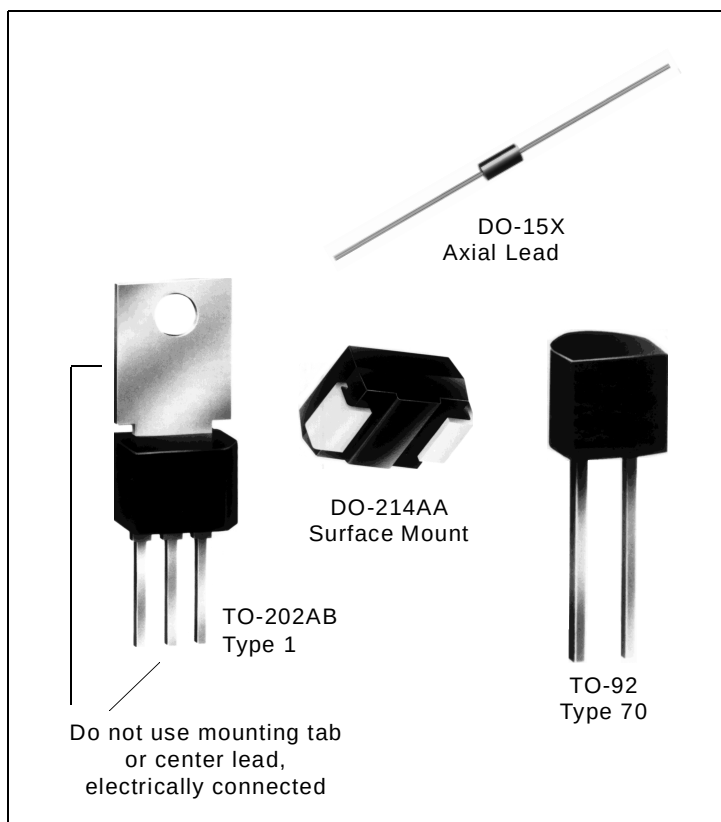


# SIDAC

(95 - 330 Volts)

## General Description

The Sidac is a silicon bilateral voltage triggered switch with greater power-handling capabilities than standard diacs. Upon application of a voltage exceeding the Sidac breakover voltage point, the Sidac switches on through a negative resistance region to a low on-state voltage. Conduction will continue until the current is interrupted or drops below the minimum holding current of the device.

Teccor offers the complete voltage range (95-330) over three different packages:

- TO-92 (95-280 volts)
- Axial lead DO-15X (95-280 volts)
- Surface Mount DO-214AA (95-280 volts)
- TO-202AB (190-330 volts)

Teccor's Sidacs feature glass passivated junctions to ensure a rugged and dependable device capable of withstanding harsh environments.

Variations of devices covered in this data sheet are available for custom design applications. Please consult the factory for more information.

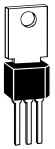
## Applications

- High voltage lamp ignitors
- Natural gas ignitors
- Gas oil ignitors
- High voltage power supplies
- Xenon ignitors
- Over voltage protector
- Pulse generators
- Fluorescent lighting ignitors
- HID lighting ignitors

## Features

- AC circuit oriented
- Glass-passivated junctions
- High surge current capability

# Electrical Specifications

| Type                                             | Part No.                                                                                                |                                                                                                          |                                                                                                            |                                                                                                            | $I_{T(RMS)}$                                                                                           | $V_{DRM}$                                               | $V_{BO}$                                                   |     | $I_{DRM}$                                                                                                   | $I_{BO}$                                                             |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                                  | <br>TO-92<br>E Package | <br>DO-15X<br>G Package | <br>TO-202AB<br>F Package | <br>DO-214AA<br>S Package | On-State<br>RMS Current<br>$T_J \leq 125^\circ\text{C}$<br>50/60Hz<br>Sine Wave<br>(7) (8)<br><br>Amps | Repetitive<br>Peak<br>Off-State<br>Voltage<br><br>Volts | Breakover Voltage<br>50/60Hz Sine Wave<br>(1)<br><br>Volts |     | Repetitive<br>Peak<br>Off-State<br>Current<br>50/60Hz<br>Sine Wave<br>$V = V_{DRM}$<br><br>$\mu\text{Amps}$ | Breakover<br>Current<br>50/60Hz<br>Sine Wave<br><br>$\mu\text{Amps}$ |
| See "Package Dimensions" section for variations. |                                                                                                         |                                                                                                          |                                                                                                            |                                                                                                            | MAX                                                                                                    | MIN                                                     | MIN                                                        | MAX | MAX                                                                                                         | MAX                                                                  |
|                                                  | K1050E70                                                                                                | K1050G                                                                                                   |                                                                                                            | K1050S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 95                                                         | 113 | 5                                                                                                           | 10                                                                   |
|                                                  | K1100E70                                                                                                | K1100G                                                                                                   |                                                                                                            | K1100S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 104                                                        | 118 | 5                                                                                                           | 10                                                                   |
|                                                  | K1200E70                                                                                                | K1200G                                                                                                   |                                                                                                            | K1200S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 110                                                        | 125 | 5                                                                                                           | 10                                                                   |
|                                                  | K1300E70                                                                                                | K1300G                                                                                                   |                                                                                                            | K1300S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 120                                                        | 138 | 5                                                                                                           | 10                                                                   |
|                                                  | K1400E70                                                                                                | K1400G                                                                                                   |                                                                                                            | K1400S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 130                                                        | 146 | 5                                                                                                           | 10                                                                   |
|                                                  | K1500E70                                                                                                | K1500G                                                                                                   |                                                                                                            | K1500S                                                                                                     | 1.0                                                                                                    | $\pm 90$                                                | 140                                                        | 170 | 5                                                                                                           | 10                                                                   |
|                                                  | K2000E70                                                                                                | K2000G                                                                                                   | K2000F1                                                                                                    | K2000S                                                                                                     | 1.0                                                                                                    | $\pm 180$                                               | 190                                                        | 215 | 5                                                                                                           | 10                                                                   |
|                                                  | K2200E70                                                                                                | K2200G                                                                                                   | K2200F1                                                                                                    | K2200S                                                                                                     | 1.0                                                                                                    | $\pm 180$                                               | 205                                                        | 230 | 5                                                                                                           | 10                                                                   |
|                                                  | K2400E70                                                                                                | K2400G                                                                                                   | K2400F1                                                                                                    | K2400S                                                                                                     | 1.0                                                                                                    | $\pm 190$                                               | 220                                                        | 250 | 5                                                                                                           | 10                                                                   |
|                                                  |                                                                                                         |                                                                                                          | K2401F1                                                                                                    |                                                                                                            | 1.0 (10)                                                                                               | $\pm 190$                                               | 220                                                        | 250 | 5                                                                                                           | 10                                                                   |
|                                                  | K2500E70                                                                                                | K2500G                                                                                                   | K2500F1                                                                                                    | K2500S                                                                                                     | 1.0                                                                                                    | $\pm 190$                                               | 240                                                        | 280 | 5                                                                                                           | 10                                                                   |
|                                                  |                                                                                                         |                                                                                                          | K3000F1                                                                                                    |                                                                                                            | 1.0                                                                                                    | $\pm 190$                                               | 270                                                        | 330 | 5                                                                                                           | 10                                                                   |

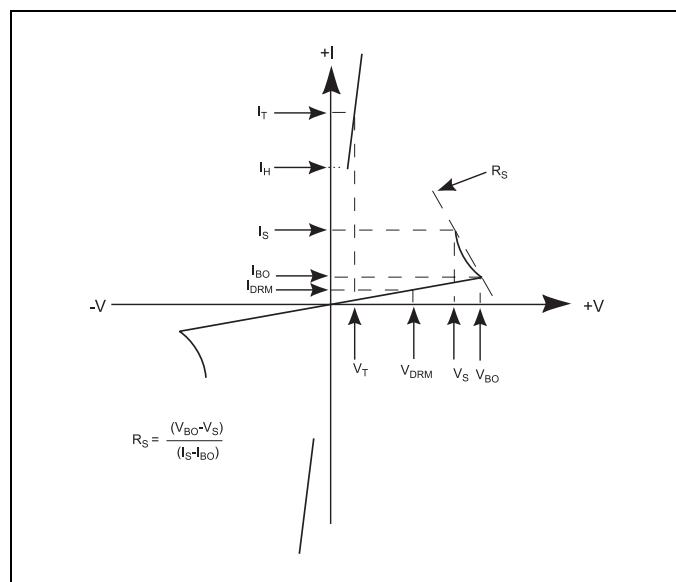
## General Notes

- All measurements are made at 60Hz with a resistive load at an ambient temperature of  $+25^\circ\text{C}$  unless otherwise specified.
- Storage temperature range ( $T_S$ ) is  $-65^\circ\text{C}$  to  $+150^\circ\text{C}$ .
- The case ( $T_C$ ) or lead ( $T_L$ ) temperature is measured as shown on the dimensional outline drawings. See "Package Dimensions" section of this catalog.
- Junction temperature range ( $T_J$ ) is  $-40^\circ\text{C}$  to  $+125^\circ\text{C}$ .
- Lead solder temperature is a maximum of  $+230^\circ\text{C}$  for 10 seconds maximum;  $\geq 1/16"$  (1.59mm) from case.

## Electrical Specification Notes

- See Figure 9.6 for  $V_{BO}$  change vs junction temperature.
- See Figure 9.7 for  $I_{BO}$  vs junction temperature.
- See Figure 9.2 for  $I_H$  vs case temperature.
- See Figure 9.14 for test circuit.
- See Figure 9.1 for more than one full cycle rating.
- $R_{\theta JA}$  for TO-202 Type 23 and Type 41 is  $70^\circ\text{C}/\text{watt}$ .
- $T_C \leq 90^\circ\text{C}$  for TO-92 Sidac and  $T_C \leq 105^\circ\text{C}$  for TO-202 Sidacs.  $T_L \leq 100^\circ\text{C}$  for DO-15X and  $T_L \leq 90^\circ\text{C}$  for DO-214AA.
- See Figure 9.15 for clarification of Sidac operation.
- For best Sidac operation, the load impedance should be near or less than switching resistance.
- Teccor's new, improved series of sidacs is designed to ensure good commutation at higher switching frequencies as required in ignitor circuits for high intensity discharge (HID) lighting. A typical circuit for a metal halide lamp ignitor is shown in the schematic, Figure 9.3. With proper component selection this circuit will produce three pulses for ignition of Osram lamp types such as HQI-T70W, HQI-T150W, and HQI-T250W which require a minimum of three pulses at 4kV magnitude and  $>1\mu\text{s}$  duration each at a minimum repetition rate of 3.3kHz.

| $I_H$                                                                      |     | $V_{TM}$                                       |     |     |     | $I_{TSM}$                                                                 |      | $R_S$                                                                                          | $dV_Q/dt$                                         | $dv/dt$                                                                                       | $di/dt$                                   |
|----------------------------------------------------------------------------|-----|------------------------------------------------|-----|-----|-----|---------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------|
| Dynamic Holding Current<br>50/60Hz Sine Wave<br>$R = 100\Omega$<br>(3) (4) |     | Peak On-State Voltage<br>$I_T = 1 \text{ Amp}$ |     |     |     | Peak One Cycle Surge Current<br>50/60Hz Sine Wave (Non-Repetitive)<br>(5) |      | Switching Resistance<br>$R_S = \frac{(V_{BO} - V_S)}{(I_S - I_{BO})}$<br>50/60Hz Sine Wave (9) | Critical Rate-of-Rise of Turn-off Voltage at 8kHz | Critical Rate-of-Rise of Off-State Voltage at Rated $V_{DRM}$<br>$T_J \leq 100^\circ\text{C}$ | Critical Rate-of-Rise of On-State Current |
| mAmps                                                                      |     | Volts Max                                      |     |     |     | Amps                                                                      |      | k $\Omega$                                                                                     | Volts/ $\mu\text{Sec}$                            | Volts/ $\mu\text{Sec}$                                                                        | Amps/ $\mu\text{Sec}$                     |
| Package                                                                    |     |                                                |     |     |     | 60Hz                                                                      | 50Hz |                                                                                                |                                                   |                                                                                               |                                           |
| TYP                                                                        | MAX | E                                              | G   | F   | S   |                                                                           |      | MIN                                                                                            | MIN                                               | MIN                                                                                           | TYP                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 |     | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |
| 60                                                                         | 150 | 1.5                                            | 1.5 | 3.0 | 1.5 | 20                                                                        | 16.7 | 0.1                                                                                            | 20                                                | 1500                                                                                          | 150                                       |



V-I Characteristics

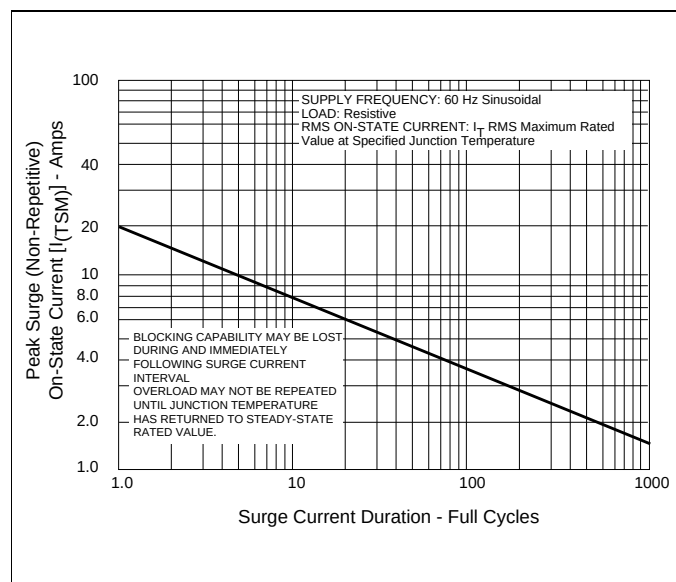


Figure 9.1 Peak Surge Current vs Surge Current Duration

| THERMAL RESISTANCE (STEADY STATE)<br>$R_{\theta JC}$ [ $R_{\theta JA}$ ] $^\circ\text{C/W}$ (TYPICAL) |         |        |         |
|-------------------------------------------------------------------------------------------------------|---------|--------|---------|
|                                                                                                       |         |        |         |
| E                                                                                                     | G       | F (6)  | S       |
| 35 [95]                                                                                               | 18 [75] | 7 [45] | 30 [85] |

# Electrical Specifications

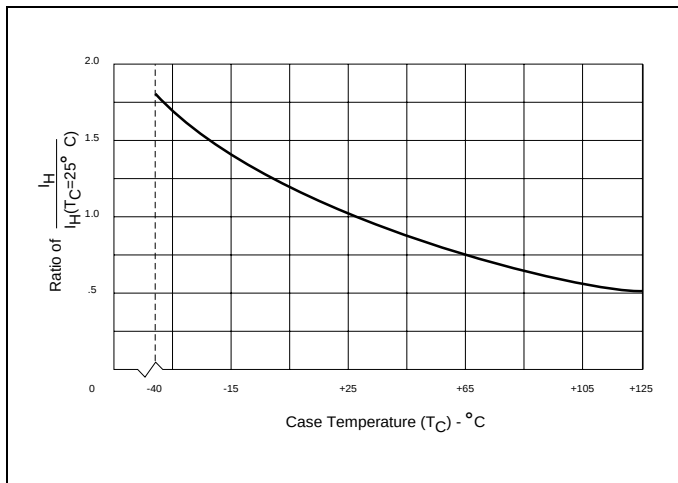


Figure 9.2 Normalized DC Holding Current vs Case/Lead Temperature

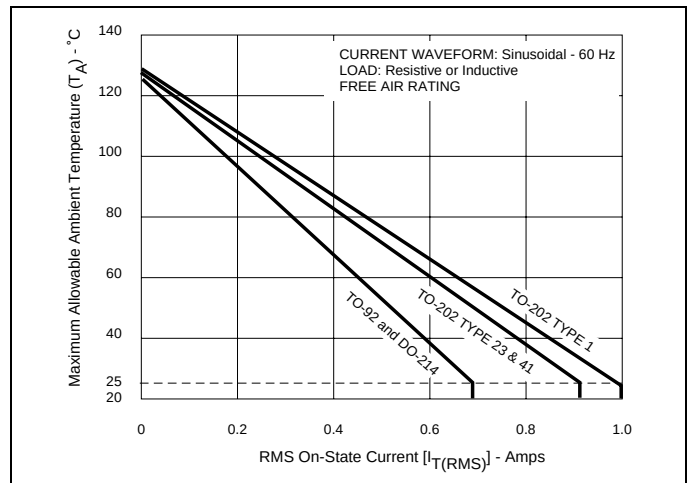


Figure 9.5 Maximum Allowable Ambient Temperature vs On-State Current

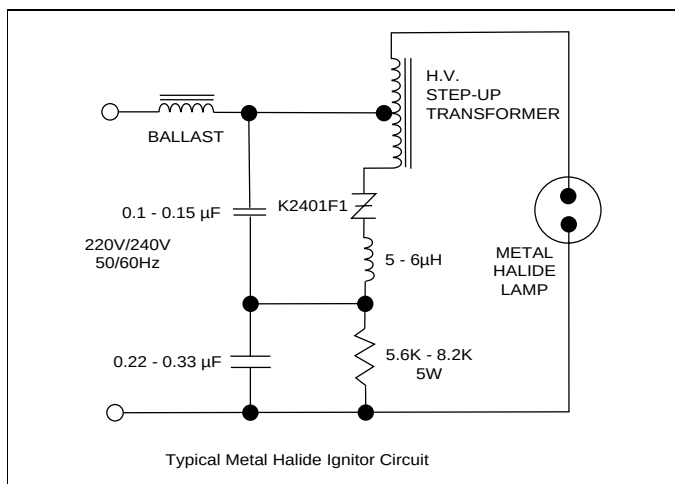


Figure 9.3 Typical Metal Halide Ignitor Circuit

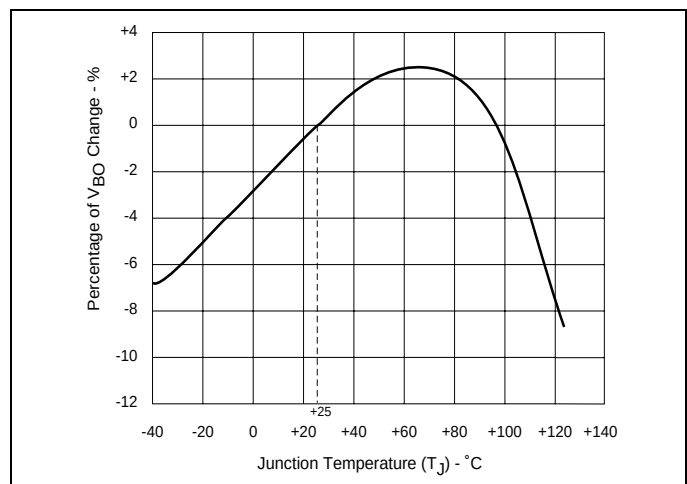


Figure 9.6 Normalized  $V_{BO}$  Change vs Junction Temperature

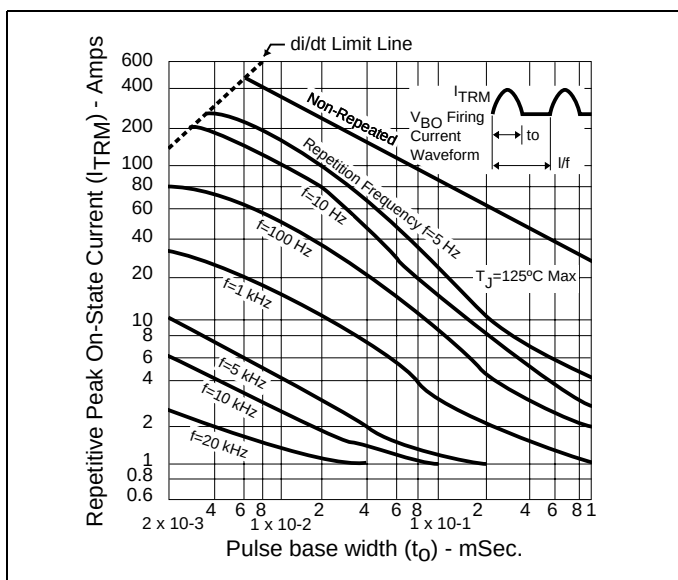


Figure 9.4 Repetitive Peak On-State Current ( $I_{TRM}$ ) vs Pulse Width at Various Frequencies

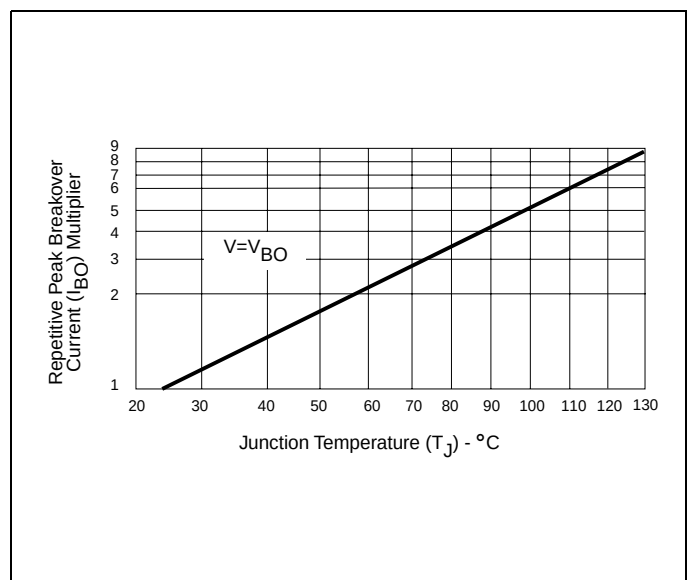


Figure 9.7 Normalized Repetitive Peak Breakover Current vs Junction Temperature

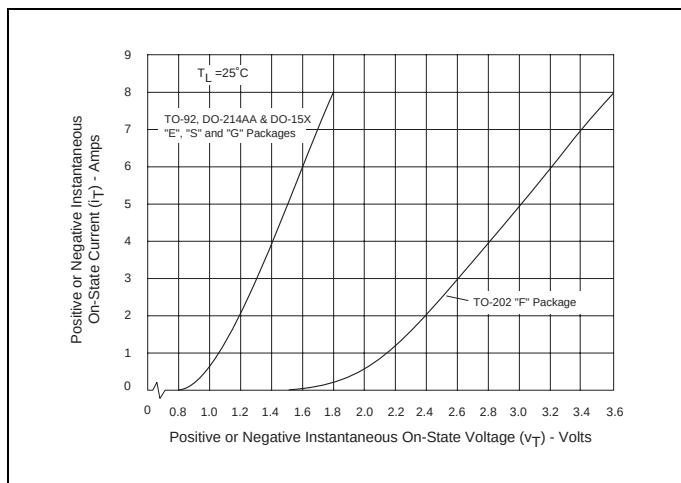


Figure 9.8 On-State Current vs On-State Voltage (Typical)

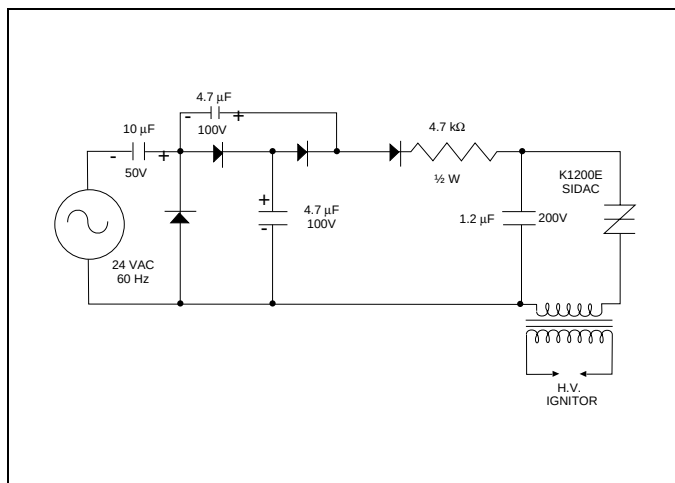


Figure 9.11 Ignitor Circuit (Low Voltage Input)

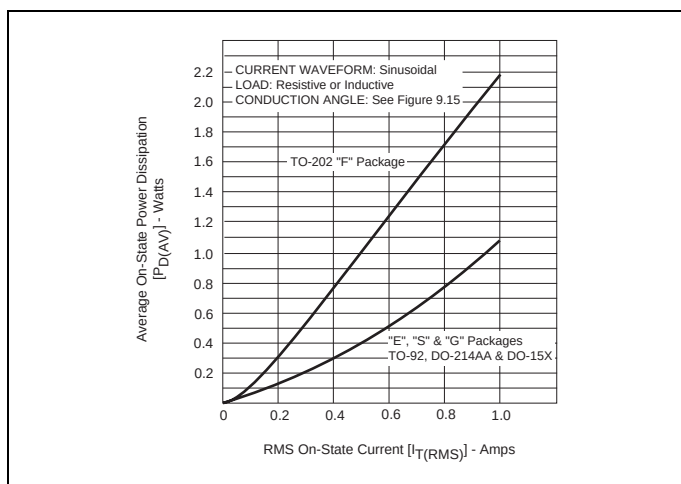


Figure 9.9 Power Dissipation (Typical) vs On-State Current

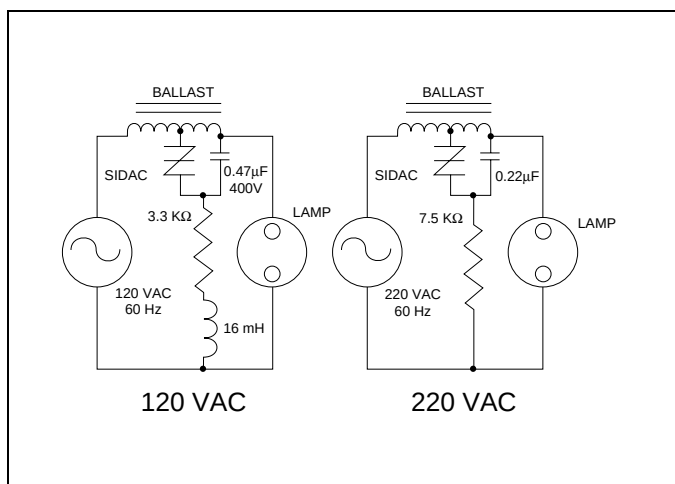


Figure 9.12 Typical High Pressure Sodium Lamp Firing Circuit

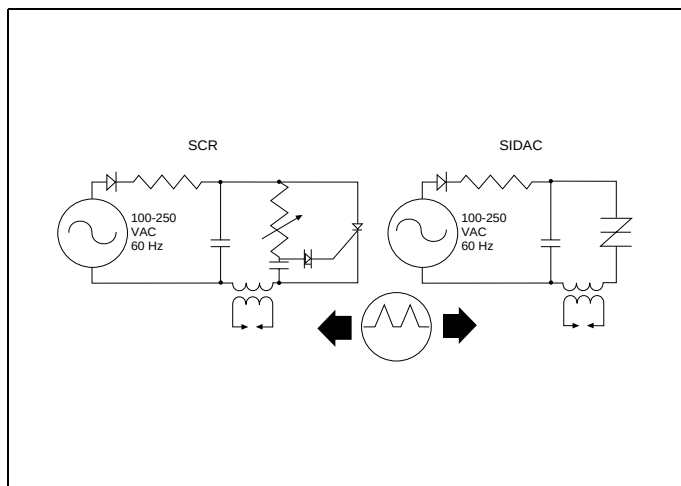


Figure 9.10 Comparison of Sidac vs SCR

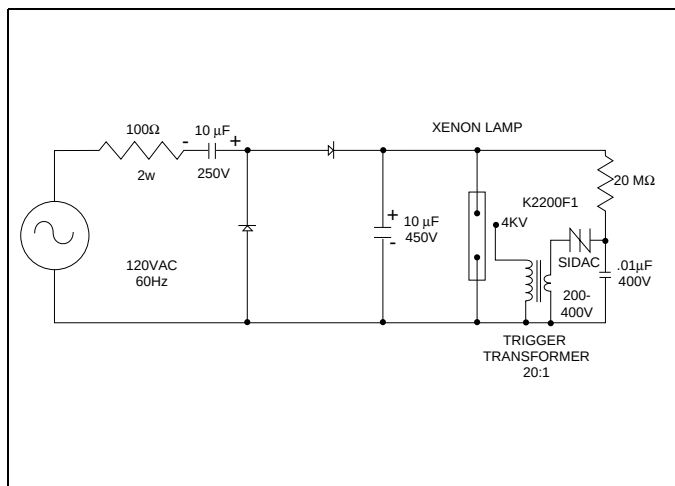


Figure 9.13 Xenon Lamp Flashing Circuit

# Electrical Specifications

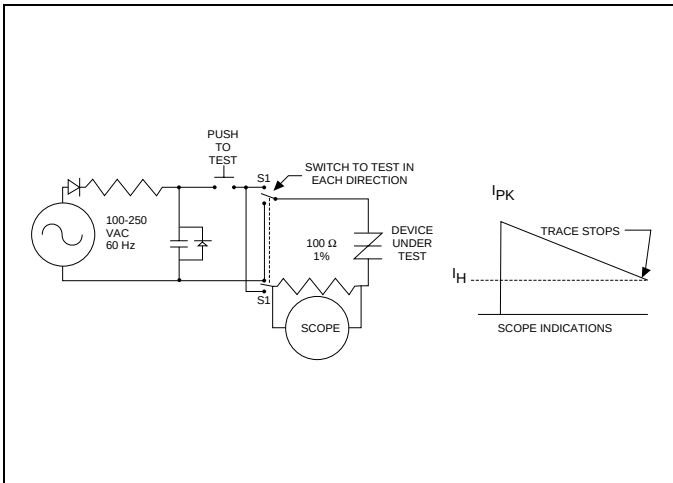


Figure 9.14 Dynamic Holding Current Test Circuit for Sidacs

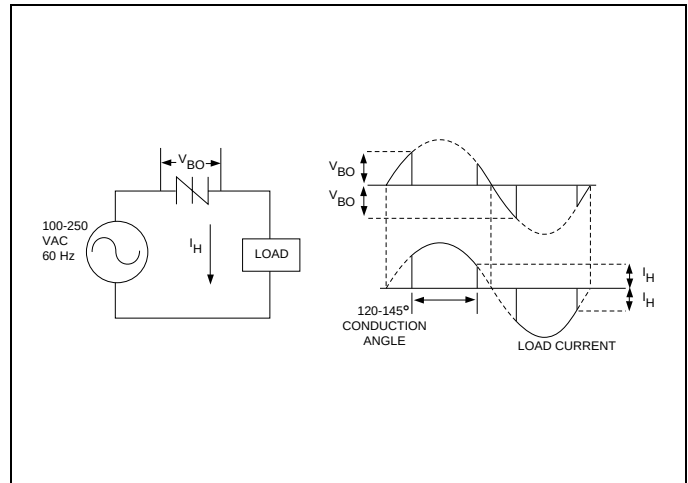


Figure 9.15 Basic Sidac Circuit

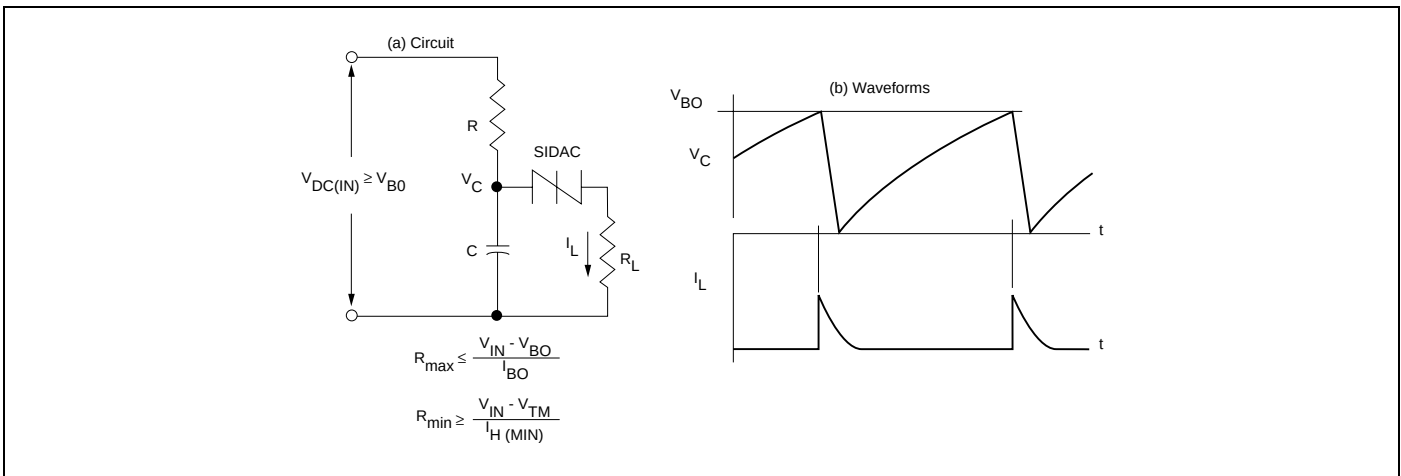


Figure 9.16 Relaxation oscillator Using a Sidac

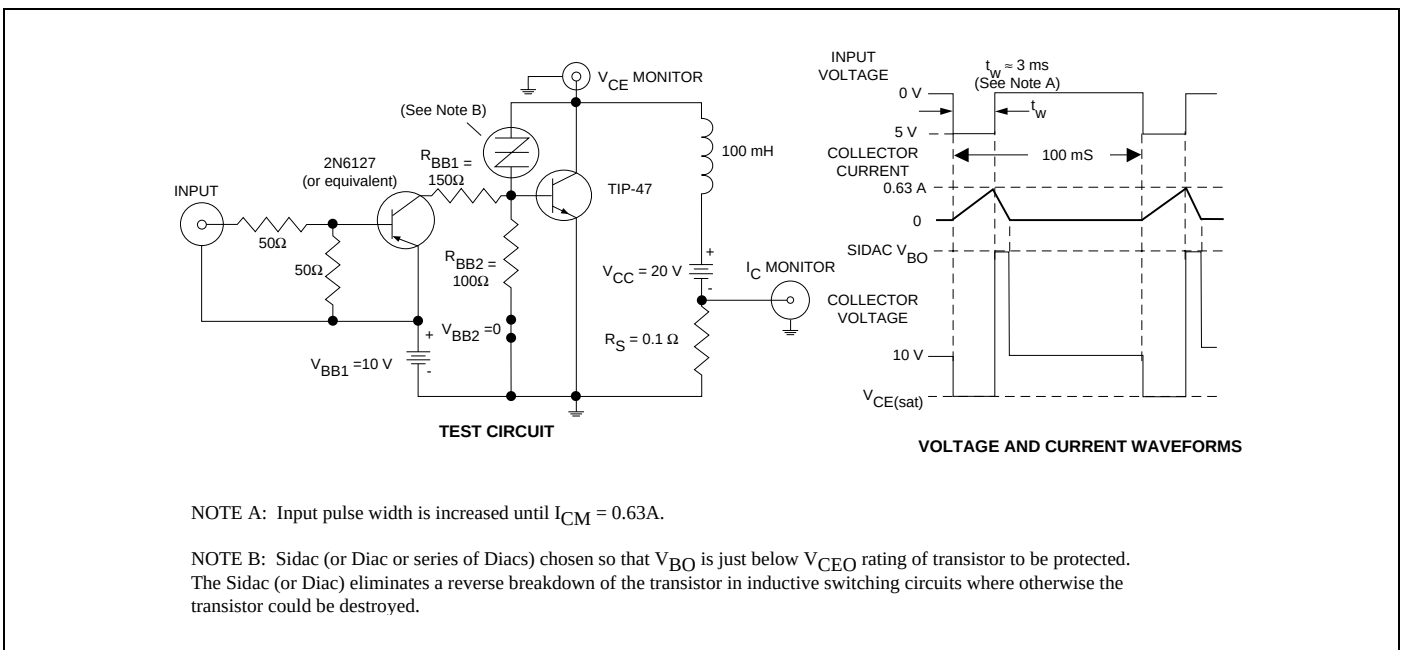


Figure 9.17 Sidac Added to Protect Transistor for Typical Transistor Inductive Load Switching Requirements