

Sidac
(79 V to 330 V)

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 continues until the current is interrupted or drops below the minimum holding current of the device.

Suntac's sidacs feature glass-passivated junctions to ensure a rugged and dependable device capable of withstanding harsh environments.



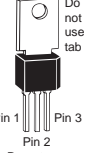

Variations of devices covered in this data sheet are available for custom design applications. Consult the factory for more information.

Applications

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

Features

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

Type	Part No.				$I_{T(RMS)}$	V_{DRM}	V_{BO}		I_{DRM}	I_{BO}	I_H	
					(6) (7) (8)		(1)			(2)	(3) (4)	
	TO-92	DO-15X	TO-202	DO-214	Amps	Volts	Volts		μAmps	μAmps	mAmps	
	See "Package Dimensions" section for variations. (9)				MAX	MIN	MIN	MAX	MAX	MAX	TYP	MAX
	SDB0900E70	SDB0900G		SDB0900S	1	±70	79	97	5	10	60	150
	SDB1050E70	SDB1050G		SDB1050S	1	±90	95	113	5	10	60	150
	SDB1100E70	SDB1100G		SDB1100S	1	±90	104	118	5	10	60	150
	SDB1200E70	SDB1200G		SDB1200S	1	±90	110	125	5	10	60	150
	SDB1300E70	SDB1300G		SDB1300S	1	±90	120	138	5	10	60	150
	SDB1400E70	SDB1400G		SDB1400S	1	±90	130	146	5	10	60	150
	SDB1500E70	SDB1500G		SDB1500S	1	±90	140	170	5	10	60	150
	SDB2000E70	SDB2000G	SDB2000F1	SDB2000S	1	±180	190	215	5	10	60	150
	SDB2200E70	SDB2200G	SDB2200F1	SDB2200S	1	±180	205	230	5	10	60	150
	SDB2400E70	SDB2400G	SDB2400F1	SDB2400S	1	±190	220	250	5	10	60	150
	SDB2500E70	SDB2500G	SDB2500F1	SDB2500S	1	±200	240	280	5	10	60	150
			SDB3000F1		1	±200	270	330	5	10	60	150

Specific Test Conditions

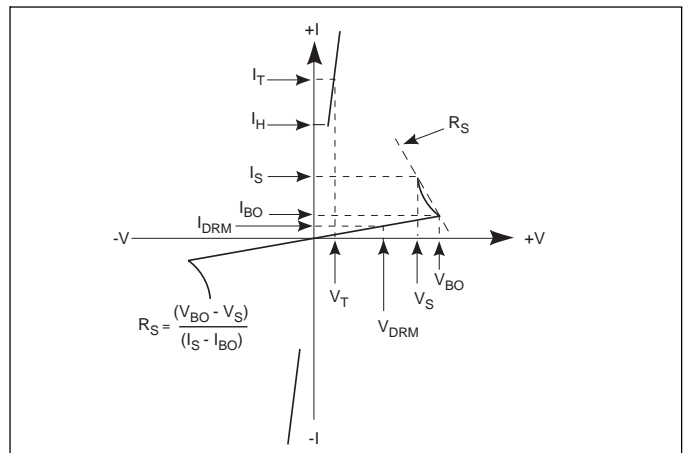
- di/dt — Critical rate-of-rise of on-state current
- dv/dt — Critical rate-of-rise of off-state voltage at rated V_{DRM} ; $T_J \leq 100\text{ }^\circ\text{C}$
- I_{BO} — Breakover current 50/60 Hz sine wave
- I_{DRM} — Repetitive peak off-state current 50/60 Hz sine wave; $V = V_{DRM}$
- I_H — Dynamic holding current 50/60 Hz sine wave; $R = 100\ \Omega$
- $I_{T(RMS)}$ — On-state RMS current $T_J \leq 125\text{ }^\circ\text{C}$ 50/60 Hz sine wave
- I_{TSM} — Peak one-cycle surge current 50/60 Hz sine wave (non-repetitive)
- R_S — Switching resistance $R_S = \frac{(V_{BO} - V_S)}{(I_S - I_{BO})}$ 50/60 Hz sine wave
- V_{BO} — Breakover voltage 50/60 Hz sine wave
- V_{DRM} — Repetitive peak off-state voltage
- V_{TM} — Peak on-state voltage; $I_T = 1\text{ A}$

General Notes

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

Electrical Specification Notes





- See 4 for V_{BO} change versus junction temperature.
- See 4 for I_{BO} versus junction temperature.
- See 3 for I_H versus case temperature.
- See 5 for test circuit.
- See 3 for more than one full cycle rating.
- $T_C \leq 90\text{ }^\circ\text{C}$ for TO-92 Sidac
 $T_C \leq 105\text{ }^\circ\text{C}$ for TO-202 Sidacs
 $T_L \leq 100\text{ }^\circ\text{C}$ for DO-15X
 $T_L \leq 90\text{ }^\circ\text{C}$ for DO-214
- See 5 for clarification of sidac operation.
- For best sidac operation, the load impedance should be near or less than switching resistance.
- See package outlines for lead form configurations. When ordering special lead forming, add type number as suffix to part number.
- Do not use electrically connected mounting tab or center lead.



V-I Characteristics

LK

V_{TM}				I_{TSM}		R_S	dv/dt	di/dt
Volts MAX				Amps				
Package				60 Hz	50 Hz	k Ω	Volts/ μ Sec	Amps/ μ Sec
E	G	F	S			MIN	MIN	TYP
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5		1.5	20	16.7	0.1	1500	150
1.5	1.5	3	1.5	20	16.7	0.1	1500	150
1.5	1.5	3	1.5	20	16.7	0.1	1500	150
1.5	1.5	3	1.5	20	16.7	0.1	1500	150
1.5	1.5	3	1.5	20	16.7	0.1	1500	150
		3		20	16.7	0.1	1500	150

Thermal Resistance (Steady State) $R_{\theta JC} [R_{\theta JA}] \text{ } ^\circ\text{C/W (TYPICAL) } ^*$			
E Package	G Package	F Package	S Package
			
35 [95]	18 [75]	7 [45] **	30 *** [85]

* See Electrical Specification Note (6).
 ** $R_{\theta JA}$ for TO-202 Type 23 and Type 41 is 70 $^\circ\text{C/Watt}$.
 *** Mounted on 1 cm² copper foil surface; two-ounce copper foil

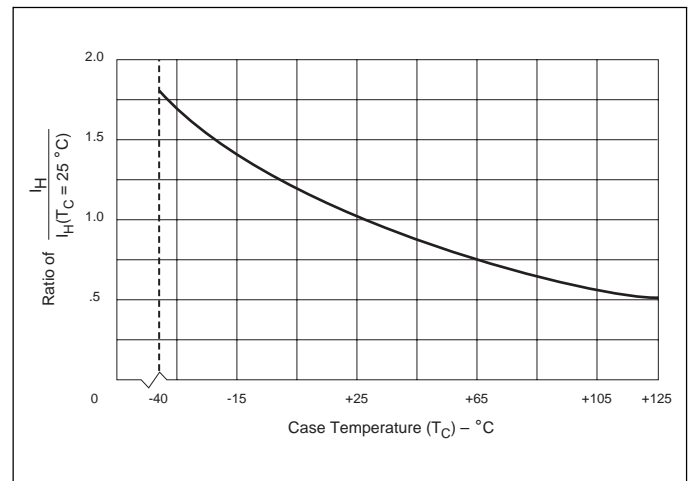


Figure E9.2 Normalized DC Holding Current versus Case/Lead Temperature

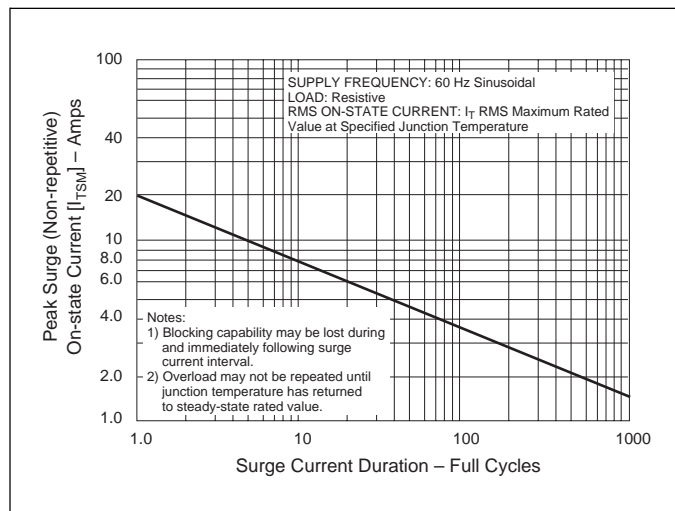


Figure E9.1 Peak Surge Current versus Surge Current Duration

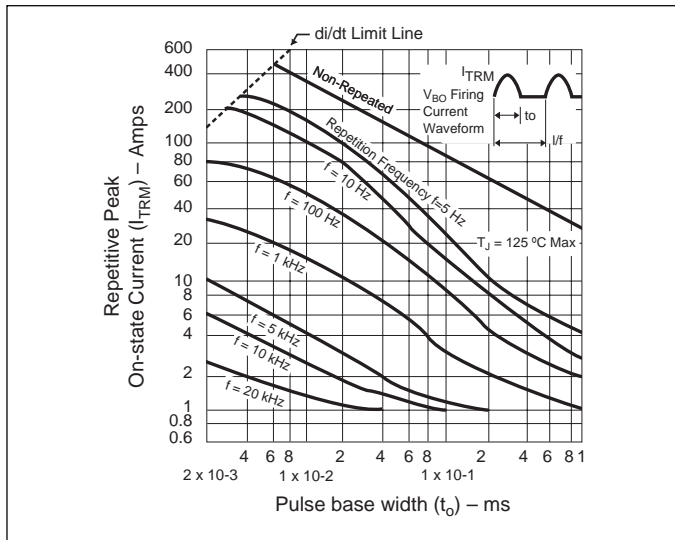


Figure E9.3 Repetitive Peak On-state Current (I_{TRM}) versus Pulse Width at Various Frequencies

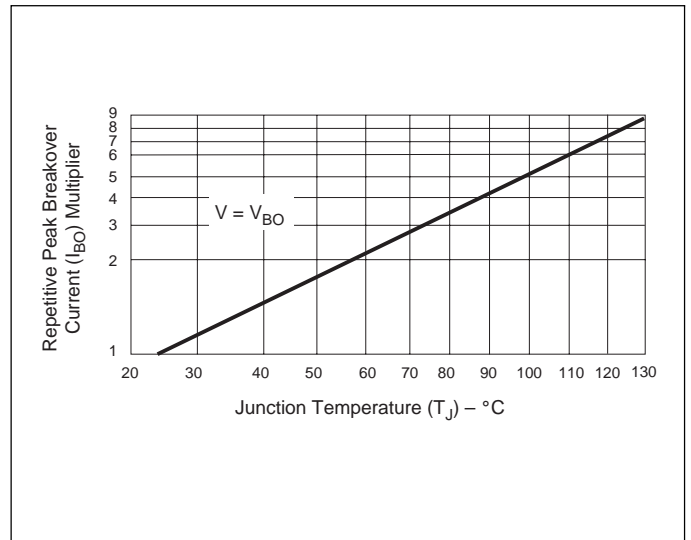


Figure E9.6 Normalized Repetitive Peak Breakover Current versus Junction Temperature

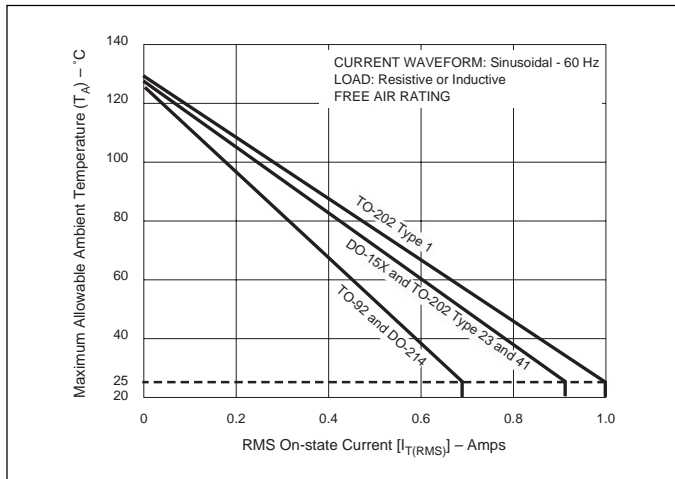


Figure E9.4 Maximum Allowable Ambient Temperature versus On-state Current

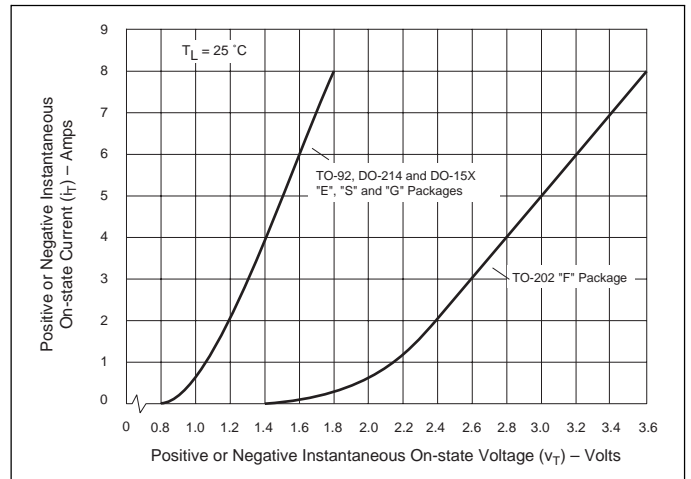


Figure E9.7 On-state Current versus On-state Voltage (Typical)

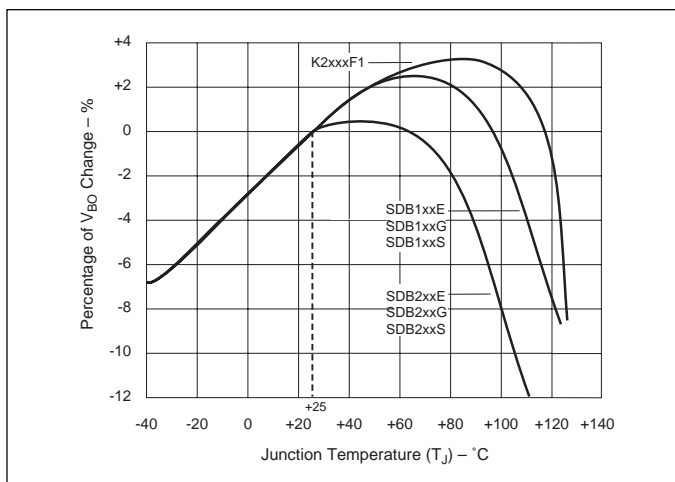


Figure E9.5 Normalized V_{BO} Change versus Junction Temperature

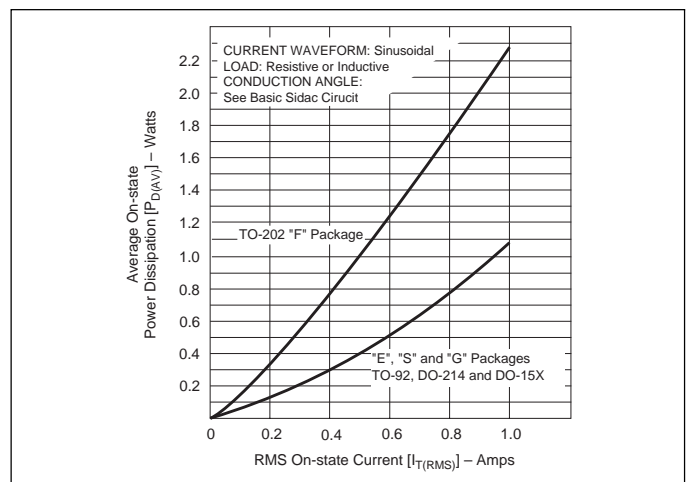


Figure E9.8 Power Dissipation (Typical) versus On-state Current [Refer to 5 for Basic Sidac Circuit]

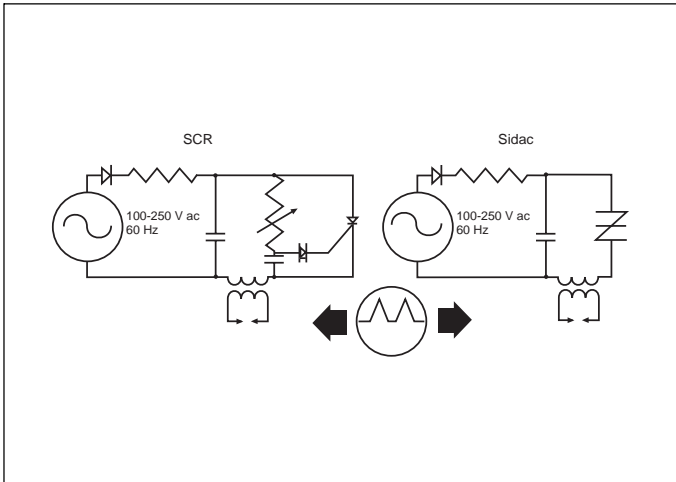


Figure E9.9 Comparison of Sidac versus SCR for Gas Ignitor Circuit

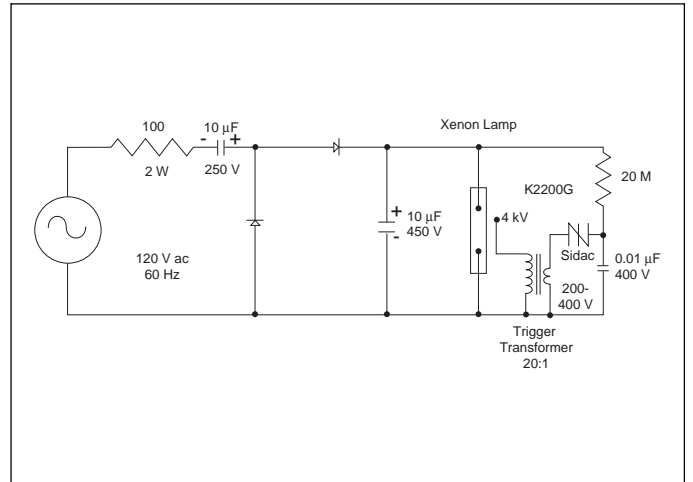


Figure E9.12 Xenon Lamp Flashing Circuit

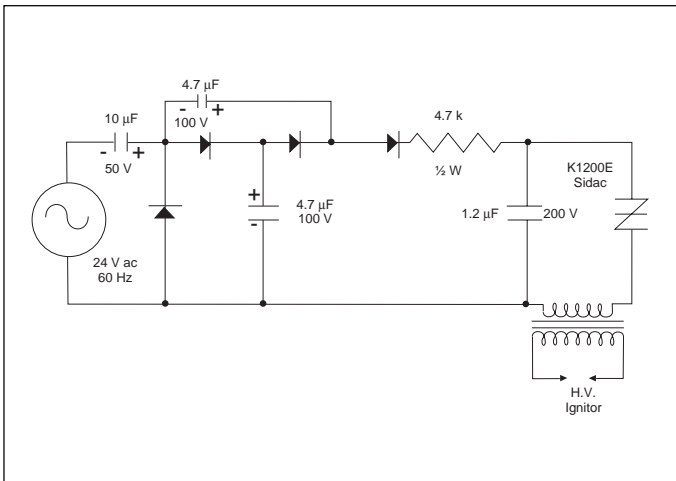


Figure E9.10 Circuit (Low Voltage Input) for Gas Ignition

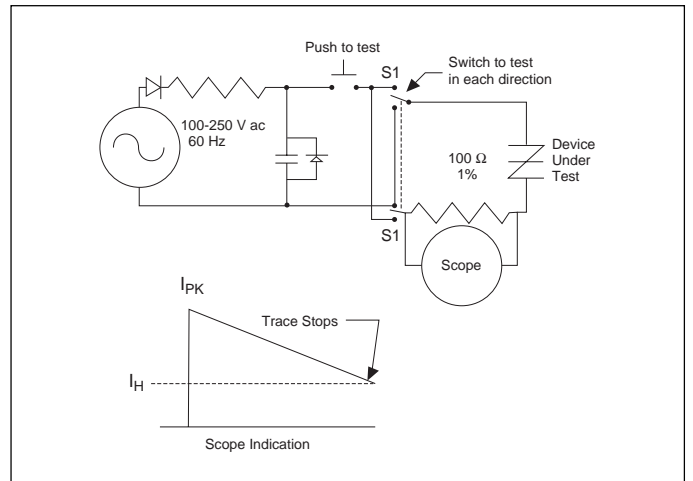


Figure E9.13 Dynamic Holding Current Test Circuit for Sidacs

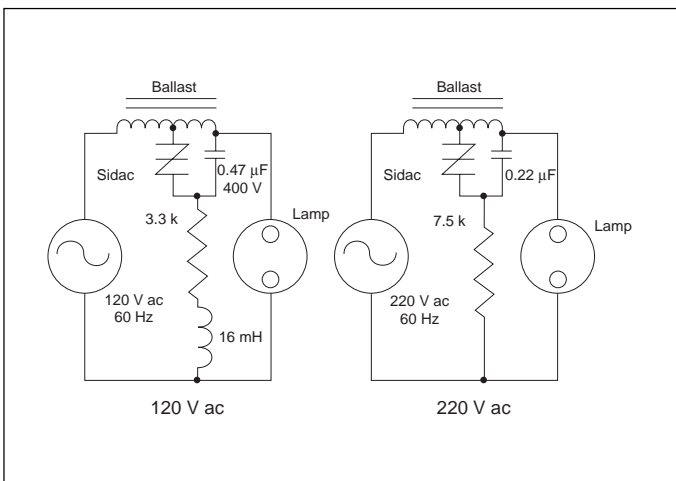


Figure E9.11 Typical High Pressure Sodium Lamp Firing Circuit

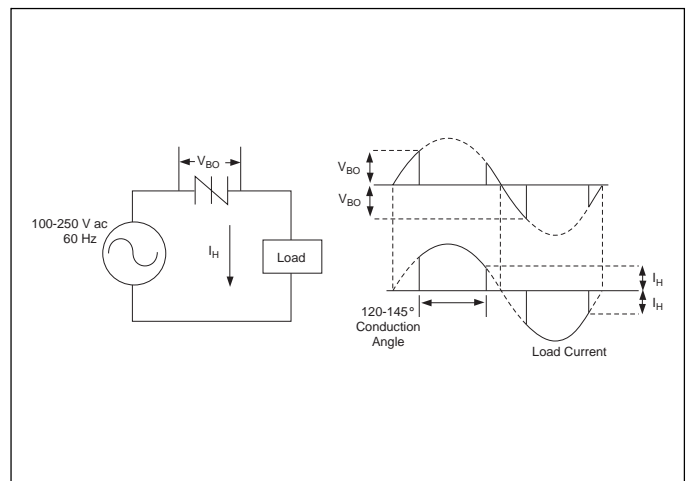


Figure E9.14 Basic Sidac Circuit

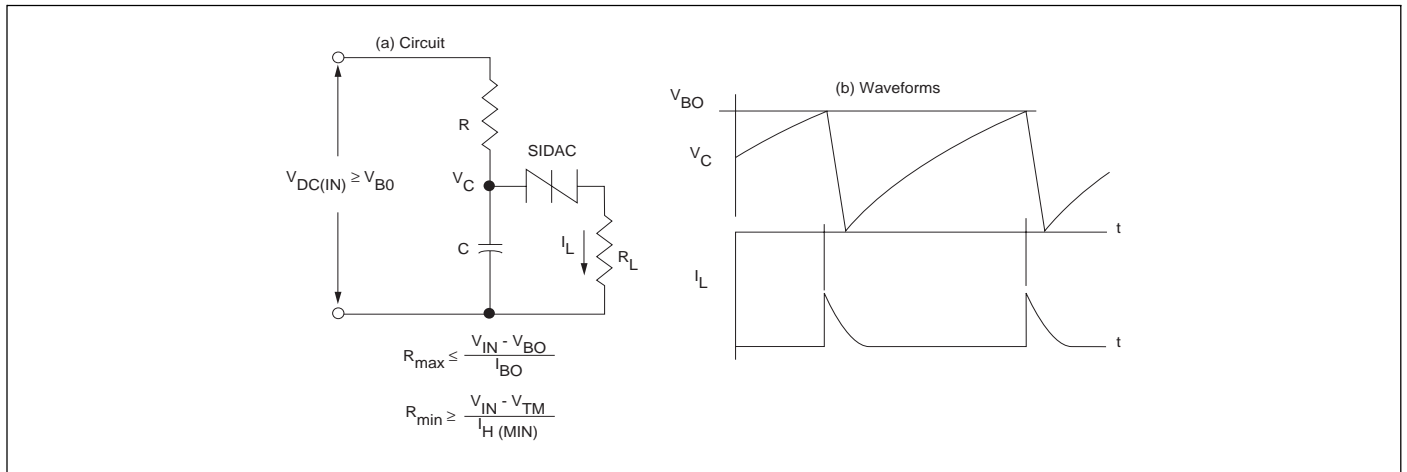
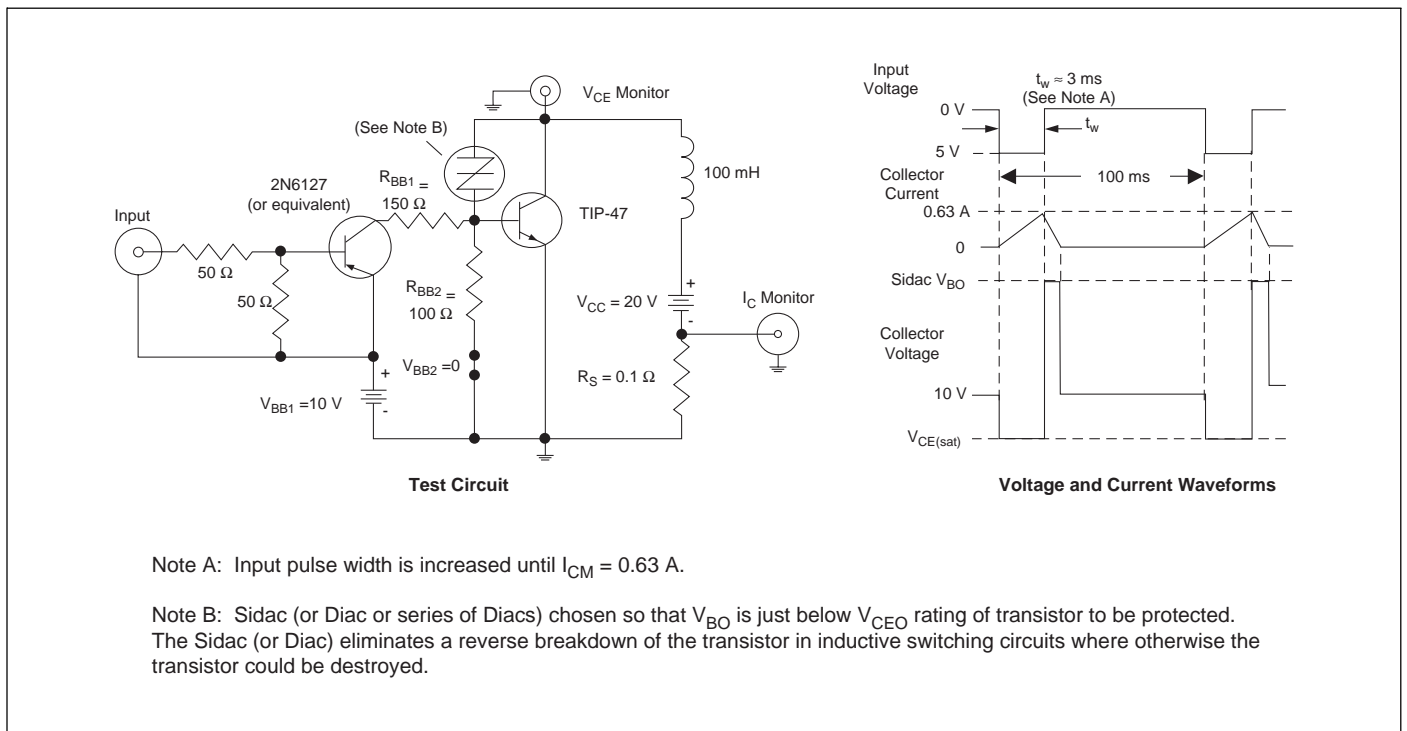


Figure E9.15 Relaxation Oscillator Using a Sidac



Note A: Input pulse width is increased until I_{CM} = 0.63 A.

Note B: Sidac (or Diac or series of Diacs) chosen so that V_{BO} is just below V_{CEO} rating of transistor to be protected. The Sidac (or Diac) eliminates a reverse breakdown of the transistor in inductive switching circuits where otherwise the transistor could be destroyed.

Figure E9.16 Sidac Added to Protect Transistor for Typical Transistor Inductive Load Switching Requirements