

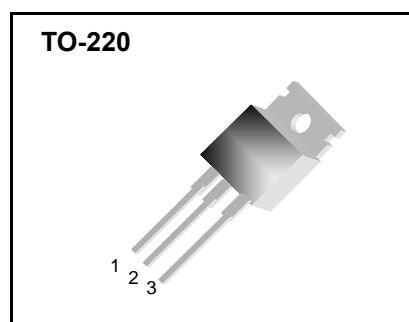
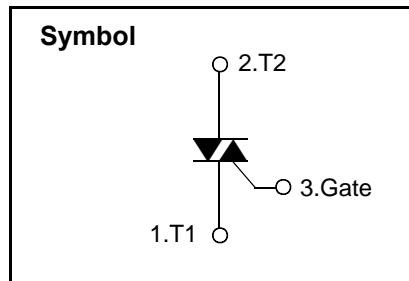
## Bi-Directional Triode Thyristor

### Features

- ◆ Repetitive Peak Off-State Voltage : 600V
- ◆ R.M.S On-State Current (  $I_{T(RMS)} = 16\text{ A}$  )
- ◆ High Commutation  $dv/dt$
- ◆ Isolation Voltage (  $V_{ISO} = 1500\text{V AC}$  )

### General Description

This device is suitable for AC switching application, phase control application such as fan speed and temperature modulation control, lighting control and static switching relay.



### Absolute Maximum Ratings ( $T_J = 25^\circ\text{C}$ unless otherwise specified )

Symbol	Parameter	Condition	Ratings	Units
$V_{DRM}$	Repetitive Peak Off-State Voltage		600	V
$I_{T(RMS)}$	R.M.S On-State Current	$T_C = 100^\circ\text{C}$	16	A
$I_{TSM}$	Surge On-State Current	One Cycle, 50Hz/60Hz, Peak, Non-Repetitive	145/155	A
$I^2t$	$I^2t$ for fusing	$t = 10\text{ms}$	105	$\text{A}^2\text{s}$
$P_{GM}$	Peak Gate Power Dissipation		5.0	W
$P_{G(AV)}$	Average Gate Power Dissipation	Over any 20ms period	0.5	W
$I_{GM}$	Peak Gate Current		2.0	A
$V_{GM}$	Peak Gate Voltage		10	V
$T_J$	Operating Junction Temperature		- 40 ~ 125	$^\circ\text{C}$
$T_{STG}$	Storage Temperature		- 40 ~ 150	$^\circ\text{C}$
	Mass		2.0	g

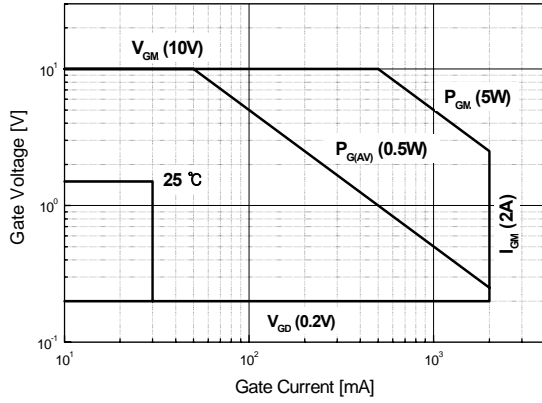
# BT139-600

## Electrical Characteristics

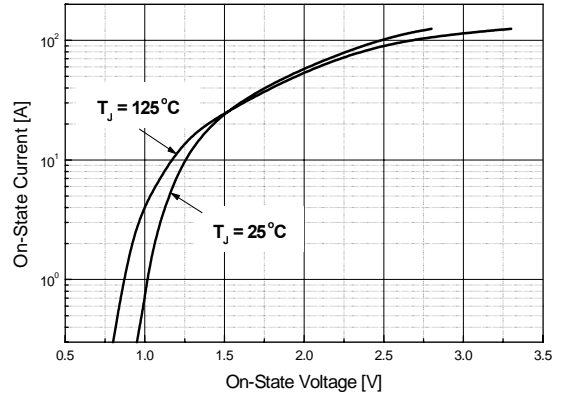
Symbol	Items		Conditions	Ratings			Unit
				Min.	Typ.	Max.	
$I_{DRM}$	Repetitive Peak Off-State Current		$V_D = V_{DRM}$ , Single Phase, Half Wave $T_J = 125\text{ }^\circ\text{C}$	—	—	2.0	mA
$V_{TM}$	Peak On-State Voltage		$I_T = 20\text{ A}$ , Inst. Measurement	—	—	1.6	V
$I_{GT1}^+$	I	Gate Trigger Current	$V_D = 6\text{ V}$ , $R_L = 10\ \Omega$	—	—	25	mA
$I_{GT1}^-$	II			—	—	25	
$I_{GT3}^-$	III			—	—	25	
$V_{GT1}^+$	I	Gate Trigger Voltage	$V_D = 6\text{ V}$ , $R_L = 10\ \Omega$	—	—	1.5	V
$V_{GT1}^-$	II			—	—	1.5	
$V_{GT3}$	III			—	—	1.5	
$V_{GD}$	Non-Trigger Gate Voltage		$T_J = 125\text{ }^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$	0.2	—	—	V
$(dv/dt)_c$	Critical Rate of Rise Off-State Voltage at Commutation		$T_J = 125\text{ }^\circ\text{C}$ , $[di/dt]_c = -6.0\text{ A/ms}$ , $V_D = 2/3 V_{DRM}$	10	—	—	$V/\mu\text{s}$
$I_H$	Holding Current			—	20	—	mA
$R_{th(j-c)}$	Thermal Impedance		Junction to case	—	—	1.2	$^\circ\text{C/W}$



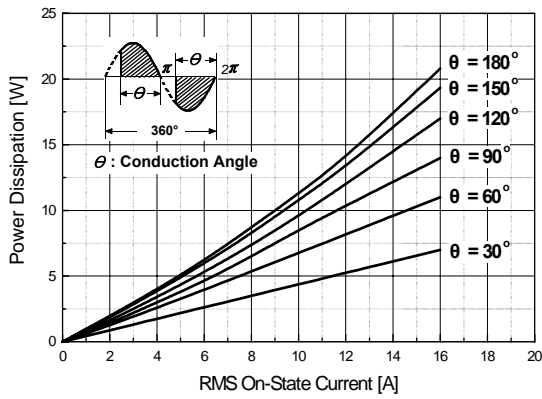
**Fig 1. Gate Characteristics**



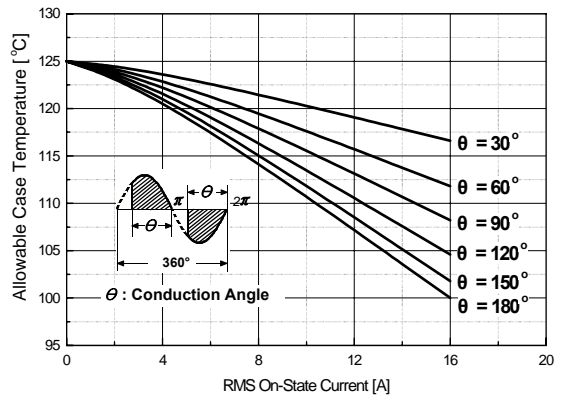
**Fig 2. On-State Voltage**



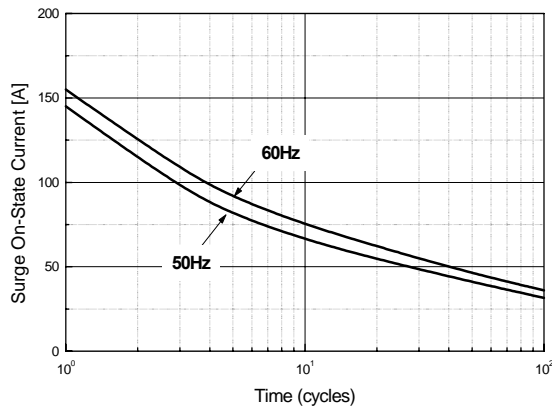
**Fig 3. On State Current vs. Maximum Power Dissipation**



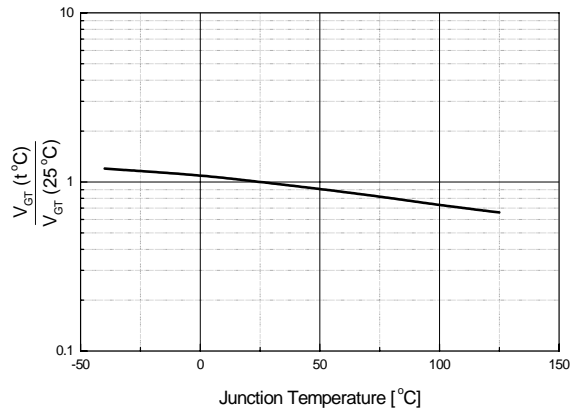
**Fig 4. On State Current vs. Allowable Case Temperature**



**Fig 5. Surge On-State Current Rating ( Non-Repetitive )**

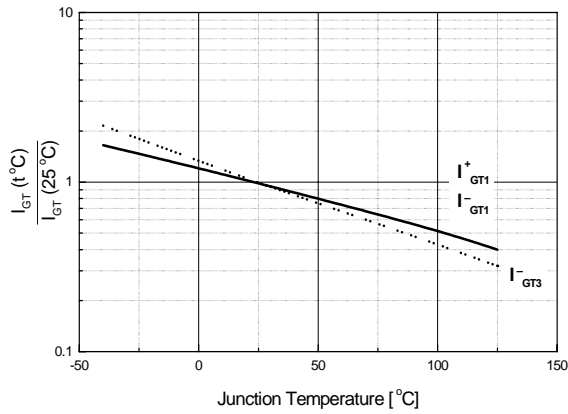


**Fig 6. Gate Trigger Voltage vs. Junction Temperature**

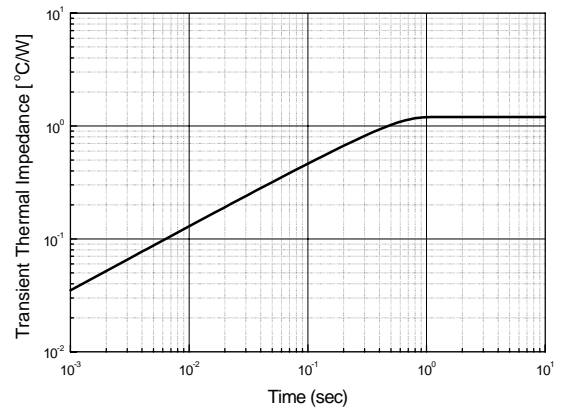


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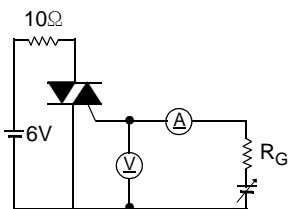
**Fig 7. Gate Trigger Current vs. Junction Temperature**



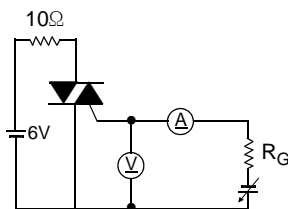
**Fig 8. Transient Thermal Impedance**



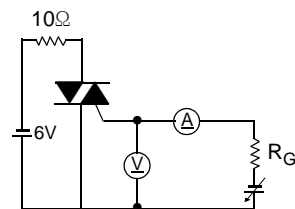
**Fig 9. Gate Trigger Characteristics Test Circuit**



Test Procedure I



Test Procedure II



Test Procedure III



## TO-220 Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.7		10.1	0.382		0.398
B	6.3		6.7	0.248		0.264
C	9.0		9.47	0.354		0.373
D	12.8		13.3	0.504		0.524
E	1.2		1.4	0.047		0.055
F		1.7			0.067	
G		2.5			0.098	
H	3.0		3.4	0.118		0.134
I	1.25		1.4	0.049		0.055
J	2.4		2.7	0.094		0.106
K	5.0		5.15	0.197		0.203
L	2.2		2.6	0.087		0.102
M	1.25		1.55	0.049		0.061
N	0.45		0.6	0.018		0.024
O	0.6		1.0	0.024		0.039
$\phi$		3.6			0.142	

