

DATA SHEET

BT151U series C Thyristors

Product specification

April 2004



Thyristors

BT151U series C

GENERAL DESCRIPTION

Passivated thyristors in a plastic envelope, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

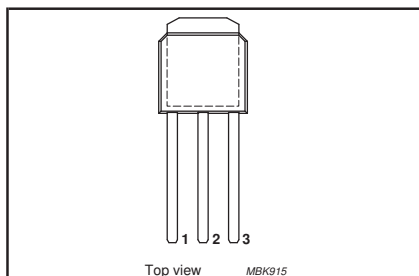
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	MAX.	MAX.	UNIT
	BT151U-	500C	650C	800C	
$V_{\text{DRM}}, V_{\text{RRM}}$	Repetitive peak off-state voltages	500	650	800	V
$I_{\text{T(AV)}}$	Average on-state current	7.5	7.5	7.5	A
$I_{\text{T(RMS)}}$	RMS on-state current	12	12	12	A
I_{TSM}	Non-repetitive peak on-state current	100	100	100	A

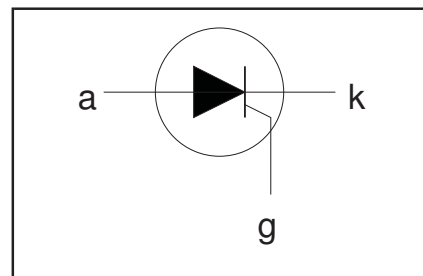
PINNING - SOT533, (I-PAK)

PIN NUMBER	DESCRIPTION
1	cathode
2	anode
3	gate
tab	anode

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.			UNIT
$V_{\text{DRM}}, V_{\text{RRM}}$	Repetitive peak off-state voltages		-	-500C 500 ¹	-650C 650 ¹	-800C 800	V
$I_{\text{T(AV)}}$	Average on-state current	half sine wave; $T_{\text{mb}} \leq 104\text{ °C}$	-	7.5			A
$I_{\text{T(RMS)}}$	RMS on-state current	all conduction angles	-	12			A
I_{TSM}	Non-repetitive peak on-state current	half sine wave; $T_{\text{j}} = 25\text{ °C}$ prior to surge	-	100			A
		$t = 10\text{ ms}$	-	110			A
I^2t	I^2t for fusing	$t = 8.3\text{ ms}$	-	50			A ² s
di_{T}/dt	Repetitive rate of rise of on-state current after triggering	$t = 10\text{ ms}$	-	50			A/ μs
I_{GM}	Peak gate current	$I_{\text{T}} = 20\text{ A}; I_{\text{G}} = 50\text{ mA}; di_{\text{G}}/dt = 50\text{ mA}/\mu\text{s}$	-	2			A
V_{RGM}	Peak reverse gate voltage		-	5			V
P_{GM}	Peak gate power		-	5			W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.5			W
T_{stg}	Storage temperature		-40	150			°C
T_{j}	Junction temperature		-	125			°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 .

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	in free air	-	-	1.3	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient		-	70	-	K/W

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	2	15	mA
I_L	Latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	10	40	mA
I_H	Holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$	-	7	20	mA
V_T	On-state voltage	$I_T = 23\text{ A}$	-	1.44	1.75	V
V_{GT}	Gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$	-	0.6	1.5	V
I_D, I_R	Off-state leakage current	$V_D = V_{DRM(max)}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ °C}$	0.25	0.4	-	V
		$V_D = V_{DRM(max)}$; $V_R = V_{RRM(max)}$; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

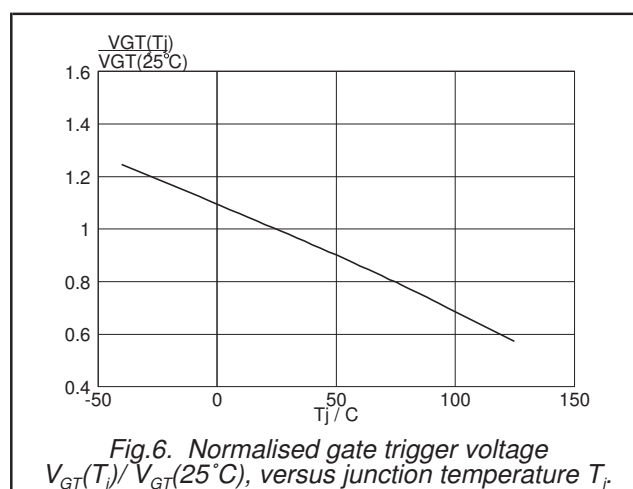
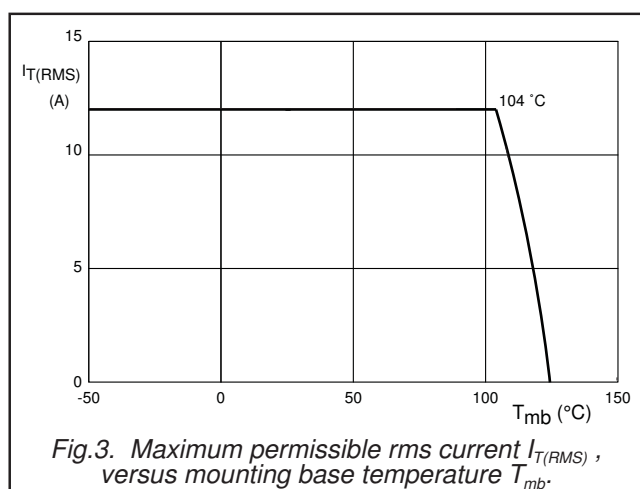
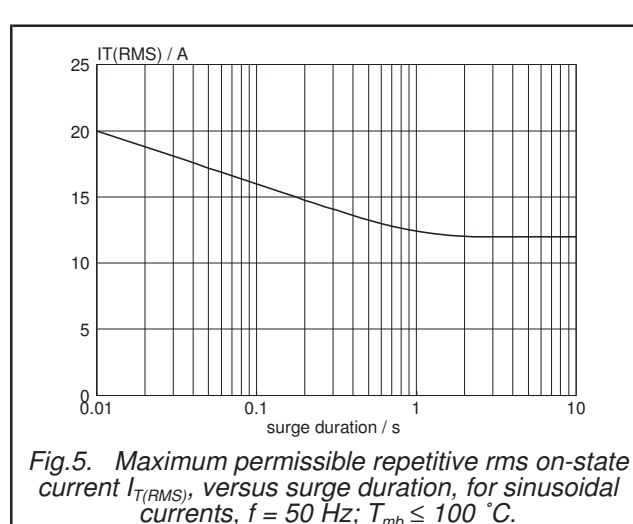
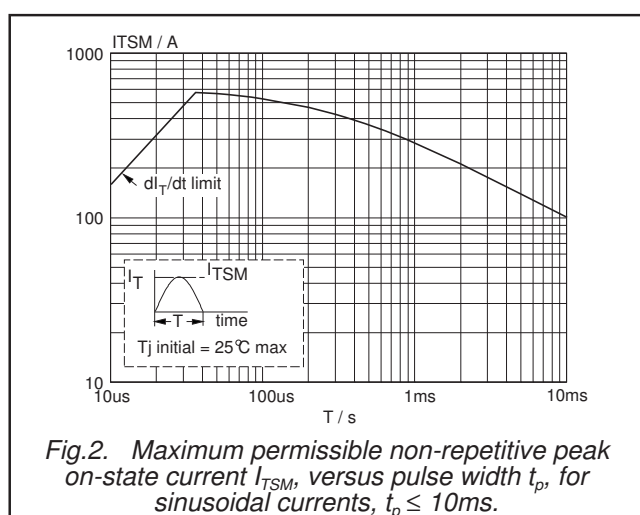
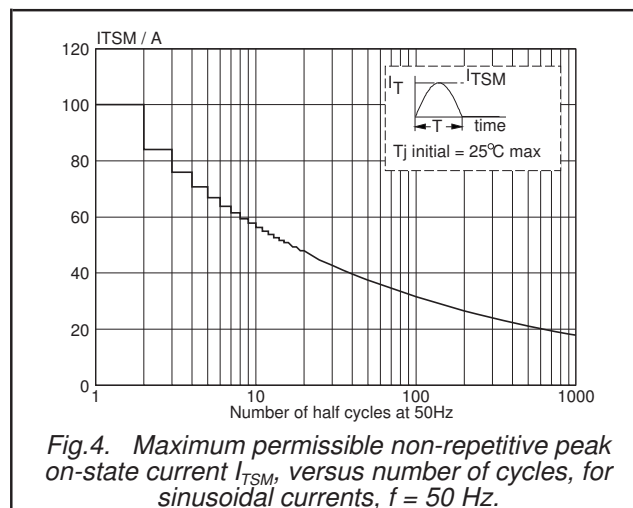
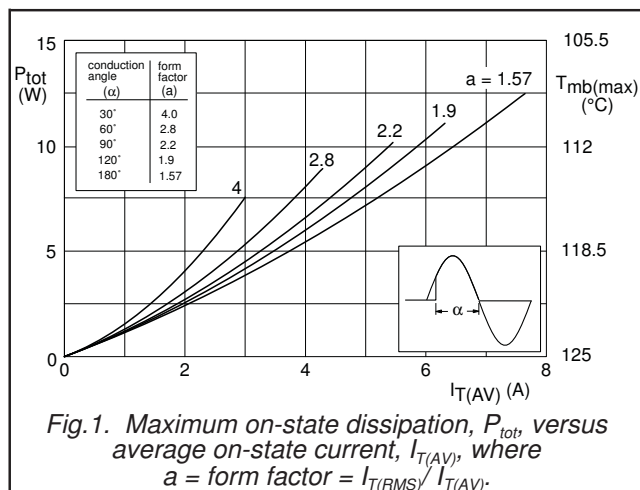
DYNAMIC CHARACTERISTICS

 $T_j = 25\text{ °C}$ 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				
t_{gt}	Gate controlled turn-on time	Gate open circuit $R_{GK} = 100\ \Omega$	50	130	-	V/ μ s
		$I_{TM} = 40\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu$ s	200	1000	-	V/ μ s
t_q	Circuit commutated turn-off time	$V_D = 67\% V_{DRM(max)}$; $T_j = 125\text{ °C}$; $I_{TM} = 20\text{ A}$; $V_R = 25\text{ V}$; $dI_{TM}/dt = 30\text{ A}/\mu$ s; $dV_D/dt = 50\text{ V}/\mu$ s; $R_{GK} = 100\ \Omega$	-	70	-	μ s

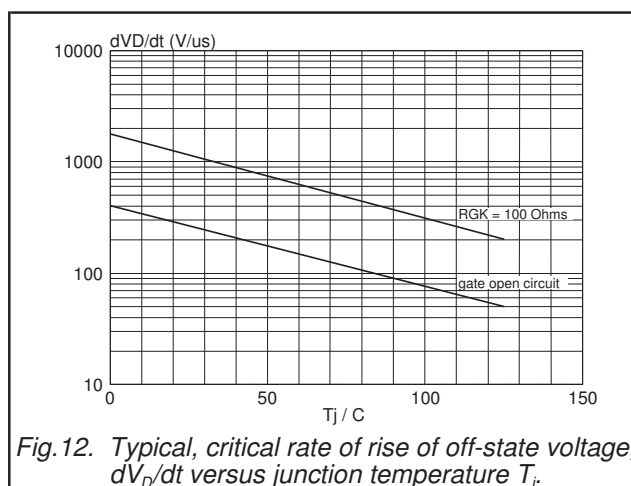
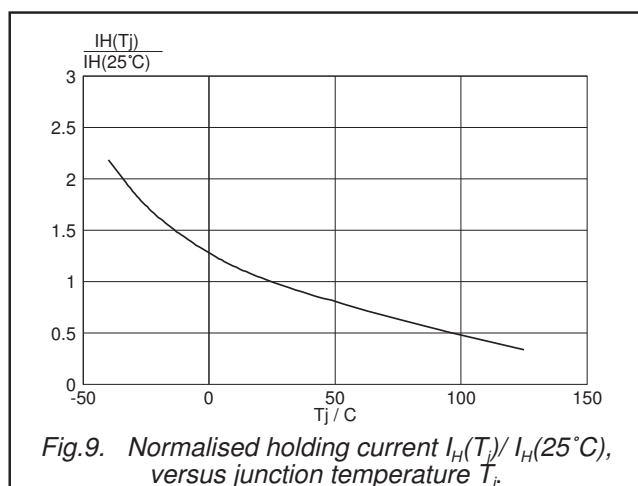
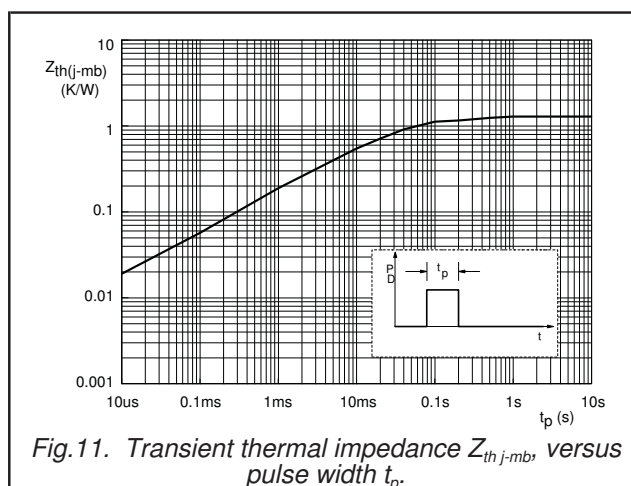
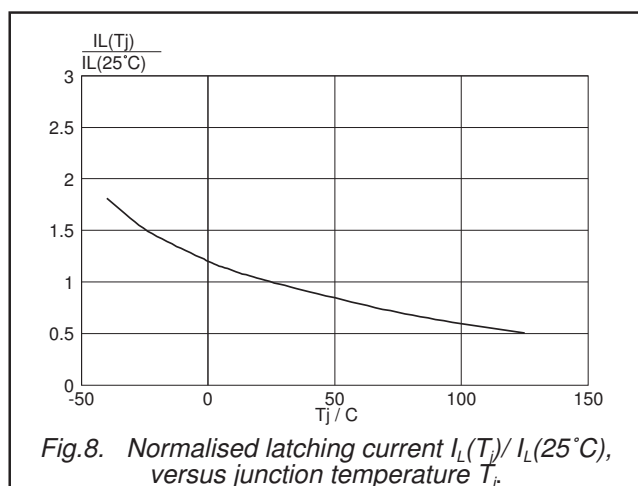
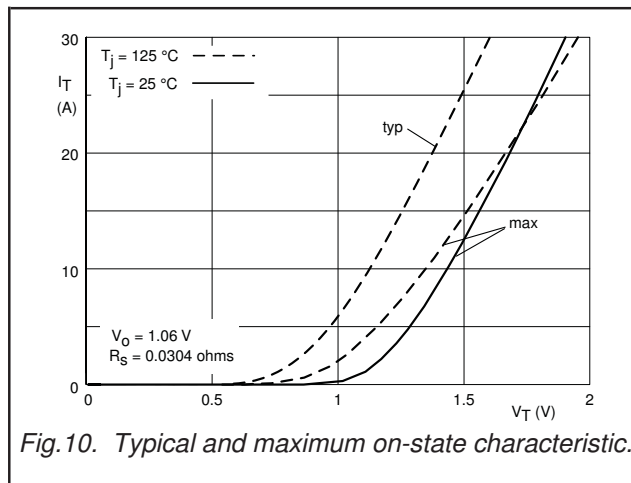
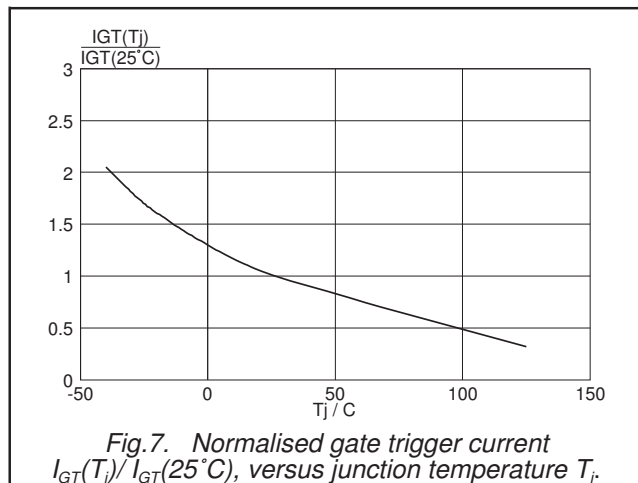
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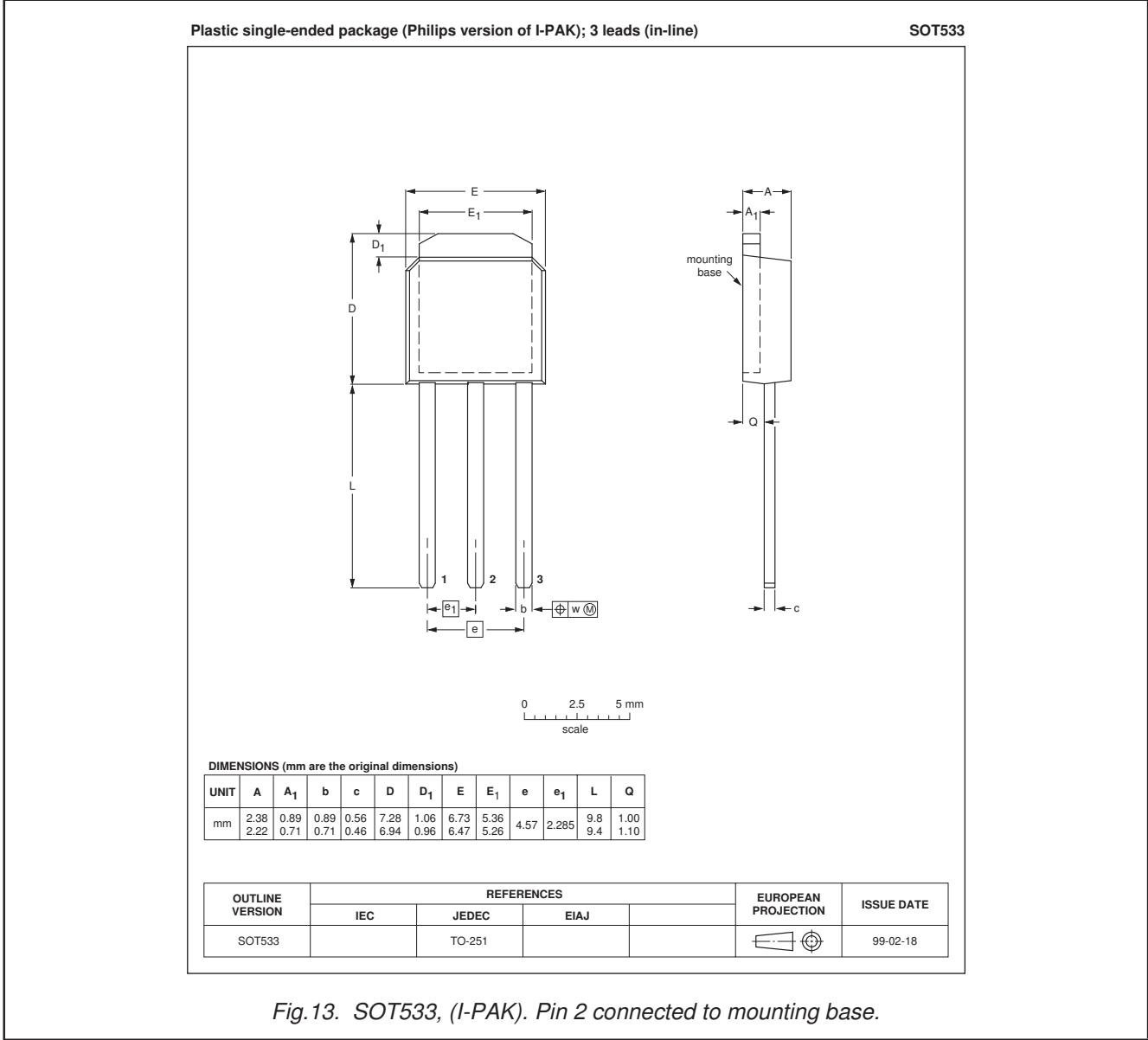
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MECHANICAL DATA



Legal information

DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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