

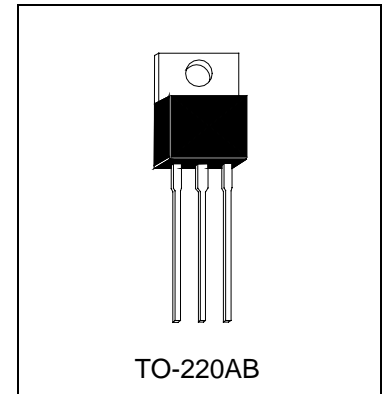


# HBT139XE

Three Quadrant Triac

## Description

Passivated, sensitive gate triacs in a plastic envelope, intended for use in general purpose bidirectional switching and phase control applications, where high sensitivity is required in all four quadrants.



## Quick Reference Data

Part No.	$V_{DRM}(V)$	$I_{T(RMS)}(A)$	$I_{TSM}(A)$	Quadrant
HBT139DE	600	16	140	I - II - III

## Pin Configuration

Pin	Description		Symbol
1	Main terminal 1		
2	Main terminal 2		
3	Gate		
tab	Main terminal 2		

## Limiting Values

Symbol	Parameter	Min.	Max.	Units
$V_{DRM}$	Repetitive peak off-state voltages	-	600	V
$I_{T(RMS)}$	RMS on-state current	-	16	A
$I_{TSM}$	Non-repetitive peak on-state current	-	140	A
$I^2t$	$I^2t$ for fusing	-	98	A <sup>2</sup> S
$dI_T/dt$	Repetitive rate of rise of on-state current after triggering T2+ G+	-	50	A/us
	T2+ G-	-	50	A/us
	T2- G-	-	50	A/us
	T2- G+	-	-	A/us
$I_{GM}$	Peak gate current	-	2	A
$V_{GM}$	Peak gate voltage	-	10	V
$P_{GM}$	Peak gate power	-	5	W
$P_{G(AV)}$	Average gate power	-	0.5	W
Tstg	Storage Temperature Range	-	150	°C
Tj	Operating junction temperature	-40	125	°C



### Static Characteristics (Ta=25°C)

Symbol	Parameter	Conditions	Rank	Unit
			V	
I <sub>GT</sub>	Gate Trigger Current	V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G+	25	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G-	25	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G-	25	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G+	-	mA
I <sub>L</sub>	Latching Current	V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G+	20	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G-	30	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G-	30	mA
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G+	-	mA
I <sub>H</sub>	Holding Current	V <sub>D</sub> =12V, I <sub>GT</sub> =0.1A	30	mA
V <sub>T</sub>	On-state Voltage	I <sub>T</sub> =25A	1.5	V
V <sub>GT</sub>	Gate Trigger Voltage	V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G+	1.5	V
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2+ G-	1.5	V
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G-	1.5	V
		V <sub>D</sub> =6V, R <sub>L</sub> =10Ω, T2- G+	-	V
I <sub>D</sub>	Off-state Leakage Current	V <sub>D</sub> =V <sub>DRM</sub>	500	uA

### Static Characteristics

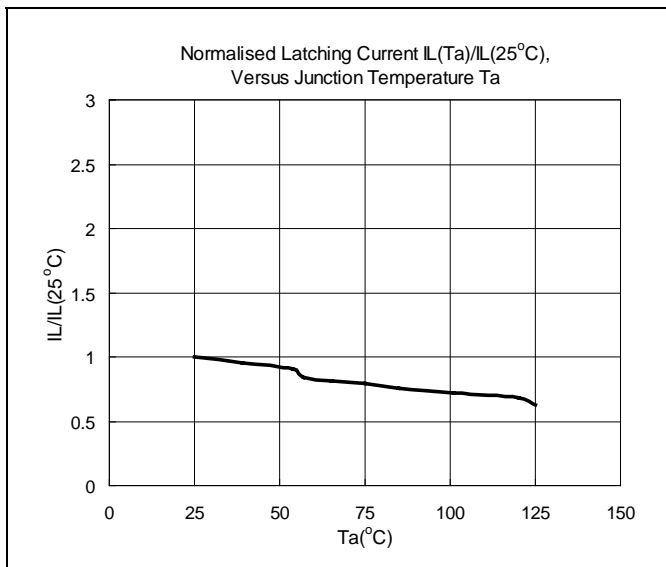
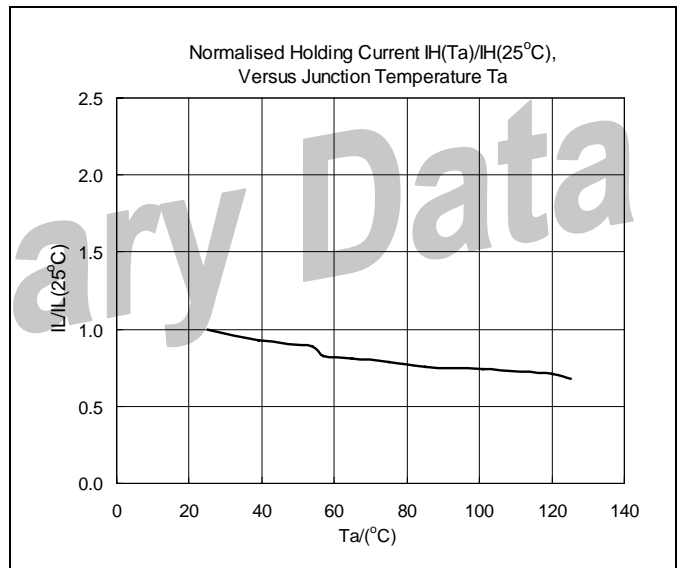
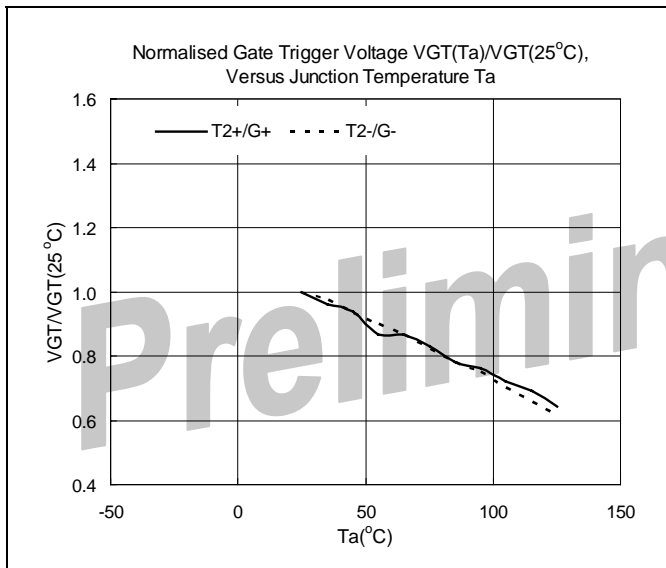
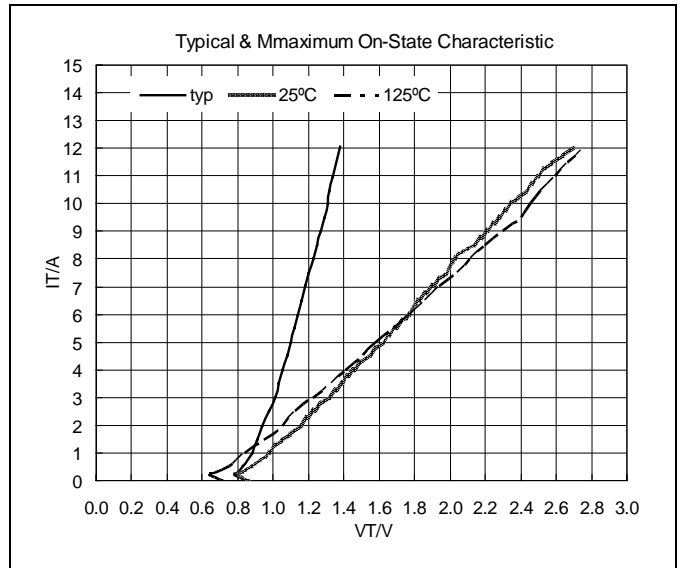
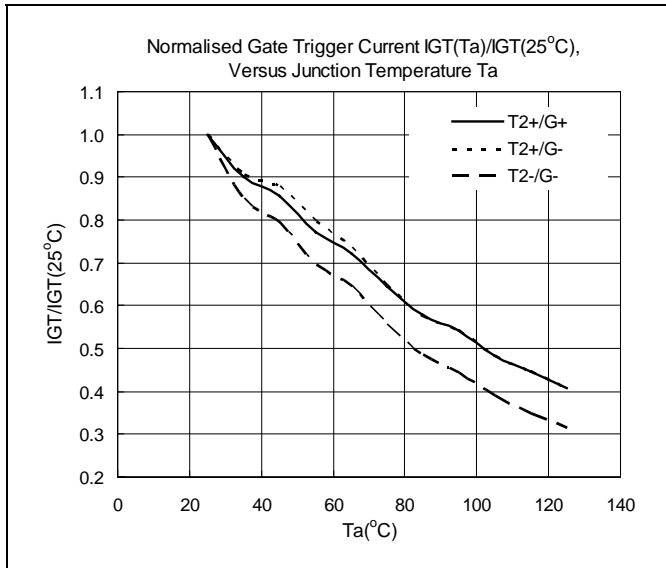
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
dV <sub>D</sub> /dt	Critical rate of rise of off-state voltage	V <sub>DM</sub> =67% V <sub>DRM(max)</sub> ; T <sub>j</sub> = 125°C; exponential waveform; gate open circuit	-	50	-	V/us
tgt	Gate controlled turn-on time	I <sub>TM</sub> =6A; V <sub>D</sub> =V <sub>DRM(max)</sub> ; I <sub>G</sub> =0.1A; dI <sub>G</sub> /dt=5A/us	-	2	-	us

### Thermal Resistances

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Rth j-mb	Thermal resistance junction to mounting base	Full cycle Half cycle In free air	-	-	1.2	K/W
Rth j-a	Thermal resistance junction to ambient		-	-	1.7	K/W
			-	60	-	K/W

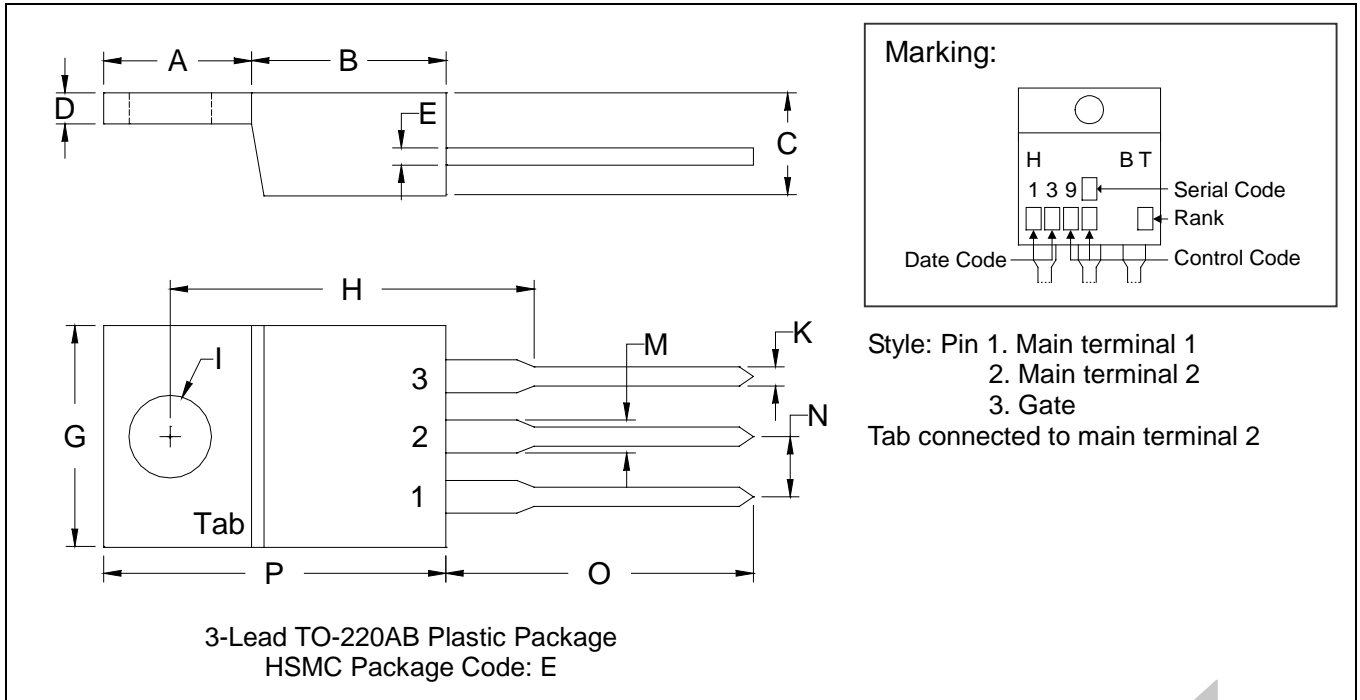


### Characteristics Curve





## TO-220AB Dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2197	0.2949	5.58	7.49	I	-	*0.1508	-	*3.83
B	0.3299	0.3504	8.38	8.90	K	0.0295	0.0374	0.75	0.95
C	0.1732	0.185	4.40	4.70	M	0.0449	0.0551	1.14	1.40
D	0.0453	0.0547	1.15	1.39	N	-	*0.1000	-	*2.54
E	0.0138	0.0236	0.35	0.60	O	0.5000	0.5618	12.70	14.27
G	0.3803	0.4047	9.66	10.28	P	0.5701	0.6248	14.48	15.87
H	-	*0.6398	-	*16.25					

**Notes:**  
 1.Dimension and tolerance based on our Spec. dated Sep. 07,1997.  
 2.Controlling dimension: millimeters.  
 3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 4.If there is any question with packing specification or packing method, please contact your local HSMC sales office.

**Material:**

- Lead: 42 Alloy; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

**Important Notice:**

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of HSMC.
- HSMC reserves the right to make changes to its products without notice.
- **HSMC semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- HSMC assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.

**Head Office And Factory:**

- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F., No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.  
 Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C  
 Tel: 886-3-5983621~5 Fax: 886-3-5982931