

## ST330C..C SERIES

### PHASE CONTROL THYRISTORS

### Hockey Puk Version

#### Features

- Center amplifying gate
- Metal case with ceramic insulator
- International standard case TO-200AB (E-PUK)

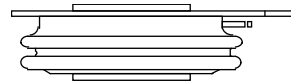
#### Typical Applications

- DC motor controls
- Controlled DC power supplies
- AC controllers

#### Major Ratings and Characteristics

| Parameters        | ST330C..C   | Units |
|-------------------|-------------|-------|
| $I_{T(AV)}$       | 720         | A     |
| @ $T_{hs}$        | 55          | °C    |
| $I_{T(RMS)}$      | 1420        | A     |
| @ $T_{hs}$        | 25          | °C    |
| $I_{TSM}$         | @ 50Hz      | 9000  |
|                   | @ 60Hz      | 9420  |
| $I^2t$            | @ 50Hz      | 405   |
|                   | @ 60Hz      | 370   |
| $V_{DRM}/V_{RRM}$ | 400 to 1600 | V     |
| $t_q$ typical     | 100         | μs    |
| $T_J$             | - 40 to 125 | °C    |

720A



case style TO-200AB (E-PUK)

**ST330C..C Series**

Bulletin I25155 rev. C 04/00

International  
**IR** Rectifier**ELECTRICAL SPECIFICATIONS****Voltage Ratings**

| Type number | Voltage Code | $V_{DRM}/V_{RRM}$ , max. repetitive peak and off-state voltage<br>V | $V_{RSM}$ , maximum non-repetitive peak voltage<br>V | $I_{DRM}/I_{RRM}$ max.<br>@ $T_J = T_J \text{ max}$<br>mA |
|-------------|--------------|---------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|
| ST330C..C   | 04           | 400                                                                 | 500                                                  | 50                                                        |
|             | 08           | 800                                                                 | 900                                                  |                                                           |
|             | 12           | 1200                                                                | 1300                                                 |                                                           |
|             | 14           | 1400                                                                | 1500                                                 |                                                           |
|             | 16           | 1600                                                                | 1700                                                 |                                                           |

**On-state Conduction**

| Parameter                                                        | ST330C..C            | Units              | Conditions                                                                                |
|------------------------------------------------------------------|----------------------|--------------------|-------------------------------------------------------------------------------------------|
| $I_{T(AV)}$ Max. average on-state current @ Heatsink temperature | 720 (350)<br>55 (75) | A<br>°C            | 180° conduction, half sine wave<br>double side (single side) cooled                       |
| $I_{T(RMS)}$ Max. RMS on-state current                           | 1420                 | A                  | DC @ 25°C heatsink temperature double side cooled                                         |
| $I_{TSM}$ Max. peak, one-cycle non-repetitive surge current      | 9000                 |                    | t = 10ms No voltage                                                                       |
|                                                                  | 9420                 |                    | t = 8.3ms reapplied                                                                       |
|                                                                  | 7570                 |                    | t = 10ms 100% $V_{RRM}$                                                                   |
|                                                                  | 7920                 |                    | t = 8.3ms reapplied                                                                       |
| $I^2t$ Maximum $I^2t$ for fusing                                 | 405                  | KA <sup>2</sup> s  | t = 10ms No voltage                                                                       |
|                                                                  | 370                  |                    | t = 8.3ms reapplied                                                                       |
|                                                                  | 287                  |                    | t = 10ms 100% $V_{RRM}$                                                                   |
|                                                                  | 262                  |                    | t = 8.3ms reapplied                                                                       |
| $I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing                   | 4050                 | KA <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reapplied                                                     |
| $V_{T(TO)1}$ Low level value of threshold voltage                | 0.91                 | V                  | $(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$ |
| $V_{T(TO)2}$ High level value of threshold voltage               | 0.92                 |                    | $(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$                                      |
| $r_{t1}$ Low level value of on-state slope resistance            | 0.58                 | mΩ                 | $(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$ |
| $r_{t2}$ High level value of on-state slope resistance           | 0.57                 |                    | $(I > \pi \times I_{T(AV)}), T_J = T_J \text{ max.}$                                      |
| $V_{TM}$ Max. on-state voltage                                   | 1.96                 | V                  | $I_{pk} = 1810A, T_J = T_J \text{ max, } t_p = 10ms \text{ sine pulse}$                   |
| $I_H$ Maximum holding current                                    | 600                  | mA                 | $T_J = 25^\circ C$ , anode supply 12V resistive load                                      |
| $I_L$ Typical latching current                                   | 1000                 |                    |                                                                                           |

**Switching**

| Parameter                                                     | ST330C..C | Units | Conditions                                                                                                                                        |
|---------------------------------------------------------------|-----------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| $di/dt$ Max. non-repetitive rate of rise of turned-on current | 1000      | A/μs  | Gate drive 20V, 20Ω, $t_i \leq 1\mu s$<br>$T_J = T_J \text{ max, anode voltage} \leq 80\% V_{DRM}$                                                |
| $t_d$ Typical delay time                                      | 1.0       | μs    | Gate current 1A, $di_g/dt = 1A/\mu s$<br>$V_d = 0.67\% V_{DRM}, T_J = 25^\circ C$                                                                 |
| $t_q$ Typical turn-off time                                   | 100       |       | $I_{TM} = 550A, T_J = T_J \text{ max, } di/dt = 40A/\mu s, V_R = 50V$<br>$dv/dt = 20V/\mu s, \text{ Gate } 0V \text{ } 100\Omega, t_p = 500\mu s$ |

### Blocking

| Parameter                                                              | ST330C..C | Units      | Conditions                                       |
|------------------------------------------------------------------------|-----------|------------|--------------------------------------------------|
| $dv/dt$ Maximum critical rate of rise of off-state voltage             | 500       | V/ $\mu$ s | $T_J = T_J$ max. linear to 80% rated $V_{DRM}$   |
| $I_{RRM}$<br>$I_{DRM}$ Max. peak reverse and off-state leakage current | 50        | mA         | $T_J = T_J$ max, rated $V_{DRM}/V_{RRM}$ applied |

### Triggering

| Parameter                                    | ST330C..C | Units | Conditions                                                                                                                                                                                      |
|----------------------------------------------|-----------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $P_{GM}$ Maximum peak gate power             | 10.0      | W     | $T_J = T_J$ max, $t_p \leq 5ms$                                                                                                                                                                 |
| $P_{G(AV)}$ Maximum average gate power       | 2.0       |       | $T_J = T_J$ max, $f = 50Hz$ , $d\% = 50$                                                                                                                                                        |
| $I_{GM}$ Max. peak positive gate current     | 3.0       | A     | $T_J = T_J$ max, $t_p \leq 5ms$                                                                                                                                                                 |
| $+V_{GM}$ Maximum peak positive gate voltage | 20        | V     | $T_J = T_J$ max, $t_p \leq 5ms$                                                                                                                                                                 |
| $-V_{GM}$ Maximum peak negative gate voltage | 5.0       |       |                                                                                                                                                                                                 |
| $I_{GT}$ DC gate current required to trigger | TYP.      | MAX.  | $T_J = -40^\circ C$<br>$T_J = 25^\circ C$<br>$T_J = 125^\circ C$<br>Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied |
|                                              | 200       | -     |                                                                                                                                                                                                 |
|                                              | 100       | 200   |                                                                                                                                                                                                 |
|                                              | 50        | -     |                                                                                                                                                                                                 |
| $V_{GT}$ DC gate voltage required to trigger | 2.5       | -     | $T_J = -40^\circ C$                                                                                                                                                                             |
|                                              | 1.8       | 3.0   | $T_J = 25^\circ C$                                                                                                                                                                              |
|                                              | 1.1       | -     | $T_J = 125^\circ C$                                                                                                                                                                             |
| $I_{GD}$ DC gate current not to trigger      | 10        | mA    | $T_J = T_J$ max<br>Max. gate current/voltage not to trigger is the max. value which will not trigger any unit with rated $V_{DRM}$ anode-to-cathode applied                                     |
| $V_{GD}$ DC gate voltage not to trigger      | 0.25      | V     |                                                                                                                                                                                                 |

### Thermal and Mechanical Specification

| Parameter                                                  | ST330C..C          | Units             | Conditions                                                         |
|------------------------------------------------------------|--------------------|-------------------|--------------------------------------------------------------------|
| $T_J$ Max. operating temperature range                     | -40 to 125         | $^\circ C$        |                                                                    |
| $T_{stg}$ Max. storage temperature range                   | -40 to 150         |                   |                                                                    |
| $R_{thJ-hs}$ Max. thermal resistance, junction to heatsink | 0.09<br>0.04       | K/W               | DC operation single side cooled<br>DC operation double side cooled |
| $R_{thC-hs}$ Max. thermal resistance, case to heatsink     | 0.02<br>0.01       | K/W               | DC operation single side cooled<br>DC operation double side cooled |
| F Mounting force, $\pm 10\%$                               | 9800<br>(1000)     | N<br>(Kg)         |                                                                    |
| wt Approximate weight                                      | 83                 | g                 |                                                                    |
| Case style                                                 | TO - 200AB (E-PUK) | See Outline Table |                                                                    |

ST330C..C Series

Bulletin I25155 rev.C 04/00

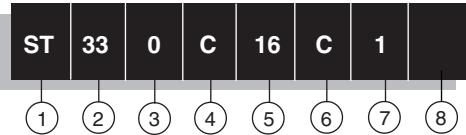
$\Delta R_{thJ-hs}$  Conduction

(The following table shows the increment of thermal resistance  $R_{thJ-hs}$  when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction |             | Rectangular conduction |             | Units | Conditions                 |
|------------------|-----------------------|-------------|------------------------|-------------|-------|----------------------------|
|                  | Single Side           | Double Side | Single Side            | Double Side |       |                            |
| 180°             | 0.012                 | 0.011       | 0.008                  | 0.007       | K/W   | $T_J = T_{J \text{ max.}}$ |
| 120°             | 0.014                 | 0.012       | 0.014                  | 0.013       |       |                            |
| 90°              | 0.017                 | 0.015       | 0.019                  | 0.017       |       |                            |
| 60°              | 0.025                 | 0.022       | 0.026                  | 0.023       |       |                            |
| 30°              | 0.043                 | 0.036       | 0.043                  | 0.037       |       |                            |

Ordering Information Table

Device Code



- 1** - Thyristor
- 2** - Essential part number
- 3** - 0 = Converter grade
- 4** - C = Ceramic Puk
- 5** - Voltage code: Code x 100 =  $V_{RRM}$  (See Voltage Rating Table)
- 6** - C = Puk Case TO-200AB (E-PUK)
- 7** - 0 = Eyelet terminals (Gate and Auxiliary Cathode Unsoldered Leads)  
1 = Fast-on terminals (Gate and Auxiliary Cathode Unsoldered Leads)  
2 = Eyelet terminals (Gate and Auxiliary Cathode Soldered Leads)  
3 = Fast-on terminals (Gate and Auxiliary Cathode Soldered Leads)
- 8** - Critical dv/dt: None = 500V/ $\mu$ sec (Standard selection)  
L = 1000V/ $\mu$ sec (Special selection)

Outline Table

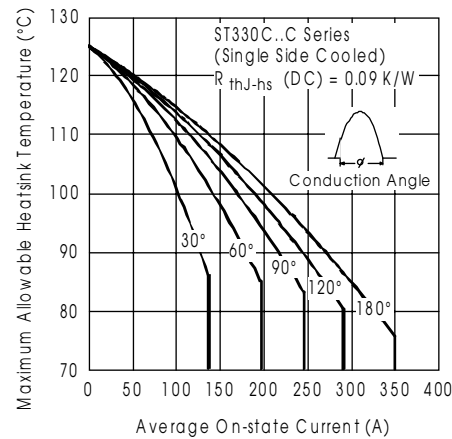
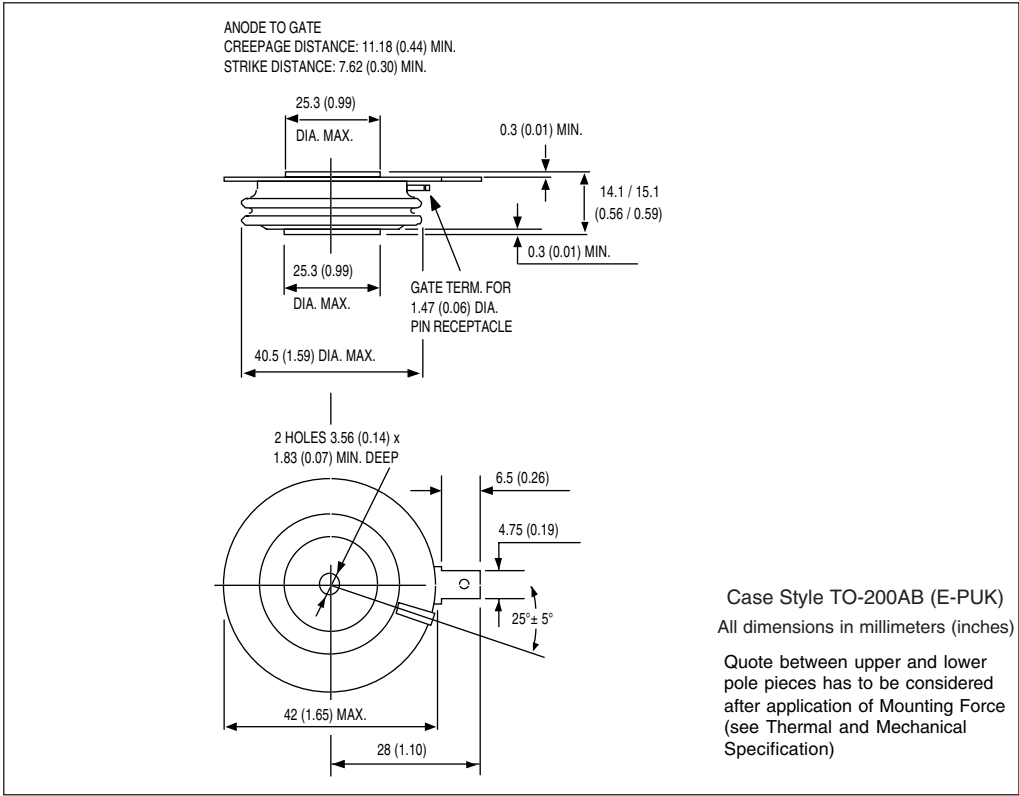


Fig. 1 - Current Ratings Characteristics

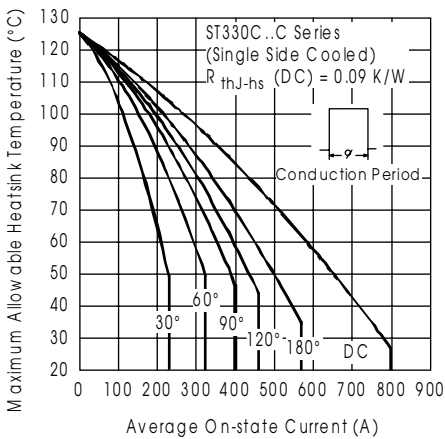


Fig. 2 - Current Ratings Characteristics

## ST330C..C Series

Bulletin I25155 rev. C 04/00

International  
**IRF** Rectifier

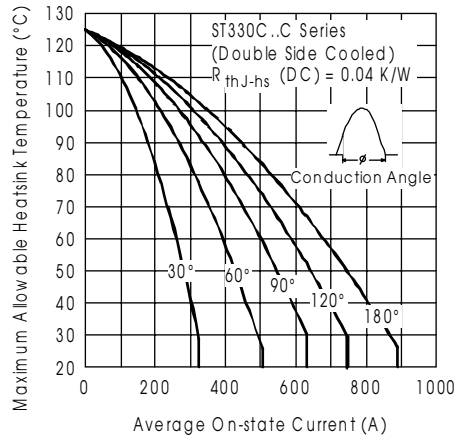


Fig. 3 - Current Ratings Characteristics

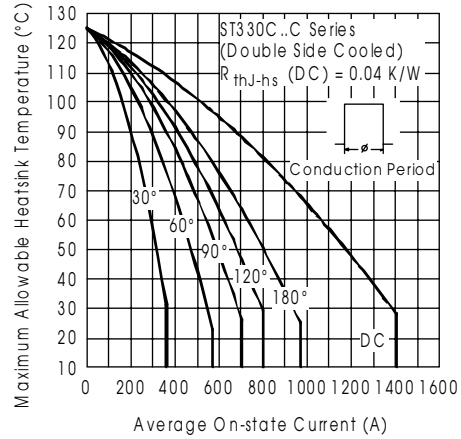


Fig. 4 - Current Ratings Characteristics

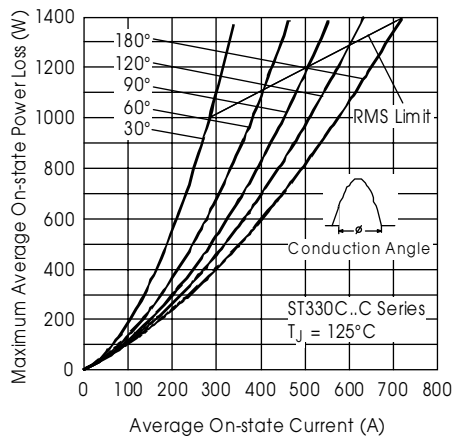


Fig. 5 - On-state Power Loss Characteristics

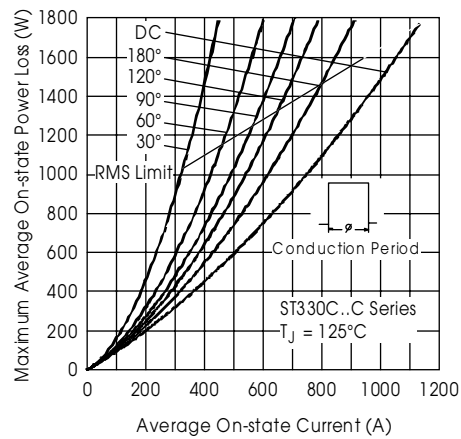


Fig. 6 - On-state Power Loss Characteristics

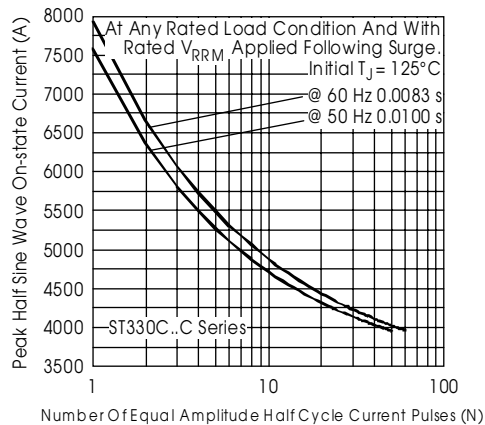


Fig. 7 - Maximum Non-Repetitive Surge Current  
Single and Double Side Cooled

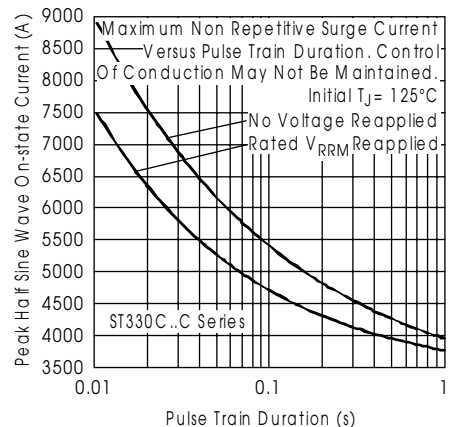


Fig. 8 - Maximum Non-Repetitive Surge Current  
Single and Double Side Cooled

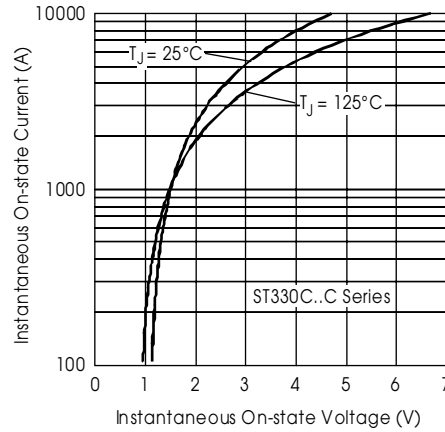


Fig. 9 - On-state Voltage Drop Characteristics

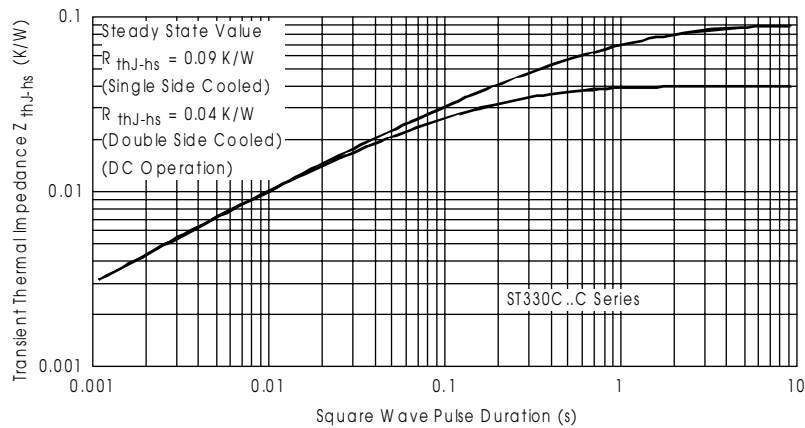


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

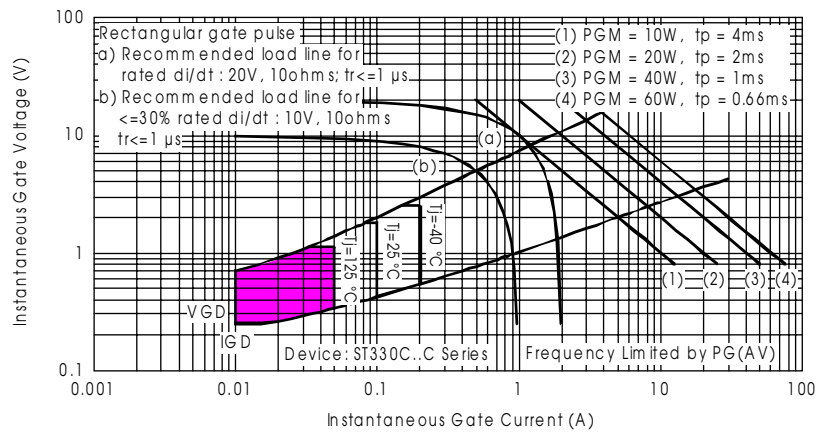


Fig. 11 - Gate Characteristics



**Стандарт  
Электрон  
Связь**

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С нами вы становитесь еще успешнее!

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