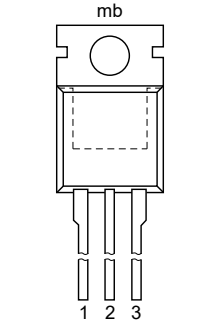



Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $R_{GK} = 100\text{ }\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; <a href="#">Fig. 12</a>		200	1000	-	V/ $\mu$ s

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
3	G	gate		
mb	A	mounting base; connected to anode		

## 6. Ordering information

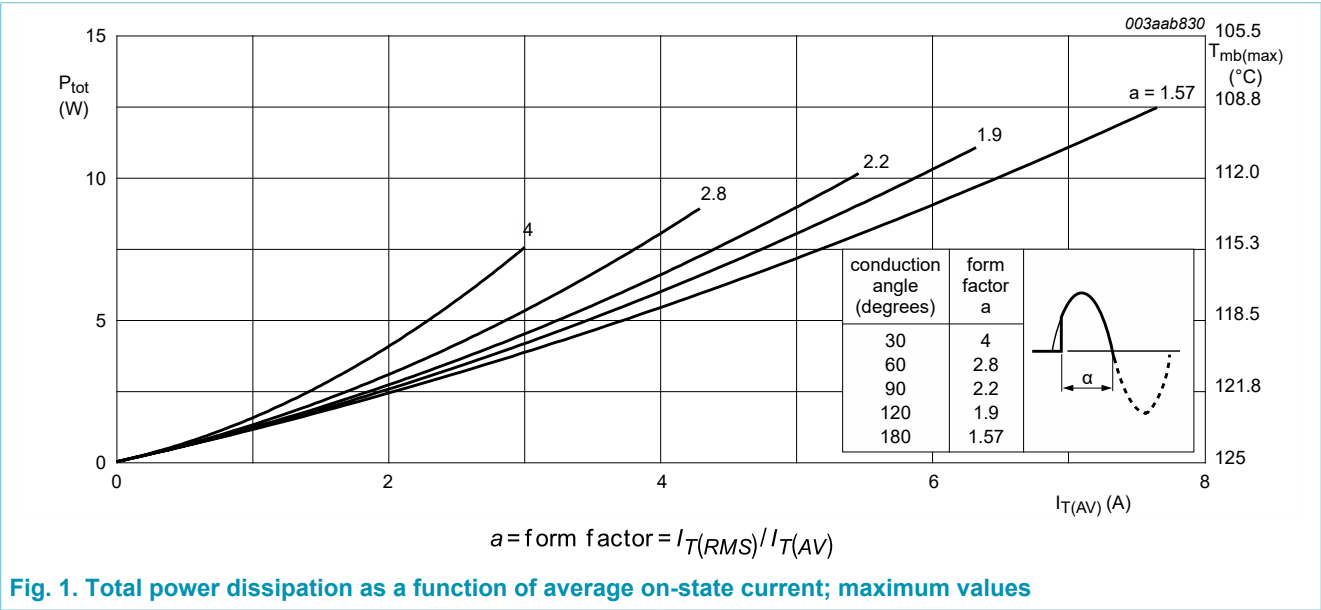
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT151-800R	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

7. Limiting values

Table 4. Limiting values  
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	800	V
$V_{RRM}$	repetitive peak reverse voltage		-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 109\text{ }^{\circ}\text{C}$ ; Fig. 1	-	7.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 109\text{ }^{\circ}\text{C}$ ; Fig. 2; Fig. 3	-	12	A
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 10\text{ ms}$ ; Fig. 4; Fig. 5	-	120	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 8.3\text{ ms}$	-	132	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN	-	72	$\text{A}^2\text{s}$
$di_T/dt$	rate of rise of on-state current	$I_G = 30\text{ mA}$	-	50	$\text{A}/\mu\text{s}$
$I_{GM}$	peak gate current		-	2	A
$V_{RGM}$	peak reverse gate voltage		-	5	V
$P_{GM}$	peak gate power		-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.5	W
$T_{stg}$	storage temperature		-40	150	$^{\circ}\text{C}$
$T_j$	junction temperature		-	125	$^{\circ}\text{C}$



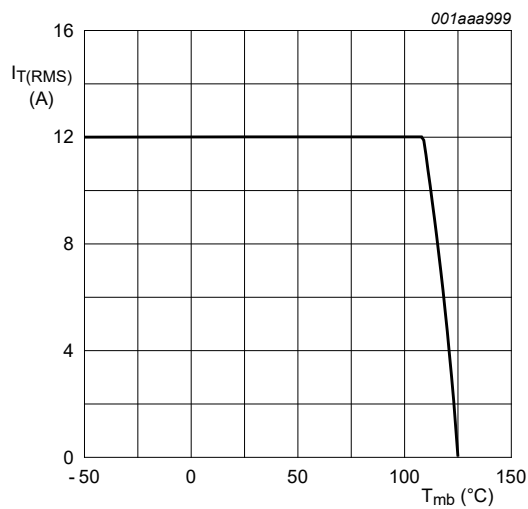
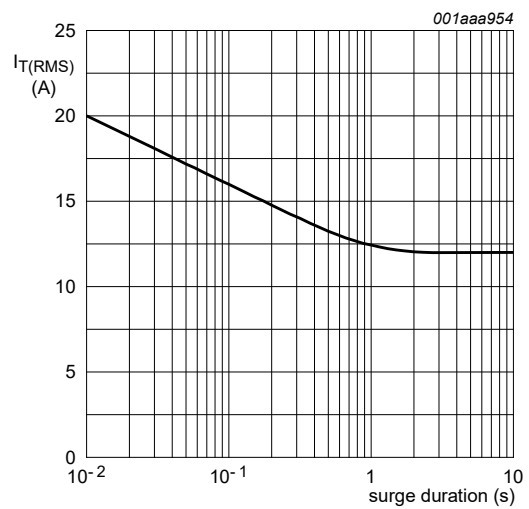


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values



$f = 50 \text{ Hz}; T_{mb} = 109^\circ\text{C}$

Fig. 3. RMS on-state current as a function of surge duration; maximum values

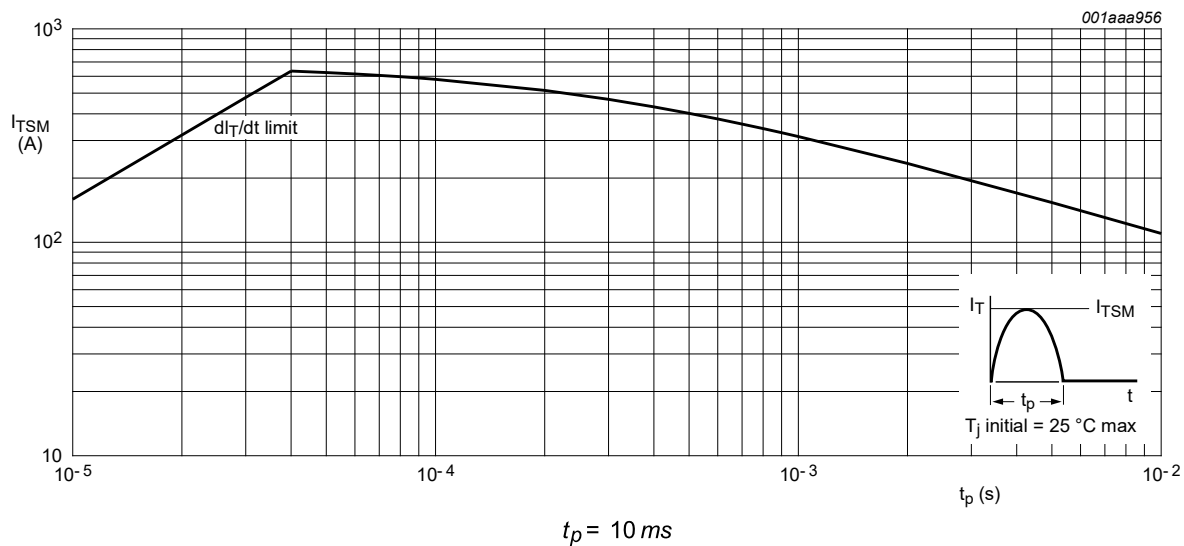
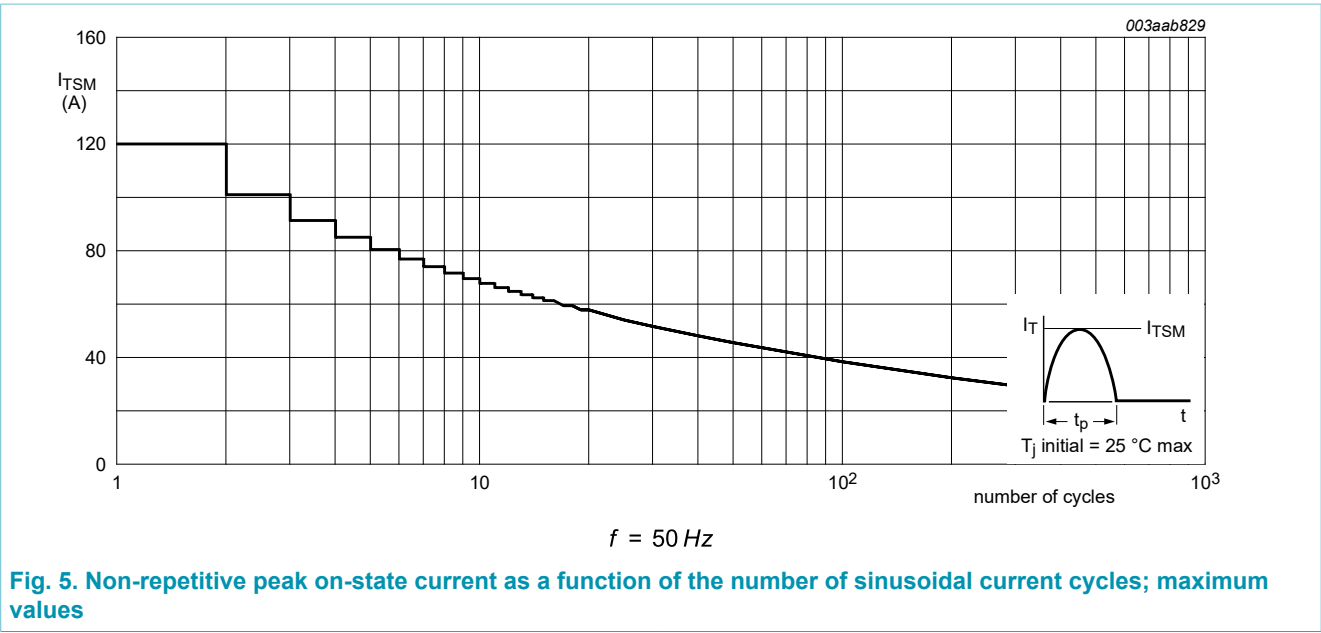


Fig. 4. Non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; maximum values



8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	<a href="#">Fig. 6</a>		-	-	1.3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

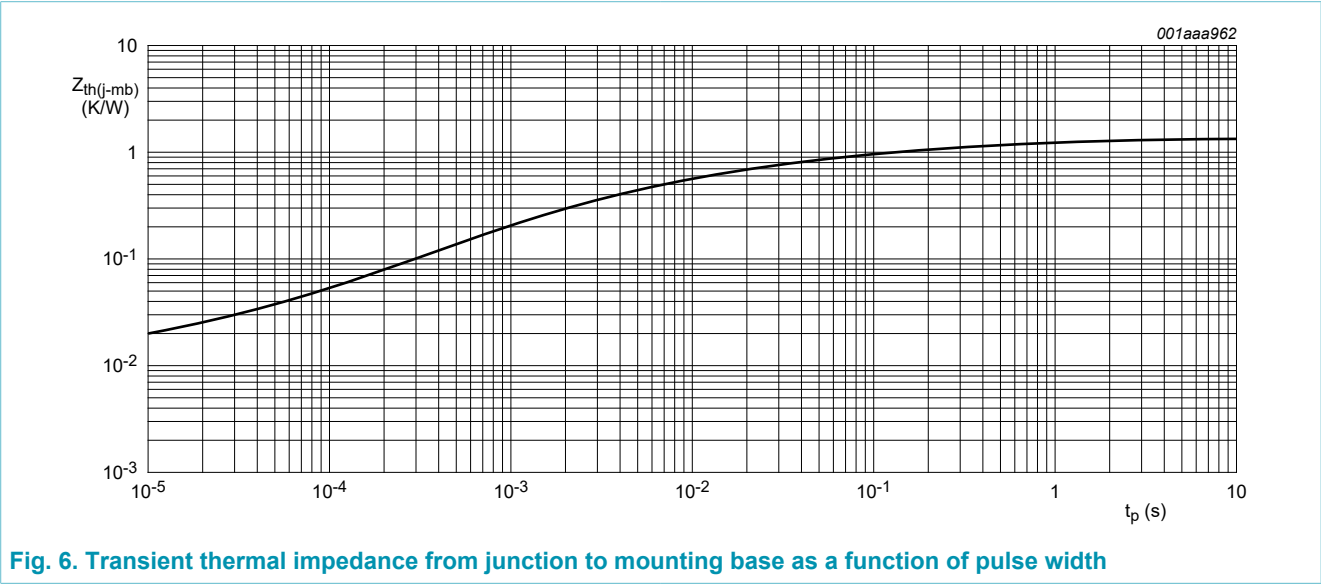
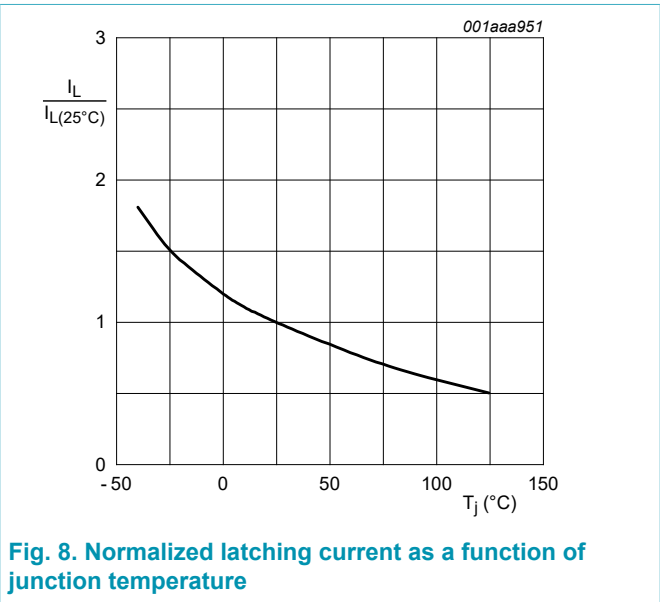
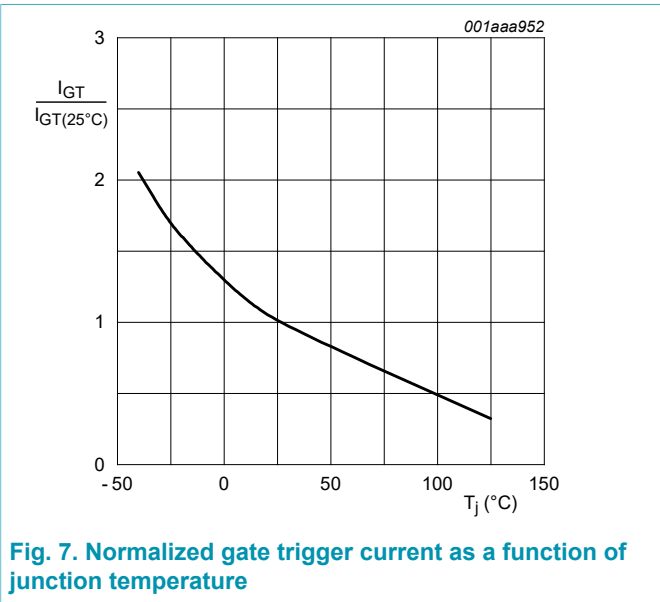


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; Fig. 7	-	2	15	mA
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; Fig. 8	-	10	40	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; Fig. 9	-	7	20	mA
$V_T$	on-state voltage	$I_T = 23\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; Fig. 10	-	1.4	1.75	V
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; Fig. 11	-	0.6	1.5	V
		$V_D = 800\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; Fig. 11	0.25	0.4	-	V
$I_D$	off-state current	$V_D = 800\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$	-	0.1	0.5	mA
$I_R$	reverse current	$V_R = 800\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$	-	0.1	0.5	mA
Dynamic characteristics						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $R_{GK} = 100\text{ }\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; Fig. 12	200	1000	-	V/ $\mu\text{s}$
		$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit; Fig. 12	50	130	-	V/ $\mu\text{s}$
$t_{gt}$	gate-controlled turn-on time	$I_{TM} = 40\text{ A}$ ; $V_D = 800\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^{\circ}\text{C}$	-	2	-	$\mu\text{s}$
$t_q$	commutated turn-off time	$V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $I_{TM} = 20\text{ A}$ ; $V_R = 25\text{ V}$ ; ( $dI_T/dt$ ) $_M = 30\text{ A}/\mu\text{s}$ ; $dV_D/dt = 50\text{ V}/\mu\text{s}$ ; $R_{GK( ext{ext})} = 100\text{ }\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ )	-	70	-	$\mu\text{s}$



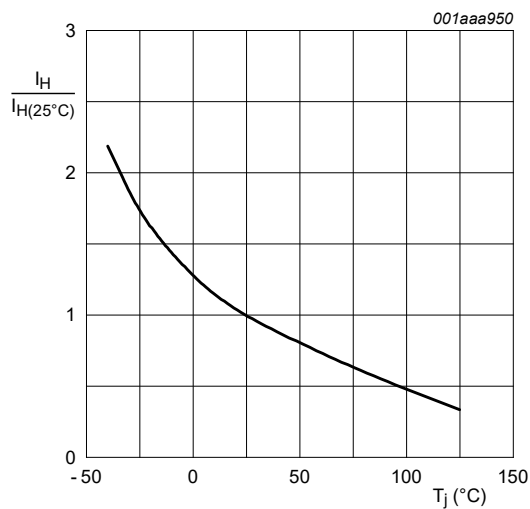
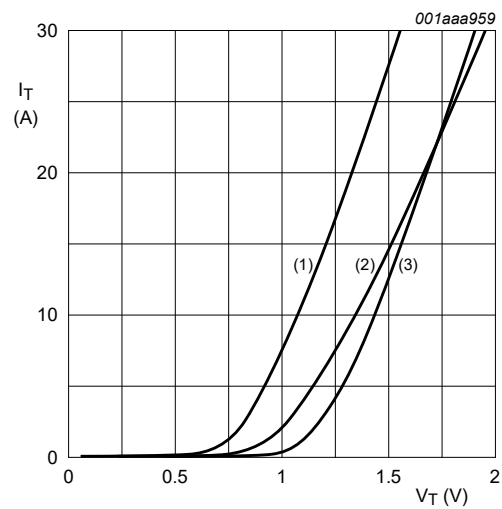


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.06\text{ V}$ ;  $R_s = 0.0304\ \Omega$   
(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

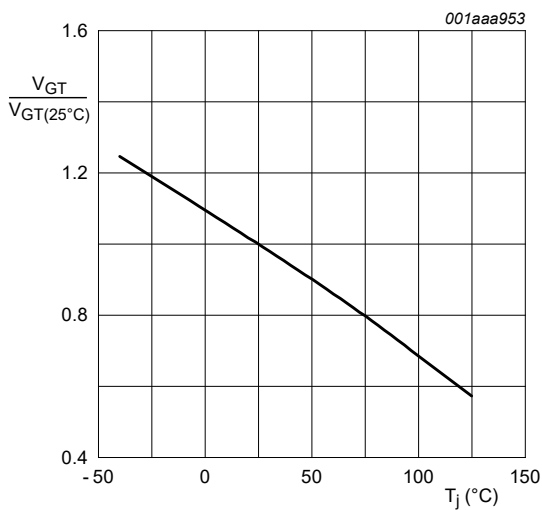
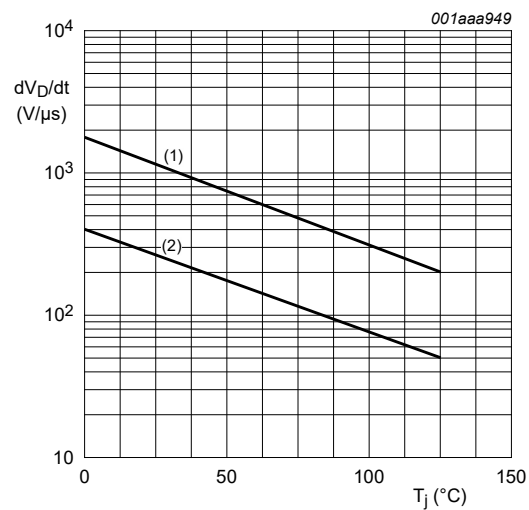


Fig. 11. Normalized gate trigger voltage as a function of junction temperature



(1)  $R_{GK} = 100\ \Omega$ ;  
(2) gate open circuit

Fig. 12. Critical rate of rise of off-state voltage as a function of junction temperature; minimum values

10. Package outline

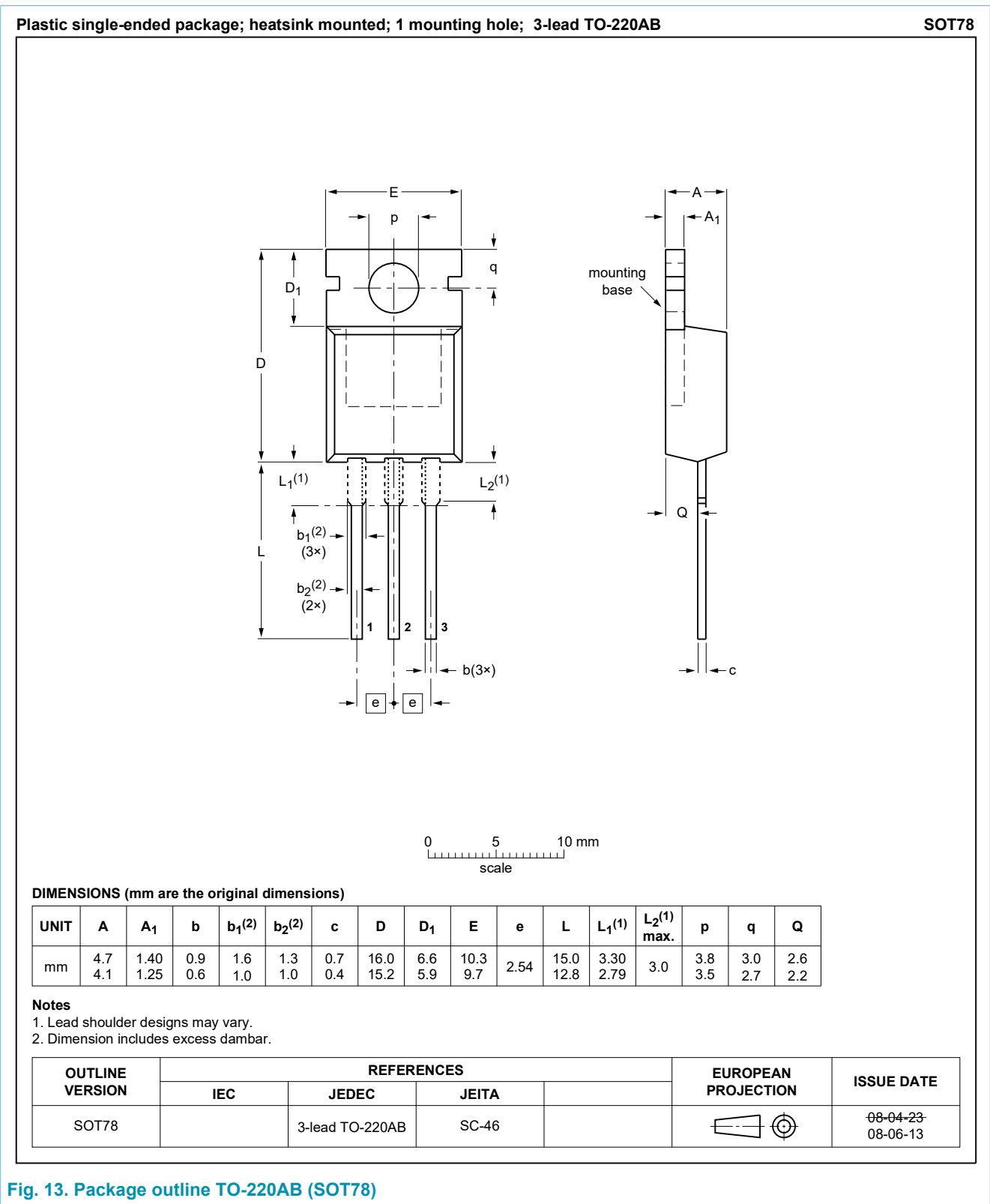


Fig. 13. Package outline TO-220AB (SOT78)

## 11. Legal information

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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.
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