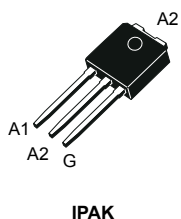


## 4 A - Triac in IPAK package



### Features

- 4 A Triac
- $V_{DRM} / V_{RRM} = 600 \text{ V}$  and  $V_{DSM} / V_{RSM} = 750 \text{ V}$
- 125 °C maximum junction temperature  $T_j$
- IPAK package
- 4 quadrants triacs with  $I_{GT} = 10 \text{ mA}$
- Halogen-free molding, lead-free plating
- ECOPACK2 compliant

### Applications

- Actuators
- Heating elements
- Inrush current limiting circuits

### Description

The Z0409MH series is 4 A Triac housed in compact through-hole IPAK package. This 4 quadrants device is suited to home appliances or power tools and industrial systems and drives loads up to 4 A.

#### Product status link

[Z0409MH](#)

#### Product summary

$I_{T(RMS)}$	4 A
$V_{DSM}/V_{RSM}$	750 V
$I_{GT}$	10 mA
$T_j \text{ max.}$	125 °C

# 1 Characteristics

**Table 1. Absolute maximum ratings (limiting values)**

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	$T_c = 107\text{ }^{\circ}\text{C}$	4	A
$I_{TSM}$	Non repetitive surge peak on-state current (full cycle, $T_j$ initial = $25\text{ }^{\circ}\text{C}$ )	$t = 16.7\text{ ms}$	16	A
		$t = 20\text{ ms}$	15	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$	1.5	$\text{A}^2\text{s}$
$di/dt$	Critical rate of rise of on-state current, $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$ , $f = 120\text{ Hz}$	$T_j = 125\text{ }^{\circ}\text{C}$	50	$\text{A}/\mu\text{s}$
$V_{DRM}/V_{RRM}$	Repetitive peak off-state voltage	$T_j = 125\text{ }^{\circ}\text{C}$	600	V
$V_{DSM}/V_{RSM}$	Non Repetitive peak off-state voltage, 10 ms		750	V
$I_{GM}$	Maximum peak gate current	$t_p = 20\text{ }\mu\text{s}$ , $T_j = 125\text{ }^{\circ}\text{C}$	1.2	A
$P_{GM}$	Maximum gate power dissipation		0.5	W
$T_{stg}$	Storage temperature range		-40 to +125	$^{\circ}\text{C}$
$T_j$	Operating junction temperature range		-40 to +125	$^{\circ}\text{C}$
$T_L$	Maximum lead temperature for soldering during 10 s		260	$^{\circ}\text{C}$

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

Symbol	Test conditions		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	Max.	10	mA
$V_{GT}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	Max.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3\text{ k}\Omega$	$T_j = 125\text{ }^{\circ}\text{C}$ Min.	0.2	V
$I_L$	$I_G = 1.2 \times I_{GT}$	I-III-IV Max.	15	mA
		II Max.	25	mA
$I_H^{(2)}$	$I_T = 500\text{ mA}$ , gate open	Max.	10	mA
$dV/dt^{(2)}$	$V_D = 67\text{ }\%$ $V_{DRM}$ ; $V_R = 67\text{ }\%$ $V_{RRM}$ , gate open	$T_j = 110\text{ }^{\circ}\text{C}$ Min.	100	$\text{V}/\mu\text{s}$
$(dV/dt)_c^{(2)}$	$(di/dt)_c = 1.8\text{ A/ms}$	$T_j = 110\text{ }^{\circ}\text{C}$ Min.	2	$\text{V}/\mu\text{s}$

1. For both polarities of OUT pin referenced to COM pin.

2. For both polarities of A2 referenced to A1.

**Table 3. Static characteristics**

Symbol	Test conditions	$T_j$		Value	Unit
$V_{TM}^{(1)}$	$I_{TM} = 5.5\text{ A}$ , $t_p = 380\text{ }\mu\text{s}$	$25\text{ }^{\circ}\text{C}$	Max.	2	V
$V_{TO}^{(1)}$	Threshold voltage	$125\text{ }^{\circ}\text{C}$	Max.	0.95	V
$R_D^{(1)}$	Dynamic resistance	$125\text{ }^{\circ}\text{C}$	Max.	180	$\text{m}\Omega$
$I_{DRM}/I_{RRM}$	$V_D = V_R = V_{DRM} = V_{RRM}$	$25\text{ }^{\circ}\text{C}$	Max.	5	$\mu\text{A}$
		$125\text{ }^{\circ}\text{C}$		0.5	mA

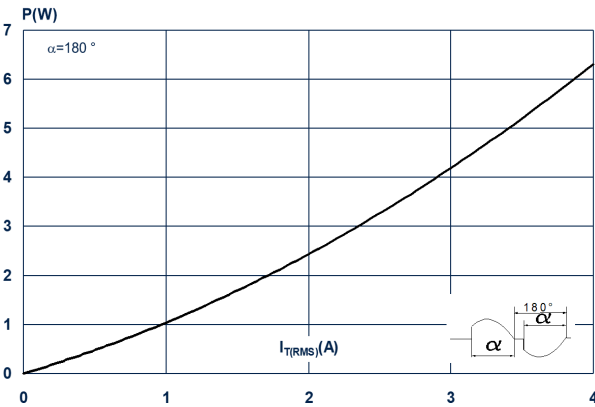
1. For both polarities of A2 referenced to A1.

**Table 4. Thermal resistance**

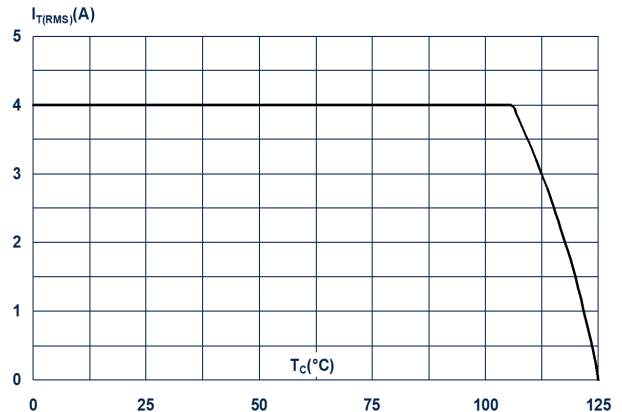
Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	Max.	3	°C/W
$R_{th(j-a)}$	Junction to ambient	Typ.	70	°C/W

## 1.1 Characteristics (curves)

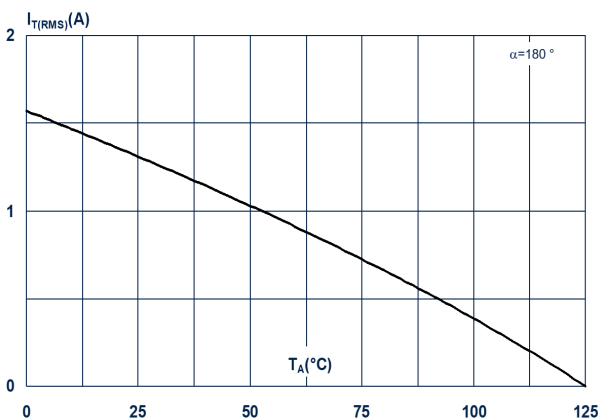
**Figure 1. Maximum power dissipation versus on-state RMS current (full cycle)**



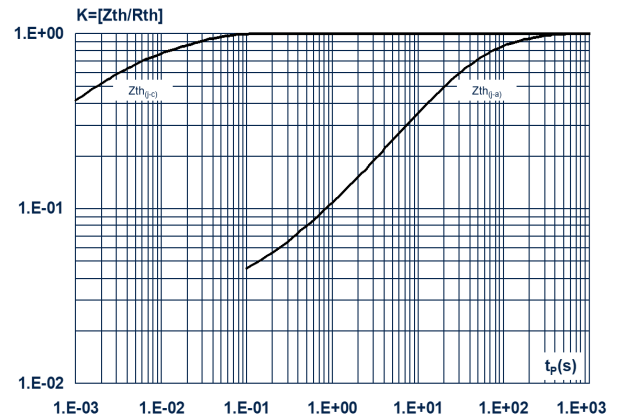
**Figure 2. Average and DC on-state current versus case temperature**



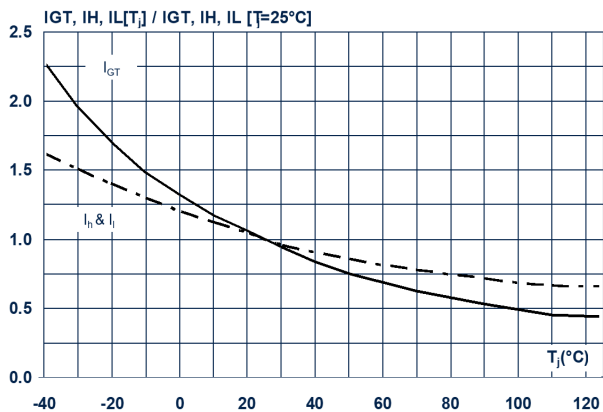
**Figure 3. On-state RMS current versus ambient temperature (full cycle)**



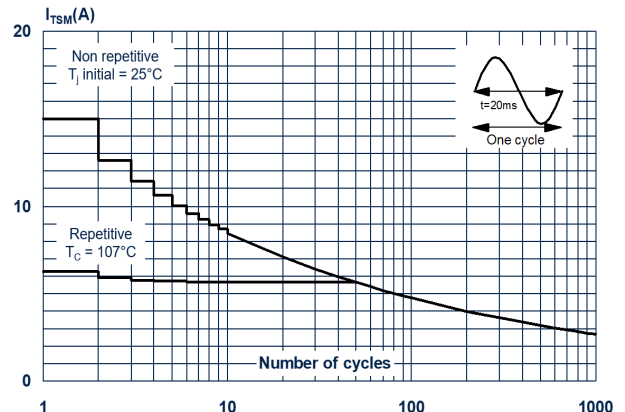
**Figure 4. Relative variation of thermal impedance versus pulse duration**



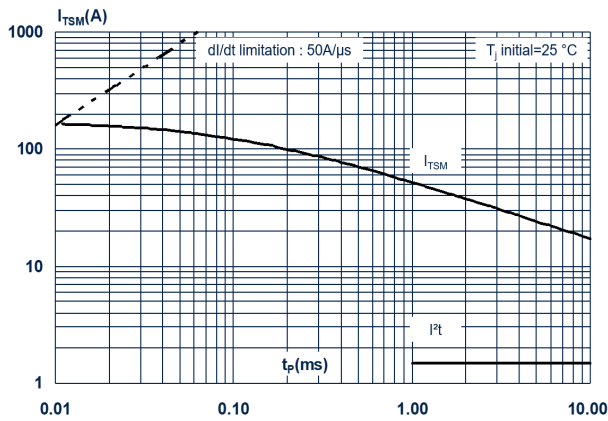
**Figure 5. Relative variation of gate triggering current and voltage versus junction temperature (typical values)**



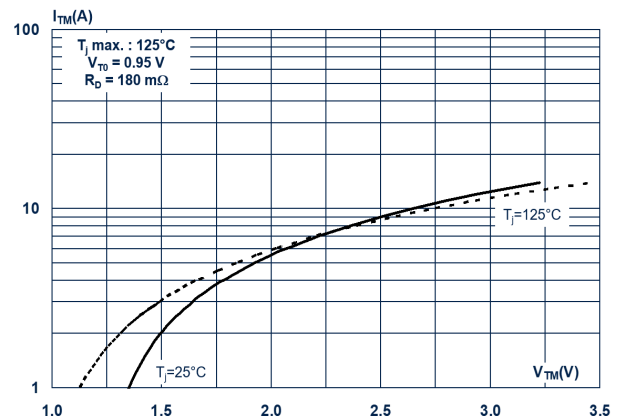
**Figure 6. Surge peak on-state current versus number of cycles**



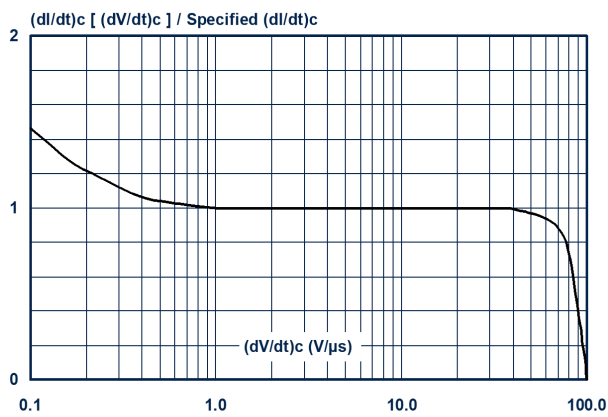
**Figure 7.** Non repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms and corresponding value of  $I^2t$



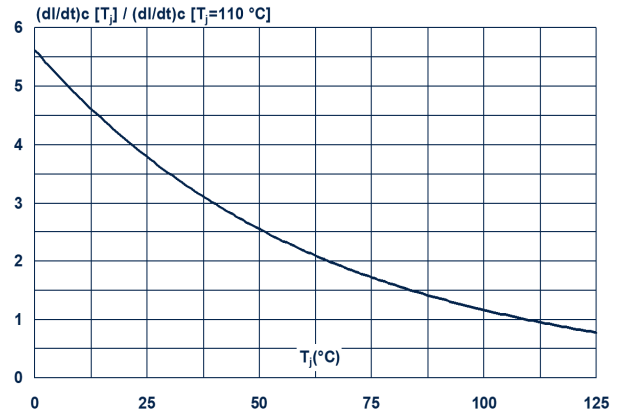
**Figure 8.** On-state characteristics (maximum values)



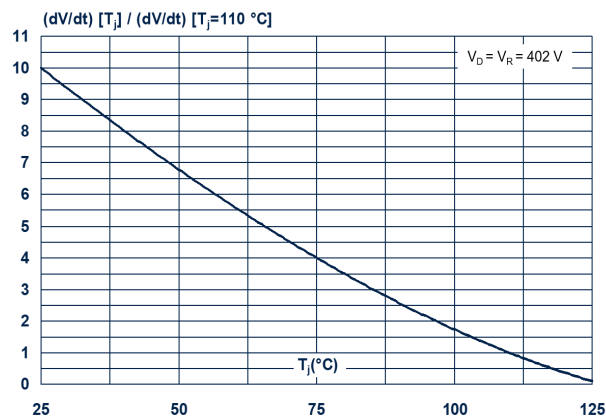
**Figure 9.** Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values)



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



**Figure 11.** Relative variation of static  $dV/dt$  immunity versus junction temperature



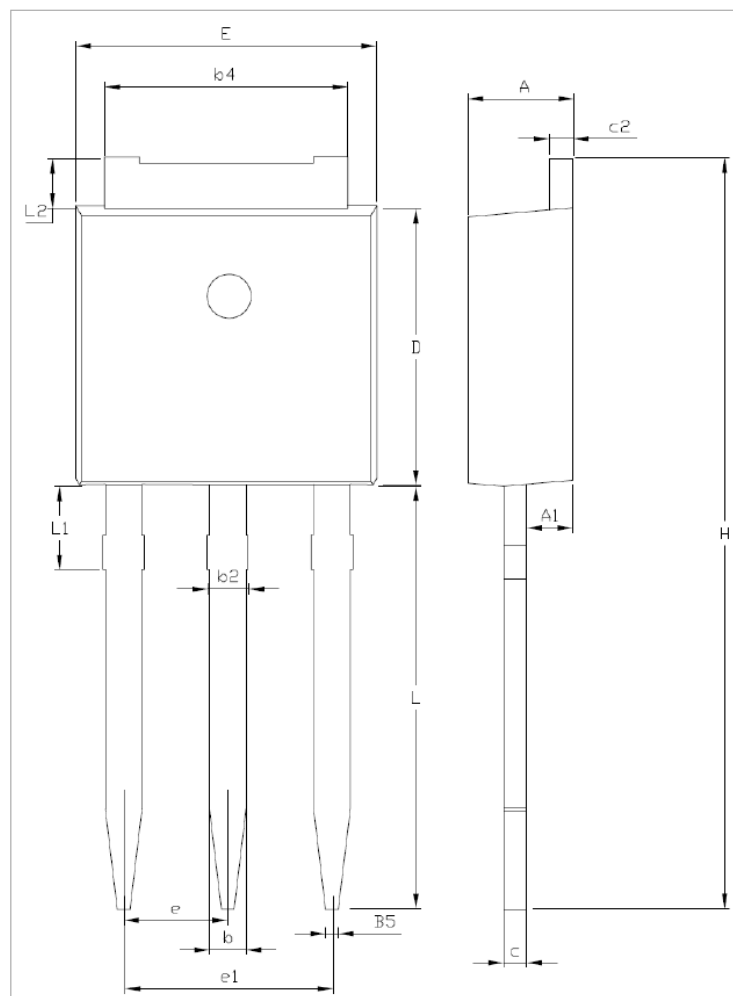
## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 IPAK package information

- Molding compounded resin is halogen free and meets UL94 flammability standard, level V0
- Lead-free package leads plating

**Figure 12. IPAK package outline**



**Table 5. IPAK package mechanical data**

Ref.	Dimensions					
	MillimetersInches (for reference only)					
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10			0.035
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43			
B5		0.30			0.012	
c	0.45		0.60			
c2	0.46		0.60			
D	6		6.20			
E	6.40		6.65	0.252		0.262
e		2.28			0.090	
e1	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.60	0.354		0.377
L1	0.8		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
V1		10°			10°	

### 3 Ordering information

Figure 13. Ordering information scheme

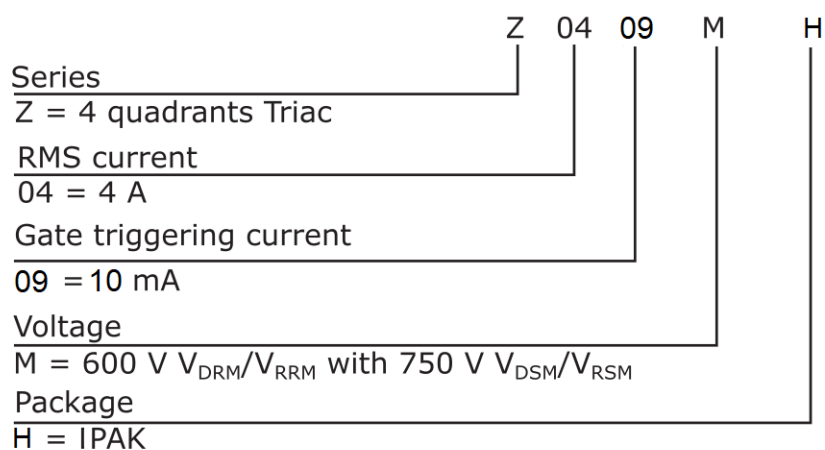


Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
Z0409MH	Z0409MH	IPAK	0.31 g	75	Tube



## Revision history

**Table 7. Document revision history**

Date	Revision	Changes
05-Sep-2022	1	Initial release.

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