

TELEFUNKEN electronic  
Creative Technologies

TCSS 111. up to TCSS 421.

T-41-73

### Optoelectronic Interrupter with Schmitt-Trigger Output Logic

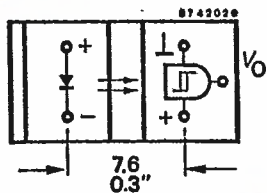
**Construction:** Emitter: GaAs IR Emitting Diode  
Detector: Integrated Optoelectronic Circuit

**Applications:** Contactless optoelectronic switching and monitoring

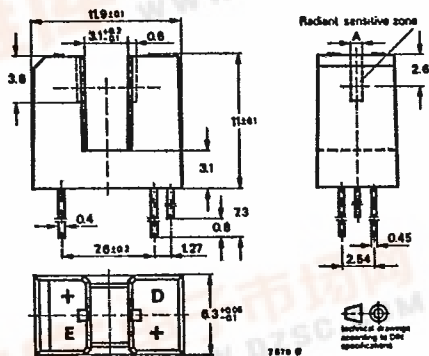
#### Features:

- Output: active "HIGH"
- Buffer- open collector
- TTL compatible
- Small dimensions
- Case plastic polycarbonate- protected against ambient light
- No adjustment
- Four package variations
- Two aperture variations

#### Pin connections



#### Dimensions in mm



For printed board construction:

TCSS 111. with aperture  
1.00 mm (0.04")

TCSS 121. with aperture  
0.50 mm (0.02")

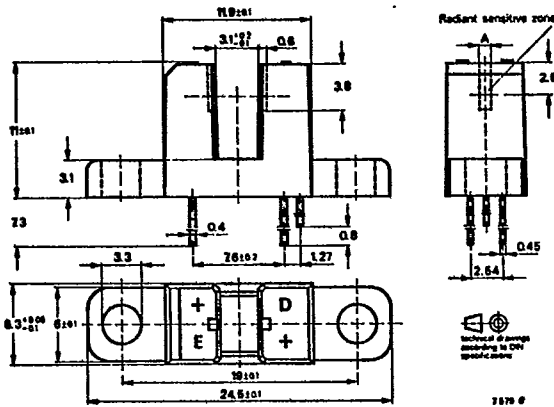
Weight max. 0.9 g

Note: Fourth number of type designation:  $f_{FT}$  group

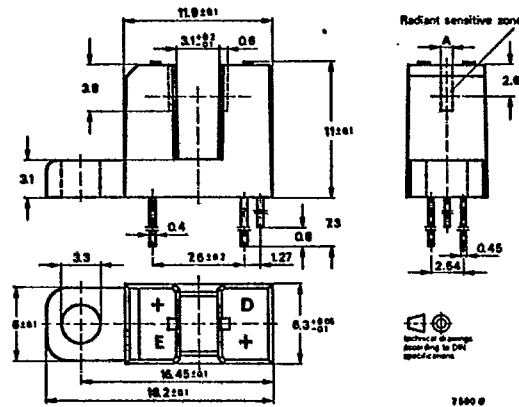
T1.2/1189.1285 E2

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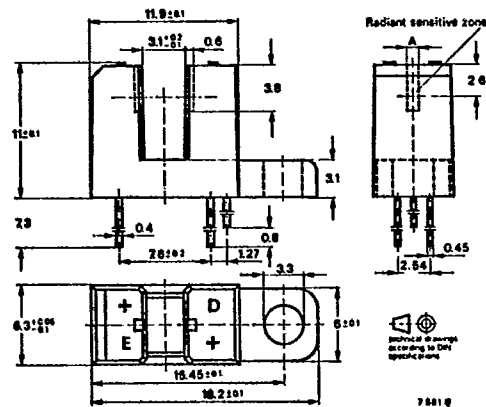
TCSS 111. up to TCSS 421.



With mounting flange on both sides:  
 TCSS 211. with aperture 1.00 mm (0.04")  
 TCSS 221. with aperture 0.50 mm (0.02")  
 Weight max. 1.0 g



With mounting flange on emitter side:  
 TCSS 311. with aperture 1.00 mm (0.04")  
 TCSS 321. with aperture 0.50 mm (0.02")  
 Weight max. 0.95 g



With mounting flange on detector side:  
 TCSS 411. with aperture 1.00 mm (0.04")  
 TCSS 421. with aperture 0.50 mm (0.02")  
 Weight max. 0.95 g

Note: Fourth number type designation: /<sub>FT</sub> group

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## Absolute maximum ratings

## Emitter

Reverse voltage	$V_R$	6	V
Forward current	$I_F$	60	mA
Forward surge current $t_p \leq 10 \mu s$	$I_{FSM}$	3	A
Power dissipation $T_{amb} \leq 25^\circ C$	$P_V$	100	mW
Junction temperature	$T_J$	100	$^\circ C$

## Detector

Supply voltages	$V_{S1}$	6.5	V
	$V_{S2}$	18	V
Output current	$I_o$	20	mA
Power dissipation $T_{amb} \leq 25^\circ C$	$P_V$	250	mW
Junction temperature	$T_J$	100	$^\circ C$

## Coupled device

Total power dissipation $T_{amb} \leq 25^\circ C$	$P_{tot}$	350	mW
Ambient temperature range	$T_{amb}$	-25...+85	$^\circ C$
Storage temperature range	$T_{stg}$	-40...+100	$^\circ C$
Soldering temperature 2 mm from case, $t \leq 5 s$	$T_{sd}$	260	$^\circ C$

## Electrical characteristics

 $T_{amb} = 25^\circ C$ 

Min. Typ. Max.

## Emitter

Forward voltage $I_F = 50 mA$	$V_F$	1.25	1.6	V
Breakdown voltage $I_R = 100 \mu A$	$V_{(BR)}$	6		V
Junction capacitance $V_R = 0, f = 1 MHz$	$C_j$	50		pF

## Detector

Supply voltage ranges	$V_{S1}$	4.75	5.25	V
	$V_{S2}$	4	16	V

## Coupled device

Supply current $V_o = V_{OH}, I_F \geq I_{TF}$	$I_{S1}$	12		mA
$I_F = 0$	$I_{S1}$	16		mA

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	Min.	Typ.	Max.	
Output current $V_{S2} = 16\text{ V}, I_F \geq I_{FT}$			100	$\mu\text{A}$
Input threshold current				
	TCSS 1110...TCSS 4110	10	20	$\text{mA}$
	TCSS 1211...TCSS 4211	15	30	$\text{mA}$
Hysteresis $R_L = 270\ \Omega$				
	$\Delta I_{FT}$	20		%
Output voltage $I_{OL} = 1.2\ \text{mA}, I_F = 0$				
	$V_{OL}$	0.3	0.4	V
Switching frequency $I_F \geq I_{FT}, R_L = 270\ \Omega$		400		$\text{kHz}$
<b>Switching characteristics</b>				
$V_{S1} = V_{S2} = 5\ \text{V}, I_F = 3 \times I_{FT}, R_L = 270\ \Omega,$ see test circuit				
Rise time	$t_r$	30		$\text{ns}$
Turn on time	$t_{on}$	0.5		$\mu\text{s}$
Fall time	$t_f$	10		$\text{ns}$
Turn off time	$t_{off}$	1.8		$\mu\text{s}$

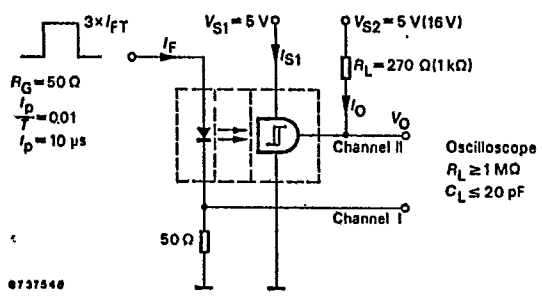


Fig. 1 Test circuit

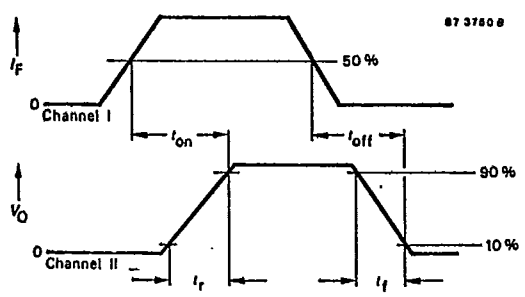


Fig. 2 Pulse diagram

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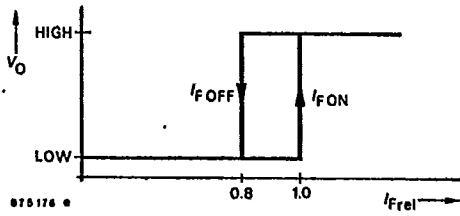
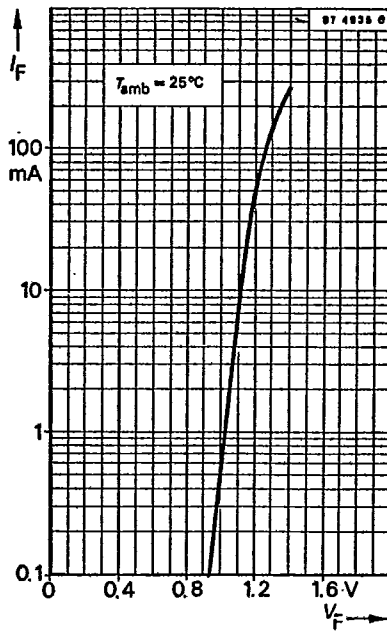
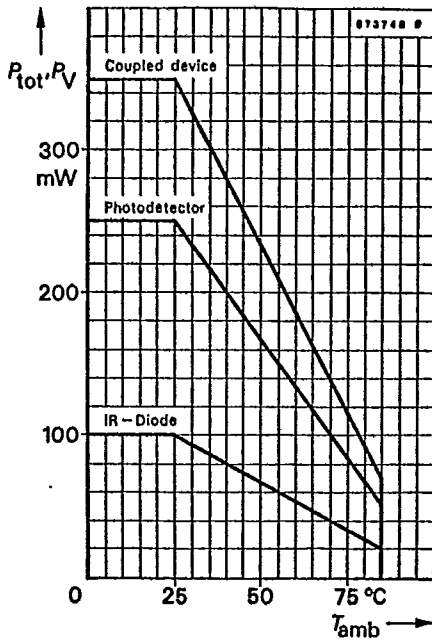


Fig. 3 Hysteresis



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