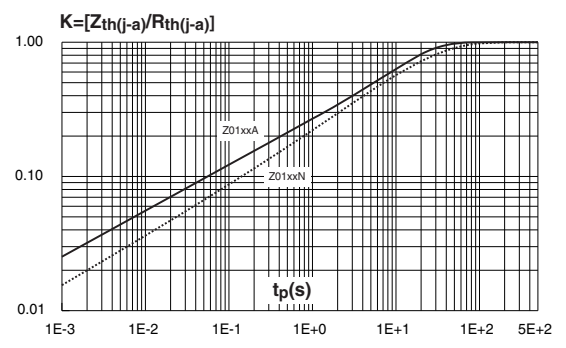


Figure 5. Relative variation of holding current and latching current versus junction temperature (typ. values)

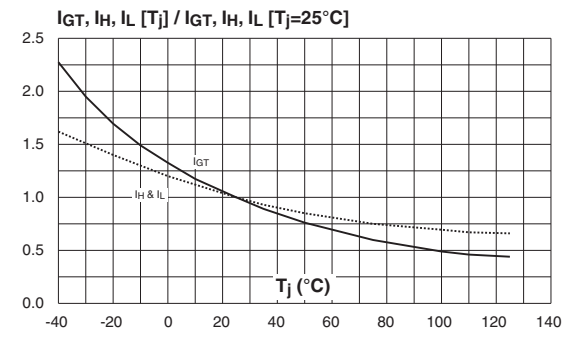


Figure 6. Surge peak on-state current versus number of cycles

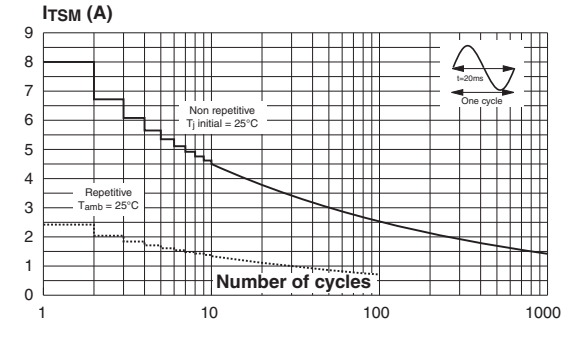


Figure 7. Non-repetitive surge peak on-state current and corresponding value of I^2t sinusoidal pulse width

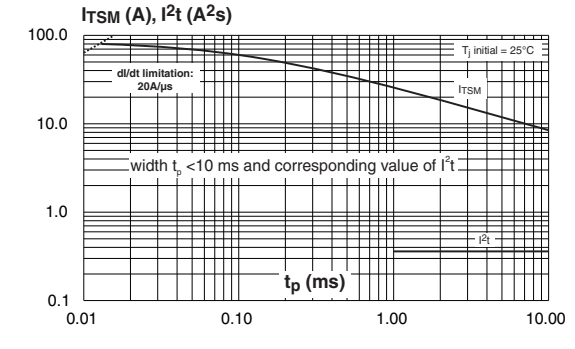


Figure 8. On-state characteristics (maximum values)

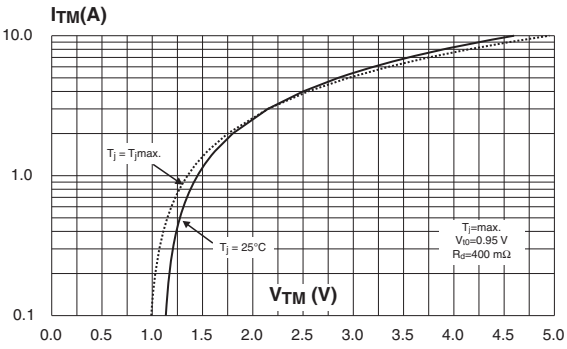


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical valuues)

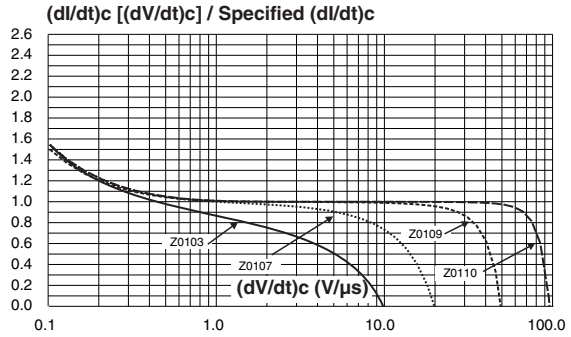


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

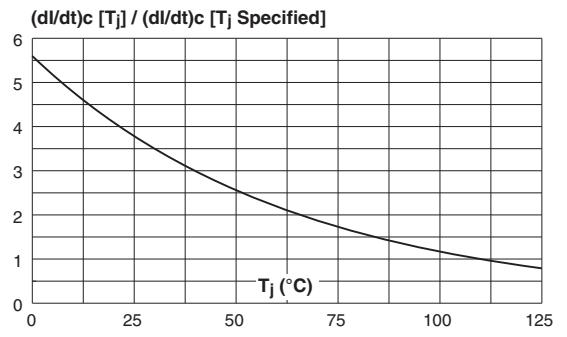
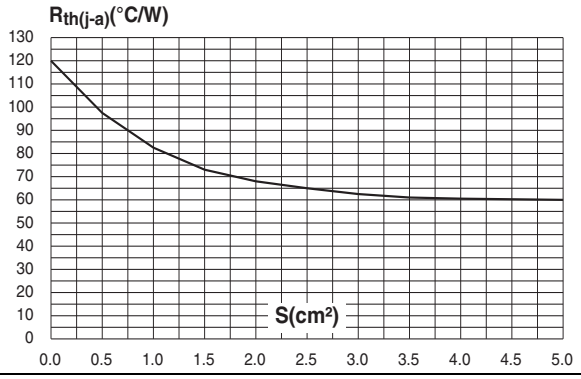


Figure 11. SOT-223 thermal resistance junction to ambient versus copper surface under case (printed circuit board FR4, copper thickness; 35 µm)



2 Ordering information

Figure 12. Ordering information scheme

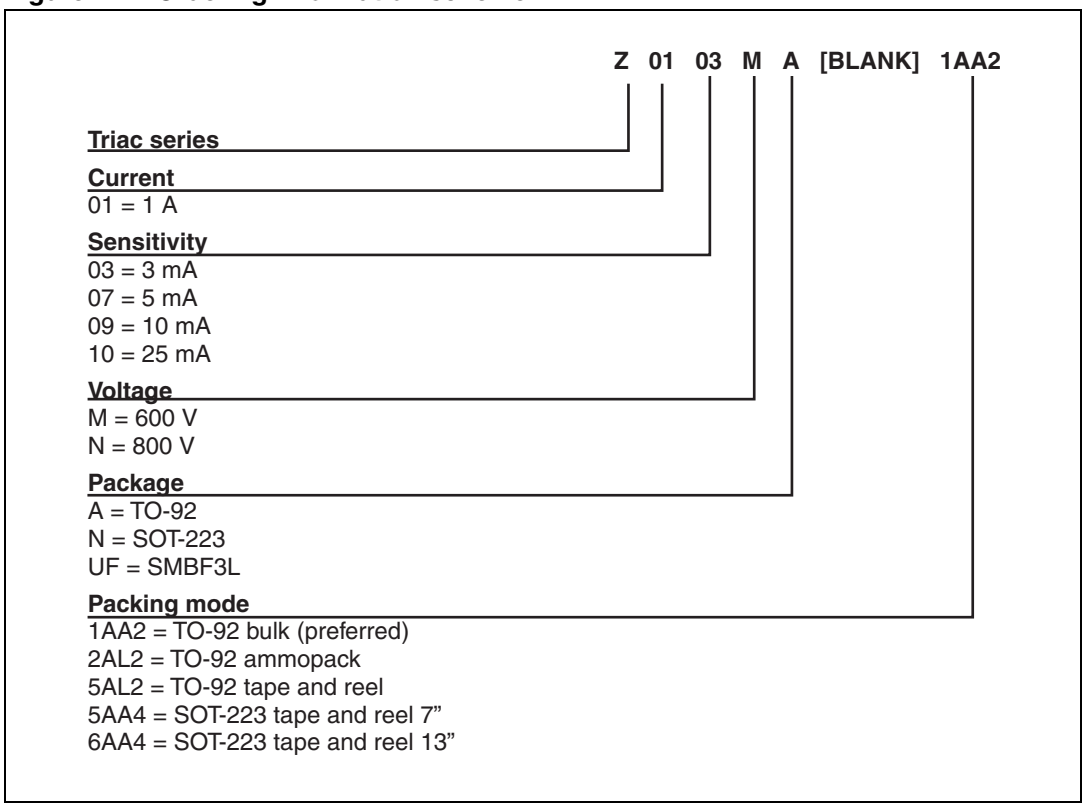


Table 5. Product Selector

Part Number	Voltage			Sensitivity	Type	Package
	600 V	700 V	800 V			
Z0103MA	X			3 mA	Standard	TO-92
Z0103MN	X			3 mA	Standard	SOT-223
Z0103SA		X		3 mA	Standard	TO-92
Z0103SN		X		3 mA	Standard	SOT-223
Z0103NA			X	3 mA	Standard	TO-92
Z0103NN			X	3 mA	Standard	SOT-223
Z0107MA	X			5 mA	Standard	TO-92
Z0107MN	X			5 mA	Standard	SOT-223
Z0107SA		X		5 mA	Standard	TO-92
Z0107SN		X		5 mA	Standard	SOT-223
Z0107NA			X	5 mA	Standard	TO-92
Z0107NN			X	5 mA	Standard	SOT-223
Z0109MA	X			10 mA	Standard	TO-92
Z0109MN	X			10 mA	Standard	SOT-223
Z0109SA		X		10 mA	Standard	TO-92
Z0109SN		X		10 mA	Standard	SOT-223
Z0109NA			X	10 mA	Standard	TO-92
Z0109NN			X	10 mA	Standard	SOT-223
Z0110MA	X			25 mA	Standard	TO-92
Z0110MN	X			25 mA	Standard	SOT-223
Z0110SA		X		25 mA	Standard	TO-92
Z0110SN		X		25 mA	Standard	SOT-223
Z0110NA			X	25 mA	Standard	TO-92
Z0110NN			X	25 mA	Standard	SOT-223

3 Packaging information

- Epoxy meets UL94, V0
- Lead-free packages

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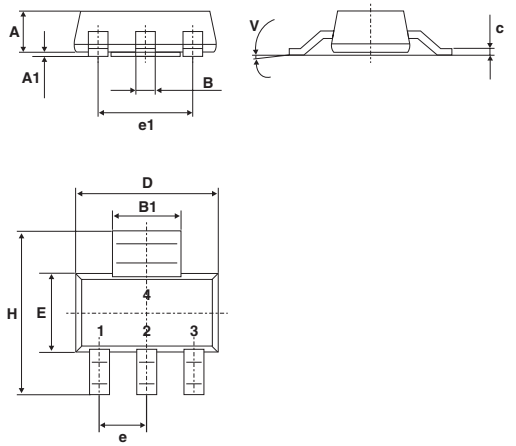
Table 6. SOT-223 dimensions



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 13. SOT-223 footprint dimensions (in millimeters)

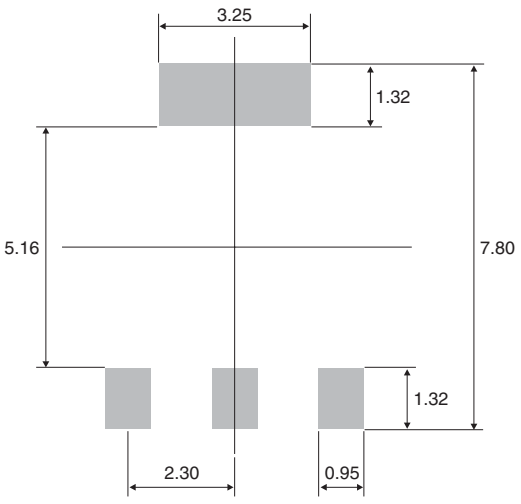
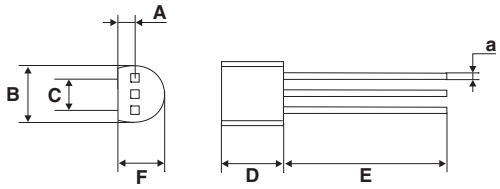


Table 7. TO-92 dimensions



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

4 Ordering information

Table 8. Ordering information

Order code[1]	Marking[1]	Package	Weight	Base quantity	Delivery mode
Z01xxyA 1AA2	Z01xxyA	TO-92	0.2 g	2500	Bulk
Z01xxyA 2AL2	Z01xxyA			2000	Ammopack
Z01xxyA 5AL2	Z01xxyA				Tape and reel
Z0103yN 5AA4	Z3y	SOT-223	0.12 g	1000	Tape and reel 7”
Z0107yN 5AA4	Z7y				
Z0109yN 5AA4	Z9y				
Z0103yN 6AA4	Z3y			4000	Tape and reel 13”
Z0107yN 6AA4	Z7y				
Z0109yN 6AA4	Z9y				

1. xx = sensitivity, y = voltage

5 Revision history

Table 9. Document revision history

Date	Revision	Changes
Oct-2001	4	Last update.
10-Feb-2005	5	Package: TO-92 tape and reel delivery mode 5AL2 added.
09-May-2005	6	Table 4 on page 2: typo. mistake corrected 1. (dV/dt)c instead of (dI/dt)c 2. V/µs unit instead of A/ms
21-Apr-2006	7	Reformatted to current standard. Table 2 on page 2: Typo corrected. Values for I_{GT} split into two separate rows.
10-Oct-2006	8	Table 2: modified test conditions for $(dV/dt)_{c.}$ Changed “ambient” to “lead or tab” in Figure 2.
20-Oct-2010	9	Package: SOT-223 13” tape and reel added = 6AA4

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