

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.

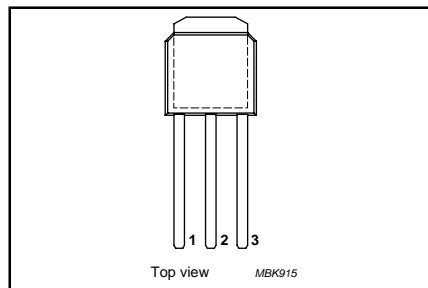
QUICK REFERENCE DATA

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

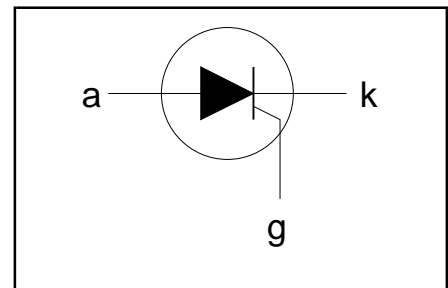
PINNING - SOT533, (I-PAK)

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_{DRM} , V_{RRM}	Repetitive peak off-state voltages		-	-500C 500 ¹ -650C 650 ¹ -800C 800	V
$I_{T(AV)}$	Average on-state current	half sine wave; $T_{mb} \leq 104\text{ °C}$	-	7.5	A
$I_{T(RMS)}$	RMS on-state current	all conduction angles	-	12	A
I_{TSM}	Non-repetitive peak on-state current	half sine wave; $T_j = 25\text{ °C}$ prior to surge	-	100	A
		$t = 10\text{ ms}$	-	110	A
		$t = 8.3\text{ ms}$	-	50	A ² s
I^2t	I^2t for fusing	$t = 10\text{ ms}$	-	50	A ² s
di_T/dt	Repetitive rate of rise of on-state current after triggering	$I_{TM} = 20\text{ A}$; $I_G = 50\text{ mA}$; $di_G/dt = 50\text{ mA}/\mu\text{s}$	-	50	A/ μs
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	°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

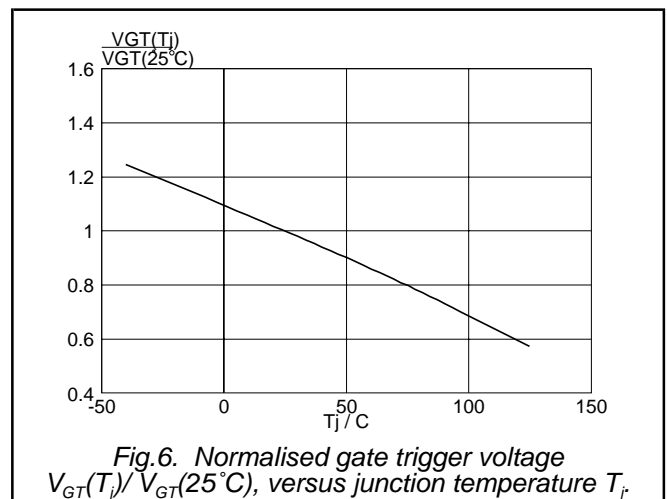
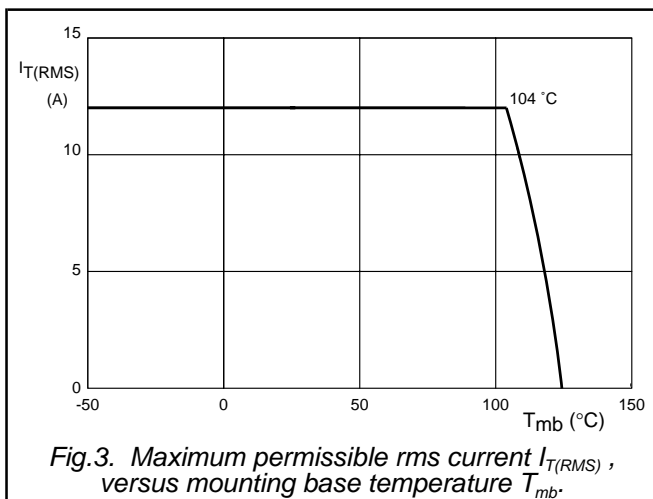
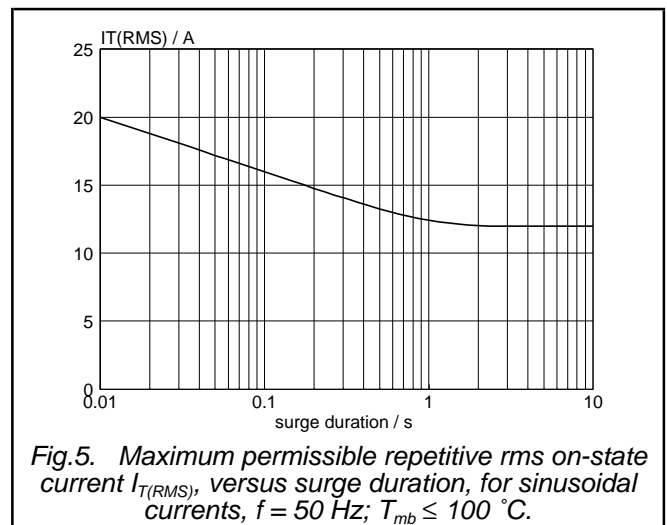
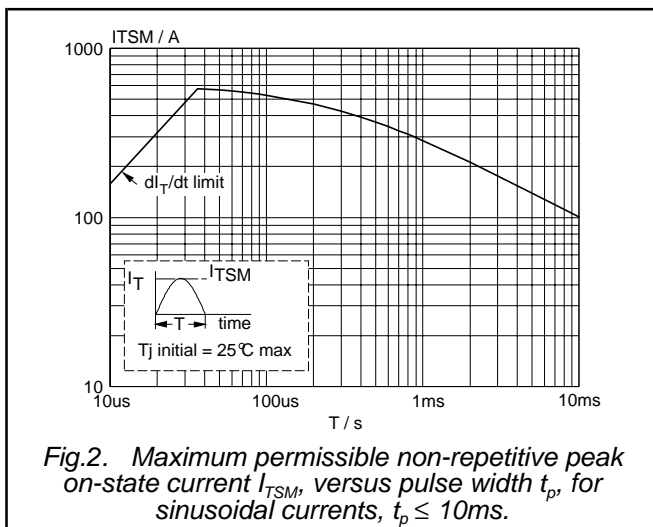
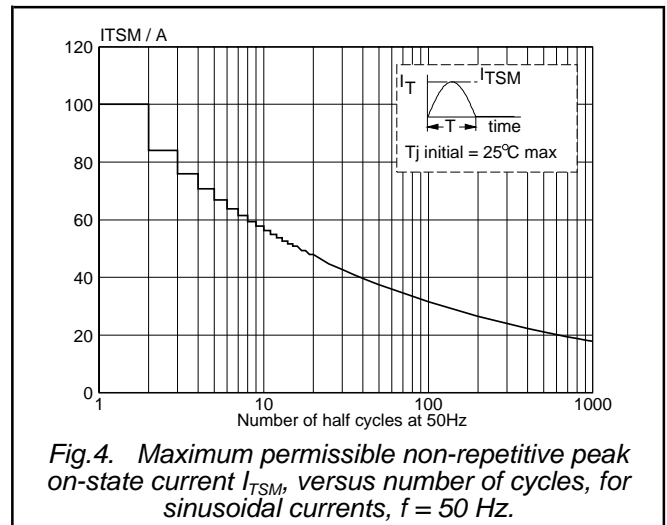
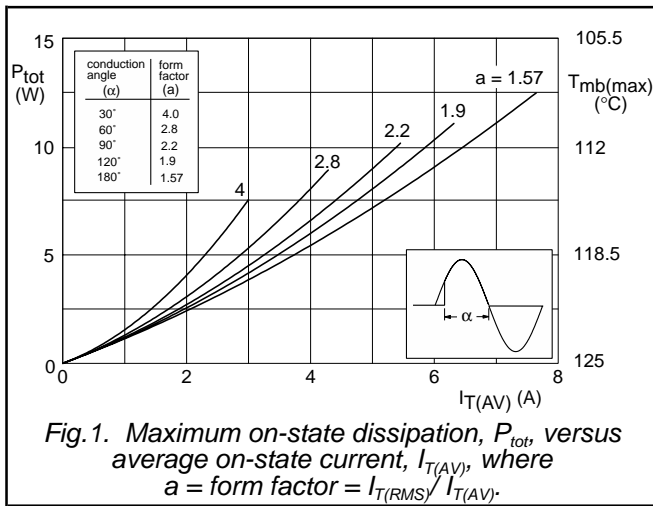
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{GT}	Gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}$	-	2	15	mA
I_L	Latching current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	10	40	mA
I_H	Holding current	$V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$	-	7	20	mA
V_T	On-state voltage	$I_T = 23\text{ A}$	-	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	50	130	-	V/ μ s
		$R_{GK} = 100\ \Omega$	200	1000	-	V/ μ s
t_q	Circuit commutated turn-off time	$I_{TM} = 40\text{ A}; V_D = V_{DRM(max)}; I_G = 0.1\text{ A};$ $di_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s
		$V_D = 67\% V_{DRM(max)}; T_j = 125\text{ °C};$ $I_{TM} = 20\text{ A}; V_R = 25\text{ V}; di_{TM}/dt = 30\text{ A}/\mu\text{s};$ $dV_D/dt = 50\text{ V}/\mu\text{s}; R_{GK} = 100\ \Omega$	-	70	-	μ s

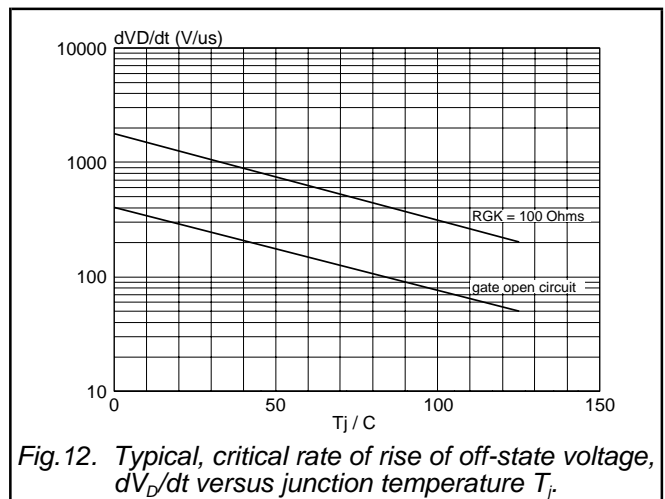
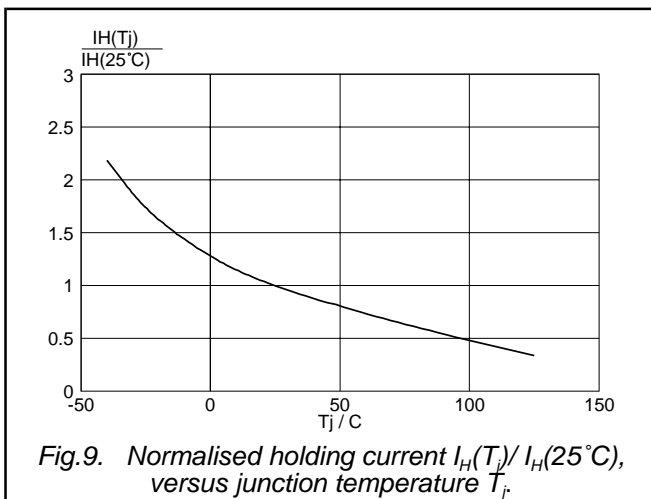
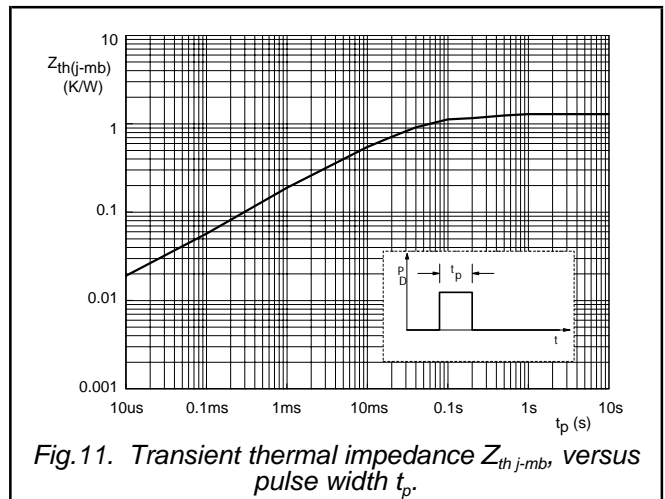
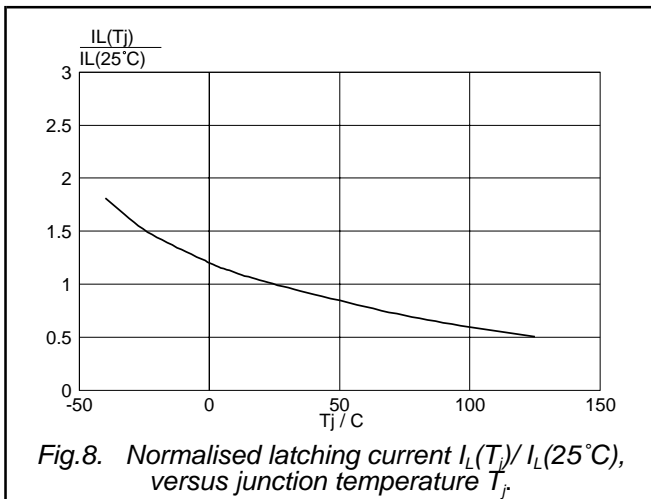
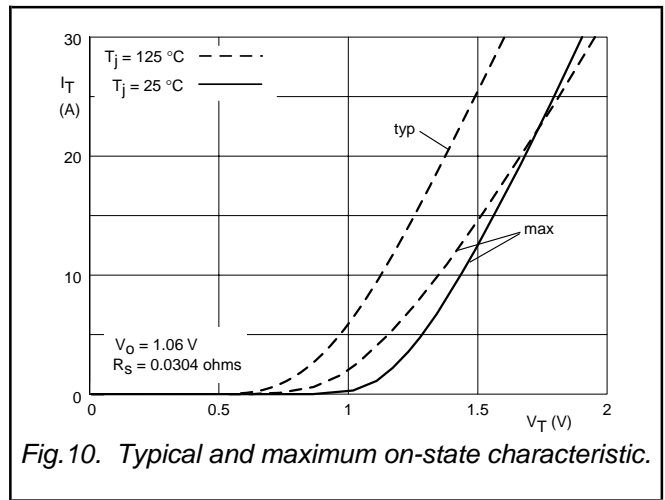
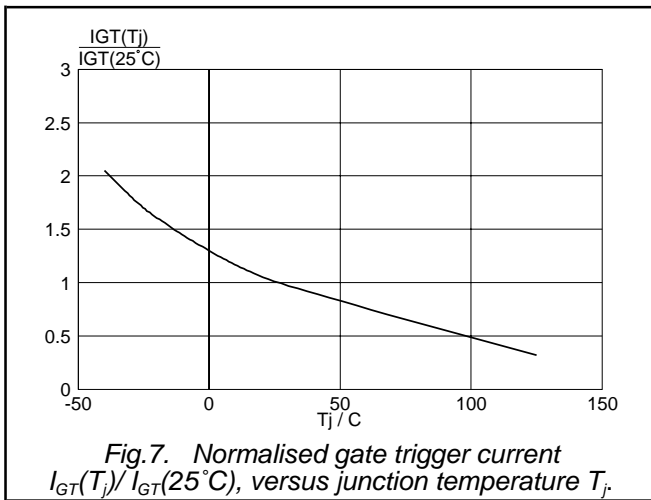
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MECHANICAL DATA

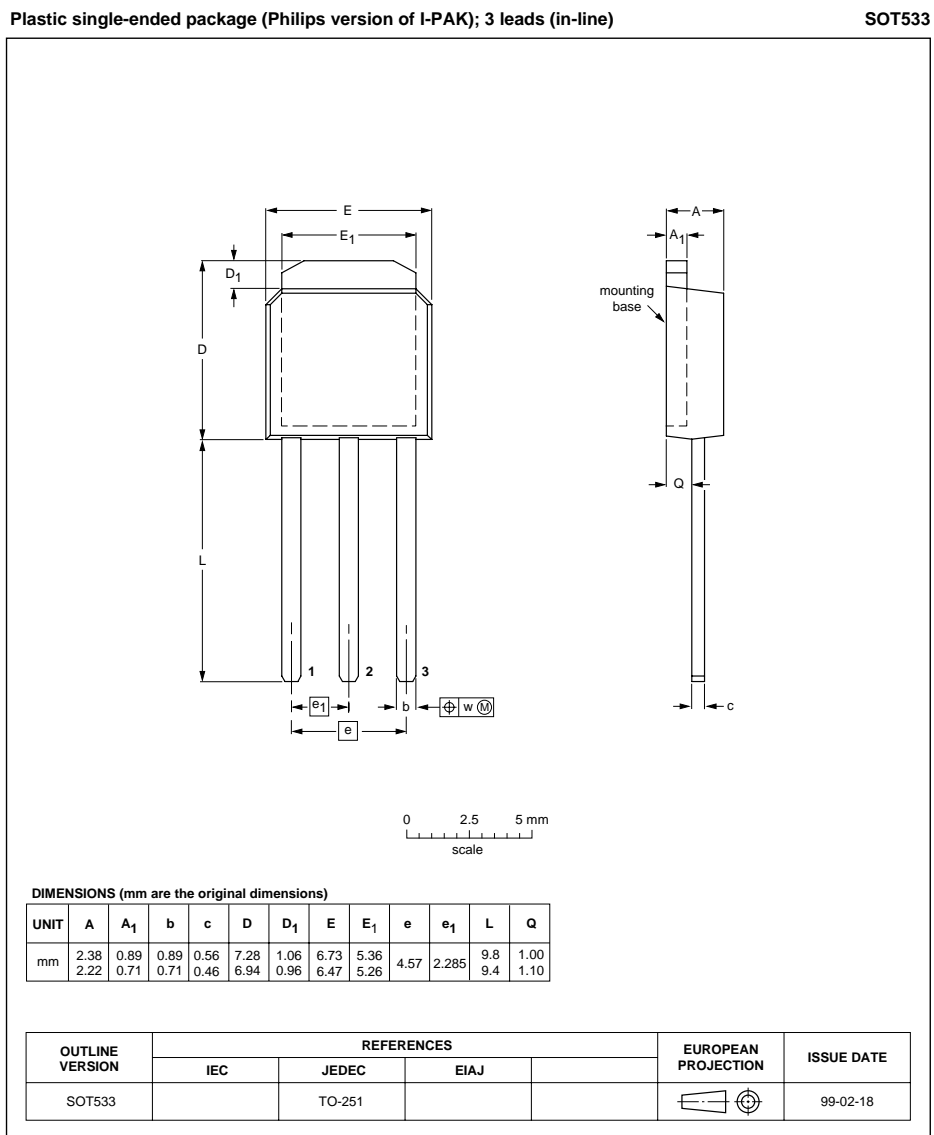


Fig. 13. SOT533, (I-PAK). Pin 2 connected to mounting base.

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DEFINITIONS

DATA SHEET STATUS		
DATA SHEET STATUS²	PRODUCT STATUS³	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A
Limiting values		
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.		
Application information		
Where application information is given, it is advisory and does not form part of the specification.		
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² Please consult the most recently issued datasheet before initiating or completing a design.

³ The product status of the device(s) described in this datasheet may have changed since this datasheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.