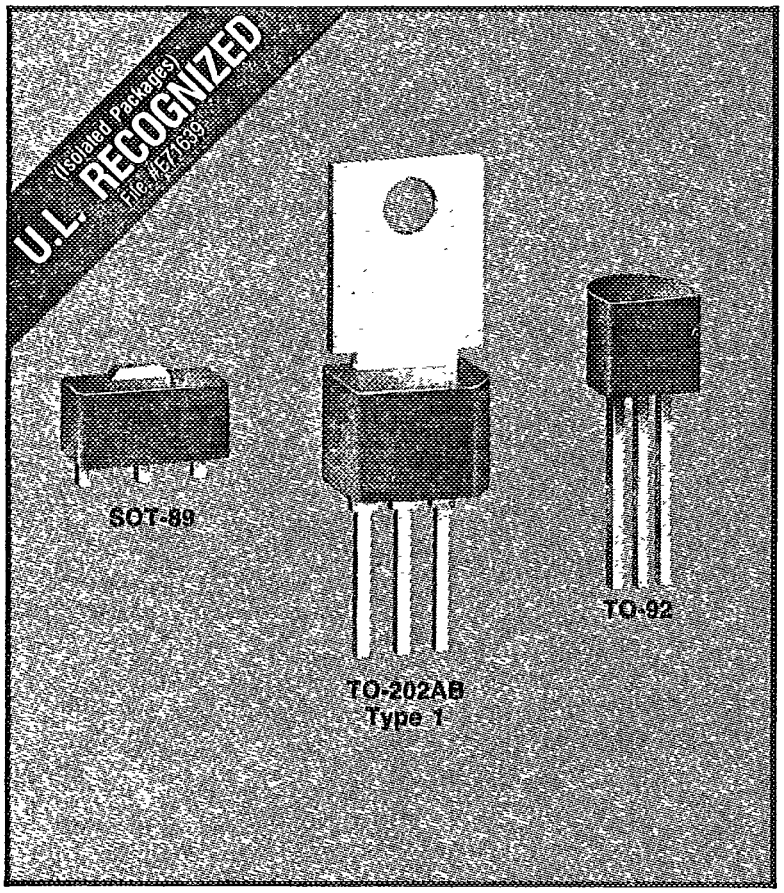
T-25-05



TECCOR ELECTRONICS, INC.
1801 HURD DRIVE
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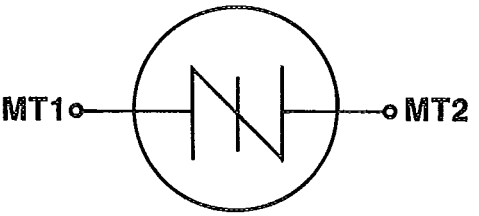


SIDAC (95-330 VOLTS)

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's low voltage Sidacs (95-170 Volts) are available in either the TO-92 package, or the surface mount SOT-89 package. Teccor's high voltage Sidacs (190-330 Volts) are assembled in the TO-202AB package for greater power handling capability.

Teccor's Sidacs feature glass passivated junctions to insure 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 factory for further information.

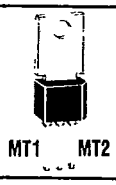
Applications

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

Features

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

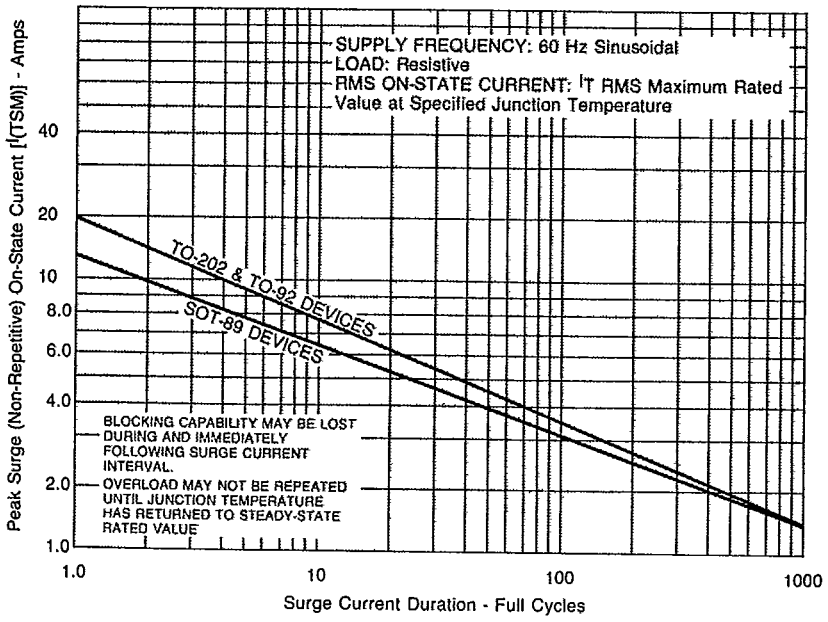
SIDACs 95-330 VOLTS

PACKAGE TYPE	PART NUMBER	I_T (RMS)	V_{DRM}	V_{BO}		I_{DRM}	I_{BO}
		On-State RMS Current $T_J \leq 110°C$ 60Hz Sine Wave (7) (8)	Repetitive Peak Off-State Voltage	Breakover Voltage 60Hz Sine Wave (1) Between MT1 & MT2		Repetitive Peak Off-State Current 60Hz Sine Wave V = V_{DRM} (2)	Breakover Current 60Hz Sine Wave
		Amps	Volts	Volts		μAmps	μAmps
FOR PACKAGE VARIATIONS & DIMENSIONAL OUTLINES SEE PAGE 81		MAXIMUM	MINIMUM	MIN	MAX	MAXIMUM	MAXIMUM
SOT-89 (Non-Isolated) 	K1050U	0.9	±90	95	113	10	200
	K1100U	0.9	±90	104	118	10	200
	K1200U	0.9	±90	110	125	10	200
	K1300U	0.9	±90	120	138	10	200
	K1400U	0.9	±90	130	146	10	200
	K1500U	0.9	±90	140	170	10	200
TO-92 (Isolated) 	K1050E	1.0	±90	95	113	10	200
	K1100E	1.0	±90	104	118	10	200
	K1200E	1.0	±90	110	125	10	200
	K1300E	1.0	±90	120	138	10	200
	K1400E	1.0	±90	130	146	10	200
	K1500E	1.0	±90	140	170	10	200
TO-202AB (Non-Isolated) 	K2000F1	1.0	±180	190	215	10	200
	K2200F1	1.0	±180	205	230	10	200
	K2400F1	1.0	±190	220	250	10	200
	K2500F1	1.0	±190	240	280	10	200
	K3000F1	1.0	±190	270	330	10	200

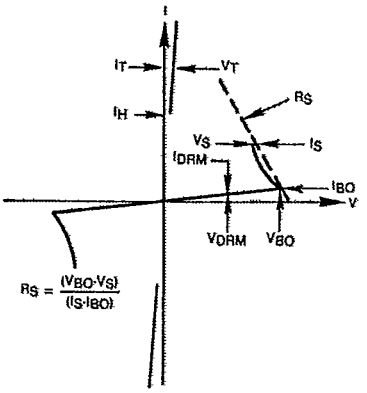
GENERAL NOTES

- All measurements are made at 60Hz 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 temperature (T_C) is measured as shown on the dimensional outline drawings. See "package dimensions" section of catalog.
- Junction temperature range (T_J) is −40°C to +110°C.
- Lead solder temperature is a maximum of +230°C for 10 seconds maximum; ≥ 1/16" from case.

FIGURE 1 — Peak Surge Current vs Surge Current Duration



V-I Characteristics



Electrical Characteristics (T_C = 25°C)

I_H		V_{TM}	I_{TSM}		R_S	dv/dt (c)	dv/dt	di/dt	R θ JC	R θ JA
Dynamic Holding Current 60Hz Sine Wave R = 100Ω (3) (4)		Peak On-State Voltage I_T = 1 Amp	Peak One Cycle Surge Current 60Hz Sine Wave (Non-Repetitive) (5) Amps		Switching Resistance $R_S = \frac{V_{BO} - V_S}{I_S - I_{BO}}$ 60Hz Sine Wave (9)	Critical Rate of Rise of Commutation Voltage @ $T_J \leq$ 110°C	Critical Rate of Rise of Off-State Voltage @ Rated V_{DRM} $T_J \leq$ 110°C	Critical Rate of Rise of On-State Current	Thermal Resistance Junction To Case	Thermal Resistance Junction To Ambient (6)
mAmps		Volts	60Hz	50Hz	kΩ	Volts/μs	Volts/μs	Amps/μs	°C/Watt	°C/Watt
TYP	MAX	MAXIMUM			MINIMUM	MINIMUM	MINIMUM	TYPICAL	MAXIMUM	MAXIMUM
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	12	10	0.1	40	1500	150	30	
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	1.5	20	16.7	0.1	40	1500	150	50	105
60	150	3.0	20	16.7	0.1	40	1500	150	8	45
60	150	3.0	20	16.7	0.1	40	1500	150	8	45
60	150	3.0	20	16.7	0.1	40	1500	150	8	45
60	150	3.0	20	16.7	0.1	40	1500	150	8	45
60	150	3.0	20	16.7	0.1	40	1500	150	8	45

ECTRICAL ISOLATION

ccor's electrically isolated TO-92 Sidacs will withstand a high potential test 1600 VAC RMS from leds to case over the operating temperature range.

NOTES TO ELECTRICAL SPECIFICATIONS

(1) See Figure 5 for V_{BO} change vs junction temperature.
(2) See Figure 6 for I_{DRM} vs junction temperatue.
(3) See Figure 2 for I_H vs case temperature.
(4) See Figure 7 for test circuit.
(5) See Figure 1 for more than one full cycle rating.
(6) R θ JA for TO-202 Type 23 & Type 41 is 70°C/Watt.
(7) $T_C \leq$ 80°C for TO-92 Sidacs, $T_C \leq$ 90°C for SOT-89 Sidacs, and $T_C \leq$ 100°C for TO-202 Sidacs.
(8) See Figure 8 for clarification of Sidac operation.
(9) For best Sidac operation, the load impedance should be near or less than switching resistance.

FIGURE 2 — Normalized DC Holding Current vs Case Temperature

SIDACs 95-330 VOLTS Characteristics (Cont'd)

FIGURE 3 — Repetitive Peak On-State Current (I_{TRM}) vs Pulse Width @ Various Frequencies

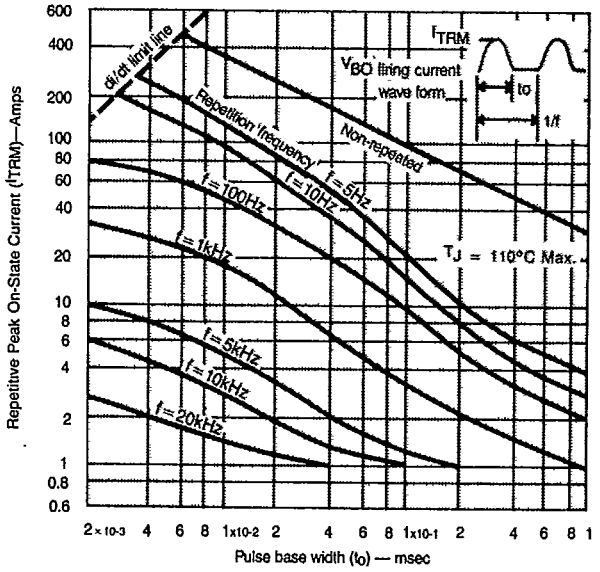


FIGURE 4 — Maximum Allowable Ambient Temperature vs On-State Current

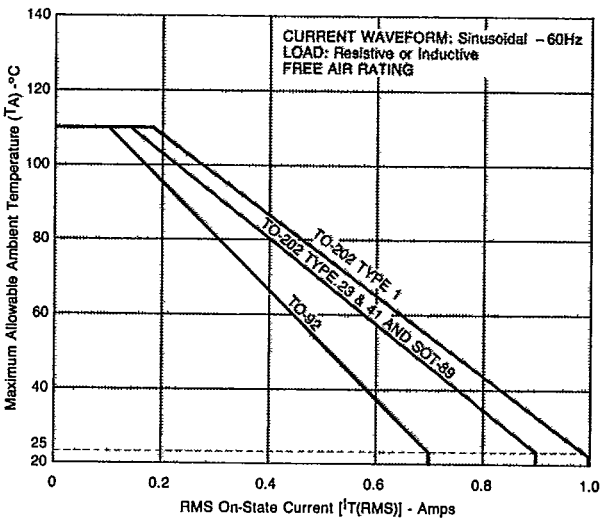


FIGURE 5 — Normalized V_{BO} Change vs Junction Temperature

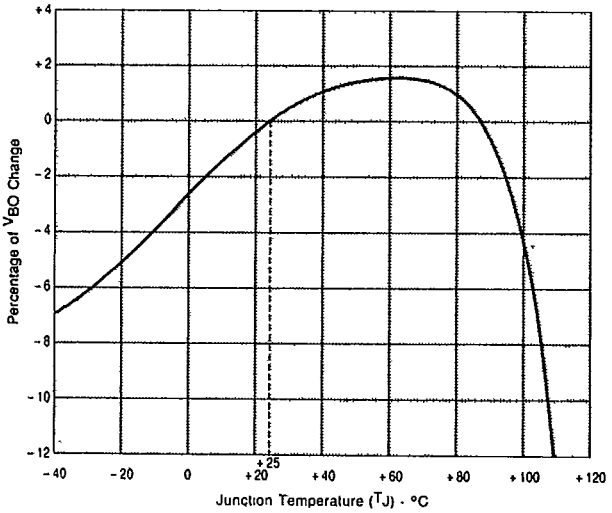
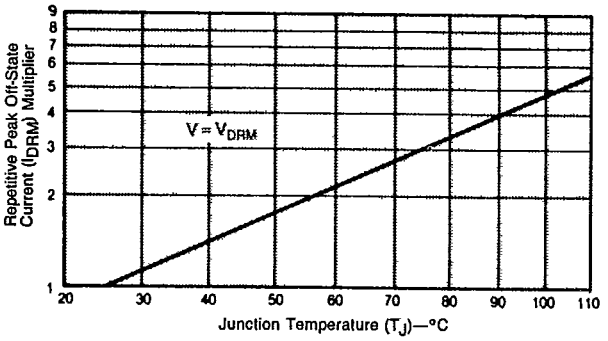


FIGURE 6 — Normalized Repetitive Peak Off-State Current vs Junction Temperature



SIDACs 95-330 VOLTS Circuit Information

FIGURE 7 —

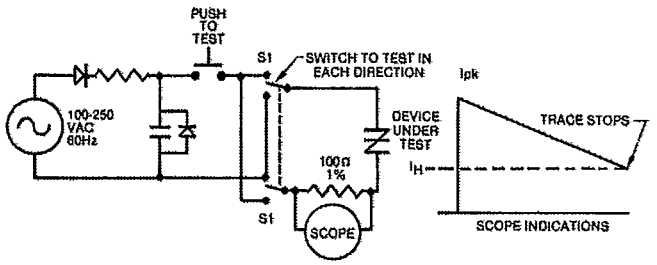


FIGURE 8 — Basic Sidac Circuit

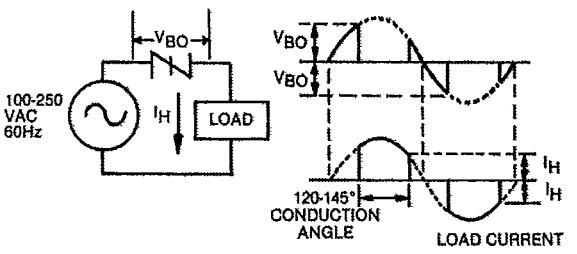


FIGURE 9 — Comparison of Sidac vs SCR

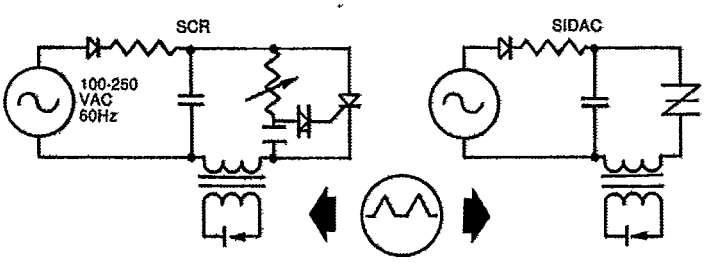


FIGURE 10 — Ignitor Circuit (Low Voltage)

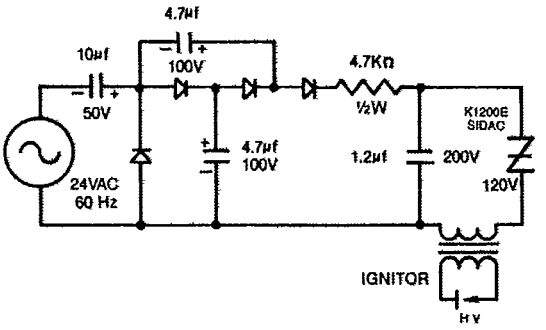
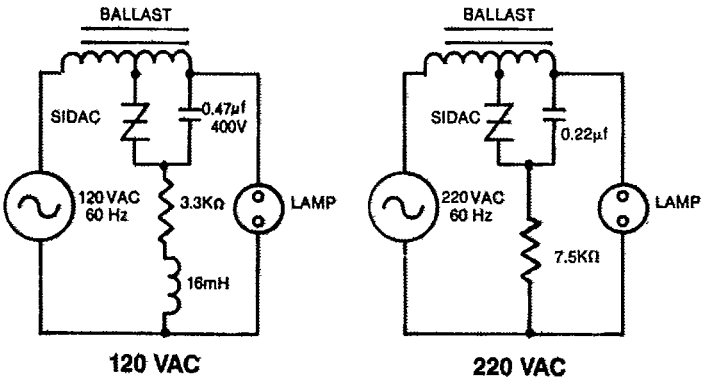


FIGURE 11 — Typical High Pressure Sodium Lamp Firing Circuit



FOR TO-202 PACKAGE TYPES ONLY
(K2000F1 thru K3000F1)

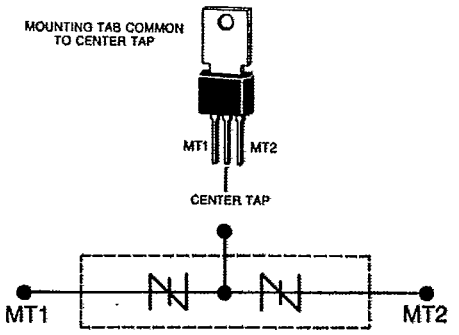
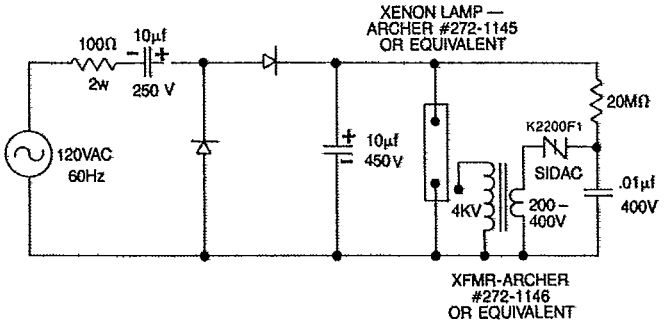
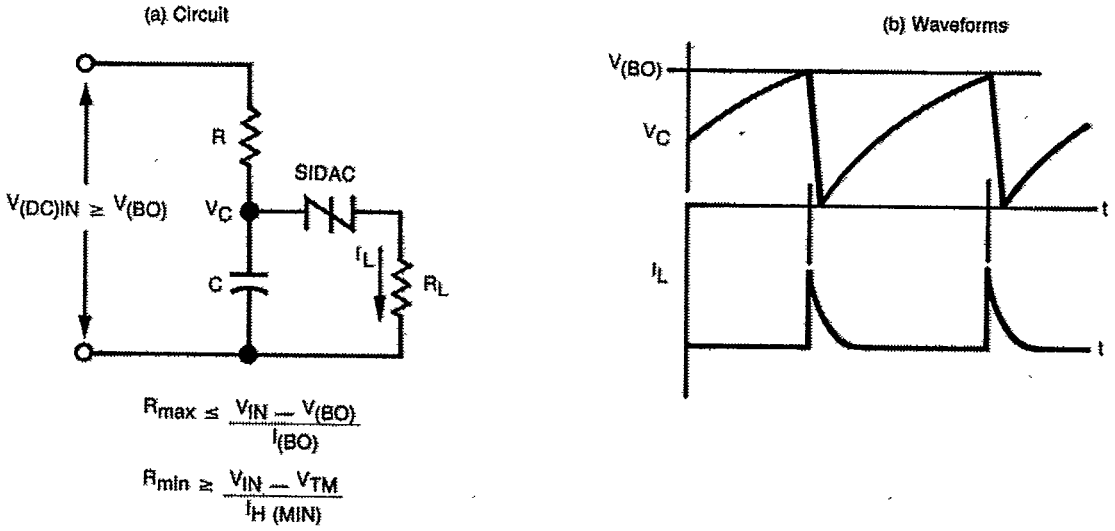


FIGURE 12 — Xenon Lamp Flashing Circuit



SIDACs 95-330 VOLTS Circuit Information

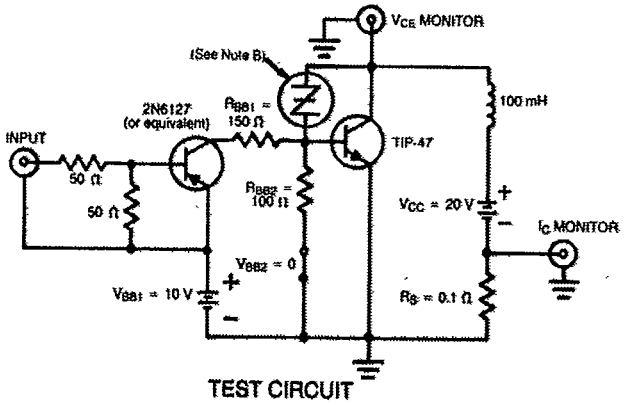
FIGURE 13 — Relaxation Oscillator Using a Sidac

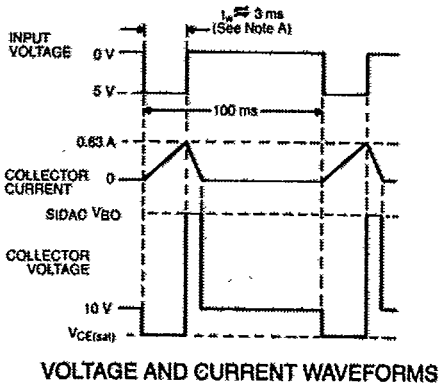


$$R_{max} \leq \frac{V_{IN} - V_{(BO)}}{I_{(BO)}}$$

$$R_{min} \geq \frac{V_{IN} - V_{TM}}{I_{H\,(MIN)}}$$

FIGURE 14 — Sidac Added to Protect Transistor for Typical Transistor Inductive Load Switching Requirements





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

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.