

## Optocoupler with Photo-MOS FET

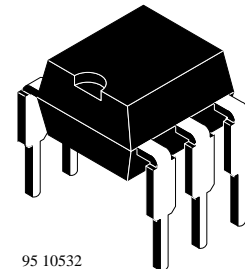
### Description

The TCDF1900/ TCDF1910 consist of two MOS FET transistors connected with a photovoltaic element, optically coupled to a gallium arsenide infrared emitting diode in a 6 lead plastic dual inline packages.

### Applications

Switches for AC and/or DC voltages in

- Telecommunication, Fax modem, Line cards, Public phones, Fax machines
- Bounce-free switching
- General replacement of mechanical device



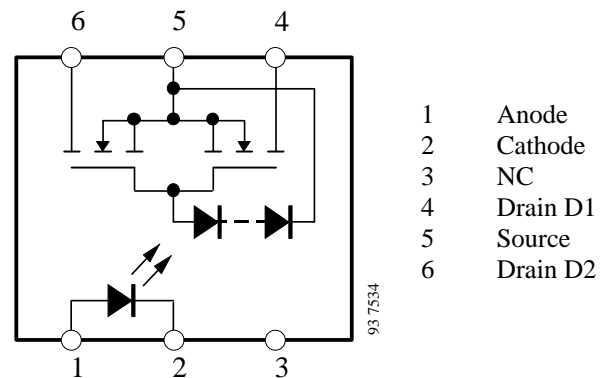
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### Features

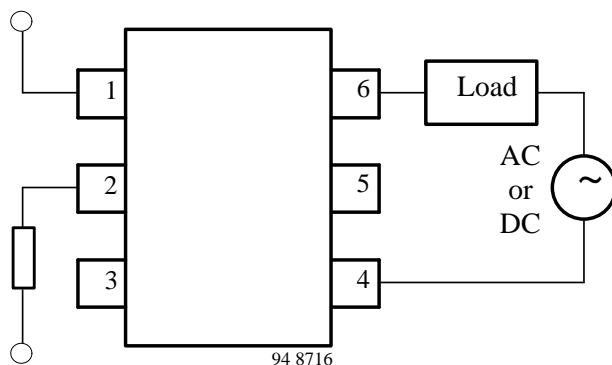
- Peak off state voltage  
TCDF1900:  $V_{OFF} = 400 \text{ V min}$   
TCDF1910:  $V_{OFF} = 250 \text{ V min}$
- Input threshold current  $I_{FT} = 5 \text{ mA max}$
- On state current  
TCDF1900:  $I_{ON} = 125 \text{ mA max}$   
TCDF1910:  $I_{ON} = 200 \text{ mA max}$
- On state resistance  
TCDF1900:  $R_{ON} = 24 \Omega \text{ max}$   
TCDF1910:  $R_{ON} = 12 \Omega \text{ max}$



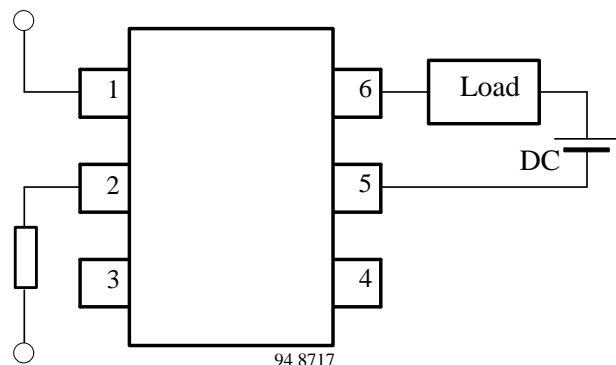
### Pin Connection



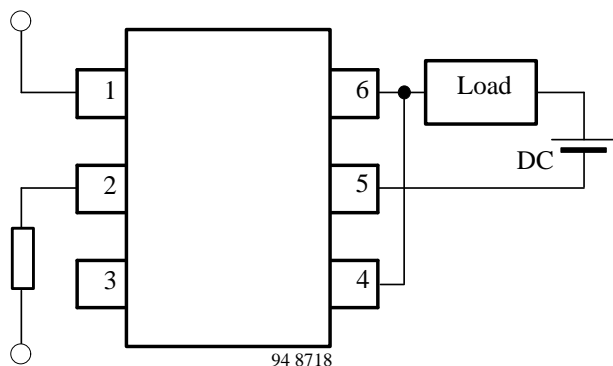
### Connection Table



A connection



B connection



C connection

## Absolute Maximum Ratings

### Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	30	mA
Forward surge current	$t_p \leq 10 \mu s$	$I_{FSM}$	3	A
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_{tot}$	100	mW
Junction temperature		$T_j$	125	$^\circ C$

### Output (Detector)

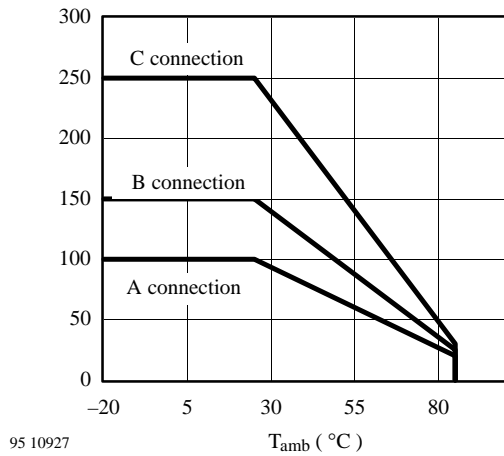
Parameters	Type	Test Conditions	Symbol	Value	Unit
Output off state Terminal voltage	TCDF1900 TCDF1910		$V_{OFF}$	400 250	V
On state current	TCDF1900 TCDF1900 TCDF1900	connection A B C	$I_{ON}$	125 125 250	mA
On state current	TCDF1910 TCDF1910 TCDF1910	connection A B C	$I_{ON}$	200 200 400	mA
On state resistance	TCDF1900 TCDF1900 TCDF1900	connection A B C	$R_{ON}$	24 12 6	$\Omega$
On state resistance	TCDF1910 TCDF1910 TCDF1910	connection A B C	$R_{ON}$	12 6 3	$\Omega$

### Coupler

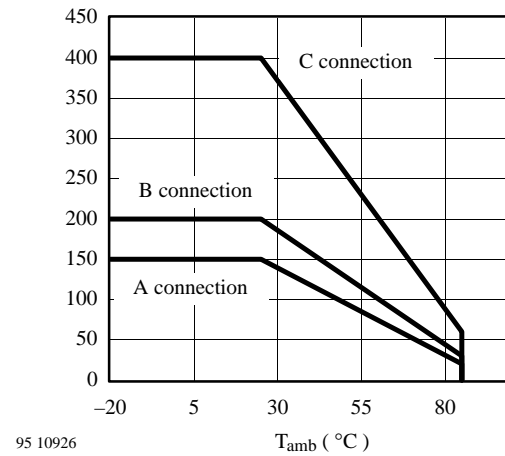
Parameters	Test Conditions	Symbol	Value	Unit
AC isolation test voltage (RMS)		$V_{IO}^{1)}$	3.75	kV
Ambient temperature range		$T_{amb}$	-20 to +85	$^\circ C$
Storage temperature range		$T_{stg}$	-55 to +100	$^\circ C$
Soldering temperature	2 mm from case, $t \leq 10 s$	$T_{sd}$	260	$^\circ C$

1) Related to standard climate 23/50 DIN 50014

## Derating Diagrams



TCDF1900



TCDF1910

## Electrical Characteristics $T_{amb} = 25^{\circ}\text{C}$

### Input (Emitter)

Parameters	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50 \text{ mA}$		$V_F$		1.4	1.7	V
Breakdown voltage	$I_R = 10 \text{ }\mu\text{A}$		$V_{(BR)}$	5			V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		60		pF

### Output (Detector)

Parameters	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Off State current	$V_S = 320 \text{ V}$	TCDF1900	$I_{off}$			1	$\mu\text{A}$
Off State current	$V_S = 200 \text{ V}$	TCDF1910	$I_{off}$			1	$\mu\text{A}$

## Coupler

Parameters	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Input threshold current	$I_{ON} = 100 \text{ mA}$		$I_{FT}$		1	5	mA
On state resistance	$I_{ON} = 125 \text{ mA}, I_{FT} = 10 \text{ mA}$	TCDF1900	$R_{ON}$		15	24	$\Omega$
On state resistance	$I_{ON} = 200 \text{ mA}, I_{FT} = 10 \text{ mA}$	TCDF1910	$R_{ON}$		7	17	$\Omega$
Isolation resistance	$V_{IO} = 500 \text{ V}$		$R_{IO}^{1)}$		$10^{12}$		$\Omega$
AC isolation test voltage (RMS)			$V_{IO}^{1,2)}$	3.75			kV
Coupling capacitance	$f = 1 \text{ MHz}$		$C_k$		0.6		pF

<sup>1)</sup> Related to standard climate 23/50 DIN 50014

<sup>2)</sup> For 100% test:  $t = 2 \text{ s}$ , for sample test :  $t = 1 \text{ min}$

## Switching Characteristics $T_{amb} = 25\text{ }^{\circ}\text{C}$

Type	$R_L = 200\text{ }\Omega$ , see figure 1 and 2									
	$t_d[\mu\text{s}]$	$t_r[\mu\text{s}]$	$t_{on}[\mu\text{s}]$	$t_s[\mu\text{s}]$	$t_f[\mu\text{s}]$	$t_{off}[\mu\text{s}]$	$I_C[\text{mA}]$	$t_{on}[\mu\text{s}]$	$t_{off}[\mu\text{s}]$	$I_F[\text{mA}]$
TCDF1900/ TCDF1910			0.1			0.2				10

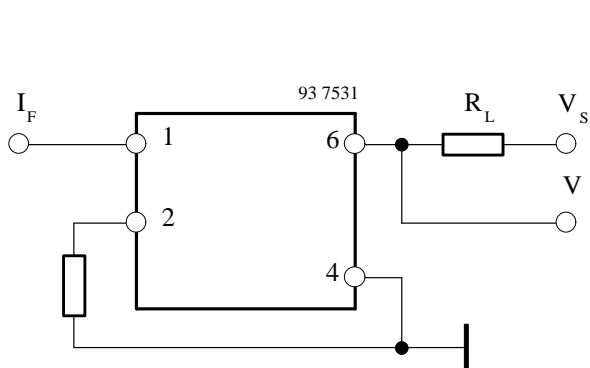


Figure 1. Test circuit

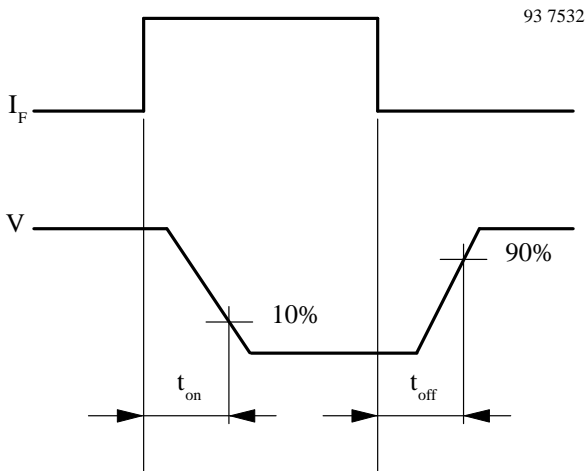
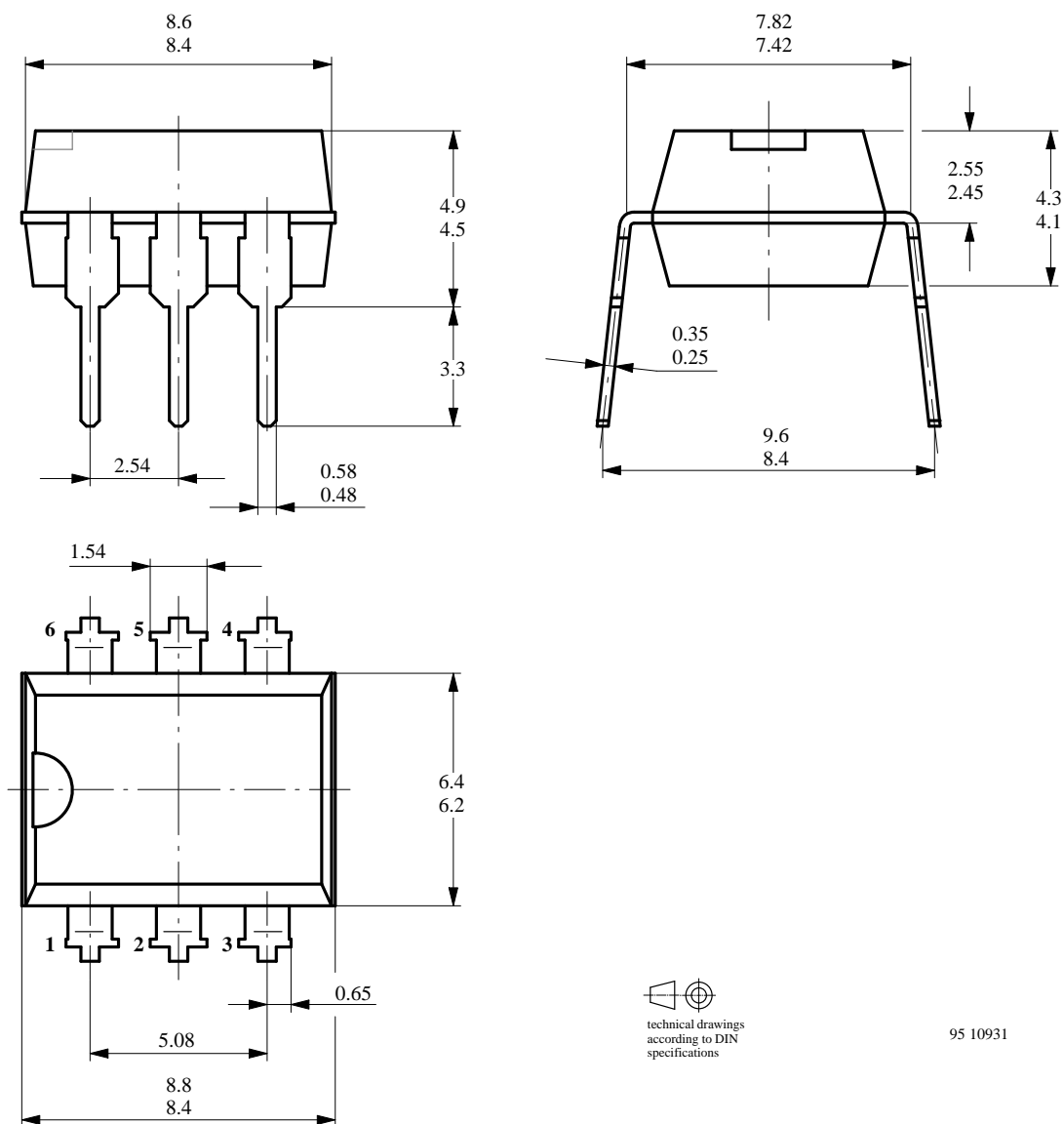


Figure 2. Impulse diagram

### Dimensions in mm



technical drawings  
according to DIN  
specifications

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## Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**TEMIC TELEFUNKEN microelectronic GmbH** semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**TEMIC** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design and may do so without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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