

DATA SHEET

BT258X series

Thyristors
logic level

Product specification

September 2018



WeEn

WeEn Semiconductors

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BT258X series

GENERAL DESCRIPTION

Passivated, sensitive gate thyristors in a full pack, plastic envelope, intended for use in general purpose switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

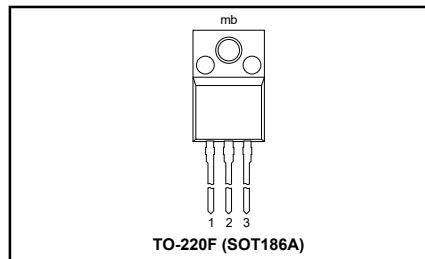
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
		500R	600R	800R	
V_{DRM}, V_{RRM}	Repetitive peak off-state voltages	500	600	800	V
$I_{T(AV)}$	Average on-state current	5	5	5	A
$I_{T(RMS)}$	RMS on-state current	8	8	8	A
I_{TSM}	Non-repetitive peak on-state current	75	75	75	A

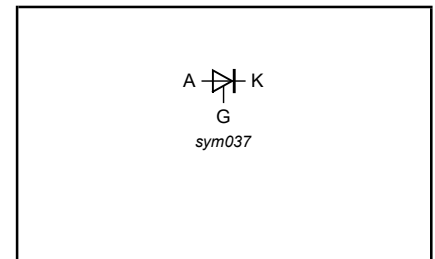
PINNING - SOT186A

PIN	DESCRIPTION
1	cathode
2	anode
3	gate
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
				-500R 500 ¹	-600R 600 ¹	-800R 800	
V_{DRM}, V_{RRM}	Repetitive peak off-state voltages		-	500 ¹	600 ¹	800	V
$I_{T(AV)}$	Average on-state current	half sine wave; $T_{hs} \leq 90^\circ C$	-	5			A
$I_{T(RMS)}$	RMS on-state current	all conduction angles	-	8			A
I_{TSM}	Non-repetitive peak on-state current	half sine wave; $T_j = 25^\circ C$ prior to surge	-	75			A
I^2t	I^2t for fusing	$t = 10\ ms$	-	82			A
dl_T/dt	Repetitive rate of rise of on-state current after triggering	$t = 8.3\ ms$	-	28			A ² s
I_{GM}	Peak gate current	$t = 10\ ms$	-	50			A/ μs
V_{RGM}	Peak reverse gate voltage	$I_{TM} = 10\ A; I_G = 50\ mA;$ $dl_G/dt = 50\ mA/\mu s$	-	2			A
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			$^\circ C$
T_j	Operating junction temperature		-	125 ²			$^\circ C$

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/ μs .

2 Note: Operation above 110 $^\circ C$ may require the use of a gate to cathode resistor of 1k Ω or less.

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ISOLATION LIMITING VALUE & CHARACTERISTIC $T_{hs} = 25\text{ °C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	$f = 50\text{-}60\text{ Hz}$; sinusoidal waveform; R.H. $\leq 65\%$; clean and dustfree	-	-	2500	V
C_{isol}	Capacitance from T2 to external heatsink	$f = 1\text{ MHz}$	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.0	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	6.9	K/W

STATIC CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	50	200	μA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	0.4	10	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	0.3	6	mA
V_T	On-state voltage	$I_T = 16\text{ A}$	-	1.3	1.6	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.4	1.5	V
I_D, I_R	Off-state leakage current	$V_D = V_{DRM(max)}$; $I_T = 0.1\text{ A}$; $T_j = 110\text{ °C}$ $V_D = V_{DRM(max)}$; $V_R = V_{RRM(max)}$; $T_j = 125\text{ °C}$	0.1	0.2	-	V
			-	0.1	0.5	mA

DYNAMIC CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; exponential waveform; $R_{GK} = 100\ \Omega$	50	100	-	V/ μs
t_{gt}	Gate controlled turn-on time	$I_{TM} = 10\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 5\text{ mA}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	2	-	μs
t_q	Circuit commutated turn-off time	$V_D = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; $I_{TM} = 12\text{ A}$; $V_R = 24\text{ V}$; $dI_{TM}/dt = 10\text{ A}/\mu\text{s}$; $dV_D/dt = 2\text{ V}/\mu\text{s}$; $R_{GK} = 1\text{ k}\Omega$	-	100	-	μs

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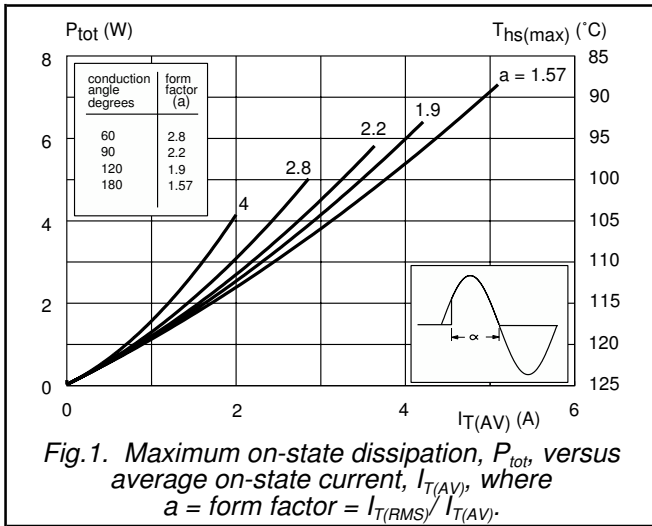


Fig. 1. Maximum on-state dissipation, P_{tot} , versus average on-state current, $I_{T(AV)}$, where $a = \text{form factor} = I_{T(RMS)}/I_{T(AV)}$.

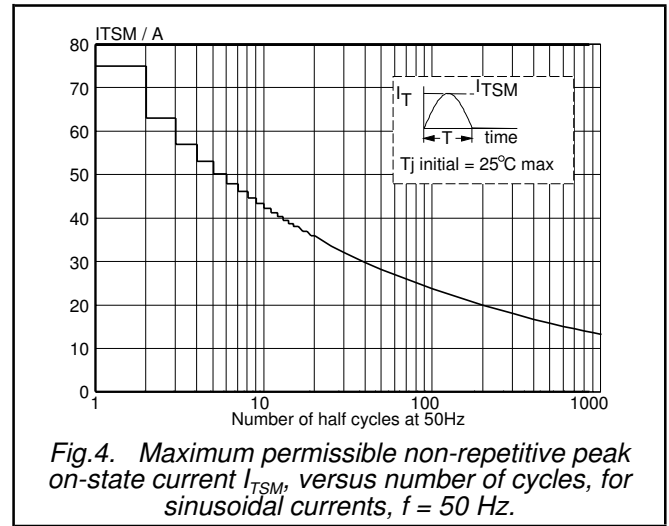


Fig. 4. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus number of cycles, for sinusoidal currents, $f = 50 \text{ Hz}$.

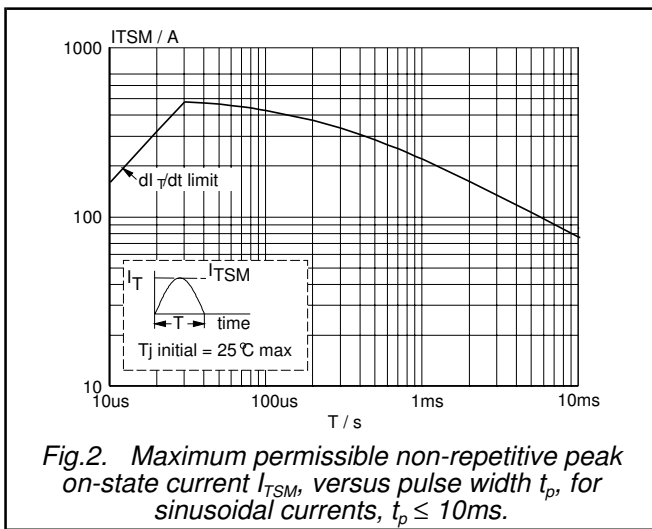


Fig. 2. Maximum permissible non-repetitive peak on-state current I_{TSM} , versus pulse width t_p , for sinusoidal currents, $t_p \leq 10 \text{ ms}$.

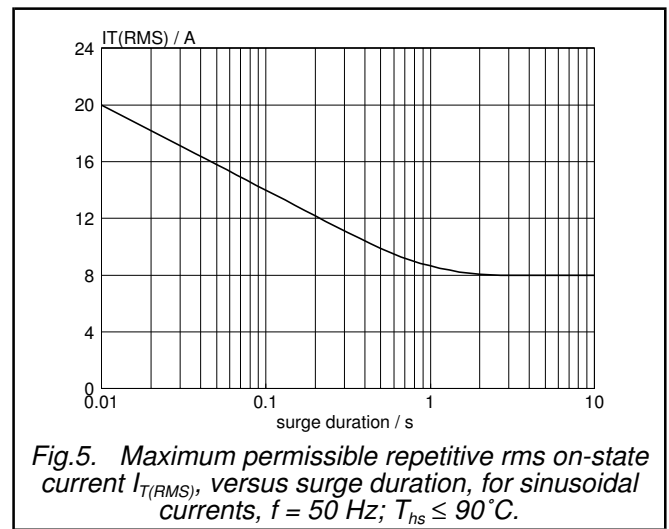


Fig. 5. Maximum permissible repetitive rms on-state current $I_{T(RMS)}$, versus surge duration, for sinusoidal currents, $f = 50 \text{ Hz}$; $T_{hs} \leq 90^\circ \text{C}$.

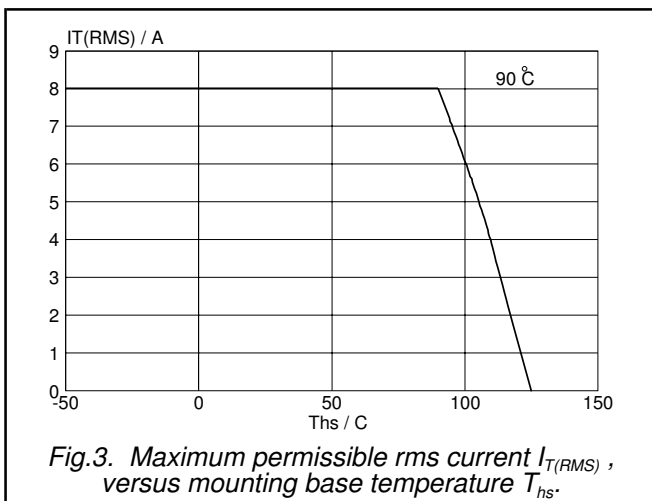


Fig. 3. Maximum permissible rms current $I_{T(RMS)}$, versus mounting base temperature T_{hs} .

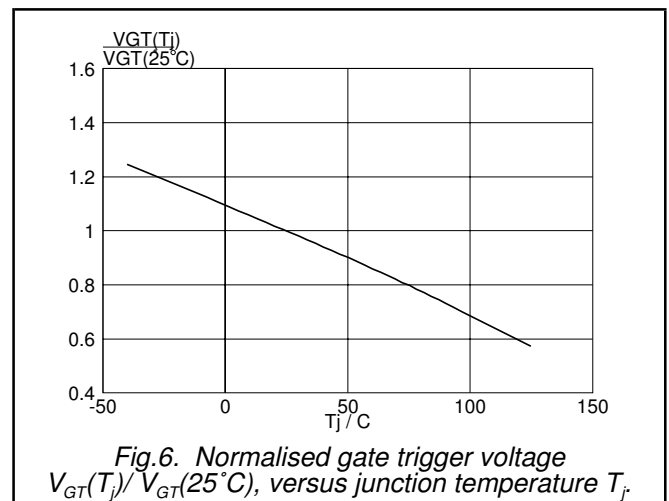
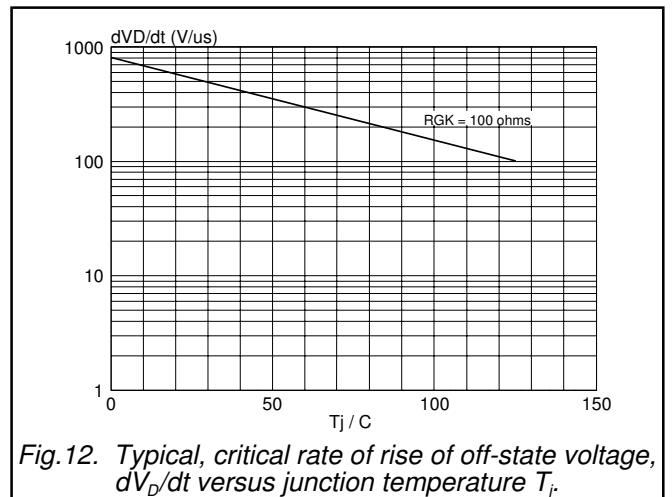
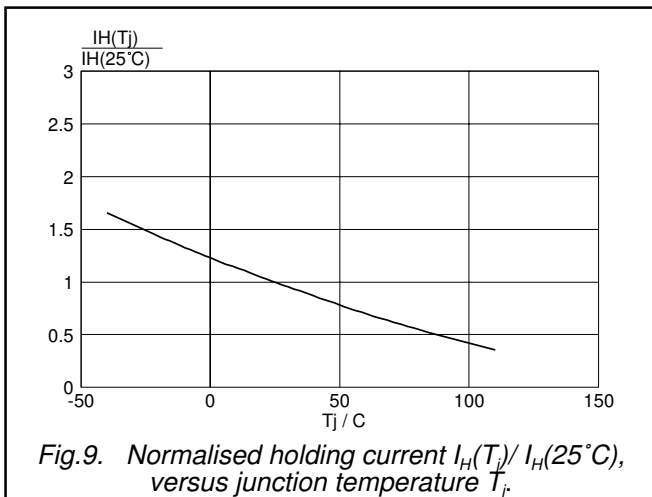
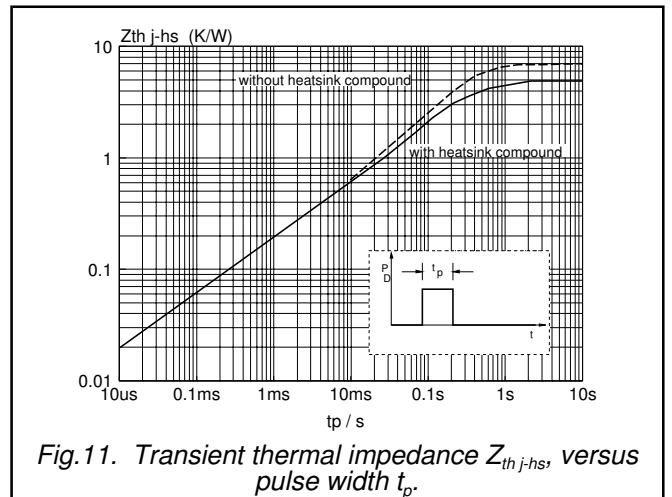
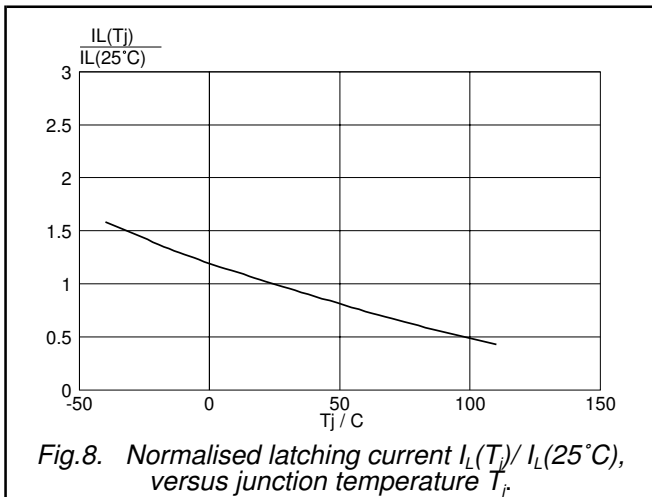
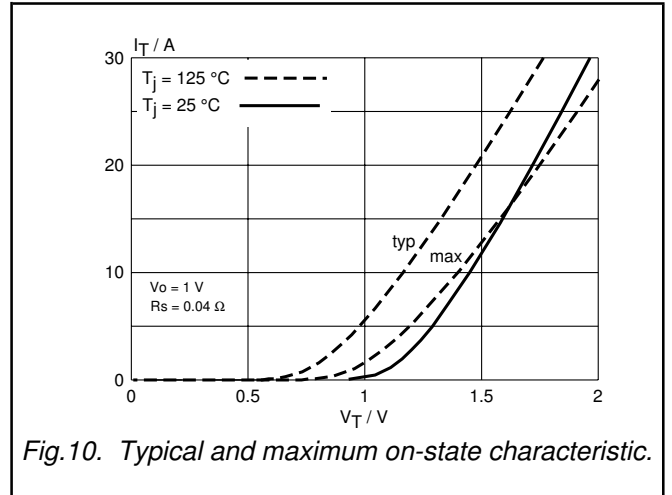
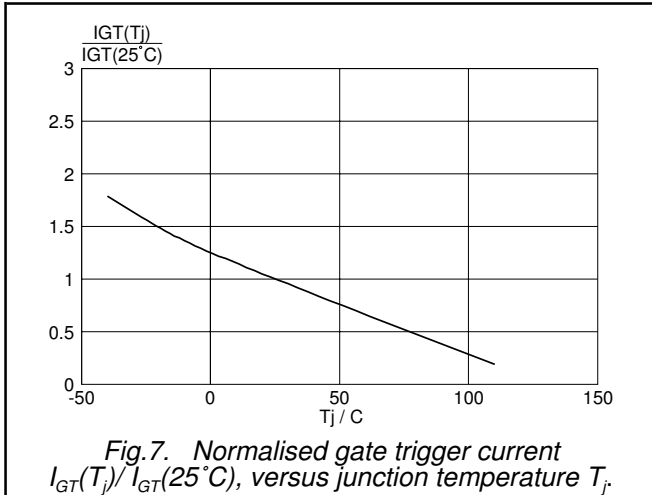


Fig. 6. Normalised gate trigger voltage $V_{GT}(T_j)/V_{GT}(25^\circ\text{C})$, versus junction temperature T_j .

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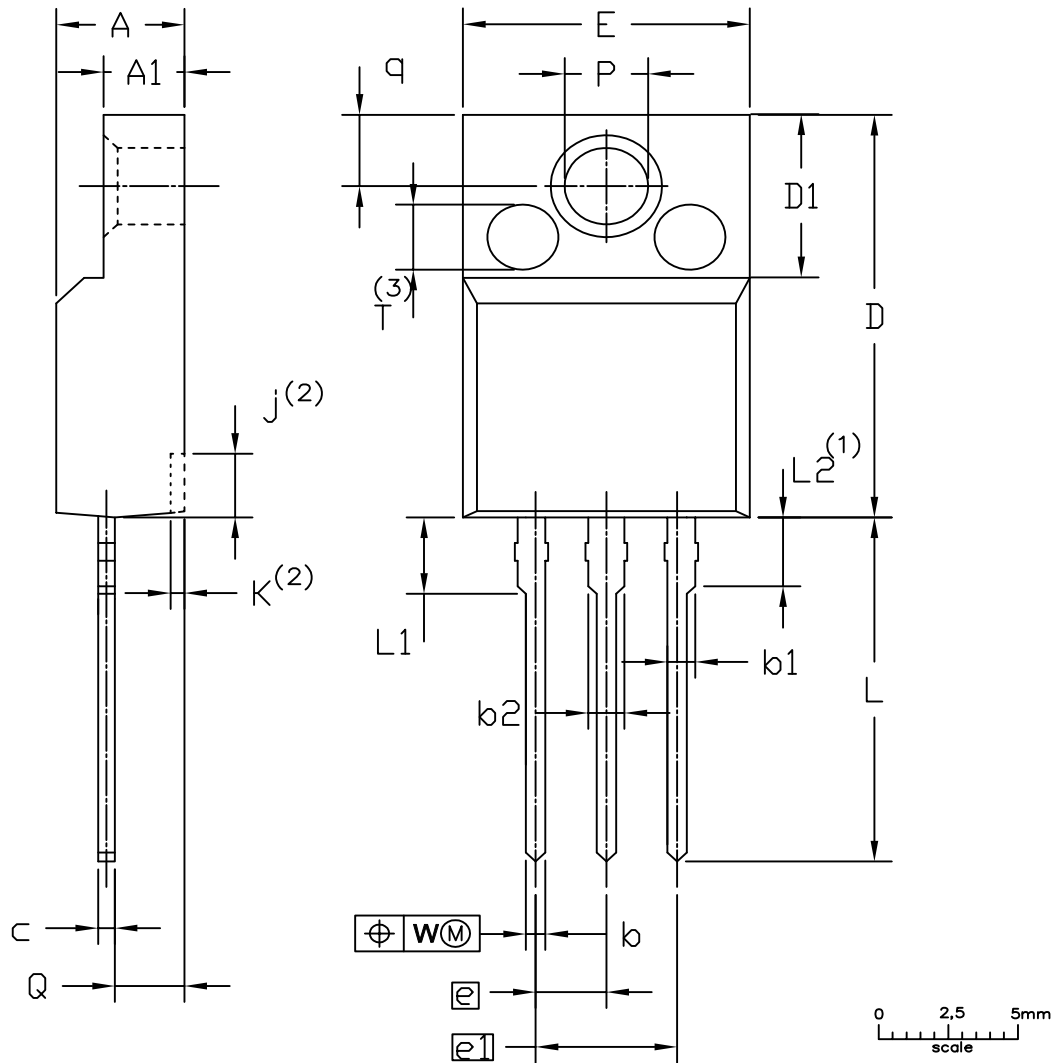
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MECHANICAL DATA

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"

SOT186A



UNIT	A	A ₁	b	b ₁	b ₂	c	D	D ₁	E	e	e ₁	j ⁽²⁾	k ⁽²⁾	L	L ₁	L ₂ ⁽¹⁾ max.	P	Q	q	W	T ⁽³⁾
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	3.2	2.6	3.0	0.4	2.5
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

Notes

1. Terminal dimensions within this zone are uncontrolled
2. Dot lines area designs may vary
3. Eject pin mark is for reference only

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT186A		3 LEADS TO220F			2013-11-14

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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