

# SCRs

## 1.25 Amp, Planar

2N1870A-2N1874A. J

### FEATURES

- Available as Either "JAN" or Standard Types
- Operating D.C. Current Range: 5 to 1250mA
- Pulse Currents: to 30A
- Voltage Ratings: to 200V
- Maximum Trigger Current: 0.2mA
- Maximum Trigger Voltage: 0.8V
- All Leads Isolated from Case
- Maximum  $\theta_{JC}$ : 20°C/W

### DESCRIPTION

These are premium PNP controlled switches intended for use in applications requiring a high degree of reliability assurance. The JAN types are specified under MIL-S-19500/198, and are included in MIL-STD-701 as recommended types for military usage.

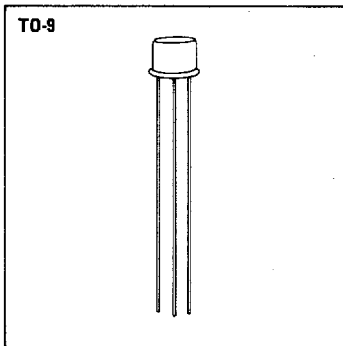
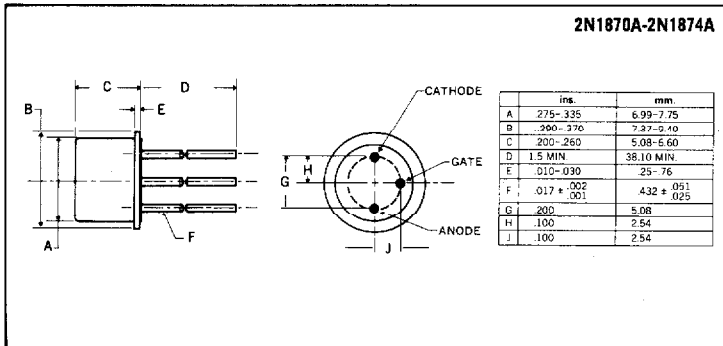
This series is useful in a wide variety of applications including: safety, arming and detonating circuits; timing and programming circuits; protective and warning circuits; driving relays; driving indicator lamps, encoding and decoding circuits; replacing relays, thyatrons, and megamps; servo motor control; pulse generation; plus many others.

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### ABSOLUTE MAXIMUM RATINGS

|   | 2N1870A<br>JAN2N1870A | 2N1871A<br>JAN2N1871A | 2N1872A<br>JAN2N1872A | 2N1873A | 2N1874A<br>JAN2N1874A |
|---|-----------------------|-----------------------|-----------------------|---------|-----------------------|
| Repetitive Peak Off-State Voltage, $V_{DRM}$                | 30V                   | 60V                   | 100V                  | 150V    | 200V                  |
| Repetitive Peak Reverse Voltage, $V_{RRM}$                  | 30V                   | 60V                   | 100V                  | 150V    | 200V                  |
| D.C. On-State Current, $I_T$                                |                       |                       |                       |         |                       |
| 100°C Ambient   |                       |                       | 250mA                 |         |                       |
| 100°C Case  |                       |                       | 1.25A                 |         |                       |
| Repetitive Peak On-State Current, $I_{TRM}$                 |                       |                       | up to 30A             |         |                       |
| Peak One Cycle Surge (Non-Rep.) On-State Current, $I_{TSM}$ |                       |                       | 15A                   |         |                       |
| Peak Gate Current, $I_{GM}$                                 |                       |                       | 250mA                 |         |                       |
| Average Gate Current, $I_{C(AV)}$                           |                       |                       | 25mA                  |         |                       |
| Reverse Gate Voltage, $V_{GR}$                              |                       |                       | 5V                    |         |                       |
| Thermal Resistance, Junction to Case, $R\theta_{JC}$        |                       |                       | 20°C/W                |         |                       |
| Operating and Storage Temperature Range                     |                       |                       | -65°C to +150°C       |         |                       |

### MECHANICAL SPECIFICATIONS



## ELECTRICAL SPECIFICATIONS (at 25°C unless noted)†

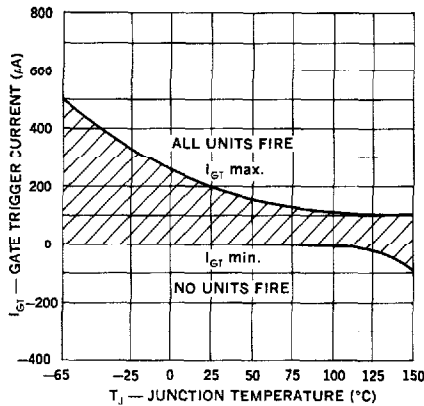
| Test                                      | Symbol    | Min. | Typical | Max. | Units      | Test Conditions                          |
|---|-----------|------|---------|------|------------|--|
| <b>Subgroup 1 (Visual and Mechanical)</b> |           |      |         |      |            |  |
| <b>Subgroup 2 (25°C Tests)</b>            |           |      |         |      |            |  |
| Off-State Current                         | $I_{DRM}$ | —    | 0.5     | 10   | $\mu A$    | $R_{GK} = 1K, V_{DRM} = + \text{Rating}$ |
| Reverse Current                           | $I_{RRM}$ | —    | 0.5     | 10   | $\mu A$    | $R_{GK} = 1K, V_{RRM} = - \text{Rating}$ |
| Gate Trigger Voltage                      | $V_{GT}$  | 0.4  | 0.55    | 0.8  | V          | $R_{GS} = 100 \text{ ohms}, V_D = 5V$    |
| Gate Trigger Current                      | $I_{GT}$  | —    | 30      | 200  | $\mu A$    | $R_{GS} > 10K \text{ ohms}, V_D = 5V$    |
| On-State Voltage                          | $V_{TM}$  | —    | 1.8     | 2.5  | V          | $I_{TM} = 2A \text{ (pulse test)}$       |
| Off-State Voltage — Critical of Rise      | $dv_c/dt$ | 100  | —       | —    | V/ $\mu s$ | Specified test circuit                   |
| Reverse Gate Current                      | $I_{GR}$  | —    | 0.5     | 10   | $\mu A$    | $V_{GRM} = 5V, \text{ anode open}$       |
| Holding Current                           | $I_H$     | 0.3  | —       | 5.0  | mA         | $I_G = -150\mu A, V_D = 5V$              |
| <b>Subgroup 3 (125°C Tests)</b>           |           |      |         |      |            |  |
| High Temp. Off-State Current              | $I_{DRM}$ | —    | 15      | 100  | $\mu A$    | $R_{GK} = 1K, V_{DRM} = + \text{Rating}$ |
| High Temp. Reverse Current                | $I_{RRM}$ | —    | 15      | 100  | $\mu A$    | $R_{GK} = 1K, V_{RRM} = - \text{Rating}$ |
| High Temp. Gate Non-Trigger Voltage       | $V_{GD}$  | 0.2  | —       | —    | V          | $R_{GS} = 100 \text{ ohms}, V_D = 5V$    |
| High Temp. Holding Current                | $I_H$     | 0.2  | —       | —    | mA         | $I_G = -150\mu A, V_D = 5V$              |
| <b>Subgroup 4 (—65°C Tests)</b>           |           |      |         |      |            |  |
| Low Temp. Gate Trigger Voltage            | $V_{GT}$  | —    | —       | 1.0  | V          | $R_{GK} = 100 \text{ ohms}, V_D = 5V$    |
| Low Temp. Gate Trigger Current            | $I_{GT}$  | —    | —       | 500  | $\mu A$    | $R_{GK} > 10K \text{ ohms}, V_D = 5V$    |
| Low Temp. Holding Current                 | $I_H$     | —    | —       | 15   | mA         | $I_G = -150\mu A, V_{AA} = 5V$           |

†All values in this table are JEDEC registered.

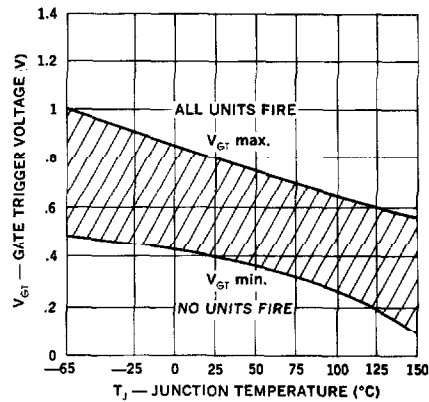
Note: Voltage ratings apply over the full operating temperature range, provided the gate is connected to the cathode through a resistor, 1 K or smaller, or other adequate gate bias is used.

## Triggering and Bias Stabilization

1. Gate Trigger Current



2. Gate Trigger Voltage



## ELECTRICAL SPECIFICATIONS (at 25°C unless noted)†

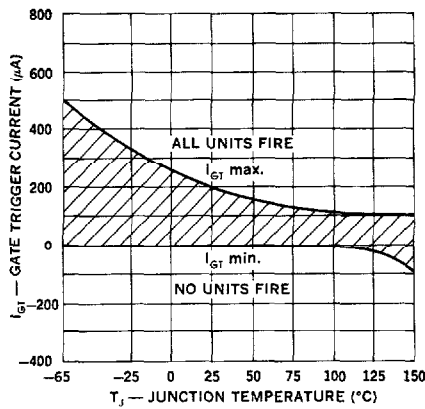
| Test                                      | Symbol    | Min. | Typical | Max. | Units      | Test Conditions                          |
|---|-----------|------|---------|------|------------|--|
| <b>Subgroup 1 (Visual and Mechanical)</b> |           |      |         |      |            |  |
| <b>Subgroup 2 (25°C Tests)</b>            |           |      |         |      |            |  |
| Off-State Current                         | $I_{DRM}$ | —    | 0.5     | 10   | $\mu A$    | $R_{GK} = 1K, V_{DRM} = + \text{Rating}$ |
| Reverse Current                           | $I_{RRM}$ | —    | 0.5     | 10   | $\mu A$    | $R_{GK} = 1K, V_{RRM} = - \text{Rating}$ |
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| On-State Voltage                          | $V_{TM}$  | —    | 1.8     | 2.5  | V          | $I_{TM} = 2A \text{ (pulse test)}$       |
| Off-State Voltage — Critical of Rise      | $dv_c/dt$ | 100  | —       | —    | V/ $\mu s$ | Specified test circuit                   |
| Reverse Gate Current                      | $I_{GR}$  | —    | 0.5     | 10   | $\mu A$    | $V_{GRM} = 5V, \text{ anode open}$       |
| Holding Current                           | $I_H$     | 0.3  | —       | 5.0  | mA         | $I_G = -150\mu A, V_D = 5V$              |
| <b>Subgroup 3 (125°C Tests)</b>           |           |      |         |      |            |  |
| High Temp. Off-State Current              | $I_{DRM}$ | —    | 15      | 100  | $\mu A$    | $R_{GK} = 1K, V_{DRM} = + \text{Rating}$ |
| High Temp. Reverse Current                | $I_{RRM}$ | —    | 15      | 100  | $\mu A$    | $R_{GK} = 1K, V_{RRM} = - \text{Rating}$ |
| High Temp. Gate Non-Trigger Voltage       | $V_{GD}$  | 0.2  | —       | —    | V          | $R_{GS} = 100 \text{ ohms}, V_D = 5V$    |
| High Temp. Holding Current                | $I_H$     | 0.2  | —       | —    | mA         | $I_G = -150\mu A, V_D = 5V$              |
| <b>Subgroup 4 (—65°C Tests)</b>           |           |      |         |      |            |  |
| Low Temp. Gate Trigger Voltage            | $V_{GT}$  | —    | —       | 1.0  | V          | $R_{GK} = 100 \text{ ohms}, V_D = 5V$    |
| Low Temp. Gate Trigger Current            | $I_{GT}$  | —    | —       | 500  | $\mu A$    | $R_{GK} > 10K \text{ ohms}, V_D = 5V$    |
| Low Temp. Holding Current                 | $I_H$     | —    | —       | 15   | mA         | $I_G = -150\mu A, V_{AA} = 5V$           |

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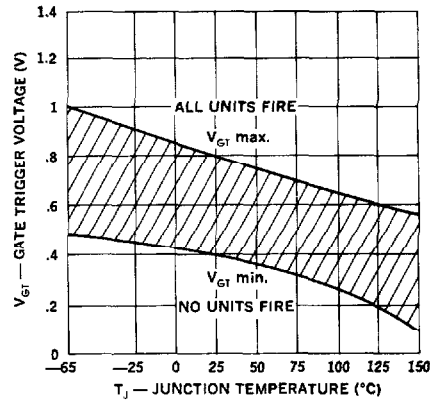
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## Triggering and Bias Stabilization

## 1. Gate Trigger Current

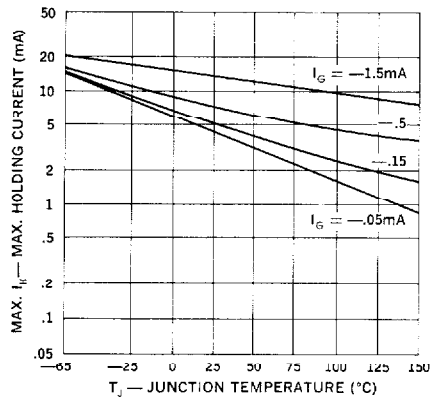


## 2. Gate Trigger Voltage

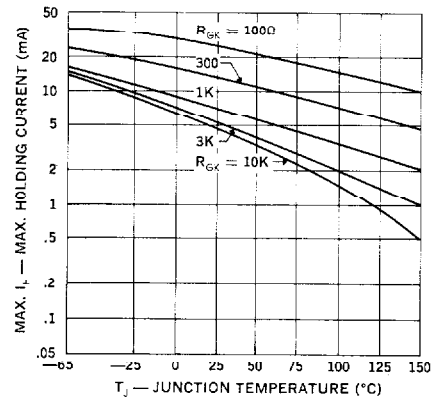


## Holding Current

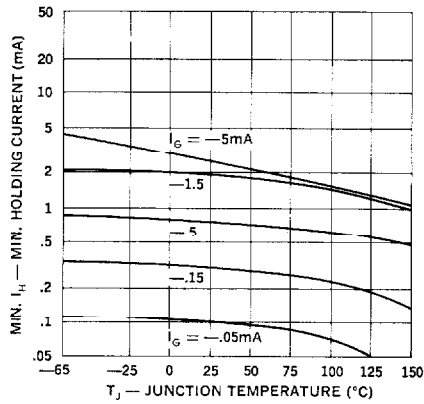
1. Max. Holding Current (Current Bias)



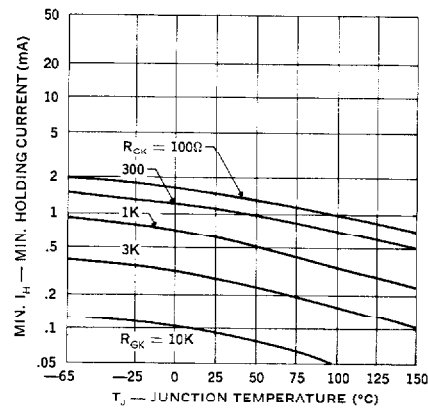
2. Max. Holding Current (Resistor Bias)



3. Min. Holding Current (Current Bias)

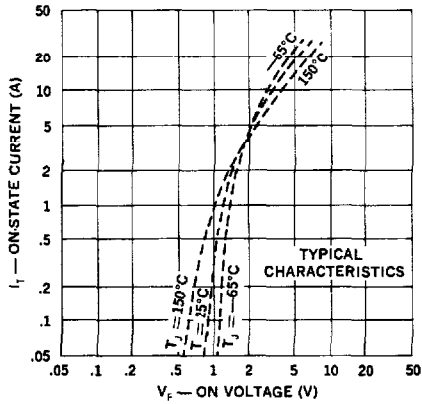


4. Min. Holding Current (Resistor Bias)

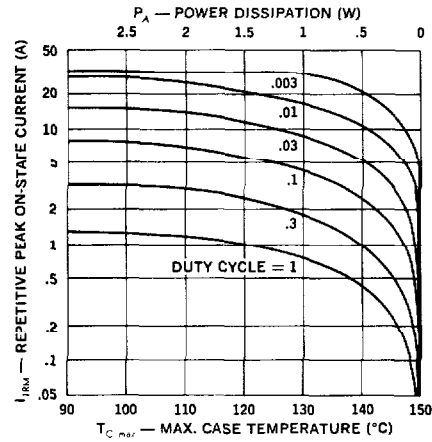


## Current Ratings — Thermal Design

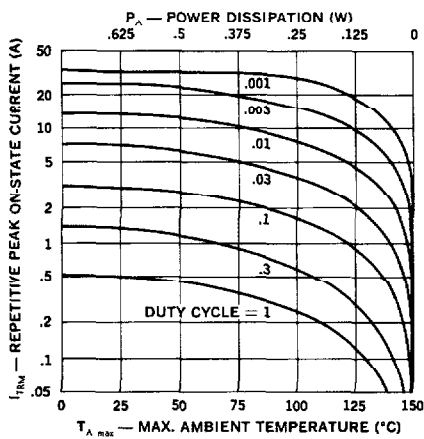
## 1. On-State Current vs. Voltage



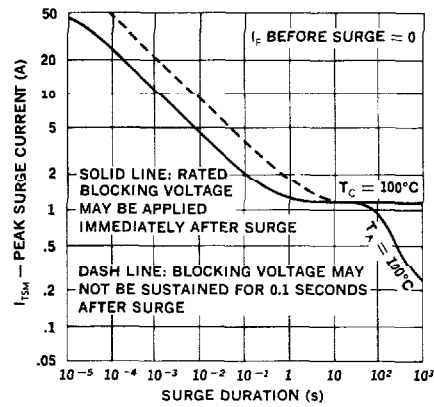
## 2. Peak Current vs. Case Temperature



## 3. Peak Current vs. Ambient Temperature



## 4. Surge Current vs. Time



## 5. Average Current vs. Case Temperature

