

Optocoupler with Photo-MOS FET

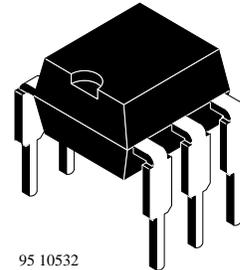
Description

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



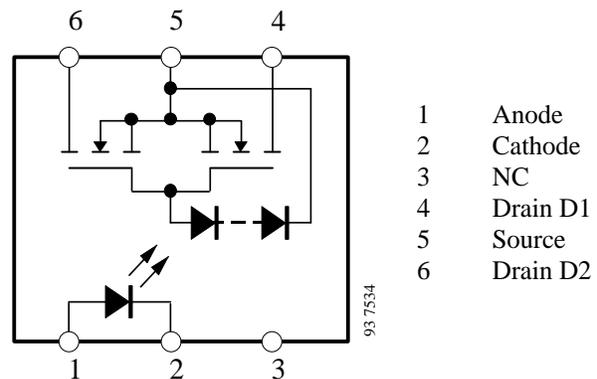
95 10532

Features

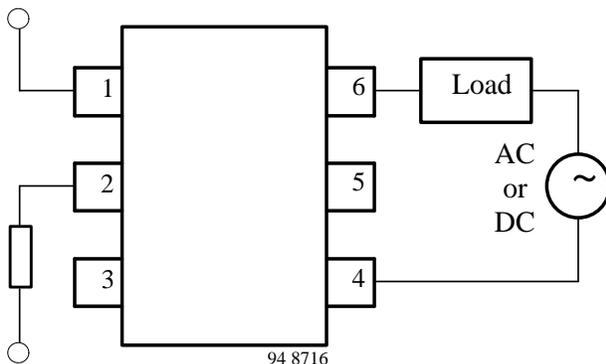
- Peak off state voltage
TCDF1900: $V_{OFF} = 400 \text{ V min}$
TCDF1910: $V_{OFF} = 250 \text{ V min}$
- Input threshold current $I_{FT} = 5 \text{ mA max}$
- On state current
TCDF1900: $I_{ON} = 125 \text{ mA max}$
TCDF1910: $I_{ON} = 200 \text{ mA max}$
- On state resistance
TCDF1900: $R_{ON} = 24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



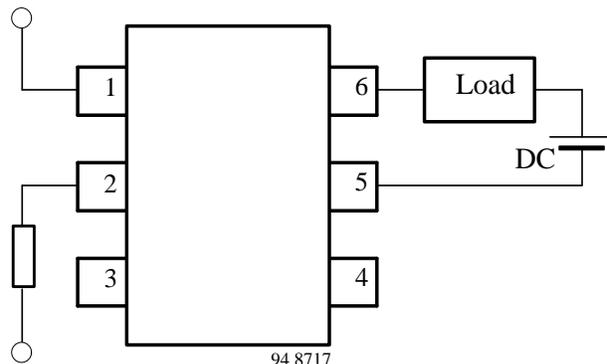
Pin Connection



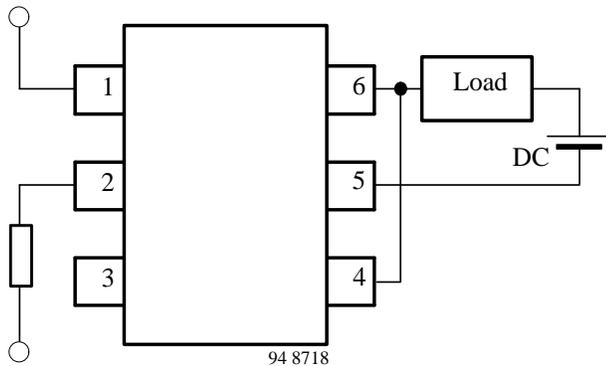
Connection Table



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)

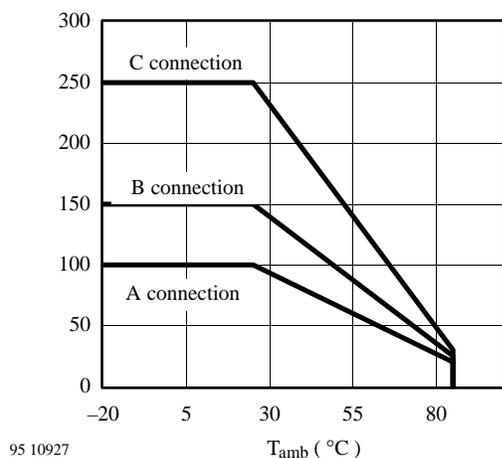
Parameters	Type	Test Conditions	Symbol	Value	Unit
Output off state Terminal voltage	TCDF1900		V_{OFF}	400	V
	TCDF1910			250	
On state current	TCDF1900	connection A	I_{ON}	125	mA
	TCDF1900	B		125	
	TCDF1900	C		250	
On state current	TCDF1910	connection A	I_{ON}	200	mA
	TCDF1910	B		200	
	TCDF1910	C		400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

Coupler

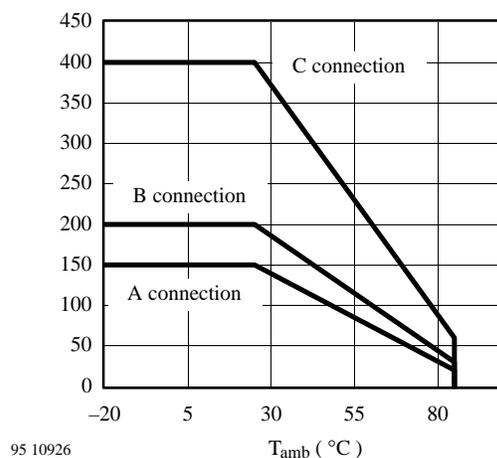
Parameters	Test Conditions	Symbol	Value	Unit
AC isolation test voltage (RMS)		$V_{IO}^{1)}$	3.75	kV
Ambient temperature range		T_{amb}	-20 to +85	$^\circ C$
Storage temperature range		T_{stg}	-55 to +100	$^\circ C$
Soldering temperature	2 mm from case, $t \leq 10 s$	T_{sd}	260	$^\circ C$

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	μA
Off State current	$V_S = 200 \text{ V}$	TCDF1910	I_{off}			1	μA

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	Ω
On state resistance	$I_{ON} = 200 \text{ mA}, I_{FT} = 10 \text{ mA}$	TCDF1910	R_{ON}		7	17	Ω
Isolation resistance	$V_{IO} = 500 \text{ V}$		$R_{IO}^{1)}$		10^{12}		Ω
AC isolation test voltage (RMS)			$V_{IO}^{1,2)}$	3.75			kV
Coupling capacitance	$f = 1 \text{ MHz}$		C_k		0.6		pF

1) Related to standard climate 23/50 DIN 50014

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

TCDF1900/ TCDF1910

TEMIC

TELEFUNKEN Semiconductors

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

Type	$R_L = 200\ \Omega$, 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

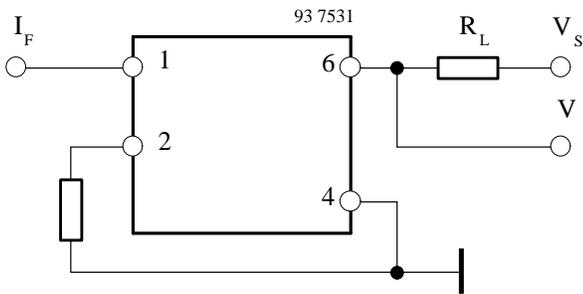


Figure 1. Test circuit

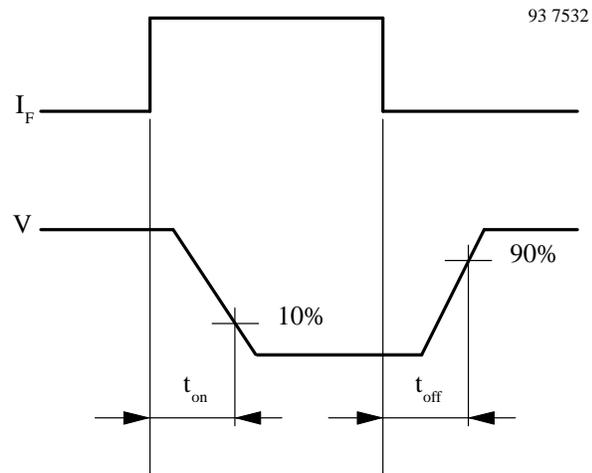
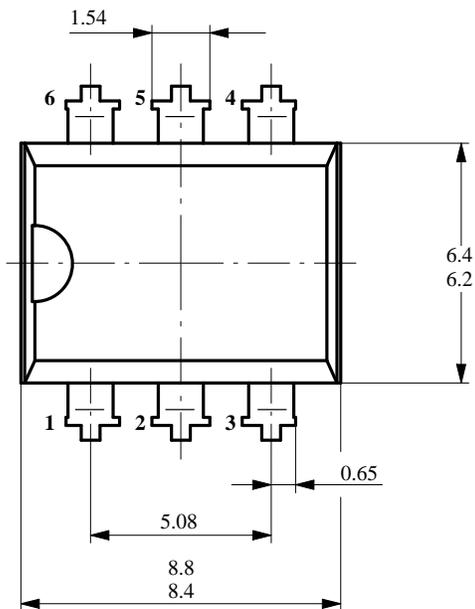
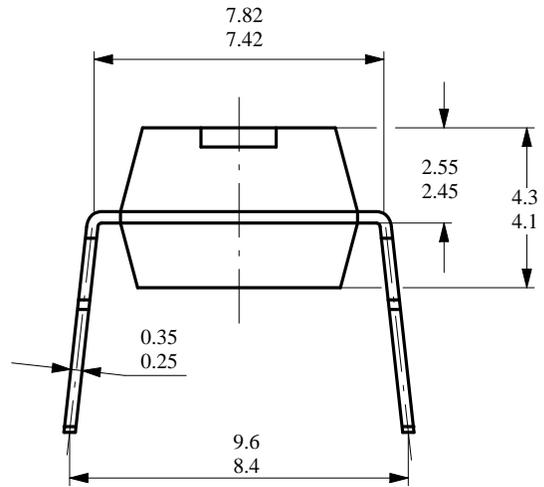
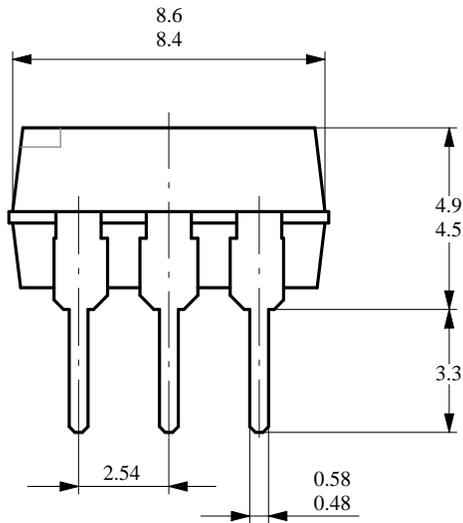


Figure 2. Impulse diagram

Dimensions in mm




technical drawings
according to DIN
specifications

95 10931

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.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423