

## 1. General description

Planar passivated high commutation three quadrant triac in a TO92 plastic package. This "series ER" triac balances the requirements of commutation performance and gate sensitivity and is intended for interfacing with low power drivers and logic ICs including microcontrollers. It has reverse pinning to that of the standard triac in this package.

## 2. Features and benefits

- 3Q technology for improved noise immunity
- Direct triggering from low power drivers and logic ICs
- High commutation capability with sensitive gate
- High immunity to false turn-on by  $dV/dt$
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- Reverse pinning version (ER)
- Sensitive gate for easy logic level triggering
- Triggering in three quadrants only

## 3. Applications

- General purpose motor control circuits
- Small loads in washing machines
- Solenoid drivers

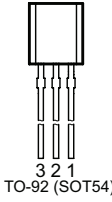

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Absolute maximum rating</b>						
$V_{DRM}$	repetitive peak off-state voltage		-	-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{lead} \leq 54\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	1	A
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+ $T_J = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G- $T_J = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G- $T_J = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	1	-	10	mA

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 TO-92 (SOT54)	 sym051
2	G	gate		
3	T2	main terminal 2		

## 6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BTA201-800ER	TO92	BTA201-800ER,412	Bulk	1000	SOT54	14-Nov-2013

## 7. Marking

Table 4. Marking codes

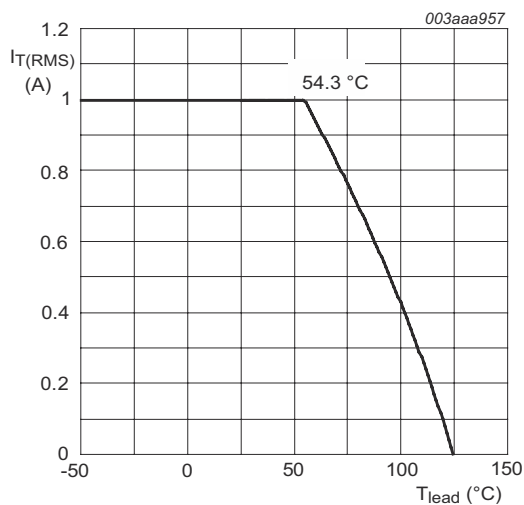
Type number	Marking codes
BTA201-800ER	201-8ER

## 8. Limiting values

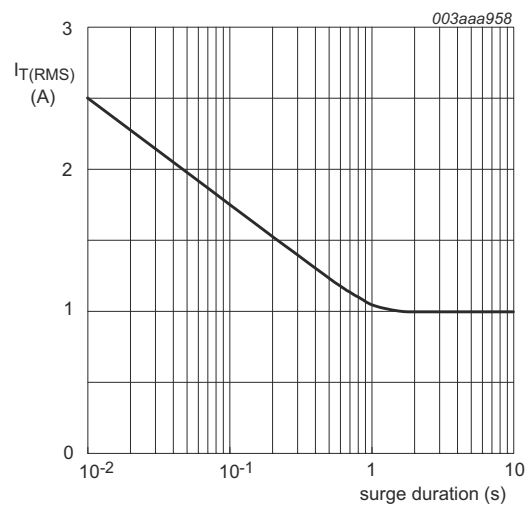
**Table 4. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{\text{DRM}}$	repetitive peak off-state voltage		-	800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{lead}} \leq 54\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	3	A
$I_{\text{TSM}}$	non-repetitive peak on-state current	full sine wave; $t_p = 16.7\text{ ms}$ ; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$	-	30	A
		full sine wave; $t_p = 20\text{ ms}$ ; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>	-	27	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; sine wave	-	3.7	$\text{A}^2\text{s}$
$dI_{\text{T}}/dt$	rate of rise of on-state current	$I_{\text{G}} = 60\text{ mA}$	-	100	$\text{A}/\mu\text{s}$
$I_{\text{GM}}$	peak gate current		-	2	A
$P_{\text{GM}}$	peak gate power		-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	-	0.3	W
$T_{\text{j}}$	junction temperature		-40	150	$^{\circ}\text{C}$



**Fig. 1. RMS on-state current as a function of lead temperature; maximum values**



**Fig. 2. RMS on-state current as a function of surge duration; maximum values**

$f = 50\text{ Hz}$ ;  $T_{\text{lead}} = 54\text{ }^{\circ}\text{C}$

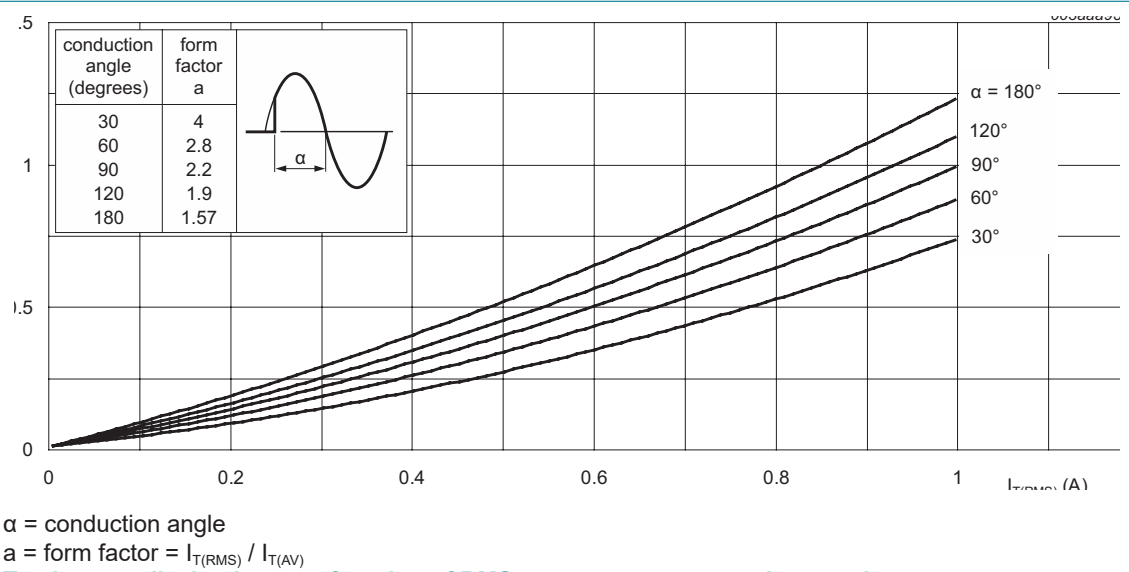


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

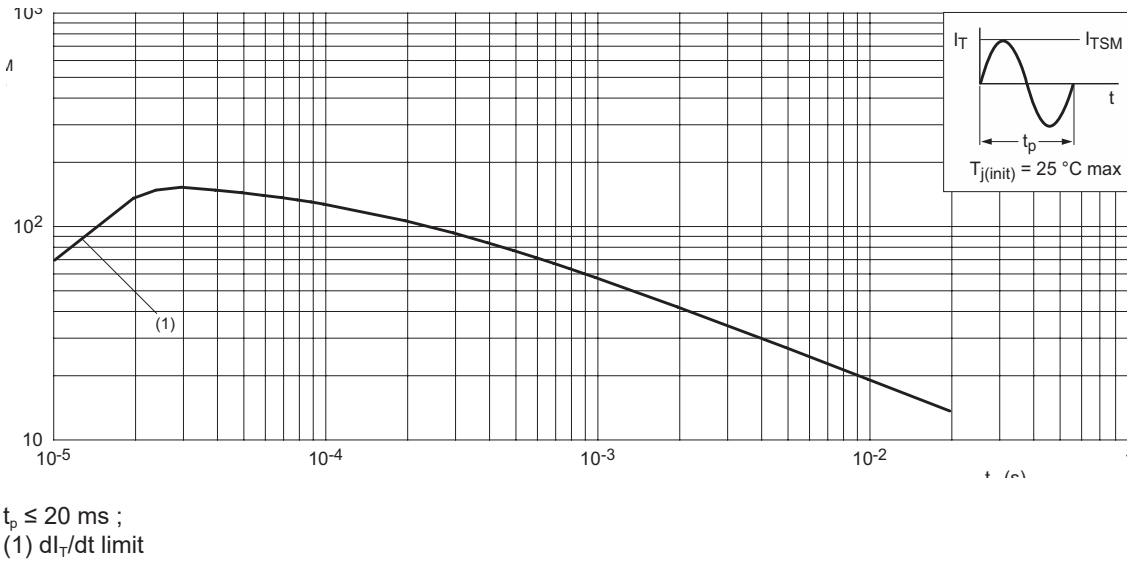


Fig. 4. Total power dissipation as a function of RMS on-state current; maximum values

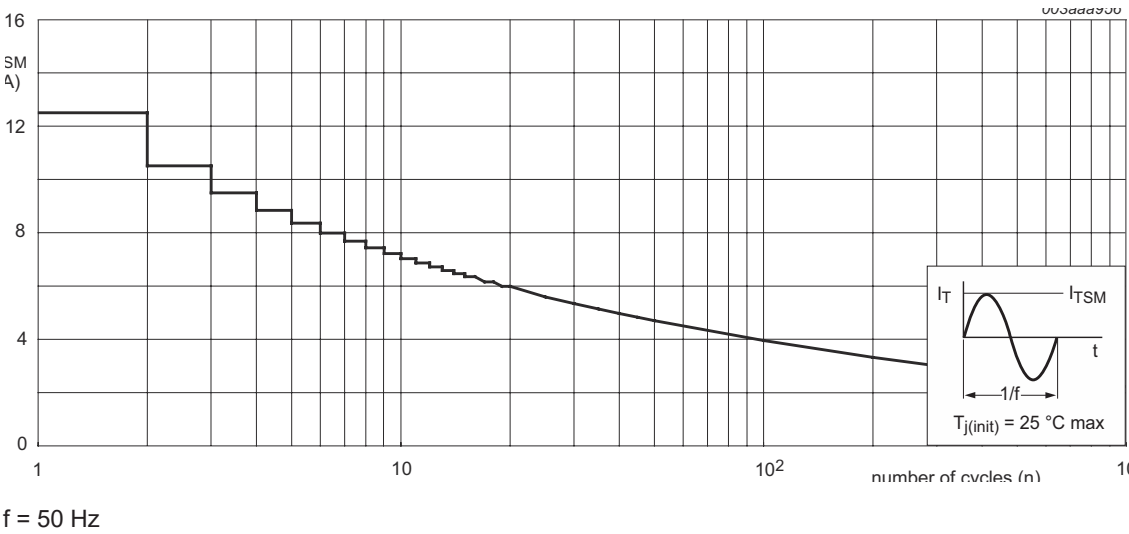
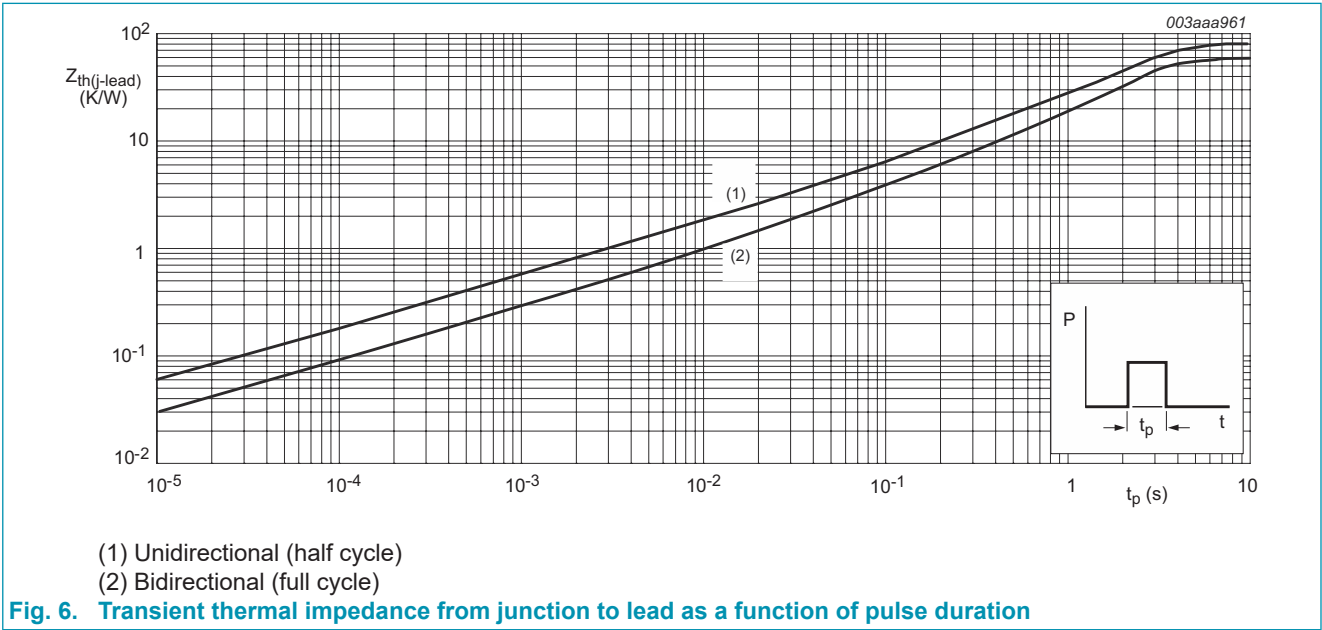


Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

9. Thermal characteristics

Table 5. Thermal characteristics

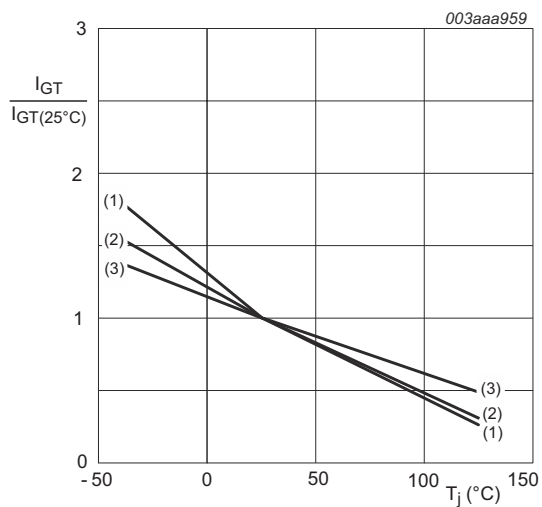
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	full cycle; Fig. 6		-	-	60	K/W
		half cycle; Fig. 6		-	-	80	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	150	-	K/W



## 10. Characteristics

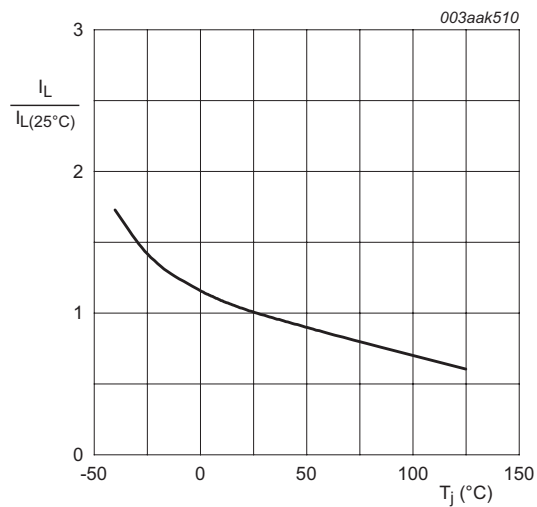
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Static characteristics</b>							
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		1	-	10	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>		1	-	10	mA
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	12	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	20	mA
		$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 8</a>		-	-	12	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 9</a>		-	-	12	mA
$V_T$	on-state voltage	$I_T = 5\text{ A}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 10</a>		-	1.2	1.5	V
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_J = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 11</a>		-	0.7	1	V
		$V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_J = 150\text{ }^\circ\text{C}$		0.2	0.3	-	V
$I_D$	off-state current	$V_D = 800\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$		-	0.1	0.5	mA
<b>Dynamic characteristics</b>							
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit; <a href="#">Fig. 12</a>		600	-	-	V/ $\mu\text{s}$
$dI_{com}/dt$	rate of change of commutating current	$V_D = 400\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$ ; $I_{T(RMS)} = 1\text{ A}$ ; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$ ; (snubberless condition); gate open circuit		2.5	-	-	A/ms
		$V_D = 400\text{ V}$ ; $T_J = 125\text{ }^\circ\text{C}$ ; $I_{T(RMS)} = 1\text{ A}$ ; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$ ; gate open circuit		3.5	-	-	A/ms

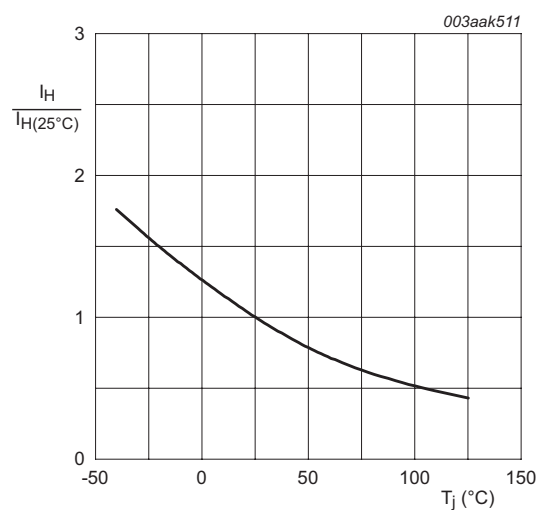


- (1) T2- G-  
(2) T2+ G-  
(3) T2+ G+

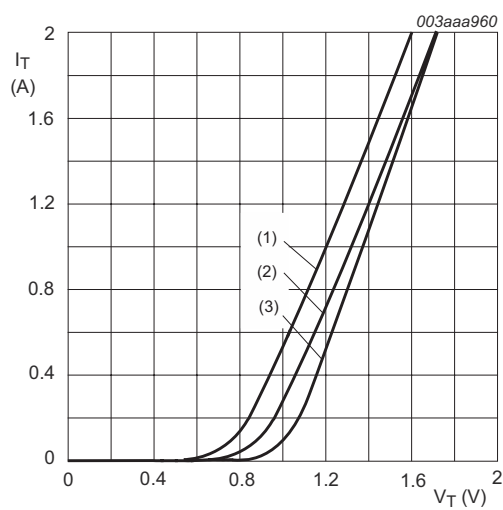
**Fig. 7. Normalized gate trigger current as a function of junction temperature**



**Fig. 8. Normalized latching current as a function of junction temperature**



**Fig. 9. Normalized holding current as a function of junction temperature**



$V_o = 1.02 \text{ V}$ ;  $R_s = 0.358 \Omega$

- (1)  $T_j = 125^{\circ}\text{C}$ ; typical values  
(2)  $T_j = 125^{\circ}\text{C}$ ; maximum values  
(3)  $T_j = 25^{\circ}\text{C}$ ; maximum values

**Fig. 10. On-state current as a function of on-state voltage**

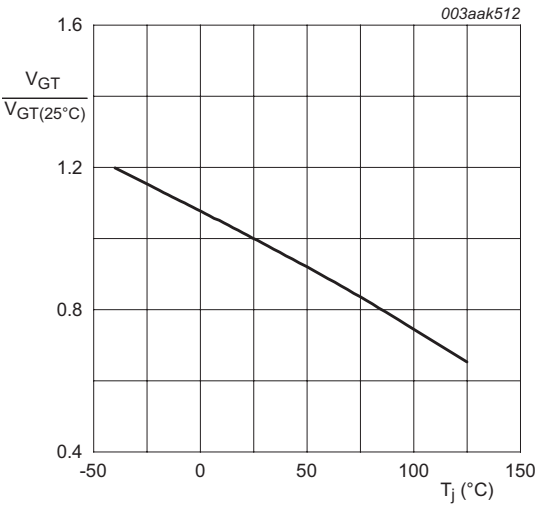


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

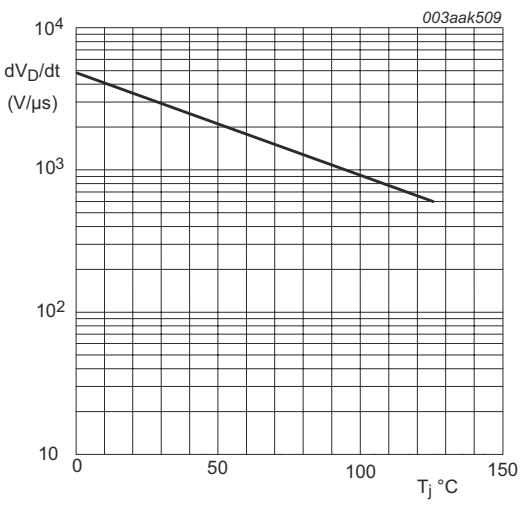
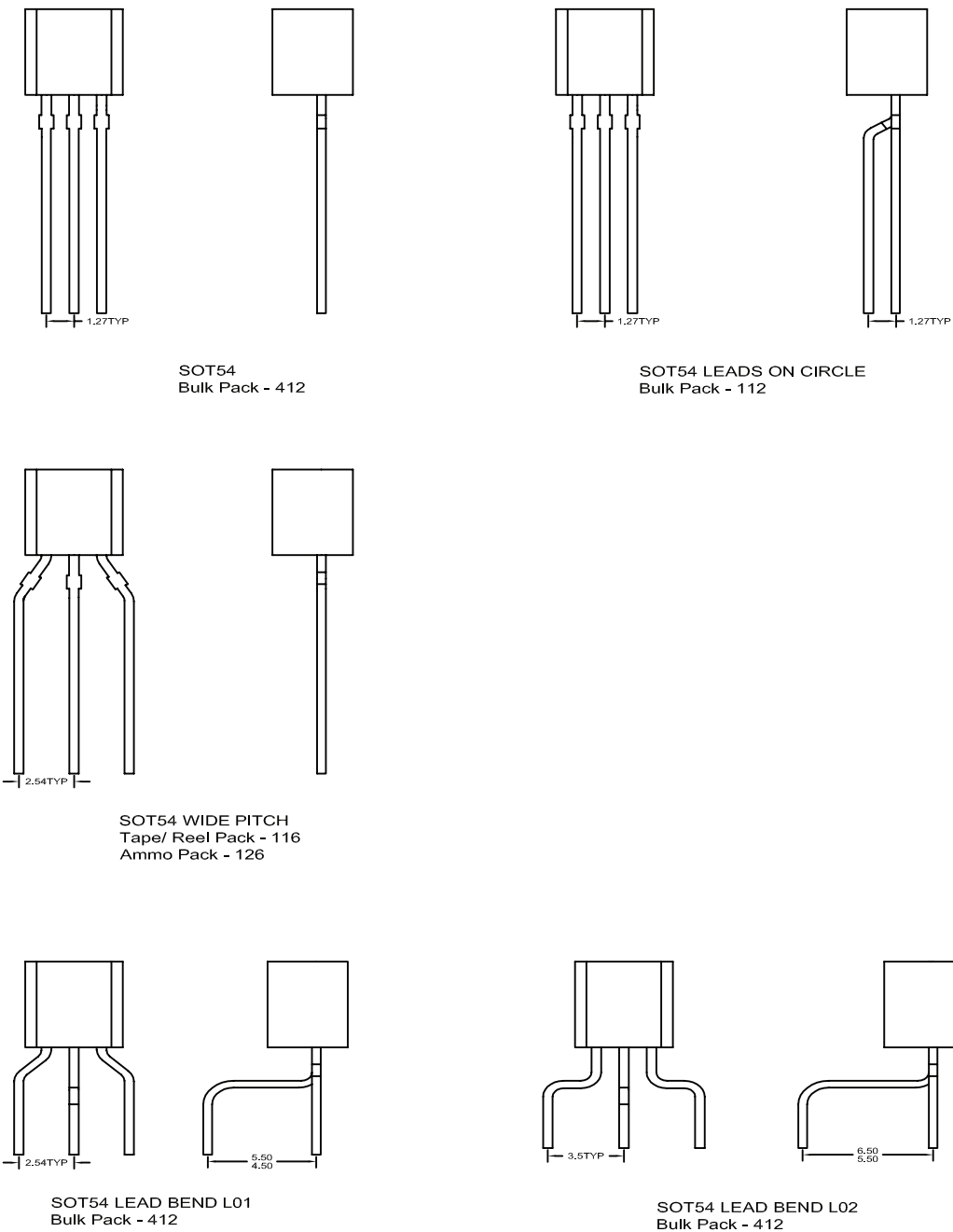


Fig. 11. Critical rate of rise of off-state voltage as a function of junction temperature; minimum values

11. Package outline

SOT54 PACKAGE OUTLINE



Remark: Detailed dimensions refer to POD drawing.

· PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.

## 12. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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13. Contents

1. General description..... 1

2. Features and benefits ..... 1

3. Applications ..... 1

4. Quick reference data..... 1

5. Pinning information..... 2

6. Ordering information..... 2

7. Marking..... 2

8. Limiting values ..... 3

9. Thermal characteristics ..... 5

10. Characteristics..... 6

11. Package outline ..... 9

12. Legal information ..... 10

13. Contents ..... 12

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