

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a SOT78 (TO-220AB) plastic package intended for use in applications requiring high thermal cycling performance and high junction temperature capability ($T_{j(max)} = 150^\circ\text{C}$).

2. Features and benefits

- High junction operating temperature capability
- High thermal cycling performance
- High voltage capability
- Planar passivated for voltage ruggedness and reliability

3. Applications

- Ignition circuits
- Motor control
- Protection circuits e.g. SMPS inrush current
- Voltage regulation

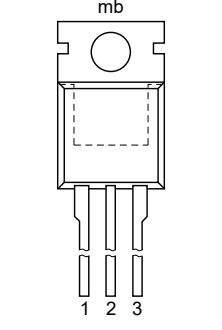
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133^\circ\text{C}$; Fig. 1	-	-	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133^\circ\text{C}$; Fig. 2 ; Fig. 3	-	-	16	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25^\circ\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	-	180	A
		half sine wave; $T_{j(init)} = 25^\circ\text{C}$; $t_p = 8.3\text{ ms}$	-	-	198	A
T_j	junction temperature		-	-	150	$^\circ\text{C}$
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25^\circ\text{C}$; Fig. 7	-	-	15	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 150^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	500	-	-	V/ μs

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package			Version
	Name	Description		
TYN16-600CT	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		-	600	V
V_{RRM}	repetitive peak reverse voltage		-	600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133^\circ\text{C}$; Fig. 1	-	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133^\circ\text{C}$; Fig. 2 ; Fig. 3	-	16	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	180	A
		half sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 8.3\text{ ms}$	-	198	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	162	A^2s
dl_T/dt	rate of rise of on-state current	$I_T = 40\text{ A}$; $I_G = 200\text{ mA}$; $dl_G/dt = 200\text{ mA}/\mu\text{s}$	-	50	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current		-	4	A
V_{RGM}	peak reverse gate voltage		-	5	V
P_{GM}	peak gate power		-	10	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	1	W
T_{stg}	storage temperature		-40	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$

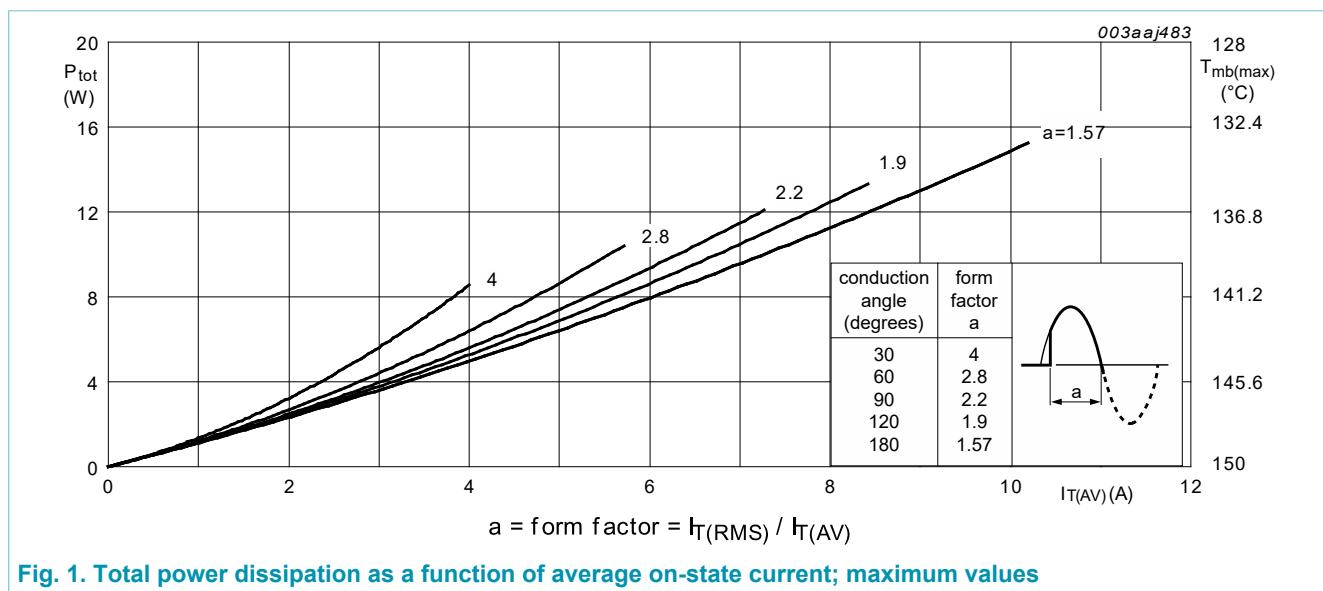


Fig. 1. Total power dissipation as a function of average on-state current; maximum values

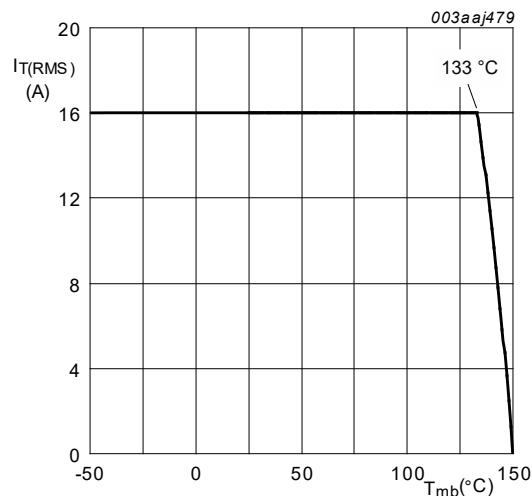


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values

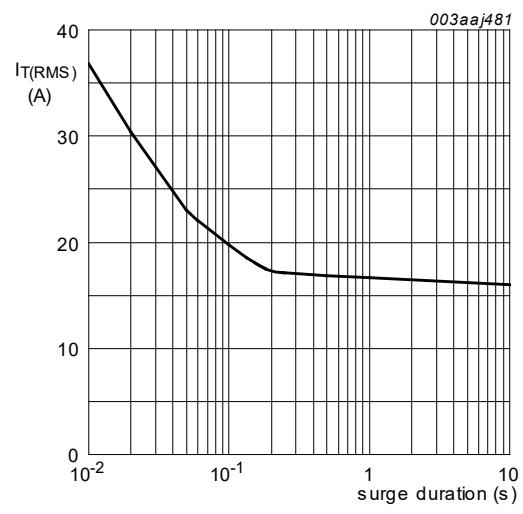


Fig. 3. RMS on-state current as a function of surge duration; maximum values

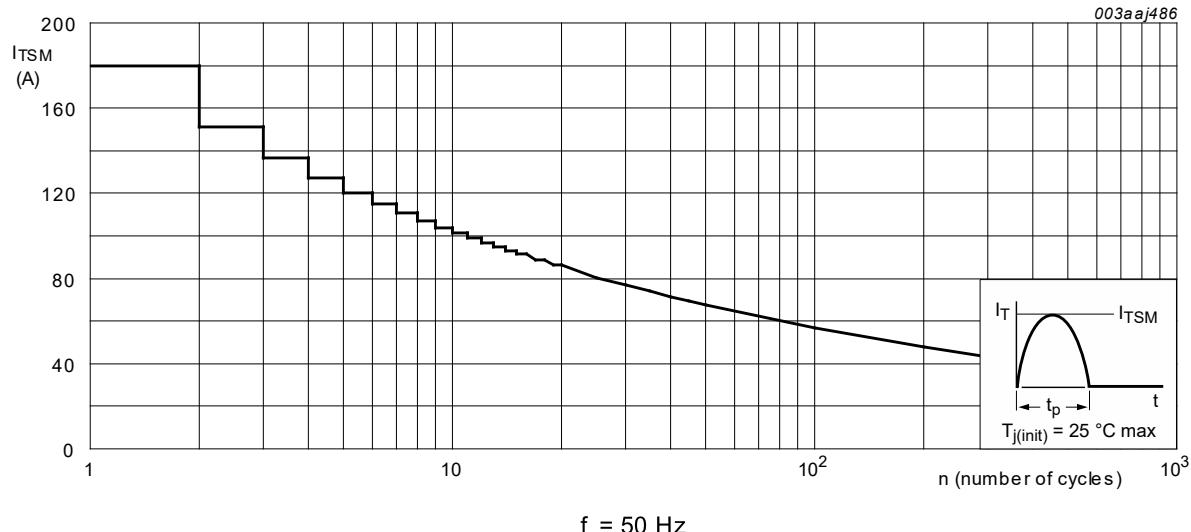


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

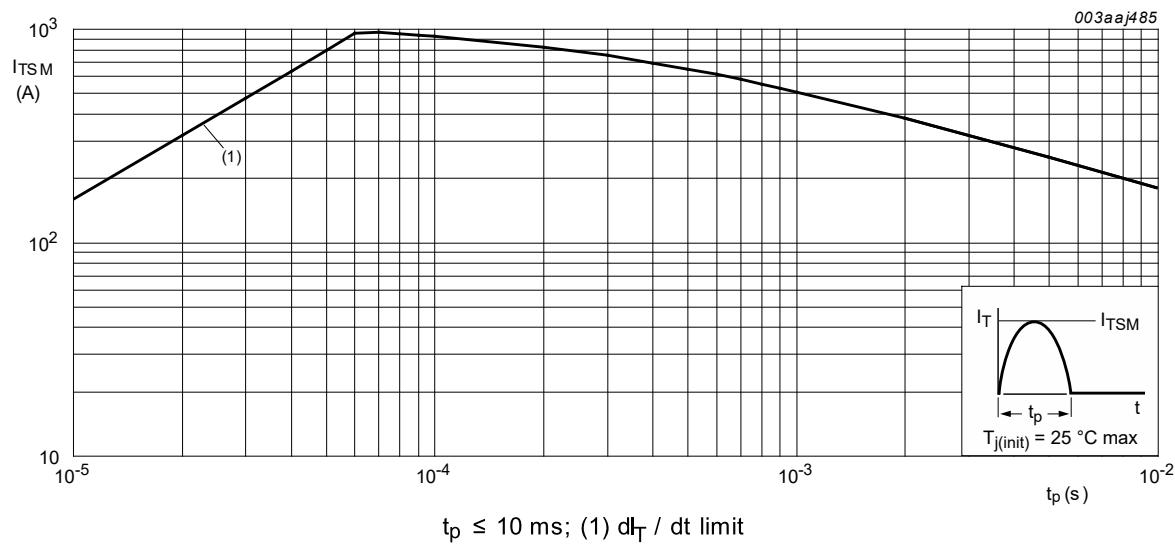
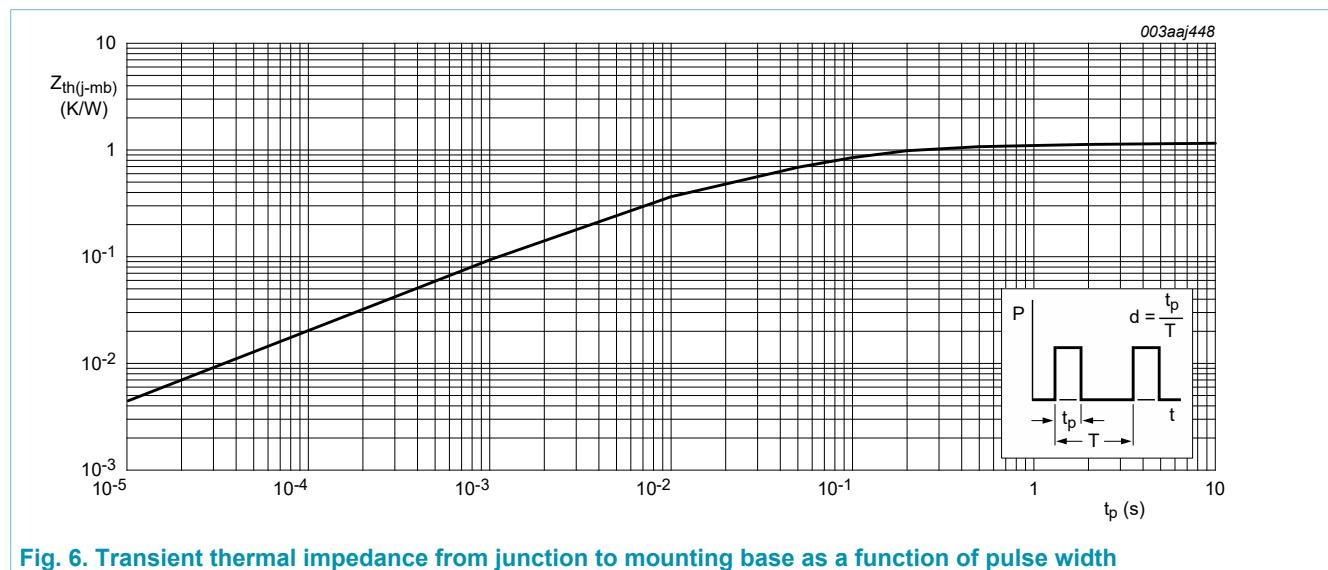


Fig. 5. Non-repetitive peak on-state current as a function of pulse width for sinusoidal currents; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

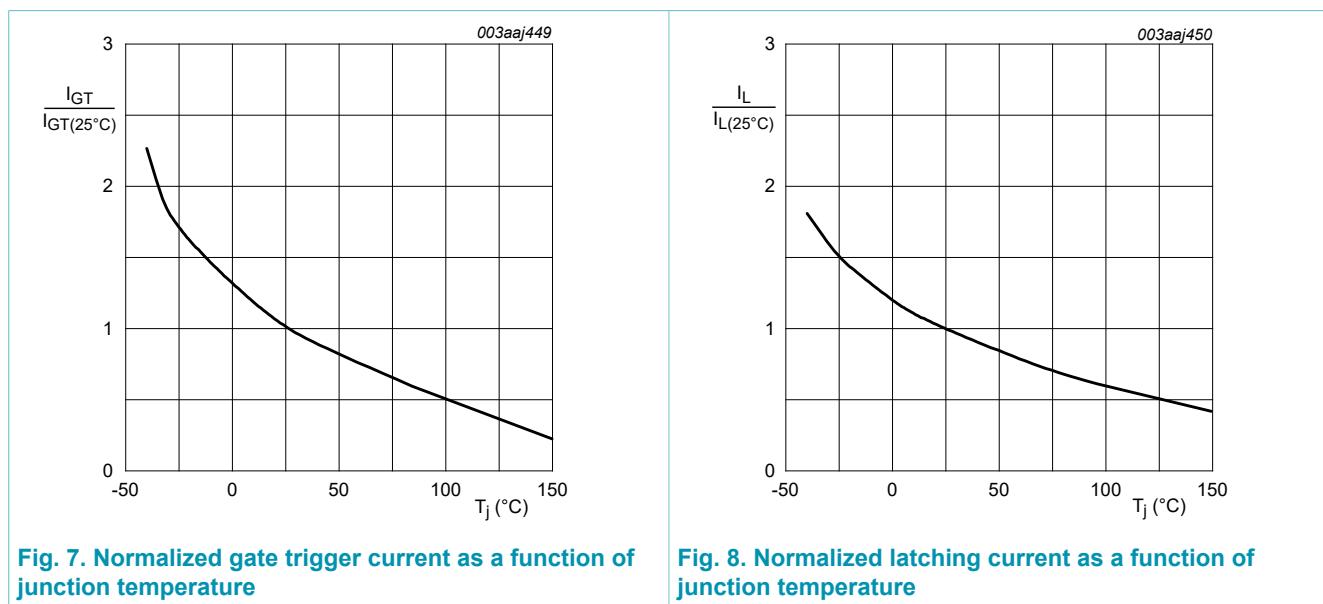
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 6	-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W



9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; $T_j = 25^\circ\text{C}$; Fig. 7		-	-	15	mA
I_L	latching current	$V_D = 12 \text{ V}$; $I_G = 0.1 \text{ A}$; $T_j = 25^\circ\text{C}$; Fig. 8		-	-	60	mA
I_H	holding current	$V_D = 12 \text{ V}$; $T_j = 25^\circ\text{C}$; Fig. 9		-	-	40	mA
V_T	on-state voltage	$I_T = 32 \text{ A}$; $T_j = 25^\circ\text{C}$; Fig. 10		-	1.2	1.6	V
V_{GT}	gate trigger voltage	$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; $T_j = 25^\circ\text{C}$; Fig. 11		-	0.7	1.3	V
		$V_D = 400 \text{ V}$; $I_T = 0.1 \text{ A}$; $T_j = 150^\circ\text{C}$; Fig. 11		0.2	0.4	-	V
I_D	off-state current	$V_D = 600 \text{ V}$; $T_j = 150^\circ\text{C}$		-	0.2	1	mA
I_R	reverse current	$V_R = 600 \text{ V}$; $T_j = 150^\circ\text{C}$		-	0.2	1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402 \text{ V}$; $T_j = 150^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/ μs



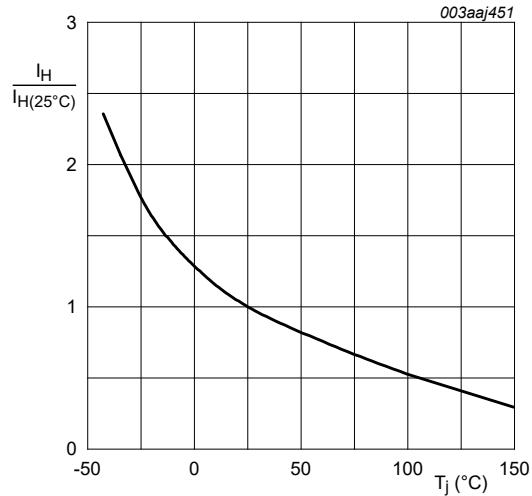


Fig. 9. Normalized holding current as a function of junction temperature

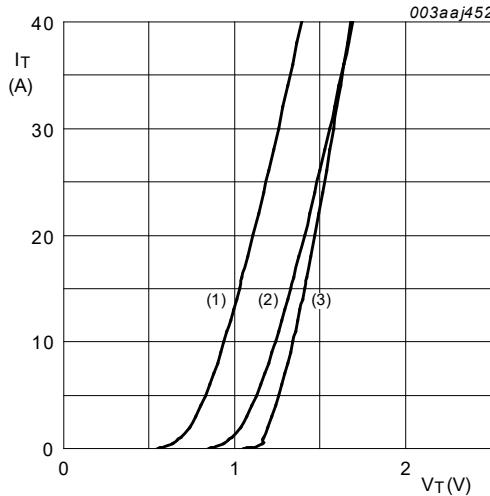


Fig. 10. On-state current as a function of on-state voltage

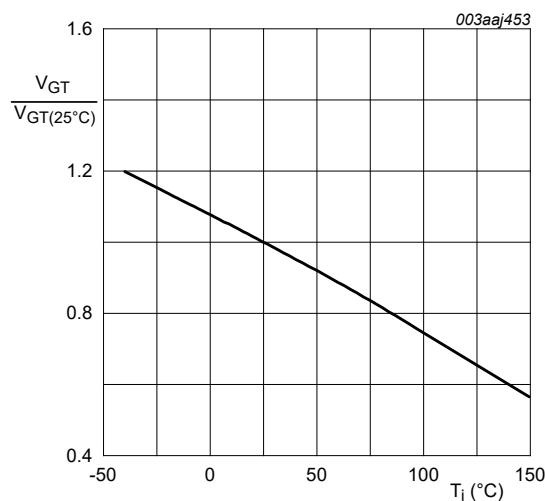
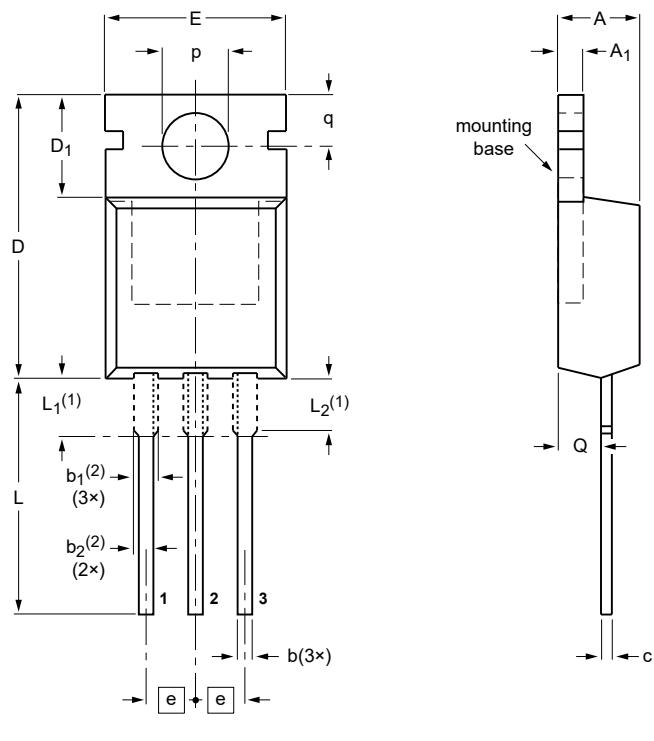


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

10. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁₍₂₎	b ₂₍₂₎	c	D	D ₁	E	e	L	L ₁₍₁₎	L ₂₍₁₎ max.	p	q	Q
mm	4.7	1.40	0.9	1.6	1.3	0.7	16.0	6.6	10.3	2.54	15.0	3.30	3.0	3.8	3.0	2.6
	4.1	1.25	0.6	1.0	1.0	0.4	15.2	5.9	9.7		12.8	2.79	3.0	3.5	2.7	2.2

Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT78		3-lead TO-220AB	SC-46			08-04-23 08-06-13

Fig. 12. Package outline TO-220AB (SOT78)

11. 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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