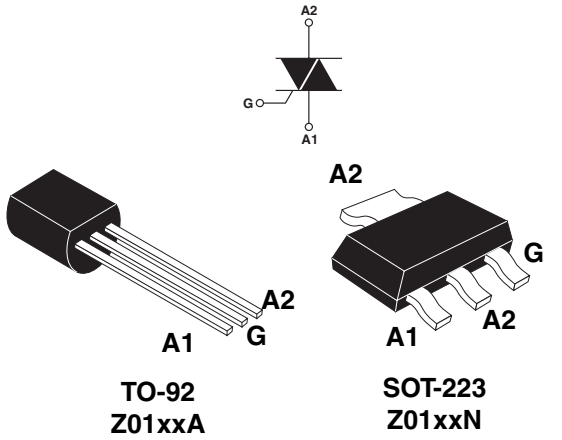
Z01

Standard

1 A Triacs

Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	1	A
V_{DRM}/V_{RRM}	600 to 800	V
$I_{GT\ (Q_1)}$	3 to 25	mA



Description

The Z01 series is suitable for general purpose AC switching applications. They can be found in applications such as home appliances (electrovalve, pump, door lock, small lamp control), fan speed controllers,...

Different gate current sensitivities are available, allowing optimized performances when controlled directly from microcontrollers.

Order Codes

Part Number	Marking
Z01xxA	See *Ordering information on page 7*
Z01xxN	

Table 1. Absolute maximum ratings

Symbol	Parameter			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		
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 $I_G = 2 \times I_{GT}$, $t_r \leq 100$ 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

1 Characteristcs

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		MX.	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.	1.56	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	
$R_{th(j-a)}$	Junction to ambient	S(1) = 5 cm²	SOT-223	60	° C/W
			TO-92	150	

1. S = Copper surface under tab.

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

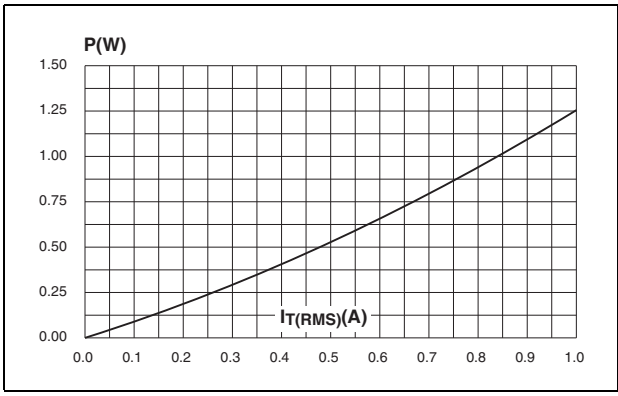


Figure 2. RMS on-state current versus lead (TO-92) or tab (SOT-223) temperature (full cycle)

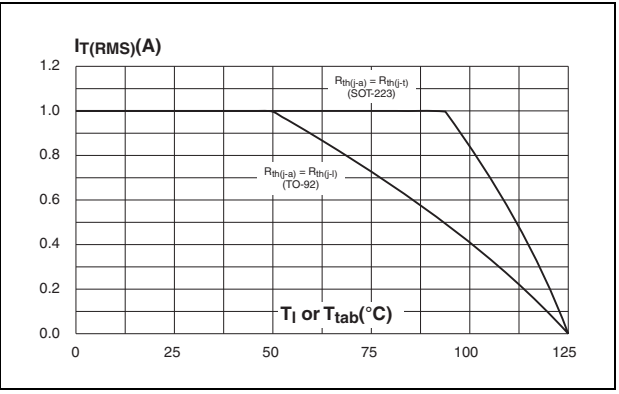


Figure 3. RMS on-state current versus ambient temperature (full cycle)

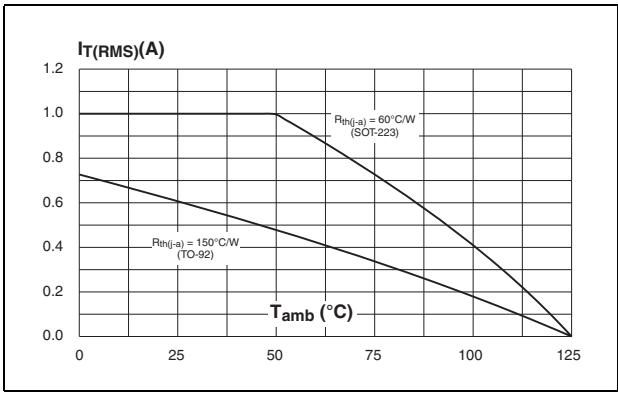


Figure 4. Relative variation of thermal impedance versus pulse duration

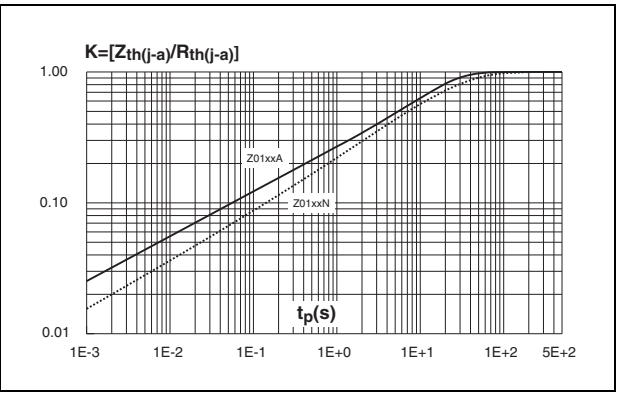


Figure 5. Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

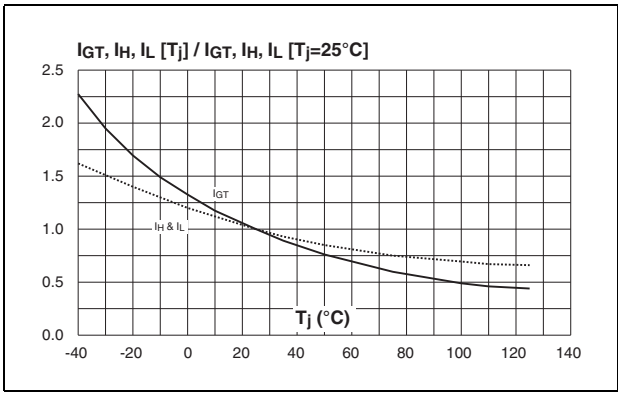


Figure 6. Surge peak on-state current versus number of cycles

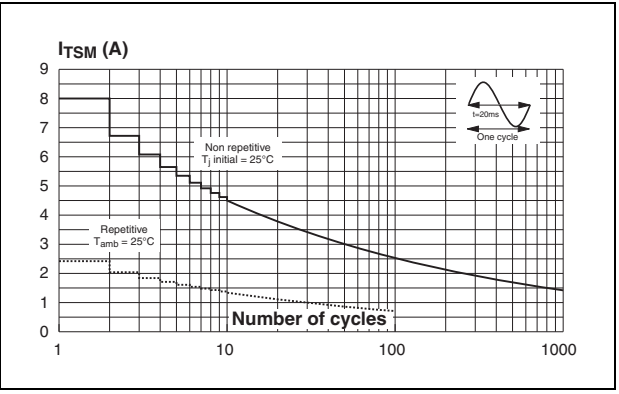


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse with width t_p < 10 ms and corresponding value of I^2t

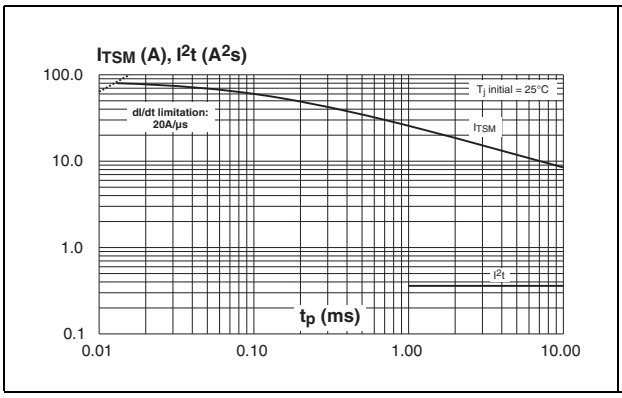


Figure 8. On-state characteristics (maximum values)

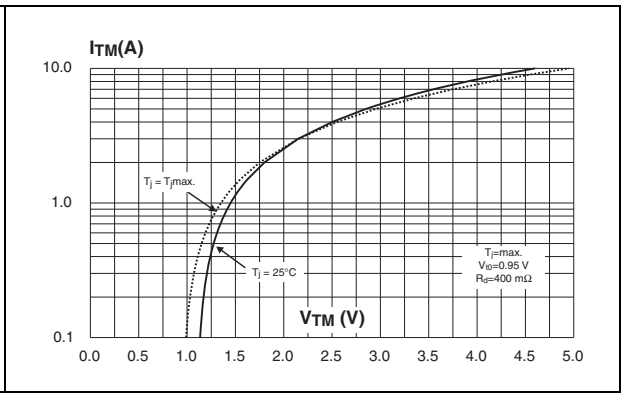


Figure 9. Relative variation of critical rate of decrease of main current versus (dV/dt)c (typical values)

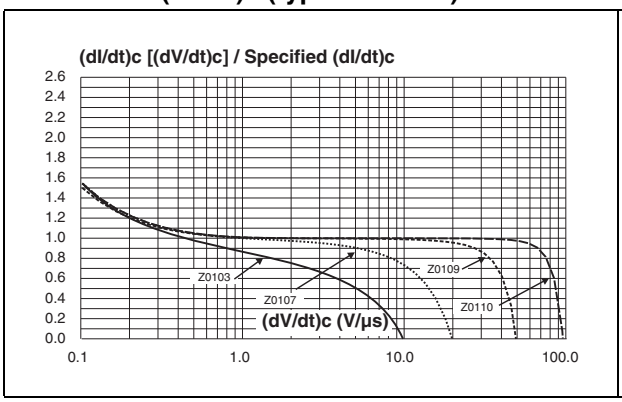


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

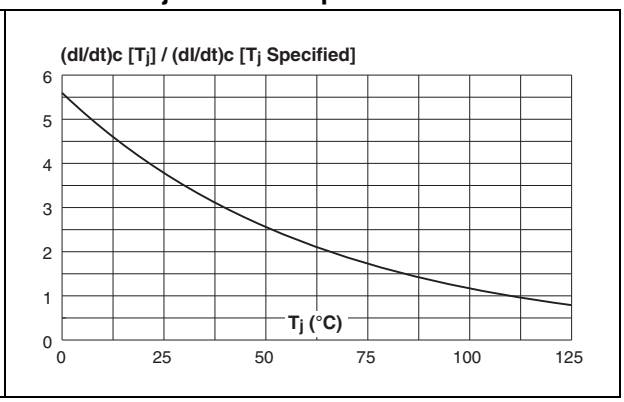
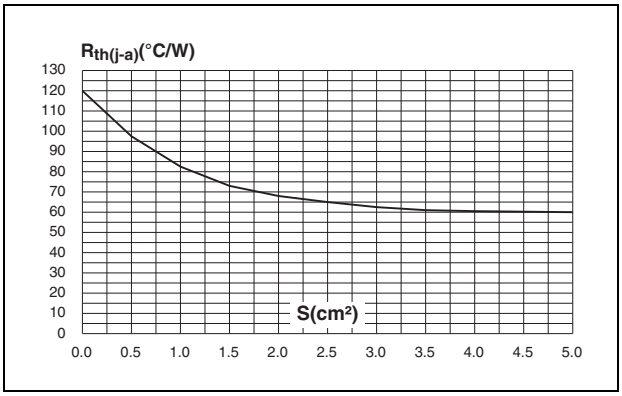


Figure 11. SOT-223 Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 µm)



2 Ordering information scheme

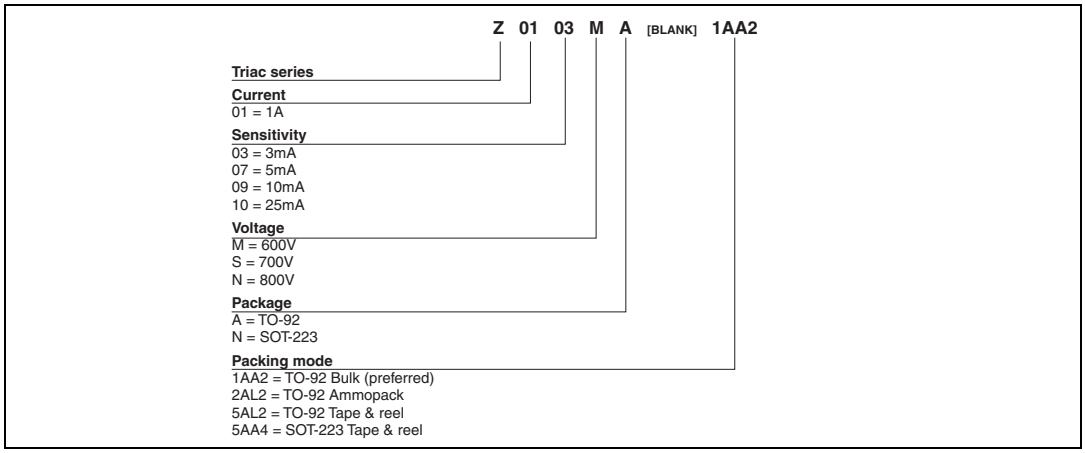
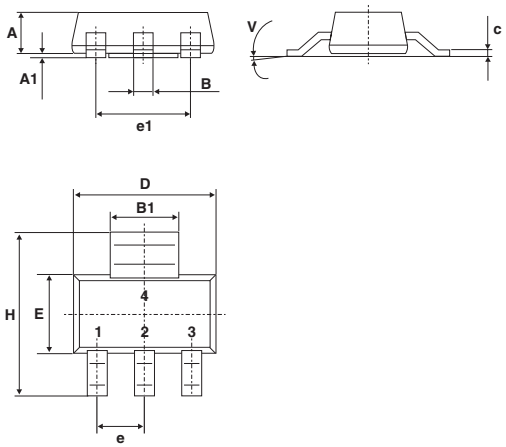


Table 5. Product Selector

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

Table 6. SOT-223 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 12. SOT-223 Footprint dimensions (in millimeters)

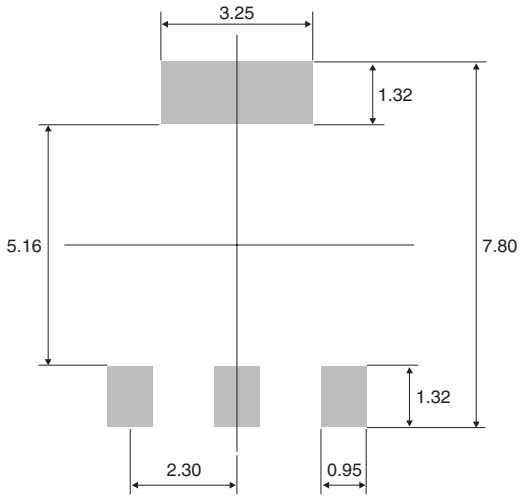
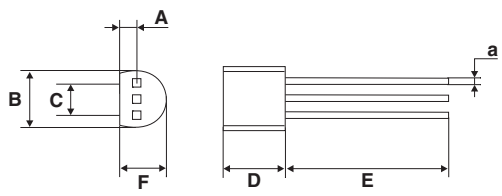


Table 7. TO-92 Dimensions



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

Ordering type(1)	Marking(1)	Package	Weight	Base quantity	Delivery mode
Z01xxyA 1AA2	Z01xxyA	TO-92	0.2 g	2500	Bulk
Z01xxyA 2AL2	Z01xxyA	TO-92	0.2 g	2000	Ammopack
Z01xxyA 5AL2	Z01xxyA	TO-92	0.2 g	2000	Tape and reel
Z0103yN 5AA4	Z3y	SOT-223	0.12 g	1000	Tape and reel
Z0107yN 5AA4	Z7y	SOT-223	0.12 g	1000	Tape and reel
Z0109yN 5AA4	Z9y	SOT-223	0.12 g	1000	Tape and reel

1. xx = sensitivity, y = voltage

5 Revision History

Date	Revision	Description of 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.

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